Pacific Coast Groundfish Fishery Management Plan

Essential Fish Habitat Designation and Minimization of Adverse Impacts

Final Environmental Impact Statement

Prepared by
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Northwest Region
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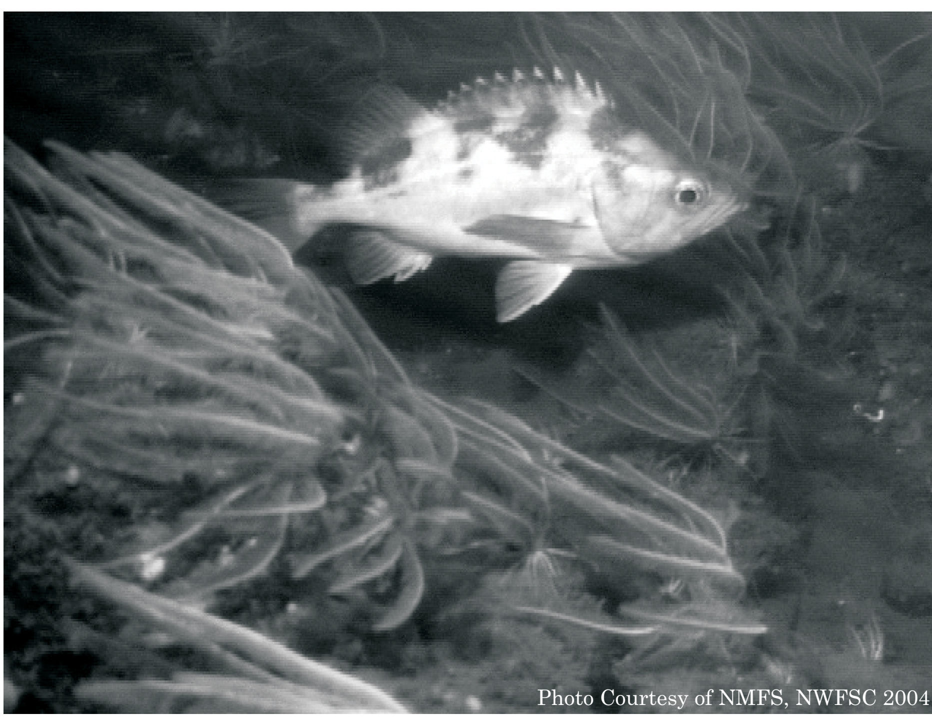

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COVER SHEET
Essential Fish Habitat Designation and Minimization of Adverse Impacts

Proposed Action:	Amend the Pacific Coast Groundfish FMP, pursuant to section 303(a)(7) of the Magnuson-Stevens Act, to (1) describe and identify essential fish habitat (EFH) for the fishery, (2) designate Habitat Areas of Particular Concern, (3) minimize to the extent practicable the adverse effects of fishing on EFH, and (4) identify other actions to encourage the conservation and enhancement of EFH. The project area for this action extends from the seaward boundary of the Pacific Coast Exclusive Economic Zone shoreward to the inland extent of estuaries.
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Abstract: This environmental impact statement (EIS) evaluates the effects of a comprehensive strategy to conserve and enhance essential fish habitat (EFH) for fish managed under the *Pacific Coast Groundfish Fishery Management Plan* (FMP). The comprehensive strategy to conserve EFH, including its identification and the implementation of measures to minimize, to the extent practicable, adverse impacts to EFH from fishing, must be consistent with provisions in the Magnuson-Stevens Fishery Conservation and Management Act and implementing regulations. Implementation of the strategy may require that the groundfish FMP be amended to describe any change in the EFH identification and description, among other things. New regulations may also be required to implement minimization measures. Preparation of this EIS stems from a 2000 court order in *American Oceans Campaign et. al. v. Daley et. al.,* Civil Action No. 99-982 (GK)(D.D.C. September 14, 2000), which requires NMFS and the Pacific Fishery Management Council, to prepare an EIS to evaluate the effects of fishing on EFH and identify measures to minimize those impacts, to the extent practicable. This final EIS (FEIS) includes an analysis of a reasonable range of alternatives, identification of the final preferred alternative, responses to comments, and appropriate revisions to the draft document. After publication of the FEIS a 30-day "cooling off" period ensues before the responsible official may sign a record of decision and implement the proposed action. NMFS must approve any FMP amendment and implementing regulations by May 6, 2006.

Executive Summary

INTRODUCTION

This environmental impact statement (EIS) evaluates the effects of alternatives for a comprehensive strategy to conserve and enhance essential fish habitat (EFH) for fish managed under the *Pacific Coast Groundfish Fishery Management Plan* (groundfish FMP). The comprehensive strategy to conserve and enhance EFH, including its identification and the implementation of measures to minimize, to the extent practicable, adverse impacts to EFH from fishing, is required by the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and implementing regulations. The MSA is the principal legal basis for fishery management within the Exclusive Economic Zone (EEZ), which extends from the outer boundary of the territorial sea to a distance of 200 nautical miles from shore. Implementation of the strategy may require that the groundfish FMP be amended to describe any change in the EFH identification and description, among other things. New regulations may also be required to implement minimization measures.

Preparation of this EIS stems from a 2000 court order in *American Oceans Campaign et. al. v. Daley et. al.,* Civil Action No. 99-982 (GK)(D.D.C. September 14, 2000) (*AOC v. Daley)*, which required NMFS and the Pacific Fishery Management Council (PFMC, or the Council), to prepare an EIS to evaluate the effects of fishing on EFH and identify measures to minimize, to the extent practicable, those impacts. NMFS published a draft EIS for public comment on February 11, 2005, after working closely with the Council. The public comment period on the draft ended on May 11, 2005. The Pacific Fishery Management Council identified a final preferred alternative at their June 13-17, 2005, meeting in Foster City, California. This final EIS (FEIS) includes an analysis of a reasonable range of alternatives, the identification of the final preferred alternative, responses to comments on the DEIS and appropriate revisions to the draft document. After the FEIS is published, a 30-day "cooling off" period ensues before the responsible official may sign a record of decision (ROD) and implement the proposed action. NMFS must approve any FMP amendment and implementing regulations by May 6, 2006.

The Proposed Action

The proposed action is to ensure compliance with section 303(a)(7) of the Magnuson-Stevens Act by amending the Pacific Coast Groundfish FMP to (1) describe and identify essential fish habitat (EFH) for the fishery, (2) designate Habitat Areas of Particular Concern, (3) minimize to the extent practicable the adverse effects of fishing on EFH, and (4) identify other actions to encourage the conservation and enhancement of EFH.

The purpose of proposed action is: first, to provide the Council and NMFS with the information they need to better account for the function of Pacific Coast groundfish EFH when making fishery management decisions; second, to ensure that this EFH is capable of sustaining groundfish stocks at levels that support sustainable fisheries; and third, that EFH is a healthy component of fully functioning ecosystems.

The proposed action is needed because the Council and NMFS have not had the tools to consider habitat and ecosystem function, and their relation to other biological and socioeconomic conditions affecting the groundfish fishery, in management decision-making. The West Coast groundfish fishery suffers from numerous challenges. Although identifying and conserving EFH cannot address all these problems, the proposed action will allow managers to provide solutions in a more comprehensive way, including consideration of EFH. Among the problems facing the fishery are overcapacity, or too many boats chasing too few fish and declining stock sizes, the latter of which led the Secretary of Commerce to declare nine groundfish stocks overfished;[1] and changing ocean conditions, which may have contributed to the failure of some groundfish stocks to replace themselves (recruitment failure). An overriding problem has been the challenge of managing fisheries with limited scientific data. This increases the risk that decisions exacerbate the kinds of fishery- and stock-related problems just identified. NMFS and the Council will be able to use information on EFH to consider the importance of habitat when making decisions on fishery management.

In the Magnuson-Stevens Act, Congress found that "one of the greatest long-term threats to the viability of commercial and recreational fisheries is the continuing loss of marine, estuarine, and other aquatic habitats" and "habitat considerations should receive increased attention for the conservation and management of fishery resources of the United States." Furthermore, one of the long-term goals for the groundfish fishery, adopted by the Council in its strategic plan, is "to protect, maintain, and/or recover those habitats necessary for healthy fish populations and the productivity of those habitats" (PFMC 2000).

Background

NMFS and the Council used a scientific risk assessment process to analyze information for the four parts of the proposed action. Acting on the advice of the National Research Council's (NRC) Committee on the Ecosystem Effects of Fishing (NRC 2002), NMFS and the Council have engaged in a public process to develop a comprehensive risk assessment (Appendix A) to determine if EFH-related problems exist, and if so, which of these problems could be appropriately considered through the Council and NEPA processes. The risk assessment focuses on the identification of EFH, threats to its health and function, and the delineation of gaps in the available data, which if filled would improve the risk assessment and support its ongoing use. Once the risk assessment was completed, the following problem statement was developed, in order to highlight the issues that this EIS is intended to resolve:

> *Based on the results of the risk assessment, public input received during scoping, and the legal mandate from the Magnuson-Stevens Act, the Council, NMFS, and partner organizations have developed the following objectives for this EIS:*
>
> - *consider alternatives for the identification and description of EFH;*
> - *consider alternatives for the designation of Habitat Areas of Particular Concern (HAPC);*
> - *consider alternatives for minimization of adverse effects of fishing on EFH;*
> - *address gaps in available data; and,*
> - *identify other actions to encourage the conservation of EFH.*

The Pacific Coast groundfish fishery encompasses the management institutions and processes used to manage diverse fishery sectors, which are defined by regulations, gear type, and target

[1] One of these stocks, Pacific whiting, has subsequently been declared rebuilt.

species. Although not bearing directly on EFH identification and description and impact minimization, the discussion here provides the context for the implementation of any such measures. Depletion of several groundfish species, and the implementation of measures needed to recover those stocks, has resulted in a reduction in allowable groundfish landings: from 277,848 mt in 1998 to 155,646 mt in 2002, or a 44% contraction (PFMC 2004). Measures to minimize the adverse effects of fishing on EFH broadly involve reducing fishing effort or fleet capacity, regulating the use and configuration of fishing gear, or closing areas to fishing (NRC 2002). Although not specifically directed at EFH impacts, the Council and NMFS have already implemented measures in all three of these categories.

ALTERNATIVES INCLUDED IN THE EIS

Four categories of alternatives are included in the EIS: (A) Identifying and describing EFH, (B) designating habitat areas of particular concern (HAPCs), (C) mitigating the adverse effects of fishing, and (D) research and monitoring. The alternatives in each category are described below. The Council selected its final preferred alternative from those described in the DEIS, in some cases modifying them in the process. The final preferred alternative is described separately.

Alternatives to Identify and Describe EFH

Alternative A1: No Action

The no action alternative would maintain the current EFH identification and description, incorporated into the groundfish FMP by Amendment 11 in 1998, which is all waters from the mean higher high water line, and the upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon, and California to the seaward boundary to the U.S. EEZ.

The FMP groups the various EFH descriptions into seven units called composite EFHs. This approach focuses on ecological relationships among species and between the species and their habitat, reflecting an ecosystem approach in defining EFH.

Alternative A.2: Depths less than 3,500 m (Component of the Final Preferred Alternative)

In this alternative, EFH would be identified as 100% of the area where Habitat Suitability Probability (HSP[2]) is greater than zero for all species and any additional area in depths less than or equal to 3,500 m (1,914 fm). By including areas out to the 3,500 m depth curve, this alternative includes all habitats where groundfish have been observed with the addition of 100 m depth as a precautionary adjustment in case of unobserved fish.

Alternative A.3: 100% HSP Area

Designate 100% of the area where HSP is greater than zero for all species.

Alternative A.4: HSP[1] Based on Management Status

Designate the upper 90% of the HSP area of overfished species HSP, upper 80% of the HSP area for precautionary zone species, and upper 60% of the HSP area for all other groundfish, and all seamounts. HSP refers to the probability that the habitat is suitable for a managed species.

Alternative A.5: 70% HSP[1] Area

Designate the upper 70% of the area where HSP is greater than zero. HSP refers to the probability that the habitat is suitable for a managed species.

Alternative A.6: 30% HSP[2] Area

Designate the upper 30% of the area where HSP is greater than zero for all species. HSP refers to the probability that the habitat is suitable for a managed species.

DEIS Alternatives to Designate HAPC

Alternative B.1: No Action

No HAPCs are currently designated for groundfish. Choosing this alternative would maintain no HAPC designations.

Alternative B.2: Estuaries (Component of the Final Preferred Alternative)

Estuaries are protected nearshore areas such as bays, sounds, inlets, and river mouths, influenced by ocean and freshwater.

Alternative B.3: Canopy Kelp (Component of the Final Preferred Alternative)

Areas where kelp has been documented and mapped would be designated as HAPC. GIS data for the floating kelp species, *Macrocystis* spp. and *Nereocystis* sp., are available from state agencies in Washington, Oregon, and California.

Alternative B.4: Seagrass (Component of the Final Preferred Alternative)

Seagrass species found on the West Coast of the U.S. include eelgrass (*Zostera* spp., *Ruppia* sp.) and surfgrass (*Phyllospadix* spp.). These grasses are vascular plants, not seaweeds, forming dense beds of leafy shoots year-round in the lower intertidal and subtidal areas. Eelgrass is found on soft-bottom substrates in intertidal and shallow subtidal areas of estuaries. Surfgrass is found on hard-bottom substrates along higher energy coasts.

Alternative B.5: Core Habitat

This alternative designates core areas, defined as the upper 10% of area with an HSP greater than 0%, for the juvenile and adult life history stages of overfished and precautionary zone groundfish species. HSP refers to the probability that the habitat is suitable for a managed species.

Alternative B.6: Rocky Reefs (Component of the Final Preferred Alternative)

This alternative designates all rocky reef areas. Rocky habitat may be composed of bedrock, boulders, or smaller rocks such as cobble and gravel.

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[2] HSP refers to the probability that the habitat is suitable for a managed species.

Alternative B.7: Areas of Interest (Component of the Final Preferred Alternative)

This alternative would designate areas that are of special interest due to their unique geological and ecological characteristics, such as Olympic Coast National Marine Sanctuary (NMS),Thompson Seamount, and the Cowcod Conservation Area(s).

Alternative B.8: Oil Production Platforms (Component of the Final Preferred Alternative)

This alternative designates areas around oil production platforms in Southern California waters. There are 27 such platforms (CARE 2004) of which 23 are in federal waters and four are in California state waters. 22 platforms in federal water and one platform in state water are considered for HAPC designation.

Alternative B.9: Process for New HAPC Designations (Component of the Final Preferred Alternative)

This alternative establishes a streamlined process for designating new HAPCs, based on proposals submitted to the Council. The process would allow organizations and individuals to petition the Council at any time to consider a new designation and ensures that the Council will consider their proposal, provided they submit specified information.

Alternatives to Minimize Adverse Impacts to EFH

Alternative C.1: No Action

There is a broad range of regulatory measures in effect on the West Coast, including areas that are closed to fishing or non-fishing activities, fishing gear restrictions, and measures to reduce fishing effort which may have a beneficial effect on EFH. These measures would be maintained.

Alternative C.2: Depth-based Gear-specific Restrictions (Component of the Final Preferred Alternative)

This alternative contains three options, which vary by the areas closed to large footrope trawl gear and fixed gear. The footrope runs along the bottom of the net opening and its size is regulated to dictate the maximum size of rollers that can be affixed to the footrope. Without larger footrope gear, bottom trawl nets snag more easily on rough, irregular terrain; thus restrictions on footrope size discourage fishing in rocky areas.

Alternative C.3: Close Sensitive Habitat

Area closures are defined using gear and habitat specific sensitivity and recovery index values. Habitat areas above index value thresholds for any gear type would be closed to all fishing. This alternative has four options, specifying the closed areas by various index values and a threshold value on higher historic trawl effort are excluded from closure.

Alternative C.4: Prohibit the Geographic Expansion of Fishing (Component of the Final Preferred Alternative)

Under this alternative, areas that have not been fished recently (2000-2002) would be closed to fishing to protect areas that are potentially pristine. This alternative has two options applying to either bottom trawling or all bottom-tending gear types.

Alternative C.5: Prohibit a Krill Fishery

This alternative would designate krill as a component of EFH as part of this EIS and prohibit fisheries that target it.

Alternative C.6: Close Hotspots

This alternative prohibits trawling in hotspot areas defined as habitat that has high probability of being EFH for a large number of groundfish. Areas that are associated with a high HSP value for 50 or more species/lifestage combinations would be closed to bottom trawling.

Alternative C.7: Close Areas of Interest (Component of the Final Preferred Alternative)

This alternative closes the areas of interest HAPCs designated under Alternative B.7 to fishing by specified gear types. (The 21 areas of interest listed under Alternative B.7 are underwater features, such as seamounts and submarine areas, or are currently under some form of protection.) This alternative has two options, which would close areas of interest to either bottom trawling or all bottom-contact fishing.

Alternative C.8: Zoning Fishing Activities

Under this alternative NMFS limits the use of bottom-tending fishing gear to specified zones where the agency determines that such activities can be conducted without altering or destroying a significant amount of habitat. Areas deeper than the 2,000 m (1,094 fm) are closed to bottom contact gear and additional areas in shallower depths are considered for closure during a five-year transition period, creating areas zoned for specific gear types. This alternative has two options, which differ based on the types of gear considered for zoning.

Alternative C.9: Gear Restrictions (Component of the Final Preferred Alternative)

This alternative includes specific gear modifications and prohibitions. Eight different gear modifications and prohibitions are separate options under this alternative.

Alternative C.10: Central California No-trawl Zones (Component of the Final Preferred Alternative)

This alternative is based on a project being undertaken by two environmental advocacy organizations, The Nature Conservancy (TNC) and Environmental Defense Fund (EDF). It involves a public-private partnership under which private funds are used to purchase groundfish limited entry trawl licenses and vessels in concert with the designation, through the Council and NMFS, of no-trawl zones off the central California coast.

Alternative C.11: Relax Gear Endorsement Requirements

Vessels holding a groundfish limited entry permit account for a large portion of groundfish landings. Currently, limited entry permits include a gear endorsement specifying the type of gear the permit holder may use. Under this alternative, gear endorsements are relaxed but the sablefish endorsement is not. This would allow permit holders to switch gear types, providing fishermen greater flexibility in changing strategies based on prevailing conditions in the fishery.

Alternative C.12: Close Ecologically Important Areas to Bottom Trawl (Component of the Final Preferred Alternative)

This alternative would close a network of areas to bottom trawling; set a maximum footrope size of eight inches on bottom trawl gear within open area; require Vessel Monitoring Systems on all bottom trawl vessels with positions recorded every five minutes; increase onboard observer coverage on bottom trawl vessels to a level determined to be necessary by NOAA to estimate annual bycatch of habitat-forming invertebrates; establish a process for setting a limit on the bycatch of habitat-forming invertebrates; require ongoing research including comprehensive benthic mapping.

Alternative C.13: Close Ecologically Important Areas to Bottom-contacting Gear (Component of the Final Preferred Alternative)

Under this alternative, the areas identified in Alternative C.12 are closed to all bottom-contacting gear types, defined as both fixed gear (longlines, pots, and traps) and bottom trawl.

Alternative C.14: Close Ecologically Important Areas to Fishing

Under this alternative, the areas identified in Alternative C.12 are closed to all fishing.

DEIS Research and Monitoring Alternatives

Alternative D.1: No Action

NMFS conducts extensive fishery-related research relevant to groundfish and has a variety of methods to monitor these fisheries. Section 7.1 in the 2005-2006 groundfish harvest specifications FEIS (PFMC 2004) describes groundfish monitoring programs carried out by NMFS, the states, and tribes, and is hereby incorporated by reference. Current monitoring programs especially relevant to the alternatives described here include the limited entry trawl logbook program, the West Coast Groundfish Observer Program, and VMS covering limited entry trawl and fixed gear vessels. These programs are primarily intended to monitor discards and landings of groundfish and to enforce current harvest limits and area restrictions. There is no component specifically intended to monitor the effects of fishing on EFH.

Alternative D.2: Expanded Logbook Program (Component of the Final Preferred Alternative)

Under this alternative vessels in all commercial sectors, including recreational charter (for hire) vessels, will participate in an expanded logbook program. This alternative has two options for how an expanded program would be implemented.

Alternative D.3: Expanded Vessel Monitoring System (Component of the Final Preferred Alternative)

This alternative will identify expansion of the Vessel Monitoring Program to cover all West Coast groundfish commercial and recreational charter vessels.

Alternative D.4: Research Reserve System (Component of the Final Preferred Alternative)

This alternative will establish a system of designated research areas within areas closed to fishing to foster habitat-related research and comparison of fished areas with unfished areas.

THE FINAL PREFERRED ALTERNATIVE

The elements of the final preferred alternative are described according to the same four categories used to organize alternatives in the DEIS. As noted above, the preferred alternative contains elements drawn from alternatives in each of these categories.

Identification and Description of EFH

The preferred alternative identifies EFH as all waters and substrate in depths less than or equal to 3,500 m, to the upriver extent of saltwater intrusion, defined as upstream and landward to where ocean-derived salts measure less than 0.5 ppt during the period of average annual low flow, and areas associated with seamounts in depths greater than 3,500 m. The 100% HSP area, all of which occurs in depths less than 3,500 m, constitutes a part of EFH for all species and life stages within the Groundfish FMP. This EFH identification is precautionary because it is based on the currently known maximum depth distribution of all life stages of fishery management unit (FMU) species. This precautionary approach is taken because uncertainty still exists about the relative value of different habitats to individual groundfish species/life stages, and thus the actual extent of groundfish EFH. While recognizing these limitations, the 100% HSP area, all of which occurs in depths less than 3,500 m, is identified as a part of groundfish EFH, recognizing that the best scientific information demonstrates this area is particularly suitable groundfish habitat for all species and life stages within the Groundfish FMP, even if they are not specifically included in the HSP model. Additionally, there is a lack of information on the value of seamounts, in depths greater than 3,500 m, to groundfish. Designating these seamounts is also precautionary because they may prove to be essential to certain life stages of fish in the groundfish fishery.

This component of the final preferred alternative is based on Alternative A.2.

Habitat Areas of Particular Concern (HAPCs) Designations

The preferred alternative identifies the following HAPCs:

- Estuaries (Alternative B.2)
- Canopy kelp (Alternative B.3)
- Seagrass (Alternative B.4)
- Rocky reefs (Alternative B.6)
- Areas of interest (modification of Alternative B.7). Not all of the areas of interest described in Alternative B.7 were incorporated into the preferred alternative. In addition, the final preferred alternative includes some areas not identified in Alternative B.7.
- Oil production platforms (modification of Alternative B.8). This component of the final preferred alternative includes 13 of the 27 oil production platforms identified in Alternative B.8.

The preferred alternative also includes a component substantially based on Alternative B.9 (process for new HAPC designations). It differs from Alternative B.9 in that the process would also allow consideration of the modification or elimination of existing HAPCs.

Minimize Adverse Fishing Impacts to EFH

The component of the final preferred alternative intended to mitigate the adverse effects of fishing on groundfish EFH comprises management measures in three categories: (1) gear modifications, (2) closed areas, and (3) promotion of reductions in fishing effort.

Gear Modifications and Prohibitions

The preferred alternative includes the following gear modifications and prohibitions:

- Prohibit bottom trawl roller gear with a footrope diameter greater than 19 inches on bottom trawl gear throughout the EEZ (modification of Alternative C.9.1).
- Prohibit bottom trawl roller gear with a footrope diameter greater than eight inches eastward of a line approximating the 100 fathom depth contour (modification of Alternative C.2.1).
- Prohibit dredge gear (Alternative C.9.5).
- Prohibit beam trawl gear (Alternative C.9.6).

Restrictions in state waters will be implemented by state law, as appropriate. Although dependent on state regulation, the restrictions on dredge and beam trawl gear are not intended to apply in internal waters (Puget Sound, San Francisco Bay, etc.).

Closed Areas

The final preferred alternative contains two types of closed areas: a "trawl footprint" closure and ecologically important closed areas.

Footprint Closure: This component of the final preferred alternative is a modification of the trawl footprint closure described under Alternative C.4. Under that alternative, areas that were not trawled from 2000 to 2003 would be permanently closed to bottom trawl. The final preferred alternative closes depths greater than 700 fathoms to bottom trawl.

Ecologically Important Closed Areas: This component of the final preferred alternative is a modification and combination of Alternative C.10, C.12, and C.13. It also includes a new procedural element that was not described in the DEIS applicable to areas closed to bottom trawl, which would allow reconsideration of these areas upon the receipt of new scientific information. Ecologically important closed areas are sited shoreward of 700 fathoms in the area not already closed to bottom trawl with the footprint closure and include areas closed to bottom trawl and all bottom-contacting gear types.

Effort Reduction

The final preferred alternative incorporates the element of Alternative C.10 involving public-private partnerships under which private funds are used to purchase groundfish limited entry trawl licensees by adding language to the FMP by amendment. The proposed language notes the

Council will support such efforts, as feasible, through their consideration of actions upon which the execution of contracts may be contingent.

Research and Monitoring

Elements of Alternatives D.2-D.4, addressing EFH-related research and monitoring were incorporated into the final preferred alternative, although these elements will not be implemented as part of the proposed action evaluated in this EIS. Rather, they are identified as programmatic elements, either expressing priorities and objectives (expansion of the logbook program, research reserves) or identifying another process as the vehicle for implementation (expansion of VMS).

Expanded Logbook Program: The preferred alternative would amend the groundfish FMP to indicate Council support for an expanded logbook program, to the degree practicable (modification of Alternative D.2).

Expanded Vessel Monitoring System: Expansion of the current Vessel Monitoring System (VMS) program currently is being considered by the Council as part of a separate action. Under that action the Council will consider expanding the VMS requirement to a range of trawl and nontrawl fisheries including, in order to support EFH conservation objectives, all bottom trawl vessels (modification of Alternative D.3).

Research on the Impacts and Results of Bottom Trawl Closed Areas: The preferred alternative makes focusing research on the impacts and results of closing areas to bottom trawl a Council priority (modification of Alternative D.4).

APPLICATION OF THE ALTERNATIVES TO TRIBES

NMFS does not intend for any of the alternatives described below to apply to tribal fisheries in usual and accustomed (u&a) grounds described in 50 C.F.R. 660.324(c). NMFS will continue to work with the tribes to ensure that within the u&a grounds, adequate measures are in place to protect EFH and HAPCs. In the future, in the event that it is determined that additional measures need to be developed, NMFS would follow the procedures outlines in 50 C.F.R. 660.324(d).

ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

Environmental Consequences of the Alternatives to Identify and Describe EFH

Designation of EFH, in accordance with section 303(a)(7) of the Magnuson-Stevens Act, does not in and of itself have any direct environmental or socioeconomic affects. However, EFH designation is likely to result in indirect environmental and socioeconomic affects.

Actions taken by a Council to minimize adverse effects of fishing on EFH may include fishing equipment restrictions, time or area closures, harvest limits, or other measures. Any such measures would be designed to reduce ongoing effects to EFH and/or promote recovery of disturbed habitats. These measures may result in socioeconomic effects for the affected sectors of the fishing industry, but will be designed to promote sustainable fisheries and long-term socioeconomic benefits.

Second, Federal and state agency actions that may adversely affect EFH trigger consultation and/or recommendations under sections 305(b)(2)-(4) of the Act. Under section 305(b)(2) of the Magnuson-Stevens Act, each federal agency must consult with NMFS regarding any action authorized, funded, or undertaken by the agency that may adversely affect EFH. The EFH regulations require that federal agencies prepare EFH Assessments as part of the consultation process (50 CFR 600.920(e)). Under section 305(b)(4)(A) of the Act, NMFS must provide EFH Conservation Recommendations to federal and state agencies regarding any action that would adversely affect EFH. Under section 305(b)(3) of the Act, Councils may comment on and make recommendations to federal and state agencies regarding any action that may affect the habitat, including EFH, of a fishery resource under Council authority.

EFH recommendations from NMFS or a Council to federal or state agencies are non-binding. Nevertheless, as a result of EFH coordination, consultations, and recommendations, Federal or state agencies may decide to restrict various activities to avoid or minimize adverse effects to EFH. Such restrictions could result in project modifications that lead to higher costs for the applicants for federal or state permits, licenses, or funding. It would be speculative to predict the specific socioeconomic effects of future restrictions on development that may be imposed by agencies that authorize, fund, or undertake actions that may adversely affect EFH. Moreover, such agencies typically evaluate socioeconomic effects and other public interest factors under NEPA and other applicable laws before taking final action on any given activity. NMFS conducts approximately 6,000 EFH consultations and related EFH reviews nationwide every year, and is unaware of substantial project delays or significant increases in costs resulting from EFH consultations. Habitat conservation resulting from EFH consultations is expected to support healthier fish stocks and more productive fisheries over the long-term, with associated environmental and socioeconomic benefits. EFH consultations may also lead to indirect benefits for other species that use the same habitats as federally managed species of fish and shellfish.

Costs associated with consultations will likely vary depending on the number of species associated with an EFH designation, and the amount of habitat designated as EFH. If an entity chooses not to participate in consultations, then the EFH designation will ultimately have no effect on that entity. If consultations result in conservation recommendations, then there are likely to be increased costs in the short-term and possibly in the long-term depending on the amount of offsetting benefits realized from enhanced habitat productivity resulting from EFH designation. The designation process may negatively affect agencies if consultations use increased agency time and resources in addition to those currently required for the ESA process.

Environmental Consequences of the final preferred Alternative component for EFH Identification and Description

The final preferred alternative for describing EFH represents a significant refinement over the status quo in that the entire EEZ would no longer be described as EFH. The final preferred alternative would describe 59.2% of the EEZ as EFH which equates to 48,719,109 ha (142,042 square miles) in addition to state waters such as bays and estuaries.

The generic consequences of the final preferred alternative are described in Section 4.2.1. The specific data elements used to formulate the alternative are expected to be used during consultation activities and improve the quality of conservation recommendations. For instance, conservation recommendations for a project proposed in a specific area can now be based on analyses of HSP, habitat types, and other information sources available from the preferred alternative. In addition to supporting the delineation of suitable habitat for the individual species and life stages, these assessment-related techniques can be used as a basis for an ecosystem approach to management. For example, the HSP profiles for individual species/life stages can be combined by GIS analyses into ecosystem-level fish assemblages to investigate and predict environmental consequences of proposed projects. The specific conservation recommendations for non-fishing activities which may result from the implementation of the final preferred alternative are fully described in appendix 14 to the Risk Assessment. The consequences of the final preferred alternative to describe EFH are considered Environmentally Positive (E+).

The final preferred alternative for describing EFH does not encompass the entire EEZ and as such may limit the geographic extent of specific components of the final preferred alternative measures to minimize adverse impacts to EFH that would otherwise apply throughout the EEZ. Those specific components approved by the Council that could be interpreted to include areas seaward of EFH are: (1) footprint closure in which bottom trawling would be prohibited seaward of 700 fathoms; (2) ban of dredge gear; (3) ban of beam trawl gear; and, (4) ban of trawl roller gear greater than 19". An analysis of the area that would be excluded from the implementation of these components is shown in Figure 4-29. NMFS has decided to apply the measures throughout the EEZ, including areas that would not be described as EFH, for purposes of the final preferred alternative. Management measures to minimize adverse impacts on EFH could apply in the EEZ in areas not described as EFH, if there is a link between the fishing activity and adverse effects on EFH. NMFS will highlight this issue in the Notice of Availability for the FMP Amendment and Proposed Rule to implement the measures and request public comment and additional information that would support or not support including non-EFH areas in the management measures.

<u>Environmental Consequences of the Alternatives to Designate HAPCs</u>

Designation of HAPCs, like designation of EFH generally, does not have any direct environmental or socioeconomic effect, but may result in indirect effects greater than those associated with EFH because resource managers and regulators are likely to place a high priority on protecting areas that have been designated as HAPCs. HAPCs are used by NMFS and the Councils to focus conservation and management efforts on particularly valuable or vulnerable subsets of EFH. Although HAPC designation does not convey any higher regulatory standards for minimizing adverse effects of fishing or conducting EFH consultations, NMFS and the Councils may apply more scrutiny to fishing and non-fishing activities that affect HAPCs as compared to EFH. NMFS and the Council may be more risk averse when developing management measures to minimize adverse effects of fishing on HAPCs, and when recommending measures to federal and state agencies to minimize adverse effects of non-fishing activities on HAPCs. The potential environmental and socioeconomic affects from management measures to protect HAPCs would be comparable to those described for EFH. As with EFH, conservation of HAPCs is expected in the long-term to support healthier fish stocks and more productive fisheries over the long-term, which, in turn, will provide added environmental and socioeconomic benefits. If an entity participates in consultations with NMFS, then it is possible that increased costs associated with time and effort expended in consultation may occur, though most nearshore consultations involving groundfish may be merged with ESA listed salmon consultations and any cost incurred may be borne through the ESA process.

Environmental Consequences of the final preferred Alternative Component to Designate HAPCs

The final preferred alternative to designate HAPC incorporates components of Alternatives B.2, B.3, B.4, B.6, B.7, B.8 and B.9. The generic consequences of the final preferred alternative to designate HAPC are described in Sections 4.3.1 and 4.3.3. The final preferred alternative to designate HAPC represents a significant change from the status quo under which there are no HAPC designations. Under the final preferred alternative, approximately 4.51% of the EEZ would be designated as HAPC which equates to 3,711,978 ha (10,822 square miles). Due to the generic consequences of designating HAPC, the final preferred alternative is considered Environmentally Positive (E+).

Practicability and Environmental Consequences of the Alternatives to Minimize Adverse Effects to EFH

All alternatives–except the status quo alternative–are expected to have positive effects to the ecological environment and, therefore, positive effects to non-consumptive users of marine resources. However, some alternatives within this EIS have aspects which may make implementation impracticable to industry, while other alternatives may not be feasible to implement on the part of management agencies.

Impact minimization alternatives C.2.1 and C.2.2, if the fixed gear components were implemented, are likely to also close the West Coast Dungeness crab fishery which is likely to translate into a loss of over $100 million to the nation annually. Depending on how impact minimization alternative C.11 would be implemented, this alternative may make it unfeasible for management agencies to predict catch levels and to stay within–or achieve–management targets. The trawl and fixed gear "bycatch models" may be dramatically compromised if analysts are unable to predict the use of gear types by fishing vessels. This alternative may be feasible for management agencies to implement if a periodic gear declaration and grace period is put in place.

Other alternatives can be considered practicable from the standpoint of population and ecosystem effects and from the standpoint of non-consumptive users of marine resources since these other alternatives have positive environmental effects due to habitat protections. It is unknown whether these other alternatives are practicable from the standpoint of industry and agencies since the amount of revenues at risk does not necessarily equate to lost revenues, and potential management boundaries and requirements have not been clearly defined at this stage. However this EIS analyzes a range of alternatives for use in contrasting potential social and economic effects with habitat protections. Additionally, while some of the alternatives may be practicable individually, they become impracticable when added to the final preferred alternative.

Practicability and Environmental Consequences of the Minimize Adverse Effects to EFH Component of the final preferred Alternative

The final preferred alternative represents a significant change from the status quo under which there are no measures in place to minimize adverse fishing effects on EFH. Under the final preferred alternative, a combination of gear restrictions, effort reduction, and closed areas would be implemented to protect a broad range of habitat types, species, and provide protection over both the Oregonian and San Diego zoographic provinces and is considered Environmentally Positive (E+). These management measures are practicable because they provide protection of EFH while having minimal cost to the fishing industry and other parts of the public sector.

Environmental Consequences of the Research and Monitoring Alternatives

The research and monitoring alternatives are expected to provide environmental benefits when compared to the status quo by improving the information available to scientists and managers on the function of habitat and how it is affected by fishing. These alternatives are likely to require additional resources on the part of management agencies, and may put fishing revenues at risk or require industry to bear additional costs.

Over the long term, positive benefits may result from increased information on the relationship between habitat and living marine resources, and spatial fishing effort. Additional spatial information would assist agencies in making better fisheries management decisions, and this may translate into additional fishing opportunities, less risk of exceeding management targets, or a greater understanding of the relationship between fishing and habitat. A research reserve system may increase the amount of knowledge relating habitat to fish and other living marine resources, and this may result in improvements in stock status (e.g. fewer precautionary zones and overfished stocks), higher fishery yields, and improved resources for marine-based education.

Environmental Consequences of the Research and Monitoring Component of the final preferred Alternative

The final preferred alternative for research and monitoring incorporates components of D-2, D.3, and D.4. The research and monitoring elements of the final preferred alternative are expected to increase the amount of information available for EFH related decisions and regulations. The final preferred alternative is considered Environmentally Positive (E+).

SUMMARY OF THE ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

The table below summarizes the environmental consequences of the alternatives to minimize adverse effects to EFH. To interpret the table, the following abbreviations are used:

0 = No Change
E+ = Environmentally Positive
E- = Environmentally Negative
U = Unknown

Summary of the Environmental Consequences of the Alternatives.

	Impacts Minimization Alternatives														
Environmental Component	Final Pref. Alt.	C.1	C.2	C.3	C.4	C.5	C.6	C.7	C.8	C.9	C.10	C.11	C.12	C.13	C.14
Marine Habitat, Ecosystem, Marine Resources	E+	0	E+	E+	E+	E+	E+	E+	E+	E+	E+	U	E+	E+	E+
Protected Species	U	0	U	U	U	U	U	U	U	U	U	U	U	U	U
Trawl Fisheries	E+/U/O	0	E-	E-	0	0	E-	E-	E-	E-	U	E-/E+	E-	E-	E-
Fixed Gear Fisheries	E+/U/O	0/U	E-	E-/E+	0	0	E-	E-/0	0/E-	E-	U	E-/E+	0	E-	E-
Recreational Fisheries	U/E+	0	0	0	0	0	E-	0/E-	0/E-	E-	U	0	0	0	E-
Other Fisheries	E+/U/O	0	0	E-	0	0	E-	0/E-	0/E-	E-	U	0	0	0	E-
Tribal Fisheries	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Consumers	U	0	E-	0	0	0	0	0	0	0	U	0	0	0	0
Safety	U	0	U	E+	E+	0	E+	E+	U/E+	0	U	U	0	0	0
Buyers and Processors	U	0	E-	0	0	0	U	0	U	0	0	0/E+	U	U	U
Communities	U	0	E-	0	0	0	U	0	U	0	U	0/E+	U	U	U
Management and Enforcement	E-	0	U	E-	E-	E-	E-	E-	E-	E-	E-	E-	E-	E-	E-
Non-Fishing Activities	U	0	U	U	U	U	U	U	U	U	U	U	U	U	U
Non-Fishing Values	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U

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Chapter 1 Purpose and Need

1.1 Introduction

This environmental impact statement (EIS) evaluates the effects of a comprehensive strategy to conserve and enhance essential fish habitat (EFH) for fish managed under the *Pacific Coast Groundfish Fishery Management Plan* (groundfish FMP). The National Marine Fisheries Service (NMFS), in collaboration with the Pacific Fishery Management Council (hereafter, the Council), prepared this document. The comprehensive strategy to conserve EFH, including its identification and the implementation of measures to minimize adverse impacts to EFH from fishing, to the extent practicable, must be consistent with provisions in the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801 et. seq.) and implementing regulations. The MSA is the principal legal basis for fishery management within the Exclusive Economic Zone (EEZ), which extends from the outer boundary of the territorial sea to a distance of 200 nautical miles from shore. Implementation of the strategy will require that the groundfish FMP be amended to describe any change in the EFH identification and description, among other things. New regulations will also be required to implement impact minimization measures.

Preparation of this EIS stems from a 2000 court order in *American Oceans Campaign et. al. v. Daley et. al.,* Civil Action No. 99-982 (GK)(D.D.C. September 14, 2000) (*AOC v. Daley)*, which required several Councils, including the Pacific Council, to prepare EISs to evaluate the effects of fishing on EFH and identify measures to minimize those impacts, to the extent practicable. The Council's Pacific groundfish FMP was affected by this order.

According to Section 102(2)(C) of the National Environmental Policy Act (NEPA), any "major federal action significantly affecting the quality of the human environment" must be evaluated in an EIS. The Council on Environmental Quality (CEQ) regulations (40 CFR 1502.9) require agencies to prepare and circulate a draft EIS (DEIS), which "must fulfill and satisfy to the fullest extent possible the requirements established for final statements in Section 102(2)(C) of [NEPA]." CEQ regulations, 40 CFR 1506.10(c), and NOAA Administrative Order 216-6. 5.01.b.1(i) stipulate a minimum 45-day public comment period on the DEIS. However, a joint stipulation pursuant to the aforementioned court order specified the date on which the DEIS must be published (February 11, 2005) and the end of the public comment period (May 11, 2005), thereby establishing a 90-day comment period. The FEIS includes: comments, response to comments, the Council action on the preferred alternative, and changes to the document based on public comment received. The Council identified a final preferred alternative after the close of the public comment period at their June 13-17, 2005, meeting in Foster City, California. NMFS then prepared this final EIS (FEIS) which supplements material in the DEIS with description and analysis of the final preferred alternative, responses to comments on the DEIS, and additional revisions to the DEIS text as appropriate. The stipulation required the FEIS to be published by December 9, 2005. After this date a 30-day "cooling off" period ensues before the responsible official may sign a record of decision (ROD) and implement the proposed action. The stipulation requires the ROD to be signed by February 28, 2006. NMFS must approve any FMP amendment or implementing regulations by May 6, 2006.

1.2 How This Document is Organized

Environmental impact analyses have four essential components: a description of the purpose and need for the proposed action, a set of alternatives that represent different ways of accomplishing the proposed action, a description of the human environment affected by the proposed action, and an evaluation of the predicted direct, indirect, and cumulative impacts of the alternatives.[3] (The human environment is interpreted comprehensively to include the natural environment and the relationship of people with that environment, 40 CFR 1508.14.) These elements allow the decision maker to look at different approaches to accomplishing a stated goal and understand the likely consequences of each choice or alternative. A public comment period allows the decision maker to also consider comments provided by the public. This EIS has ten chapters, plus appendices, covering the following topics:

- The rest of this chapter discusses why NMFS and the Council are designating EFH and considering measures to minimize the adverse impact of fishing on EFH. This description of ***purpose and need*** defines the need for, and goals and objectives of, the proposed action. The ***purpose and need*** also defines the scope of the subsequent analysis. In addition, Chapter 1 provides some background on the proposed action, the groundfish fishery management regime, and the process of developing this EIS.

- Chapter 2 provides different ***alternatives*** the Council considered to address the purpose and need, including the final preferred alternative identified by the Council. These alternatives are organized in four categories: designation of EFH, designation of habitat areas of particular concern (HAPCs), measures to minimize the adverse effects of fishing on EFH, and research and monitoring program alternatives to improve understanding of habitat function and the effects of fishing on EFH.

- Chapter 3 describes the ***affected environment***, or ***baseline*** environmental and social conditions as they exist before implementation of the proposed action.

- Chapter 4 assesses the predicted ***environmental consequences*** (including socioeconomic impacts) of the alternatives outlined in Chapter 2. This analysis compares and contrasts the alternatives and evaluates how the human environment may potentially be changed by the proposed action in comparison to the baseline conditions described in Chapter 3.

- Chapter 5 explains how these management measures are consistent with the groundfish FMP and 10 National Standards set forth in the MSA (§301(a)) and governing plans, plan amendments, and accompanying regulations.

- Chapter 6 describes how this EIS addresses relevant laws and executive orders, other than the MSA. As appropriate, it also includes additional elements and determinations required by these mandates.

- Chapters 7 and 8 provide background information on the staff who prepared this document and its distribution to other agencies and interested parties.

- Chapter 9 defines acronyms and contains the glossary.

- Chapter 10 contains the literature cited.

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[3] Federal regulations at 40 CFR 1502 detail the required contents of an EIS. Although there are several additional components, this list is of the core elements.

- Chapter 11 describes the Public Comment received on the Draft EIS, the process of responding to comments, NMFS response to comments and reproductions of the comment letters received.

- Several appendices provide additional background information on methodologies used in developing this EIS and the alternatives considered in the analyses.

1.3 Purpose and Need for the Proposed Action

1.3.1 The Proposed Action

The proposed action is to ensure compliance with section 303(a)(7) of the Magnuson-Stevens Act by amending the Pacific Coast Groundfish FMP to (1) describe and identify essential fish habitat (EFH) for the fishery, (2) designate Habitat Areas of Particular Concern, (3) minimize to the extent practicable the adverse effects of fishing on EFH, (4) provide research needs, and (5) identify other actions to encourage the conservation and enhancement of EFH. The project area for this action is the Pacific Coast EEZ shoreward to the inland extent of estuaries (Figure 1-1). NMFS and the Council used a scientific risk assessment process to analyze information for the four parts of the proposed action.

1.3.2 Purpose of the Proposed Action

The purpose of proposed action is: first, to provide the Council and NMFS with the information they need to better account for the function of Pacific Coast groundfish EFH when making fishery management decisions; second, to ensure that EFH is capable of sustaining groundfish stocks at levels that support sustainable fisheries; and third, that EFH is capable of sustaining enough groundfish to function as a healthy component of the ecosystem.

1.3.3 Need

The proposed action is needed because the Council and NMFS have not had the tools to consider habitat and ecosystem function, and their relation to other biological and socioeconomic conditions affecting the groundfish fishery, in management decisionmaking. The West Coast groundfish fishery suffers from numerous challenges; although identifying and conserving EFH cannot address all these problems, the proposed action will allow managers to provide solutions in a more comprehensive way, including consideration of EFH. Among the problems facing the fishery are declining stock sizes which led the Secretary of Commerce to declare nine groundfish stocks overfished;[4] and changing ocean conditions, which may have contributed to the failure of some groundfish stocks to replace themselves (recruitment failure). An overriding problem has been the challenge of managing fisheries with limited scientific data. This increases the risk that decisions exacerbate the kinds of fishery- and stock-related problems just identified.

In the Magnuson-Stevens Act, Congress found that "one of the greatest long-term threats to the viability of commercial and recreational fisheries is the continuing loss of marine, estuarine, and other aquatic habitats" and "habitat considerations should receive increased attention for the conservation and management of fishery resources of the United States." Furthermore, one of long-term goals for the groundfish fishery, adopted by the Council in its strategic plan, is "to protect, maintain, and/or recover those habitats necessary for healthy fish populations and the productivity of those habitats" (Ad-Hoc Pacific Groundfish Fishery Strategic Plan Development Committee 2000).

[4] One of these stocks, Pacific whiting, has subsequently been declared rebuilt.

Each of the key problems mentioned earlier is related to the need to sustain fully functional EFH and underscores the importance of understanding EFH and EFH conservation as part of a holistic approach to fishery management.

1.4 Objectives Satisfied By This EIS

Acting on the advice of the National Research Council's Committee on the Ecosystem Effects of Fishing (National Research Council 2002), NMFS and the Council have engaged in a public process to develop a Comprehensive Risk Assessment (Appendix A) to determine if EFH-related problems exist, and if so, which of these problems could be appropriately considered through the Council and NEPA processes. The risk assessment focuses on the identification of EFH, threats to its health and function, and the delineation of gaps in the available data, which if filled would improve the risk assessment and support its ongoing use. Once the risk assessment was completed, the following problem statement was developed, in order to highlight the issues that this EIS is intended to resolve:

> *Based on the results of the risk assessment, public input received during scoping, and the legal mandate from the Magnuson-Stevens Act, the Council, NMFS, and partner organizations have developed the following objectives for this EIS:*
>
> - *consider alternatives for the designation of EFH;*
> - *consider alternatives for the designation of HAPCs;*
> - *consider alternatives for minimization of adverse effects of fishing on EFH;*
> - *address gaps in available data; and,*
> - *identify other actions to encourage the conservation of EFH.*

1.5 The Mandate to Identify and Conserve Essential Fish Habitat

The MSA, enacted in 1976, establishes the framework for managing fisheries in the EEZ. Broadly speaking, its provisions promote sustainable use of fishery resources. This requires maintaining healthy fish stocks, and in the case of overfished stocks, ending overfishing and rebuilding them, in order to increase long-term economic and social benefits to the nation from living marine resources. The Act also establishes a unique institutional framework through a system of eight regional fishery management Councils. The Councils, composed of representatives from state and federal agencies, tribes, and appointees representing resource users, develop policies, plans, and management measures for the fisheries occurring in each of the eight regions. FMPs developed by the Council are the primary vehicle for establishing a management framework. NMFS (as designated by the Secretary of Commerce) has approval authority for the FMPs and amendments, as well as implementation that include regulations.

The MSA has been amended several times, including significant amendments in 1996 by the Sustainable Fisheries Act (SFA). The SFA added habitat conservation provisions in the MSA by introducing a requirement that FMPs "describe and identify essential fish habitat…, minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat" (16 U.S.C. 1853(a)(7)). This provision also directed NMFS to develop guidelines for describing and identifying EFH. These guidelines are published in the Code of Federal Regulations at 50 CFR Part 600, Subpart J. Subpart J also addresses consideration of fishery management measures to minimize to the extent practicable adverse effects on EFH from fishing.

The MSA also states "Each Federal agency shall consult with the Secretary [of Commerce] with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any essential fish habitat identified under this Act" (16 U.S.C. 1855(b)(2)).NMFS (on behalf of the Secretary of Commerce) consults on federal actions affecting EFH, and provides recommendations to conserve and protect EFH. During this time the Councils may comment and make recommendations to the federal action agency and NMFS. Regulations at 50 CFR Part 600, Subpart K detail this consultation process. The majority of consultations address the potential effects of various nonfishing activities that may be permitted or undertaken by other federal agencies. In the case of federal fishing regulations, NMFS is required to make recommendations to the Council and work through the Council process to develop measures that may be deemed necessary to minimize adverse impacts of EFH to the extent practicable.

Regulations at 50 CFR 600.815(a)(8) define habitat areas of particular concern (HAPCs) as a subset of EFH that should be identified in an FMP. HAPCs must meet at least one of the four criteria identified in the regulations:

1) The importance of the ecological function provided by the habitat.
2) The extent to which the habitat is sensitive to human-induced environmental degradation.
3) Whether, and to what extent, development activities are, or will be, stressing the habitat type.
4) The rarity of the habitat type.

HAPCs help to focus the consultation process, by identifying habitat areas that may be especially important or vulnerable. This helps in the allocation of scarce human and budgetary resources. When the Council identified the range of alternatives analyzed in this EIS, including several designating HAPCs, they noted that the effects of fishing on HAPCs should be considered when evaluating future management actions.

The Endangered Species Act (ESA) is also a consideration in the EFH consultation process. (Chapter 6 describes this cross-cutting mandate.) NMFS shares ESA authority with the U.S. Fish and Wildlife Service (USFWS), which has responsibility over terrestrial animals, birds, and freshwater fishes. Federal agencies must consult with NMFS (or the USFWS) pursuant to Section 7 of the ESA if an action it authorizes, funds, or carries out may affect an ESA-listed species. NMFS and USFWS may issue conservation recommendations, terms and conditions, or a list of reasonable and prudent alternatives to reduce adverse effects. Because the geographic extent of a listed species can overlap with that of MSA-managed species, EFH regulations allow for EFH consultations to be incorporated into ESA consultations with NMFS.

1.6 The Current Management Framework For Pacific Coast Groundfish

The Pacific Coast groundfish fishery encompasses the management institutions and processes used to manage diverse fishery sectors, which are defined by regulations, gear type, and target species. Although not bearing directly on EFH identification and description and impact minimization, the discussion here provides the context for the implementation of any such measures. Depletion of several groundfish species, and the implementation of measures needed to recover those stocks, have resulted in a reduction in allowable groundfish landings: from 277,848 mt in 1998 to 155,646 mt in 2002, or a 44% reduction (PFMC 2004). Measures to minimize the adverse effects of fishing on EFH broadly involve reducing fishing effort or fleet capacity, regulating the use and configuration of fishing gear, or closing areas to fishing (National Research Council 2002). Although not specifically directed at EFH impacts, the Council and NMFS have already implemented measures in all three of these categories.

1.6.1 The Institutional Framework

The Pacific Council manages fisheries off the coasts of Washington, Oregon, and California. As with all the Councils, its membership is specified in the MSA. Voting members include representatives from state resource management agencies in California, Idaho (because anadromous salmon spawn in state rivers), Oregon, and Washington; NMFS; and Indian tribes with federally recognized fishing rights. In addition to these governmental representatives, the Secretary appoints eight additional voting members, chosen from nominations put forward by the four states' governors. Nonvoting members on the Council represent the USFWS, the Coast Guard, the State Department, the Pacific States Marine Fisheries Commission, and the State of Alaska.

The Council system fosters cooperation between member states, Indian tribes, and the federal government in fishery management. Management measures implemented through a federal FMP apply to vessels operating in the EEZ (50 CFR 660.301). Groundfish catch limits also apply to federal FMP-managed fish caught in state waters (50 CFR 660.302(a)). If, for instance, a vessel fishes in both state and federal waters, any fish caught count toward the limits in the federal groundfish regulations, whether the fish were caught in state or federal waters. A state can also regulate vessels registered under the laws of that state in federal waters as long as the state's laws and regulations are consistent with a federal FMP and applicable federal law. Otherwise, states retain jurisdiction in waters within three nautical miles from shore. For example, federal regulations implement closed areas in federal waters and state regulations implement closed areas in state waters.

Treaties between the United States and numerous Pacific Northwest Indian tribes reserve to these tribes the right of taking fish at usual and accustomed grounds and stations (u & a grounds) in common with all citizens of the United States. See U.S. v. Washington, 384 F. Supp. 312, 349-350 (W.D. Wash. 1974). NMFS recognizes four tribes as having u & a grounds in the marine areas managed by the groundfish FMP: the Makah, Hoh, and Quileute Tribes, and the Quinault Indian Nation. The Makah Tribe is a party to the Treaty of Neah Bay, Jan. 31, 1855, 12 Stat. 939. See 384 F. Supp. at 349, 363. The Hoh and Quileute Tribes and the Quinault Indian Nation are successors in interest to tribes that signed the Treaty with the Quinault, et al. (Treaty of Olympia), July 1, 1855, 12 Stat. 971. See 384 F. Supp. at 349, 359 (Hoh), 371 (Quileute), 374 (Quinault). The tribes' u&a grounds do not vary by species of fish. U.S. v. Washington, 157 F. 3d 630, 645 (9th Cir. 1998).

Courts recognize two separate aspects to the tribal treaty right. First, the "geographical" aspect provides that the treaty tribes have the right to fish throughout the entirety of their usual and accustomed fishing grounds. See U.S. v. Oregon, 718 F.2d 299 (9th Cir. 1983); Muckleshoot Indian Tribe v. Hall, 698 F.Supp. 1504 (W.D. Wash. 1988); Northwest Sea Farms, Inc. v. U.S. Army Corps of Engineers, 931 F. Supp 1515 (W.D. Wash. 1996). Second, the "fair share" aspect provides that the treaty tribes have the "right to a fair share of the catch passing" through their usual and accustomed fishing grounds. U.S. v. Oregon at 303. The fair share of the fish is interpreted as up to 50 percent of the harvestable surplus of fish that pass through the tribes' u&a grounds. The courts apply the conservation necessity principle to federal actions relating to treaty rights. See Makah v. Brown, No. C85-160R/ United States v. Washington, Civil No. 9213 - Phase I, Subproceeding No. 92-1, Order on Five Motions Relating to Treaty Halibut Fishing, at 6-7, (W.D. Wash. Dec. 29, 1993); Midwater Trawlers Co-op. v. Department of Commerce, 282 F.3d 710, 718-719 (9th Cir. 2002). Under the conservation necessity principle, any regulation must be "a reasonable and necessary conservation measure" and its application to the tribes is "necessary in the interest of conservation." See Antoine v. Washington, 420 U.S. 194, 207 (1975). The concept of conservation has particular meaning when applied in the context of Indian treaty rights. See United States v. Washington, 384 F.Supp. at 342, aff'd, 520 F.2d at 685-686; United States v. Oregon, 718 F.2d at 305.

The treaty right was originally adjudicated with respect to salmon and steelhead. However, it is now recognized as applying to all species of fish and shellfish within the tribes' u&a grounds. U.S. v. Washington, 873 F.Supp. 1422, 1430, aff'd 157 F. 3d 630, 644-645 (9th Cir. 1998), cert. denied, 119 S.Ct. 1376; Midwater Trawlers Co-op. v. Department of Commerce, 282 F.3d 710, 717 (9th Cir. 2002) ["The term 'fish' as used in the Stevens Treaties encompassed all species of fish, without exclusion and without requiring specific proof. (citations omitted)"].

NMFS recognizes the areas set forth in 50 C.F.R. 660.324(c) as marine u&a grounds for groundfish for the four Washington coastal tribes. The Makah u&a grounds were adjudicated in U.S. v. Washington, 626 F.Supp. 1405, 1466 (W.D. Wash. 1985), aff'd 730 F.2d 1314 (9th Cir. 1984); see also Makah Indian Tribe v. Verity, 910 F.2d 555, 556 (9th Cir. 1990); Midwater Trawlers Co-op. v. Department of Commerce, 282 F.3d 710, 718 (9th Cir. 2002). The u&a grounds of the Quileute, Hoh, and Quinault Tribes have been recognized administratively by NMFS. The u&a grounds recognized by NMFS may be revised as ordered by a federal court.

In recognition of the sovereign status and co-manager role of these Indian tribes over shared Federal and tribal fishery resources, the regulations at 50 C.F.R. 660.324(d) establish procedures that will be followed for the development of regulations regarding tribal fisheries within the u&a grounds. The regulations provide that the agency will develop regulations in consultation with the affected tribe(s) and insofar as possible, with tribal consensus.

1.6.2 Fishery Sectors

Groundfish fishery sectors are defined through a combination of cross-cutting regulatory definitions, gear types, target species, and user groups. Regulatory sectors stem from the license limitation program implemented by groundfish FMP Amendment 6, adopted in 1992. A fixed number of licenses were issued, and a specific gear endorsement (either trawl, longline, or fish pot) associated with the license is required to harvest groundfish with that gear. This established three broad regulatory sectors: limited entry trawl, limited entry fixed gear (longline or fish pot), and open access. A mix of vessels falls into the open access category, which includes vessels that may target groundfish directly or take it incidentally to fisheries for nongroundfish species. Gear types permissible in the open access fisheries are governed by federal regulations at 50 CFR 600.725 and 660.302. Vessels participating in the nongroundfish fisheries that take groundfish incidentally may hold a license for that target fishery, issued by NMFS or a state government, yet still be considered in the open access sector for the purpose of groundfish fishing. Different management measures, as described below, are applied to these three sectors. The distinction between commercial and recreational sectors—and within the recreational sector, charter (for hire) and private vessels—provides an even broader definition of fishery sectors. Finally, within these regulatory and user group categories, further subdivisions may be made based on target species, gear type, or geographic region. Specific management measures may be, in turn, applied to these subsectors. For example, the limited entry trawl sector includes vessels targeting Pacific whiting, an abundant low-value pelagic species caught with midwater trawl nets. Vessels in this whiting sector, which includes at-sea processors and shore-based boats, are managed differently from other groundfish trawl vessels. The states manage recreational fisheries, although the measures they enact are coordinated through the Council and are implemented in federal regulations by NMFS. Geographic sub-sectors, comprising recreational fisheries in each state, can be identified for the recreational sector.

1.6.3 The Harvest Management Framework

The Council has developed four FMPs, for salmon, groundfish, coastal pelagic species, and highly migratory species. The groundfish FMP was approved in 1982. The management unit includes more than 80 species. These species include over 60 species of rockfish in the family *Scorpaenidae*, seven roundfish species, 12 flatfish species, assorted sharks and skates, and a few miscellaneous bottom-dwelling marine fish species. Management of these groundfish species is based on principles outlined in the MSA, groundfish FMP, and national standard guidelines, which provide guidance on the 10 national standards in the MSA. The groundfish FMP has been amended 17 times to date. Many of the recent amendments respond to new requirements of the SFA and subsequent court-ordered remands of those amendments.

Amendment 11 incorporated a range of new SFA requirements related to setting harvest levels, determining when a stock is overfished, addressing bycatch concerns, and designating EFH. No measures to minimize adverse impacts to EFH from fishing were implemented as part of this amendment. According to the amendment document, the rationale for not adopting such measures was the lack of information "connecting fishing gear or activities to the destruction of groundfish EFH" and on appropriate minimization measures, if the effects of fishing could be assessed (PFMC 1998, p. 18).

Although not directly related to EFH issues, the harvest management framework established by Amendment 11 and Amendment 12—for setting harvest limits, or optimum yield, determining when a stock is overfished, and procedures for rebuilding overfished stocks—has profoundly affected the management system, and West Coast groundfish fisheries, over the past five years. Abundance-based reference points were identified, relative to an estimate of "virgin" or unexploited biomass of a given stock (denoted B_0). The concept of maximum sustainable yield (MSY) is used to identify a harvest limit, the Maximum Fishing Mortality Threshold (MFMT, denoted as F_{MSY}).[5] For a given population, and set of ecological conditions, there is a biomass that produces MSY (denoted as B_{MSY}), which is less than B_0. (Generally, population sizes above B_{MSY} are less productive because of competition for resources.) The Council-specified proxy MSY abundance for most West Coast groundfish species is 40% of B_0 (denoted as $B_{40\%}$). Two additional harvest rate related reference points are described in the groundfish FMP: the allowable biological catch (ABC) and optimum yield (OY). The ABC, which is the maximum sustainable harvest, is calculated by applying an estimated or proxy F_{MSY} harvest rate (MFMT) to the estimated abundance of the exploitable stock. OY represents a precautionary reduction from ABC due to uncertainty or the need to rebuild stocks to B_{MSY}. The ABC and OY for a stock are translations of harvest rates into a specific quantify of fish (measured by weight) that can be harvested in a year. The OY is considered a total catch limit. This means that managers need to account for or estimate both landed catch and discards when managing harvests.

These reference points establish the framework for management. Any harvest rate that exceeds the MFMT is considered overfishing. The Council may not set an OY representing a harvest rate above this threshold. The Council has also specified a minimum stock size threshold (MSST) at 25% of B_0 (denoted as $B_{25\%}$). Once a stock falls below this threshold it is declared overfished by the Secretary. This triggers a requirement to implement a stock rebuilding plan consistent with requirements in the MSA and groundfish FMP. Stocks estimated to be above this overfishing threshold, yet below an abundance level that supports MSY, are considered to be in the "precautionary zone." The Council has specified precautionary reductions in harvest rate for such stocks to increase abundance to $B_{40\%}$, referred to as the 40-10 adjustment.[6] Most stocks with an estimated abundance greater than $B_{40\%}$ are managed by setting

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[5] MSY represents a theoretical maximum surplus production from a population of constant size; national standard guidelines (50 CFR 600.310(c)(1)) define it as "the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions."

[6] The "40-10" refers to percentages of unfished biomass. As the stock declines below $B_{40\%}$, the total catch OY is reduced from the ABC until, at 10% of B_0, the OY is set to zero. However, in practice the 40-10 adjustment only

harvest to the ABC. In summary, stocks can be classified in three categories according to their status: the biomass of healthy stocks is at or above B_{MSY}, the biomass of precautionary zone stocks is between B_{MSY} and the MSST; the biomass of overfished stocks is initially below the MSST. Stocks that have been declared overfished retain that description, and are subject to rebuilding requirements, until their size has returned to B_{MSY}. Therefore, a stock's size could be in the precautionary zone, but because it had previously dipped below the MSST, the stock would still be considered overfished.

1.6.4 Current Issues Affecting Groundfish Management

As noted above, eight groundfish stocks are currently declared overfished and subject to rebuilding plans.[7] They are: bocaccio (*Sebastes levis*), cowcod (*S. levis*), canary rockfish (*S. pinninger*), darkblotched rockfish (*S. crameri*), Pacific ocean perch (*S. alutus*), widow rockfish (*S. entomalas*), yelloweye rockfish (*S. ruberimus*), and lingcod (*Ophidon elongates*). The need to rebuild these stocks has had a major effect on the groundfish management regime. Many groundfish species co-occur, making it difficult or impossible for fishermen to completely avoid the overfished species while targeting healthy stocks. The very low OYs that have to be set for some overfished species therefore act to constrain fishing opportunity for healthy stocks. Furthermore, because the eight overfished species occur across a range of depths, geographic regions, and habitats, diverse West Coast fisheries, from large catcher-processors targeting Pacific whiting to recreational anglers up and down the coast, are subject to overfished species protection constraints. Historically, the main tool for managing commercial groundfish catches has been landing limits. In their current form these cumulative landing limits set the amount of a species or a mix of species that may be landed in a two-month period. While these limits are based on landings, or the amount of fish brought to the dock, total catch must be accounted for when determining whether there is a risk of an OY being breached. At the same time, once fishermen have reached the landing limit for a species, they have an incentive to discard fish at sea so that they may continue landing other species. These at-sea discards, or bycatch, have become a focus of management, both to better monitor the amount and institute measures to reduce it.

NMFS and the Council use a three-part strategy to meet Magnuson-Stevens Act mandates on bycatch monitoring and minimization: (1) gather data through a standardized reporting methodology on the amount and type of bycatch occurring in the fishery; (2) assess these data through bycatch models to estimate when, where, and with which gear types bycatch of varying species occurs; and (3) implement management measures through Federal fisheries regulations that minimize bycatch and bycatch mortality to the extent practicable, and that keep the total mortality of groundfish within the OYs of the various groundfish species and species groups.

NMFS uses the West Coast groundfish observer program (WCGOP) established in August 2001 and required in the FMP in Section 6.5.1.2, as its primary standardized reporting methodology for bycatch in the groundfish fisheries. The WCGOP focuses on vessels participating in the shore-delivery cumulative limit fisheries for non-whiting groundfish. Although WCGOP deploys observers on vessels of all major gear types, the program initially focused on observing trawl vessel fishing activity. As WCGOP has developed, it has expanded into more observations in the limited entry nontrawl fleet. About 75 percent of WCGOP's observer hours tend to be spent on trawl vessels, with the remaining 25 percent primarily

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applies to stocks above $B_{25\%}$ (the MSST) because once a stock falls below this level, an adopted rebuilding plan supplants it.

[7] The rebuilding plans for these eight species are found in section 4.5.4 of the FMP. Implementing regulations are at 50 CFR 660.365.

focused on limited entry longline and pot vessels. Through 2003, NMFS's observer coverage of the limited entry fixed gear fleet focused on vessels participating in the primary sablefish fishery. Beginning in 2004, the agency began adding observer coverage to the remainder of limited entry fixed gear fishing strategies and to the open access directed groundfish fisheries. Vessels participating in the at-sea whiting fisheries (catcher-processors and motherships) have been voluntarily carrying observers since 1991, although these vessels are now required to do so under federal regulations at 50 CFR 660.314. The WCGOP and the whiting observer programs, in combination with state fish ticket and logbook programs and fisheries-independent data, are used to support groundfish bycatch assessment models. In addition to these Federal programs, the Council relies on state recreational fisheries sampling programs, which use a combination of at-sea and at-dock samplers to gather catch and discard data on the recreational fisheries.

NMFS and the Council use data on bycatch and discard in models intended to estimate the amount and type of bycatch occurring in the groundfish fisheries. NMFS first introduced a groundfish fisheries total catch assessment model (known as "the bycatch model") in late 2001 for the 2002 fishing season. As the WCGOP has evolved, so has the bycatch model. During its first year, the bycatch model focused on overfished species taken incidentally in the trawl fisheries, and was populated with data from observation experiments from the mid-1990s and prior years. By January 2003, NMFS had analyzed data from the first year of the WCGOP and the bycatch models for fishing years 2003 and 2004 were updated with WCGOP-generated data. Prior to 2004, the bycatch model had focused on co-occurrence ratios for overfished species taken in target species fisheries without also looking at potential discard of target species. For the 2004 fishing year, NMFS expanded the bycatch model to set discard rates for target species by depth. Like initial WCGOP efforts, the models for the 2002-2003 fishing years also focused on the trawl fisheries. For 2005-2006, NMFS has again updated the trawl bycatch model with trawl fisheries data from WCGOP. NMFS has also revised the new fixed gear bycatch model, initially used in 2004, for the 2005-2006 fisheries that uses observer data from the limited entry fixed gear fisheries.

The third part of the NMFS and Council bycatch reduction strategy is a series of management programs intended to either directly control fishing activities or to create incentives for bycatch reduction. NMFS has implemented a wide array of fishery management measures intended to minimize bycatch and bycatch mortality over the past several years. The agency has supported a series of state-sponsored exempted fishing permit (EFP) programs to test bycatch-reducing gear types, full retention programs, and area closures. Working with the states and the Council, NMFS has also implemented shorter-than-year-round fishing seasons for various species and sectors of the groundfish fleet to protect overfished groundfish species. NMFS and the Council have also reduced overcapacity in the fleets, ultimately reducing the number of vessels on the water. Amendment 14 to the FMP implemented a permit stacking program for the limited entry fixed gear fleet that reduced the number of vessels participating in the primary sablefish fishery by about 40 percent. In late 2003, NMFS implemented a buyback of limited entry trawl vessels and their permits, reducing the groundfish trawl fleet by about 35 percent. Since 2000, NMFS has required gear modifications that restrict the use of trawl gear in rockier habitat coastwide, and that constrain the catching capacity of recreational fishing gear off California. Higher groundfish landings limits have been made available for trawl vessels using gear or operating in areas where overfished species are less likely to be taken. Species-to-species landings limit ratios have been thoroughly examined in the bycatch model mentioned earlier, and are re-examined each year as new observer program data become available. As an additional tool to manage overfished species bycatch, NMFS has implemented a suite of areas that are closed to specific types of fishing known collectively as the Rockfish Conservation Areas (RCAs).

1.6.5 The Harvest Specification Process

In accordance with the groundfish FMP, since 1990 the Council has annually set Pacific Coast groundfish harvest specifications (acceptable and sustainable harvest amounts) and management measures designed to achieve those harvest specifications, with harvest specifications and management measures in effect for the calendar year January 1 to December 31. A shift to a biennial management cycle, as implemented by groundfish FMP Amendment 17, takes effect in 2005–2006. Thus, 2004 was the last year under the annual process. Under the biennial management cycle, harvest specifications and management measures are established for the two-year period in advance of the biennium. Separate ABCs and OYs are established for each calendar year in the two-year cycle. Council decisionmaking for this action occurs over three meetings, culminating in June of the year preceding the biennium. In addition to allowing more careful consideration of management proposals, this process addresses an issue raised by the court ruling in *Natural Resources Defense Council* (NRDC) v. *Evans*, 2001 168 F. Supp. 2d 1149 (N.D. Cal. 2001). The court found that NMFS was not allowing sufficient time for public notice and comment on the regulations before they were implemented at the beginning of a new year. The biennial process allows more time to complete full notice-and-comment rulemaking before the January 1 start date.

1.7 The Development of This EIS

The preceding description establishes the management context within which the EFH-related measures evaluated in this EIS should be considered. The development of this EIS covers roughly the same period cited at the beginning of Section 1.6: in 1999, a coalition of environmental groups challenged the Secretarial approval of the EFH FMP amendments prepared by the Gulf of Mexico, Caribbean, New England, North Pacific, and Pacific Fishery Management Councils in *AOC v. Daley*. The court found that the agency's decisions on the EFH amendments were in accordance with the MSA, but held that the environmental assessments (EAs) on the amendments were in violation of NEPA and ordered NMFS to complete new and more thorough NEPA analyses for each of these EFH amendments.

NMFS entered into a joint stipulation with the plaintiff organizations, which called for each affected Council to complete EISs to consider actions to minimize, to the extent practicable, adverse effects of fishing on EFH (*AOC v. Evans*, Civil No. 99-982 (GK)(D.D.C. December 5, 2001)). NMFS decided that the scope of the EISs should include all the EFH-related actions described in Section 1.2. EIS development has proceeded in four phases, as described in the following sections.

1.7.1 Initial Scoping

According to the NEPA, the public and other agencies must be involved in the decisionmaking process for agency actions. "Scoping" is an important part of this process. Scoping is designed to provide interested citizens, government officials, and tribes an opportunity to help define the range of issues and alternatives that should be evaluated in the EIS. NEPA regulations stress that agencies should provide public notice of NEPA-related proceedings and hold public hearings whenever appropriate during EIS development (40 CFR 1506.6).

The scoping process is designed to ensure all significant issues are properly identified and fully addressed during the course of the EIS process. The main objectives of the scoping process are to provide stakeholders with a basic understanding of the proposed action; explain where to find additional information about the project; provide a framework for the public to ask questions, raise concerns, identify issues, and recommend options other than those being considered by the agency conducting the scoping; and ensure those concerns are included within the scope of the EIS.

NMFS published a Notice of Intent (NOI) to prepare an EIS on April 10, 2001 (66 FR 18586), announcing public scoping meetings during May and June 2001 in Seattle, Washington; Newport and Astoria, Oregon; and Eureka, Los Alamitos, and Burlingame, California. According to the NOI, the EIS would evaluate the groundfish FMP from a broad, programmatic perspective, presenting "an overall picture of the environmental effects of fishing as conducted under Pacific Coast Groundfish FMP."

However, as a result of this initial public scoping, NMFS decided the process would be improved if the programmatic evaluation of the groundfish FMP were shifted from an EIS more narrowly focused on EFH issues (67 FR 5962).[8]

1.7.2 Development of the Decisionmaking Framework

At a March 2002 workshop NMFS habitat scientists agreed on a rough decisionmaking framework, which was presented to the Council as a "road map" for the EIS at their April 2002 meeting in Portland, Oregon. Since the development of Amendment 11, which had initially identified and described groundfish EFH, much more data had become available. For example, the 1998 designation was based primarily on catch records and a literature review of species' habitat associations; but newly available data on physical and biological substrate types, which play key ecological roles in groundfish habitat function, would allow more detailed analysis and interpretation.

The decisionmaking framework is designed so that the best available science is interpreted for policy makers before they develop alternatives for the EIS. Scientific information is consolidated and interpreted through a comprehensive risk assessment. Through use of this assessment, policy discussions can benefit from the best available science. Figure 1-2 shows the overall scheme of the decisionmaking framework, including the comprehensive risk assessment. Data relating to habitat, habitat use, fishing and non-fishing impacts to habitat, and current protection measures were consolidated in a geographic information system (GIS), a database containing geo-referenced attribute data that can be analyzed and mapped. A separate habitat use database was constructed, bringing together information on groundfish in the scientific literature in a framework that allows information to be queried and sorted. These data are used in two GIS-based models related to the major actions evaluated in this EIS: EFH identification and description, HAPC designation, and impact minimization. (As discussed below, the impacts model could not be fully used in policy development due to data limitations.)

The Council modeled development of the comprehensive risk assessment on the relationship between stock-assessments, which provide the basis for setting harvest levels, and the use of that scientific information for policy decisions. The Council in turn, uses scientific information to make social choices, within a legal framework, relating to risk and the allocation of potential costs and benefits. Similarly, the EFH decisionmaking framework separates the scientific endeavor from policymaking. Development of the comprehensive risk assessment shares two other features of the stock assessment process. First, results were vetted through a process of scientific peer review. Second, it was an open process, which allowed the public to follow and comment on its development.

After the Council approved the decisionmaking framework in April 2002, NMFS began organizing the necessary technical infrastructure, including contracting agency personnel and outside experts and consolidating data, which continued throughout implementation of the comprehensive risk assessment. In order to guide the technical team developing the risk assessment, at their November 2002 meeting the Council established the Ad Hoc Groundfish Habitat Technical Review Committee (Habitat TRC), composed of experts on groundfish biology and ecology, marine geologists, fishermen, and environmental advocates. The Habitat TRC met three times to provide guidance on risk assessment development: a February 19–20, 2003, meeting in Seattle, Washington; an August 4, 2003, teleconference (with public listening posts in Seattle, Washington; Gladstone and Newport, Oregon; and, Santa Cruz, California); and a November, 20-21, 2003, meeting Santa Cruz, California. The Habitat TRC also met

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[8] The scope of the programmatic EIS was subsequently narrowed to focus on bycatch minimization. The FEIS for this action was published in September 2004 (NMFS 2004).

December 7-8, 2004, in Portland, Oregon, to conduct a technical review of the alternatives developed by the Council for inclusion in this EIS, which was a requirement of the joint stipulation in *AOC v. Daley*.

As the comprehensive risk assessment neared completion in early 2004, the Council's Scientific and Statistical Committee (SSC) reviewed its components and provided recommendations to the Council on its use by the Council for developing the alternatives evaluated in this EIS. Along with the guidance provided by the Habitat TRC, this comprised the scientific peer review mentioned previously. Based on an initial review by their Groundfish Subcommittee, the SSC advised the Council that the EFH identification and description component could be used for developing EIS alternatives. The Council ratified this recommendation at their April 2004 meeting.

Having explored all available data sources and considered various approaches, the technical team developing the risk assessment narrowed the impacts component to focus on the limited entry trawl sector. This is the only sector where sufficient spatial data are available, through logbook reporting, to model fishing impacts. (The scarcity of geo-referenced data on non-fishing impacts prevented their inclusion in the model as well.) The SSC Groundfish Subcommittee met again in May 2004 to review this component and concluded with a qualified endorsement. Based on their report, the SSC advised to the Council to use some elements of this model while recommending that more work be done on other elements before use in decisionmaking. Because of constraints on time and resources, further development of the model could not be completed before the Council began considering the range of alternatives to be evaluated in this EIS. Therefore, at their June 2004 meeting, the Council directed that only those elements approved by the SSC be used to formulate fishing impact minimization alternatives in this EIS.

A complete data gaps analysis explaining NMFS compliance with the CEQ regulations at 1502.22, regarding what to do when there is incomplete or unavailable information, is available in Section 5.3 of the Risk Assessment (Appendix A to this EIS).

1.7.3 Production of the DEIS

In addition to partially approving the fishing impacts component of the risk assessment at their June 2004 meeting, the Council asked its Ad Hoc EFH EIS Oversight Committee to meet and develop a preliminary range of alternatives. Membership of the Committee includes the Washington, Oregon, and California state representatives on the Council, fishermen, and environmental advocates. Work by the Committee represented the initiation of the policy phase shown in Figure 1-2. The Committee held a three-day meeting in August 2004 and developed the preliminary range of alternatives. These alternatives were considered by the Council at their September 2004 meeting and adopted with some modifications. At their next meeting, in November 2004, the Council further refined the range of alternatives and identified their preliminary preferred alternatives.

In addition to the initial public scoping period described above in Section 1.7.1, these Council meetings allow for public participation and comment during Council, subcommittee, and advisory body meetings. The advisory bodies involved in groundfish management include the Groundfish Management Team (GMT), with representation from state, federal, and tribal fishery scientists; and the Groundfish Advisory Subpanel (GAP), whose members are drawn from the commercial, tribal, and recreational fisheries, fish processors, and environmental advocacy organizations. These committees and others, such as the Habitat Committee (HC), provided comment and advice on the range of alternatives to be included in the EIS and which should be chosen as preferred by the Council.

1.7.4 Identification of the Final Preferred Alternative and Production of the FEIS

As discussed in Section 2.1, the Council and NMFS did not choose a final preferred alternative in advance of the publication of the DEIS. Instead, they identified a set of preliminary preferred alternatives at their November 1-5, 2004, meeting, which were noted in the DEIS. This indicated to the public a narrower range of alternatives from which the Council was mostly likely to select a final preferred alternative. At their June 13-17, 2005, meeting, which occurred after the end of the public comment period on the DEIS, they chose the final preferred alternative. This allowed the Council to benefit from the large volume of public comment on the range of alternatives and the Council's preliminary preferred alternatives. The final preferred alternative is described in this FEIS

Chapter 2 Alternatives

2.1 Introduction

This chapter describes four sets of alternatives, as identified by the objectives in Section 1.4, to (1) identify and describe EFH (Section 2.3), (2) designate HAPCs (Section 2.4), (3) minimize fishing impacts to EFH to the extent practicable (Section 2.5), and (4) implement habitat-related research and monitoring initiatives (Section 2.6). Section 2.7 describes the Council's comprehensive final preferred alternative, which combines alternatives from each of these four categories, with some modifications based on public comment. In the DEIS the alternatives were organized into four separate categories related to the objectives described in Section 1.4 in order to simplify the analysis and make it easier for the public to compare the alternatives and understand how they address the purpose and need for the proposed action. This organization is retained in the FEIS, but the final preferred alternative is described in a separate section in order to demonstrate how it comprehensively combines elements from each of these four categories.

The Council's Ad Hoc EFH EIS Oversight Committee developed a preliminary range of alternatives during a meeting held August 16-18, 2004, in Portland, Oregon. The Council adopted this preliminary range for analysis in the DEIS, with some modifications, at their meeting in San Diego, California, September 13-17, 2004. At their November 1-5, 2004, meeting in Portland, Oregon, the Council identified preliminary preferred alternatives. They also refined the range of alternatives by eliminating some alternatives from further detailed analysis (Section 2.6). The Council chose their final preferred alternative at the June 13-17, 2005, meeting in Foster City, California.

CEQ's regulations to implement NEPA at 40 CFR 1502.14(e) require an agency to identify a "preferred alternative or alternatives, if one or more exists, in the [DEIS] and identify such alternative in the final statement unless another law prohibits the expression of such a preference." In addition, identification of a preliminary preferred alternative or alternatives in the DEIS is required by the joint stipulation in *AOC v. Daley*. In order to satisfy this requirement in a way that fosters public input and informed decisionmaking, the Council chose preliminary preferred alternatives for EFH identification and description, HAPCs, and fishing impact minimization measures at their November 2004 meeting and these were identified in the DEIS. They explicitly construed this choice as preliminary.—At their June 2005 meeting, after the public comment on the DEIS had been received, the Council identified the final preferred alternative described in Section 2.7.

The final preferred alternative contains some elements that were not among those they identified as preliminary preferred in the DEIS. Some of the alternatives incorporated into the final preferred alternative have also been modified. However, the effects of the preferred alternative are within the range of effects predicted for the alternatives described in the DEIS. Table 2-2 summarizes these differences.

The next five sections briefly describe the alternatives. The level of detail provided here is sufficient for framing the analysis and Council decisionmaking. As appropriate, measures contained in the final preferred alternative selected by the Council in June 2005 are described in more detail in Section 2.7, as well as in FMP amendment language and any implementing regulations. In order to reduce confusion, the alternatives are identified using an alphanumeric label.

2.2 Application of the Alternatives to Tribal Fisheries

NMFS does not intend for any of the alternatives described below to apply to tribal fisheries in usual and accustomed grounds described in 50 C.F.R. 660.324(c). NMFS will continue to work with the tribes to ensure that, within the u&a grounds, adequate measures are in place to protect EFH and HAPCs. In the future, in the event that it is determined that additional measures need to be developed, NMFS would follow the procedures outlines in 50 C.F.R. 660.324(d). See also Section 1.6.1.

2.3 EFH Identification and Description Alternatives

Requirements for identifying and describing EFH are found in the Magnuson-Stevens Act and implementing regulations at 50 CFR part 600; subpart J. The regulations require the agency to undertake a scientific process to determine the extent of habitat that is essential for managed species throughout their life history. EFH identification and description provides the basis for the statutory requirement to consult and provides geographic focus for development of conservation strategies.

The identification and description of EFH does not in and of itself have direct effects on habitat, the status of groundfish stocks, or the ecosystem; however, the geographic focus it provides can serve as a tool for managers to focus conservation efforts and stewardship over the habitat component of groundfish resources. Section 303(a)(7) of the Magnuson-Stevens Act requires that adverse effects from fishing on EFH must be minimized to the extent practicable and other actions encouraged that would conserve and enhance such habitat. In addition, the identification and description of EFH serves to facilitate the consultation process as described in section 305(b) of the Magnuson-Stevens Act, which states that federal action agencies must consult with NMFS on any action that may adversely affect EFH. Identification and description of EFH is a management tool that is the starting point for considering conservation and enhancement.

2.3.1 Scientific Basis for the EFH Identification and Description Alternatives

The alternatives to identify and describe EFH were developed by a scientific process to comply with the requirements of the EFH regulations at 50 CFR part 600; subpart J, and to describe and identify EFH. This sub-section summarizes the results of that process, which is explained in detail in the Risk Assessment, included as Appendix A.

The Risk Assessment involved a data consolidation phase in which the best available ecological, environmental, and fisheries information was assembled and incorporated into appropriate databases. Data were prioritized and obtained in consultation with scientific advisory committees and agency scientists. The specific information assembled and applied to the EFH identification and description alternatives includes:

- Geological substrate data (GIS);
- Estuaries (GIS);
- Canopy kelp (GIS);
- Seagrass (GIS);
- Structure-forming invertebrate information;
- Bathymetric data (GIS);
- Latitude (GIS);
- Information on pelagic habitat;

- Data quality (GIS and other); and,
- Information on the functional relationships between fish and habitat (literature review, Habitat Use Database).

Ideally, EFH would be identified by delineating habitat in terms of its contribution to growth, reproduction, survival, and production of groundfish; however, such information is not available. There is limited information on the distribution and habitat-related density of species that was compiled and utilized in developing the alternatives.

Alternatives to the no action alternative were developed through a process of scientific modeling. Due to a generally poor availability of data on how and where fish utilize and rely on habitat to carry out basic life functions, such as spawning, breeding, feeding, and growth to maturity, a model was developed to predict an overall measure of the suitability of habitat in particular locations for as many species as possible. Where possible, the suitability of habitat was measured using the occurrence of fish species in NMFS trawl survey catches. For species not well represented in the trawl catches, information from the scientific literature was used. Species and life stages for which no specific information could be found were considered using the precautionary principle.

The model characterizes habitat in terms of three variables: depth, latitude, and substrate (both physical and biogenic substrate, where possible). For the purposes of the model these three characteristics provide a reasonable representation of the essential features of habitat that influence the occurrence of fish. Depending on these characteristics and the observed distributions of fish in relation to them, each location (a parcel or polygon of habitat in the GIS) is allocated a suitability value between 0 and 100%. This is called the *Habitat Suitability Probability*, or HSP, and it is calculated for as many species and life stages in the FMP as possible based on available data. These scores and the differences between scores for different locations are then used to develop a proxy for the areas that can be regarded as "essential". The higher the HSP, the more likely the habitat area should be identified as EFH.

The EFH identification model provides spatially explicit estimates of HSP for 160 groundfish species/life stage combinations, including the adults of all species in the FMP. Distribution ranges for depth and latitude were derived where possible from in-situ observations of occurrence in NMFS trawl survey catches. Where survey data were insufficient, depth and latitude ranges were extracted from reports and papers in the scientific literature. Preferences for substrate types were also taken from the scientific literature. The HSP values for each habitat polygon are mapped using GIS software. For the reader unfamiliar with GIS, a primer is contained on page 14 of the Risk Assessment.

The alternatives represent a range of threshold HSP values or percentages of total area (ranked by HSP), below which the habitat polygons are not identified as EFH and above which they are. The higher the threshold value, the larger the area of habitat identified as EFH for a given species/life stage. To address all species/life stages, the GIS polygons are ranked from highest to lowest HSP value for each modeled species/life stage. Next, polygons are selected in descending rank order until some pre-determined percentage of the total area covered by polygons with an HSP value greater than 0.01% has been included in the set. Once this has been done for all of the modeled species, the resulting areas are combined into a single area to be identified as EFH.

For example, Alternative A.5 identifies the "top 70% HSP area" as EFH, meaning that highest-ranked polygons were selected successively until 70% of the area was included. Higher HSP thresholds are more "risk averse" in that there is a greater probability that suitable habitat is included. By varying the HSP values, the action alternatives represent alternative levels of risk aversion. Alternatives A-2 and A-3 are the most risk averse in that they apply an HSP threshold of 100%. Alternative A-6 is the least risk averse in that an HSP threshold of 30% is applied.

A feature of the HSP approach is that the thresholds can be varied for individual species/life stages depending on the level of management concern. Alternative A.4 demonstrates this feature by applying different thresholds based on management categories used by the Council. Overfished species[9] are treated with the most risk aversion through application of a 90% HSP threshold. Species in the precautionary[10] zone are treated with slightly less risk aversion through application of an 80% HSP threshold. The remaining groundfish are treated with the least amount of risk aversion through application of a 60% HSP threshold. To account for uncertainty in the results of the HSP model, two of the action alternatives contain precautionary adjustments. Alternative A.2 is based on an HSP threshold of 100% with a precautionary adjustment out to depths of 3500 meters. Seamounts were included in A.4 to account for potential importance that is not revealed in the results of the HSP model. Further discussion of seamounts is contained in the discussion of the alternative below.

The HSP approach represents an important advance in NMFS' ability to delineate suitable habitat at the individual species/life stage and apply GIS software in an "ecosystem" approach to management. The HSP profiles for individual species/life stages can be combined by GIS analyses into ecosystem-level fish assemblages to investigate and predict environmental consequences of proposed projects.

There are six EFH identification and description alternatives, which are listed according to total area encompassed. The Council identified two preliminary preferred alternatives in this category.

While efforts to identify and describe EFH for the Pacific Groundfish fishery have been encouraging, unfortunately the project team realized at a late date that some of the essential fish habitat maps generated from the information collected on the managed species were incorrect. Since publication of the DEIS the project team has continued to correct and update the underlying data sets used to generate HSP maps describing groundfish EFH. This FEIS contains updated maps in Appendix I and a report of the final peer review process in Appendix D. Additionally, the EFH identification alternatives have been updated to reflect the corrected HSP information (although changes to the alternatives are insignificant compared to those published in the DEIS).

By using this approach to analyzing the information, HSP provides a better method to analyze the EFH information and develop the description and identification of EFH than the method outlined in the guidelines at 50 CFR 600.815. This is because it takes advantage of computer analyses of a large amount of information that is organized in such a way that it provides a clear understanding of the relationship between groundfish and habitat. The EFH model, including a description of the reliability of the information, used to develop HSP values for individual groundfish species/life stage is further described in Appendix A.

Alternative A.1: No Action

The no action alternative would maintain the current EFH identification and description, incorporated into the groundfish FMP by Amendment 11 in 1998 (see Figure 2-1).

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[9] Overfished species include bocaccio (*Sebastes paucispinis*), cowcod (*S. levis*), canary rockfish (*S. pinninger*), darkblotched rockfish (*S. crameri*), Pacific ocean perch (*S. alutus*), widow rockfish (*S. entomalas*), yelloweye rockfish (*S. ruberimus*), and lingcod (*Ophidon elongates*).

[10] Precautionary zone species are sablefish (*Anoplopoma fimbria*), Dover sole (*Microstomus pacificus*), and shortspine thornyhead (*Sebastolobus alascanus*).

The more than 80 groundfish species in the management unit occupy diverse habitats at all stages in their life histories. As a consequence of the large number of groundfish fishery management unit (FMU) species and their diverse habitat associations, when all the individual EFHs are taken together, all waters from the mean higher high water line, and the upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon, and California to the seaward boundary to the U.S. EEZ become EFH.

Therefore, the FMP groups the various EFH descriptions into seven units called composite EFHs. This approach focuses on ecological relationships among species and between the species and their habitat, reflecting an ecosystem approach in defining EFH. Seven major habitat types are proposed as the basis for such assemblages or composites. These major habitat types are readily recognizable by those who potentially may be required to consult about impacts to EFH, and their distributions are relatively stationary and measurable over time and space.

The seven composite areas identified as EFH are as follows.

1. **Estuarine** – Those waters, substrates, and associated biological communities within bays and estuaries of the EEZ, from the mean higher high water level (MHHW, which is the high tide line) or extent of upriver saltwater intrusion to the respective outer boundaries for each bay or estuary as defined in the Coast Guard lines of demarcation at 33 CFR 80.1.

2. **Rocky Shelf** – Those waters, substrates, and associated biological communities living on or within 10 meters (5.5 fathoms) overlying rocky areas, including reefs, pinnacles, boulders and cobble, along the continental shelf, excluding canyons, from the high tide line MHHW to the shelf break (approximately 200 meters or 109 fathoms).

3. **Nonrocky Shelf** - Those waters, substrates, and associated biological communities living on or within 10 meters (5.5 fathoms) overlying the substrates of the continental shelf, excluding the rocky shelf and canyon composites, from the high tide line MHHW to the shelf break (approximately 200 meters or 109 fathoms).

4. **Canyon** – Those waters, substrates, and associated biological communities living within submarine canyons, including the walls, beds, seafloor, and any outcrops or landslide morphology, such as slump scarps and debris fields.

5. **Continental Slope/Basin** - Those waters, substrates, and associated biological communities living on or within 20 meters (11 fathoms) overlying the substrates of the continental slope and basin below the shelf break (approximately 200 meters or 109 fathoms) and extending to the westward boundary of the EEZ.

6. **Neritic Zone** - Those waters, substrates, and associated biological communities living in the water column more than 10 meters (5.5 fathoms) above the continental shelf.

7. **Oceanic Zone** - Those waters, substrates, and associated biological communities living in the water column more than 20 meters (11 fathoms) above the continental slope and abyssal plain, extending to the westward boundary of the EEZ.

Because it designates the entire EEZ including areas shoreward to the mean higher high water line, this alternative encompasses the largest area, 317,690 square miles.

Alternative A.2: Depths less than 3,500 m (Component of the Final Preferred Alternative)

In this alternative, EFH would be identified as 100% of the area where HSP is greater than zero for all species and any additional area in depths less than or equal to 3,500 m (1,914 fm) (see Figure 2-2). This alternative would designate 187,741 square miles in the EEZ, and to the mean higher high water line and upriver extent of salt water, as EFH. The deepest observation of groundfish is 3,400 m (Wakefield, Pers. Com.). By including areas out to the 3500 m depth curve, this alternative includes all habitats where groundfish have been observed with the addition of 100 m depth as a precautionary adjustment in case of non-observed groundfish species. The additional 100 m depth also acts to buffer uncertainty in the HSP model. This alternative includes all 7 composite areas as in alternative A.1, but a smaller amount of square miles.

Alternative A.3: 100% HSP Area

Designate 100% of the area where HSP is greater than zero for all species (see Figure 2-3). This alternative would designate 87,160 square miles as EFH, all of it within the area that would be designated by Alternative A.2. The scientific rationale for this alternative is provided in section 2.3.1.

Alternative A.4: HSP Based on Management Status

Designate the upper 90% of the HSP area of overfished species HSP, upper 80% of the HSP area for precautionary zone species, and upper 60% of the HSP area for all other groundfish, and all seamounts (see Figure 2-4). The alternative would designate 79,481 square miles as EFH, most of which falls within the area described by the previous alternatives, with the addition of some deeper areas around seamounts. The scientific rationale for this alternative is provided in section 2.3.1.

Alternative A.5: 70% HSP Area

Designate the upper 70% of the area where HSP is greater than zero (Figure 2-5). The alternative would designate 78,569 square miles as EFH, all of which falls within the area described by alternatives A.1, A.2, and A.3. The scientific rationale for this alternative is provided in section 2.3.1.

Alternative A.6: 30% HSP Area

Designate the upper 30% of the area where HSP is greater than zero for all species (Figure 2-6). The alternative would designate 66,589 square miles as EFH, all of which falls within the area described by the previous alternatives. The scientific rationale for this alternative is provided in section 2.3.1.

2.4 Alternatives for HAPC Designation

Although the Magnuson-Stevens Act does not require Councils to designate HAPCs, NMFS encourages them to do so, based on one or more of the following considerations from the EFH regulations at 50 CFR 600.815 (a)(8):

1) The importance of the ecological function provided by the habitat;

2) The extent to which the habitat is sensitive to human-induced environmental degradation;

3) Whether, and to what extent, development activities are, or will be, stressing the habitat type; and,

4) The rarity of the habitat type.

There are nine HAPC designation alternatives in this EIS. At the November, 2004 meeting, the Council chose seven of these as their preliminary preferred alternatives. These alternatives are not mutually exclusive and all could be included in a final preferred alternative, even if some of the designated areas were to overlap one another. HAPC must be a subset of EFH so the HAPC alternatives may be limited by the EFH identification that results from this EIS. Chapter 4 contains a full analysis of the overlap of the HAPC alternatives with the EFH alternatives.

Alternative B.1: No Action

No HAPCs are currently designated for groundfish. Choosing this alternative would maintain no HAPC designations.

Alternative B.2: Estuaries (Component of the Preferred Alternative)

Estuaries are protected nearshore areas such as bays, sounds, inlets, and river mouths, influenced by ocean and freshwater. Tidal cycles and freshwater runoff varies salinity within estuaries and results in great diversity, offering freshwater, brackish and marine habitats within close proximity (Haertel and Osterberg 1967).

The inland extent of the estuary HAPC is defined as MHHW, or the upriver extent of saltwater intrusion, defined as upstream and landward to where ocean-derived salts measure less than 0.5 ppt during the period of average annual low flow. The seaward extent is an imaginary line closing the mouth of a river, bay, or sound; and to the seaward limit of wetland emergents, shrubs, or trees occurring beyond the lines closing rivers, bays, or sounds. This HAPC also includes those estuary-influenced offshore areas of continuously diluted seawater. This definition is based on Cowardin et al. (1979 #1222)

Estuaries are naturally dynamic and complex, and human actions that degrade or eliminate estuarine conditions have the effect of stabilizing and simplifying this complexity (Williams et al. 1996), reducing their ability to fulfill fish and wildlife needs for reproduction, feeding, refuge, and other physiological necessities (Gunter 1957; Good 1987; Phillips 1984; Simenstad et al. 1991). Estuaries tend to be shallow, protected, nutrient rich, and are biologically productive, providing important habitat for marine organisms, including groundfish. Estuaries are vulnerable to damage from a wide range of non-fishing activities because estuaries are often close to human population centers and receive runoff from adjacent land areas. Anthropogenic impacts to estuaries may include nutrient loading, introduction of non-native species, changes in water temperature, increased turbidity etc.

Estuaries were included as an HAPC designation alternative under 50 CFR 600.815(a)(8)(1)-(3) because they are of ecological importance, are sensitive to human-induced environmental degradation and are hosts to environmentally stressful development activities.

Figure 2-7 shows the location of these HAPCs. GIS data on West Coast estuaries were derived primarily from the USFWS' National Wetlands Inventory (NWI). Where digital data for the NWI were unavailable, data from NOAA's Coastal Assessment Framework were used.

Alternative B.3: Canopy Kelp (Component of the Preferred Alternative)

Of the habitats associated with the rocky shelf habitat composite, canopy kelp forests are of primary importance to the ecosystem and serve as important groundfish habitat. Lush kelp forest communities (e.g., giant kelp, bull kelp, elk kelp, and feather boa kelp) are found relatively close to shore along the open coast and the canopy kelp HAPC includes those waters, substrate, and other biogenic habitat associated with canopy-forming kelp species. On the rocky shelf, these subtidal communities provide vertically-structured habitat through the water column. The stands provide nurseries, feeding grounds and shelter to a variety of groundfish species and their prey (Ebeling, et al. 1980; Feder, et al. 1974). Giant kelp communities are highly productive relative to other habitats, including wetlands, shallow and deep sand bottoms, and rock bottom artificial reefs (Bond *et al.*, 1998). Foster and Schiel (1985) reported that the net primary productivity of kelp beds may be the highest of any marine community. Kelp forest ecosystems undergo distinct phase shifts between kelp dominated and sea urchin dominated states (Steneck et al. 2002). Kelp forests are vulnerable to cascading effects of top-down forcing and fishing down food webs (Steneck et al. 2002; Estes et al. 2004). Kelp forest phase shifts have complex explanations and consequences with linkages across multiple species, large areas and long periods of time (Estes et al. 2004).

Canopy kelp were included as an HAPC designation alternative under 50 CFR 600.815(a)(8)(1) and (2) because they are of ecological importance and are sensitive to human-induced environmental degradation.

GIS data for the floating kelp species, *Macrocystis* spp. and *Nereocystis* sp., are available from state agencies in Washington, Oregon, and California. These data have been compiled into a comprehensive data layer delineating kelp beds along the West Coast. The kelp source data were provided for each state by the following agencies: Washington Department of Natural Resources (WDNR), Oregon Department of Fish and Game (ODFW), and California Department of Fish and Game (CDFG). Source data were collected using a variety of remote sensing techniques, including aerial photos and multispectral imagery. Because kelp abundance and distribution is highly variable, these data do not necessarily represent current conditions. However, data from multiple years were compiled together with the assumption that these data would indicate areas where kelp has been known to occur. Washington State has the most comprehensive database, covering 10 years of time (1989-1992, 1994-2000), and surveying the Straits of Juan de Fuca and the Pacific Coast every year. Oregon did a coastwide survey in 1990, and then surveyed select reefs off southern Oregon in 1996-1999. A comprehensive kelp survey in California was performed in 1989, and additional surveys of most of the coastline occurred in1999 and 2002. Figure 2-8 shows the location of these HAPCs.

Alternative B.4: Seagrass (Component of the Preferred Alternative)

Seagrass species found on the West Coast of the U.S. include eelgrass (*Zostera* spp., *Ruppia* sp.) and surfgrass (*Phyllospadix* spp.). These grasses form dense beds of leafy shoots year-round in the lower intertidal and subtidal areas. Eelgrass is found on soft-bottom substrates in intertidal and shallow subtidal areas of estuaries. Surfgrass is found on hard-bottom substrates along higher energy coasts. The seagrass HAPC includes those waters, substrate, and other biogenic features associated with eelgrass or surfgrass.

Seagrass beds have high primary productivityand provide habitat for many invertebrates and epiphytes, and provide many crustaceans, fish, and birds with protection and food. Several commercially important species use seagrass beds including Dungeness crab (Spencer 1932) and Pacific herring (Taylor 1964). Pacific coast seagrasses have been shown to be vulnerable to anthropogenically introduced species of seagrasses such as *Spartina alterniflora* (Taylor et al. 2004) and *Zostera japonica* (Harrison and Bigley 1982).

Seagrasses were included as an HAPC designation alternative under 50 CFR 600.815(a)(8)(1) and (2) because they are of ecological importance and are sensitive to human-induced environmental degradation.

Despite their known ecological importance for many commercial species, seagrass beds have not been as comprehensively mapped as kelp beds. Wyllie-Echeverria and Ackerman (2003) published an excellent coastwide assessment of seagrass that identifies sites known to support seagrass and estimates of seagrass bed areas; however, their report does not compile existing GIS data. GIS data for seagrass beds have been located and compiled for the EFH EIS and mapped in Figure 2-9.

Potential data sources for seagrass were identified through database searches via the internet as well as initial contacts provided by NMFS EFH staff and Sandy Wyllie-Echeverria at the University of Washington. Twenty-eight individuals or organizations were contacted for seagrass data or to provide further contacts.

Eelgrass mapping projects have been undertaken for many estuaries along the West Coast. These mapping projects are generally done for a particular estuary, and many different mapping methods and mapping scales have been used. Therefore, the data that have been compiled for eelgrass beds are an incomplete view of eelgrass distribution along the West Coast. Data depicting surfgrass distribution are very limited—the only GIS data showing surfgrass are in the San Diego area.

Figure 2-9 shows the location of these HAPCs.

Alternative B.5: Core Habitat

This alternative designates core areas, defined as the upper 10% of area with an HSP greater than 0%, for the juvenile and adult life history stages of overfished and precautionary zone groundfish species. HSP is explained in section 2.3.1. Figure 2-10 shows the location of these HAPCs. This alternative is consistent with 50 CFR 600.815(a)(8)(1).

Alternative B.6: Rocky Reefs (Component of the Preferred Alternative)

Rocky habitats are generally categorized as either nearshore or offshore in reference to the proximity of the habitat to the coastline. Rocky habitat may be composed of bedrock, boulders, or smaller rocks such as cobble and gravel. Hard substrates are one of the least abundant benthic habitats, yet they are among the most important habitats for fishes. Typical shallow water hard bottom fishes include rockfish (e.g. *Sebastes* spp.), lingcod, and sculpins (MMS 2002).

Managed species known to use tide pools (Section 3.2.2.1.3) and other nearshore hard bottom habitat (Section 3.2.2.1.5) in the coastal zone include black rockfish, black-and-yellow rockfish, brown rockfish, cabezon, calico rockfish, California scorpionfish, canary rockfish, chilipepper, copper rockfish, grass rockfish, gopher rockfish, kelp greenling, leopard shark, lingcod, olive rockfish, quillback rockfish, redstripe rockfish, rosethorn rockfish, shortbelly rockfish, silvergray rockfish, and spotted ratfish.

In the offshore area, many managed species are dependent on hard bottom habitat during some portion of their life cycle. Typically, deeper water hard bottom habitats are inhabited by large, mobile fishes such as rockfish, sablefish, Pacific hake, spotted ratfish, and spiny dogfish (MMS 2002). Cross and Allen (1993) estimated that about 30% of the fish species and 40% of the families occur over hard substrates.

This alternative designates all rocky reef areas including those waters, substrates and other biogenic features associated with hard substrate (bedrock, boulders, cobble, gravel, etc.) to MHHW. A first approximation of its extent is provided by the substrate data in Figure 2-11, which shows the location of these HAPCs. At finer scales, through direct observation, it may be possible to further distinguish between hard and soft substrate in order to define the extent of this HAPC.

Fishing with certain gear types can modify rocky habitat and have a negative impact on plants and animals found there. A full discussion of impacts to rocky reef areas is contained in several sections of Chapter 3.

Rocky reefs were included as an HAPC designation alternative under 50 CFR 600.815(a)(8)(1) and 50 CFR 600.815(a)(8)(2) because they are of ecological importance and are sensitive to human-induced environmental degradation.

Alternative B.7: Areas of Interest (Component of the Final Preferred Alternative)

This alternative would designate areas that are of special interest due to their unique geological and ecological characteristics.

The following areas of interest are:

- Off of Washington: the northern portion of the northwest Olympic Coast National Marine Sanctuary (NMS) and Grays Canyon
- Off of Oregon: Daisy Bank/Nelson Island, Rogue Canyon, Heceta Bank, Astoria Canyon, Thompson Seamount, and President Jackson Seamount
- Off of California: Gumdrop Seamount, Pioneer Seamount, Guide Seamount, Taney Seamount, Davidson Seamount, and San Juan Seamount; Eel River Canyon, Mendocino Canyon; Morro Ridge, Gorda Escarpment, Cordell Bank; Monterey Bay, Monterey Canyon, and the Cowcod Conservation Area(s)

The Council could choose any combination of these areas as part of a preferred alternative. Figure 2-12 shows the location of these HAPCs.

Seamounts and canyons are prominent features in the coastal underwater landscape, and may be important in rockfish management because "rockfish distributions closely match the bathymetry of coastal waters" (Williams and Ralston 2002).

Seamounts rise steeply to heights of over 1000 m from their base and are typically formed of hard volcanic substrate. They are unique in that they tend to create complex current patterns (Lavelle et al, 2003; Millineaux and Mills 1997) and have highly localized species distributions (de Forges et al, 2000). Worldwide, it is estimated that 15% of species that live on seamounts are possibly seamount endemics, but a recent study on a southwest Pacific seamount suggested a greater portion (29-34%) of the species found there were potentially endemic (de Forges et al, 2000) and therefore require careful management. Currents generated by seamounts retain rockfish larvae (Mullineaux and Mills 1997; Dower and Perry

2001) and zooplankton, a principal food source for rockfish (Genin et al, 1988; Haury et al, 2000). Several species observed on seamounts, such as deep sea corals, are particularly vulnerable to anthropogenic impacts (Sanctuary Integrated Monitoring Network ([SIMoN]) website September 30, 2004). Seamounts also provide habitat for many groundfish prey species (See Section 3.3.3.2)

Canyons are complex habitats that have enhanced biomass due to on-shore transport and high concentrations of zooplankton, a principal food source of juvenile and adult rockfish (Brodeur 2001). Canyons may have hard and soft substrate and are high relief areas that can provide refuge for fish, and localized populations of groundfish may take advantage of the protection afforded by canyons (SIMoN website September 30, 2004) and the structure-forming invertebrate megafauna that grow there. A canyon in the North Pacific was observed to have dense aggregations of rockfish associated with sea whips (*Halipteris willemoesi*), while damaged sea whip "forests" had far fewer rockfish (Brodeur 2001).

Cordell Bank is an offshore granite bank about 45 nautical miles (nm) northwest of San Francisco, California. The vertical relief and hard substrate of the Bank provides benthic habitat with near-shore characteristics in an open ocean environment 20 nm from shore. Unpublished observations indicate the presence of many rockfish species, sponges, anemones, hydrocorals, hydroids, tunicates, and scattered crabs, holothurians, and gastropods (CBNMS and MBNMS 2004). Many species have been observed, either deeper, farther north, or farther south than ever before known (Schiemder 1991). Four fisheries have occurred throughout the range of the entire Cordell Bank National Marine Sanctuary: Dungeness crab, highly migratory, groundfish and salmon (CBNMS and MBNMS 2004).

Daisy Bank is a highly unique geological feature that occurs in federal waters due west of Newport, Oregon and appears to play a unique and potentially rare ecological role for groundfish and large invertebrate sponge species. The bank was observed in 1990 to support more than 6,000 juvenile rockfish per hectare; a number thirty times higher than those observed on adjacent banks during the same study period. The same study also indicated that Daisy Bank seems to support more and larger lingcod and large sponges than other nearby banks (Hixon August 2004). This alternative is consistent with 50 CFR 600.815(a)(8)(1) and (3).

Alternative B.8: Oil Production Platforms (Component of the Final Preferred Alternative)

This alternative designates areas around oil production platforms in Southern California waters. According to a report submitted to the Council by the California Artificial Reef Enhancement Program (CARE 2004), currently there are 27 such platforms remaining out of the 34 constructed since the late 1950s. Of these platforms, twenty four are included for possible HAPC designation; twenty-three of in federal waters and one are in California state waters. Platforms included under this alternative are listed in Table 2-1. Figure 2-13 shows the location of these HAPCs. High concentrations of groundfish have been observed in association with many of the platforms off the California coast, including overfished species such as bocaccio and cowcod. In addition to providing suitable habitat, most of these structures are not fished and act as de facto reserves. The platforms rise steeply from the bottom and provide distinctive high relief habitat in primarily soft bottom habitat. Recent scientific study has yielded supporting evidence of the high productivity, and possibly strong ecological importance, of platform habitats to groundfish species. Therefore oil platforms are included as an HAPC designation alternative under 50 CFR 600.815(a)(8)(1); the importance of the ecological function provided by the habitat.

Alternative B.9: Process for New HAPC Designations (Component of the Final Preferred Alternative)

This alternative establishes a streamlined process for designating new HAPCs, based on proposals submitted to the Council. This procedural alternative recognizes that new scientific information could reveal other important habitat areas that should be designated HAPCs, based on the criteria outlined above. This process allows organizations and individuals to petition the Council at any time to consider a new designation and ensures, provided they submit a complete package as described below, that their proposal will be considered by the Council. In establishing an HAPC designation process, this alternative is akin to the stock assessment review (STAR) process the Council has implemented, but would not be tied to a fixed schedule coordinated with biennial management. The designation process would include the following elements:

1) A petitioner submits a proposal for a new HAPC by letter to the Chairman and Executive Director of the Council.

2) Mandatory components of a proposal would be identified in the FMP (by amendment). Proposals would be required to include: (a) the location of the HAPC, defined by specified geographic characteristics such as coordinates, depth contours, distinct biogeographic characteristics; (b) how the HAPC meets one or more of the criteria specified in regulations at (50 CFR 600.815 (a)(8)); and (c) a preliminary assessment of potential biological and socioeconomic effects of the designation.

3) Council/NMFS staff determine whether the proposal contains the mandatory components outlined in step two. If this technical review determines that the proposal is inadequate, staff return it to the petitioner for revision and resubmission. If it is determined adequate, staff forward it to the Council for full consideration as described below.

4) Full consideration of HAPC proposals would occur over three Council meetings:

    i. At the first meeting the Council would establish a timeline for consideration, including merit review by the HC and the SSC.

    ii. At the second meeting the HC and SSC would provide their merit review to the Council. Depending on the results of this review, the Council could direct staff to begin developing any documentation necessary for implementation. The proposal would also be forwarded to other advisory bodies for additional review.

    iii. At the third meeting the Council would receive advisory body reports, review implementing documentation, and decide whether to approve an FMP amendment for Secretarial review.

Table 2-1: Oil Platforms considered for HAPC designation (added since Draft EIS).

Platform	Latitude/Longitude	Located in Federal or State Waters?	Included in Council Preferred Alternative	Included under Alternative A.6?
Ellen	33°35'N, 118°08'W	Federal	No	Yes
Elly	33°35'N, 118°08'W	Federal	No	Yes
Eureka	33°34'N, 118°07'W	Federal	No	Yes
Harmony	34°23'N, 120°10'W	Federal	No	Yes
Henry	34°20'N, 119°34'W	Federal	No	Yes
Heritage	34°21'N, 120°17'W	Federal	No	Yes
Hillhouse	34°20'N, 119°37'W	Federal	No	Yes
Hogan	34°20'N, 119°32'W	Federal	No	Yes
Holly	34°23'N, 119°54'W	State	No	Yes
Houchin	34°20'N, 119°33'W	Federal	No	Yes
Edith	33°36'N 118°08'W	Federal	Yes	Yes
Gail	34°08'N, 119°24'W	Federal	Yes	No
Gilda	34°11'N, 119°25'W	Federal	Yes	Yes
Grace	34°11'N, 119°28'W	Federal	Yes	Yes
Habitat	34°17'N, 119°35'W	Federal	Yes	Yes
Harvest	34°28'N, 120°41'W	Federal	Yes	Yes
Hermosa	34°27'N, 120°39'W	Federal	Yes	Yes
Hidalgo	34°30'N, 120°42'W	Federal	Yes	Yes
Hondo	34°23'N, 120°07'W	Federal	Yes	No
Irene	34°37'N, 120°44'W	Federal	Yes	Yes
Platform A	34°20'N, 119°37'W	Federal	Yes	Yes
Platform B	34°20'N, 119°37'W	Federal	Yes	Yes
Platform C	34°20'N, 119°38'W	Federal	Yes	Yes

Source: Coordinates for platforms in State waters were obtained from OCS MMS Report 2000-057, Oil-Spill Risk Analysis: Pacific Outer Continental Shelf Program; Coordinates for platforms in Federal waters were obtained from the Minerals Management Service website, February 4, 2004 by A. Bailey.

2.5 Alternatives to Minimize Adverse Fishing Impacts to EFH

The NRC report cited earlier characterizes three variables that directly influence fishing impacts on habitat: gear type, habitat type, and intensity of fishing effort (National Research Council 2002). The suite of management tools that can be used to minimize adverse impacts to EFH involve gear modification, area closures, or fishing effort reduction. The Council identified 14 alternatives, some with additional sub-options, for inclusion in the DEIS. These alternatives mainly employ gear-specific area closures and gear restrictions. Alternative C.10 has an explicit effort reduction component. However, the Council recognizes the need to reduce fishing effort, particularly in the groundfish limited entry trawl sector.

The Council chose seven preliminary preferred alternatives in this category, Alternatives C.4, C.9, C.10, C.11, C.12, C.13, and C.14. Alternative C.4 has two options; only one of which is included in the final preferred alternative. The other alternatives are not mutually exclusive. Furthermore, Alternatives C.12 through C.14 incorporate the concept outlined in Alternative C.4, limiting the expansion of fisheries into previously unfished areas.

2.5.1 Scientific Basis for Alternatives to Minimize Adverse Fishing Impacts to EFH

The Magnuson-Stevens Act mandates that the FMP contain measure to minimize, to the extent practicable, adverse effect from fishing on EFH. The EFH final rule establishes that Councils must act to minimize, to the extent practicable, adverse effects from fishing when such effects are more than minimal and temporary in nature (50 CFR 600.815). This is referred to in the remaining sections as the "minimal and temporary threshold." The Risk Assessment process for this EIS sought to geographically delineate where specific habitat/fishing gear combinations exceed the threshold to trigger Council action. The following sub-sections briefly summarize the results of the Risk Assessment and explain how they were applied in development of alternatives.

The Risk Assessment organizes the best available information into a GIS database for addressing the minimal and temporary threshold. There are strengths and weaknesses in the information. The following sub-sections are provided to disclose our capabilities in assessing impacts relative to a minimal and temporary threshold.

An assessment of the minimal and temporary threshold ideally addresses all effects on habitat (i.e. fishing and non-fishing) to produce a map of specific areas where adverse impacts should be minimized. Although the clear focus of the Council's responsibility is fishing impacts, the cumulative effects of all potential impacts are important.

Adverse effect means any impact that reduces the quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside EFH, and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

To isolate areas that have been subjected to adverse effects as described in the EFH Final Rule, the TRC created a decisionmaking framework that identifies fundamental data inputs and interpretation (Figure 2-14). The data inputs are described in detail in the Risk Assessment and include the broad categories of habitat, habitat use, fishing effects, non-fishing effects, and existing protection. Chapters 4 and 5 of the Risk Assessment describe a robust attempt to bring the data inputs together in an interpretive model to output mapped areas of adverse impacts as defined in the EFH Final Rule. This attempt at modeling was recognized as preliminary, and due to data and time constraints it was not possible to progress the analysis sufficiently to provide a fully integrated quantitative analytical tool capable of identifying areas of impacted habitat and demonstrating the effects of minimization alternatives. A report on the utility of the model by the Council's SSC is contained in Appendix D. The central constraint to the impacts analysis was insufficient data of the necessary resolution to model a relationship between the intensity of fishing effort and effects on habitat. The lessons learned through the modeling process are discussed here to illuminate the analytical capabilities available for the EIS and define the results of the assessment that form the basis for the alternatives.

2.5.1.1 Summary of the Assessment to Determine Adverse Effects and the Application for Developing the Alternatives

Although the impacts model described in the Risk Assessment was considered insufficiently developed for use in quantitative analysis of impacts, reviewers agreed with the authors that the risk assessment provided both essential data sets and relevant lessons for application in the EIS (Appendix D). The reviewers were constructive in separating useful elements for the EIS. The reader should note that analytical limitations are presented with the express purpose of informing decisionmakers so that, where appropriate, precautionary management principles (how to act in the absence of definitive information) can be considered.

State-of-the-art habitat effects research is focused on physical alteration to habitat and changes in biodiversity that result from impact. This means it is not possible to construct alternatives that are specifically targeted at objectives other than these two variables. The relevance of this limitation is that alternatives cannot be quantitatively constructed to increase production of groundfish or enhance ecosystem function.

Another limitation is that the status of habitat in reference to a pristine condition is not knowable through assessment. Three variables are fundamental to assessing the status of habitat: the locations and intensity of fishing impacts, the sensitivity of specific habitat types to specific impacts at differing levels of intensity, and the potential for habitat to recover between impact events. Each of the habitat types on the West Coast probably react differently to different types and intensity of impact; and, have unique rates of recovery. The status of habitat is a balance in how the habitat was affected by an impact and how much recovery takes place between impacts. The impacts model described in Chapters 4 and 5 of the Risk Assessment brought the available information together in a structured model to assess the status of habitat at the scale of the West Coast. Limited information on the relationship between fishing impact and the intensity of fishing effort rendered the results of the model presently unusable for purposes of analysis in the EIS.

Although it is not possible at this time to quantify the status of habitat, several important principles came out of the Risk Assessment process and were utilized to develop alternatives. Figure 2-15 is a theoretical representation of habitat impacts at differing intensities of fishing effort and is used here to illustrate principles for considering the ramifications of habitat impacts in this EIS. The curves represent the intersection of fishing effort and habitat impact and are shown for habitat types of differing sensitivity. The principles are discussed in terms of fishing but hold true for non-fishing and environmental variables as well. They are:

1. Habitat that has not been subject to impact is pristine. This simple point holds true for impacts, regardless of their source. The curves in the figure originate at 0 (for both effort and impact) to demonstrate this principle.

2. The sensitivity of habitat governs the slope of the impact function. This is represented in the figure by showing separate curves for unique sensitivity levels. The curve on the left rises steeply

to show a scenario in which highly sensitive habitat takes relatively little fishing effort to become highly impacted. In theory, a single contact between fishing gear and habitat would have devastating effects on the habitat. The curve to the right shows a scenario for less sensitive habitat where impact increases gradually with increased fishing effort. In theory, repeated contacts between fishing gear and habitat would result in only marginal increases to the overall habitat impact under this scenario.

3. There is a maximal level of impact at which additional fishing effort results in no additional impact. This is demonstrated in the three curves to the left that achieve an asymptote, or leveling off, in impact. At this level of impact, the habitat would be impacted as much as it possibly can be regardless of how much additional fishing effort is applied. Similarly, modest reductions in fishing effort are likely to have little benefit.

4. Habitat has a limited capacity to recover from impact, and recovery is ongoing from some point in time after the impact ceases. This is particularly true in cases where habitat impact is measured in reduced biodiversity where organisms may repopulate an area after impact.

5. Repeated contact with fishing gear will cause the status of habitats to move from left to right along these curves, while recovery between contacts will move the status from right to left back down the curves.

Another important principle that informed the development of alternatives is that adverse impacts to habitat can impair the ability of fish to carry out basic biological functions such as spawning, feeding, breeding, and growth to maturity. Fish, like all organisms, rely on habitat for their survival. The habitat requirements of many fish change depending on the life history stage. Pacific coast rockfish, for example, spend their early life history as eggs and larvae floating in the water column before settling as juveniles on the substrate, where they grow to maturity and reproduce. Although it cannot be quantified, healthy functioning habitat is critical for populations of fish to sustain themselves and there is a level at which adverse impacts to habitat will impair the ability of fish to do so.

Large-scale modification to habitat may have long-lasting or permanent implications at the scale of the ecosystem. Benthic and pelagic habitats are fundamental components of the ecosystems off the West Coast as are the fish and other organisms that rely on them. It follows that large-scale modification to habitat can result in fundamental change to the ecosystem. For example, if a complex habitat that supports reproduction of a species is modified to the point that the species can no longer reproduce successfully there, and the species is unable to adapt and reproduce elsewhere, the survival of the species and its role in the ecosystem would be threatened. The extent of the threat would depend on the extent of the modification (e.g., is all of the habitat non-functional or just a portion?), and the related ability of the habitat to recover and/or the species to adapt to alternative habitats. Some habitats may take a long time to recover or may reach an alternative stable state from which a return to its former state is highly unlikely, even following a complete removal of impacts and thus evolve into a new role in the ecosystem.

In light of this, NMFS and the Council took a precautionary approach to developing the alternatives. That is, although the alternatives cannot be specifically targeted to promote sustainable fisheries with predictable population-level results, the alternatives were developed to reduce adverse impacts in terms of physical modification to habitat and biodiversity. The paucity of quantified, spatially explicit data on adverse impacts, and the extent to which adverse impacts have reduced the ability of groundfish to sustain themselves, functioned as the problem statement around which the alternatives were constructed. The alternatives were deliberately developed to reflect the broad range of available data and present the full spectrum of precautionary choices for decisionmakers to meet the purpose and need of action to minimize the adverse effects of fishing. The remainder of this sub-section discusses the information compiled through the Risk Assessment and scoping processes and how it was utilized as the basis for specific alternatives. Additional detail is provided under the alternative headings as appropriate. It should be noted that the complete Risk Assessment contains more information than is presented here and is incorporated by reference.

<u>Sensitivity and Recovery Indices</u>

The magnitude and duration of fishing gear effects on habitat are required components of the EIS and are considered here by incorporation of Appendix 10 to the Risk Assessment: *Pacific Coast Groundfish EFH; The Effects of Fishing Gears on Habitat: West Coast Perspective.* This study was done specifically for the EIS in order to put information from global habitat studies in the context of the West Coast. This was necessary because very little direct research on fishing impacts to habitat have been done on the West Coast. Practicable Council action is triggered by adverse effects that are more than minimal and not temporary in nature (50 CFR 600.815). There is a paucity of scientific information from the West Coast to help us understand the location of effects of fishing on habitat that exceed the "minimal and temporary threshold." However, there is significantly more information available from the rest of the world. If the analysis of adverse effects were to rely only on information from studies that were conducted on the West Coast, it would not be possible to make informed judgment on the location and nature of habitat impacts from fishing. In recognition of this problem, the TRC recommended during their February 19-20, 2003, meeting that the global literature be interpreted in the context of the West Coast. In doing so, they recognized that the effects of fishing on West Coast habitats could be inferred from studies conducted in other areas.

In summary, the West Coast perspective study assigns sensitivity values (magnitude of the effect; e.g., minimal) and recovery times (duration of the effect; e.g. temporary) to the habitat type/fishing gear combinations documented on the West Coast. The resulting values were then mapped using GIS.

The process of inference from global literature results in a loss of resolution in some cases. For instance, Appendix 9 to the Risk Assessment describes 30 fishing gears known to be in use (or that have been used) on the West Coast. To consider the global literature in the context of the West Coast, the gear types had to be filtered down into five major categories of dredge, trawl, nets, traps and pots, and hook and line.

Sensitivity values for each habitat type/fishing gear combination are resolved to a four-point scale that represents direct change to habitat and biodiversity as a result of fishing. The sensitivity of habitat is indexed as follows:

0 = No detectable adverse impacts on the seabed; i.e., no significant differences between impact and control areas in any metrics.

1 = Minor impacts such as shallow furrows on bottom; small differences between impact and control sites, less than 25% in most measured metrics.

2 = Substantial changes such as deep furrows on bottom; differences between impact and control sites 25-50% in most metrics measured.

3 = Major changes in bottom structure such as re-arranged boulders; large losses of many organisms with differences between impact and control sites greater than 50% in most measured metrics.

Recovery time is indexed in years.

This information is applied explicitly in alternative C-3.

HSP Profiles and Maps

HSP profiles and maps are summarized in section 2.3.1. This information is applied in alternative C-6.

Maps of Habitat Types and Habitat Use Data

GIS information compiled through the Risk Assessment and brought forward during scoping delineates the known habitat types for the West Coast. Additionally, a database that describes the association of groundfish with habitat types was assembled. Information on the location of and groundfish association with megahabitats (e.g., canyons and seamounts), substrate types (e.g., hard or soft), macro-scale habitat, biogenic habitat, bathymetry, and prey resources (e.g., krill) are examples of the information that was considered in the development of alternatives and used to identify areas of interest. This information forms the basis of alternatives C-5, C-7, and components of C-12 through C-14.

Structure-forming Invertebrate Information

Structure-forming invertebrates are habitat types of biological origin. There is insufficient data on structure-forming invertebrates to base alternatives on distinct polygons in the GIS analysis of habitat types (note that kelp and seagrass are structure forming and are included in the description of habitat types above). However, data from trawl surveys and other sources have been assembled and are described in Appendix B. These trawl surveys are directed to collect groundfish and information for the purposes of groundfish stock assessment, but some indirect information on invertebrates is also obtained. While the protection of structure-forming invertebrates cannot be quantified, enough information exists to perform a qualitative analysis though the effects of the alternatives are largely unknown. This information forms the basis of alternative C-4 and components of alternatives C-7, C-8, C-10, C-12, C-13, and C-14.

A recent innovation by Oceana is their calculation of "biogenic areas" based on trawl survey data. This methodology had not been peer-reviewed as of publication of the DEIS, but was used for components of alternatives C-12 through C-14, as well as the final preferred alternative. During the public comment period, the Council's Scientific and Statistical Committee reviewed the methodology and approved use of the information (See Appendix D).

Fishing Gear Descriptions

Appendix 8 of the Risk Assessment contains a detailed review of the fishing gear deployed on the West Coast, including potential impacts of each gear type, and was utilized in the development of alternatives C-9, C-11, C-12, C-13, and C-14.

Additionally, the effects of the 2000 trawl footrope restriction and associated landing limits on the spatial distribution of fishing effort within certain habitat types is discussed in Appendix 19 to the Risk Assessment and is the basis for alternative C-2.

Spatially Explicit Estimates of Fishing Effort and Revenue

Information from trawl logbooks was used to calculate spatially explicit estimates of trawl effort and revenue, which were utilized to site area-based alternatives in consideration of economic value. Similar information on fixed-gear and recreational fisheries does not exist at the scale of the West Coast. The information was considered in the development of all the area-specific alternatives, but most explicitly in C-3, C-4, C-12, C-13, and C-14, where adjustments were made for revenue thresholds.

Public Proposals and Other Information

Public proposals and other information were also used in the development of alternatives and are explained in the context of alternatives C-4, C-8, C-10, and C-12 through C-14.

Summary Conclusions

In summary, at this time NMFS and the Council are not able to make a definitive determination that adverse effects from fishing to EFH have occurred or are occurring. However, we have taken a precautionary approach, based on the best available science, to developing the alternatives based on the potential for adverse effects to EFH. The precautionary approach is justified by the potential for adverse effects to significantly impair the ability of fish to carry out basic biological functions. Based on the precautionary approach, and to make a broad range of choices available to decisionmakers, alternatives were developed from each available source of information as compiled through the risk assessment and public proposals.

2.5.2 Description of Impacts Minimization Alternatives

Alternative C.1: No-Action

Amendment 11 to the FMP, which originally incorporated EFH-related SFA requirements into the groundfish FMP, did not include measures to minimize fishing impacts on EFH. However, as discussed in Chapter 1, measures intended to reduce bycatch of overfished species may have a collateral beneficial effect on EFH. Restrictions on the use of large footrope gear have had a demonstrable effect on fishing behavior and the types of habitat that are accessible. As discussed in the description of Alternative C.2, as a result of these restrictions fishermen have avoided rocky areas, which are not only important habitat for some overfished species but may also be more sensitive if they harbor concentrations of benthic invertebrates such as corals and sponges. RCAs have closed areas to some forms of bottom-contacting fishing gear and thus may have some mitigative effect. The boundaries of these areas are based on depth ranges where, according to catch records, bycatch of overfished species is highest. Along parts of the coast where the continental shelf is narrow and the continental slope is steep, the RCAs are not very wide and may only affect a small portion of habitat. Furthermore, RCAs are designed using catch information; the functional importance of specific habitat types is not a factor in determining their extent.

Alternative C.2: Depth-based Gear-specific Restrictions (Component of Final Preferred Alternative)

The groundfish FMP allows fishing vessels to use large footrope, small footrope, and mid-water or pelagic trawl gear as defined at 50 CFR 660.302 and 660.322(b). Specific restrictions on the use of these gear types are established as part of the biennial harvest specifications process. The most recent biennial management period began on January 1, 2005. The Council also recommends inseason adjustments to these management measures, which may include gear-related measures.

This alternative contains three options closing waters shoreward of specific depth contours to large footrope trawl gear and fixed gear. The footrope runs along the bottom of the net opening and its size is regulated to dictate the maximum size of rollers that can be affixed to the footrope. Without larger footrope gear, bottom trawl nets snag more easily on rough, irregular terrain; thus restrictions on footrope size discourage fishing in rocky areas and have the potential to minimize adverse impacts to EFH. A recent study by Oregon State University researchers (Bellman and Heppell 2004) provides the rationale for this alternative. Bellman's work demonstrated that restrictions on the use of large footrope gear and associated landing limits, first implemented in 2000 in order to reduce catches of certain overfished rockfish species, reduced bottom trawling in rocky habitat. However, this research did not conclusively separate the effect of limiting the large footrope gear alone, without the connection to associated landing limit changes.

Although the impacts of deploying fixed gear, such as longlines and traps, is considered less severe than that resulting from bottom trawling, these gear types can access the rocky habitat currently inaccessible to small footrope trawl gear. Therefore, this alternative closes shoreward areas to fixed gear.

Large footrope trawl gear is prohibited in areas shoreward of the RCAs north of Cape Mendocino, California. The seaward RCA boundary for limited entry trawl in the 2005-2006 biennial management period is 200 fathoms north of 38° N latitude and 150 fathoms south of 38° N latitude. The seaward boundary of the limited entry fixed gear RCA for 2005-2006 is 100 fathoms north of 40° 10' N latitude and 150 fathoms south of that line. Although prohibited to the shoreline off of Washington, fixed gear is allowed inside of a shoreward boundary varying between 20 fm and 60 fm, depending on location and season, off of Oregon and California.

This alternative contains three options for closures, which are similar to those in effect because of the RCAs and related gear restrictions. However, there are some important distinctions. First, the current closures are established and modified on a continuing basis in order to reduce bycatch of overfished species. Thus, their boundaries vary over time, although because of the long rebuilding periods for many of the overfished groundfish species, RCAs are likely to be in place for a long time. This alternative would establish permanent gear-specific closed areas intended not just to address overfished species bycatch, but also the effects of these gear types on bottom habitat. Second, these options would effectively close the nearshore areas currently open to limited entry fixed gear off of Oregon and California. Third, all fixed gear—not just those used by groundfish limited entry permit holders—would be prohibited in the designated closed areas. For example, the Dungeness crab trap fishery, managed by the states, is not subject to current limited entry fixed gear closures, but would be prohibited in the closed areas identified in this alternative.

This alternative has three options:

> **Option C.2.1**: Prohibit the use of large footrope trawl gear shoreward of 200 fm and prohibit all fixed gear shoreward of 100 fm north of 40°10' N latitude and 150 fm south of 40°10' N latitude. (See Figure 2-15)
>
> **Option C.2.2**: Prohibit the use of large footrope trawl gear throughout the EEZ and prohibit all fixed gear shoreward of 100 fm north of 40°10' N latitude and 150 fm south of 40°10' N latitude. (See Figure 2-16)
>
> **Option C.2.3**: Prohibit the use of large footrope trawl gear shoreward of 200 fm and prohibit all fixed gear shoreward of 60 fm coastwide. (See Figure 2-17)

Alternative C.3: Close Sensitive Habitat

Habitat sensitivity and recovery index values were developed as part of the fishing impact model component of the comprehensive risk assessment and are described in the preceding sub-section. Although the SSC did not approve the impact function component of the model for use in developing the alternatives in this EIS, the methodology for developing the indices was approved. Based on a comprehensive survey of the scientific literature on the effects of fishing on different habitat types, index values were developed and assigned to each of the unique habitat areas (or polygons) identified in GIS. The sensitivity index uses a zero to three integer scale (See Section 2.5.1.1). Each interval in the scale is based on a descriptive assessment of effects. Recovery index values are the number of years required, in the absence of fishing, for a habitat to return to a pre-existing state. Index values are specific to a particular gear type. In other words, a particular habitat will have different index values for dredge gear, bottom trawl, nets, hook-and-line, and pots and traps. This alternative focuses on those habitats that, according to the sensitivity and recovery index, are the most sensitive to impact and the slowest to recover.

Area closures are defined using these gear-specific sensitivity and recovery index values. Habitat areas above index value thresholds for any gear type, as specified in the following options, are closed to all fishing. This alternative has four options:

> **Option C.3.1**: For each gear type, those areas where the sensitivity index value is greater than or equal to two and the recovery index value is greater than one are identified. The combined area is then screened to include only the area where the cumulative number of hours trawled from 2000 through 2002 is less than 100 hours. The resulting areas are closed to all fishing (i.e., to all gear types). (See Figure 2-18)
>
> **Option C.3.2**: For each gear type, those areas where both the sensitivity and recovery index values are greater than or equal to 0.5 are identified. The combined area is then screened to include only the area where the cumulative number of hours trawled from 2000 through 2002 is less than 100 hours. The resulting areas are closed to all fishing (i.e., to all gear types). (See Figure 2-19)
>
> **Option C.3.3**: The same as Option 1 except no adjustment is made for trawl effort. (See Figure 2-20)
>
> **Option C.3.4**: The same as Option 2 except no adjustment is made for trawl effort. (See Figure 2-21)

Alternative C.4: Prohibit the Geographic Expansion of Fishing (Component of the Final Preferred Alternative)

Under this alternative, areas that have not been fished recently (2000-2002) would be closed to fishing to protect areas that are potentially pristine. This alternative would prevent impact to organisms such as deep-sea corals that may occur in pristine areas and are particularly vulnerable to maximal impact in association with a single fishing event (Roberts and Hirshfield 2004). The alternative is modeled after a provision in Senate Bill 108-1953 that would create “coral management areas” where the seafloor has not been affected by fishing for a qualifying period. Because there is relatively little known about the abundance and distribution of deep sea coral, areas that have not been impacted are potentially pristine habitats. This alternative takes a precautionary approach to protection of such habitats.

The qualifying period, the years 2000-2002, was chosen to represent the time period during which regulations began to become more stringent in response to overfishing. The years after 2002 were excluded from the qualifying period; however, to avoid inclusion of areas, such as the RCAs, that have been closed on an annual and inseason basis to foster rebuilding of overfished species.

This alternative has two options:

> **Option C.4.1**: Trawl fisheries would be prohibited from fishing in areas that were untrawled during 2000-2002 (See Figure 2-22).

Option C.4.2: Apply the expansion limit to all bottom-tending gear types. Due to the absence of geo-referenced fishing effort data for fixed-gear fisheries, the closure would extend west from a line approximating the 2,000 m (1,094 fm) depth contour to the seaward margin of the EEZ (See Figure 2-23).

Alternative C.5: Prohibit a Krill Fishery

Krill, or euphausiid shrimp, are important prey for a wide range of fish species along the West Coast. As such, they may be primary prey for groundfish, or linked to groundfish in other ways through the food web (i.e., they are prey for groundfish prey). For this reason, they could be considered a part of pelagic EFH, meriting protection from the direct effects of fishing. A report to the Council (Smith 2004) notes that although eight krill species form the bulk of the euphausiid community in the California Current System, two cold-water species, *Euphausia pacifica* and *Thysanoessa spinifera*, form dense surface aggregations likely to serve as prey for fishery target species.

At their November 2004 meeting, the Council considered development of a formal prohibition on directed fisheries for krill in Council-managed waters. State laws currently prohibit krill landings by state-licensed fishing vessels at California, Oregon, and Washington ports. Thus, any Council action would provide for consistent federal and state management. There are currently no directed krill fisheries in Council-managed waters. The Council considered three options for implementing such a ban:

- Use the List of Fisheries established under §305(a) of the Magnuson-Stevens Act and published at 50 CFR 600.725(v). The list identifies all fisheries under the authority of each regional Council and all fishing gear used in such fisheries. It provides a means to prohibit the entry of new gear types into U.S. fisheries until a Council has had an opportunity to evaluate whether the entry would be consistent with the Council's management programs. Gear used to harvest krill would be prohibited through the List of Fisheries.

- Incorporate krill as a management unit species in the Council's Coastal Pelagic Species (CPS) FMP. The authority under this FMP could then be used to prohibit krill fisheries.

- Designate krill as forage under one or more FMPs. The Council's FMPs would be amended to designate krill as forage for managed species and then prohibit fishing for krill. This approach was used by the North Pacific Council, which amended its fishery management plans for Gulf of Alaska groundfish and Bering Sea groundfish to prohibit krill fishing.

- Designate krill as a component of EFH as part of this EIS and prohibit fisheries that target it.

This alternative would implement the last of the four proposals described above. However, at their November 2004 meeting, the Council decided to address this issue through an amendment to the CPS FMP due to the likelihood it could be implemented more quickly. Therefore, it was not chosen as a preliminary preferred alternative in this EIS.

Alternative C.6: Close Hotspots

This alternative prohibits trawling in habitat that has high probability of being EFH for a large number of groundfish as a means of focusing protection in areas of high groundfish diversity. First, for each modeled species the top 20% HSP area is found (see Section 2.2 for a discussion of this methodology). These GIS habitat polygons are then screened to include only those associated with 50 or more species/lifestage combinations. The resulting area is then closed to bottom trawling. Although these areas are termed "hotspots" because of their presumed value to a large number of groundfish, Figure 2-24 shows that most waters shallower than about 200 m would be closed to bottom trawling under this alternative.

Alternative C.7: Close Areas of Interest (Component of the Final Preferred Alternative)

This alternative closes any combination of the areas of interest HAPCs designated under Alternative B.7 to fishing by specified gear types. (The 21 areas of interest listed under Alternative B.7 are underwater features, such as seamounts and submarine areas, or are currently under some form of protection.) Figure 2-25 shows these areas of interest. Closures affect the following activities due to their potential for adverse effects:

Option C.7.1: Close areas of interest to bottom trawling.

Option C.7.2: Close areas of interest to all bottom-contacting activities.

Alternative C.8: Zoning Fishing Activities

Under this alternative NMFS limits the use of bottom-tending fishing gear to specified zones where the agency determines that such activities can be conducted without altering or destroying a significant amount of habitat. This alternative was put forward by the EIS Oversight Committee as a comprehensive strategy for minimizing adverse effects to EFH and adaptive management.

First, all areas deeper than the 2,000 m (1,094 fm) contour along the continental slope extending to the maximum westward range of groundfish EFH are closed to certain bottom-tending fishing gear types, according to the options described below. Second, a five-year transition period to gear specific zones is established for the remaining area inside the 2,000 m contour, which remains open to these activities, subject to any other restrictions, for the five years from implementation (e.g., 2007-2011). Third, during this five-year period, NMFS conducts the research necessary to delineate zones where specified fishing activities would be permitted. At the end of the five-year transition period, the gear-specific zones come into effect and any remaining unzoned area is closed to affected gear types, according to the options described below. (Restrictions applied outside 2,000 m remain in effect.)

Option C.8.1: Fishing zones are established for bottom-contact trawls, dredges, and similar bottom-tending mobile fishing gear. Other bottom-contacting gear types are unaffected by the zoning system, including the prohibition outside 2,000 m (Figure 2-26).

Option C.8.2: Fishing zones are established for all bottom-contacting gear types, including bottom longlines, traps, and pots. The immediate closure outside of 2,000 m applies to all bottom-contacting gear types (Figure 2-26).

In addition to establishing the zoning system, NMFS will conduct a gear substitution and modification research program, intended to redesign bottom fishing gear to reduce damage to habitat. This program will have a significant cooperative research element by employing fishermen in the design and testing of new gear.

The zoning system will be regularly modified to incorporate new information about habitat sensitivity and recovery factors, gear impacts on habitat, and to accommodate use of newly developed or modified gear.

Alternative C.9: Gear Restrictions (Component of the Final Preferred Alternative)

Changing the way fishing gear contacts habitat through gear modification can be an effective way to minimize adverse impacts on habitat. Appendix 8 to the Risk Assessment describes all of the fishing gears that are, or have been, utilized on the West Coast and includes a description of how the gear interacts with benthic habitat. This alternative includes specific gear modifications and prohibitions that are based on that interaction due to the potential for adverse impacts to EFH. Under this alternative the following gear restrictions would be implemented in areas identified as EFH for groundfish:

- C.9.1: Prohibit roller gear larger than 15 inches on bottom trawls.
- C.9.2: Prohibit the use of flat trawl doors (i.e., require cambered doors).
- C.9.3: Limit the length of a single longline groundline to 3 nm.
- C.9.4: Employ Habitat-Friendly Anchoring Systems
- C.9.5: Prohibit dredge gear.
- C.9.6: Prohibit beam-trawl gear.
- C.9.7: Prohibit set-gillnets in waters deeper than 60 fm.
- C.9.8: Prohibit dingle bar gear (troll groundfish gear).

The restrictions are intended to make fishing gear less damaging to bottom habitat.

Alternative C.10: Central California No-trawl Zones (Component of the Final Preferred Alternative)

This alternative is based on a project being undertaken by two environmental advocacy organizations, The Nature Conservancy (TNC) and Environmental Defense Fund (EDF). It involves a public-private partnership under which private funds are used to purchase groundfish limited entry trawl licenses and vessels in concert with the designation, through the Council and NMFS, of no-trawl zones off the central California coast. Figure 2-27 shows the extent of the project area. Any closed areas will be located within this area. TNC and EDF provided a technical write-up of their proposal that is included in Appendix F.

The project area extends from Point Conception to Davenport, California, and includes adjacent offshore seamounts (Gumdrop, Guide, Pioneer, Davidson, and Rodriguez). This area has high biological diversity and ecological value to groundfish and their habitats. It contains nearly the full range of habitat types found on the continental shelf and slope, including estuaries, nearshore rocky reefs, kelp forests, highly diverse soft and mixed bottom habitats, deep canyons, offshore banks, and seamounts. These diverse habitat types are important for the support of a correspondingly rich array of species, including 21 cetacean species, six pinniped species, 184 species of shore and sea birds, and hundreds of fish and invertebrate species. In addition, there is evidence suggesting that benthic biodiversity peaks in upwelling zones found in this area.

TNC/ED have identified 23 permit holders they believe regularly trawl inside the project area. Most homeport in Morro Bay, Moss Landing, Monterey, or Half Moon Bay. TNC/EDF intend to purchase a significant majority of the bottom trawling permits and vessels in this region if the Council/NMFS designates a significant portion of the project area as no-bottom-trawl zones. TNC/ED will identify areas they think should be designated no-trawl zones using the GIS data developed as part of this EIS in combination with a participatory process involving trawl fishermen in the project area. If this alternative is adopted as an FMP and regulatory amendment, these areas will be closed to bottom trawling by NMFS once TNC/EDF have negotiated purchase contracts or options for at least half of the limited trawl permit holders they have identified as operating in the project area. Closed areas and effort reduction are cited by NRC as priority measures to reduce adverse impacts to EFH (NRC 2000).

Alternative C.11: Relax Gear Endorsement Requirements

This alternative would allow fishermen to choose among gear types and potentially use gears that, according to the sensitivity and recovery index, are less damaging to EFH. Vessels holding a groundfish limited entry permit account for a large portion of groundfish landings. Currently, limited entry permits include a gear endorsement specifying the type of gear the permit holder may use. These endorsements identify three gear categories: trawl, longline, and pot. In addition, longline and pot gear permit holders may also have a sablefish endorsement. Permit holders with this species-specific endorsement may participate in the high-value primary sablefish fishery and are allocated vessel-specific catch quotas, known as tier limits because the endorsements fall into one of several categories, or tiers, with different catch quotas. This regime is further complicated by measures that allow a fisherman to "stack" several sablefish-endorsed permits for use by a single vessel, making him eligible for the combined quota of the individual endorsements.

Under this alternative, gear endorsements are relaxed but the sablefish endorsement is not. This would allow permit holders to switch gear types, providing fishermen greater flexibility in changing strategies based on prevailing conditions in the fishery. In terms of mitigating habitat impacts, a benefit may occur if fishermen with trawl-endorsed permits switched to longline or pot gear, since trawl gear is indexed as more damaging to benthic habitat. However, implementing this alternative would also be complicated from a management perspective if it made it more difficult to predict total catches. Currently, management measures, primarily cumulative landing limits, are established according to regulatory categories by modeling predicted total catch for each sector under different cumulative limits. If vessels could freely switch gear during the fishing year, catches in a given regulatory sector might unexpectedly go up or down.

Alternative C.12: Close Ecologically Important Areas to Bottom Trawl (Component of the Final Preferred Alternative)

As discussed in Section 1.7, this EIS is being prepared pursuant to a joint stipulation in *AOC v. Daley*. According to the subsequent joint stipulation, NMFS proposed to the Council that an alternative specified by the plaintiffs, represented by Oceana, be adopted and fully analyzed in the DEIS. Plaintiffs provided their alternative to NMFS as a "specific fishery management action" before the Council meeting at which the alternatives were adopted for analysis in the DEIS. Oceana gave the Council a presentation of their proposal at the September 2004 meeting and a written description at the November 2004 meeting. The Council moved both to include it for analysis in the DEIS and identified it as one of their preliminary preferred alternatives (Figure 2-28). Oceana provided the following text as a description of the alternative. Additional technical description is contained in Appendix C. Oceana subsequently revised this alternative. The revisions were considered by the Council and are described in the Final Preferred Alternative.

> *Draft Plain text description for draft EIS* *January 3, 2005*
>
> ***Comprehensive Collaborative Mitigation Alternative:***
>
> *The Comprehensive Collaborative Alternative seeks to maintain vibrant fisheries while protecting habitat and biodiversity. The Alternative focuses on reducing the impacts of bottom trawling on Essential Fish Habitat. According to the National Academy of*

Sciences (2002) bottom trawling reduces habitat complexity, causes shifts in benthic (bottom-dwelling) communities, and reduces productivity of benthic habitats. The Academy recommends three management measures to reduce the effects of bottom trawling: area closures, gear modifications, and effort reduction. The Alternative employs all three of these management measures, while maintaining commercial fishing opportunities, by limiting fishing to areas where trawling is currently taking place (freezing the existing bottom trawl "footprint"), closing specific areas of sensitive habitat to bottom trawling within the existing bottom trawl footprint, limiting roller gear size, and requiring ongoing research and monitoring.

Spatial Management

The spatial management measures of the Comprehensive Alternative define the areas that are open and closed to bottom trawling. The bottom trawl footprint was defined as those areas where three or more vessels fished with bottom trawl gear between 2000 and 2003. The period from 2000-2003 was selected to reflect current trawling activities, while recognizing that there is variability in where trawling occurs each year. The area within the bottom trawl footprint would remain open to bottom trawling, with the exception of the areas described below. In addition, this alternative does not supercede existing closures and other management measures within the bottom trawl footprint.

With the Comprehensive Alternative, within the bottom trawl footprint, specific areas of complex sensitive habitat would be closed to bottom trawling. Specific areas of complex sensitive habitat were identified using all available datasets and applying the following criteria:

- *Hard substrate, including rocky ridges and rocky slopes (PSFMC 2003)*
- *Habitat-forming invertebrates (Etnoyer and Morgan 2003)*
- *Submarine canyons and gullies (PSFMC 2003)*
- *Untrawlable areas (trawl hangs and abandoned trawl survey stations) (Zimmerman 2003)*
- *Seamounts (PSFMC 2003)*
- *Highest 20% habitat suitability for overfished groundfish species as defined by NOAA (PFMC 2004)*

All data was plotted in GIS and considered in the selection and placement of areas open and closed to bottom trawling, with consideration made to practicability and continued fishing opportunities. For a detailed description of the methodology used in the development see the complete description of this Alternative submitted to the PFMC (available at http://www.pcouncil.org/groundfish/gfefheis/oceana_alternative.pdf).

Figure 1: Spatial Management Summary

[Area of bottom trawl footprint]
minus
[Complex sensitive habitats]
minus
[Existing management closures]
equals
[Area open to bottom trawling]

The scientific justification for closure recommendations is based on the following:

Hard substrate

Hard substrates, which include rocky ridges and rocky slopes, are one of the least abundant benthic habitats, yet they are among the most important habitats for fishes (Hixon et al. 1991, Pacific EFH PDEIS 2005). Hard substrates are also the seafloor substrate most sensitive to bottom trawling (NAS 2002, Pacific EFH PDEIS 2005).

Habitat-forming invertebrates

Deep sea corals and sponges provide three dimensional structures that form habitat for commercial groundfish, shellfish, and other marine life (Husebo et al. 2002; Krieger and Wing 2002, Malecha et al. 2002, Heifetz 2002). Structure-forming invertebrates (or biogenic habitat) are sensitive to impacts from bottom trawl gear (NAS 2002, Anderson et al. 2003, Engel and Kvitik 1998, Krieger 2001, Malecha and Stone 2003, MacDonald et al. 1996, Kaiser et al. 2000, Mortensen et al. 2003, Van Santbrink and Bergman 1994).

An extensive database was used to determine "hotspots" where the presence of habitat-forming invertebrates was frequently recorded or large samples of these invertebrates occurred. The database comprised records from AFSC slope and shelf trawl surveys from 1977 to 2001, NWFSC slope and shelf trawl surveys from 2001 to 2003, and MCBI's database of deep sea coral records. MCBI's database includes coral records from the California Academy of Sciences, Smithsonian Institution, MBARI, and Scripps compiled from various research cruises and scientific collections (Etnoyer and Morgan 2003).

For a detailed description of the methodology used to utilize data on habitat-forming invertebrates, see the complete description of this Alternative submitted to the PFMC (http://www.pcouncil.org/groundfish/gfefheis/oceana_alternative.pdf).

Submarine canyons and gullies

Submarine canyons are known to be areas of enhanced productivity due to current upwelling zones (Freeland and Denman 1982). For this reason, canyons show enhanced concentrations of benthic invertebrates (Haedrich et al. 1980; Sarda et al. 1994; Vetter and Dayton 1999), plankton (Cartes et al. 1994; Macquart-Moulin and Patriti 1996), demersal fishes (Stefanescu et al. 1994), and whales (Kenney and Winn 1987; Schoenherr 1991) relative to surrounding areas on the slope and shelf. Brodeur (2001) found dense concentrations of Pacific ocean perch (Sebastes alutus) and krill associated with biogenic habitats in a Bering Sea submarine canyon, while areas with damaged biogenic structures had far fewer rockfish, and areas in the canyon without biogenic structure had no rockfish.

Untrawlable areas

The Zimmerman (2003) database includes all records from the NMFS West Coast Triennial Trawl Survey where major trawl net hangs were recorded. Since these areas are considered unsuitable for trawling, the assumption is that these records indicate areas of high structural complexity, such as boulders or rock outcrops (Zimmerman, pers. com.). Trawl hangs (or substrate/structure that induces a trawl hang) provide habitat for juvenile fish (Link and Demarest 2003).

Seamounts

Seamounts are sites of enriched biological activity relative to the surrounding waters (Mullineaux and Mills 1997, Dower and Perry 2001, Haney et al. 1995). Koslow et al. (2001) conducted a survey of Tasmanian seamounts where 30% of species identified were new to science and 30-60% were found nowhere else on earth. The rarity and uniqueness of seamount faunal communities provides strong scientific justification for a highly precautionary approach (de Forges et al. 2000, Stocks 2004, Probert et al. 1997).

Highest 20% habitat suitability for overfished groundfish species

Habitat suitability modeling performed in the Habitat Comprehensive Risk Assessment (PFMC 2004) identified areas of the highest suitability for overfished groundfish species. The proposed spatial management measures in this Alternative were selected to ensure protection of habitat important for overfished groundfish species.

Other management measures

In addition to the spatial management measures determining open and closed areas to bottom trawling the following measures would apply:

- *Set a maximum footrope size of eight inches on bottom trawl gear within open area*
- *Require Vessel Monitoring Systems (VMS) on all bottom trawl vessels with positions recorded every 5 minutes*
- *Increase onboard observer coverage on bottom trawl vessels to a level determined to be necessary by NOAA to estimate annual bycatch of habitat-forming invertebrates*
- *Establish a process for setting a limit on the bycatch of habitat-forming invertebrates*
- *Require ongoing research including comprehensive benthic mapping*

Tribal fisheries

This alternative does not apply to those Tribal fisheries with allocation rights within the customary and accustomed Tribal fishing areas given present level of participation and distribution of bottom trawl groundfish treaty fisheries, unless the Fisheries Service concludes that restrictions are necessary for conservation. The Fisheries Service should consult with the Tribes to implement conservation measures, when required, that would affect Tribal fisheries.

Conclusion

This Alternative considered the interrelatedness and spatial arrangement of complex sensitive habitat criteria in relation to areas prosecuted by bottom trawl fisheries to develop an approach to manage the effects of bottom trawling on habitat. The Alternative employed all available data to develop a comprehensive approach to protect Essential Fish Habitat, as required by law, for the Pacific Coast while maintaining vibrant commercial fisheries.

Alternative C.13: Close Ecologically Important Areas to Bottom-contacting Gear (Component of the Final Preferred Alternative)

This alternative, identified by the Council at their November 2004 meeting, is a variation on Alternative C.12. (Because Alternative C.12 was submitted by an outside party, pursuant to a stipulation between NMFS and the plaintiff, represented by Oceana, the Council decided not to modify the alternative by adding options, as is the case with some of the other alternatives. Therefore, this alternative and Alternative C.14, are variations on Alternative C.12, and are identified separately.) Under this alternative, the areas identified in Alternative C.12 (Figure 2-28) are closed to all bottom-contacting gear types because of their potential impact on EFH, defined as both fixed gear (longlines, pots, and traps) and bottom trawl. The open area component would also apply; for the same reason as discussed under Alternative C.4.2, this open area would be defined as waters shoreward of the 2,000 m depth contour not in closed areas.

Alternative C.14: Close Ecologically Important Areas to Fishing

This alternative, identified by the Council at their November 2004 meeting, is a second variation on Alternative, C.12. Under this alternative, the areas identified in Alternative C.12 (see Figure 2-28) are closed to all fishing to provide a full range of precautionary choices for minimizing adverse effects from fishing to EFH. The open area component would also apply; for the same reason as discussed under Alternative C.4.2, this open area would be defined as waters shoreward of the 2,000 m depth contour not in closed areas.

2.6 Research and Monitoring Alternatives

The Council is required by regulation to review the EFH provisions of their FMPs at least every five years (50 CFR 600.815(a)(10)). This requirement was established in the EFH final rule by NMFS to accommodate progress in our scientific understanding of marine habitat. The five-year review cycle is a mandatory checkpoint for the Council to consider new science and amend the FMP if necessary. Information about the location, function, and consequences of human activity on habitat underpins efforts to conserve EFH and address this review requirement. In fact, development of the Risk Assessment described in Appendix A brought to light a variety of data gaps, which have made it difficult to quantify adverse impacts to EFH resulting from human activities, including fishing. The action alternatives described in this section identify measures that the Council and NMFS could implement to increase scientific understanding of groundfish habitat and thereby improve the conservation and management of EFH. The alternatives are not exclusive and more than one may be a component of the final action that results from this EIS.

Alternative D.1: No Action

This section provides an overview of the status of habitat-related research and monitoring on the West Coast.

<u>Habitat and Associated Biological Research</u>

The Risk Assessment involved a data consolidation phase in which the best available ecological, environmental, and fisheries information was reviewed and incorporated into appropriate databases, in consultation with scientific advisory committees and agency scientists. Specific information assembled into a GIS and applied to the identification and description of EFH alternatives including West-coastwide distributions of:

- Benthic substratum types (including maps on data quality in some areas)
- Estuaries
- Canopy kelp
- Seagrasses
- Bathymetry
- Latitude

Also considered in identifying and describing EFH alternatives were data on:

- Presence/absence distribution of some structure-forming invertebrates
- A general description of pelagic habitats
- Associations among groundfish and benthic substratum types

The ultimate goal is to delineate EFH in terms of its contribution to rates of growth, reproduction, survival, and production of the diverse group of groundfishes on the West coast. Currently, our understanding of EFH for many of these groundfish species is based on the distribution of presence/absence data on late-juvenile and adult stages of the fishes and their associated habitats; data on habitat-specific densities is available for only a few species, and there is fewer data to evaluate habitat-specific productivity. Assessing attributes and functions of EFH remains especially difficult in deep-water marine environments because these assessments require advanced and expensive technology such as remotely operated vehicles, manned submersibles, and other types of remote sensing devices.

There is a critical need for comprehensive, detailed, and accurate information on benthic habitats and associated groundfish assemblages on spatial scales relevant to fishery management and habitat protection. Development of more efficient and effective visual and acoustic methods to survey deepwater benthic habitats and fishes is ongoing, especially in complex, diverse habitats that are difficult to assess with conventional survey tools. Additionally, core nursery grounds and spawning areas, both benthic and pelagic, need to be identified for fully-informed protection of these areas to be considered. There also is a critical need to understand the relationship between large climate events and abundance, growth, spawning success, and survival of groundfish species.

Currently there are several efforts underway to create maps of seafloor habitats on the West coast, including those used here to identify EFH alternatives. These efforts have been facilitated by the development of a unifying seafloor classification system for benthic habitats (Greene et al. 1999, 2003). While these efforts represent the first delineation of rocky and unconsolidated seafloor substrata, they are just first step in describing, quantifying, and understanding benthic habitats throughout the entire range of groundfish species on the West coast. These databases and maps currently are considered preliminary because of varying levels of data quality and verification (ground-truthing), as well as the limited spatial coverage of some of the information. Detailed mapping of groundfish habitat has been accomplished in relatively few important areas, such as offshore banks of the Southern California Bight, Monterey Bay, California, and Heceta Bank, Oregon, and is slowly being extended to other areas of the Coast. It is absolutely imperative that the databases and maps be revised and improved on a regular schedule as new information is collected, and that these valuable baseline habitat maps be maintained and made easily accessible to the greater marine resources community. These data are critical not only in the identification of EFH but in comparative risk assessment of anthropogenic impacts (e.g., fishing gears; pollution; dredging; etc.) to these habitats.

Settled juveniles and adults of many species of groundfishes, rockfishes in particular, are difficult (or impossible) to accurately appraise with traditional survey methodologies due to the close association between many of these species and their rugged, rocky heterogeneous habitats. Consequently, alternative techniques, using laser line systems and direct observations along quantitative transects conducted from submersibles in various habitats, are being developed to improve assessments. This approach is especially critical when focusing on benthic habitats of extreme heterogeneity and biological assemblages of high diversity.

Identifying EFH for pelagic groundfish life history stages is a critical line of research that is largely absent in the EFH assessment of alternatives. New technologies, such as airborne LIDAR, are being developed to identify near-surface pelagic stages of some species. Coastwide collection and modeling of relevant information, such as the multi-decadal databases developed from CalCOFI surveys of fish eggs and larvae and from mid-water surveys of newly recruited groundfishes and associated physical oceanographic aspects of habitat (i.e. temperature and salinity from shipboard and satellite remote sensing), are ongoing efforts to better understand the relationship between the structure and function of pelagic habitats and the recruitment, survival, and productivity of managed fish species. Enhanced oceanographic monitoring systems are being developed to meet the need to understand species and climate/ocean interactions in modifying groundfish production.

Research on the distribution and function of structure-forming invertebrates, particularly as components of EFH for groundfish, is just beginning. Only since December 2003 did scientific and technical information on presence/absence distribution and habitat associations of some of these species become available for inclusion in this EIS. Ongoing research includes the systematics, distribution, and abundance of structure-forming invertebrates (particularly corals, sponges, anemones, sea pens, etc.) in deep water. A critical need is to understand the potential role of these species as groundfish EFH in continental shelf and slope ecosystems. Because these large invertebrates enhance the diversity and structural component of fish habitat and are vulnerable to impacts by at least some fisheries, they may signify HAPC.

<u>Research on Anthropogenic Impacts to EFH</u>

The evaluation of anthropogenic impacts to EFH in this EIS was based on sensitivity indices of various types of benthic habitats to disturbance or influence by various types of fishing gears, and on rates of recovery from such disturbances. These indices and rates were estimated from limited information, much of which derived from studies conducted outside our West coast region of interest.

Research on impacts of fishing to groundfish habitat should include objectives to improve our understanding of the ecological effects of fishing on the biodiversity and trophodynamics of ecosystems, the evaluation of gear impacts to marine benthic habitats on the shelf and slope, and the development of ways to reduce adverse impacts, including the use of marine protected areas, modified fishing gear, and bycatch information. To date, the best available science on fishing impacts to benthic habitats is limited to observations of modification to some physical components of habitats and associated changes in biodiversity. Understanding functional impacts (i.e. how physical modification of the ecosystem affects groundfish productivity) begins with the baseline characterization and cataloging of habitats described in this document.

Some critical research needs related to fishing impacts and groundfish populations include:

- estimating rates of impacts of specific fishing gears on the diverse habitat types found on the West coast;

- estimating the rates of habitat recovery from both chronic and acute disturbances;

- quantifying population and ecosystem effects resulting from fishing impacts;
- describing trophodynamic changes related to fishing impacts;
- evaluating the role of MPAs in management of fisheries and habitats; and
- evaluating the influence of MPAs on production, rebuilding, and long term sustainability of groundfish.

The alternatives to the status quo are focused primarily on actions within the authority of the Council and NMFS to monitor fishing-related impacts to EFH. NMFS conducts extensive fishery-related research relevant to groundfish and has a variety of methods to monitor these fisheries. Section 7.1 in the 2005-2006 groundfish harvest specifications FEIS (PFMC 2004) describes groundfish monitoring programs carried out by NMFS, the states, and tribes, and is hereby incorporated by reference. Current monitoring programs especially relevant to the alternatives described here include the limited entry trawl logbook program, the West Coast Groundfish Observer Program, and VMS covering limited entry trawl and fixed gear vessels. These programs are primarily intended to monitor discards and landings of groundfish and to enforce current harvest limits and area restrictions. There is no component specifically intended to monitor the effects of fishing on EFH.

Alternative D.2: Expanded Logbook Program (Component of the Final Preferred Alternative)

Currently, groundfish limited entry trawl vessels are required to record information on the time and location of fishing activities, along with estimates of catch composition, in a logbook. Some of these data are entered into the Pacific Fisheries Information Network (PacFIN) data system and may be accessed by managers. Information on fishing location, albeit limited because only tow set positions have been entered into the database, has proved invaluable to managers. Tow haul positions are now being incorporated into the database as well, to provide additional spatial information on fishing location. Knowing the spatial distribution of fishing effort is especially important to an evaluation of the effects of fishing on EFH. One of the most important data gaps hampering the full development of the fishing impacts model component of the comprehensive risk assessment has been the paucity of this kind of information. Under this alternative vessels in all commercial sectors, including recreational charter (for hire) boats, will participate in an expanded logbook program.

Option D.2.1: All fishing vessels maintain a logbook, recording information on fishing time, location, and catch composition similar to the current trawl logbook program.

Option D.2.2: A representative, random sample of all fishing vessels is required to maintain logbooks, gathering the information described above.

Alternative D.3: Expanded Vessel Monitoring System (Component of the Final Preferred Alternative)

Combining VMS data with logbook and observer data would likely result in a more complete picture of fishing activities, although information contained in observer data is not currently used in regard to monitoring or reviewing fishing location or effort. The key piece of information provided by VMS would be a higher resolution track line of a trawl or fixed gear set. In the past, PacFIN records only included trawl set positions, this limits the ability to determine precisely where fishing impacts have occurred.

This alternative will identify expansion of the VMS program to cover all West Coast groundfish commercial and recreational charter vessels as an important program objective to be implemented through tiered actions. There are various considerations in any such expansion, including how to phase in VMS over time and any thresholds or exemptions (for example, based on vessel length) for VMS requirements. This objective includes the use of VMS data to monitor and evaluate the effects of fishing on groundfish habitat.

Alternative D.4: Research Reserve System (Component of the Final Preferred Alternative)

Another key constraint to understanding the effects of fishing on habitat results from the lack of unaffected control sites that can be used in comparative studies. If fishing is restricted in specific areas to minimize fishing impacts on habitat, some of those areas could be used to measure the length of time needed for habitat features and function to recover. Over time these sites could also be compared with sites where fishing is ongoing in order to research the effects of fishing. This alternative will establish a system of research reserves within closed areas established as part of any of the fishing impact minimization alternatives. These research reserves will help to focus research efforts. By encouraging research in a discrete set of reserve areas, results can be more easily compared. A reserve system could include a representative sample of habitat types in order to allow comparison of the effects of fishing across these different types.

2.7 The Final Preferred Alternative

Table 2-2 lists the alternatives described in Sections 2.3 through 2.6, indicating which were identified as preliminary preferred, incorporated into the final preferred alternative, and whether they were modified when incorporated into the preferred alternative. Of the 21 alternatives identified as preliminary preferred (this count includes sub-options included in some alternatives), 13 were incorporated into the final preferred alternative, some with modifications. The Council also chose six alternatives not identified as preliminary preferred to include in their preferred alternative. The final preferred alternative is described below according to the four categories of alternatives used above.

2.7.1 EFH Identification and Description

EFH is identified as all waters and substrate in depths less than or equal to 3,500 m. and waters and substrate associated with seamounts in depths greater than 3,500 m. When adopting this component of the final preferred alternative, the Council also indicated that any areas they also designated as HAPCs but not already identified by the above criteria would be included in the EFH definition. No such areas resulted from the HAPC designations in this preferred alternative. This component of the final preferred alternative corresponds to Alternative A.2 with the modification identifying seamounts in depths greater than 3,500 m.

The 100% HSP area, all of which occurs in depths less than 3,500 m, constitutes a part of EFH as noted in the description of Alternative A.2.

This EFH identification is precautionary because it is based on the currently known maximum depth distribution of all life stages of FMU species. This precautionary approach is taken because uncertainty still exists about the relative value of different habitats to individual groundfish species/life stages, and thus the actual extent of groundfish EFH. For example, there were insufficient data to derive HSP values for all species/life stages. Furthermore, the data used to determine HSP values is subject to continued refinement. While recognizing these limitations, the 100% HSP area, all of which occurs in depths less than 3,500 m, is identified as a part of groundfish EFH, recognizing that the best scientific information demonstrates this area is particularly suitable groundfish habitat. While precautionary, groundfish EFH still constitutes an area considerably smaller than the entire West Coast EEZ, the groundfish EFH identification under the No Action Alternative.

Figure 2-29 shows the extent of this EFH identification.

2.7.2 Habitat Areas of Particular Concern

2.7.2.1 HAPC Designations

The final preferred alternative includes designation of a wide range of habitat types as HAPC as well as a process for considering revisions to HAPC designations. The Council and NMFS chose this element of the final preferred alternative to highlight particular habitat types for added, precautionary emphasis during the consultation processes.

The following HAPC designations are included in the preferred alternative without modification from the DEIS except that the descriptions encompass the actual rather than mapped extent of these habitats:

Estuaries (Alternative B.2): The inland extent of the estuary HAPC is defined as MHHW, or the upriver extent of saltwater intrusion, defined as upstream and landward to where ocean-derived salts measure less than 0.5 ppt during the period of average annual low flow. The seaward extent is an imaginary line closing the mouth of a river, bay, or sound; and to the seaward limit of wetland emergents, shrubs, or trees occurring beyond the lines closing rivers, bays, or sounds. This HAPC also includes those estuary-influenced offshore areas of continuously diluted seawater. This definition is based on Cowardin, et al. (1979).

Canopy kelp (Alternative B.3): The canopy kelp HAPC includes those waters, substrate, and other biogenic habitat associated with canopy-forming kelp species (e.g., *Macrocystis* spp. and *Nereocystis* sp.).

Seagrass (Alternative B.4): The seagrass HAPC includes those waters, substrate, and other biogenic features associated with eelgrass species (*Zostera* spp.), widgeongrass (*Ruppia maritima*), or surfgrass (*Phyllospadix* spp.).[11]

Rocky reefs (Alternative B.6): The rocky reefs HAPC includes those waters, substrates and other biogenic features associated with hard substrate (bedrock, boulders, cobble, etc.) to MHHW. A first approximation of its extent is provided by the substrate data in the groundfish EFH assessment GIS. However, at finer scales, through direct observation, it may be possible to further distinguish between hard and soft substrate in order to define the extent of this HAPC.

The following HAPC designations are based on the mapped extent delineated in the EFH GIS and represent modifications from the alternatives described in the DEIS:

Areas of interest (Alternative B.7):

- Areas incorporated from Alternative B.7 without modification: Thompson Seamount, Daisy Bank, President Jackson Seamount, Cordell Bank, Gumdrop Seamount, Pioneer Seamount, Guide

[11] The extent and effect of non-native species in seagrass HAPCs, such as *Zostera japonica*, may be considered in conservation recommendations NMFS makes to other federal and state agencies (see Section 7.5)

Seamount, Monterey Canyon, Taney Seamount, Davidson Seamount, San Juan Seamount, Cowcod Conservation Area East.

- Areas incorporated from Alternative B.7 with modification: Potato Bank, Cherry Bank, Hidden Ref/Kidney Bank in the Cowcod Conservation Area West.

- Areas in the preferred alternative that are not part of Alternative B.7: All waters and sea bottom in Washington state waters (0-3 nm); selected areas in the Channel Islands National Marine Sanctuary (Anacapa Island SMCA, Anacapa Island SMR, Carrington Point, Footprint, Gull Island, Harris Point, Judith Rock, Painted Cove, Richardson Rock, Santa Barbara, Scorpion, Skunk Point, South Point); any seamounts off the coast of California not already included in Alternative B.7.

The following areas are part of Alternative B.7 but were not incorporated into the preferred alternative: the northern portion of the northwest Olympic Coast National Marine Sanctuary, Grays Canyon, Astoria Canyon, Heceta Bank, Rogue Canyon, Eel River Canyon, Mendocino Canyon, Gorda Escarpment, Morro Ridge, and Monterey Bay.

The shoreward boundary of the Washington State waters HAPC is defined by MHHW while the seaward boundary is the extent of the three-mile territorial sea. The remaining area of interest HAPCs are defined by their mapped boundaries in the EFH assessment GIS. The coordinates defining these boundaries will be published in Appendix B to the groundfish FMP.

<u>Oil production platforms (Alternative B.8)</u>: The preferred alternative designates the following 13 oil production platforms as HAPCs: Platform A, Platform B, Platform C, Edith, Gail, Grace, Gilda, Habitat, Hondo, Hermosa, Harvest, Hidalgo, and Irene. This is a modification of Alternative B.8, which includes all 27 extant platforms in waters off of Southern California. The HAPC area for these oil production platforms is defined by a circle around each platform whose center is the published location given by latitude-longitude coordinates (U.S. Department of the Interior, Minerals Management Service, OCS Pacific Region) with a radius 1.5 times the maximum published platform jacket dimension (U.S. Department of the Interior, Minerals Management Service, OCS Pacific Region).

Figure 2-30 shows the areas designated HAPCs under the final preferred alternative.

2.7.2.2 Process for Modifying Existing or Designating New HAPCs

This component of the final preferred alternative is a modification of Alternative B.9, process for designating new HAPCs. It has the same procedural components of Alternative B.9, but would also allow submission of proposals to modify or eliminate existing HAPCs. Furthermore, instead of the Habitat Committee, the Council identified a new standing committee, the Essential Fish Habitat Oversight Committee, that would participate in the review of HAPC proposals. Any such changes would require an FMP amendment as described for Alternative B.9

2.7.3 Measures to Minimize the Adverse Impacts of Fishing

The component of the final preferred alternative intended to minimize the adverse effects on fishing on groundfish EFH comprises management measures in three categories: (1) gear modifications, (2) closed areas, and (3) promotion of reductions in fishing effort.

2.7.3.1 Gear Modifications

For waters within 0-200 miles offshore coastwide, the following gear restrictions will apply:

- Prohibit bottom trawl roller gear with a footrope diameter greater than 19 inches on bottom trawl gear throughout the EEZ. This is a modification of Alternative C.9.1, which would have limited footrope diameter to 15 inches or less. The 19" restriction was chosen by the Council over 15" based on input from the fishing industry.
- Prohibit bottom trawl roller gear with a footrope diameter greater than eight inches eastward of a line approximating the 100-fathom depth contour. This would make the existing gear restriction, in place as a bycatch reduction measure, a permanent habitat protection measure. This is a modification of Alternative C.2.1, which would have prohibited large footrope trawl gear in depths less than 200 fathoms along with similar restriction on fixed gear. The 100-fathom contour was chosen over the 200-fathom contour in order to allow trawl fishermen to access important fishing grounds while still providing important habitat protection.
- Prohibit dredge gear. This corresponds to Alternative C.9.5.
- Prohibit beam trawl gear. This corresponds to Alternative C.9.6.

Restrictions in state waters will be implemented by state law, as appropriate. Although dependent on state regulation, the restrictions on dredge and beam trawl gear are not intended to apply in internal waters (Puget Sound, San Francisco Bay, etc.).

2.7.3.2 Closed Areas

The final preferred alternative contains two types of closed areas: a "trawl footprint" closure and ecologically important closed areas.

2.7.3.2.1 Footprint Closure

This component of the final preferred alternative is a modification of the trawl footprint closure described under Alternative C.4 and C-12. Under that alternative, areas that were not trawled from 2000 to 2003 would be permanently closed to bottom trawl. The final preferred alternative closes depths greater than 700 fathoms. The footprint area identified under Alternatives C.4 and C.12 covers 294,142sq. mi. while the footprint area under the final preferred alternative covers 246,350 sq. mi.

The 700 fm isobath is generally a more precautionary approximation of the historic extent of bottom trawling in the management area. It is intended to prevent the expansion of bottom trawling into areas where groundfish EFH has not been adversely affected by fishing. The closure encompasses the part of the EEZ deeper than 3,500 m, the isobath defining the deepest extent of groundfish EFH in the preferred alternative. By applying this closure to a part of the management area not identified as groundfish EFH, this measure is intended to be precautionary; there is limited information on the importance to groundfish habitats in all areas at depths greater than 700 fm. It is intended to prevent adverse effects from bottom trawling while over time more information is gathered about groundfish habitat within this area or the relationship between habitats in this area and groundfish EFH.

2.7.3.2.2 Ecologically Important Closed Areas

This component of the final preferred alternative is a modification of Alternative C.7, C.10, C.12, and C.13. It also includes a new procedural element that was not described in the DEIS that is similar to

Alternative B.9, but applicable to areas closed to bottom trawl. The selection of the specific areas included in the final preferred alternative occurred through a collaborative process involving Oceana; groundfish trawl fishermen, organized by the Fishermen's Marketing Association; the Fisheries Heritage Group, bringing together harbor managers, the Nature Conservancy, Environmental Defense, the Center for Future Oceans, and fisheries representatives; Council advisory bodies; and West Coast states. As noted above, Oceana developed Alternative C.12 and the Council incorporated it into the DEIS. During the public comment period Oceana worked to modify the proposal they had developed based on new information they had gathered. At the same time, the Fishermen's Marketing Association developed a proposal for areas to be closed to bottom trawl that represented areas similar to those identified by Oceana but excluding areas judged by fishermen to be important fishing grounds. The Fisheries Heritage Group engaged in a similar exercise on the Central California coast, identifying three areas between Monterey and Point Conception. All three groups submitted their proposals as part of public comment on the DEIS. During the June 2005 Council meeting, when the Council identified their preferred alternative, these groups worked with the Council's Groundfish Management Team and other state and federal officials to craft a joint proposal that best met their differing objectives. By combining the perspectives of these groups, the final preferred alternative is intended to be a practicable measure that balances the mandate to conserve EFH while taking into account the effects on fishing communities.

Most of the ecologically important closed areas are sited shoreward of 700 fathoms in the area not already closed to bottom trawl with the footprint closure and include areas closed to bottom trawl, all bottom-contacting gear types, or all fishing gear. Table 2-3 lists these areas by type, showing the area covered. Specific areas were chosen for closure to various gear types in order to minimize potential adverse impacts from fishing.

The overlap between the final preferred alternative (including the three areas proposed by the Fisheries Heritage Group) and the proposals submitted by Oceana and the Fishermen's Marketing Association is as follows:

Area unique to the final preferred alternative (i.e., not closed under the other proposals):	914 sq. mi.
Areas unique to the Oceana proposal:	33,696 sq. mi.
Area unique to the Fishermen's Marketing Association proposal:	131 sq. mi.
Area common to the final preferred alternative and the Oceana proposal:	258,207 sq. mi.
Area common to the final preferred alternative and the Fishermen's Marketing Association proposal:	241,617 sq. mi.
Area common to the Oceana proposal and the Fishermen's Marketing Association proposal:	241,659 sq. mi.
Area common to all three proposals:	241,221 sq. mi.

Figures 2-31 through 2-37 show the location of these closed areas.

2.7.3.3 Effort Reduction

The final preferred alternative incorporates the element of Alternative C.10 involving public-private partnerships under which private funds are used to purchase groundfish limited entry trawl licensees in conjunction with Council/NMFS action to close specific areas. Reduction of fishing effort and area closures are cited by NRC as a primary tool for minimizing adverse effects to EFH from fishing (NRC 2000). By proposing that the following language be added to the FMP by amendment:

> If consistent with the goals and objectives of this FMP, the Council may facilitate and encourage private purchases of groundfish limited entry permits and corresponding vessels that would result in reduced fleet capacity. As with the Federally-sponsored 2003 groundfish trawl buyout program, such private purchases would have to permanently foreclose the future use of subject permits and vessels in West Coast groundfish fisheries. Aside from any socioeconomic benefits, reducing fleet fishing capacity can mitigate adverse impacts of fishing to groundfish EFH to the degree that fishing activity with adverse consequences is reduced. Contracts for the purchase of groundfish limited entry permits and/or vessels may contain conditions, specifying that the execution of the contract is contingent on the implementation of other measures to mitigate the adverse impacts of fishing on groundfish EFH. At the same time, the Council will take into account impacts on the segment of the fishing industry and fishing communities that are not a party to such contracts, and also take into account related FMP objectives 13, 15, 16, and 17 (Section 2.1). Mitigation measures may be contingent on Council action or recommendations, and the Council will strive to conduct its decision-making in such a way as to facilitate the private negotiation of such contract conditions. If contingent mitigation measures include establishing new areas closed to bottom trawl, or the modification of the location and extent of existing areas, the habitat conservation framework described in Section 6.2.4 may be used to implement such areas by regulatory amendment, using the procedures described under 6.2 D.

2.7.4 Research and Monitoring

Elements of Alternatives D.2-D.4, addressing EFH-related research and monitoring were incorporated into the final preferred alternative, although these elements will not be implemented as part of the proposed action evaluated in this EIS. Rather, they are identified as programmatic elements, that will be included in the FMP amendment, either expressing priorities and objectives (expansion of the logbook program, research reserves) or identifying another process as the vehicle for implementation (expansion of VMS). In addition, section 2.9 contains a description of NMFS' current research plan related to EFH.

2.7.4.1 Expanded Logbook Program

Alternative D.2 would require vessels in all commercial sectors, including recreational charter (for hire) vessels, to participate in an expanded logbook program. The final preferred alternative would amend the groundfish FMP to include the following statement: "The Council supports expansion of the logbook program to cover other fishery sectors besides groundfish limited entry trawl, where practicable. The Council also supports entering more of the existing information gathered by means of logbooks, such as the haul-back position of trawl tows, into the data system."

2.7.4.2 Expanded Vessel Monitoring System

Alternative D.3 identifies expansion of the VMS program for West Coast groundfish fisheries to cover all commercial and recreational charter vessels as an important program objective to be implemented through tiered actions. Expansion of the program is being considered by the Council as part of a separate action, supported by an EA (NMFS NWR 2005), which was initiated because of the need to monitor vessel activity with respect to existing Groundfish Conservation Areas (which include RCAs and CCAs). The Council will choose their preferred alternative for VMS expansion at their November 2005 meeting. Under that action the Council will consider expanding the VMS requirement to a range of trawl and nontrawl fisheries. The final preferred alternative for this EFH EIS identifies the requirement for VMS on all bottom trawl vessels as part of the range of alternatives included in the VMS EA referenced above. These fisheries include ridgeback prawn, California halibut, sea cucumber, and pink shrimp.

2.7.4.3 Research on the Impacts and Results of Closed Areas

Alternative D.4 would establish a system of research reserves within closed areas established as part of the fishing impact minimization alternatives. The final preferred alternative makes focusing research on the impacts results of closing areas to bottom trawl or bottom contact gear a Council priority. The groundfish FMP would be amended with the following language:

> The Council will support, through the work of its advisory bodies, such as the Habitat Committee, efforts to identify discrete sites within closed areas in order to focus research efforts. By encouraging research at identified sites, results can be more easily compared. Such a system or research sites should include a representative sample of habitat types in order to allow comparison of the effects of fishing across these different types.

2.8 Alternatives Eliminated From Further Detailed Study

Regulations guiding the development of EISs state "…for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated" (40 CFR 1502.14(a)). As discussed in Section 2.1, the alternatives evaluated in this EIS were developed over several meetings and formally adopted by the Council. This section briefly describes the modifications that occurred by Council action at their September and November meetings.

At their September, 2004 meeting, the Council forwarded all of the EFH and HAPC designation alternatives developed by the EFH EIS Oversight Committee for inclusion in the EIS. However, they recommended the alternatives be ordered by the total area that would be designated, which resulted in a renumbering of these alternatives. They also recommended adding an alternative describing a process for HAPC designation (Alternative B.9). They added Option C.2.3, which closes areas within 60 fathoms to fixed gear. (In the preliminary decision document used by the Council at the November 2004, meeting this option mistakenly characterized the large footrope trawl closure as applying to the whole EEZ rather than shoreward of 200 fm. The description has been subsequently corrected.) They also added options C.3.3 and C.3.4, which are based on different sensitivity and index values. They also made several modifications to the list of gear restrictions described in Alternative C.9 and eliminated two provisions applying to longline gear. These options were eliminated because they were considered not practicable. (In the preliminary documents the restrictions were listed as a set of options in order to emphasize the Council's flexibility in modifying this list. Because the Council chose this as a preliminary preferred alternative, references to options have been removed.) A description of the plaintiffs' alternative was not part of the description of alternatives reviewed by the Council at their September, 2004 meeting; the Council requested that it be included as an alternative once developed. The Council forwarded all of the research and monitoring alternatives for inclusion in the DEIS.

At their November 2004, meeting, while identifying their preliminary preferred alternatives, the Council also further modified some alternatives and eliminated others. They eliminated two EFH identification and description alternatives. One would have designated EFH based on HSP values only for assessed species. This alternative was deemed inconsistent with EFH regulations, which require designations to be based on all management unit species. The second eliminated alternative is similar to Alternative A.4, except that it had slightly different HSP area percentages for the different management status categories (the top 100% HSP area for overfished species, the top 90% HSP area for precautionary zone species, and the top 70% HSP area for all other species). This alternative was eliminated because of its similarity to Alternative A.4. Reducing the number of alternatives allows more focused analysis while still providing a sufficient range of designation options and contrast between the different alternatives. The Council forwarded all of the HAPC designation alternatives for inclusion in the DEIS. They eliminated an impact minimization alternative, which would have closed 25% of representative habitat to fishing. (This alternative had two options, one focusing on habitat types and the other more specifically on biogenic habitat.) It was eliminated because of methodological difficulties involved in determining what specific areas would be closed to satisfy the 25% criterion. In addition, Alternatives C.7, C.10, C.12, C.13, and C.14, which close discrete areas to various forms of fishing, largely satisfy the objective of the eliminated alternative. Alternative C.9 was further modified by eliminating three gear restrictions, which would have required weak links on trawl tickler chains, phasing in aluminum trawl doors, and prohibiting stick gear and weights on line gear contacting the bottom. These options were eliminated because they are not practicable and/or enforceable. The Council also focused the set gillnet prohibition on waters deeper than 60 fm, based on options that also included a 30 fm and 80 fm closure line. Alternatives C.13 and C.14 were added in order to consider different types of fishing restrictions on the ecologically important areas identified in Alternative C.12.

2.9 NWFSC EFH Research Plan

The current research plan for the NW Fisheries Science Center (NWFSC) includes the continuation of coast-wide routine bottom trawl surveys in areas that are accessible to these methods, and the development of new survey methods for monitoring and mapping areas that are either not accessible to the usual research trawl gear or in which sampling should have minimal and non-extractive impacts. This initial mapping is important to establish the “baseline” condition of the closed areas at the onset of regulations and monitor the impacts of closures on the entire ecosystem. Continued mapping and monitoring of EFH areas is also needed to continue the time series of assessments of groundfish populations used to conduct stock assessments.

The NWFSC is already testing innovative non-extractive methods. Both AUVs and ROVs have been tested and used for mapping biological communities in coordination with multibeam sonar mapping of the surficial geology. These tests have highlighted the functionalities that should be added to existing AUV and ROV platforms to maximize their utility for EFH mapping. During these tests the Center has completed selected mapping of groundfish, invertebrates and geology of ecologically important closed areas for groundfish and HAPC sites. The sites mapped to date are Cherry Bank, Bandon High Spot, TNC/ED areas 1 and 2, and Daisy Bank. In addition, Heceta Bank and Astoria Canyon have been mapped during research conducted in 1998 and 2001, respectively, as well as a large deep-water area seaward of Heceta and Stonewall Banks that was mapped in sequence during 1998, 2002, and 2004. With existing resources, the NWFSC plans to continue non-extractive baseline mapping of additional areas for the next five years. It is estimated that three areas each year could be mapped for a total of 15 additional areas. This would only allow for mapping of about one half of the proposed ecologically important closed areas for groundfish and/or HAPC sites (not including estuaries, inland seas, seagrass beds, canopy kelp, and oil platforms).

As additional resources are available, more areas would be mapped and a plan for routine monitoring could be implemented. An estimated area of 34,200 sq km of ecologically important closed areas for West Coast Groundfish, and 36,200 sq km of groundfish HAPC and areas of interest & rocky reefs/banks are a high priority for mapping. It is estimated that this will require 104 days at sea for multibeam sonar mapping. Additional days at sea would be required for mapping of the biological communities. The estimated cost of mapping the surficial geology and the biology of these areas is estimated to be

$7,000,000. After the initial mapping was completed, a program of routine monitoring will be necessary to assess the recovery of the ecosystem after the cessation of fishing by bottom-contact gear. It is estimated that $1,000,000 a year would be required on a continuing basis to monitor the closed areas on a rotating basis. The area of the general groundfish EFH not already mapped is about 298,300 sq km. To provide only multibeam mapping information for this area the cost is estimated at $7,000,000. This initial mapping would be required to develop an estimate of the further mapping needs to obtain necessary biological information.

In addition to the mapping of these areas, the NWFSC plans on continuing their ongoing habitat research program to determine the association between habitat features and fish and other invertebrates, including structure-forming invertebrates such as sponges and cold water corals. Information on cold-water corals also will continue to be collected by the West Coast Groundfish Observer Program. These data will be used to add to the minimal information on the distribution of cold water corals.

Table 2-2: Summary of the Alternatives.

Alternative Name	Preliminary Preferred	Final Preferred	Modified	Figure Number
EFH Alternatives				
A.1 (No Action)				Figure 2-1
A.2 (Depths less than 3,500 m)	✓	✓	✓	Figure 2-2, Figure 2-29
A.3 (100% HSP Area)	✓			Figure 2-3, Figure 2-29
A.4 (HSP Based on Management Status)				Figure 2-4
A.5 (70% HSP Area)				Figure 2-5
A.6 (30% HSP Area)				Figure 2-6
HAPC Alternatives				
B.1 (No Action)				No Figure
B.2 (Estuaries)	✓	✓		Figure 2-7, Figure 2-30
B.3 (Canopy Kelp)	✓	✓		Figure 2-8, Figure 2-30
B.4 (Seagrass)	✓	✓		Figure 2-9, Figure 2-30
B.5 (Core Habitat)				Figure 2-10
B.6 (Rocky Reefs)	✓	✓		Figure 2-11, Figure 2-30
B.7 (Areas of Interest)		✓	✓	Figure 2-12, Figure 2-30
B.8 (Oil Production Platforms)		✓	✓	Figure 2-13, Figure 2-30
B.9 (Process for new HAPC designations)				No Figure
Minimize Adverse Fishing Impacts to EFH				
C.1 (No Action)				No Figure
C.2 (Depth-based gear restrictions)				
C.2.1 (Option 1)		✓	✓	Figure 2-15
C.2.2 (Option 2)				Figure 2-16
C.2.3 (Option 3)				Figure 2-17
C.3 (Close sensitive habitat)				
C.3.1 (Option 1)				Figure 2-18
C.3.2 (Option 2)				Figure 2-19

Alternative Name	Preliminary Preferred	Final Preferred	Modified	Figure Number
C.3.3 (Option 3)				Figure 2-20
C.3.4 (Option 4)				Figure 2-21
C.4 (Prohibit geographic expansion of fishing)				
C.4.1 (Option 1)	✓	✓	✓	Figure 2-22
C.4.2 (Option 2)	✓			Figure 2-23
C.5 (Prohibit a krill fishery)				No Figure
C.6 (Close hotspots)				Figure 2-24
C.7 (Close areas of interest)		✓	✓	Figure 2-25
C.8 (Zoning fishing activities)				
C.8.1 (Option 1)				Figure 2-26
C.8.2 (Option 2)				Figure 2-26
C.9 (Gear Restrictions)				
C.9.1 (Prohibit roller gear larger than 15”)	✓	✓	✓	No Figure
C.9.2 (Prohibit the use of flat trawl doors)	✓			No Figure
C.9.3 (Limit the length of a single longline groundline to 3 nm)	✓			No Figure
C.9.4 (Employ habitat-friendly anchoring systems)	✓			No Figure
C.9.5 (Prohibit dredge gear)	✓	✓		No Figure
C.9.6 (Prohibit beam-trawl gear)	✓	✓		No Figure
C.9.7 (Prohibit set-gillnets in waters deeper than 60 fm)	✓			No Figure
C.9.8 (Prohibit dingle bar gear)	✓			No Figure
C.10 (Central California no-trawl zones)	✓	✓		Figure 2-27
C.11 (Relax gear endorsement requirements)	✓			No Figure
C.12 (Close ecologically important areas to bottom trawl	✓	✓	✓	Figure 2-28
C.13 (Close ecologically important areas to bottom-contacting gear	✓	✓	✓	Figure 2-28
C.14 (Close ecologically important areas to fishing)	✓			Figure 2-28
Research and Monitoring				
D.1 (No Action)				No Figure
D.2 (Expanded logbook program)		✓	✓	
D.2.1 (All fishing vessels)				No Figure
D.2.2 (Random sample)				No Figure

Alternative Name	Preliminary Preferred	Final Preferred	Modified	Figure Number
D.3 (Expanded VMS program)				No Figure
D.4 (Research reserve system)				No Figure

Table 2-3: Summary of Gear Restrictions by Area (added since Draft EIS)

Area Name	% of EEZ	Area (sq mi)
Closed to bottom trawl west of a line approximating the 700 fathom isobath*	77.45%	246,062.4
Closed to bottom trawl gear off of Washington		
Biogenic_1	0.15%	476.2
Biogenic_2	0.03%	90.3
Biogenic_3	0.02%	79.3
Grays Canyon	0.02%	63.4
Olympic_2	0.07%	211.4
Subtotal	0.29%	920.6
Closed to bottom trawl gear off of Oregon		
Astoria Canyon	0.22%	684.7
Bandon High Spot	0.02%	70.3
Daisy Bank / Nelson Island	0.01%	25.5
Deepwater off Coos Bay	0.07%	218.0
Heceta Bank	0.05%	163.3
Nehalem Bank / Shale Pile	0.02%	77.1
Newport Rockpile / Stonewall Bank	0.02%	66.2
Rogue Canyon	0.11%	341.7
Siletz Deepwater	0.07%	207.7
Subtotal	0.58%	1,854.4
Closed to all bottom contact gear off of Oregon		
President Jackson Seamount	0.12%	380.8
Thompson Seamount	0.05%	165.3
Subtotal	0.17%	546.1
Closed to bottom trawl gear off of California		
Biogenic Area 12	0.03%	99.2
Blunts Reef	0.01%	22.3
Catalina Island	0.14%	458.8
Cherry Bank	0.07%	217.1
Cordell Bank	0.05%	148.8
Cowcod Conservation Area East	0.05%	147.7
Delgada Canyon	0.00%	15.7
Eel River Canyon	0.11%	336.0
Farallon Islands / Fanny Shoal	0.02%	55.1
Half Moon Bay	0.02%	49.6
Hidden Reef / Kidney Bank	0.09%	297.9
Mendocino Ridge	0.23%	719.3
Monterey Bay / Canyon	0.26%	831.3
Point Arena Offshore	0.01%	34.0
Point Sur Deep	0.03%	84.4
Potato Bank	0.03%	110.7
TNC/ED Area 1	0.03%	105.2
TNC/ED Area 2	1.26%	3,991.8
TNC/ED Area 3	0.40%	1,265.7
Tolo Bank	0.01%	21.3
Subtotal	2.84%	9,011.8

Area Name	% of EEZ	Area (sq mi)
Closed to all bottom contact gear of California		
Anacapa Island SMCA	0.00%	9.6
Anacapa Island SMR	0.00%	15.3
Carrington Point	0.00%	12.7
Cordell Bank (within 50 fm isobath)	0.01%	26.4
Davidson Seamount	0.24%	775.5
Footprint	0.01%	26.9
Gull Island	0.01%	34.9
Harris Point	0.02%	50.1
Judith Rock	0.00%	4.6
Painted Cove	0.00%	1.8
Richardson Rock	0.02%	72.7
Santa Barbara	0.02%	56.8
Scorpion	0.01%	18.6
Skunk Point	0.00%	1.4
South Point	0.00%	15.0
Subtotal	0.35%	1122.3
TOTAL	81.69%	259,517.6

Chapter 3 Figures

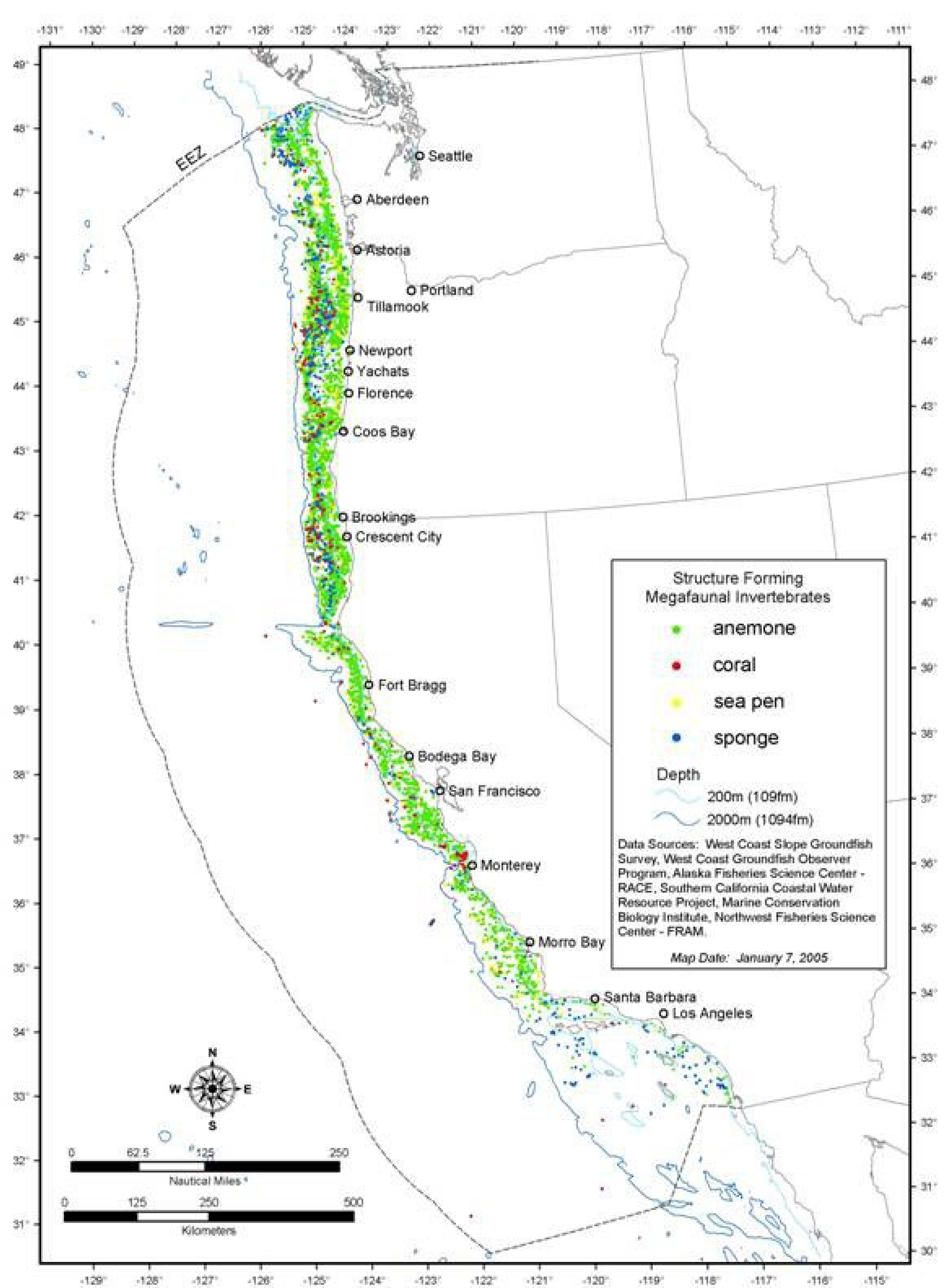


Figure 3-1: Observed structure-forming megafaunal invertebrates

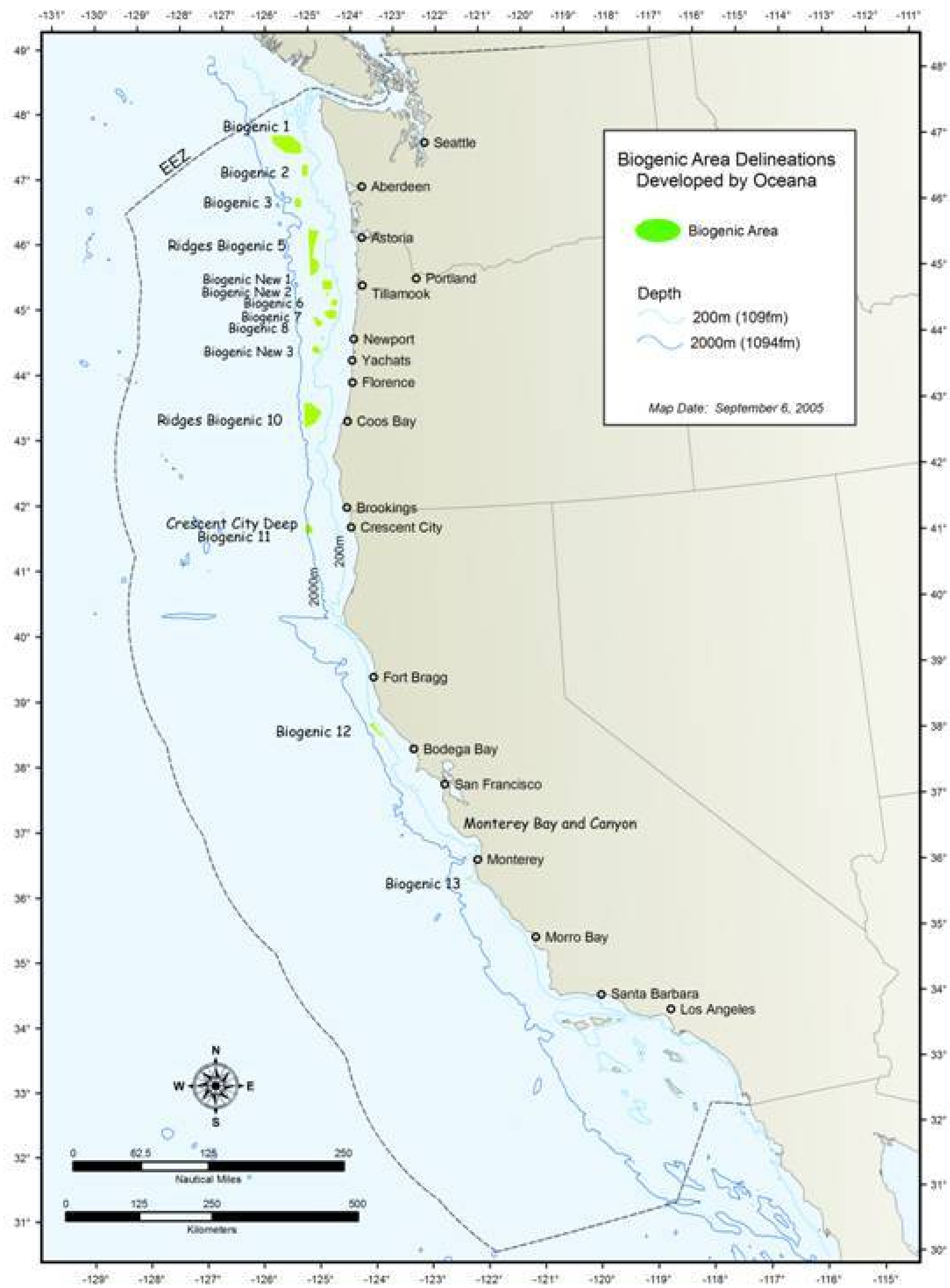


Figure 3-2: Biogenic Areas Delineated by Oceana (added since Draft EIS)

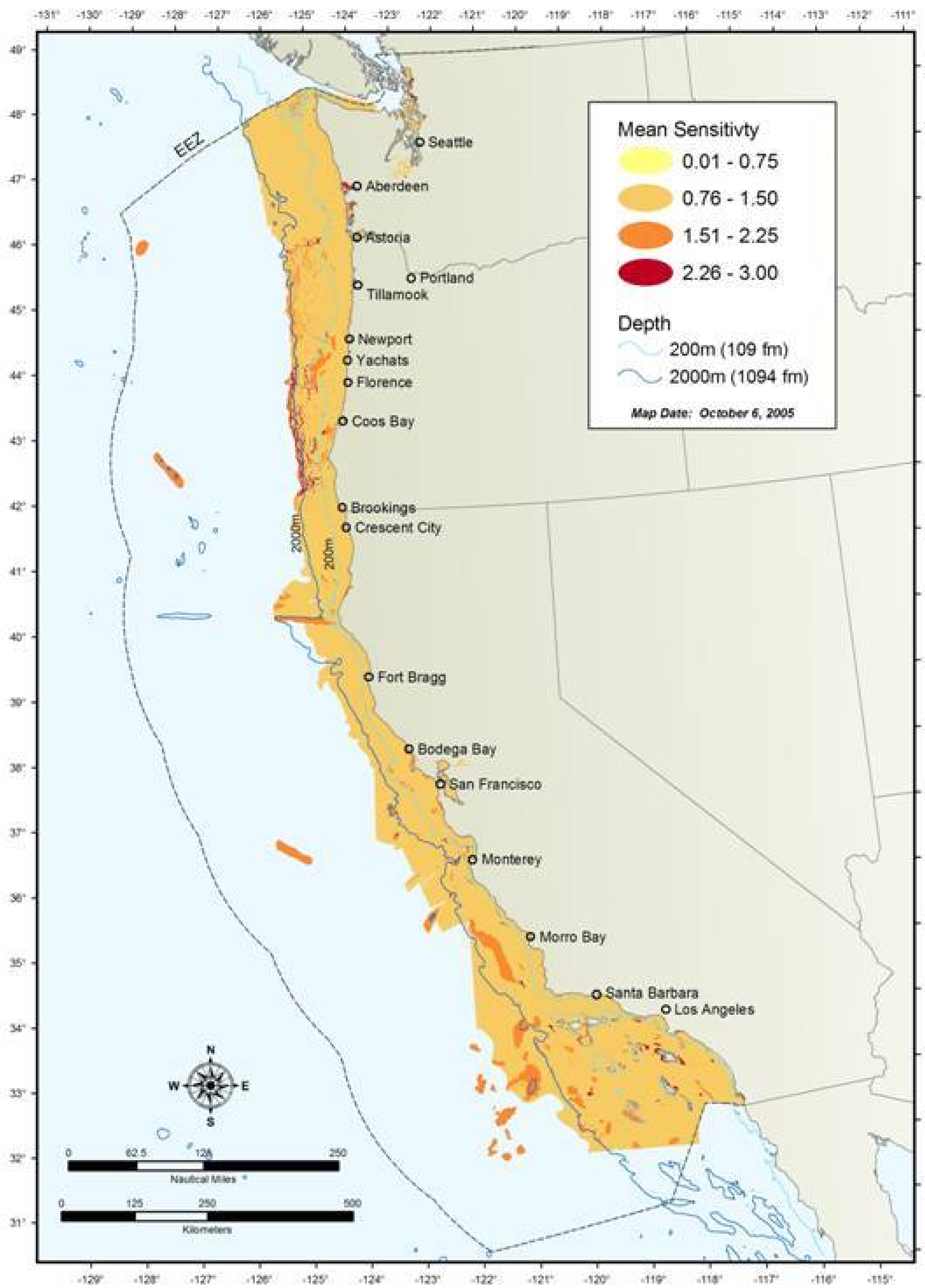


Figure 3-3: Habitat map by sensitivity to impacts from fishing gear – dredge (updated since draft EIS).

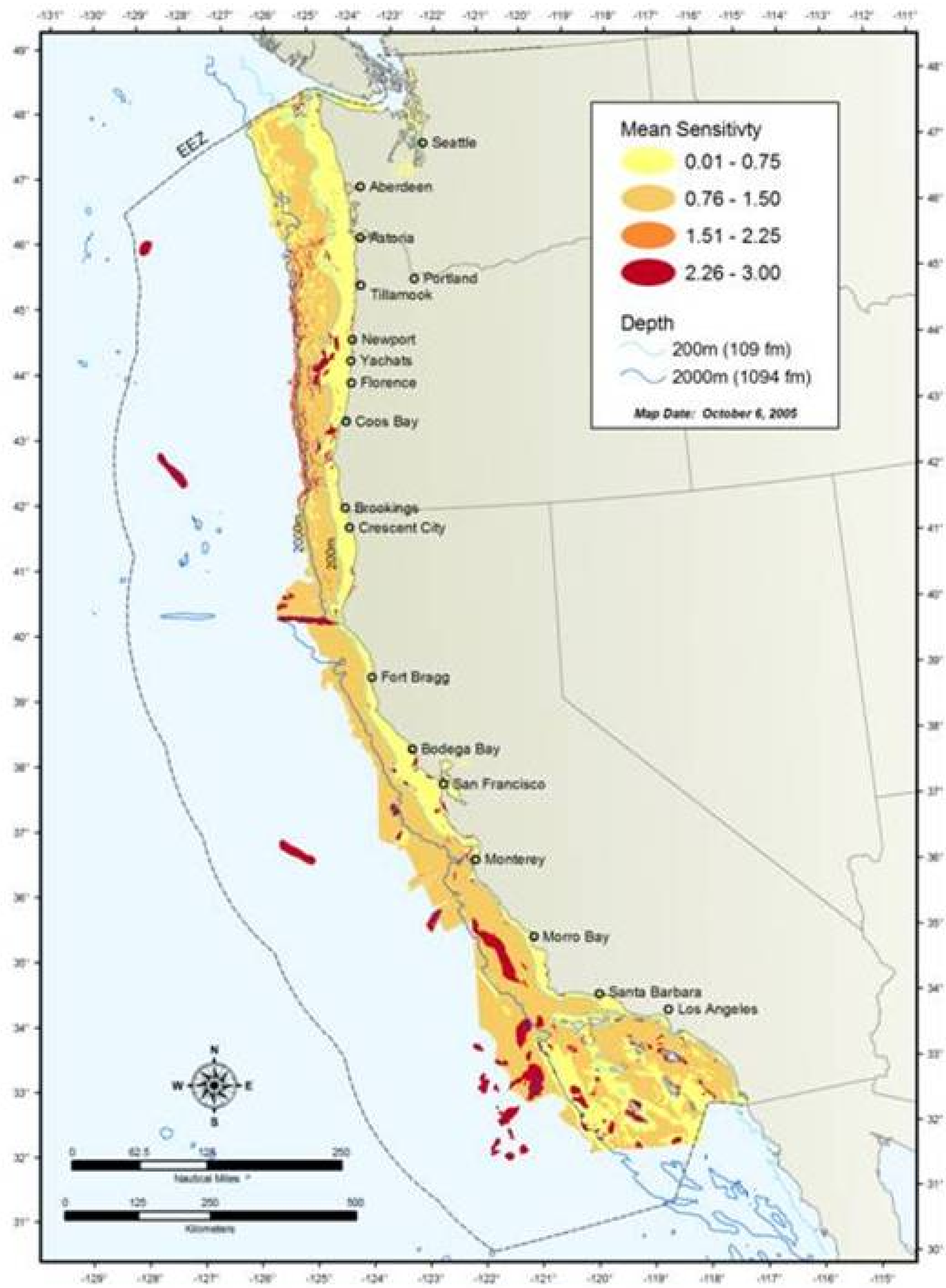


Figure 3-3: Habitat map by sensitivity to impacts from fishing gear – bottom trawl (updated since draft EIS).

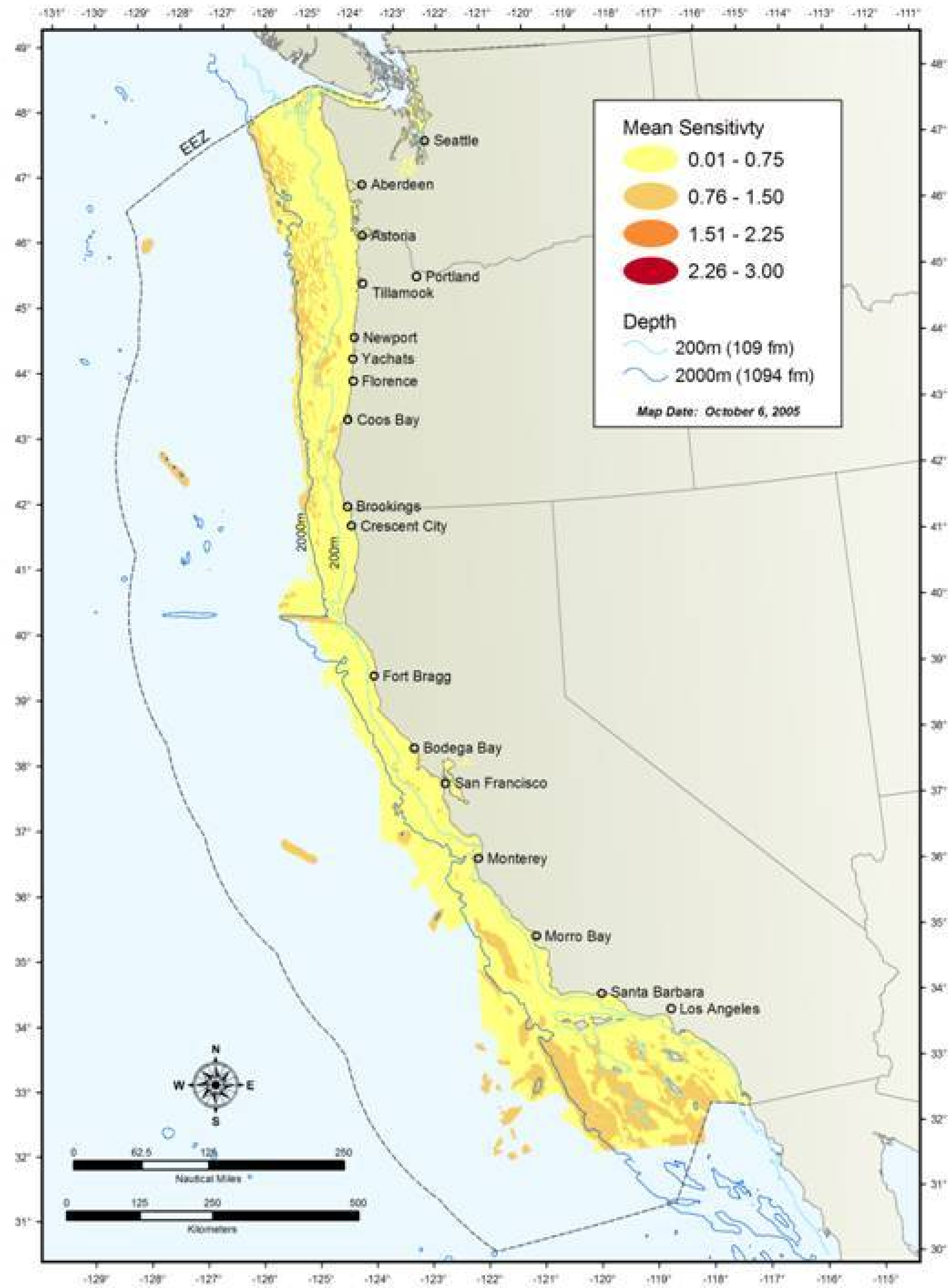


Figure 3-3: Habitat map by sensitivity to impacts from fishing gear – net (updated since Draft EIS).

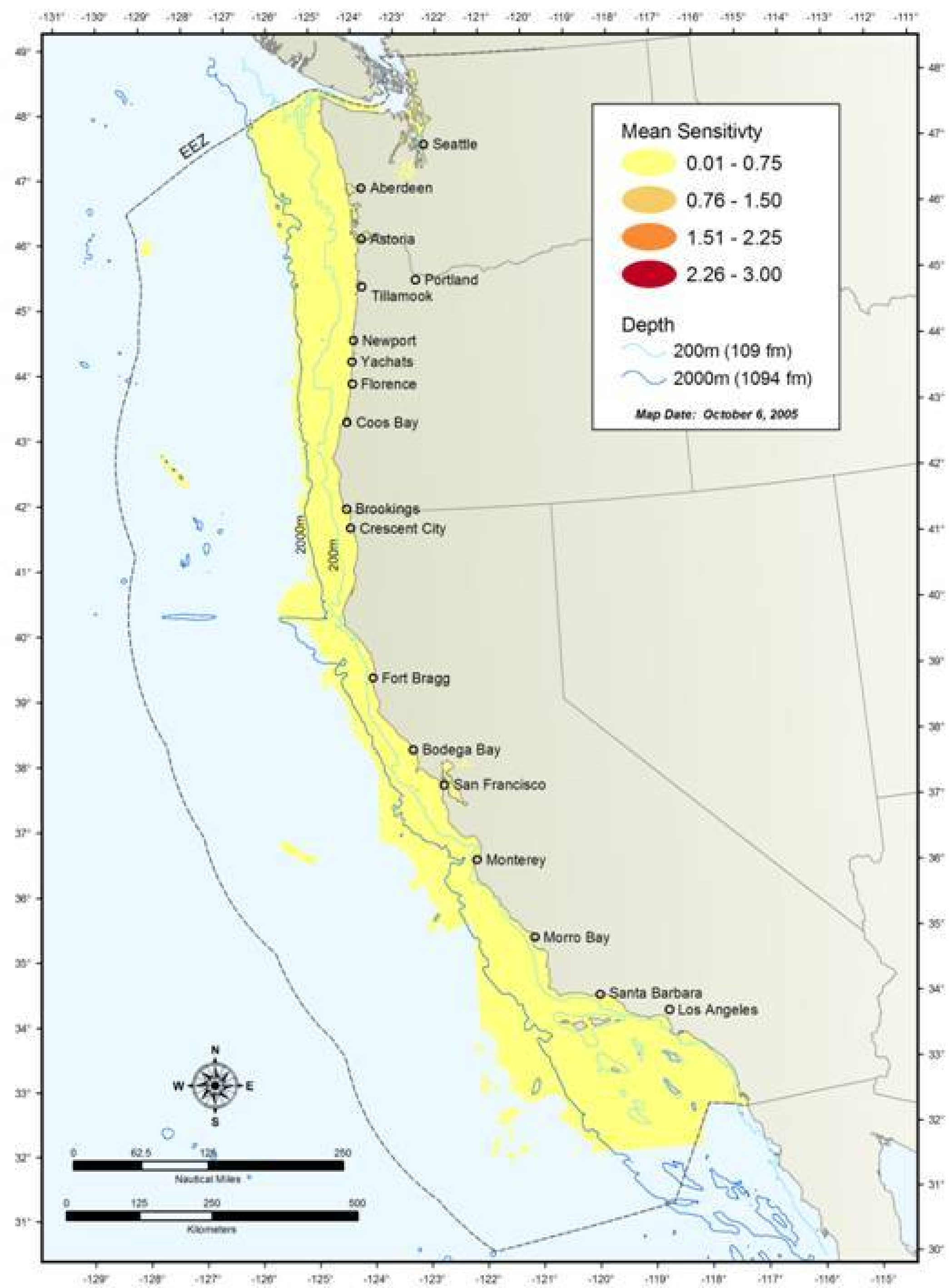


Figure 3-3: Habitat map by sensitivity to impacts from fishing gear – pot and trap (updated since Draft EIS).

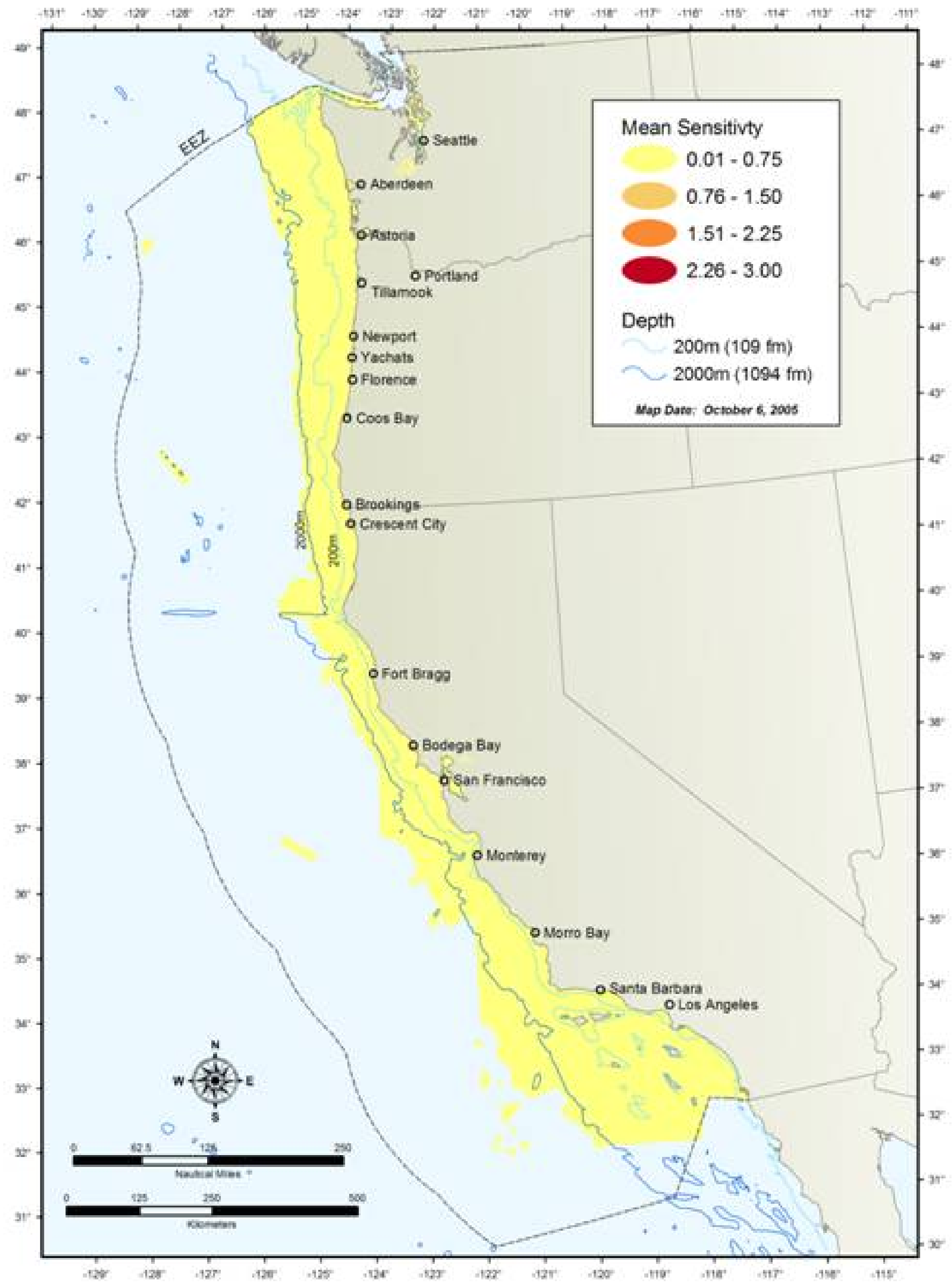


Figure 3-3: Habitat map by sensitivity to impacts from fishing gear – hook and line (updated since Draft EIS).

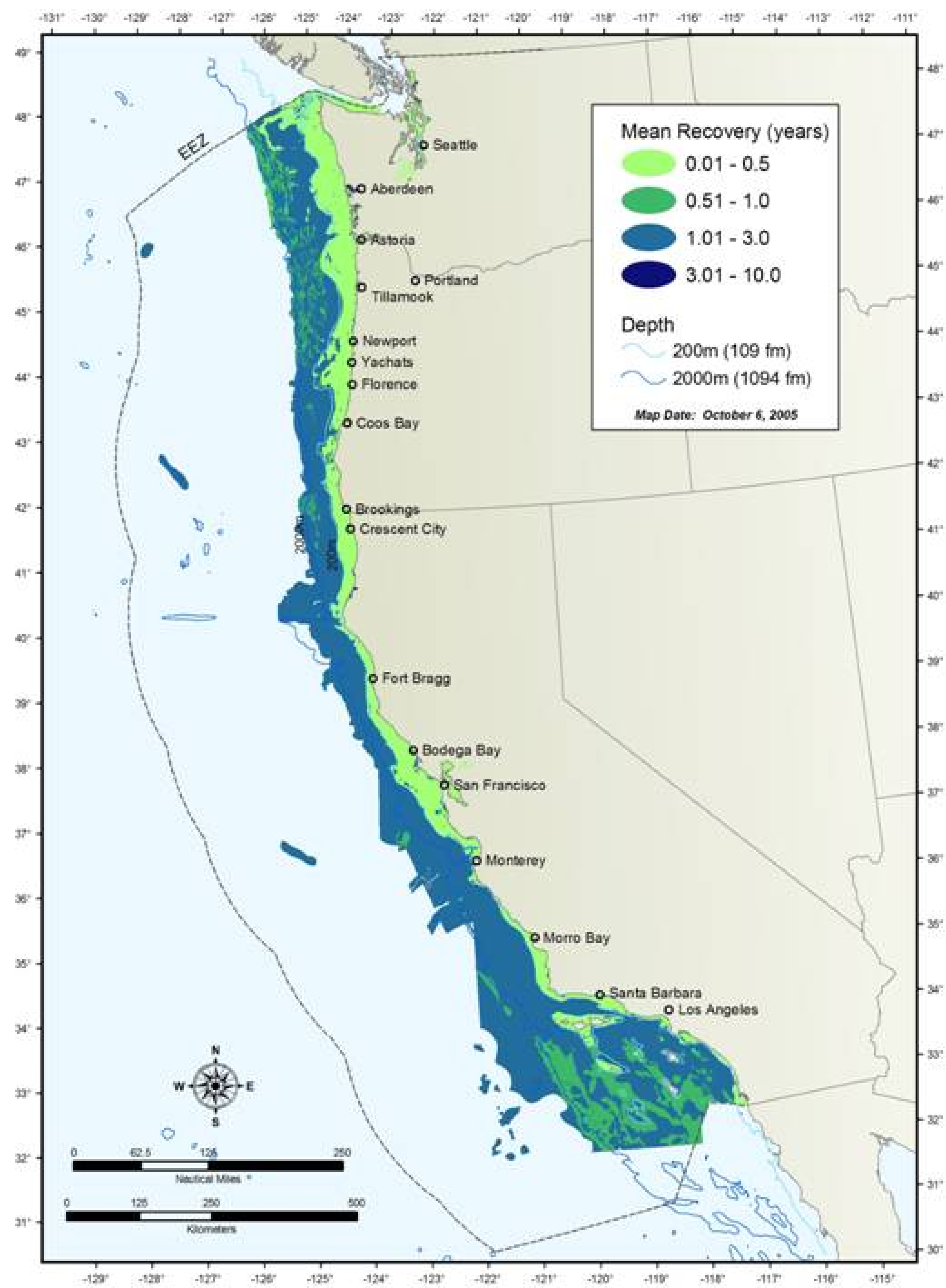


Figure 3-4: Habitat map by recovery times from impact by fishing gear - dredge (updated since Draft EIS.

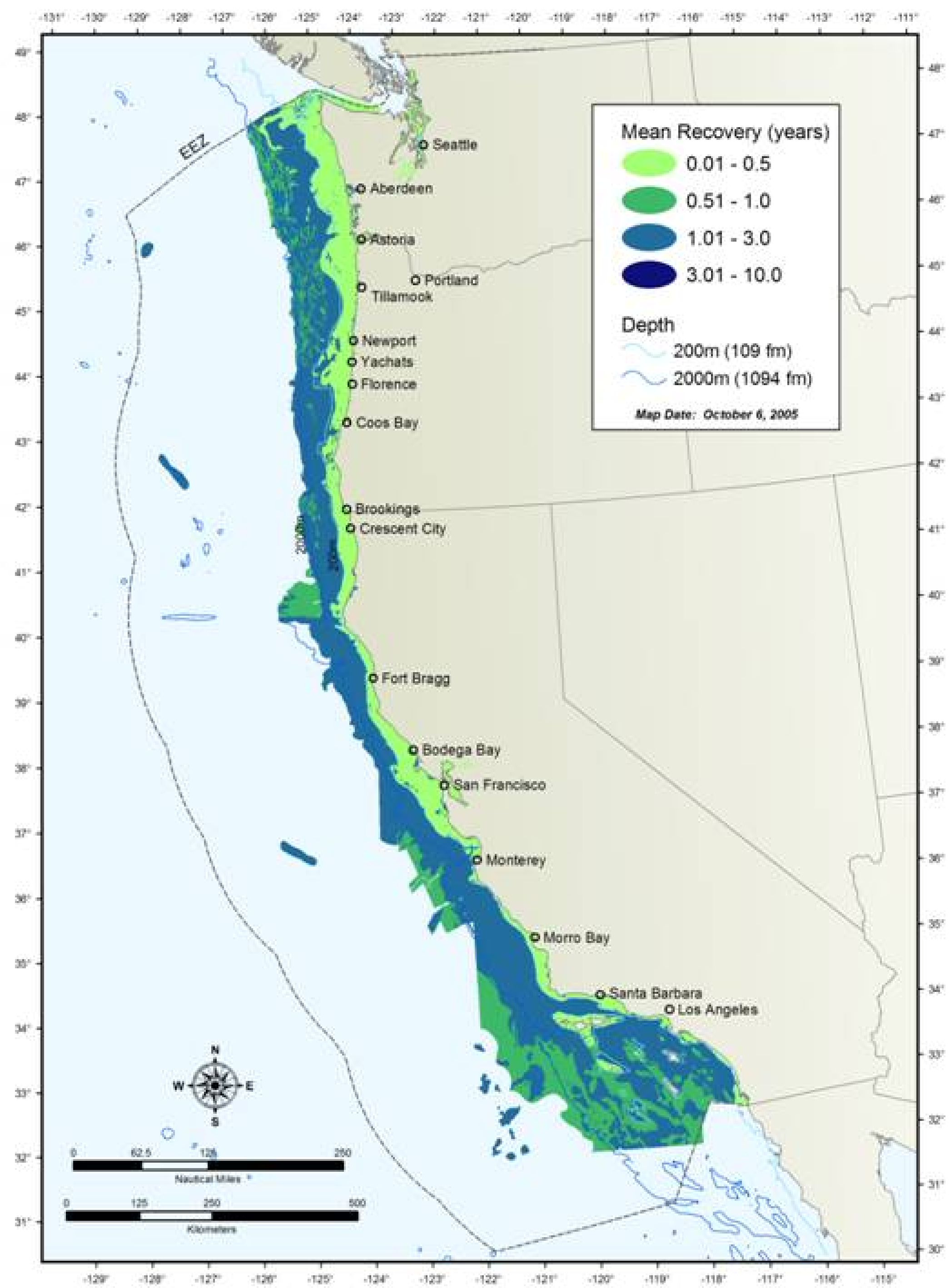


Figure 3-4: Habitat map by recovery times from impact by fishing gear – bottom trawl (updated since Draft EIS.

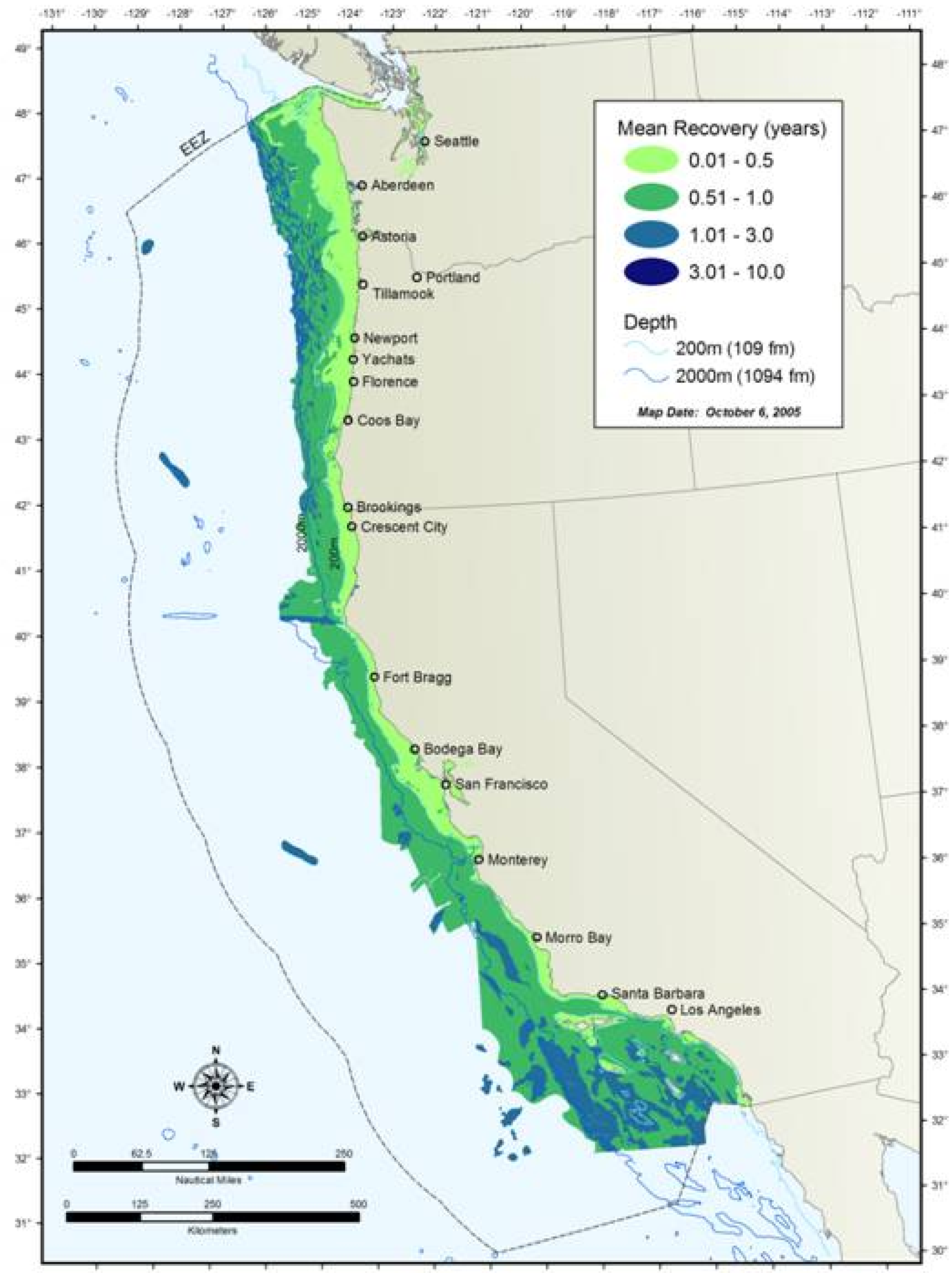


Figure 3-4: Habitat map by recovery times from impact by fishing gear - net (updated since Draft EIS.

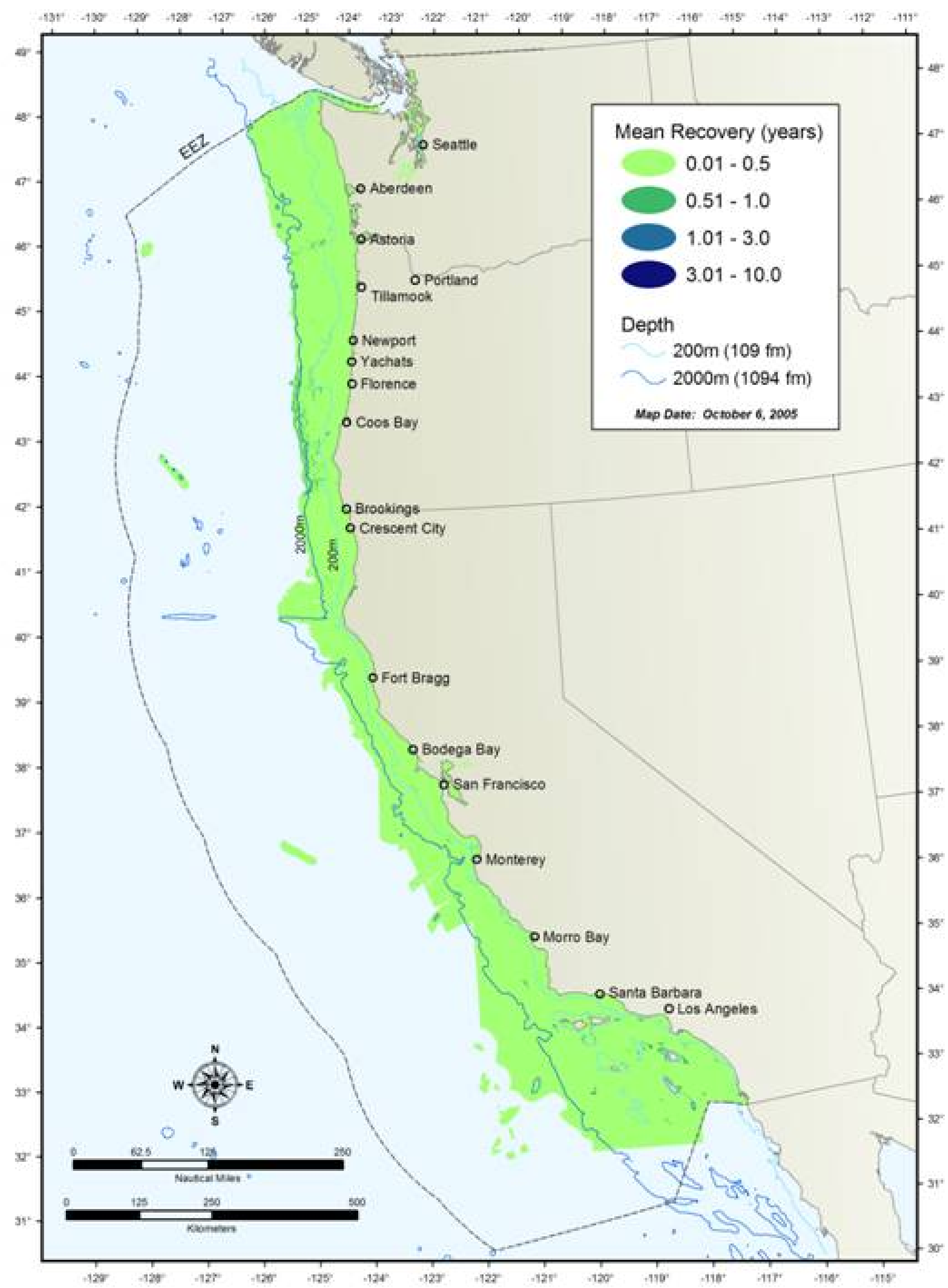


Figure 3-4: Habitat map by recovery times from impact by fishing gear – pot and trap (updated since Draft EIS.

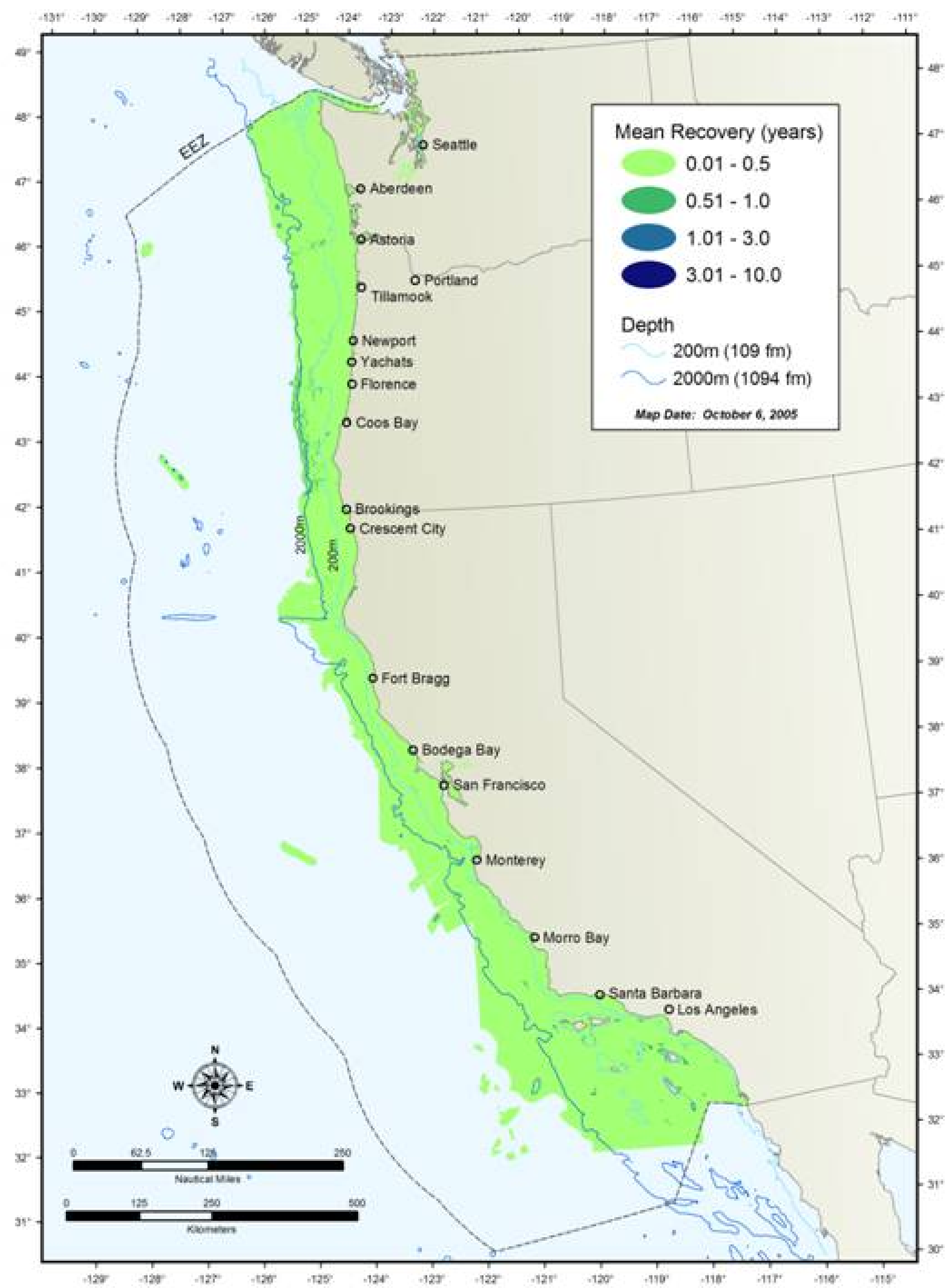


Figure 3-4: Habitat map by recovery times from impact by fishing gear – hook and line (updated since Draft EIS.

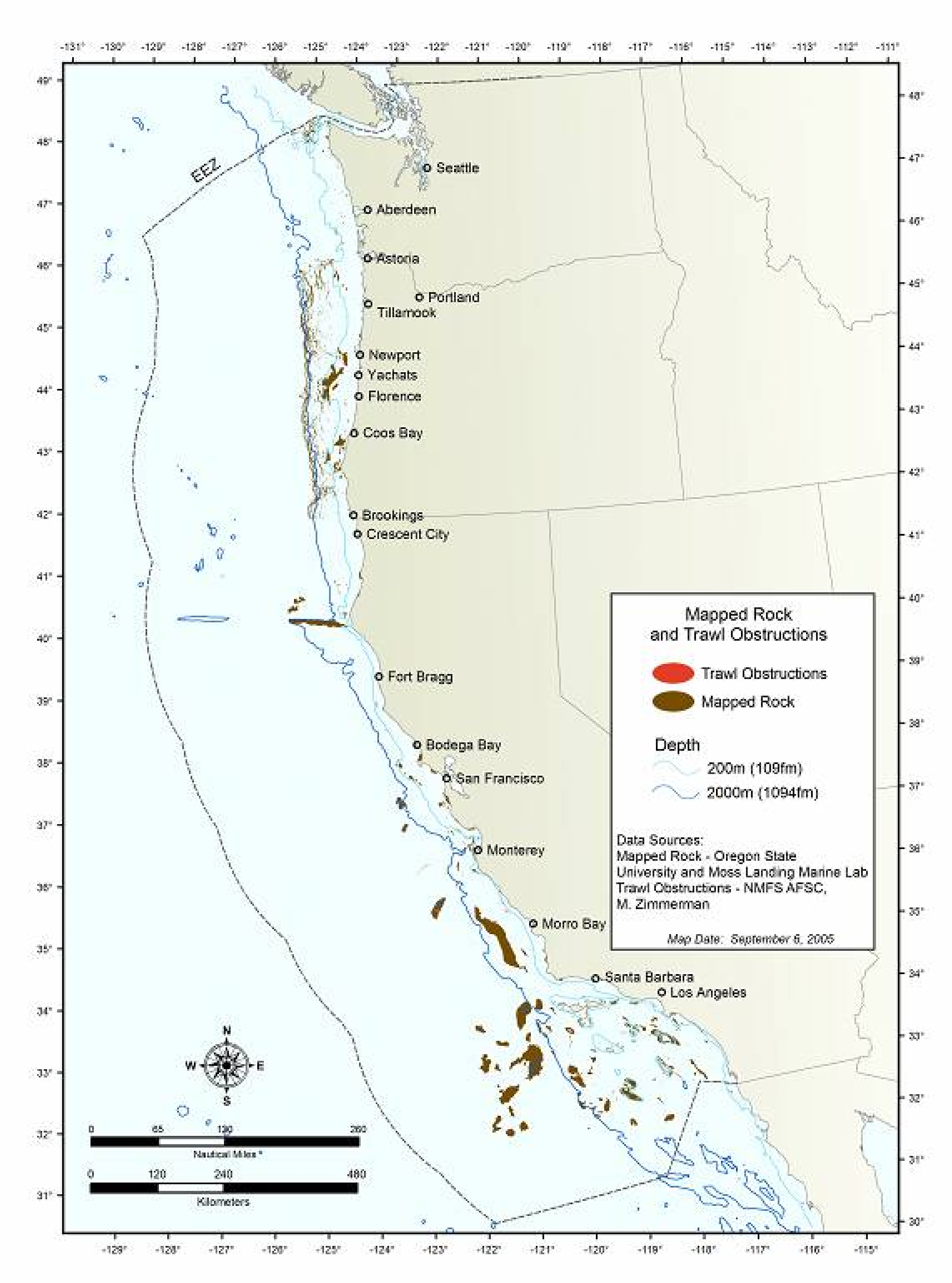


Figure 3-5: Rocky substrate (updated since Draft EIS)

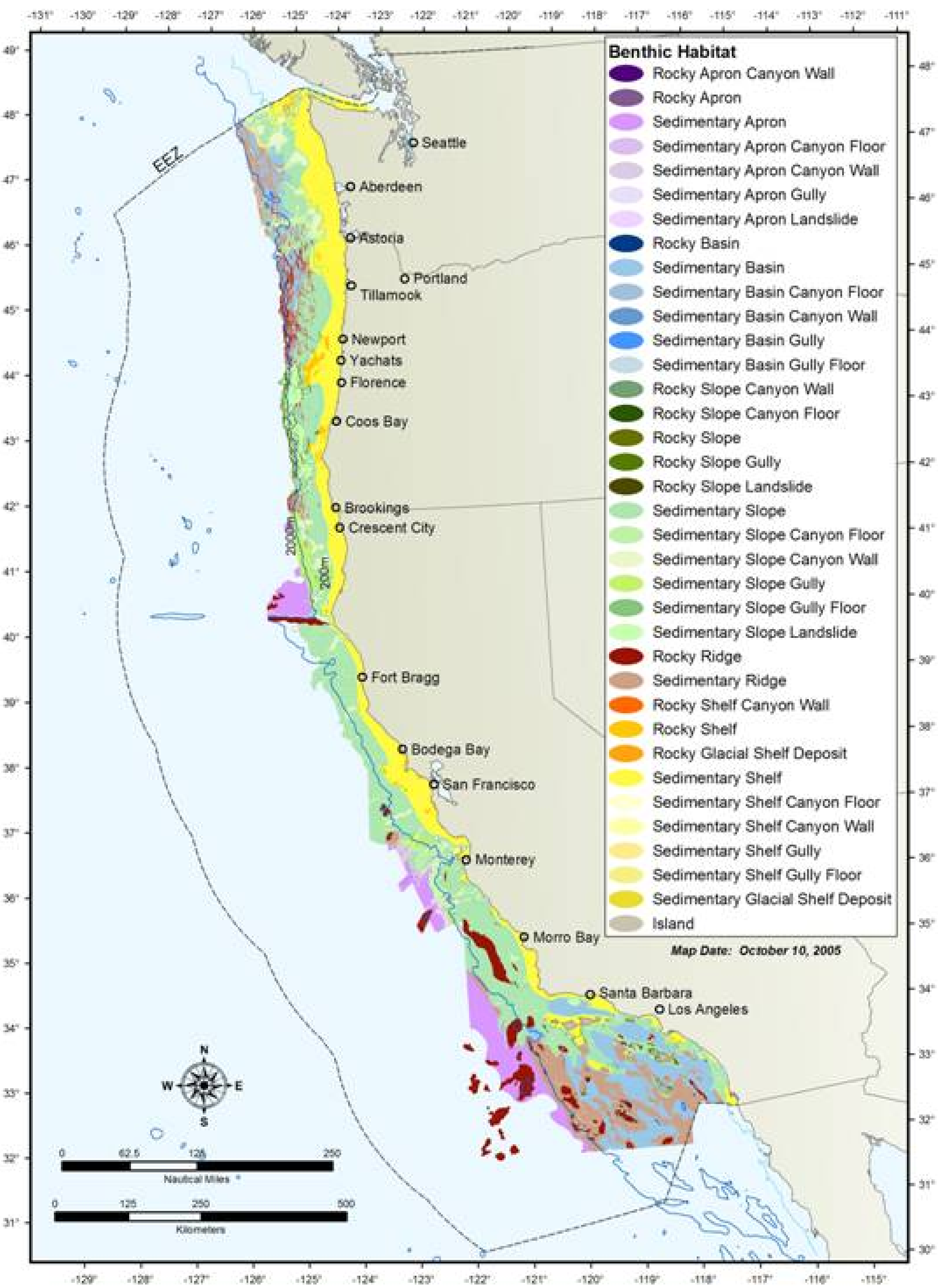


Figure 3-6: Benthic types off the coasts of Washington, Oregon and California (updated since Draft EIS).

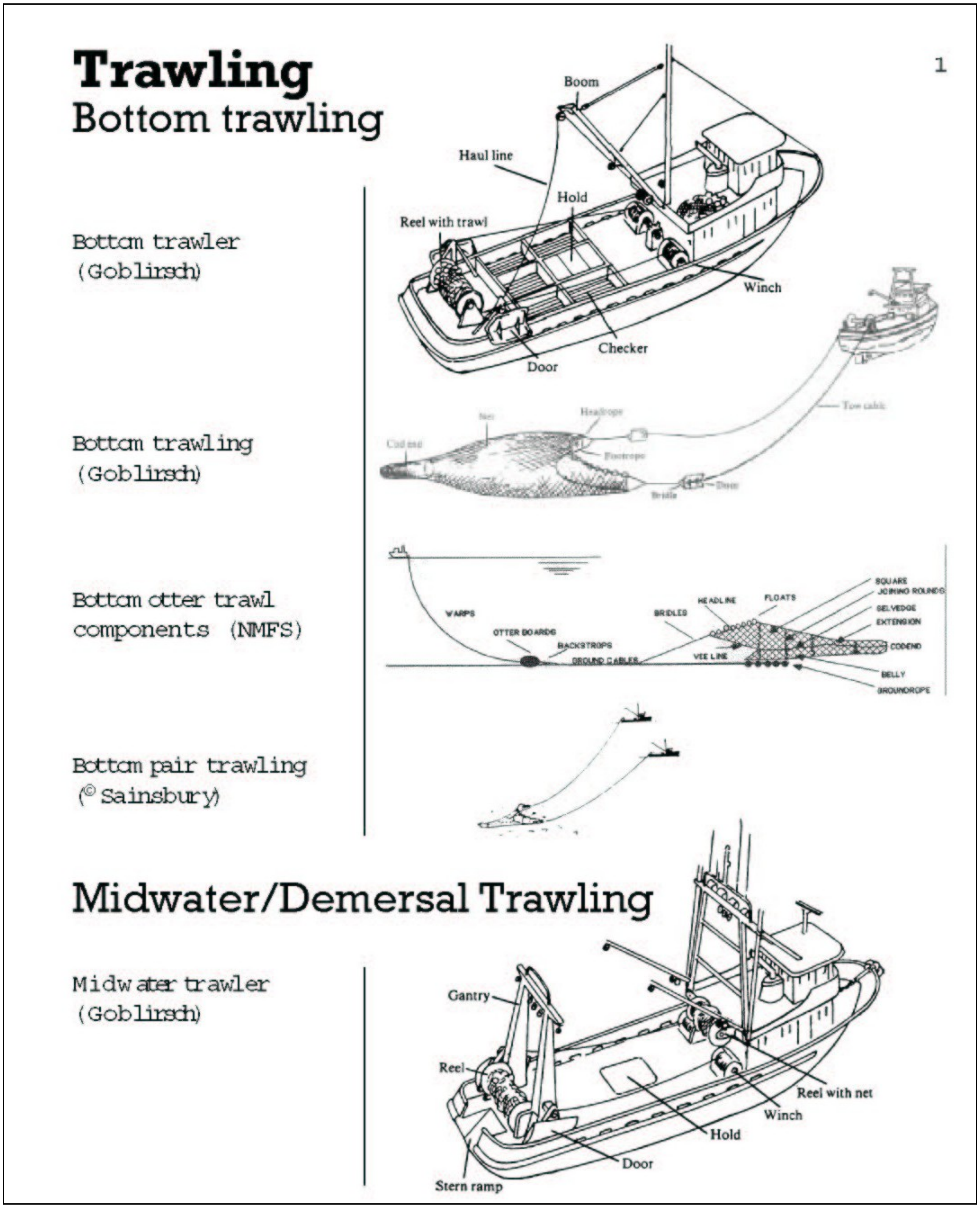
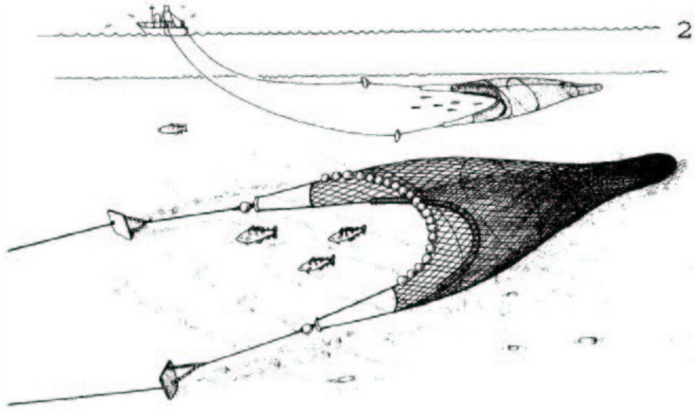
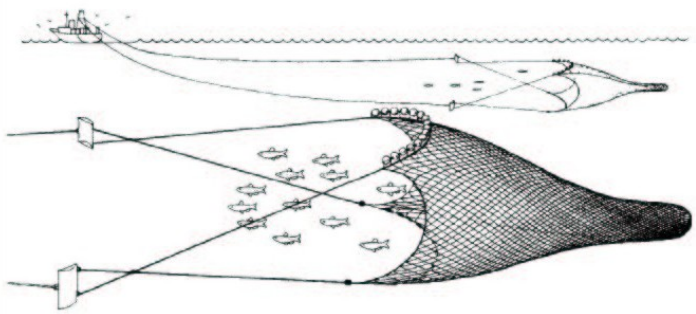


Figure 3-7: Graphic showing major trawl types (copyrighted images are used by permission and may not be reproduced).

Demersal trawl gear
(© Jennings)



Midwater trawling
(© Jennings)



Midwater trawl
components

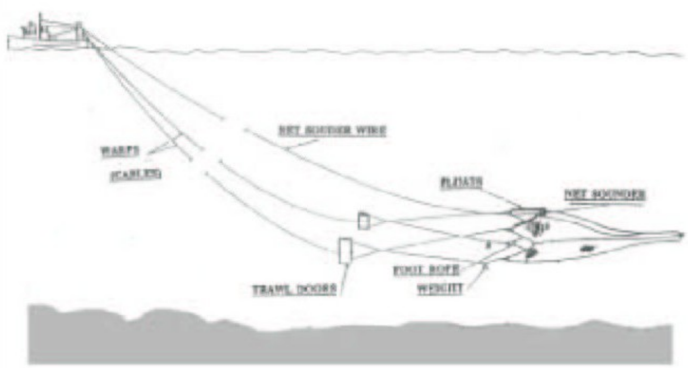


Figure 3-8: Graphic showing major trawl types from an in-water perspective (copyrighted images are used by permission and may not be reproduced).

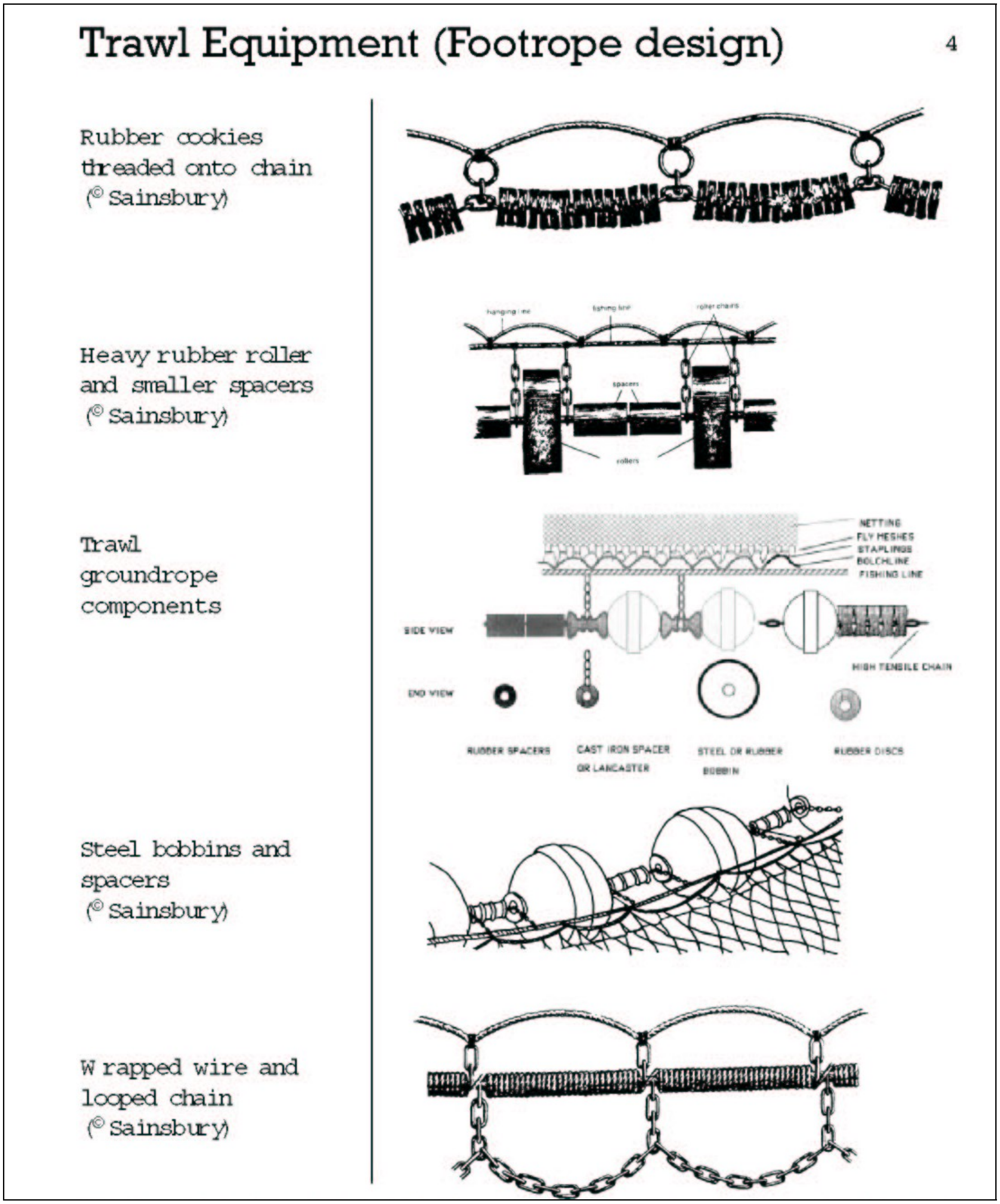


Figure 3-9: Trawl footrope design (copyrighted images are used by permission and may not be reproduced).

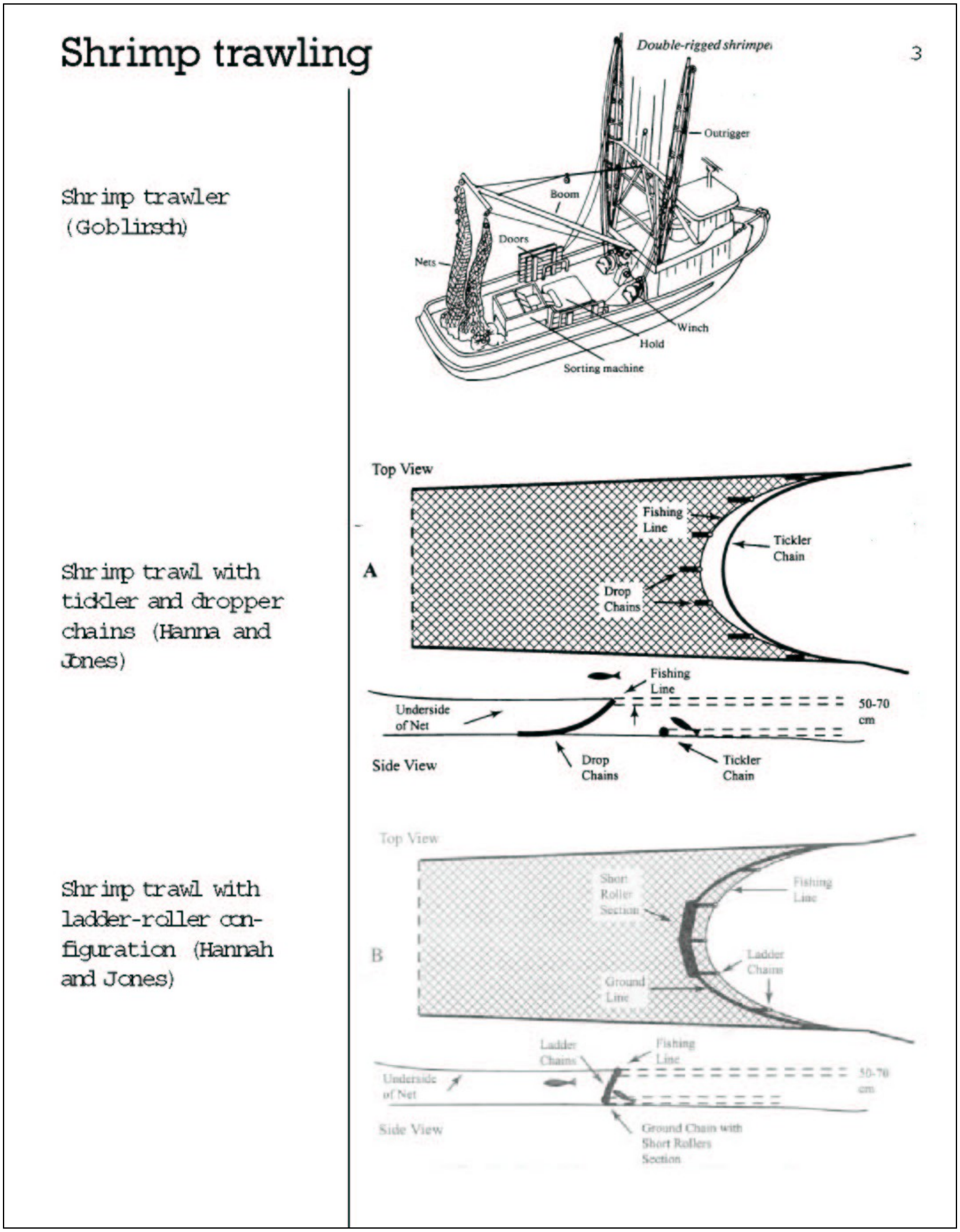


Figure 3-10: Shrimp trawl gear design (copyrighted images are used by permission and may not be reproduced).

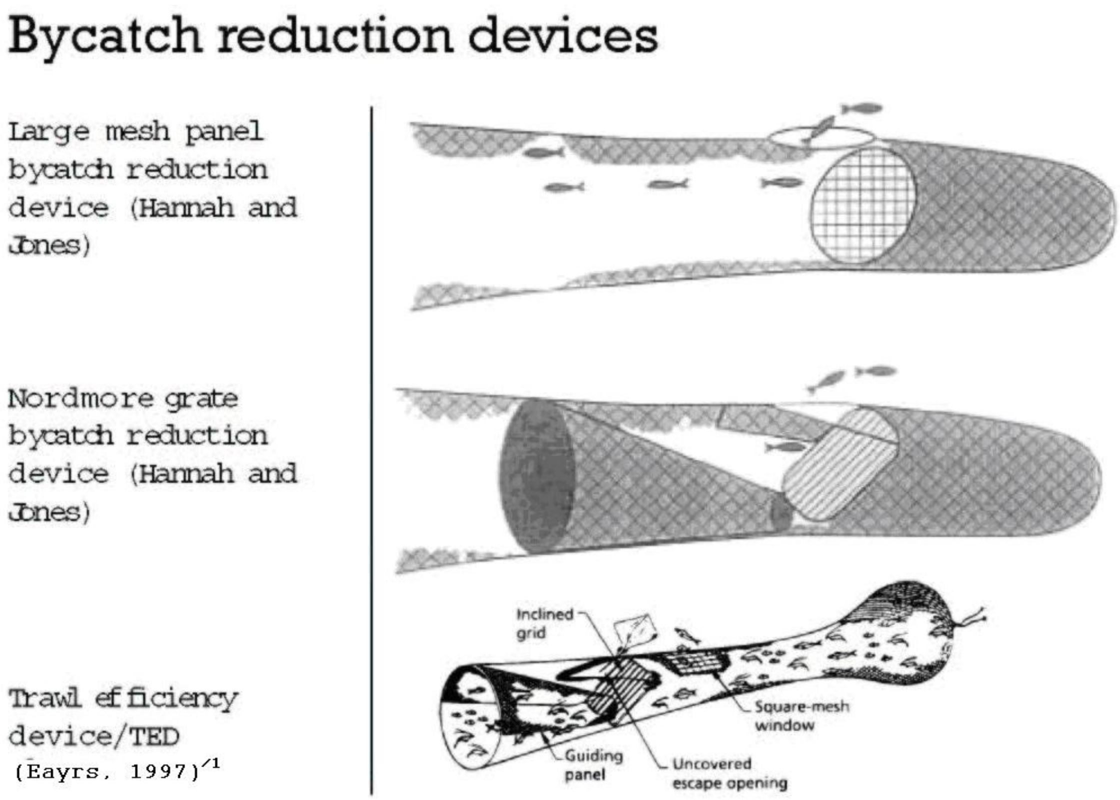


Figure 3-11: Bycatch reduction devices for trawl gear (copyrighted images are used by permission and may not be reproduced).

/1 This figure was incorrectly cited in the December 2005 FEIS and was modified on August 20, 2008. The correct citation is: Eayrs, S. et al. 1997. A guide to bycatch reduction in Australian prawn trawl fisheries. Australian Maritime College.

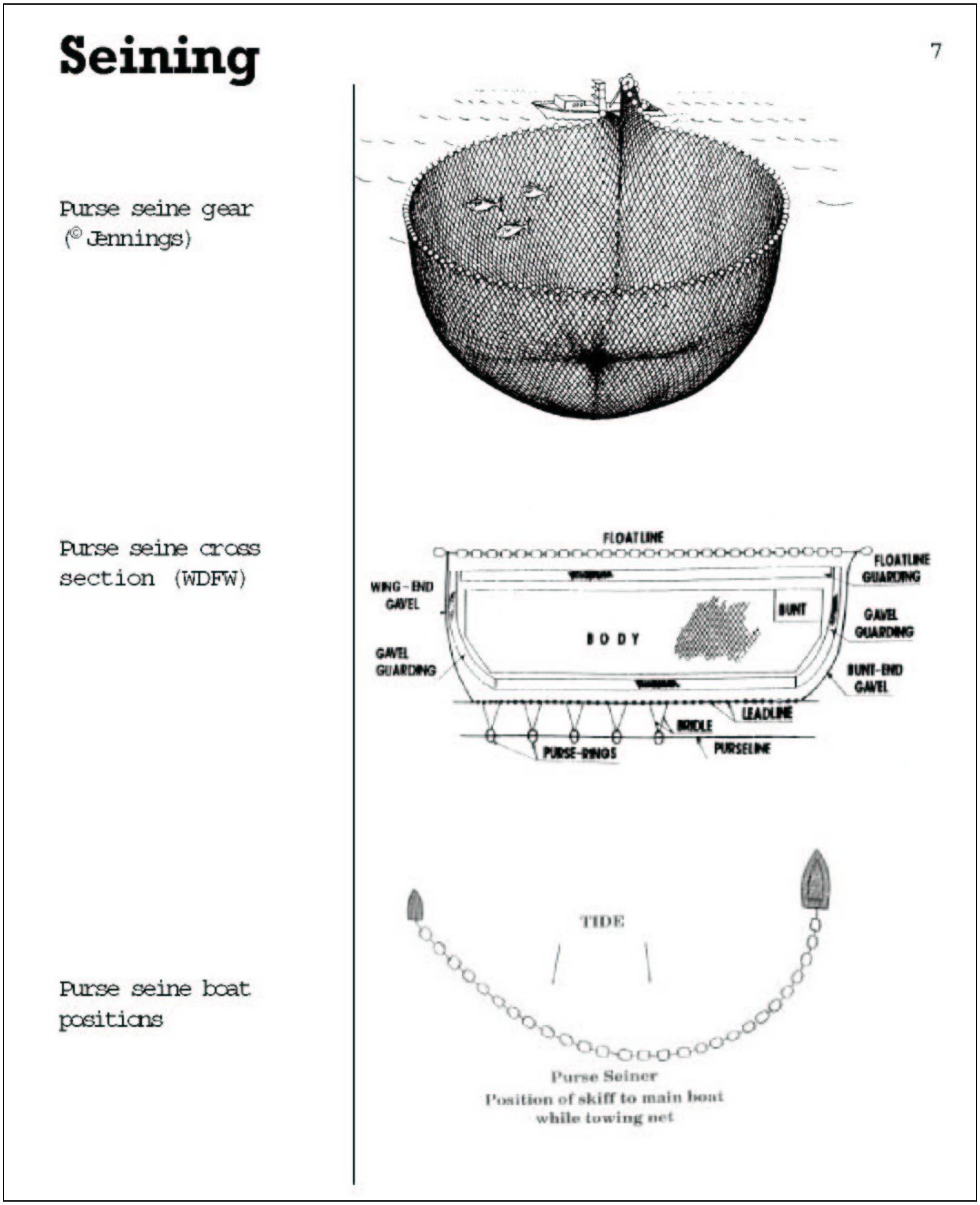


Figure 3-12: Seine gear design (copyrighted images are used by permission and may not be reproduced).

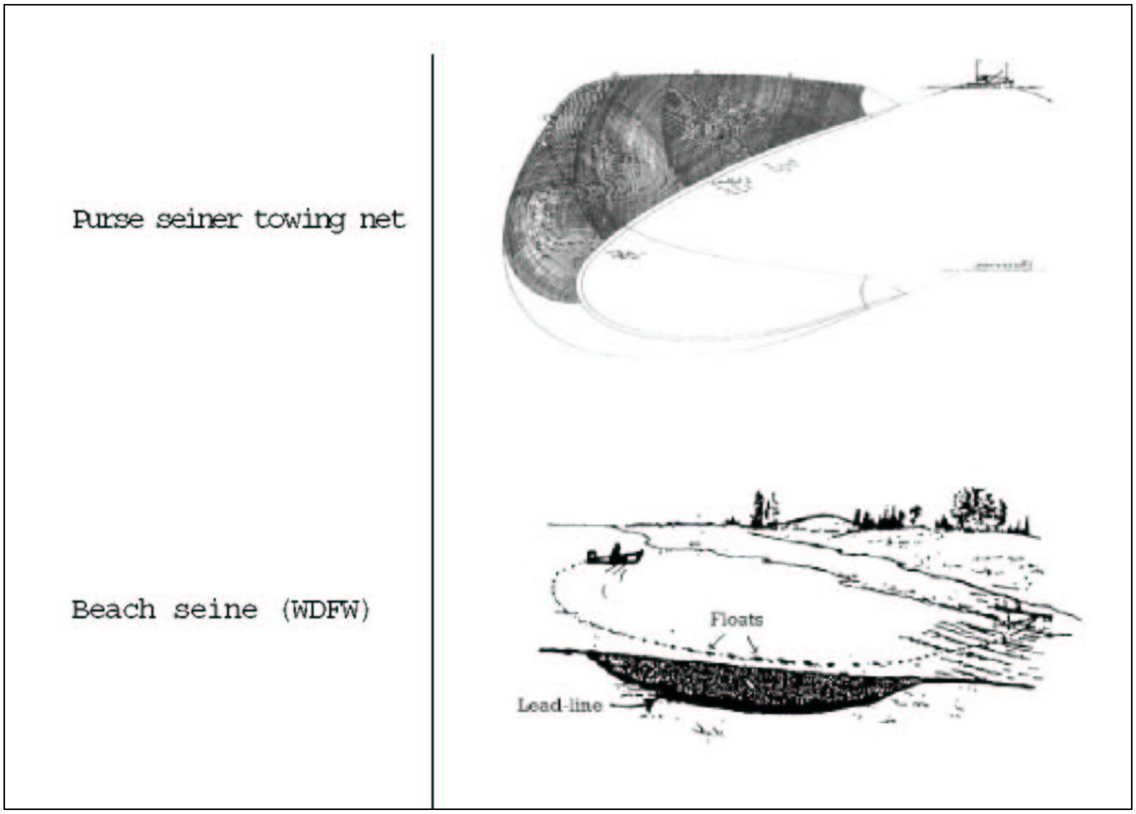
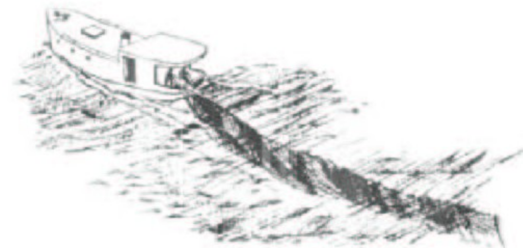


Figure 3-13: Seine gear design (copyrighted images are used by permission and may not be reproduced).

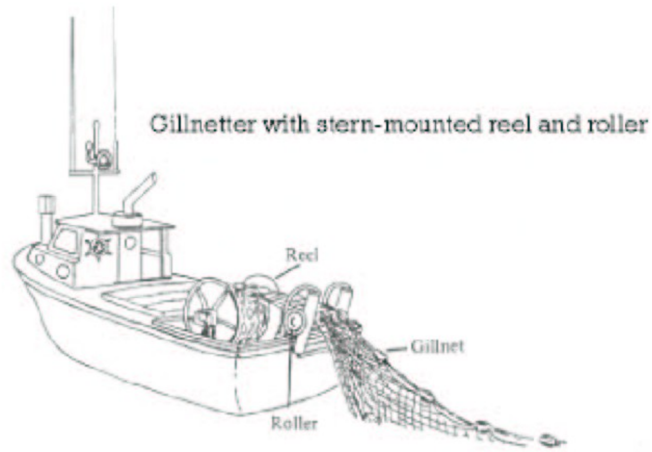
Gillnetting

9

Gillnetting



Gillnetter (Goblirsch)



Floating gillnets (Goblirsch)

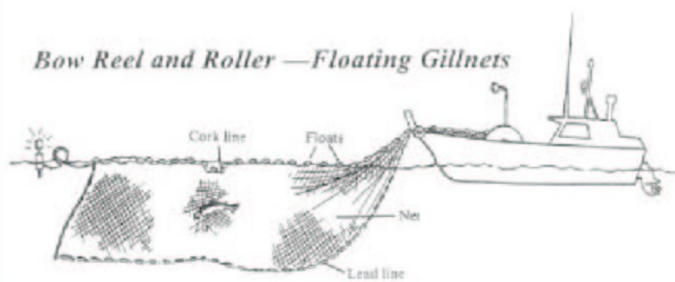


Figure 3-14: Gillnets (copyrighted images are used by permission and may not be reproduced).

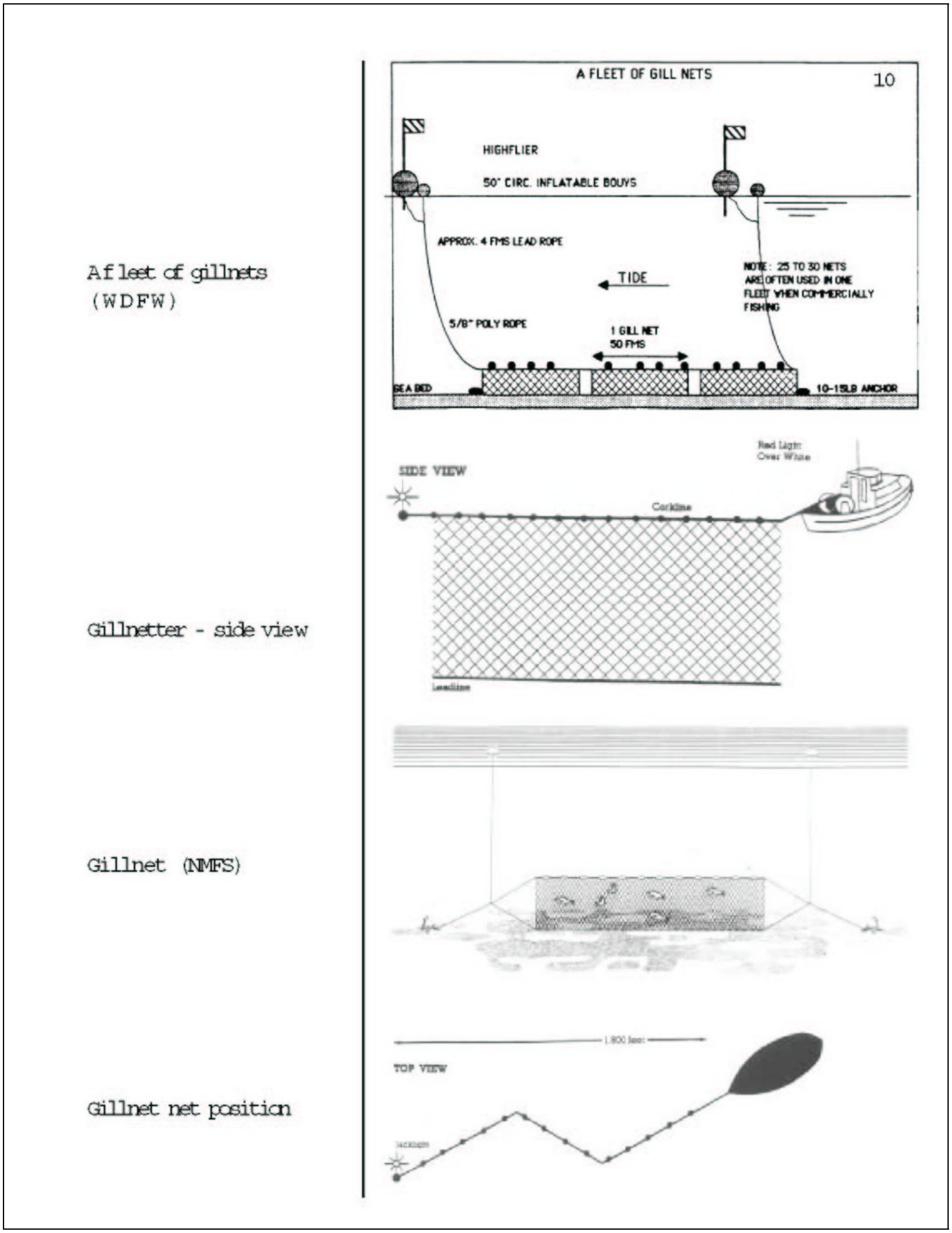


Figure 3-15: Gillnet design (copyrighted images are used by permission and may not be reproduced).

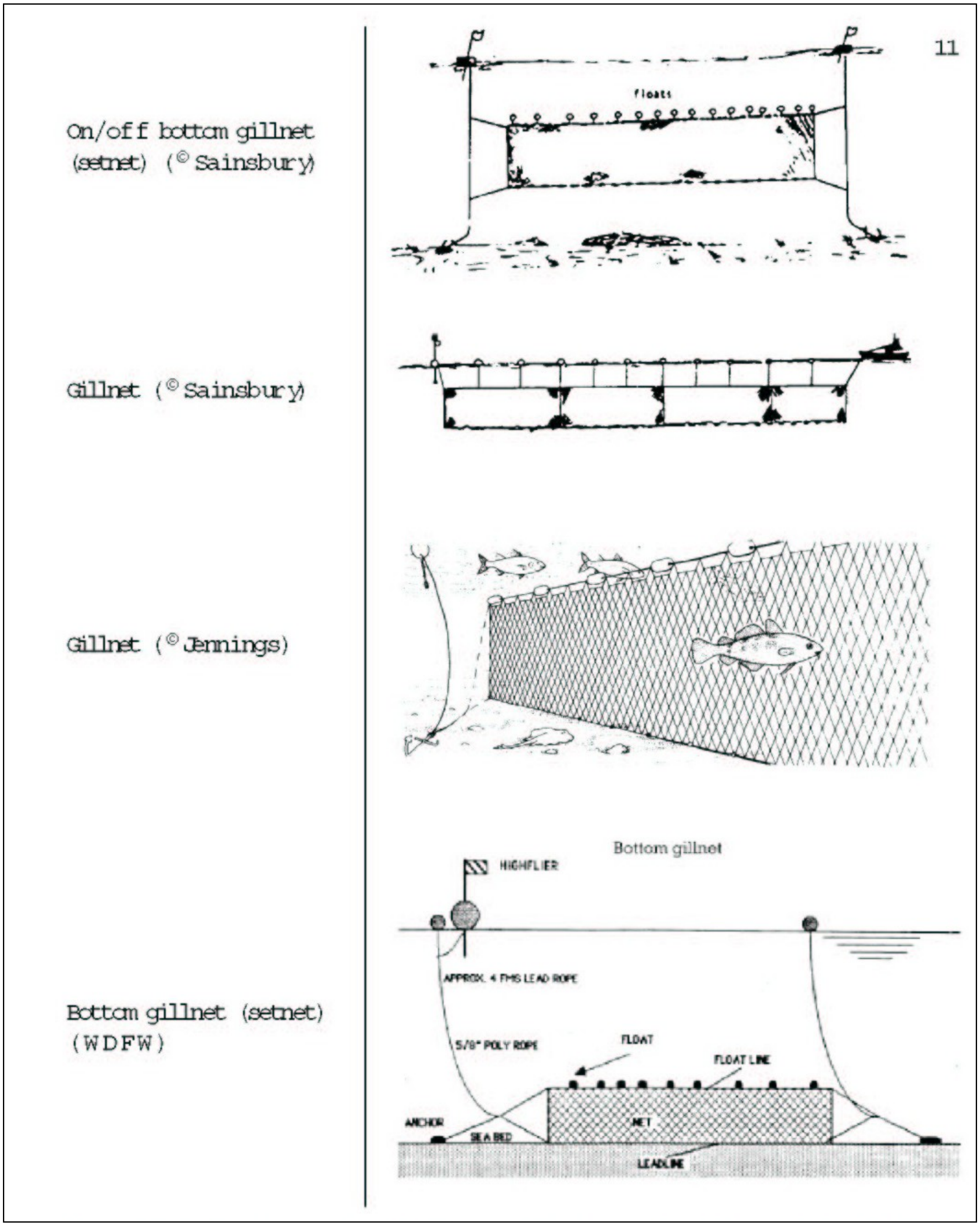


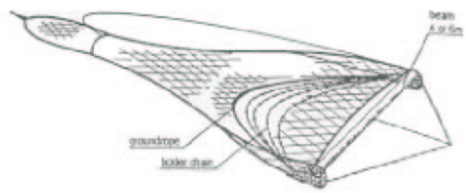
Figure 3-16: Gillnet design (copyrighted images are used by permission and may not be reproduced).

Beam trawling

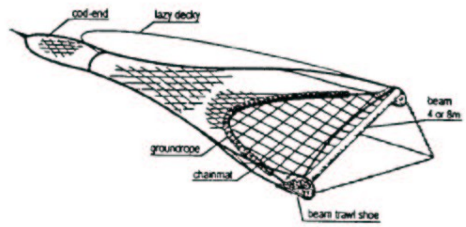
6

Beam trawls
(© Sainsbury)

Beam trawl design 1
(Watling and Morse)

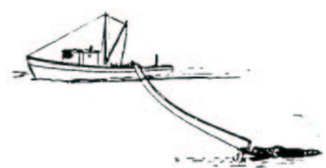


Beam trawl design 2
(Watling and Morse)



Dredging

Dredging (© Sainsbury)



Scallop dredge
(Goblirsch)

To be added

Note: Copyrighted images from Sainsbury and Jennings are used by permission, and may not be reproduced.

Figure 3-17: Beam trawl and dredge gear (copyrighted images are used by permission and may not be reproduced).

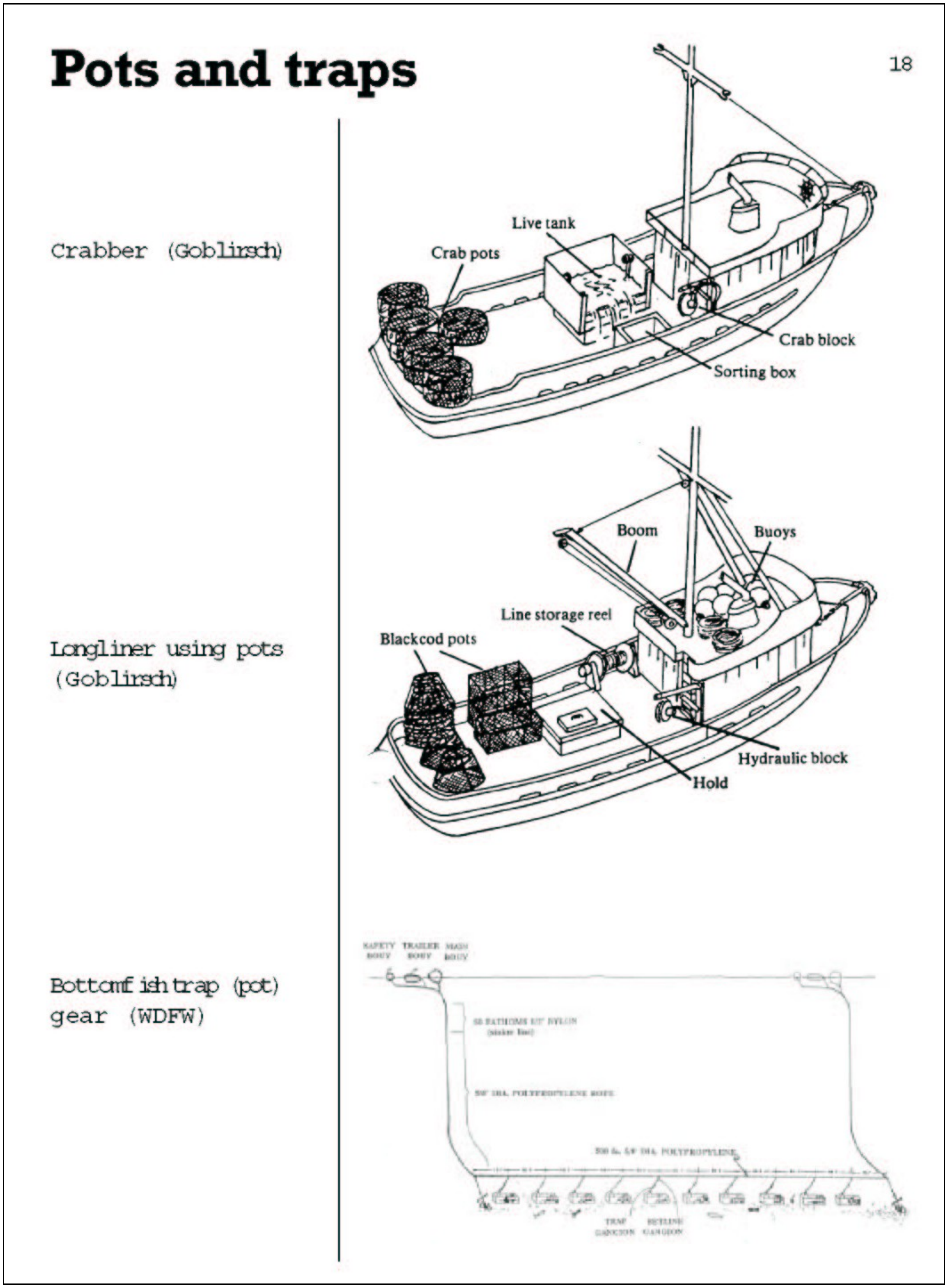
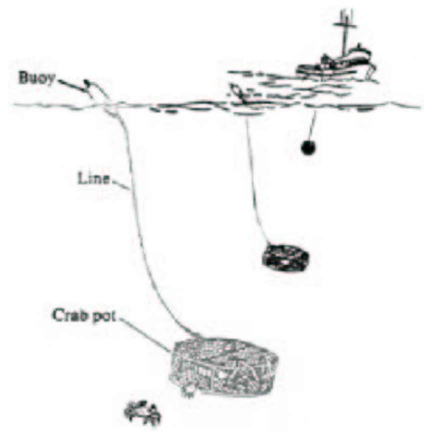


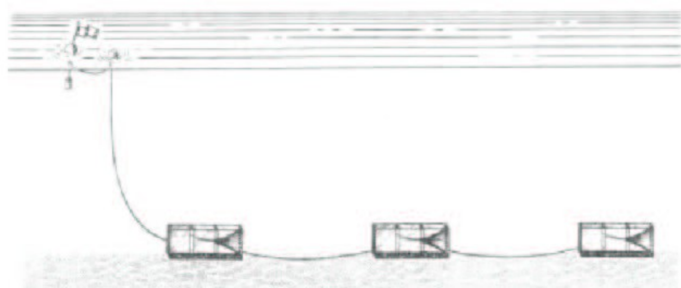
Figure 3-18: Pot and trap gear (copyrighted images are used by permission and may not be reproduced).

19

Set crab pots (Goblirsch)



Traps on sea floor (NMFS)



Basket-shaped sable-fish (blackcod) pot

Sablefish trap (Canada Dept. of Fisheries and Oceans)

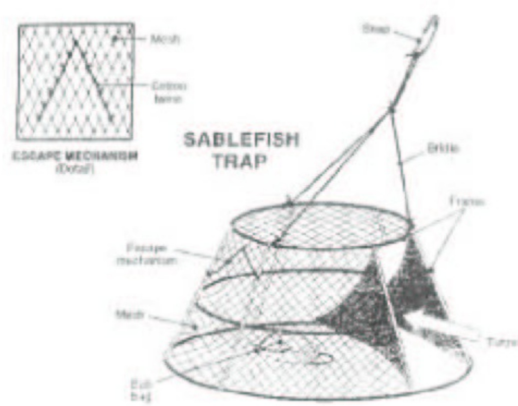
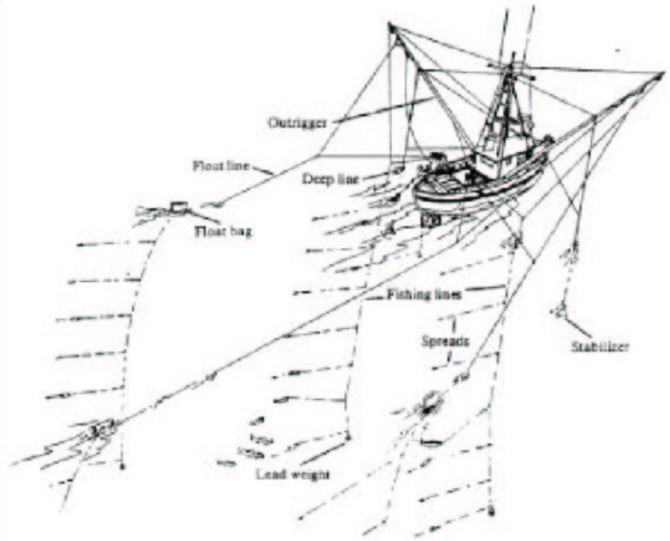


Figure 3-18: Pot and trap gear (continued)(copyrighted images are used by permission and may not be reproduced).

Trolling

12

Trolling (Goblirsch)



Salmon troller (Goblirsch)

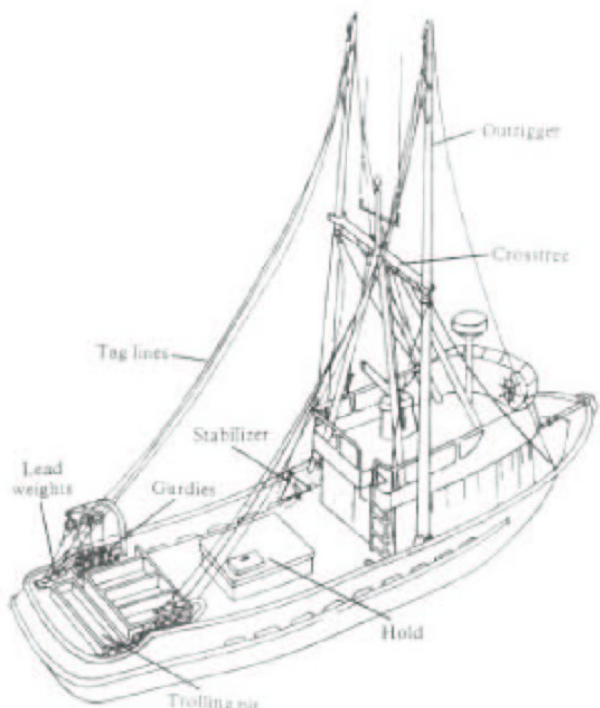
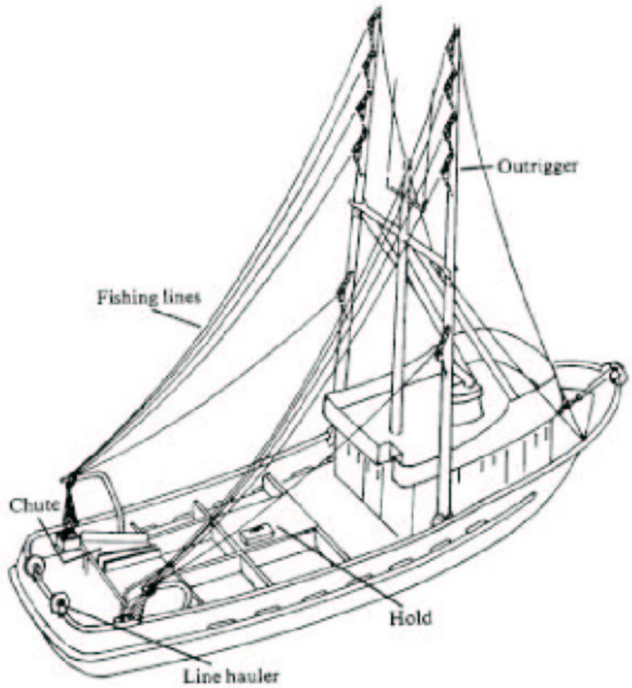


Figure 3-19: Troll gear (copyrighted images are used by permission and may not be reproduced).

Albacore troller
(Gobr lirsch)



Albacore troll gear
(Goblirsch)

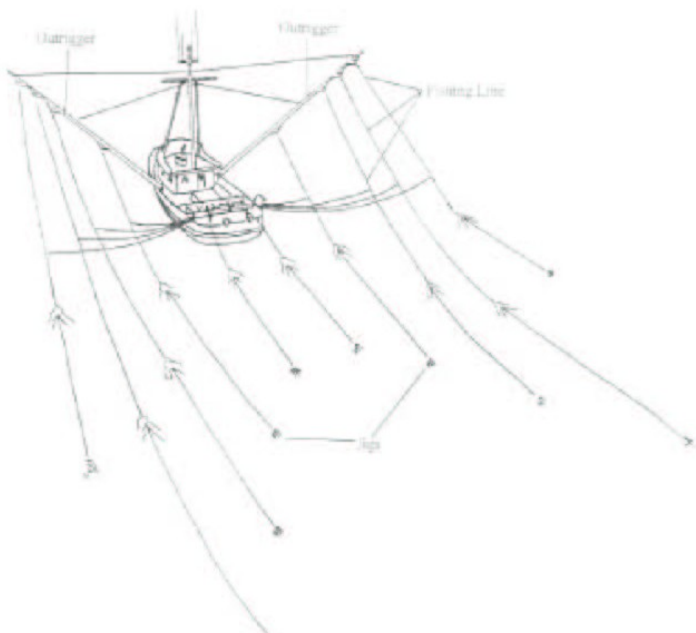


Figure 3-19: Troll gear (continued)(copyrighted images are used by permission and may not be reproduced).

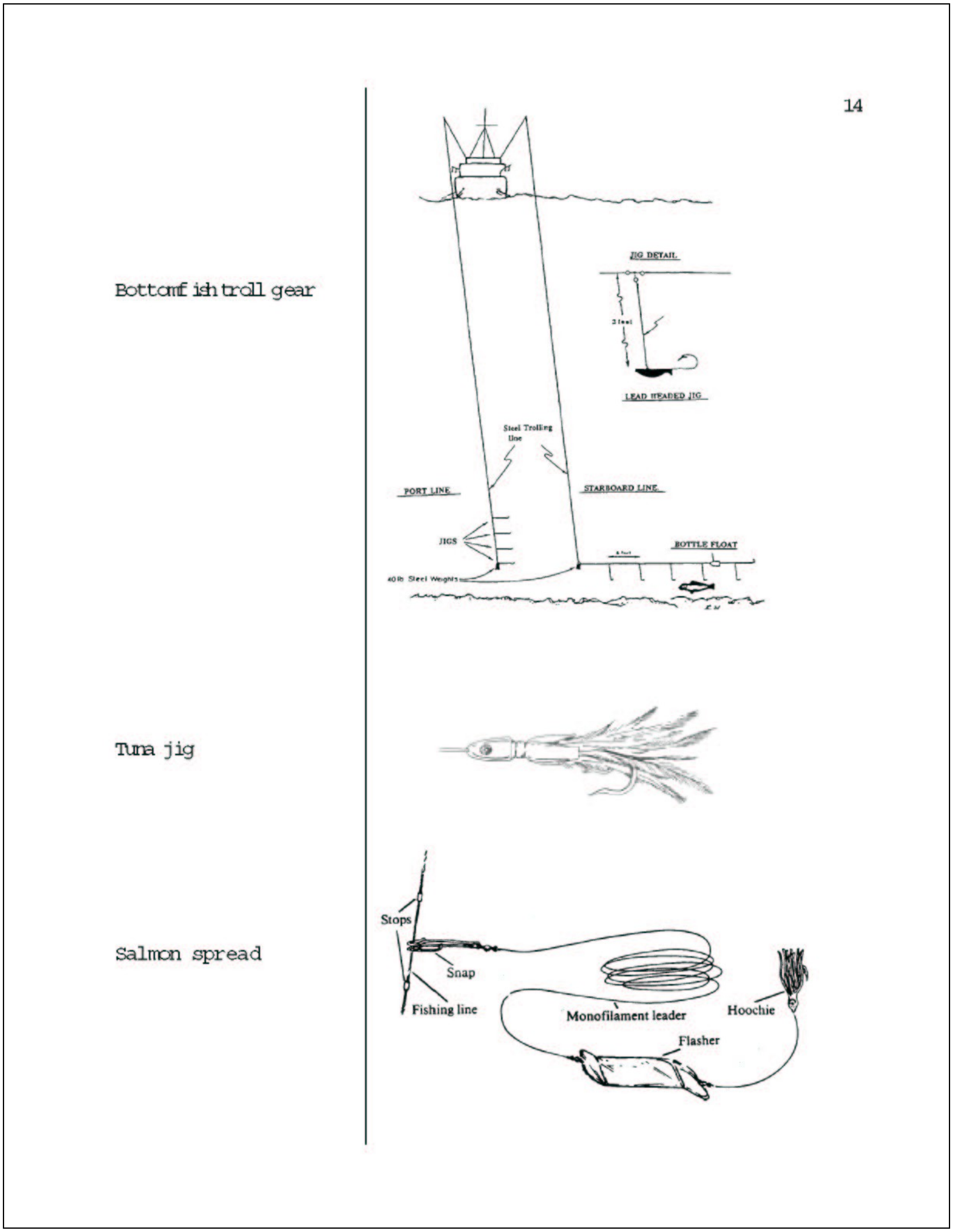


Figure 3-19: Troll gear (continued)(copyrighted images are used by permission and may not be reproduced).

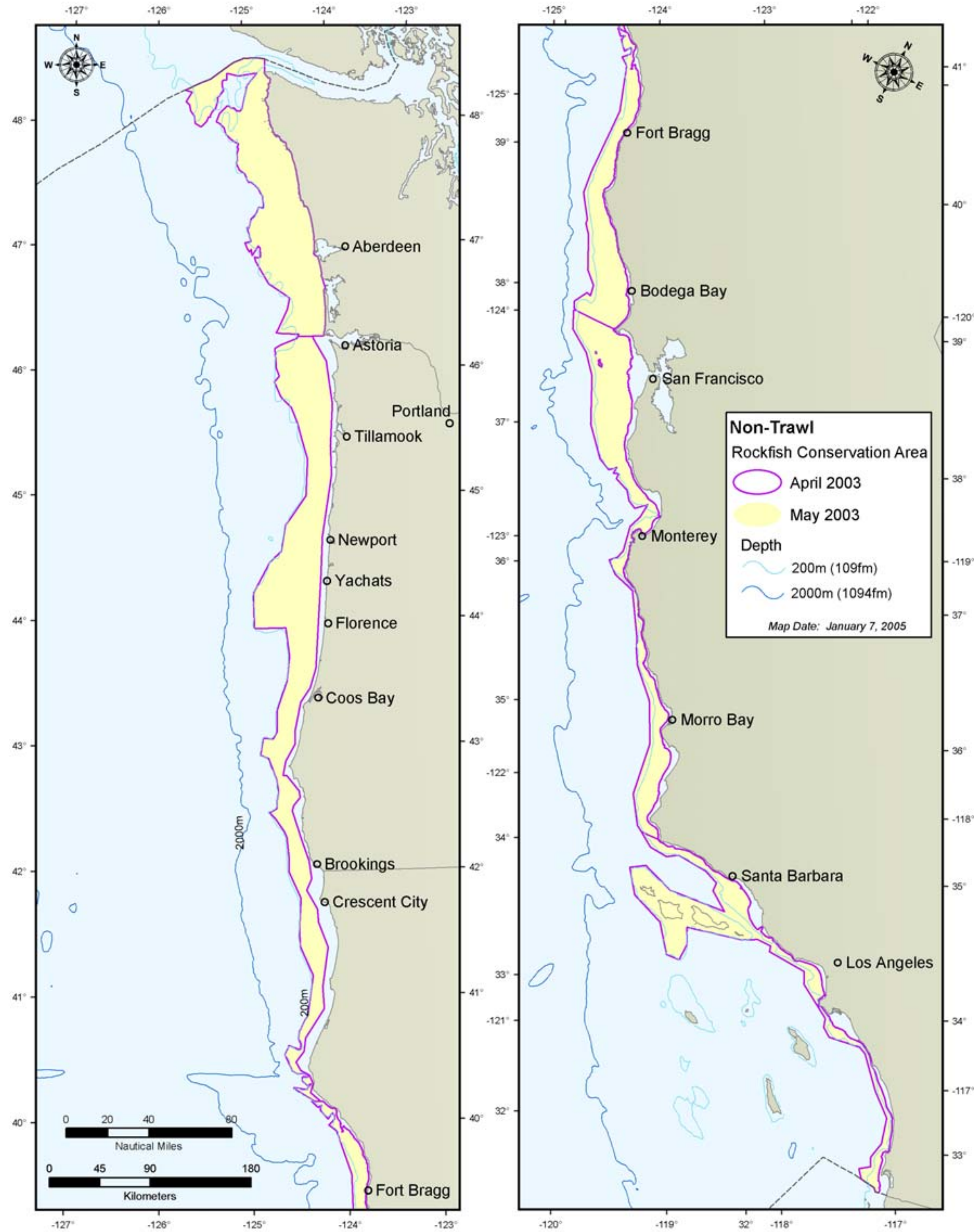


Figure 3-20: Rockfish Conservation Area non-trawl April-May 2003

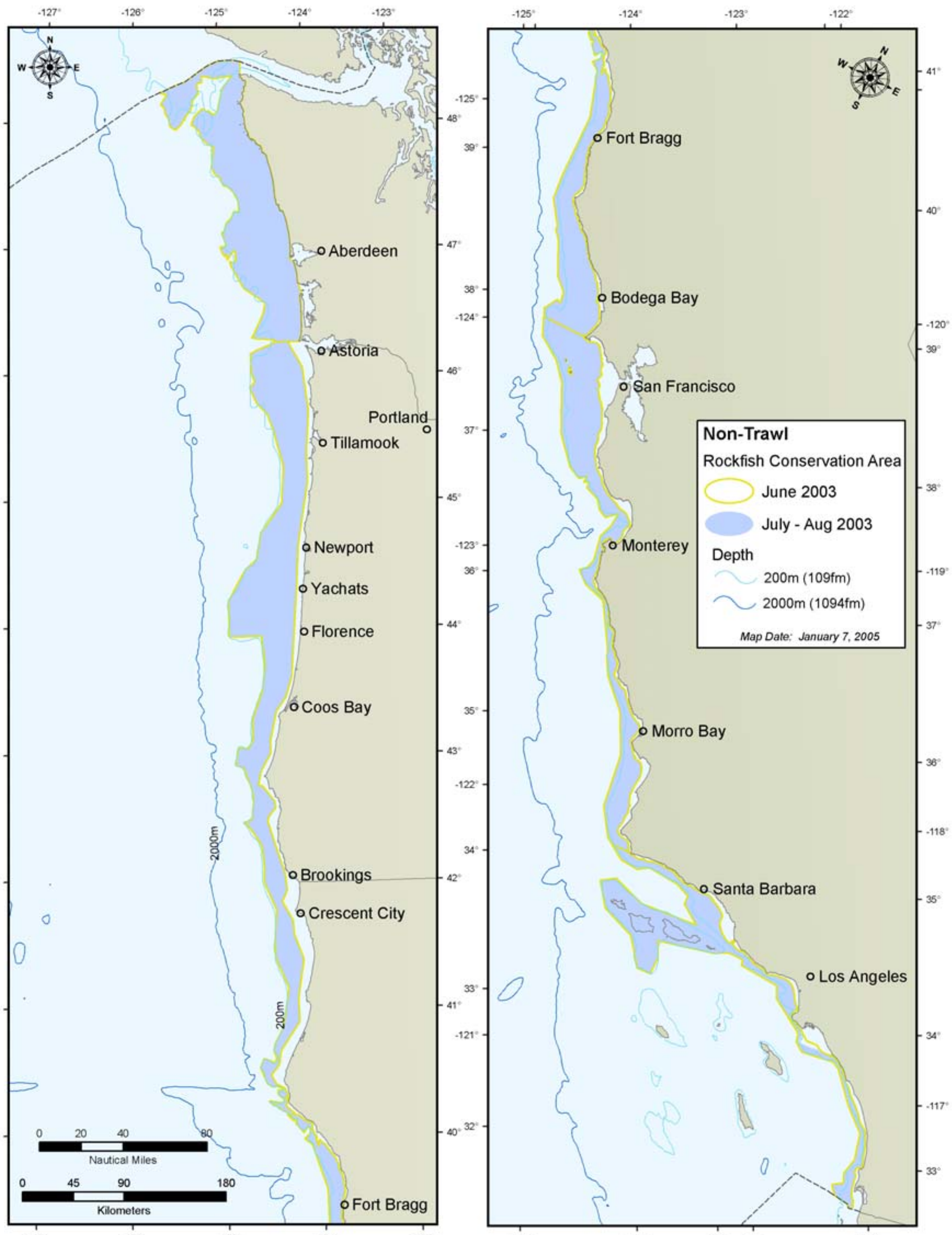


Figure 3-21: Rockfish Conservation Area non-trawl June-August 2003

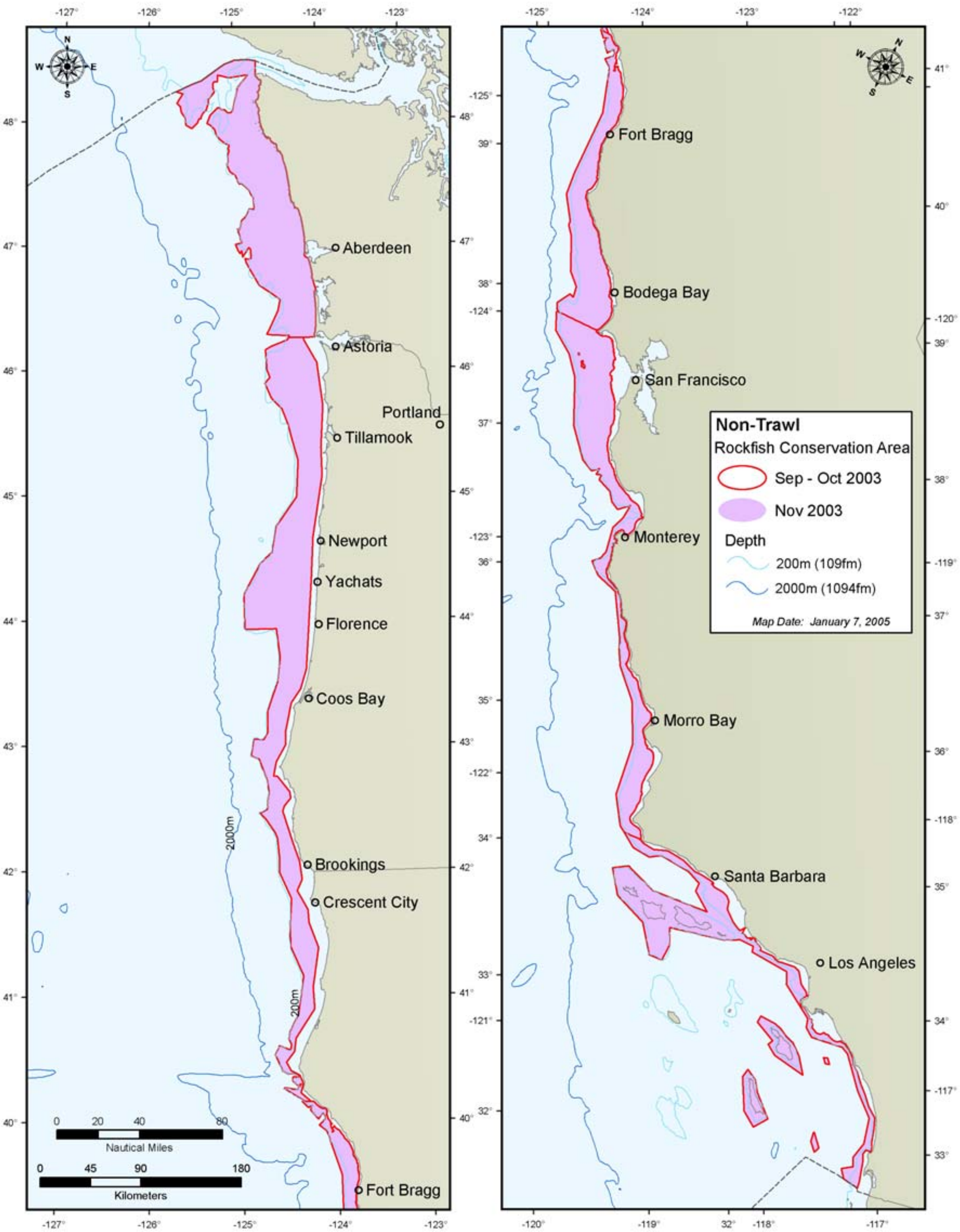


Figure 3-22: Rockfish Conservation Area non-trawl September-November 2003

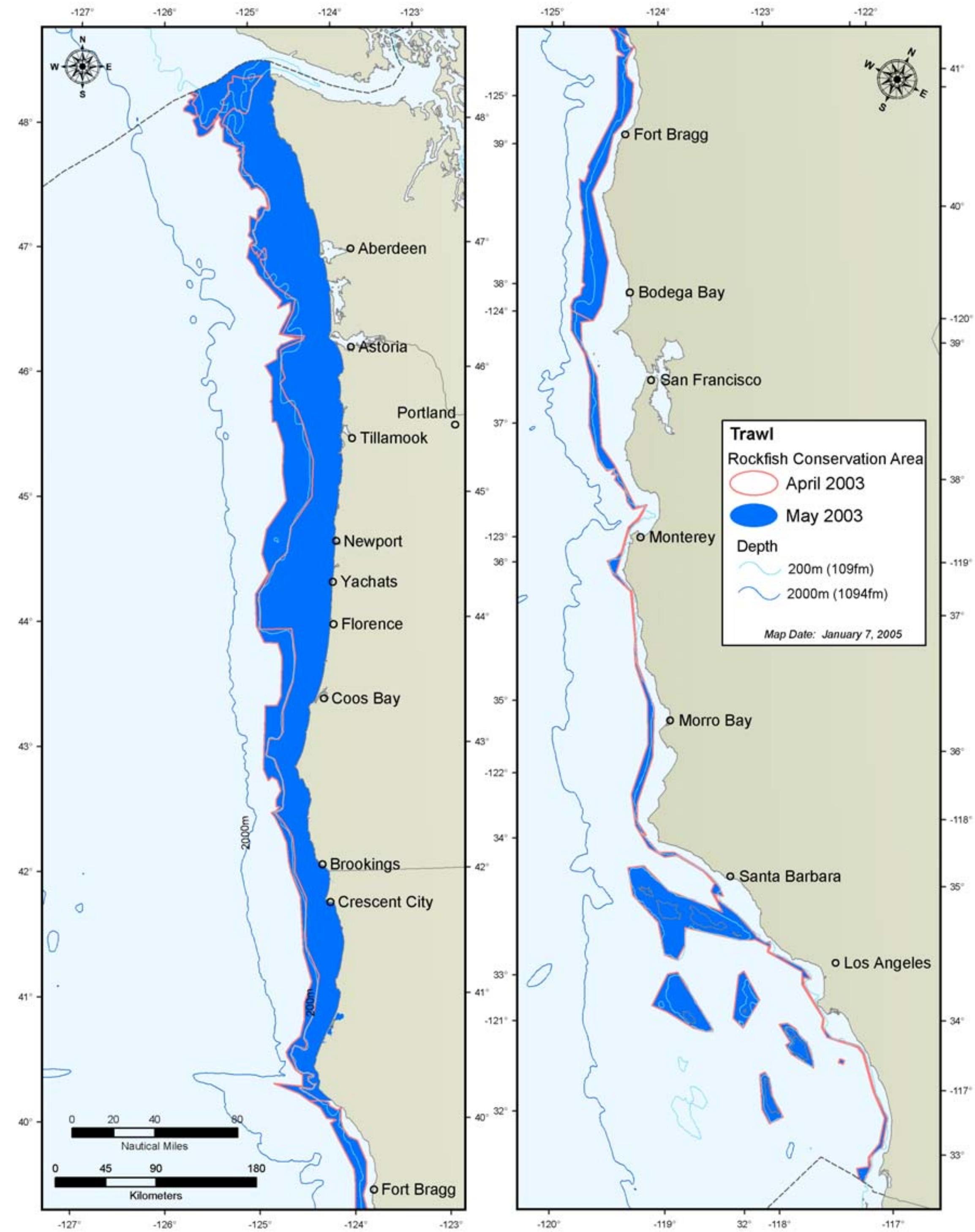


Figure 3-23: Rockfish Conservation Area trawl April-May 2003

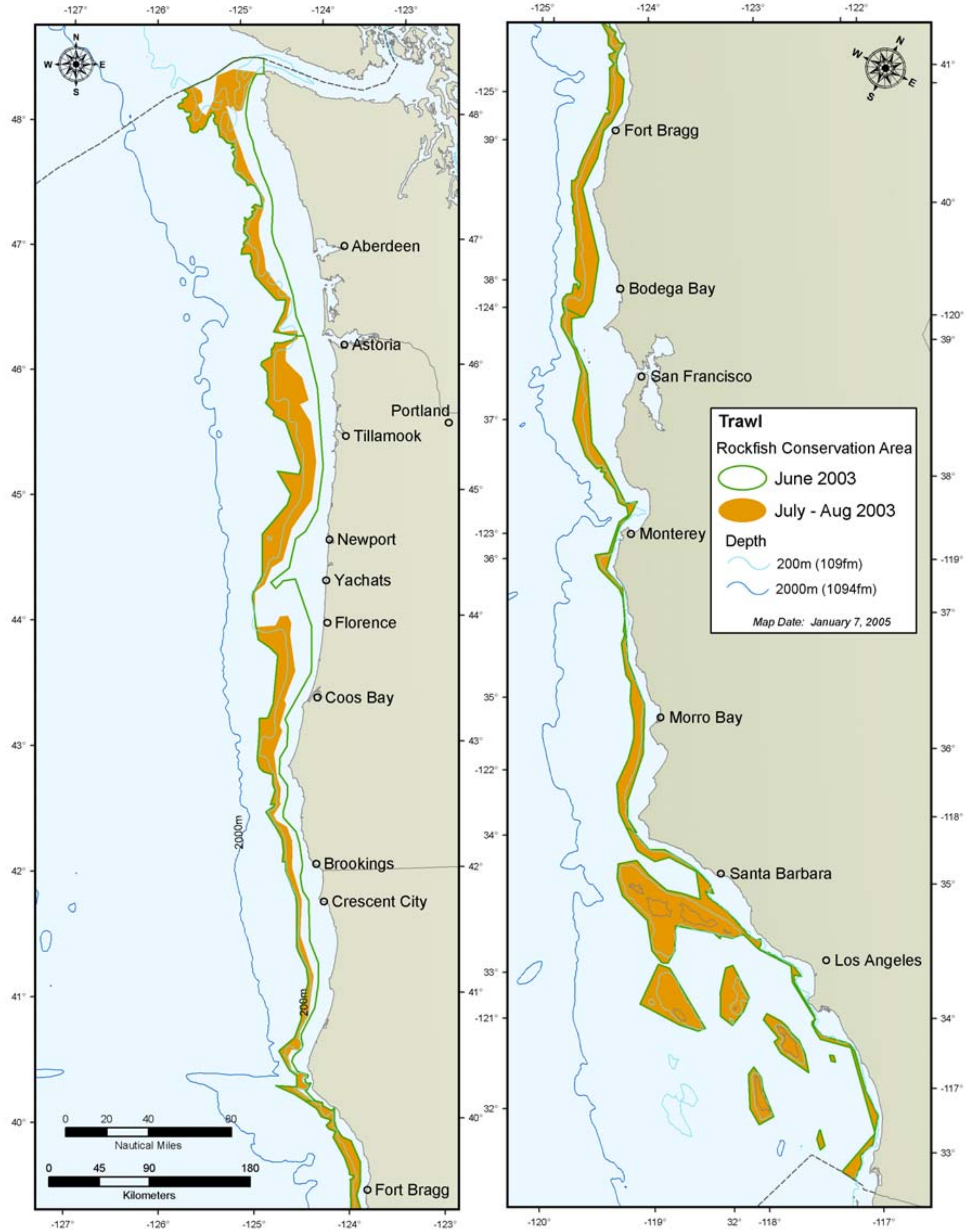


Figure 3-24: Rockfish Conservation Area trawl June-August 2003

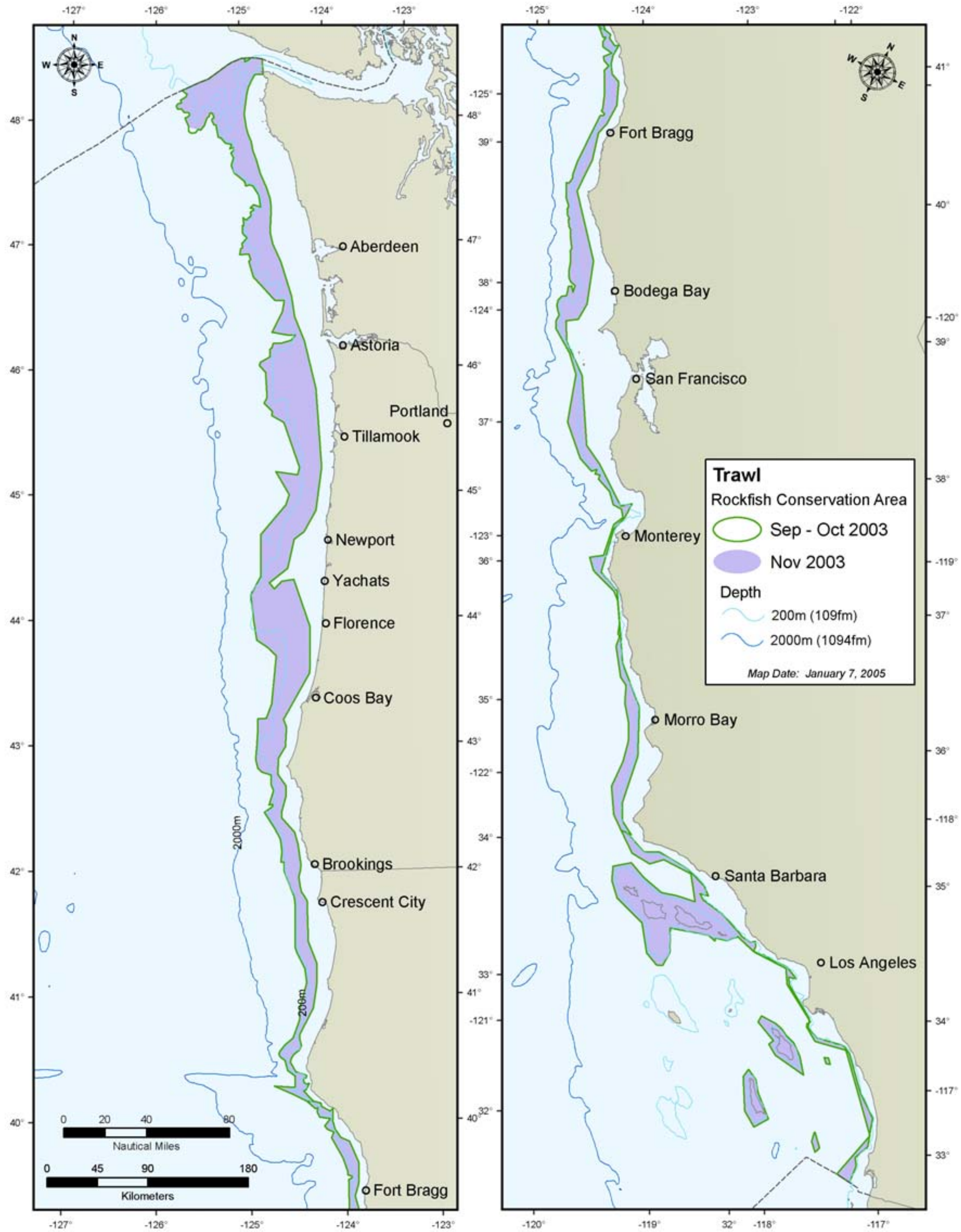


Figure 3-25: Rockfish Conservation Area trawl September-November 2003

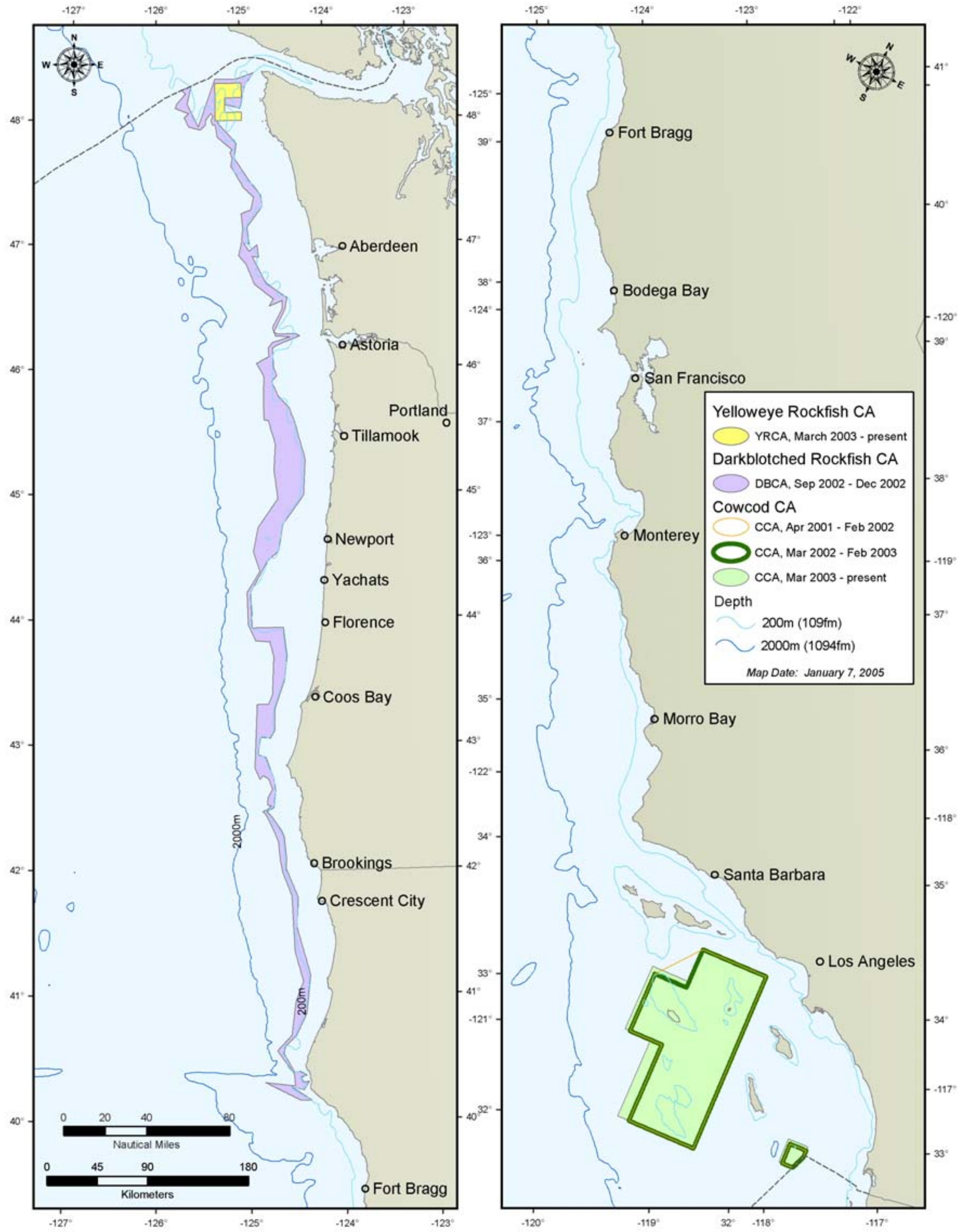


Figure 3-26: Yelloweye Rockfish Conservation Area, Darkblotched Rockfish Conservation Area, Cowcod Conservation Area

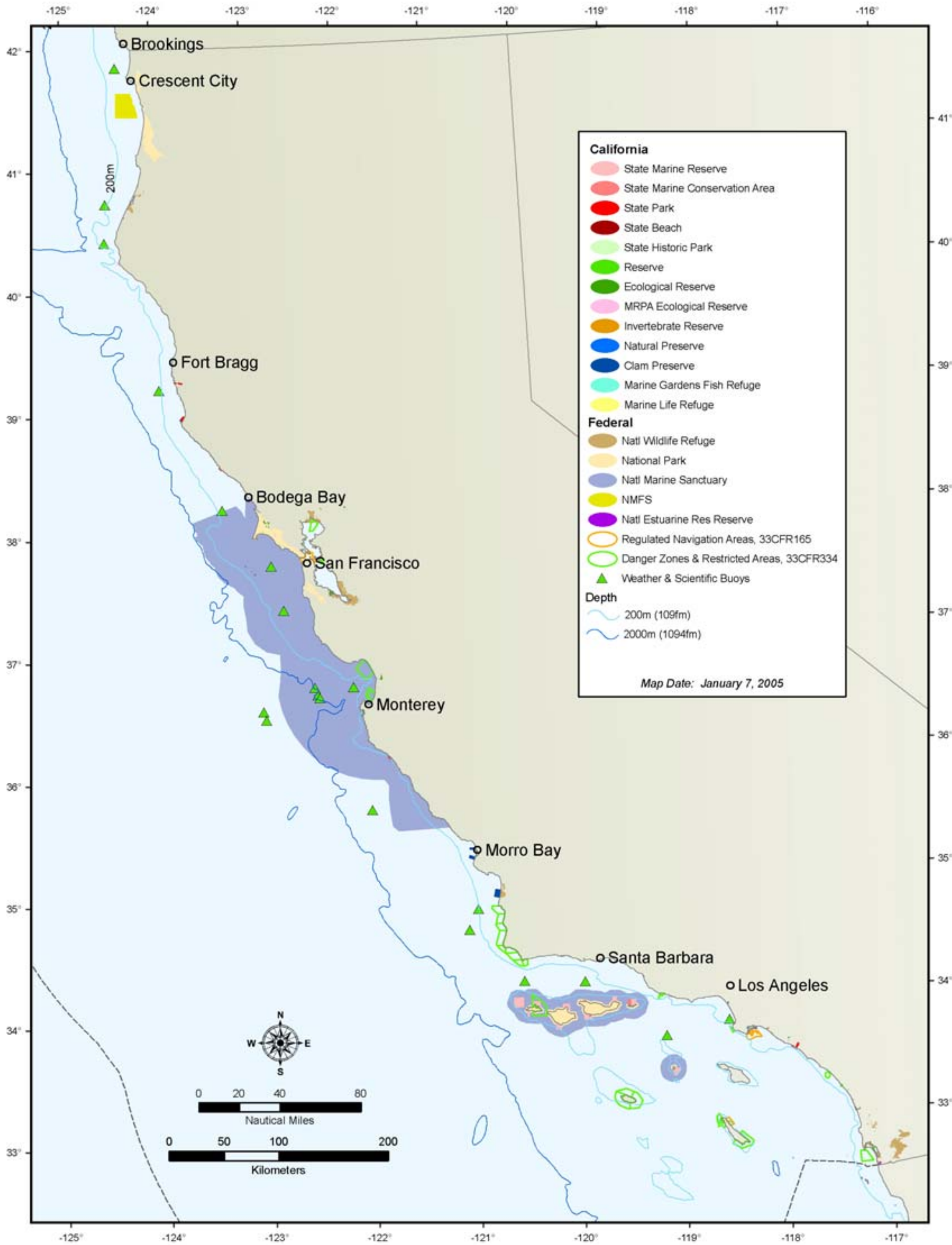


Figure 3-27: Marine Managed Areas - California

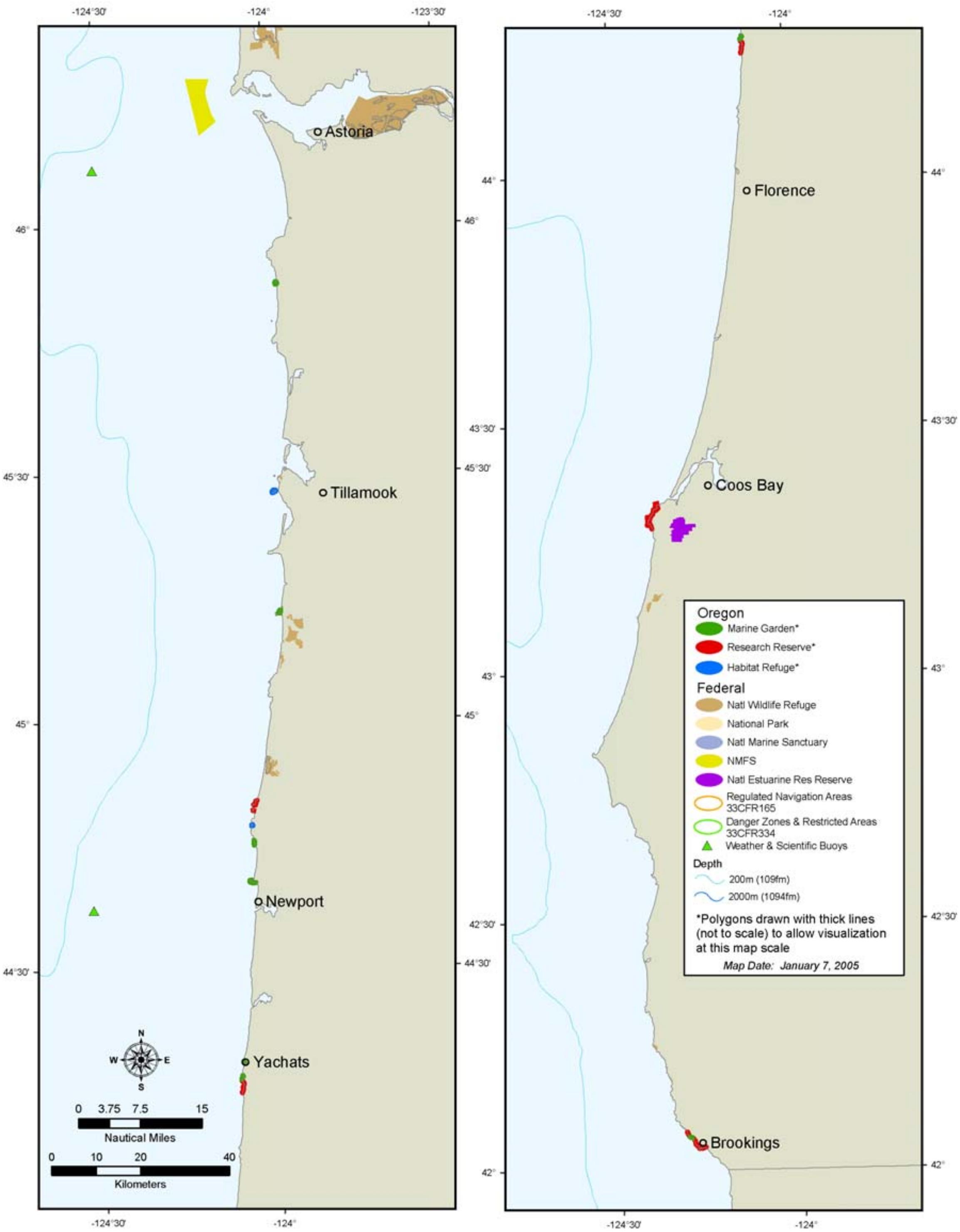


Figure 3-28: Marine Managed Areas - Oregon

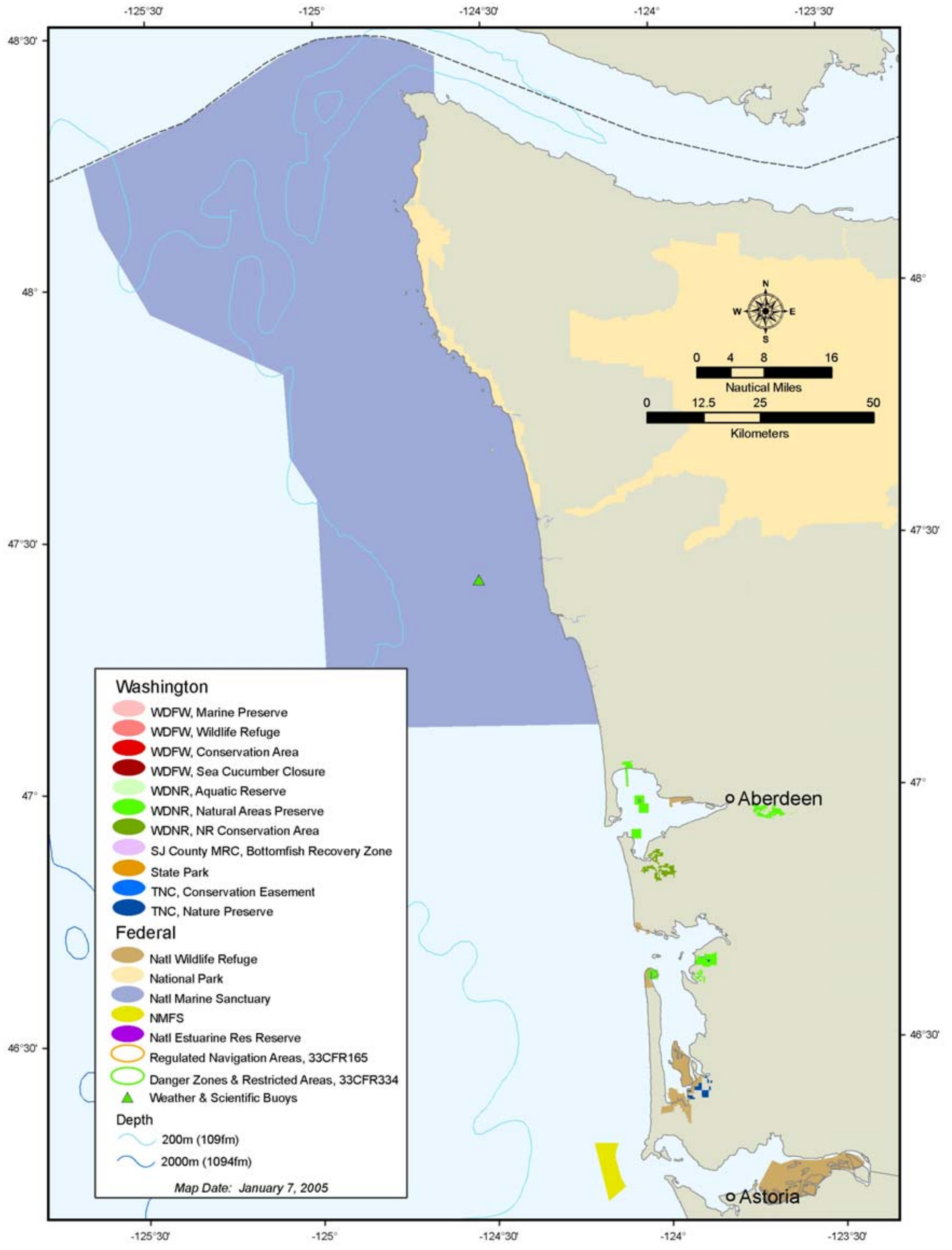


Figure 3-29: Marine Managed Areas – Washington, Outer Coast

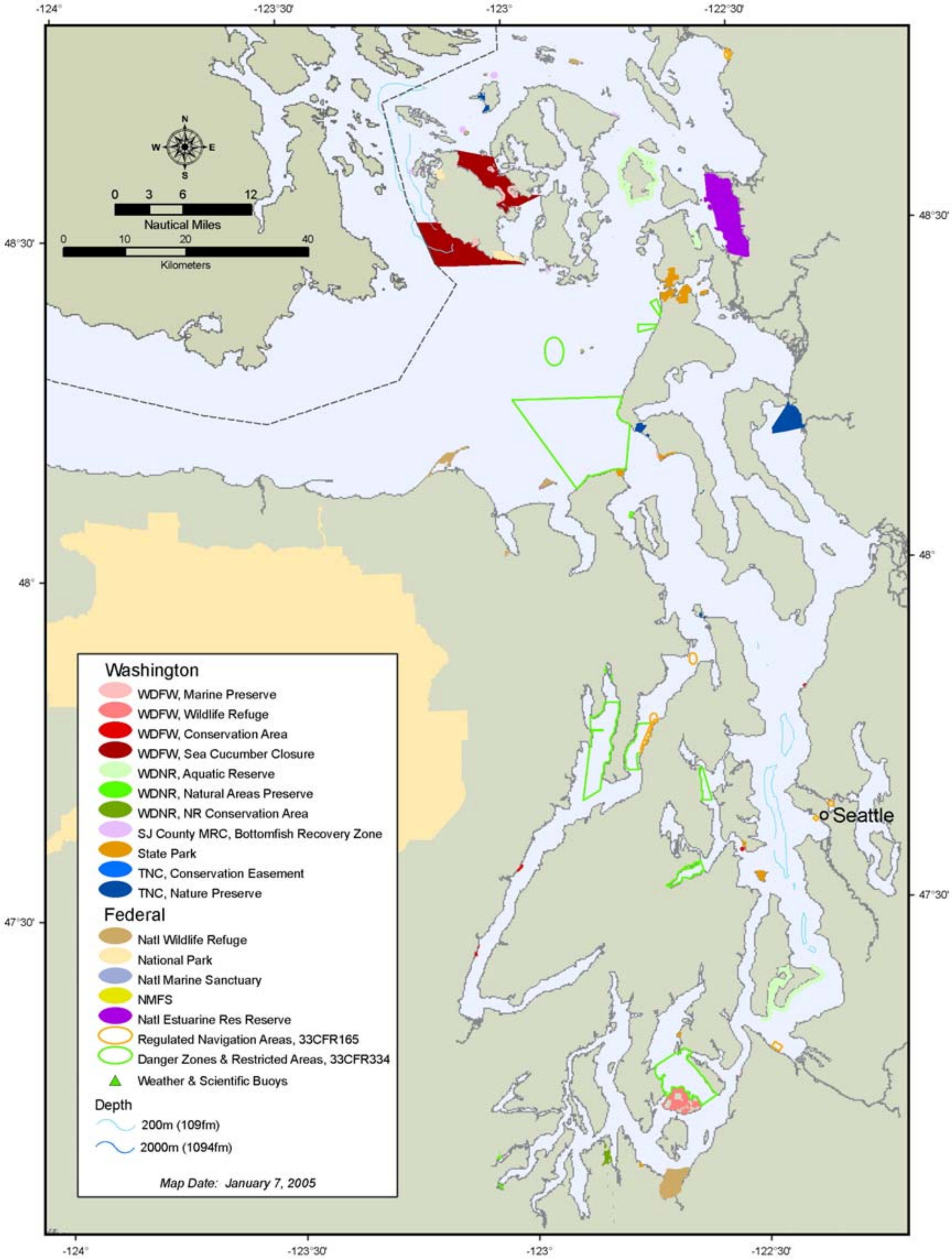


Figure 3-30: Marine Managed Areas - Washington, Puget Sound

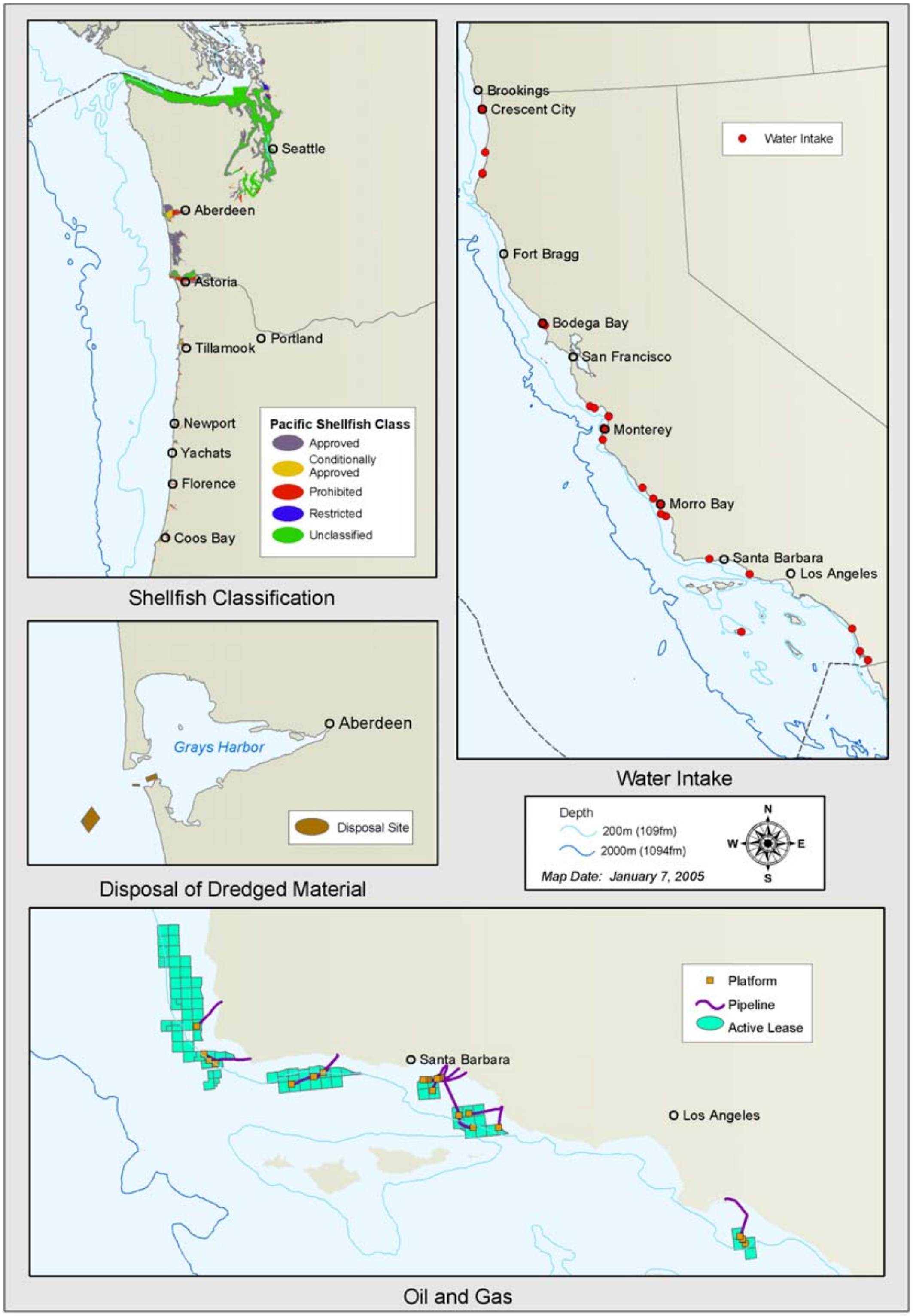


Figure 3-31: Non-fishing activities

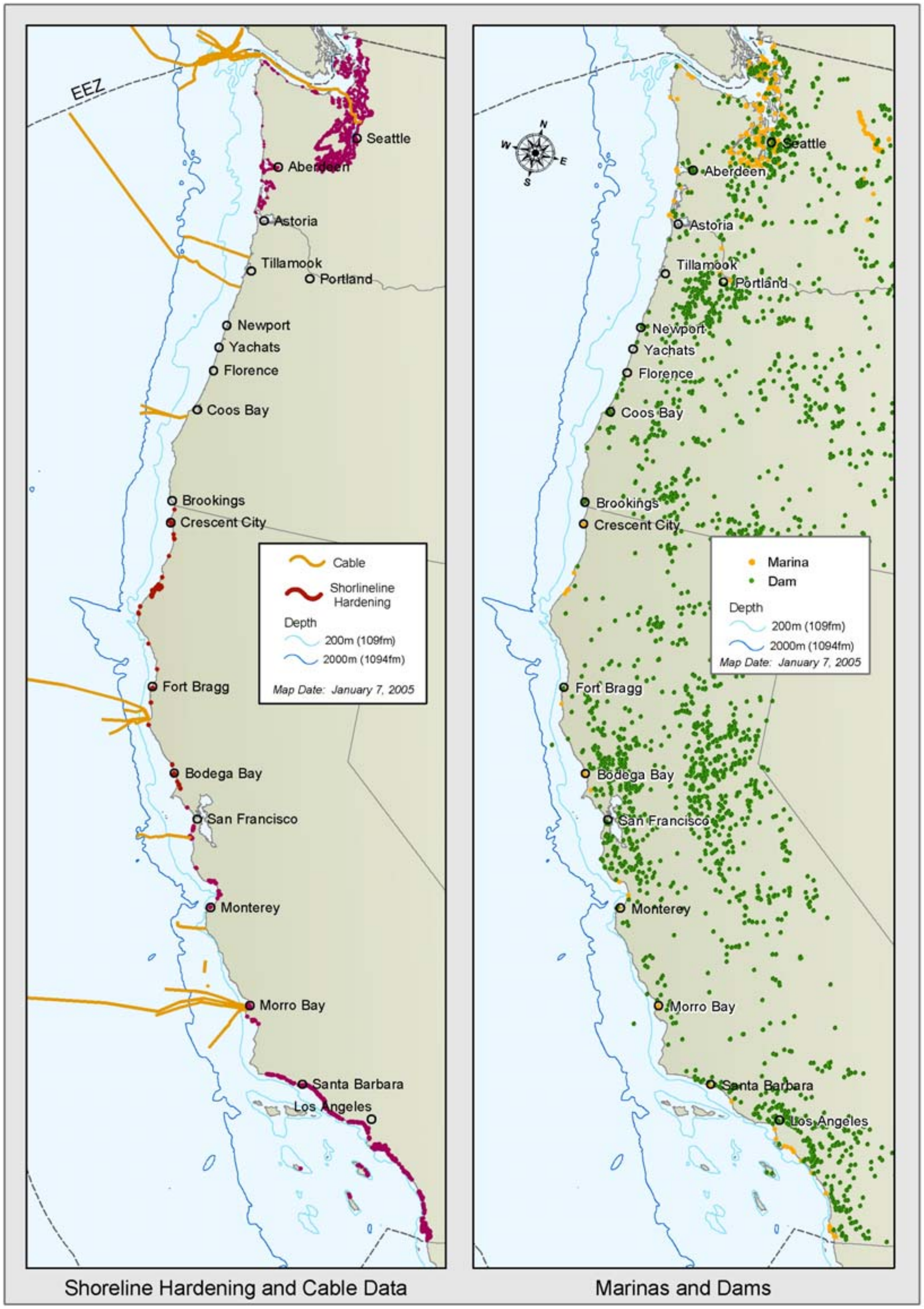


Figure 3-32: Non-fishing activities

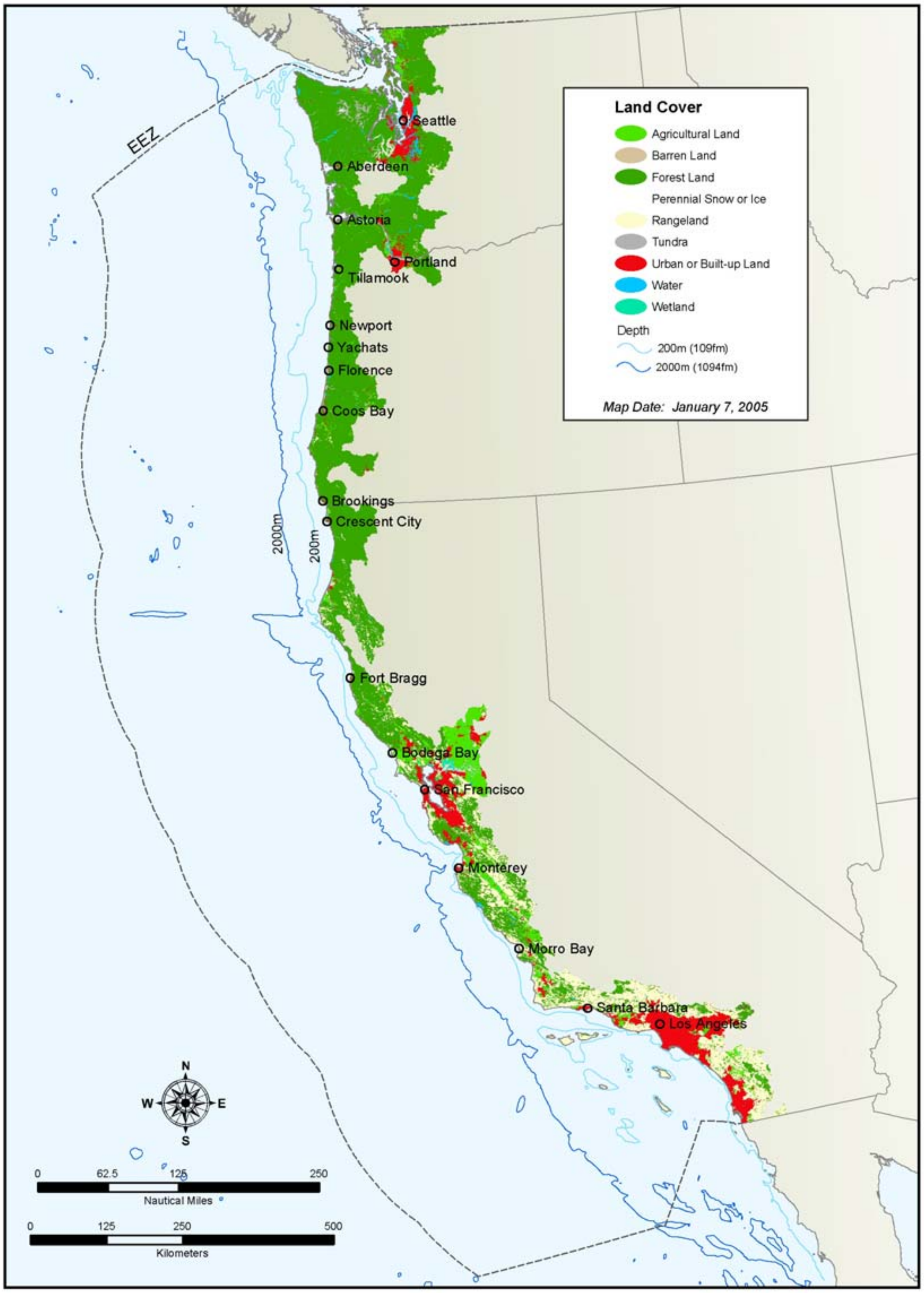


Figure 3-33: Non-fishing activities

Chapter 3 Figures

Chapter 4 Environmental Consequences

This chapter contains comparative analyses of the consequences of each alternative in the context of each component of the affected environment presented in Chapter 3.

4.1 Criteria for Evaluating the Consequences of the Alternatives

The consequences of the alternatives on marine habitat, the ecosystem, marine resources, the socioeconomic environment, and protected species are analyzed in the remainder of this chapter. The criteria for evaluating the consequences of the alternatives on marine habitat, the ecosystem, and marine resources are described in section 4.1.1. The criteria for evaluating the socioeconomic consequences of the alternatives are described in section 4.1.2. The criteria for evaluating the consequences of the alternatives on protected species are described in section 4.6.

4.1.1 Criteria for Evaluating the Consequences of the Alternatives on Marine Habitat, the Ecosystem, and Marine Resources

The following subsections, 4.1.1.1 through 4.1.1.7, describe the criteria used in the analyses of the consequences of the alternatives on marine habitat, the ecosystem, and marine resources.

4.1.1.1 Criteria for Evaluating the Consequences of the EFH and HAPC Designation Alternatives on Marine Habitat, the Ecosystem, and Marine Resources

The environmental consequences of the alternatives to identify and describe EFH are discussed in terms of: (1) the generic consequences common to all the alternatives; (2) risk aversion, scientific uncertainty, and geographic comparison of specific alternatives; and, (3) the implications of the EFH alternatives on the HAPC and Impacts Minimization alternatives. Section 4.2.1 discusses the generic consequences common to all the alternatives and is a qualitative analysis of indirect environmental and socioeconomic effects. Section 4.2.3 analyzes the implications of the EFH alternatives on the HAPC and Impacts Minimization alternatives.

The environmental consequences of the alternatives to designate HAPC are discussed in terms of: (1) the generic consequences common to all the alternatives; and, (2) geographic comparison of specific alternatives.

4.1.1.2 Criteria for Evaluating the Consequences of the Impacts Minimization Alternatives on Marine Habitat, the Ecosystem, and Marine Resources

Each of the alternatives is analyzed for its predicted effects on marine habitat, the ecosystem, and marine resources. The methodology for each is described in the remainder of this subsection.

4.1.1.3 Minimization of Adverse Effects

Each Alternative is analyzed for the extent to which it is may minimize adverse effects to EFH from fishing. Habitat effects research from throughout the world is focused on physical alteration to habitat and changes in biodiversity that result from effect. It is not possible to analyze the degree to which the function of habitat within the ecosystem or for groundfish will be affected by the alternatives. Another limitation is that the status of habitat in reference to a pristine condition is not knowable through assessment at this time. This means that the effect of an alternative on EFH, relative to the pristine condition of the habitat, cannot be assessed for this EIS. The Risk Assessment in Appendix A provides background on these limitations.

To analyze the expected performance of the alternative in minimizing adverse fishing effects, a GIS-based methodology is utilized for this EIS. The alternatives are overlaid with the sensitivity and recovery information developed through the Risk Assessment and the amount of habitat for each is calculated as a percentage of the whole. This provides a measure of the relative amount of habitat that is protected from fishing effects which is comparable among the alternatives.

Sensitivity values for each habitat type/fishing gear combination are resolved to a 4-point scale that represents direct change to habitat and biodiversity as a result of fishing. The sensitivity of habitat is indexed as follows:

0 = No detectable adverse effects on the seabed; i.e. no significant differences between effect and control areas in any metrics.

1 = Minor effects such as shallow furrows on bottom; small differences between effect and control sites, less than 25% in most measured metrics.

2 = Substantial changes such as deep furrows on bottom; differences between effect and control sites 25-50% in most metrics measured.

3 = Major changes in bottom structure such as re-arranged boulders; large losses of many organisms with differences between effect and control sites greater than 50% in most measured metrics.

Recovery time is indexed in years.

As a result of the focus of global literature on fishing effects, all of the sensitivity metrics rely on physical modification to the seabed and changes in biodiversity. It is not understood if these types of metrics necessarily equate to functional changes to habitat. That is, the results of the GIS analysis should not be strictly interpreted as an indication that limiting fishing effects in sensitive areas preserves the function of the habitat for groundfish and the ecosystem. Reducing physical modification and negative changes in biodiversity, given the limited data available and precautionary principals of resource management, is considered Environmentally Positive in scoring the alternatives and the alternatives are comparable by considering the relative amounts of habitat that is protected by their sensitivity and recovery values.

Habitat Table 4-22 compares the relative amount of habitat sensitivity and recovery. To simplify the large amount of information for the analyses of individual alternatives, dredge gear is not discussed, as it is not currently used off the West Coast. Pot, trap, and hook and line gear have maximum sensitivity and recovery values of 0.8, which are considered minimal, so are excluded from the discussion as well. The information for these gears is available in Habitat Table 4-22 and 4-23.

Nets are discussed in the analyses of individual alternatives for sensitivity values of 0.75 or larger, where recovery time is greater than 1.25 years. Bottom trawl is discussed for sensitivity values of 1.0 or larger, where recovery time is greater than or equal to 1 year. To further assist the reader to comprehend the large volume of information from the Habitat Tables, groupings are made at reasonable combinations of sensitivity and recovery levels.

To understand this analysis, one must view the sensitivity and recovery levels as a proxy for habitat type. That is, GIS technology allows the substrate types to be indexed and mapped by the sensitivity and recovery values described above. The polygons are defined by their assigned values and function in the analysis as discrete habitat types. The status or expected status due to the implementation of a particular alternative, of a particular habitat type is not knowable because of the scientific inability to factor in fishing intensity and the relationship of impact to recovery (k) at this time (see Risk Assessment Appendix A). It is a common pitfall of readers as they interpret this analysis, to be confused by the inclusion of sensitivity and recovery values for gear types that are not included in the relevant alternative. The information on all gear types is included because it displays a habitat type and is intended to fully disclose all relevant information so the reader can make an informed judgment on the performance of individual alternatives.

4.1.1.4 Habitat for Individual Species/Life Stages

Each alternative is analyzed for the extent to which it protects habitat for individual species/life stages of groundfish. This is accomplished through a GIS-based analysis in which the alternatives are overlaid with spatial profiles of suitable habitat for 168 individual species/life stages (out of 382 possible species life stage combinations, data is available for 168). A full discussion of how suitable was profiled is contained in the Risk Assessment (Appendix A).

Adverse effects to habitat can impair the ability of fish to carry out basic ecological functions such as spawning, feeding, breeding, and growth to maturity. These functions occur at discrete life stages and the habitat requirements of many fish change depending on the life stage. West Coast rockfish for example, spend their early life history as eggs and larvae floating in the water column before settling as juveniles on the substrate where they grow to maturity and reproduce. Although there is not a quantifiable measure of how much habitat is required for a population of fish to attain a stable, productive age structure, healthy functioning habitat is critical for populations of fish to sustain themselves and there is a level at which adverse effects to habitat will impair the ability of fish to do so.

In the event of catastrophic environmental conditions or management failure, a more even age structure can be expected to serve as insurance that fish (e.g. either many of a single age class or a few of many age classes) will persist to sustain the population. The scientific tools do not exist, or are unavailable for this EIS, to assess the effects of the alternatives on population dynamics. To assess the level of insurance for comparison among the alternatives, this analysis considers the relative amount of suitable habitat for a species/life stage that occurs within a closed area. Note that this is not an analysis of the abundance of species/life stage but rather quantifies suitable habitat. Although care should be taken in interpreting these results, the analysis concludes insurance for individual species/life stages accrues in proportion to the amount of suitable habitat that is protected. Insurance for a complete population accrues as habitat is protected for each life stage.

While efforts to identify suitable habitat for the Pacific Groundfish fishery have been encouraging, unfortunately the project team realized prior to publication of the DEIS that some of the maps generated from the information collected on the managed species were incorrect. Since publication of the DEIS the project team has continued to correct and update the underlying data sets used to generate HSP maps describing groundfish EFH. This FEIS contains updated maps and represent the best available science for spatial analyses of groundfish and habitat associations. The reader should still be cautioned that although the maps have undergone peer review, there is still uncertainty associated with the mapped representations of groundfish habitat. Caveats for understanding and utilizing the maps are contained in Appendix D.

4.1.1.5 Habitat Types

Each alternative is analyzed for the extent to which it protects individual habitat types. This is accomplished through a GIS-based analysis in which the alternatives are overlaid with maps of substrate and biogenic habitat. This is intended to provide a comparable measure of how habitat components of the ecosystem are protected. The substrate habitat types described in section 3.2.4 are carried forward for this analysis with the addition of estuaries as a unique habitat type (estuaries are described in section 3.2.2.1). Spatial data on biogenic habitats is limited to canopy kelp and seagrass which are described in section 3.2.2.1.2. Although spatial data sufficient for GIS analysis of corals, anemones, sea pens, and sea whips is not available for this EIS, a map of where these habitat-forming organisms have occurred in trawl surveys is provided as a means of visual comparison with the alternatives (Figure 3-1). Caveats on the use of this data is provided in Appendices A and B.

To foster the ecosystem approach, the analysis is stratified according to the major zoogeographic provinces (large areas which significant differences in biology) that are known to occur on the West Coast. The provinces are described in Chapter 3. In summary, they are the Oregonian Province north of Point Conception, California, and the San Diego Province to the south.

Considering the paucity of information on the ecosystem function of discrete habitat types and taking a precautionary approach to analyzing the alternatives, well-rounded protection of habitat is considered Environmentally Positive. That is, in the absence of definitive research, the analysis concludes that it is beneficial to protect some portion of each habitat type and that higher levels of protection (by relative area) is more beneficial than lower levels.

4.1.1.6 Additional Qualitative Analyses

Additional qualitative analyses are included for each alternative where appropriate.

4.1.1.7 Summary of Cumulative Effects on Habitat, the Ecosystem, and Marine Resources

Because we lack the ability to quantitatively predict how the alternatives compare to no action, a qualitative discussion is provided on the overall cumulative effects on habitat, the ecosystem, and marine resource. The information below forms the basis of our conclusions on cumulative impacts of each alternative.

<u>Closed Areas</u>

The various types of closed area alternatives include total prohibition of bottom-contacting activities (fishing and non-fishing), prohibition of fishing, prohibition of bottom fishing, and prohibition of bottom trawling. Closed areas reduce or eliminate effects to habitat and the marine resources therein. The size of the closed area may be important in terms of the functional contribution of habitat to the ecosystem and the production of marine resources. Closed areas may provide insurance to the persistence of marine resources and contribute to increased stock sizes outside the areas; however, these benefits are not quantifiable and may be significantly effected by the size of the area. Geographically larger closed areas are considered more beneficial than smaller ones.

For purposes of the analysis, a complete removal of anthropogenic effects is considered the most beneficial, followed by prohibition of fishing, prohibition of bottom fishing, and prohibition of bottom trawling. Completely removing effects over the long-term would allow habitat to maintain or return to a pristine condition. This benefit is scaled down as activities are added. A prohibition of fishing would remove all fishing effects but allow for non-fishing activities that may damage habitat. A prohibition of bottom fishing would protect habitat from direct effects however benefits to the insurance of marine resources may be limited if fish stocks are removed by pelagic gear types. A prohibition of bottom trawling would protect habitat from direct effects associated with trawling but leave the potential for effects from other bottom-tending gear types such as longline and pot gear. The function of prohibiting bottom trawling, while allowing harvest of fish by other gear types would potentially decrease the benefits of the closed area as a means of insurance to the persistence of marine resources.

Gear Restrictions

The various types of gear restrictions include complete prohibitions on particular gears, to gear modifications, to area-specific gear prohibitions. For purposes of the analyses, gear restrictions are considered to reduce, but not eliminate, direct effects to habitat. The analyses assume that direct effects to habitat will still occur although at reduced levels from the status quo.

Effort Reduction

Alternative C.10 includes an effort reduction component and is discussed in section 4.4.10.

Forage Habitat

Alternative C.5 includes a prohibition on harvesting forage habitat and is discussed in section 4.4.5.1.

Non-Fishing Effects

The habitat protection measures considered in this EIS do not protect against non-fishing threats such as pollutants, invasive species, diseases, and global warming. Such threats however, may be important factors in the health of groundfish populations and the ecosystem. To the extent that they would influence the environmental performance of the alternatives, the effects are assumed for purposes of analysis to be uniform throughout the project area and are not considered influential. This is due to an inability to predict more localized trends and is an inherent weakness in predicting cumulative effects of the alternatives.

Cumulative Effects

Cumulative effects are viewed as the sum of existing environmental trends, reasonably foreseeable environmental trends, and the effect of a particular alternative on the environment within the context of those trends. Each of the alternatives is considered for its potential to contribute to cumulative environmental effects and is given a positive, negative, zero, or unknown score. The final cumulative determination ultimately depends on how one weighs each portion of the effected environment, and the past, present, future, and alternative influence on that portion of the environment and is developed based on the preceding discussion for each general factor (i.e. closed areas, gear restrictions, effort reduction, forage habitat, and mobile threats). Additionally, the Council and NMFS have selected a combination of the alternatives for final action that would influence the final cumulative effect.

0 = No Change
E+ = Environmentally Positive
E- = Environmentally Negative
U = Unknown

4.1.2 Criteria for Evaluating the Socioeconomic Consequences of the Alternatives

This section describes the methodology used to assess the effect on the socioeconomic environment related to the alternatives in this EIS. The socioeconomic environment is delineated into West Coast fisheries, fish processors and buyers, consumers, management and enforcement, safety, communities, non-market values, and non-fishing values. Each of these delineations is addressed within the analysis of alternatives in order to enable the reader to compare and contrast the effects of each alternative on the socioeconomic environment in a consistent manner. Where data exists, the effect on each of these components is quantified. Where data does not exist, the effect on each alternative is discussed qualitatively. A summary of the criteria used to evaluate the socioeconomic consequences of the alternatives is presented in Socioeconomic Table 4-1.

4.1.2.1 Methodology for Assessing Effects on the Socioeconomic Environment

Analysis of alternatives and their relationship to the socioeconomic environment largely centers on the set of alternatives designed to minimize fishing effects to groundfish habitat. EFH and HAPC designation alternatives are expected to have similar effects to the socioeconomic environment in the form of consultation activities, and these effects are discussed in those sections. Alternatives designed to minimize fishing effects to habitat have a more dynamic effect on the socioeconomic environment, and as such, more analysis is provided on those alternatives. Quantitative measurements are provided for each impacts minimization alternative that has area closures impacting bottom trawl fisheries as part of that alternative. Where data exists other forms of quantitative analysis are provided for that alternative. In addition to quantitative measures, mapping was used to show revenue hotspots, effort hotspots, and trawl track information.

Quantitative measures provided for area closure analyses are in the form of limited entry groundfish bottom trawl revenues that are displaced or put “at risk” if those proposed area closures are put in place. Ideally, displaced revenues from all West Coast fisheries would be included in the analysis of displaced revenues and would act as a measure of aggregate effects to the fishery where effects to processors, communities, and the nation, for example, would be multiplicative of those fleet-wide displaced gross revenues. Unfortunately, spatial data for fisheries other than the limited entry groundfish trawl fleet are not available, or are not available on a temporally consistent and coastwide basis. Because of the lack of quantitative and spatial data available, NMFS solicited public comment following the release of the draft EIS, and public meetings were held in coastal communities likely to be impacted by management measures designed to protect essential fish habitat. Significant public comment was received through both mechanisms, and this comment has been used to the extent possible in analyzing the impact of alternatives.

Limited entry groundfish trawl revenues are used in each of these alternatives because they are the only consistent measure of fishing revenues that can be applied in an equal fashion across alternatives. Using limited entry groundfish bottom trawl revenues put at risk as a quantitative measure serves as an index of effects from each alternative. Although spatially-based revenues from the limited entry trawl sector are not necessarily indicative of spatially-based revenues from other sectors, the use of limited entry trawl data as an index is appropriate given that the trawl fleet is the largest source of groundfish landings, meaning the trawl fleet may have the largest effect on most communities and processors engaged in the groundfish industry, and a change in trawl activities may effect more entities than a change in other groundfish fishery sectors. Furthermore, although other spatial data exist (for example, Washington currently has electronic logbook data for open access trawls), using additional data that is not consistent between states and across the coast would tend to bias the analysis and make alternatives that influence that sector appear to have a larger effect than those that do not. (Open access trawling is defined as trawling that occurs by vessels that do not hold a federal groundfish trawl limited entry permit, but may catch groundfish incidentally while targeting another species.) For example, the use of Washington open access trawl data would make the effect of alternatives appear larger for alternatives that effect the Washington open access trawl fleet than for alternatives that do not effect that fleet. Without open access trawl data for other states, incorporating Washington open access trawl data into this analysis may be misleading to the reader. However, other spatial data that is available is used on a case by case basis where that information is appropriate. This information is used to describe impacts to those particular fisheries, but it should be noted that these impacts are not summed with the trawl revenues at risk analysis because it is likely that summing them would bias the analysis in the manner that was described previously.

Trawl revenues put at risk are quantified by using catch records and associated latitude and longitude coordinates for individual tows from trawl logbook data in the years 2000–2003 that are available in the PacFIN database. The West Coast EEZ was split into a grid of 10x10 minute block areas, and catch from trawl logbook records assigned to one of those areas, based on the latitude and longitude recorded for individual tows. Each of these 10x10 minute blocks were then assigned a value (in U.S. dollars) based on the amount of landed catch revenue that was attributed to all of the tows occurring within that block area, and the block areas were then matched to areas that would be closed under the various impacts minimization alternatives. This information is provided in the EIS in two ways. One approach assumes that the entire amount of revenue attributed to the 10x10 block area would be displaced if that block intersects (to any degree) with a potentially closed area. The second approach proportions the revenue within that block according to the portion of the block that would be closed under an alternative. The approach using the 10x10 block area likely represents a maximum amount of revenue that would be displaced from a closed area. The approach using the proportioned revenue from a 10x10 block area is likely to be near the actual amount of revenue that would be displaced if the actual closed area boundary represents the habitat area to be closed to fishing, but it is unknown whether it is an underestimate or an overestimate. Both methods are shown because for many alternatives the final boundaries for the closed areas were not developed.

Following the development of the revenues at risk analysis, trawl end points for the year 2003 were keyed into a database system and this information was used to show trawl track information for that year by combining trawl end points with start points. This information was mapped for the entire coast to show tracks where vessels had regularly trawled during the 2003 season (Figures 4-1 through 4-6). Although this trawl track information cannot specifically show where - during a particular tow - certain quantities of species were caught, this information was designed to compliment the trawl revenues at risk analysis by showing areas of high effort.

During the development of the trawl revenues at risk analysis, several discussions occurred on the appropriate resolution (size) of block areas that would be used. A resolution of 10x10 minute blocks–as opposed to 5x5–was used for several reasons, including;

- The available coordinates for trawl tows in the PacFIN database represent the start of tow location and tows may occur for several miles, so 10x10 blocks are more likely to cover the entire tow area,

- 10x10 minute block areas have been used in previous analyses and are already available in the PacFIN database,

- This resolution was agreed on (prior to the development of this EIS) by industry and agency representatives as being the most appropriate resolution, and

- The authors believe that potential variability between the estimated coordinate in logbook data and the actual coordinate of the tow–in combination with above factors–means that analysis using a finer resolution may be incorrect or misleading.

Trawl revenues that are put at risk should not be confused with revenues that are actually lost. Some portion of revenues put at risk may indeed be lost; however, revenues at risk are best described as revenues that will be displaced if that alternative is selected. Some of those revenues may be lost if–for example–the catch-per-unit effort and total catch in areas remaining open to fishing are substantially different from those closed, if the cost of traveling to areas remaining open is higher, or if the incidental take restrictions on prohibited or overfished species in areas remaining open limits the available catch of target species.[1] Unfortunately, a precise prediction of revenues that may be lost and the distribution of that loss are not possible due to data limitations. Factors that may cause substantial amounts of displaced revenues to be lost are discussed where the authors are able to reasonably identify those factors based on accepted theory and knowledge of the fishery.

Effects to processors, communities, and the region are generally multiplicative of effects to fishing vessels. If a change in landed catch or exvessel revenues occurs, processors may see a change in the amount of product flow to processing plants, which in turn may change revenues. A change in the mix of species can also have positive or negative effects on processors if a change in species mix results in a change in the amount of high or low valued species. For example, if processors retain some profit margin above the exvessel price of species, an increase in deliveries of high valued sablefish could positively effect processors even if there is an equivalent reduction in landings of some other, lower-valued species.

Community and regional economic effects can generally be described as being multiplicative of exvessel and processing revenues and labor. Revenues generated by fishing related activity have direct, indirect, and induced effects. Direct effects can be described as changes in the industries (e.g., changes in output, employment, or labor income in fishery industries) to which a final demand change was made. Indirect effects are changes in inter-industry purchases as they respond to the new demands of the directly effected industries–i.e., the purchases by fishery industries from other economic sectors. Induced effects reflect changes in household spending as income changes due to the changes in production. The total effects are the sum of direct, indirect, and induced effects.

The Fisheries Economic Assessment Model (FEAM) provides one means of calculating processing, community, and regional effects. This model is currently maintained and updated by The Research Group, Corvallis Oregon, and was adapted in 2004 to be more specific to changes in the limited entry trawl sector. A description of the FEAM is provided in Appendix E. Outputs from the FEAM are described here to provide information on processor, community, and regional effects resulting from possible changes in the limited entry trawl fishery. The outputs apply specifically to the limited entry trawl sector and are meant to compliment the trawl revenue at risk analysis provided in Chapter 4. Unfortunately, available resources make it infeasible to trace the trawl revenues-at-risk analysis to the community and state level; but the FEAM processor, community, and state outputs do not vary enough to substantially change the ranking–in terms of the amount of revenues at risk–for each alternative.

[1] It should be noted that none of the alternatives change the total amount of harvest that can be taken by the fleet (i.e. OYs), but other factors could change cumulative limits.

Socioeconomic Tables 4-12 and 4-13 provide the factor or multiplier that would be applied to round pounds of landed catch from the limited entry trawl fleet. The factor represents the total effect. In the case of processors, this represents gross revenues. In the case of communities, states, or the West Coast region, this represents the sum of direct, indirect, and induced economic effects. Species-specific multipliers are provided so that the reader can draw inferences on effects that potential closures may have if those potential closures are relatively DTS or flatfish species intense for example. Although a multiplier for 'Groundfish' is provided, it is important to note that the multiplier in this case is based on the mix of species that have been landed by limited entry trawlers in the past. The more the species mix of landed catch changes from past landings, the less accurate that multiplier becomes.

The analysis of the effect of the alternatives on non-market values qualitatively assesses the potential for changes to non-market values based on principles of economic theory. In general, it is assumed that alternatives that have positive environmental effects will positively effect non-market values. A discussion of our capability to assess the influence of the alternatives on non-market values is contained in the analysis. One recognized constraint is the lack of available information on how the public values the Pacific ecosystem, groundfish and habitat. There is no known data on the extent to which the public values Pacific groundfish or habitat specifically. This imposes limits on the analysis of the effects. Therefore, it is not possible at this time to determine the extent to which an alternative effects non-market values. The likely direction and rate of change in non-market values, however, are assessed.

Effects to non-market values rely on the expected magnitude of potential changes to the ecosystem, groundfish and habitat. Other components of the socioeconomic environment rely on revenue changes and consultation costs, while non-market values rely on the potential effects to the ecosystem, groundfish and habitat. This is also true for the research and monitoring alternatives.

Quantifying the effect of alternatives on many portions of the socioeconomic environment is not possible due to data limitations. Where the authors are unable to quantify effects, a qualitative discussion of those effects is provided which is based on common theory, knowledge of the fishery, other NEPA and Council documents, and other applied and academic publications. Sections that are qualitative are structured in a manner that lays out the considerations of each alternative, discusses the possible effects to each environmental component of the social and economic environment, and identifies the most likely outcome from a socially beneficial or negative standpoint based on what is currently known about the relationship of habitat to the socioeconomic environment.

Analyses in this section are further divided into a short-run and long-run perspective where differences in time perspective are appropriate and where short and long-run outcomes can be identified. In general, short-run effects are easier to evaluate than long-run effects. Effects over the long-run may change as fishermen, processors, communities, and markets adapt to changing regulations. These adaptations may counter a short-run negative effect as business and community goals result in a reallocation of resources to capitalize on changing conditions and if habitat protection measures result in increased fishery yields. However, over the long-run an effect may grow if communities and businesses are unable to adapt to that change in the environment.

Much of this analysis focuses on the short and long-run cost effect to the socioeconomic environment. The ability to measure the potential benefits of short and long-term habitat protection on West Coast fisheries does not currently exist due to a lack of research and data pertaining to such protections. However, it is accepted that habitat is necessary for the survival of species, and that protecting habitat will foster the continued survival of existing species. Whether protecting habitat from damage will foster an increase in fish populations that will in turn translate into an increase in catch is unknown. In the case of groundfish, this theory is especially questionable since many groundfish species are sedentary, and an increase in a particular fish population may occur in areas inaccessible to fishing gear. For example, closing areas to types of fishing gear may increase the populations of fish species within those areas, but it is questionable whether spill-over effects will occur to areas outside those closed areas when species are sedentary in nature. Without spill-over effects, it is questionable whether increases in catch are likely to occur as a result of an increase in population, and this makes long term fishery benefits as a result of habitat protection debatable. Indeed, the SSC white paper on marine reserves (PFMC June 2004) concluded that perhaps one of the only certain benefits to closing areas to fishing (a tool analyzed in the impacts minimization alternatives) may be the reduction in stock uncertainty due to the existence of more robust stocks (various age groups) within those closed areas. Furthermore, although stock improvements may indeed occur as a result of closed areas, the evidence that a growth in stock would translate into additional fishing opportunities because of spillover from that closed area was still hypothetical and unproved.

Cumulative effects are viewed as the sum of existing trends, reasonably foreseeable trends, and the effect of a particular alternative. Cumulative effects are assessed in a qualitative fashion since at least one variable in the set of existing, future, and alternative variables is qualitative for each option and this makes a quantitative analysis unfeasible. Cumulative effects can be measured based on the sum of scores assigned to each past, present, and reasonably foreseeable trend, and each alternative. Each of these is given a positive, negative, zero, or unknown score; however, the final cumulative determination ultimately depends on how one weighs each portion of the effected environment, and the past, present, future, and alternative influence on that portion of the environment.

0 = No Change
E+ = Socially Positive
E- = Socially Negative
U = Unknown

4.2 Consequences of the Alternatives to Identify and Describe EFH (Alternatives A.1–A.6)

The following subsections, 4.2.1 through 4.2.3 describe the effects of Alternatives A.1 through A.6 on the effected environment. Subsection 4.2.4 describes the effects of the Final Preferred alternative to describe EFH on the effected environment.

4.2.1 Generic Consequences Common to all the EFH Identification and Description Alternatives

Designation of EFH, in accordance with section 303(a)(7) of the Magnuson-Stevens Act, does not in and of itself have any direct environmental or socioeconomic effects. However, EFH designation is likely to result in indirect environmental and socioeconomic effects because management measures are linked to adverse effects on EFH.

First, every FMP must minimize to the extent practicable adverse effects of fishing on EFH, pursuant to section 303(a)(7) of the Act. Under section 303(a)(7) of the Act and the associated provisions of the EFH regulations (50 CFR 600.815(a)(2)), each FMP must contain an evaluation of the potential adverse effects of fishing on EFH. Councils must act to prevent, mitigate, or minimize any adverse effects from fishing, to the extent practicable, if there is evidence that a fishing activity adversely effects EFH in a manner that is more than minimal and not temporary in nature. In determining whether it is practicable to minimize an adverse effect from fishing, Councils should consider the nature and extent of the adverse effect on EFH and the long-term and short-term costs and benefits of potential management measures to EFH, associated fisheries, and the nation. Subsequent amendments to the FMP or to its implementing regulations must ensure that the FMP continues to minimize to the extent practicable adverse effects on EFH caused by fishing.

Actions taken by a Council to minimize adverse effects of fishing on EFH may include fishing equipment restrictions, time or area closures, harvest limits, or other measures. Any such measures would be designed to reduce ongoing effects to fish habitats and/or promote recovery of disturbed habitats. These measures may result in socioeconomic effects for the effected sectors of the fishing industry, but would be designed to promote sustainable fisheries and long-term socioeconomic benefits. The environmental consequences of proposed actions would be evaluated in applicable NEPA documents before they are implemented. Section 4.4 of this EIS discusses the environmental consequences of the alternative measures to minimize effects of fishing on EFH, which are described in Chapter 2.

Second, Federal and state agency actions that may adversely effect EFH trigger consultation and/or recommendations under sections 305(b)(2)-(4) of the Act. Under section 305(b)(2) of the Magnuson-Stevens Act, each federal agency must consult with NMFS regarding any action authorized, funded, or undertaken by the agency that may adversely effect EFH. The EFH regulations require that federal agencies prepare EFH Assessments as part of the consultation process (50 CFR 600.920(e)). Under section 305(b)(4)(A) of the Act, NMFS must provide EFH Conservation Recommendations to federal and state agencies regarding any action that would adversely effect EFH. Under section 305(b)(3) of the Act, Councils may comment on and make recommendations to federal and state agencies regarding any action that may effect the habitat, including EFH, of a fishery resource under Council authority.

EFH recommendations from NMFS or a Council to federal or state agencies are non-binding. Nevertheless, as a result of EFH coordination, consultations, and recommendations, Federal or state agencies may decide to restrict various activities to avoid or minimize adverse effects to EFH. Such restrictions could result in project modifications that lead to higher costs for the applicants for federal or state permits, licenses, or funding. It would be speculative to predict the specific socioeconomic effects of future restrictions on development that may be imposed by agencies that authorize, fund, or undertake actions that may adversely effect EFH. Moreover, such agencies typically evaluate socioeconomic effects and other public interest factors under NEPA and other applicable laws before taking final action on any given activity. NMFS conducts approximately 6,000 EFH consultations and related EFH reviews nationwide every year, and is unaware of substantial project delays or significant increases in costs resulting from EFH consultations. Habitat conservation resulting from EFH consultations is expected to support healthier fish stocks and more productive fisheries over the long-term, with associated environmental and socioeconomic benefits. EFH consultations may also lead to indirect benefits for other species that use the same habitats as federally managed species of fish and shellfish.

Federal agencies will incur costs as a result of conducting EFH consultations, since time and resources will be required to develop EFH Assessments, exchange correspondence, and engage in other coordination activities required for effective interagency consultation. In some cases federal agencies might also request information from applicants for permits, licenses, or funding to assist the agency in completing EFH consultation. However, the EFH regulations encourage agencies to combine EFH consultations with existing environmental review procedures to promote efficiency and avoid duplication of effort. To further streamline EFH consultation, if more than one agency is responsible for a Federal action, the consultation requirements may be fulfilled by a single lead agency. State agencies and other non-federal entities are not required to consult with NMFS regarding the effects of their actions on EFH. If an entity participates in consultations with NMFS, then it is possible that costs associated with time and effort expended in consultation may be incurred, though most nearshore EFH consultations involving groundfish may be merged with ESA listed salmon consultations and any cost incurred may be borne through the ESA process.

Costs associated with consultations will likely vary depending on the number of species associated with an EFH designation, and the amount of habitat designated as EFH. If an entity chooses not to participate in consultations, then the EFH designation will ultimately have no effect on that entity. If consultations result in conservation recommendations, then there are likely to be increased costs in the short-term and possibly in the long-term depending on the amount of offsetting benefits realized from enhanced habitat productivity resulting from EFH designation. The designation process may negatively effect agencies if consultations use increased agency time and resources in addition to those currently required for the ESA process.

The EFH alternatives are not likely to have an effect on protected species; or, if the alternatives result in EFH conservation recommendations that improve habitat conditions the effect would be Environmentally Positive (E+).

4.2.2 Geographic Comparisons of the EFH Identification and Description Alternatives

The EFH alternatives, (A.1 through A.6), have been numbered in descending order of total area. The status quo alternative (A.1) encompasses the entire Exclusive Economic Zone (EEZ) of the West Coast, and all other areas are a subset of this area. Habitat Table 4-1 lists the areas included under each EFH identification alternative. To facilitate a more thorough comparison of all EFH alternatives to each other, we used GIS overlay analysis to merge all the areas together for visualization and quantification of the overlap between alternatives.

Figure 4-1 depicts the predominant spatial commonalities among the EFH alternatives. There is a core area that is common to all alternatives that includes the estuaries, the continental shelf, and most of the continental slope. Alternative A.6 is the most restrictive, delineating only the best 30% of the area for all species/life stage combinations with HSP values. As such, Alternative A.6 excludes some of the deeper areas in the Southern California Bight, as well as some deeper areas all along the western edge of the HSP data that are included in all of the other alternatives. Alternatives A.1 (EEZ), A.2 (depths < 3500 m), and A.3 (100% HSP) are the most inclusive alternatives and some of the deepest habitats in the HSP data are included only in these three alternatives. Finally, the large northwestern section of the EEZ is only included in alternatives A.1 and A.2, and the large southwestern section of the EEZ is only included alternative A.1. In addition, there is a small area within Puget Sound, due to disparate data sources, that is not included in the HSP data, and therefore this area is only included in alternatives A.1 and A.2.

Habitat Table 4-2 shows the total area of each EFH alternative and the total area that each alternative shares with the other alternatives. The diagonal values are blank because there is no need to compare the alternative to itself. The table is a mirror image along the diagonal. As mentioned above, alternatives A.2 through A.6 are completely within the EEZ, so the entire area of these alternatives is shared with A.1. In addition, alternative A.3 is a subset of Alternative A.2, so its entire area is in common with A.2. Alternative A.4 shares most of its area with Alternatives A.2 and A.3, although there are parts of some seamounts that either have no suitable habitat or are deeper than 3500 m. Alternative A.5 is a subset of alternatives A.1, A.2, and A.3. Nearly all the area of alternative A.5 is shared with alternative A.4, with the exception of some deeper areas in the Southern California Bight and along the western edge A.4. Alternative A.6 is a subset of Alternatives A.1, A.2, A.3, A.4, and A.5, so it's entire area is common to all alternatives.

Habitat Table 4-3 summarizes the information in Habitat Table 4-2 as percentages of total area. This table is not a mirror image along the diagonal because the percentage of area depends on whether you are asking the question "what percentage of X's area is shared with Y?" or "what percentage of Y's area is shared with X? For example, because A.3 is a subset of A.2, 100% of its area is shared with A.2. However, A.2 is larger than A.3, so only 46.4% of A.3's area is shared with A.2. In order to answer the question, "what percentage of X's area is shared with Y?" the table should be read from left to right, with alternative "X" being in the leftmost column and alternative "Y" being in the row along the top of the table.

4.2.3 The Implications of the EFH Identification and Description Alternatives on HAPC and Effects Minimization

Another important comparison for the analysis of all alternatives is to compare the spatial coverage of the HAPC alternatives (B.1 through B.9) and the impacts minimization alternatives (C.1 through C.14) to the EFH alternatives (A.1 through A.6). This analysis indicates the areas of HAPC and impacts minimization alternatives that may be excluded based on the selection of a particular EFH alternative. Habitat Tables 4-4 and 4-5 indicate which HAPC or impacts minimization alternatives would be limited by which EFH alternative. In other words, there is a portion of the HAPC or impacts minimization alternative that is outside of the area designated as EFH.

For a spatial perspective on the areas that may be excluded, standard GIS functions were used to overlay each HAPC and impacts minimization alternative with the EFH alternatives. There is a map for each HAPC alternative or impacts minimization alternative that may be limited by any EFH alternative. Figures 4-8 through 4-14 show the HAPC alternatives that may be limited in area by the EFH alternatives. Figures 4-15 through 4-28 show the impacts minimization alternatives that may be limited by the EFH alternatives. In order to synthesize the large number of combinations, (for each HAPC or impacts minimization alternative, there is a comparison with five EFH alternatives), we depicted each area that may be excluded with the combination of EFH alternatives that may exclude that particular area. Each unique combination uses a different color. The legend can then be interpreted as a matrix in the following ways: (a) for a particular color on the map, the EFH alternative(s) listed next to that color may exclude that area, or (b) for a particular EFH alternative, one may read down from the top and find all the colors depicting areas that may be excluded by that alternative. If, for example, one were considering EFH Alternative A.4, one would look for the areas on the map that are colored dark forest green, navy blue, peach, and aqua to see the areas that would be excluded from that HAPC or impacts minimization alternative if EFH alternative A.4 were chosen. The areas colored yellow are included in all EFH alternatives. EFH A.1 (status quo) is not depicted on the exclusion areas maps because all HAPC and impacts minimization alternatives are within the Exclusive Economic Zone, so there are no areas excluded.

Figure 4-29 shows the areas of the final preferred impacts minimization alternative may be excluded by the final preferred EFH alternative.

For more information on the environmental consequences of excluding some HAPC and effects minimization areas, see the environmental consequences section for those HAPC and impacts minimization alternatives.

4.2.4 Consequences of the Final Preferred Alternative to Identify and Describe EFH

The final preferred alternative for describing EFH represents a significant refinement over the status quo in that the entire EEZ would no longer be described as EFH. The final preferred alternative would describe 59.2% of the EEZ as EFH which equates to 48,719,109 ha (142,042 square miles) in addition to shoreward areas in state waters including bays and estuaries.

The final preferred alternative for describing EFH is presented in Chapter 2. The generic consequences of the final preferred alternative are described in 4.2.1. The specific data elements used to formulate the alternative are expected to be used during consultation activities and improve the quality of conservation recommendations. For instance, conservation recommendations for a project proposed in a specific area can now be based on analyses of HSP, habitat types, and other information sources available from the preferred alternative. In addition to supporting the delineation of suitable habitat for the individual species and life stages, these assessment-related techniques can be used as a basis for an ecosystem approach to management. For example, the HSP profiles for individual species/life stages can be combined by GIS analyses into ecosystem-level fish assemblages to investigate and predict environmental consequences of proposed projects. The specific conservation recommendations for non-fishing activities which may result from the implementation of the final preferred alternative are fully described in appendix 14 to the Risk Assessment. The consequences of the final preferred alternative to describe EFH are considered Environmentally Positive (E+).

The final preferred alternative for describing EFH does not encompass the entire project area and as such may limit the geographic extent of specific components of the final preferred alternative measures to minimize adverse impacts to EFH that would otherwise apply throughout the EEZ. Those specific components approved by the Council that could be interpreted to include areas seaward of EFH are: (1) footprint closure in which bottom trawling would be prohibited seaward of 700 fathoms; (2) ban of dredge gear; (3) ban of beam trawl gear; and, (4) ban of trawl roller gear greater than 19". An analysis of the area that would be excluded from the implementation of these components is shown in Figure 4-29. NMFS has selected a preferred alternative that includes measures that, if implemented, would apply throughout the EEZ. Management measures to minimize adverse impacts on EFH could apply in the EEZ in areas not described as EFH, if there is a link between the fishing activity and adverse effects on EFH. Management measures could be based on the Council's discretionary authority to protect habitat outside EFH that is based on section 303(b)(12) of the Magnuson-Stevens Act. NMFS will highlight this issue in the Notice of Availability for the FMP Amendment and Proposed Rule to implement the measures and request public comment and additional information that would support or not support including non-EFH areas in the management measures.

4.3 Consequences of the Alternatives to Designate HAPC (Alternatives (B.1-B.9)

The following subsections, 4.3.1 through 4.3.3 describe the effects of Alternatives B.1 through B.6 on the effected environment. Section 4.3.4 describes the effects of the final preferred alternative to designate HAPC on the effected environment.

4.3.1 *Generic Consequences of the HAPC Designation Alternatives*

Designation of HAPCs, like designation of EFH generally, does not have any direct environmental or socioeconomic effect, but may result in indirect effects greater than those associated with EFH because resource managers and regulators are likely to place a high priority on protecting areas that have been designated as HAPCs. HAPCs are used by NMFS and the Councils to focus conservation and management efforts on particularly valuable or vulnerable subsets of EFH. Although HAPC designation does not convey any higher regulatory standards for minimizing adverse effects of fishing or conducting EFH consultations, NMFS and the Councils may apply more scrutiny to fishing and non-fishing activities that adversely effect HAPCs as compared to EFH, and may be more risk averse when developing management measures to minimize adverse effects of fishing on HAPCs, and when recommending measures to federal and state agencies to minimize adverse effects of non-fishing activities on HAPCs. The potential environmental and socioeconomic effects from management measures to protect HAPCs would be comparable to those described in section 4.2.1 for EFH. As with EFH, conservation of HAPCs is expected in the long-term to support healthier fish stocks and more productive fisheries over the long-term, which, in turn, will provide added environmental and socioeconomic benefits. If an entity participates in consultations with NMFS, then it is possible that increased costs associated with time and effort expended in consultation may occur, though most nearshore consultations involving groundfish may be merged with ESA listed salmon consultations and any cost incurred may be borne through the ESA process.

The HAPC alternatives are not likely to have an effect on salmon; or, if the alternatives result in improved habitat conditions the effect would be Environmentally Positive (E+).

4.3.2 Geographic Comparison of the HAPC Designation Alternatives

The geographic area of the HAPC alternatives is shown in Habitat Table 4-6. Ranking from the greatest area to the least, the alternatives are in the following order: B.5, B.7, B.6, B.2, B.6, B.4, B.3, B.7, and B.8. B.9 is a process-based alternative and is not applicable to this analysis.

4.3.3 Alternative B.8

This alternative shares the generic consequences of HAPC described above but is considered separately due to the distinctive characteristics described in this section (See also Section 3.2.2.2.4). There are differing views regarding the ecological role of oil rig platforms.

Holbrook et al. (2000) stresses that current research is inconclusive with regard to whether the observed fish abundance and densities at platforms indicate increased fish productivity. There is concern that this increase is from attraction of fish populations away from natural reef systems (Chabot, personal communication; Charter, personal communication). When attempting to assess the productivity of an artificial reef, one must consider its location in relation to other reefs within the management area, size of the management area and patterns of larval recruitment (Carr and Hixon 1997). Artificial reefs only enhance production if production of organisms is greater on artificial reefs than on natural reefs within a defined management area (Carr and Hixon 1997).

Other noted concerns to oil platform HAPC designation include avoidance of returning the area under and around the oil platform to natural habitat, the potential for these sites to attract increased effort by fishermen and increased predators resulting in increased net mortality, and the potential for the oil platforms to be a hazard to navigation (Charter 2004, personal communication). According to Mr. Corrigan of the U.S. Coast Guard (2005, personal communication), both active and decommissioned platforms would only be considered a hazard to navigation if they are lacking appropriate marks on nautical charts and appropriate lighting. Gas and oil platforms are required to have these precautions in place according to regulation, making them an obstruction rather than a hazard to navigation.

Mercury contamination in fish that are long-lived and high order predators has caused the U.S. Food and Drug Administration (FDA) to issue advisories and ban certain fish from U.S. markets (EPA and FDA March 2004). Trefry et al (2002) found that the total mercury (Hg) near six drilling sites in the Gulf of Mexico were significantly higher than in areas well away from platforms. The disposal of drilling fluids containing mercury from operational oil rigs has resulted in concerns that mercury levels in fish caught near oil rigs, even years after the oil rig is no longer operational, may be substantially higher than those caught elsewhere and could be a health hazard to humans (Charter 2004, personal communication). It should be noted, however, that the Gulf of Mexico has a substantially higher number of rigs than the coast of California and that cumulative effects need to be thoroughly investigated in order to assess whether the risk associated with mercury levels in West Coast fish is significant.

The concerns shared above by environmental groups during public scoping have little or no supporting scientific research. However, the lack of scientific support does not make these concerns invalid. Therefore both positive and negative arguments for designation of oil platforms as HAPC are made available for full and fair consideration by decisionmakers.

Acknowledging these environmental concerns, there is recent scientific research indicating oil rig platforms off the Southern California Coast are a benefit to the ecosystem (See also Section 3.2.2.2.4).

Most platform studies have observed a species richness rivaling that of natural reefs, a vast majority being economically important rockfish species of all ages (Love 2005 in press, Love 2004 unpublished data, Love et al. 2003, Love et al. 2000a, Helvey 1999, Love et al. 1999a, Love et al. 1999b). Several studies have found higher densities of groundfish at platforms compared to natural outcroppings (Love et al. 1997, Love et al. 1999b, Love 2005b in review). This difference has been attributed to: reduced to nonexistent fishing pressure at platforms due to Coast Guard restrictions (Love et al. 1997, Love et al. 2003); high levels of recruitment for high relief platform structures (Love et al. 2003, Love 2005a in review); and reduced predation due to age-depth stratification (Love et al. 2003, Love et al. 2000a).

Further evidence that platforms provide habitat for increased fish productivity was found by Love (2005 unpublished data) when he compared growth rates, and found that in all instances fishes at platforms grew faster than fishes at paired reefs. Also, since many platforms have higher adult densities than natural reefs, they will produce a disproportionate amount of larvae in the region (Love et al. 2003). Research also demonstrates that a small amount of artificial nursery habitat may be valuable in rebuilding overfished species, as evidenced by findings that six platforms in Santa Barbara Channel produce about 20% of the juvenile bocaccio for the species' entire range (Love 2005 in press).

As the oil and gas industry ceases production on aging oil and gas platforms, oil and gas industry managers must decide what to do with the structure, a process called decommissioning. Federal regulations, under 30 CFR 250.1728, state that all platforms and other facilities must be completely removed to at least 15 feet below mudline. However, both lease provisions and the Minerals Management Service regulations governing disposition of offshore facilities are flexible enough to allow the federal government to contemplate and approve methods of jacket disposition other than complete removal, as we have seen in the Gulf States (CARE website, Love et al. 2003, Steinbach, personal communication). Further, the leases and regulations regarding platform disposition would be subject to conformance with state legislation, which (in the Gulf of Mexico) specifically established a policy for converting existing obsolete oil rigs to artificial reefs (Steinbach, personal communication). This platform reefing process allows for varying degrees of removal of the structure. If this trend of reefing platforms follows in Southern California, habitat under and around the platforms denied HAPC designation may or may not be returned to its natural state depending on the extent and process of decommissioning.

The U.S. Coast Guard restricts access of vessels over 100 feet long to the waters adjacent to platforms (Corrigan 2005, personal communication) and the physical structure of the platform restricts both commercial and recreational gear. These factors combined make it unlikely that large-scale fishing effort would increase if oil platforms are designated as HAPC.

It is up to the U.S. Coast Guard to provide necessary navigational aids in the event that a platform is reefed. However, HAPC designation does not create a reefing program for oil platforms. Therefore HAPC designation of oil platforms would not create additional hazards to navigation.

NMFS found no scientific research supporting concerns for human health due to platform associated mercury contamination of rockfish. Although Trefry et al. (2002) found higher total mercury near oil platforms in the Gulf of Mexico, methylmercury concentrations were not significantly different between near platform and far test sites. Methylmercury is the form of mercury that is synthesized and concentrated as it moves up through the food chain (EPA and FDA, 2004).

The overall effect of this alternative on fishing and non-fishing values is unclear in both the short-term and the long-term. Designation of the areas surrounding oil platforms would enhance NMFS' opportunity to fully consider a platforms potential contribution to the ecology of overfished species as part of the consultation process prior to decommissioning. The Environmental Consequences of designating oil production platforms as HAPC is considered unknown (U).

4.3.4 Consequences of the Final Preferred Alternative to Designate HAPC

The final preferred alternative to designate HAPC incorporates components of Alternatives B.2, B.3, B.4, B.6, B.7, B.8 and B.9. The generic consequences of the final preferred alternative to designate HAPC are described in Sections 4.3.1 and 4.3.3. The final preferred alternative to designate HAPC represents a significant change from the status quo under which there are no HAPC designations. Under the final preferred alternative, approximately 4.51% of the EEZ would be designated as HAPC which equates to 3,711,978 ha (10,822 square miles). Due to the generic consequences of designating HAPC, the final preferred alternative is considered Environmentally Positive (E+).

4.4 Consequences of the Alternatives to Minimize Adverse Fishing Effects to EFH (Alternatives C.1-C.14) on Marine Habitat, the Ecosystem, and Marine Resources

The following subsections, 4.4.1 through 4.4.14 describe the effects of alternatives C.1 through C.14 on marine habitat, the ecosystem, and marine resources. Section 4.4.15 describes the effects of the final preferred alternative on marine habitat, the ecosystem, and marine resources. For presentational purposes, socioeconomic effects are described in section 4.7.

4.4.1 Consequences of Alternative C.1: No Action

The current condition of habitat relative to a pristine state is unknown due to the scientific limitations described in Chapter Two and Appendix A. Similarly, it is not possible to predict changes to the condition of habitat as a result of reasonably foreseeable actions.

Chapter 3 describes the ecosystem and biological resources that occur in the EEZ and their relationship to habitat. Current habitat protections described in section 3.6 are presumed for purposes of this analysis to contribute to the no action alternative. That is, they contribute to the protection of habitat and are expected to persist. One notable exception is the RCA, which for purposes of this analysis is considered short-term. The area is defined during the biannual management process described in Chapter 1 and is therefore subject, by design of the groundfish management process, to negotiation and change. Additionally, the specific areas that define the RCA change considerably within a fishing year as bycatch quotas are monitored and adjusted. Chapter 3 describes the magnitude of these changes that are in some cases significant. Another issue that limits the effectiveness of the trawl RCA as a habitat protection measure is that non-groundfish trawl fisheries (i.e. State managed pink shrimp fisheries) are not excluded from the area. Therefore there are no measures to consider for a cumulative impacts analysis.

Alternative C.1 would not change the status quo (O).

4.4.2 Consequences of Alternative C.2: Depth-based Gear-specific Restrictions

The following subsections, 4.4.2.1 through 4.4.2.5 describe the effects of alternatives C.2 on marine habitat, the ecosystem, and marine resources.

4.4.2.1 Geographic Area

Habitat Table 4-9 compares the total geographic area of the impacts minimization alternatives.

Alternative C.2.1 for large footrope trawl gear encompasses 23,643 square nm and is equal to 10% of the EEZ. Alternative C.2.1 for fixed gear encompasses 20,287 square nm and is equal to 9% of the EEZ.

Alternative C.2.2 for large footrope trawl gear encompasses 239,892 square nm and is equal to 100% of the EEZ. Alternative C.2.2 for fixed gear encompasses 20,287 square nm and is equal to 8% of the EEZ.

Alternative C.2.3 for large footrope trawl gear encompasses 23,643 square nm and is equal to 10% of the EEZ. Alternative C.2.3 for fixed gear encompasses 13,471 square nm and is equal to 6% of the EEZ.

4.4.2.2 Minimization of Adverse Effects

Alternatives C.2.1, C.2.2, and C.2.3 have components that affect the large footrope trawl fishery however, due to data limitations, the sensitivity and recovery values do not differentiate between footrope sizes. It is not possible, given this limitation, to quantify the extent to which adverse effects would be minimized by this alternative.

4.4.2.3 Habitat for Individual Species/Life Stages

Habitat Table 4-15 shows the habitat of individual species/life stages that would be protected by this alternative. The information is presented for 168 separate species/life stage combinations. To simplify this information, we performed a frequency distribution. We chose four categories of amount of habitat protected; 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many species/life stage combinations fell into each category as presented below. This tells us how many species are affected by the alternative, and how much of their habitat would be protected.

For Alternative C.2.1 (large footrope trawl gear): 0 species/life stage combinations would have 0% of their habitat protected; 7 species/life stage combinations would have up to 25% of their habitat protected; 9 species/life stage combinations would have up to 50% of their habitat protected; 20 species/life stage combinations would have up to 75% of their habitat protected; and 132 species/life stage combinations would have up to 100% of their habitat protected.

For Alternative C.2.1 (fixed gear): 2 species/life stage combinations would have 0% of their habitat protected; 9 species/life stage combinations would have up to 25% of their habitat protected; 17 species/life stage combinations would have up to 50% of their habitat protected; 30 species/life stage combinations would have up to 75% of their habitat protected; and 110 species/life stage combinations would have up to 100% of their habitat protected.

For Alternative C.2.2 (large footrope trawl gear): 0 species/life stage combinations would have 0% of their habitat protected; 0 species/life stage combinations would have up to 25% of their habitat protected; 0 species/life stage combinations would have up to 50% of their habitat protected; 0 species/life stage combinations would have up to 75% of their habitat protected; and 168 species/life stage combinations would have up to 100% of their habitat protected.

For Alternative C.2.2 (fixed gear): 2 species/life stage combinations would have 0% of their habitat protected; 9 species/life stage combinations would have up to 25% of their habitat protected; 17 species/life stage combinations would have up to 50% of their habitat protected; 30 species/life stage combinations would have up to 75% of their habitat protected; and 110 species/life stage combinations would have up to 100% of their habitat protected.

For Alternative C.2.3 (large footrope trawl gear): 0 species/life stage combinations would have 0% of their habitat protected; 7 species/life stage combinations would have up to 25% of their habitat protected; 9 species/life stage combinations would have up to 50% of their habitat protected; 20 species/life stage combinations would have up to 75% of their habitat protected; and 132 species/life stage combinations would have up to 100% of their habitat protected.

For Alternative C.2.3 (fixed gear): 5 species/life stage combinations would have 0% of their habitat protected; 25 species/life stage combinations would have up to 25% of their habitat protected; 43 species/life stage combinations would have up to 50% of their habitat protected; 47 species/life stage combinations would have up to 75% of their habitat protected; and 48 species/life stage combinations would have up to 100% of their habitat protected.

4.4.2.4 Habitat Types

Habitat Table 4-16 compares the amount of substrate and biogenic habitat types that would be protected by the alternatives. To simplify this information, we performed a frequency distribution. We chose four categories of amounts of substrate or biogenic habitat that would be protected: 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many substrate types or biogenic habitat types fell into each category as presented below. This tells us how many substrate types or biogenic habitat types are affected by the alternative, and how much of each would be protected. For uncategorized amounts, see habitat table 4-16.

In the Oregonian zoogeographic province (north of Point Conception, California), alternative C.2.1 and C.2.3 for large footrope trawl gear protects:

- 9 substrate habitat types would have 0% of their area protected; 14 substrate types would have up to 25% of their area protected; 2 habitat types would have up to 50% of their area protected; 1 habitat type would have up to 75% of their area protected; and 3 habitat types would have up to 100% of their area protected; and,

- estuary, kelp, and seagrass would have 100% of their area protected.

In the Oregonian zoographic province (north of Point Conception, California), alternative C.2.1 and C.2.2 for fixed gear protects:

- 12 substrate habitat types would have 0% of their area protected; 13 substrate types would have up to 25% of their area protected; 1 habitat types would have up to 50% of their area protected; 1 habitat types would have up to 75% of their area protected; and 2 habitat types would have up to 100% of their area protected; and,

- estuary, kelp, and seagrass would have 100% of their area protected.

In the Oregonian zoogeographic province (north of Point Conception, California), alternative C.2.2 for large footrope trawl gear protects:

- 0 substrate habitat types would have 0% of their area protected; 0 substrate types would have up to 25% of their area protected; 0 habitat types would have up to 50% of their area protected; 0 habitat types would have up to 75% of their area protected; and 29 habitat types would have up to 100% of their area protected; and,

- estuary, kelp, and seagrass would have 100% of their area protected.

In the Oregonian zoogeographic province (north of Point Conception, California), alternative C.2.3 for fixed gear protects:

- 22 substrate habitat types would have 0% of their area protected; 5 substrate types would have up to 25% of their area protected; 0 habitat types would have up to 50% of their area protected; 2 habitat types would have up to 75% of their area protected; and 0 habitat types would have up to 100% of their area protected; and,

- estuary habitat would have 89% of its area protected, and kelp, and seagrass would have 100% of their area protected.

In the San Diego zoogeographic province (south of Point Conception, California), alternative C.2.1 and C.2.3 for large footrope trawl gear protects:

- 6 substrate habitat types would have 0% of their area protected; 17 substrate types would have up to 25% of their area protected; 2 habitat types would have up to 50% of their area protected; 1 habitat types would have up to 75% of their area protected; and 3 habitat types would have up to 100% of their area protected; and,

- estuary, kelp, and seagrass would have 100% of their area protected.

In the San Diego zoogeographic province (south of Point Conception, California), alternative C.2.1 and C.2.2 for fixed gear protects:

- 10 substrate habitat types would have 0% of their area protected; 15 substrate types would have up to 25% of their area protected; 1 habitat types would have up to 50% of their area protected; 1 habitat types would have up to 75% of their area protected; and 2 habitat types would have up to 100% of their area protected; and,

- estuary, kelp, and seagrass would have 100% of their area protected.

In the San Diego zoogeographic province (south of Point Conception, California), alternative C.2.2 for large footrope trawl gear protects:

- 0 substrate habitat types would have 0% of their area protected; 0 substrate types would have up to 25% of their area protected; 0 habitat types would have up to 50% of their area protected; 0 habitat types would have up to 75% of their area protected; and 29 habitat types would have up to 100% of their area protected; and,

- estuary, kelp, and seagrass would have 100% of their area protected.

In the San Diego zoogeographic province (south of Point Conception, California), alternative C.2.3 for fixed trawl gear protects:

- 21 substrate habitat types would have 0% of their area protected; 6 substrate types would have up to 25% of their area protected; 0 habitat types would have up to 50% of their area protected; 2 habitat types would have up to 75% of their area protected; and 0 habitat types would have up to 100% of their area protected; and,

- estuary, kelp, and seagrass would have 100% of their area protected.

4.4.2.5 Summary of Environmental Consequences and Cumulative Impacts

Alternative C.2 creates gear restrictions that would have an overall positive effect on habitat, the ecosystem, and marine resources (E+). Prohibitions on large footrope trawl gear under the relevant portions of the alternative would likely have the effect of removing trawl effects from rocky habitats (Bellman 2004). The positive effects of this may be masked somewhat where fixed gear is utilized. The components of the alternative that limit fixed gear would likewise remove effects associated with that gear type. The cumulative effects of this alternative, in addition to all the factors described in Section 4.1.1.7, is positive because it would reduce use of trawl gears that have the potential to adversely affect EFH.

4.4.3 Consequences of Alternative C.3: Close Sensitive Habitat

The following subsections, 4.4.3.1 through **Error! Reference source not found.**, describe the effects of alternatives C.3 on marine habitat, the ecosystem, and marine resources.

4.4.3.1 Geographic Area

Habitat Table 4-9 compares the total geographic area of the impacts minimization alternatives. Alternative C.3.1 encompasses 5,473 square nm and is equal to 2% of the EEZ. Alternative C.3.2 encompasses 40,202 square nm and is equal to 17% of the EEZ. C.3.3 encompasses 7,099 square nm and is equal to 3% of the EEZ. C.3.4 encompasses 55,516 square nm and is equal to 23% of the EEZ.

4.4.3.2 Minimization of Adverse Effects

Alternatives C.3.1 through C.3.4 would close areas to all types of fishing.

For nets, alternative C.3.1:

- the amount of habitat that would be protected where the sensitivity value is greater than 0.75 and recovery is in excess of 1.25 years is 36%.

- the amount of habitat that would be protected where the sensitivity value is greater than 1.2 and recovery is in excess of 1.0 years is 30%.

- the amount of habitat that would be protected where the sensitivity value is greater than 1.5 and recovery is in excess of 1.5 years is 74%.

For bottom trawls, alternative C.3.1:

- the amount of habitat that would be protected where the sensitivity value is greater than 1.0 and recovery is in excess of 1 year is 0%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.0 and recovery is in excess of 3.0 years is 80%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.75 and recovery is in excess of 2.75 years is 73%.

For nets, alternative C.3.2:

- the amount of habitat that would be protected where the sensitivity value is greater than 0.75 and recovery is in excess of 1.25 years is 36%.
- the amount of habitat that would be protected where the sensitivity value is greater than 1.2 and recovery is in excess of 1.0 years is 92%.
- the amount of habitat that would be protected where the sensitivity value is greater than 1.5 and recovery is in excess of 1.5 years is 74%.

For bottom trawls, alternative C.3.2:

- the amount of habitat that would be protected where the sensitivity value is greater than 1.0 and recovery is in excess of 1 year is 100%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.0 and recovery is in excess of 3.0 years is 80%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.75 and recovery is in excess of 2.75 years is 73%.

For nets, alternative C.3.3:

- the amount of habitat that would be protected where the sensitivity value is greater than 0.75 and recovery is in excess of 1.25 years is 100%.
- the amount of habitat that would be protected where the sensitivity value is greater than 1.2 and recovery is in excess of 1.0 years is 33%.
- the amount of habitat that would be protected where the sensitivity value is greater than 1.5 and recovery is in excess of 1.5 years is 100%.

For bottom trawls, alternative C.3.3:

- the amount of habitat that would be protected where the sensitivity value is greater than 1.0 and recovery is in excess of 1 year is 0%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.0 and recovery is in excess of 3.0 years is 100%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.75 and recovery is in excess of 2.75 years is 100%.

For nets, alternative C.3.4:

- the amount of habitat that would be protected where the sensitivity value is greater than 0.75 and recovery is in excess of 1.25 years is 100%.
- the amount of habitat that would be protected where the sensitivity value is greater than 1.2 and recovery is in excess of 1.0 years is 100%.
- the amount of habitat that would be protected where the sensitivity value is greater than 1.5 and recovery is in excess of 1.5 years is 100%.

For bottom trawls, alternative C.3.4:

- the amount of habitat that would be protected where the sensitivity value is greater than 1.0 and recovery is in excess of 1 year is 100%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.0 and recovery is in excess of 3.0 years is 100%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.75 and recovery is in excess of 2.75 years is 100%.

4.4.3.3 Habitat for Individual Species/Life Stages

Habitat Table 4-15 shows the habitat of individual species/life stages that would be protected by this alternative. The information is presented for 168 separate species/life stage combinations. To simplify this information, we performed a frequency distribution. We chose four categories of amount of habitat protected; 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many species/life stage combinations fell into each category as presented below. This tells us how many species are affected by the alternative, and how much of their habitat would be protected.

For Alternative C.3.1: 40 species/life stage combinations would have 0% of their habitat protected; 80 species/life stage combinations would have up to 25% of their habitat protected; 21 species/life stage combinations would have up to 50% of their habitat protected; 17 species/life stage combinations would have up to 75% of their habitat protected; and 10 species/life stage combinations would have up to 100% of their habitat protected.

For Alternative C.3.2: 5 species/life stage combinations would have 0% of their habitat protected; 100 species/life stage combinations would have up to 25% of their habitat protected; 33 species/life stage combinations would have up to 50% of their habitat protected; 20 species/life stage combinations would have up to 75% of their habitat protected; and 10 species/life stage combinations would have up to 100% of their habitat protected.

For Alternative C.3.3: 24 species/life stage combinations would have 0% of their habitat protected; 84 species/life stage combinations would have up to 25% of their habitat protected; 3 species/life stage combinations would have up to 50% of their habitat protected; 4 species/life stage combinations would have up to 75% of their habitat protected; and 53 species/life stage combinations would have up to 100% of their habitat protected.

For Alternative C.3.4: 5 species/life stage combinations would have 0% of their habitat protected; 48 species/life stage combinations would have up to 25% of their habitat protected; 32 species/life stage combinations would have up to 50% of their habitat protected; 19 species/life stage combinations would have up to 75% of their habitat protected; and 64 species/life stage combinations would have up to 100% of their habitat protected.

4.4.3.4 Habitat Types

Habitat Table 4-16 compares the amount of biogenic and substrate habitat types that would be protected by the alternatives. To simplify this information, we performed a frequency distribution. We chose four categories of amounts of substrate or biogenic habitat that would be protected: 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many substrate types or biogenic habitat types fell into each category as presented below. This tells us how many substrate types or biogenic habitat types are affected by the alternative, and how much of each would be protected. For uncategorized amounts, see habitat table 4-16.

In the Oregonian zoogeographic province (north of Point Conception, California), alternative C.3.1 protects:

- 19 substrate habitat types would have 0% of their area protected; 3 substrate types would have up to 25% of their area protected; 2 habitat types would have up to 50% of their area protected; 1 habitat types would have up to 75% of their area protected; and 4 habitat types would have up to 100% of their area protected; and,

- estuary habitat would have 1% of their area protected, kelp would have 83% of their area protected, and seagrass would have 14% of their area protected.

In the Oregonian zoogeographic province (north of Point Conception, California), alternative C.3.2 protects:

- 6 substrate habitat types would have 0% of their area protected; 3 substrate types would have up to 25% of their area protected; 4 habitat types would have up to 50% of their area protected; 5 habitat types would have up to 75% of their area protected; and 11 habitat types would have up to 100% of their area protected; and,

- estuary habitat would have 11% of their area protected, kelp would have 83% of their area protected, and seagrass would have 93% of their area protected.

In the Oregonian zoogeographic province (north of Point Conception, California), alternative C.3.3 protects:

- 17 substrate habitat types would have 0% of their area protected; 1 substrate types would have up to 25% of their area protected; 0 habitat types would have up to 50% of their area protected; 0 habitat types would have up to 75% of their area protected; and 11 habitat types would have up to 100% of their area protected; and,

- estuary habitat would have 1% of their area protected, kelp would have 100% of their area protected, and seagrass would have 19% of their area protected.

In the Oregonian zoogeographic province (north of Point Conception, California), alternative C.3.4 protects:

- 4 substrate habitat types would have 0% of their area protected; 1 substrate types would have up to 25% of their area protected; 0 habitat types would have up to 50% of their area protected; 0 habitat types would have up to 75% of their area protected; and 24 habitat types would have up to 100% of their area protected; and,

- estuary habitat would have 12% of their area protected, kelp and seagrass would have 100% of their area protected.

In the San Diego zoogeographic province (south of Point Conception, California), alternative C.3.1 protects:

- 21 substrate habitat types would have 0% of their area protected; 3 substrate types would have up to 25% of their area protected; 2 habitat types would have up to 50% of their area protected; 1 habitat types would have up to 75% of their area protected; and 2 habitat types would have up to 100% of their area protected; and,

- estuary habitat would have 0% of their area protected, kelp would have 93% of their area protected, and seagrass would have 5% of their area protected.

In the San Diego zoogeographic province (south of Point Conception, California), alternative C.3.2 protects:

- 5 substrate habitat types would have 0% of their area protected; 3 substrate types would have up to 25% of their area protected; 5 habitat types would have up to 50% of their area protected; 5 habitat types would have up to 75% of their area protected; and 11 habitat types would have up to 100% of their area protected; and,

- estuary habitat would have 40% of their area protected, kelp would have 93% of their area protected, and seagrass would have 72% of their area protected.

In the San Diego zoogeographic province (south of Point Conception, California), alternative C.3.3 protects:

- 19 substrate habitat types would have 0% of their area protected; 1 substrate types would have up to 25% of their area protected; 0 habitat types would have up to 50% of their area protected; 0 habitat types would have up to 75% of their area protected; and 9 habitat types would have up to 100% of their area protected; and,

- estuary habitat would have 0% of their area protected, kelp would have 100% of their area protected, and seagrass would have 30% of their area protected.

In the San Diego zoogeographic province (south of Point Conception, California), alternative C.3.4 protects:

- 3 substrate habitat types would have 0% of their area protected; 1 substrate types would have up to 25% of their area protected; 0 habitat types would have up to 50% of their area protected; 0 habitat types would have up to 75% of their area protected; and 25 habitat types would have up to 100% of their area protected; and,

- estuary habitat would have 43% of their area protected, kelp and seagrass would have 100% of their area protected.

4.4.3.5 Summary of Environmental Consequences and Cumulative Impacts

Alternative C.3 would prohibit all gear types in closed areas and would have overall positive effects on marine habitat, the ecosystem, and marine resources (E+). Habitat, and the ecosystem functions it provides, would be fully protected from fishing effects although the potential for effects from non-fishing activities exists. Because there would be no harvest of marine resources, the alternative has the potential to function as insurance from catastrophic environmental events and management failure. There is also the possibility that marine resources, such as groundfish, will attain a full age structure including highly productive older females, and will provide positive spill over effects to areas that are open to fishing. The cumulative effects of this alternative, in addition to all the factors described in Section 4.1.1.7, is positive because it would reduce use of trawl gears that have the potential to adversely affect EFH.

4.4.4 Consequences of Alternative C.4: Prohibit the Geographic Expansion of Fishing

The following subsections, 4.4.4.1 through 4.4.4.5, describe the effects of Alternative C.4 on marine habitat, the ecosystem, and marine resources.

4.4.4.1 Geographic Area

Habitat Table 4-9 compares the total geographic area of the impacts minimization alternatives. Alternative C.4.1 encompasses 214,149 square nm and is equal to 89.27% of the EEZ. Alternative C.4.2 encompasses 178,021 square nm and is equal to 74.21% of the EEZ.

4.4.4.2 Minimization of Adverse Effects

Alternative C.4.1 would be closed to bottom trawl only (e.g. no protection from other gears). Alternative C.4.2 would close areas to all bottom-tending fishing gear.

For bottom trawls, alternative C.4.1:

- the amount of habitat that would be protected where the sensitivity value is greater than 1.0 and recovery is in excess of 1 year is 89%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.0 and recovery is in excess of 3.0 years is 47%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.75 and recovery is in excess of 2.75 years is 45%.

For nets, alternative C.4.2:

- the amount of habitat that would be protected where the sensitivity value is greater than 0.75 and recovery is in excess of 1.25 years is 0%.
- the amount of habitat that would be protected where the sensitivity value is greater than 1.2 and recovery is in excess of 1.0 years is 0%.
- the amount of habitat that would be protected where the sensitivity value is greater than 1.5 and recovery is in excess of 1.5 years is 25%.

For bottom trawls, alternative C.4.2:

- the amount of habitat that would be protected where the sensitivity value is greater than 1.0 and recovery is in excess of 1 year is 100%.

- the amount of habitat that would be protected where the sensitivity value is greater than 2.0 and recovery is in excess of 3.0 years is 0%.

- the amount of habitat that would be protected where the sensitivity value is greater than 2.75 and recovery is in excess of 2.75 years is 28%.

4.4.4.3 Habitat for Individual Species/Life Stages

Habitat Table 4-15 shows the habitat of individual species/life stages that would be protected by this alternative. The information is presented for 168 separate species/life stage combinations. To simplify this information, we performed a frequency distribution. We chose four categories of amount of habitat protected; 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many species/life stage combinations fell into each category as presented below. This tells us how many species are affected by the alternative, and how much of their habitat would be protected.

For Alternative C.4.1: 0 species/life stage combinations would have 0% of their habitat protected; 102 species/life stage combinations would have up to 25% of their habitat protected; 47 species/life stage combinations would have up to 50% of their habitat protected; 14 species/life stage combinations would have up to 75% of their habitat protected; and 5 species/life stage combinations would have up to 100% of their habitat protected.

For Alternative C.4.2: 154 species/life stage combinations would have 0% of their habitat protected; 14 species/life stage combinations would have up to 25% of their habitat protected; 0 species/life stage combinations would have up to 50% of their habitat protected; 0 species/life stage combinations would have up to 75% of their habitat protected; and 0 species/life stage combinations would have up to 100% of their habitat protected.

4.4.4.4 Habitat Types

Habitat Table 4-16 compares the amount of biogenic and substrate habitat types that would be protected by the alternatives. To simplify this information, we performed a frequency distribution. We chose four categories of amounts of substrate or biogenic habitat that would be protected: 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many substrate types or biogenic habitat types fell into each category as presented below. This tells us how many substrate types or biogenic habitat types are affected by the alternative, and how much of each would be protected. For uncategorized amounts, see habitat table 4-16.

In the Oregonian zoogeographic province (north of Point Conception, California), alternative C.4.1 protects:

- 2 substrate habitat types would have 0% of their area protected; 9 substrate types would have up to 25% of their area protected; 8 habitat types would have up to 50% of their area protected; 3 habitat types would have up to 75% of their area protected; and 7 habitat types would have up to 100% of their area protected; and,

- estuary habitat would have 63% of their area protected, kelp would have 37% of their area protected, and 57% of seagrass would have 57% of their area protected.

In the Oregonian zoogeographic province (north of Point Conception, California), alternative C.4.2 protects:

- 7 substrate habitat types would have 0% of their area protected; 8 substrate types would have up to 25% of their area protected; 6 habitat types would have up to 50% of their area protected; 1 habitat types would have up to 75% of their area protected; and 7 habitat types would have up to 100% of their area protected; and,
- estuary, kelp, and seagrass would have 0% of their areas protected.

In the San Diego zoogeographic province (south of Point Conception, California), alternative C.4.1 protects:

- 5 substrate habitat types would have 0% of their area protected; 10 substrate types would have up to 25% of their area protected; 8 habitat types would have up to 50% of their area protected; 3 habitat types would have up to 75% of their area protected; and 3 habitat types would have up to 100% of their area protected;
- estuary habitat would have 69% of their area protected, kelp would have 77% of their area protected, and seagrass would have 68% of their area protected.

In the San Diego zoogeographic province (south of Point Conception, California), alternative C.4.2 protects:

- 12 substrate habitat types would have 0% of their area protected; 9 substrate types would have up to 25% of their area protected; 6 habitat types would have up to 50% of their area protected; 1 habitat types would have up to 75% of their area protected; and 1 habitat types would have up to 100% of their area protected; and,
- estuary, kelp, and seagrass would have 0% of their areas protected.

4.4.4.5 Summary of Environmental Consequences and Cumulative Impacts

Alternative C.4 would have overall positive effects on the ecosystem (E+). C.4.1 would fully protect habitat, and the ecosystem function it provides, from effects from bottom trawling but would allow effects from other bottom-tending gears. C.4.2 would prohibit effects from all bottom-tending gears. Both options are likely to have significant benefits although non-fishing activities may reduce their effectiveness. Benefits to marine resources, such as insurance and spill-over, may be masked somewhat due to the potential for harvest from other gear types. The alternative has the added benefit of addressing significant scientific uncertainty by prohibiting effects in areas that have not been fished recently. As such, it is likely to protect areas that are currently pristine. The cumulative effects of this alternative, in addition to all the factors described in Section 4.1.1.7, is positive because it would reduce use of trawl gears that have the potential to adversely affect EFH.

4.4.5 Consequences of Alternative C.5: Prohibit a Krill Fishery

The function of krill in the ecosystem is fully described in Chapter 3. At this point in time, a ban on krill harvest is considered Environmentally Positive (E+) if for no other reason than that we do not know how much krill biomass is available for harvest nor do we know how any given level of harvest will effect the amount of krill available to their fish, bird and mammal predators, or on the effect of bycatch. Thus a ban on potential krill harvest would be a precautionary ecosystem measure pending a formal krill stock assessment. Lacking an assessment, a “no harvest” policy provides assurance that negative environmental effects do not occur.

4.4.5.1 Consequences of Alternative C.5 on Protected Species

The consequences of banning krill harvest on protected are regarded as Environmentally Positive (E+) for the same reasons discussed in 4.1.1.

4.4.6 Consequences of Alternative C.6: Close Hotspots

The following subsections, 4.4.6.1 through 4.4.6.5, describe the effects of alternative C.6 on marine habitat, the ecosystem, and marine resources.

4.4.6.1 Geographic Area

Habitat Table 4-9 compares the total geographic area of the impacts minimization alternatives. Alternative C.6 encompasses 18,268 square nm and is equal to 7.77% of the EEZ.

4.4.6.2 Minimization of Adverse Effects

Alternatives C.6 would close areas to bottom trawling (e.g. no protection from other gear types).

For bottom trawls:

- the amount of habitat that would be protected where the sensitivity value is greater than 1.0 and recovery is in excess of 1 year is 0%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.0 and recovery is in excess of 3.0 years is 96%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.75 and recovery is in excess of 2.75 years is 0%.

4.4.6.3 Habitat for Individual Species/Life Stages

Habitat Table 4-15 shows the habitat of individual species/life stages that would be protected by this alternative. The information is presented for 168 separate species/life stage combinations. To simplify this information, we performed a frequency distribution. We chose four categories of amount of habitat protected; 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many species/life stage combinations fell into each category as presented below. This tells us how many species are affected by the alternative, and how much of their habitat would be protected.

For Alternative C.6: 3 species/life stage combinations would have 0% of their habitat protected; 11 species/life stage combinations would have up to 25% of their habitat protected; 20 species/life stage combinations would have up to 50% of their habitat protected; 39 species/life stage combinations would have up to 75% of their habitat protected; and 95 species/life stage combinations would have up to 100% of their habitat protected.

4.4.6.4 Habitat Types

Habitat Table 4-16 compares the amount of biogenic and substrate habitat types that would be protected by the alternatives. To simplify this information, we performed a frequency distribution. We chose four categories of amounts of substrate or biogenic habitat that would be protected: 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many substrate types or biogenic habitat types fell into each category as presented below. This tells us how many substrate types or biogenic habitat types are affected by the alternative, and how much of each would be protected. For uncategorized amounts, see habitat table 4-16.

In the Oregonian zoogeographic province (north of Point Conception, California), alternative C.6 protects:

- 17 substrate habitat types would have 0% of their area protected; 9 substrate types would have up to 25% of their area protected; 0 habitat types would have up to 50% of their area protected; 0 habitat types would have up to 75% of their area protected; and 3 habitat types would have up to 100% of their area protected; and,

- estuary habitat would have 24% of their area protected, kelp would have 100% of their area protected, and seagrass would have 24% of their area protected.

In the San Diego zoogeographic province (south of Point Conception, California), alternative C.6 protects:

- 17 substrate habitat types would have 0% of their area protected; of 9 substrate types would have up to 25% of their area protected; 0 habitat types would have up to 50% of their area protected; 0 habitat types would have up to 75% of their area protected; and 3 habitat types would have up to 100% of their area protected; and,

- estuary habit would have 63% of their area protected at would have 0% of their area protected, kelp would have 84% of their area protected, and seagrass would have 30% of their area protected.

4.4.6.5 Summary of Environmental Consequences and Cumulative Impacts

Alternative C.6 would have overall positive effects on the ecosystem (E+). The alternative would fully protect habitat, and the ecosystem function it provides, from effects from bottom trawling but would allow effects from other bottom-tending gears. It is likely to have significant benefits although non-fishing activities may reduce their effectiveness. Benefits to marine resources, such as insurance and spill-over, may be masked somewhat due to the potential for harvest from other gear types. However, because it is calculated to include only those areas where habitat is suitable for high numbers of groundfish, it protects habitat for a large diversity of species. The cumulative effects of this alternative, in addition to all the factors described in Section 4.1.1.7, is positive because it would reduce use of bottom trawl gear that has the potential to adversely affect EFH.

4.4.7 Consequences of Alternative C.7: Close Areas of Interest

The following subsections, 4.4.7.1 through 4.4.7.5, describe the effects of alternative C.7 on marine habitat, the ecosystem, and marine resources.

4.4.7.1 Geographic Area

Habitat Table 4-9 compares the total geographic area of the impacts minimization alternatives. Alternative C.7.1 and alternative C.7.2 are identical in area and encompass 8,796 square nm and are equal to 3.67% of the EEZ.

4.4.7.2 Minimization of Adverse Effects

Alternative C.7.1 would close areas to bottom trawl (e.g. not to other gear types). Alternative C.7.2 would close areas to all bottom-contacting activities.

For bottom trawls, alternative C.7.1:

- the amount of habitat that would be protected where the sensitivity value is greater than 1.0 and recovery is in excess of 1 year is 3%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.0 and recovery is in excess of 3.0 years is 3%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.75 and recovery is in excess of 2.75 years is 17%.

For nets, alternative C.7.2:

- the amount of habitat that would be protected where the sensitivity value is greater than 0.75 and recovery is in excess of 1.25 years is 0%.
- the amount of habitat that would be protected where the sensitivity value is greater than 1.2 and recovery is in excess of 1.0 years is 26%.
- the amount of habitat that would be protected where the sensitivity value is greater than 1.5 and recovery is in excess of 1.5 years is 15%.

For bottom trawls, alternative C.7.2:

- the amount of habitat that would be protected where the sensitivity value is greater than 1.0 and recovery is in excess of 1 year is 3%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.0 and recovery is in excess of 3.0 years is 3%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.75 and recovery is in excess of 2.75 years is 17%.

4.4.7.3 Habitat for Individual Species/Life Stages

Habitat Table 4-15 shows the habitat of individual species/life stages that would be protected by this alternative. The information is presented for 168 separate species/life stage combinations. To simplify this information, we performed a frequency distribution. We chose four categories of amount of habitat protected; 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many species/life stage combinations fell into each category as presented below. This tells us how many species are affected by the alternative, and how much of their habitat would be protected.

For Alternatives C.7.1 and C.7.2 (which are identical in area): 0 species/life stage combinations would have 0% of their habitat protected; 109 species/life stage combinations would have up to 25% of their habitat protected; 47 species/life stage combinations would have up to 50% of their habitat protected; 9 species/life stage combinations would have up to 75% of their habitat protected; and 3 species/life stage combinations would have up to 100% of their habitat protected.

4.4.7.4 Habitat Types

Habitat Table 4-16 compares the amount of biogenic substrate habitat types that would be protected by the alternatives. To simplify this information, we performed a frequency distribution. We chose four categories of amounts of substrate or biogenic habitat that would be protected: 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many substrate types or biogenic habitat types fell into each category as presented below. This tells us how many substrate types or biogenic habitat types are affected by the alternative, and how much of each would be protected. For uncategorized amounts, see habitat table 4-16.

In the Oregonian zoogeographic province (north of Point Conception, California), alternative C.7.1 or C.7.2 protects:

- 6 substrate habitat types would have 0% of their area protected; 8 substrate types would have up to 25% of their area protected; 7 habitat types would have up to 50% of their area protected; 2 habitat types would have up to 75% of their area protected; and 6 habitat types would have up to 100% of their area protected; and,

- estuary habitat would have 0% of their area protected, kelp would have 3% of their area protected, and seagrass would have 0% of their area protected.

In the San Diego zoogeographic province (south of Point Conception, California), alternative C.7.1 or C.7.2 protects:

- 11 substrate habitat types would have 0% of their area protected; 7 substrate types would have up to 25% of their area protected; 4 habitat types would have up to 50% of their area protected; 2 habitat types would have up to 75% of their area protected; and 5 habitat types would have up to 100% of their area protected; and,

- estuary habitat would have 0% of their area protected, kelp would have 7% of their area protected, and seagrass would have 0% of their area protected.

4.4.7.5 Summary of Environmental Consequences and Cumulative Impacts

Alternative C.7 would have overall positive effects on the ecosystem (E+). C.7.1 would fully protect habitat, and the ecosystem function it provides, from effects from bottom trawling but would allow effects from other bottom-tending gears. C.7.2 would prohibit effects from all bottom-tending gears. Both options are likely to have significant benefits although non-fishing activities may reduce their effectiveness. Benefits to marine resources, such as insurance and spill-over, may be masked somewhat due to the potential for harvest from other gear types. The alternative applies to areas of interest that were chosen for their unique habitat features and as such provides protection to unique habitat types. The cumulative effects of this alternative, in addition to all the factors described in Section 4.1.1.7, is positive because it would reduce use of bottom trawl gear that has the potential to adversely affect EFH.

4.4.8 Consequences of Alternative C.8: Zoning Fishing Activities

The following subsections, 4.4.8.1 through 4.4.8.5, describe the effects of alternative C.8 on marine habitat, the ecosystem, and marine resources.

4.4.8.1 Geographic Area

Habitat Table 4-9 compares the total geographic area of the impacts minimization alternatives. Alternative C.8.1 and alternative C.8.2 are identical in area and encompass 178,021 square nm and equal to 74.21% of the EEZ.

4.4.8.2 Minimization of Adverse Effects

Alternative C.8.1 would close areas to all mobile, bottom-contacting gear. Alternative C.8.2 would close areas to all bottom-tending gear.

For nets, alternatives C.8.1 and C.8.2:

- the amount of habitat that would be protected where the sensitivity value is greater than 0.75 and recovery is in excess of 1.25 years is 0%.
- the amount of habitat that would be protected where the sensitivity value is greater than 1.2 and recovery is in excess of 1.0 years is 0%.
- the amount of habitat that would be protected where the sensitivity value is greater than 1.5 and recovery is in excess of 1.5 years is 25%.

For bottom trawls, alternatives C.8.1 and C.8.2:

- the amount of habitat that would be protected where the sensitivity value is greater than 1.0 and recovery is in excess of 1 year is 100%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.0 and recovery is in excess of 3.0 years is 0%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.75 and recovery is in excess of 2.75 years is 28%.

4.4.8.3 Habitat for Individual Species/Life Stages

Habitat Table 4-15 shows the habitat of individual species/life stages that would be protected by this alternative. The information is presented for 168 separate species/life stage combinations. To simplify this information, we performed a frequency distribution. We chose four categories of amount of habitat protected; 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many species/life stage combinations fell into each category as presented below. This tells us how many species are affected by the alternative, and how much of their habitat would be protected.

For Alternatives C.8.1 and C.8.2 (which are identical in area): 154 species/life stage combinations would have 0% of their habitat protected; 14 species/life stage combinations would have up to 25% of their habitat protected; 0 species/life stage combinations would have up to 50% of their habitat protected; 0 species/life stage combinations would have up to 75% of their habitat protected; and 0 species/life stage combinations would have up to 100% of their habitat protected.

4.4.8.4 Habitat Types

Habitat Table 4-16 compares the amount of substrate habitat types that would be protected by the alternatives. To simplify this information, we performed a frequency distribution. We chose four categories of amounts of substrate or biogenic habitat that would be protected: 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many substrate types or biogenic habitat types fell into each category as presented below. This tells us how many substrate types or biogenic habitat types are affected by the alternative, and how much of each would be protected. For uncategorized amounts, see habitat table 4-16.

In the Oregonian zoogeographic province (north of Point Conception, California), alternative C.8.1 or C.8.2 protects:

- 7 substrate habitat types would have 0% of their area protected; 8 substrate types would have up to 25% of their area protected; 6 habitat types would have up to 50% of their area protected; 1 habitat types would have up to 75% of their area protected; and 7 habitat types would have up to 100% of their area protected; and,
- estuary habitat, kelp, and seagrass would have 0% of their areas protected.

In the San Diego zoogeographic province (south of Point Conception, California), alternative C.8.1 or C.8.2 protects:

- 12 substrate habitat types would have 0% of their area protected; 9 substrate types would have up to 25% of their area protected; 6 habitat types would have up to 50% of their area protected; 1 habitat types would have up to 75% of their area protected; and 1 habitat types would have up to 100% of their area protected; and,
- estuary habitat, kelp, and seagrass would have 0% of their areas protected.

4.4.8.5 Summary of Environmental Consequences and Cumulative Impacts

Alternative C.8 would have overall positive effects on the ecosystem (E+). C.8.1 would fully protect habitat, and the ecosystem function it provides, from effects from mobile bottom-tending gear, such as bottom trawling, but would allow effects from other bottom-tending gears. C.8.2 would prohibit effects from all bottom-tending gears. Both options are likely to have significant benefits, although non-fishing activities may reduce their effectiveness. Benefits to marine resources, such as insurance and spill-over, may be masked somewhat due to the potential for harvest from other gear types. The alternative has the added benefit of a long-term approach that would systematically prohibit effects in areas unless science develops sufficiently to demonstrate fishing would not create adverse habitat effects. The cumulative effects of this alternative, in addition to all the factors described in Section 4.1.1.7, is positive because it would reduce use of bottom trawl gear that has the potential to adversely affect EFH.

4.4.9 Consequences of Alternative C.9–Gear Restrictions

Alternative C.9 includes specific gear modifications and prohibitions that are designed to reduce adverse habitat effects. The alternative contains 8 separate options that are considered in turn for the remainder of this section.

4.4.9.1 Consequences of Prohibiting Roller Gear Larger than 15 Inches

Roller gear is used to allow trawls to be towed over rough bottom and is described fully in section 3.5. Roller gear larger than 8 inches is allowed seaward of the RCA; however, most vessels do not use roller gear in excess of 15 inches (Brown, McMullen, Pettinger 2004. personal communication). The benefits to habitat can only be qualitatively assessed due to a lack of experimental data. It is widely held however that large roller gear (e.g. 15 inches and greater) allow trawlers to access more sensitive habitats. This premise is upheld by an OSU study that showed a potential redistribution of the trawl fishery away from rocky areas after implementation of regulations that prohibited large footrope gear in certain portions of the EEZ (Bellman 2004). Prohibition of roller gear would likely protect such habitats by making them inaccessible to trawlers; however, it is not clear that 15-inch is an appropriate size cutoff versus 8 inches to achieve a redistribution of the trawl fishery away from sensitive habitat.

It is likely that no immediate benefit would result from this option because the gear is not widely used, if at all. The prohibition may however, prevent future access to sensitive habitats by trawlers with economic incentive to convert to larger footrope gear and for this reason is regarded as environmentally positive (E+). The cumulative effects of this alternative, in addition to all the factors described in Section 4.1.1.7, is positive because it would reduce use of trawl gears that have the potential to adversely affect EFH.

4.4.9.2 Consequences of Prohibiting Roller Gear Larger than 15 Inches on Protected Species

There are no foreseeable consequences of this alternative on protected species.

4.4.9.3 Consequences of Prohibiting Flat Trawl Doors

(i.e. requiring cambered doors) Trawl doors, including flat and cambered, are described in section 3.5. There is no experimental evidence to suggest that cambered doors have less effect on habitat than flat doors; however, fishermen on the West Coast are increasingly using cambered doors as they are more fuel efficient due to their increased hydrodynamic efficiency and reduced drag on the bottom (Brown, 2003). The reduction in bottom drag suggests that cambered doors can be fished with less direct habitat effects than flat doors. For this reason, the option is regarded as environmentally positive (E+). The cumulative effects of this alternative, in addition to all the factors described in Section 4.1.1.7, is positive because it would reduce use of trawl gears that have the potential to adversely affect EFH.

4.4.9.4 Consequences of Prohibiting Flat Trawl Doors (i.e. requiring cambered doors) on Protected Species

There are no foreseeable consequences of this alternative on protected species.

4.4.9.5 Consequences of Limiting Single Longline Groundline to 3 nm

Bottom longline gear is described fully in section 3.5. The principal components of the longline that can produce effects on the seabed are the anchors or weights, the hooks and the mainline. The key determinant of the effects of longlines is how far they travel over the seabed during setting or retrieval. Significant travel distance is more likely during retrieval. If the hauling vessel is not above the part of the line that is being lifted, the line, hooks and anchors can be pulled across the seabed before ascending. If the hooks and line snare exposed organisms, those organisms can be injured or detached. Lines may undercut emergent structures or roll over them. The relatively low breaking strength of the line may limit damage to more durable seafloor features (Rose et al. 2002). The mainline can also be moved numerous feet along the bottom and up into the water column by fish, particularly halibut during escape runs. Objects in the path of the groundline can be disturbed (Johnson 2002).

While there is no direct experimental evidence to suggest that habitat effects can be reduced by modifying the length of groundline; it may be inferred that shorter longlines would reduce the travel distance during retrieval and thereby reduce adverse effects to bottom habitat. Such a reduction (from current levels) may be minimal however and without further research it is inappropriate to make a conclusion in this EIS. Further, most longline fishing off the West Coast use groundlines less than 3 nm. As described in section 3.5.1.1, typical groundline lengths are: halibut fishery roughly 3 nm; the groundfish fishery roughly 1.0 nm; and, the blackcod fishery roughly 1.5 nm. For this reason, the environmental consequences of this alternative are regarded as having no change from current and reasonably foreseeable conditions (0). There are no foreseeable cumulative effects of this alternative because currently longlines over 3 nm long are not commonly used.

4.4.9.6 Consequences of Limiting Single Longline Groundline to 3 nm on Protected Species

There are no foreseeable consequences of this alternative on protected species.

4.4.9.7 Consequences of Employing Habitat-Friendly Anchoring Systems

Requiring fixed gear vessels to use habitat-friendly anchoring systems is likely to have Environmentally Positive effects on habitat; however, there is insufficient information available for this EIS to know specifically what types of anchors are available and predict the type of changes that may occur. A preliminary review of anchoring systems suggests that anchors resembling the "Bruce" anchor (an anchor design with a weak link which allows the anchor to be retrieved from the shovel instead of the shaft if it gets snagged) may be merit further consideration by the Council and NMFS.

4.4.9.8 Consequences of Employing Habitat-Friendly Anchoring Systems on Protected Species

There are no foreseeable consequences of this alternative on protected species.

4.4.9.9 Consequences of Prohibiting Dredge Gear

Dredge gear is described fully in section 3.5.7. The effects of dredge gear on habitat are described in section 3.2.5. Experimental data suggests that dredge gear modifies habitat more than any other gear type and can have similar effects on biodiversity (appendix 10 to the Risk Assessment). The effect of dredge gear on the seabed is dependent on the power and capability of the fishing vessel, the towing speed, the weight of the dredge and its size and design. The principal contact with the seabed is made by the shoes, tickler chains and footrope, with the lower edge of the frame only encountering higher sand waves and emergent structures. The chain bag also is pulled across the seabed. Hydraulic baffles may increase the suspension of sediment, while reducing the need for elements in direct contact with the bottom. Although dredge gear is not currently utilized on the West Coast, this alternative is regarded as environmentally positive in that it would eliminate the possibility of it happening in the future (E+). The cumulative effects of this alternative, in addition to all the factors described in Section 4.1.1.7, is positive because it would reduce use of fishing gears that have the potential to adversely affect EFH.

4.4.9.10 Consequences of Prohibiting Dredge Gear on Protected Species

There are no foreseeable consequences of this alternative on protected species.

4.4.9.11 Consequences of Prohibiting Beam-trawl Gear

Beam-trawl gear is described fully in section 3.5. During beam trawl fishing, the sole plates on the trawl head and the tickler chains are in direct contact with the seabed. The sole plates generally contact the seabed at a slight angle. The pressure exerted by the trawl head on the seabed is strongly related to the towing speed. As the speed is increased, the lift on the gear increases and the resultant pressure force decreases. A less firm bottom contact, e.g. on softer grounds, can also be obtained by shortening the warp length. A shrimp beam trawl weighs (in air) several hundred kilograms.

Tickler chains also contact the bottom. Generally only one tickler chain is used when fishing shrimp. The pressure exerted by the tickler chain is substantially lower than that exerted by the trawl heads, though the area covered is greater. When the tickler chain is towed over the seabed, sediments are transported. Smaller particles will go into suspension and may be transported away by currents or resettle in the track of the trawl. Local variations in morphology such as ripples may be flattened out.

The amount of penetration into the seabed depends on sediment type, with the greatest amount of penetration occurring on very fine to fine-muddy sand. If more than one chain is used on the beam trawl, the added weight increases contact with the seabed and increases fluidization of the sediment as each chain passes, allowing following chains to penetrate deeper (Jennings et al 2001).

Limitations in direct scientific observation of beam-trawl effects allows only for a qualitative analysis of the predicted effects of this alternative. For purposes of the analysis, beam trawl is assumed to have similar effects to standard bottom trawl gear that rates relatively high in potential effect among all the gear types. A prohibition on beam trawl gear would likely result in reduced physical modification to bottom habitat and associated loss in benthic biodiversity and is therefore regarded as environmentally positive (E+). The cumulative effects of this alternative, in addition to all the factors described in Section 4.1.1.7, is positive because it would reduce use of trawl gears that have the potential to adversely affect EFH.

4.4.9.12 Consequences of Prohibiting Beam-trawl Gear on Protected Species

There are no foreseeable consequences of this alternative on protected species.

4.4.9.13 Consequences of Prohibiting Set Gillnets in Waters Deeper than 60 fm

Gillnet gear is described fully in section 3.5. The benthic effects of a set gillnet fishing operation occurs during the retrieval of the gear. During retrieval, the nets and leadlines may snag bottom structures or the exposed sedentary benthos. The anchoring system can also affect bottom organisms and structure if they are dragged along the bottom before ascent. Lost nets can tear organisms from the seabed or overturn cobble and small boulders to which organisms may be attached if they are moved along the seabed by currents. Gillnets may be lost during bad weather or through interaction with mobile gears. Retrieval of gear lost to inclement weather is now high due to the increased use of GPS (global positioning systems), while gillnets lost to interactions with other gear is less likely to be retrieved. Once lost, gear may continue to fish. The extent of this 'ghost fishing' will be related to factors such as water depth, light levels, and water movements as well as vertical profile. A lost gillnet can provide a new surface for epibenthic organisms such as bryozoans to settle on and niches for fish and crabs. Although these organisms will help make the net visible to finfish, it can also provide a food source as certain organisms settle on the net or are caught in the net. This will commonly attract fish or other scavengers to eat those caught and the scavenger species can also get entangled. Overtime, especially in areas of high water flow, nets become bundled up, reducing their ability to entangle fish. In deep water, where fouling is very limited and currents slower, derelict nets may fish for longer periods.

Because nets are expensive and can easily become torn if they are snagged on hard or rough bottoms, the goal of setnetters is to avoid these areas, while setting their nets just off to the side and parallel to these areas, on mud or sandy bottoms. Similarly for fear of snagging, efforts are also made to avoid dragging the anchor on retrieval (West 2003). A 1000 fathom long swordfish net, cut loose during a storm to avoid the sinking of a vessel, when retrieved 6 days later had already bunched up into a dense mass the size of a small house and was not catching fish (West 2003).

The set net is banned off Washington and Oregon except for small numbers of treaty set net fishermen on the Columbia River above Bonneville Dam and on certain smaller rivers of western Washington. This treaty fishery takes salmon, dogfish and true cod; lingcod and rockfish are caught as bycatch.

Off California, setnets are only allowed offshore of the three-mile state waters boundary and south of 38 degrees North latitude. Set nets can be fished at all water depths depending on the behavior of the fish being pursued. For example, white seabass can be targeted with set nets both when they reside near the bottom (during some parts of their life cycle) as well as when they are in the upper parts of the water column. There is a set net fishery for bonito, flying fish, and white croaker (mesh sizes of 2.75- 3 inches, 7.0 cm-7.6 cm), fishery for white seabass (using minimum mesh sizes of six inches, 15.2 cm), and a fishery for barracuda with a 3.5" (8.9 cm) mesh size. In California set nets are also used for angel shark, California halibut, lingcod, mullet, and perch. While trammel nets are also allowed in these fisheries, these nets are not currently known to be in use (West 2003).

Set gillnets are rated as having relatively low habitat effect when compared to other gear types and therefore this option is regarded as having only marginal environmental benefits (0). The cumulative effects of this alternative, in addition to all the factors described in Section 4.1.1.7, is positive because it would reduce use of fishing gears that have the potential to adversely affect EFH.

4.4.9.14 Consequences of Prohibiting Set Gillnets in Waters Deeper than 60 fm on Protected Species

There are no foreseeable consequences of this alternative on protected species.

4.4.9.15 Consequences of Prohibiting Dingle Bar Gear

Dingle bar and other troll gears are described fully in section 3.5. Dingle bars can contact the seafloor when deployed. The hooks and line can snag on rocks, corals, kelps and other objects during retrieval. This may upend smaller rocks and break hard corals, while leaving soft corals unaffected. Invertebrates and other lightweight objects can also be dislodged. While hook-and-line fishing rates as among the least destructive relative to other gear types, dingle bars are generally used to target lingcod in sensitive habitats that may be modified by the gear type. Therefore this alternative is regarded as environmentally positive (E+). The cumulative effects of this alternative, in addition to all the factors described in Section 4.1.1.7, is positive because it would reduce use of fishing gears that have the potential to adversely affect EFH.

4.4.9.16 Consequences of Prohibiting Dingle Bar Gear on Protected Species

There are no foreseeable consequences of this alternative on protected species.

4.4.10 Consequences of Alternative C.10: Central California No-trawl Zones

The following subsections, 4.4.10.1 through 4.4.10.5, describe the effects of alternative C.10 on marine habitat, the ecosystem, and marine resources.

4.4.10.1 Geographic Area

Habitat Table 4-9 compares the total geographic area of the impacts minimization alternatives. Alternative C.10 encompasses 8,345 square nm and is equal to 3.48% of the EEZ.

4.4.10.2 Minimization of Adverse Effects

Alternative C.10 would close areas to trawling (e.g. other gear types would be allowed).

For bottom trawls:

- the amount of habitat that would be protected where the sensitivity value is greater than 1.0 and recovery is in excess of 1 year is 1%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.0 and recovery is in excess of 3.0 years is 17%.

- the amount of habitat that would be protected where the sensitivity value is greater than 2.75 and recovery is in excess of 2.75 years is 6%.

4.4.10.3 Habitat for Individual Species/Life Stages

Habitat Table 4-15 shows the habitat of individual species/life stages that would be protected by this alternative. The information is presented for 168 separate species/life stage combinations. To simplify this information, we performed a frequency distribution. We chose four categories of amount of habitat protected; 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many species/life stage combinations fell into each category as presented below. This tells us how many species are affected by the alternative, and how much of their habitat would be protected.

For Alternative C.10: 11 species/life stage combinations would have 0% of their habitat protected; 148 species/life stage combinations would have up to 25% of their habitat protected; 9 species/life stage combinations would have up to 50% of their habitat protected; 0 species/life stage combinations would have up to 75% of their habitat protected; and 0 species/life stage combinations would have up to 100% of their habitat protected.

4.4.10.4 Habitat Types

Habitat Table 4-16 compares the amount of biogenic and substrate habitat types that would be protected by the alternatives. To simplify this information, we performed a frequency distribution. We chose four categories of amounts of substrate or biogenic habitat that would be protected: 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many substrate types or biogenic habitat types fell into each category as presented below. This tells us how many substrate types or biogenic habitat types are affected by the alternative, and how much of each would be protected. For uncategorized amounts, see habitat table 4-16.

In the Oregonian zoogeographic province (north of Point Conception, California), alternative C.10:

- 8 substrate habitat types would have 0% of their area protected; 15 substrate types would have up to 25% of their area protected; 3 habitat types would have up to 50% of their area protected; 0 habitat types would have up to 75% of their area protected; and 3 habitat types would have up to 100% of their area protected; and,

- estuary habitat, 34% of kelp, and 0% of seagrass would have 0% of their areas protected.

In the San Diego zoogeographic province (south of Point Conception, California), alternative C.10:

- 12 substrate habitat types would have 0% of their area protected; 11 substrate types would have up to 25% of their area protected; 3 habitat types would have up to 50% of their area protected; 0 habitat types would have up to 75% of their area protected; and 3 habitat types would have up to 100% of their area protected; and,

- estuary habitat, 1% of kelp, and 0% of seagrass would have 0% of their areas protected.

4.4.10.5 Summary of Environmental Consequences and Cumulative Impacts

Alternative C.10 would have overall positive effects on the ecosystem (E+). The alternative would fully protect habitat, and the ecosystem function it provides, from effects from bottom trawling but would allow effects from other bottom-tending gears. It is likely to have significant benefits, although non-fishing activities may reduce their effectiveness. Benefits to marine resources, such as insurance and spill-over, may be masked somewhat due to the potential for harvest from other gear types. It is also unclear at this time if permits that are purchased from active fishermen will be permanently retired or utilized by fishermen (i.e. by sale or lease of permit rights) who operate outside the closed area(s). If the permits are used, there may be some intensification of habitat effects to areas outside of the closed areas. If the permits are not used, the overall level of effect would be reduced. The cumulative effects of this alternative, in addition to all the factors described in Section 4.1.1.7, is positive because it would reduce use of bottom trawl gear that has the potential to adversely affect EFH.

4.4.11 Consequences of Alternative C.11: Relax Gear Endorsement Requirements

This alternative would allow fishers to choose gear types based on market conditions and may result in more "habitat-friendly" gears being chosen. Market conditions that may influence these decisions are described in section 4.7.3.11. Several changes in fleet structure are likely under this alternative. 1) DTS trawlers may switch to fixed gear during portions of the year to target sablefish, 2) shelf trawlers may switch to fixed gear during portions of the year to target sablefish, and 3) some fixed gear vessels may convert to trawling to target shelf flatfish.

Under this alternative, it is possible that total trawl effort would not change along the shelf. The catch per unit effort associated with fixed gear caught flatfish in combination with the price per pound for most flatfish species would tend to make it difficult for vessels to make a profit by using fixed gear to target flatfish along the shelf. Although total trawl effort may not change along the shelf (though the number of vessels may change), incentives may encourage fixed gear vessels to use trawl gear for targeting flatfish. This may not change total trawl effort since total effort on the shelf is constrained by rebuilding species and target species OYs, but the number of vessels trawling for flatfish may increase, thus reducing the pounds of flatfish harvest per vessel.

If DTS trawlers make more net revenue by using fixed gear, those vessels may use fixed gear during portions of the year. This would tend to reduce the amount of trawl effort along the slope. However, the inability of fixed gear to catch other DTS species relative to trawl gear may make it less profitable for some–or all–of these vessels to switch gear types if the reduction in catch of DTS species outweighs the benefits of the higher price for fixed gear sablefish.

Under this alternative, shelf flatfish trawlers may switch to fixed gear and target sablefish, thus increasing the number of vessels targeting sablefish and reducing available pounds per vessel. Depending on the opportunities afforded to fixed gear vessels that may switch to trawling during portions of the year. This alternative could have environmentally positive or negative effects because it is unpredictable if or how fishers will change gear types. The alternative is regarded as having Unknown effects (U).

4.4.12 Consequences of Alternative C.12: Close Ecologically Important Areas to Bottom Trawl

The following subsections, 4.4.12.1 through 4.4.12.5, describe the effects of alternative C.12 on marine habitat, the ecosystem, and marine resources.

4.4.12.1 Geographic Area

Habitat Table 4-9 compares the total geographic area of the impacts minimization alternatives. Alternative C.12 encompasses 235,115 square nm and is equal to 98.01% of the EEZ.

4.4.12.2 Minimization of Adverse Effects

Alternatives C.12 would close areas to bottom trawl (e.g. other gear types would be allowed).

For bottom trawls:

- the amount of habitat that would be protected where the sensitivity value is greater than 1.0 and recovery is in excess of 1 year is 100%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.0 and recovery is in excess of 3.0 years is 78%
- the amount of habitat that would be protected where the sensitivity value is greater than 2.75 and recovery is in excess of 2.75 years is 88%.

4.4.12.3 Habitat for Individual Species/Life Stages

Habitat Table 4-15 shows the habitat of individual species/life stages that would be protected by this alternative. The information is presented for 168 separate species/life stage combinations. To simplify this information, we performed a frequency distribution. We chose four categories of amount of habitat protected; 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many species/life stage combinations fell into each category as presented below. This tells us how many species are affected by the alternative, and how much of their habitat would be protected.

For Alternative C.12: 0 species/life stage combinations would have 0% of their habitat protected; 12 species/life stage combinations would have up to 25% of their habitat protected; 83 species/life stage combinations would have up to 50% of their habitat protected; 48 species/life stage combinations would have up to 75% of their habitat protected; and 25 species/life stage combinations would have up to 100% of their habitat protected.

4.4.12.4 Habitat Types

Habitat Table 4-16 compares the amount of substrate habitat types that would be protected by the alternatives. To simplify this information, we performed a frequency distribution. We chose four categories of amounts of substrate or biogenic habitat that would be protected: 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many substrate types or biogenic habitat types fell into each category as presented below. This tells us how many substrate types or biogenic habitat types are affected by the alternative, and how much of each would be protected. For uncategorized amounts, see habitat table 4-16.

In the Oregonian zoogeographic province (north of Point Conception, California), alternative C.12 protects:

- 0 substrate habitat types would have 0% of their area protected; 1-25% of 1 substrate types would have up to 25% of their area protected; 6 habitat types would have up to 50% of their area protected; 5 habitat types would have up to 75% of their area protected; and 17 habitat types would have up to 100% of their area protected; and,
- estuary habitat would have 87% of their area protected, kelp would have 69% of their area protected, and seagrass would have 87% of their area protected.

In the San Diego zoogeographic province (south of Point Conception, California), alternative C.12 protects:

- 0 substrate habitat types would have 0% of their area protected; 1 substrate type would have up to 25% of their area protected; 6 habitat types would have up to 50% of their area protected; 6 habitat types would have up to 75% of their area protected; and 16 habitat types would have up to 100% of their area protected; and,

- estuary habitat would have 69% of their area protected, kelp would have 92% of their area protected, and seagrass would have 96% of their area protected.

This alternative would also prohibit bottom trawling in the biogenic areas delineated by Oceana as described in Chapters 2 and 3. As of the publication of the DEIS, NMFS had not made a determination as to the reliability of scientific method used to calculate these areas. During the public comment period, the Council's Scientific and Statistical Committee reviewed the methodology and approved use of the information within this EIS (See Appendix D). The approved methodology indicates that alternative will provide significant protection of these organisms that are vulnerable to effect.

4.4.12.5 Summary of Environmental Consequences and Cumulative Impacts

Alternative C.12 would have overall positive effects on the ecosystem (E+). The alternative would fully protect habitat, and the ecosystem function it provides, from effects from bottom trawling but would allow effects from other bottom-tending gears. It is likely to have significant benefits although non-fishing activities may reduce their effectiveness. Benefits to marine resources, such as insurance and spill-over, may be masked somewhat due to the potential for harvest from other gear types. The alternative applies to areas that were chosen for their unique habitat features and as such provides protection to unique habitat types. The cumulative effects of this alternative, in addition to all the factors described in Section 4.1.1.7, is positive because it would reduce use of bottom trawl gear that has the potential to adversely affect EFH.

4.4.13 Consequences of Alternative C.13: Close Ecologically Important Areas to Bottom-contacting Gear

The following subsections, 4.4.13.1 through 0, describe the effects of alternatives C.13 on marine habitat, the ecosystem, and marine resources.

4.4.13.1 Geographic Area

Habitat Table 4-9 compares the total geographic area of the impacts minimization alternatives. Alternative C.13 encompasses 235,115 square nm and is equal to 98.01% of the EEZ.

4.4.13.2 Minimization of Adverse Effects

Alternatives C.13 would close areas to all bottom-contacting fishing gear.

For nets:

- the amount of habitat that would be protected where the sensitivity value is greater than 0.75 and recovery is in excess of 1.25 years is 90%.

- the amount of habitat that would be protected where the sensitivity value is greater than 1.2 and recovery is in excess of 1.0 years is 58%.

- the amount of habitat that would be protected where the sensitivity value is greater than 1.5 and recovery is in excess of 1.5 years is 87%.

For bottom trawls:

- the amount of habitat that would be protected where the sensitivity value is greater than 1.0 and recovery is in excess of 1 year is 100%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.0 and recovery is in excess of 3.0 years is 78%
- the amount of habitat that would be protected where the sensitivity value is greater than 2.75 and recovery is in excess of 2.75 years is 88%.

4.4.13.3 Habitat for Individual Species/Life Stages

Habitat Table 4-15 shows the habitat of individual species/life stages that would be protected by this alternative. The information is presented for 168 separate species/life stage combinations. To simplify this information, we performed a frequency distribution. We chose four categories of amount of habitat protected; 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many species/life stage combinations fell into each category as presented below. This tells us how many species are affected by the alternative, and how much of their habitat would be protected.

For Alternative C.13: 0 species/life stage combinations would have 0% of their habitat protected; 12 species/life stage combinations would have up to 25% of their habitat protected; 83 species/life stage combinations would have up to 50% of their habitat protected; 48 species/life stage combinations would have up to 75% of their habitat protected; and 25 species/life stage combinations would have up to 100% of their habitat protected.

4.4.13.4 Habitat Types

Habitat Table 4-16 compares the amount of biogenic and substrate habitat types that would be protected by the alternatives. To simplify this information, we performed a frequency distribution. We chose four categories of amounts of substrate or biogenic habitat that would be protected: 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many substrate types or biogenic habitat types fell into each category as presented below. This tells us how many substrate types or biogenic habitat types are affected by the alternative, and how much of each would be protected. For uncategorized amounts, see habitat table 4-16.

In the Oregonian zoogeographic province (north of Point Conception, California), alternative C.13 protects:

- 0 substrate habitat types would have 0% of their area protected; 1 substrate types would have up to 25% of their area protected; 6 habitat types would have up to 50% of their area protected; 5 habitat types would have up to 75% of their area protected; and 17 habitat types would have up to 100% of their area protected; and,
- estuary habitat would have 87% of their area protected, kelp would have 69% of their area protected, and seagrass would have 87% of their area protected.

In the San Diego zoogeographic province (south of Point Conception, California), alternative C.13 protects:

- 0 substrate habitat types would have 0% of their area protected; 1 substrate types would have up to 25% of their area protected; 6 habitat types would have up to 50% of their area protected; 6 habitat types would have up to 75% of their area protected; and 16 habitat types would have up to 100% of their area protected; and,

- estuary habitat would have 69% of their area protected, kelp would have 92% of their area protected, and seagrass would have 96% of their area protected.

This alternative would also prohibit bottom trawling in the biogenic areas delineated by Oceana as described in Chapters 2 and 3. As of the publication of the DEIS, NMFS had not made a determination as to the reliability of scientific method used to calculate these areas. During the public comment period, the Council's Scientific and Statistical Committee reviewed the methodology and approved use of the information within this EIS (See Appendix D). The approved methodology indicates that alternative will provide significant protection of these organisms that are vulnerable to effect.

4.4.13.5 Summary of Environmental Consequences and Cumulative Impacts

Alternative C.13 would have overall positive effects on the ecosystem (E+). The alternative would prohibit effects from all bottom-tending gears. It is likely to have significant benefits although non-fishing activities may reduce their effectiveness. Benefits to marine resources, such as insurance and spill-over, may be masked somewhat due to the potential for harvest from other gear types. The alternative has the added benefit of a long-term approach that would systematically prohibit effects in areas unless science develops sufficiently to demonstrate fishing would not create adverse habitat effects. The alternative applies to areas that were chosen for their unique habitat features and as such provides protection to unique habitat types. The cumulative effects of this alternative, in addition to all the factors described in Section 4.1.1.7, is positive because it would reduce use of trawl gears that have the potential to adversely affect EFH.

4.4.14 Consequences of Alternative C.14: Close Ecologically Important Areas to Fishing

The following subsections, 4.4.14.1 through 0, describe the effects of alternative C.14 through C.6 on marine habitat, the ecosystem, and marine resources.

4.4.14.1 Geographic Area

Habitat Table 4-9 compares the total geographic area of the impacts minimization alternatives. Alternative C.14 encompasses 235,115 square nm and is equal to 98.01% of the EEZ.

4.4.14.2 Minimization of Adverse Effects

Alternatives C.14 would close areas to all fishing.

For nets:

- the amount of habitat that would be protected where the sensitivity value is greater than 0.75 and recovery is in excess of 1.25 years is 90%.
- the amount of habitat that would be protected where the sensitivity value is greater than 1.2 and recovery is in excess of 1.0 years is 58%.
- the amount of habitat that would be protected where the sensitivity value is greater than 1.5 and recovery is in excess of 1.5 years is 87%.

For bottom trawls:

- the amount of habitat that would be protected where the sensitivity value is greater than 1.0 and recovery is in excess of 1 year is 100%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.0 and recovery is in excess of 3.0 years is 78%
- the amount of habitat that would be protected where the sensitivity value is greater than 2.75 and recovery is in excess of 2.75 years is 88%.

4.4.14.3 Habitat for Individual Species/Life Stages

Habitat Table 4-15 shows the habitat of individual species/life stages that would be protected by this alternative. The information is presented for 168 separate species/life stage combinations. To simplify this information, we performed a frequency distribution. We chose four categories of amount of habitat protected; 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many species/life stage combinations fell into each category as presented below. This tells us how many species are affected by the alternative, and how much of their habitat would be protected.

For Alternative C.14: 0 species/life stage combinations would have 0% of their habitat protected; 12 species/life stage combinations would have up to 25% of their habitat protected; 83 species/life stage combinations would have up to 50% of their habitat protected; 48 species/life stage combinations would have up to 75% of their habitat protected; and 25 species/life stage combinations would have up to 100% of their habitat protected.

4.4.14.4 Habitat Types

Habitat Table 4-16 compares the amount of biogenic and substrate habitat types that would be protected by the alternatives. To simplify this information, we performed a frequency distribution. We chose four categories of amounts of substrate or biogenic habitat that would be protected: 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many substrate types or biogenic habitat types fell into each category as presented below. This tells us how many substrate types or biogenic habitat types are affected by the alternative, and how much of each would be protected. For uncategorized amounts, see habitat table 4-16.

In the Oregonian zoogeographic province (north of Point Conception, California), alternative C.14 protects:

- 0 substrate habitat types would have 0% of their area protected; 1 substrate types would have up to 25% of their area protected; 6 habitat types would have up to 50% of their area protected; 5 habitat types would have up to 75% of their area protected; and 17 habitat types would have up to 100% of their area protected; and,
- estuary habitat would have 63% of their area protected, kelp would have 63% of their area protected, and seagrass would have 63% of their area protected.

In the San Diego zoogeographic province (south of Point Conception, California), alternative C.14 protects:

- 0 substrate habitat types would have 0% of their area protected; 1 substrate types would have up to 25% of their area protected; 6 habitat types would have up to 50% of their area protected; 6 habitat types would have up to 75% of their area protected; and 16 habitat types would have up to 100% of their area protected; and,

- estuary habitat would have 63% of their area protected, kelp would have 63% of their area protected, and seagrass would have 63% of their area protected.

This alternative would also prohibit bottom trawling in the biogenic areas delineated by Oceana as described in Chapters 2 and 3. As of the publication of the DEIS, NMFS had not made a determination as to the reliability of scientific method used to calculate these areas. During the public comment period, the Council's Scientific and Statistical Committee reviewed the methodology and approved use of the information within this EIS (See Appendix D). The approved methodology indicates that alternative will provide significant protection of these organisms that are vulnerable to effect.

4.4.14.5 Summary of Environmental Consequences and Cumulative Impacts

Alternative C.14 would prohibit all gear types in closed areas and would have overall positive effects on marine habitat, the ecosystem, and marine resources (E+). Habitat, and the ecosystem functions it provides, would be fully protected from fishing effects although the potential for effects from non-fishing activities exists. Because there would be no harvest of marine resources, the alternative has the potential to function as insurance from catastrophic environmental events and management failure. There is also the possibility that marine resources, such as groundfish, will attain a full age structure including highly productive older females, and will provide positive spill over effects to areas that are open to fishing. The alternative applies to areas that were chosen for their unique habitat features and as such provides protection to unique habitat types. The cumulative effects of this alternative, in addition to all the factors described in Section 4.1.1.7, is positive because it would reduce use of fishing gears that have the potential to adversely affect EFH.

4.4.15 Consequences of the Final Preferred Alternative to Minimize Adverse Fishing Effects to EFH on Marine Habitat, the Ecosystem, and Marine Resources

The final preferred alternative to minimize adverse fishing effects to EFH incorporates components of Alternatives C.2, C.4, C.7, C.9, C.10, C.12, and C.13. The final preferred alternative represents a significant change from the status quo under which there are no measures in place for the specific purpose of minimizing adverse fishing effects on EFH.

4.4.15.1 Geographic Area Protected by the Final Preferred Alternative

Habitat Table 4-9 compares the total geographic area of the impacts minimization alternatives. The final preferred alternative encompasses 196,032 square nm and is equal to 82% of the EEZ in addition to areas shoreward. The final preferred alternative includes 52 ecologically important areas as well as gear restrictions. Habitat Table 4-13 compares these ecologically important areas by area, including percent of the EEZ.

4.4.15.2 Minimization of Adverse Effects by the Final Preferred Alternative

The component of the final preferred alternative intended to minimize the adverse effects of fishing on groundfish EFH comprises management measures in three categories: (1) gear modifications, (2) closed areas, and (3) promotion of reductions in fishing effort.

Gear Modifications and Prohibitions

The preferred alternative includes the following gear modifications and prohibitions:

- Prohibit bottom trawl roller gear with a footrope diameter greater than 19 inches on bottom trawl gear throughout the EEZ and state waters seaward of the shoreline (modification of Alternative C.9.1).

- Prohibit bottom trawl roller gear with a footrope diameter greater than eight inches eastward of a line approximating the 100 fathom depth contour (modification of Alternative C.2.1).
- Prohibit dredge gear (Alternative C.9.5).
- Prohibit beam trawl gear throughout the EEZ and state waters seaward of the shoreline (Alternative C.9.6).

Habitat Table 4-14 lists the gear restrictions within the 52 ecologically important areas included in the final preferred alternative.

Restrictions in state waters may be implemented by state law, as appropriate. Although dependent on state regulation, the restrictions on dredge and beam trawl gear are not intended to apply in internal waters (Puget Sound, San Francisco Bay, etc.).

Closed Areas

The final preferred alternative contains two types of closed areas: a "trawl footprint" closure and ecologically important closed areas.

<u>Footprint Closure</u>: This component of the preferred alternative is a modification of the trawl footprint closure described under Alternatives C.4 and C.12. Under those alternatives, areas that were not trawled from 2000 to 2003 would be permanently closed to bottom trawl. The final preferred alternative closes depths greater than 700 fathoms to bottom trawl.

<u>Ecologically Important Closed Areas</u>: This component of the preferred alternative is a modification and combination of Alternative C.7, C.10, C.12, and C.13. Closure types within these ecologically important areas included under the preferred alternative are listed in Habitat Table 4-14. The preferred alternative also includes a new procedural element that was not described in the DEIS, applicable to areas closed to bottom trawl, which would allow reconsideration of these areas upon the receipt of new scientific information. Ecologically important closed areas are sited shoreward of 700 fathoms in the area not already closed to bottom trawl with the footprint closure and include areas closed to bottom trawl, all bottom-contacting gear types, or all fishing gear.

Effort Reduction

The final preferred alternative incorporates the element of Alternative C.10 involving public-private partnerships under which private funds are used to purchase groundfish limited entry trawl licensees by adding language to the FMP by amendment. The proposed language notes the Council will support such efforts, as feasible, through their consideration of actions upon which the execution of contracts may be contingent.

Minimization of Adverse Effects

To analyze the expected performance of the alternative in minimizing adverse fishing effects, a GIS-based methodology is utilized for this EIS. The alternatives, including the final preferred alternative, are overlaid with the sensitivity and recovery information developed through the Risk Assessment in Appendix A and the amount of habitat for each is calculated as a percentage of the whole. This provides a measure of the relative amount of habitat that is protected from fishing effects which is comparable among the alternatives.

Sensitivity values for each habitat type/fishing gear combination are resolved to a 4-point scale that represents direct change to habitat and biodiversity as a result of fishing. The sensitivity of habitat is indexed as follows:

0 = No detectable adverse effects on the seabed; i.e. no significant differences between effect and control areas in any metrics.

1 = Minor effects such as shallow furrows on bottom; small differences between effect and control sites, less than 25% in most measured metrics.

2 = Substantial changes such as deep furrows on bottom; differences between effect and control sites 25-50% in most metrics measured.

3 = Major changes in bottom structure such as re-arranged boulders; large losses of many organisms with differences between effect and control sites greater than 50% in most measured metrics.

Habitat Table 4-22 compares the relative amount of habitat sensitivity and recovery. To simplify the large amount of information for the analyses of individual alternatives, dredge gear is not discussed, as it is not currently used off the West Coast. Pot, trap, and hook and line gear have maximum sensitivity and recovery values of 0.8, which are considered minimal, so are excluded from the discussion as well. The information for these gears is available in Habitat Table 4-22 and 4-23.

Nets are discussed in the analyses of individual alternatives for sensitivity values of 0.75 or larger, where recovery time is greater than 1.25 years. Bottom trawl is discussed for sensitivity values of 1.0 or larger, where recovery time is greater than or equal to 1 year. To further assist the reader to comprehend the large volume of information from the Habitat Tables, groupings are made at reasonable combinations of sensitivity and recovery levels.

For dredge:

- the amount of habitat that would be protected where the sensitivity value is greater than 1.0 and recovery is in excess of 1 year is 45%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.0 and recovery is in excess of 2 years is 0%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.9 and recovery is in excess of 4.05 years is 0%.

For bottom trawls:

- the amount of habitat that would be protected where the sensitivity value is greater than 1.0 and recovery is in excess of 1 year is 100%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.0 and recovery is in excess of 3.0 years is 6%.
- the amount of habitat that would be protected where the sensitivity value is greater than 2.75 and recovery is in excess of 2.75 years is 58%.

For nets:

- the amount of habitat that would be protected where the sensitivity value is greater than 0.75 and recovery is in excess of 1.25 years is 0%.
- the amount of habitat that would be protected where the sensitivity value is greater than 1.2 and recovery is in excess of 1.0 years is 37%.
- the amount of habitat that would be protected where the sensitivity value is greater than 1.5 and recovery is in excess of 1.5 years is 53%.

For pot/trap:

- the amount of habitat that would be protected where the sensitivity value is greater than 0.3 and recovery is in excess of 0.05 years is 36%.
- the amount of habitat that would be protected where the sensitivity value is greater than 0.4 and recovery is in excess of 0.4 years is 51%.
- the amount of habitat that would be protected where the sensitivity value is greater than 0.8 and recovery is in excess of 0.8 years is 6%.

For hook and line:

- the amount of habitat that would be protected where the sensitivity value is greater than 0.2 and recovery is in excess of 0.2 year is 100%.
- the amount of habitat that would be protected where the sensitivity value is greater than 0.3 and recovery is in excess of 0.3 year is 57%.
- the amount of habitat that would be protected where the sensitivity value is greater than 0.8 and recovery is in excess of 0.8 year is 6%.

4.4.15.3 Habitat for Individual Species/Life Stages Protected by the Final Preferred Alternative

Each alternative is analyzed for the extent to which it protects habitat for individual species/life stages of groundfish. This is accomplished through a GIS-based analysis in which the alternatives are overlaid with spatial profiles of suitable habitat for 168 individual species/life stages (out of 382 possible species life stage combinations, data is available for 168). A full discussion of how suitable was profiled is contained in the Risk Assessment (Appendix A).

Habitat Table 4-15 shows the habitat of individual species/life stages that would be protected by the final preferred alternative. The information is presented for 168 separate species/life stage combinations. To simplify this information, we performed a frequency distribution. We chose four categories of amount of habitat protected; 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many species/life stage combinations fell into each category as presented below. This tells us how many species are affected by the alternative, and how much of their habitat would be protected.

The final preferred alternative would protect: 0 species/life stage combinations would have 0% of their habitat protected; 124 species/life stage combinations would have up to 25% of their habitat protected; 44 species/life stage combinations would have up to 50% of their habitat protected; 0

species/life stage combinations would have up to 75% of their habitat protected; and 0 species/life stage combinations would have up to 100% of their habitat protected.

4.4.15.4 Habitat Types Protected by the Final Preferred Alternative

Habitat Table 4-16 compares the amount of biogenic and substrate habitat types that would be protected by the final preferred alternative. To simplify this information, we performed a frequency distribution. We chose four categories of amounts of substrate or biogenic habitat that would be protected: 1-25%, 26-50%, 51-75%, and 76-100%. We then determined how many substrate types or biogenic habitat types fell into each category as presented below. This tells us how many substrate types or biogenic habitat types are affected by the alternative, and how much of each would be protected. For uncategorized amounts, see habitat table 4-16.

In the Oregonian zoogeographic province (north of Point Conception, California), the final preferred alternative to minimize adverse fishing effects to EFH protects:

- 1 substrate habitat types would have 0% of their area protected; 2 substrate types would have up to 25% of their area protected; 5 habitat types would have up to 50% of their area protected; 6 habitat types would have up to 75% of their area protected; and 15 habitat types would have up to 100% of their area protected; and,

- estuary habitat would have 0% of their area protected, kelp would have 4% of their area protected, and seagrass would have 0% of their area protected.

In the San Diego zoogeographic province (south of Point Conception, California), the final preferred alternative to minimize adverse fishing effects to EFH protects:

- 1 substrate habitat types would have 0% of their area protected; 5 substrate types would have up to 25% of their area protected; 6 habitat types would have up to 50% of their area protected; 6 habitat types would have up to 75% of their area protected; and 11 habitat types would have up to 100% of their area protected; and,

- estuary habitat would have 0% of their area protected, kelp would have 6% of their area protected, and seagrass would have 12% of their area protected.

4.4.15.5 Qualitative Assessment of Each Component of the Final Preferred Alternative for Impacts Minimization

Gear Modifications and Prohibitions

The preferred alternative includes the following gear modifications and prohibitions:

Prohibit bottom trawl roller gear with a footrope diameter greater than 19 inches on bottom trawl gear throughout the EEZ (modification of Alternative C.9.1).

The benefits to habitat from prohibition of bottom trawl roller gear with a footrope diameter greater than 19 inches on bottom trawl gear throughout the EEZ can only be qualitatively assessed due to a lack of experimental data. It is widely held however that large roller gear (e.g. 19 inches and greater) allow trawlers to access more sensitive habitats. This premise is upheld by an OSU study that showed a potential redistribution of the trawl fishery away from rocky areas after implementation of regulations that prohibited large footrope gear in certain portions of the EEZ (Bellman 2004). Prohibition of roller gear would likely protect such habitats by making them inaccessible to trawlers; however, the benefit of prohibiting 19" roller gear versus 8" is not clear. It is likely that no immediate benefit would result from this option because the gear is not widely used, if at all. The prohibition may however, prevent future access to sensitive habitats by trawlers with economic incentive to convert to larger footrope gear and for this reason is regarded as environmentally positive (E+).

Prohibit bottom trawl roller gear with a footrope diameter greater than eight inches eastward of a line approximating the 100 fathom depth contour (modification of Alternative C.2.1).

Prohibition of bottom trawl roller gear with a footrope diameter greater than eight inches eastward of a line approximating the 100 fathom depth contour creates gear restrictions that would have an overall positive effect on habitat, the ecosystem, and marine resources (E+). Prohibitions on large footrope trawl gear included under the final preferred alternative would likely have the effect of removing trawl effects from rocky habitats (Bellman 2004).

Prohibit dredge gear (Alternative C.9.5).

Although dredge gear is not currently utilized on the West Coast, the prohibition of dredge gear under the final preferred alternative is regarded as environmentally positive in that it would eliminate the possibility of it happening in the future (E+). Additional information on the environmental consequences of prohibiting dredge gear can be found in Section 4.4.9.9.

Prohibit beam trawl gear (Alternative C.9.6).

Limitations in direct scientific observation of beam-trawl effects allows only for a qualitative analysis of the predicted effects of the prohibition of beam trawl gear within the final preferred alternative. For purposes of the analysis, beam trawl is assumed to have similar effects to standard bottom trawl gear that rates relatively high in potential effect among all the gear types. Additional information on the environmental consequences of prohibiting beam trawl gear can be found in Section 4.4.9.11. A prohibition on beam trawl gear would likely result in reduced physical modification to bottom habitat and associated loss in benthic biodiversity and is therefore regarded as environmentally positive (E+).

Closed Areas

The final preferred alternative contains two types of closed areas: a “trawl footprint” closure and ecologically important closed areas. Maps of these areas can be found at Figures 4-1 through 4-6

Ecologically Important Closed Areas:

This component of the preferred alternative is a modification of Alternative C.10, C.12, and C.13. It also includes a new procedural element that was not described in the DEIS. It is similar to Alternative B.9, but applicable to areas closed to bottom trawl. The selection of the specific areas included in the final preferred alternative occurred through a collaborative process involving Oceana; groundfish trawl fishermen, organized by the Fishermen’s Marketing Association; the Fisheries Heritage Group, bringing together harbor managers, the Nature Conservancy, Environmental Defense, the Center for Future Oceans, and fisheries representatives; Council advisory bodies; and West Coast states. As noted above, Oceana developed Alternative C.12 and the Council incorporated it into the DEIS. During the public comment period Oceana worked to modify the proposal they had developed based on new information they had gathered. At the same time, the Fishermen’s Marketing Association developed a proposal for areas to be closed to bottom trawl that represented areas similar to those identified by Oceana but excluding areas judged by fishermen to be important fishing grounds. The Fisheries Heritage Group engaged in a similar exercise on the Central

> California coast, identifying three areas between Monterey and Point Conception. All three groups submitted their proposals as part of public comment on the DEIS. During the June 2005 Council meeting, when the Council identified their preferred alternative, these groups worked with the Council's Groundfish Management Team and other state and federal officials to craft a joint proposal that best met their differing objectives. By combining the perspectives of these groups, the final preferred alternative is intended to be a practicable measure that balances the mandate to conserve EFH while taking into account the effects on fishing communities (as required by MSA National Standard 8).

The final preferred alternative incorporates the element of Alternative C.10 involving public-private partnerships under which private funds are used to purchase groundfish limited entry trawl licensees by adding language to the FMP by amendment. The proposed language notes the Council will support such efforts, as feasible, through their consideration of actions upon which the execution of contracts may be contingent.

4.4.15.6 Summary of Cumulative Effects of the Final Preferred Alternative on Habitat, the Ecosystem, and Marine Resources

The final preferred alternative represents a significant change from the status quo under which there are no measures in place to minimize adverse fishing effects on EFH. Under the final preferred alternative, a combination of gear restrictions, effort reduction, and closed areas would be implemented to protect a broad range of habitat types, species, and provide protection over both the Oregonian and San Diego zoographic provinces and is considered Environmentally Positive (E+). The cumulative effects of this alternative, in addition to all the factors described in Section 4.1.1.7, is positive because it would reduce use of bottom trawl gear that has the potential to adversely affect EFH.

4.5 Consequences of the Alternatives for Research and Monitoring (Alternatives D.1-D.4)

Environmental consequences of the Alternatives for Research and Monitoring (Alternatives D.1-D.4) can be found in the following sections: Section 4.5.1 through 4.5.4. Section 4.5.5 provides analysis of the environmental consequences of the Final preferred alternative for research and monitoring.

4.5.1 Consequences of Alternative D.1 (No Action)

This section provides an overview of the status of habitat-related research and monitoring on the West Coast.

4.5.1.1 Habitat and Associated Biological Research

The Risk Assessment involved a data consolidation phase in which the best available ecological, environmental, and fisheries information was reviewed and incorporated into appropriate databases, in consultation with scientific advisory committees and agency scientists. Specific information assembled into a GIS and applied to the identification and description of EFH alternatives includes West-coastwide distributions of:

- Benthic substratum types (including maps on data quality in some areas)
- Estuaries
- Canopy kelp
- Seagrasses

- Bathymetry
- Latitude

Also considered in identifying and describing EFH alternatives were data on:

- Presence/absence distribution of some structure-forming invertebrates
- A general description of pelagic habitats
- Associations among groundfish and benthic substratum types

The ultimate goal is to delineate EFH in terms of its contribution to rates of growth, reproduction, survival, and production of the diverse group of groundfishes on the West coast. Currently, our understanding of EFH for many of these groundfish species is based on the distribution of presence/absence data on late-juvenile and adult stages of the fishes and their associated habitats; data on habitat-specific densities is available for only a few species, and there is fewer data to evaluate habitat-specific productivity. Until the late 1980s/early 1990s, surveys of benthic marine habitats and associated groundfishes largely were limited to subtidal (<30 m water depth) observations (primarily by SCUBA), while most of the West coast groundfish species and fisheries occur in deeper water. Assessing attributes and functions of EFH remains especially difficult in deep-water marine environments because of these assessments require advanced and expensive technology such as remotely operated vehicles, manned submersibles, and other types of remote sensing devices.

There is a critical need for comprehensive, detailed, and accurate information on benthic habitats and associated groundfish assemblages on spatial scales relevant to fishery management and habitat protection. Development of more efficient and effective visual and acoustic methods to survey deepwater benthic habitats and fishes is ongoing, especially in complex, diverse habitats that are difficult to assess with conventional survey tools. Additionally, core nursery grounds and spawning areas, both benthic and pelagic, need to be identified for fully-informed protection of these areas to be considered. There also is a critical need to understand the relationship between large climate events and abundance, growth, spawning success, and survival of groundfish species.

Currently there are several efforts underway to create maps of seafloor habitats on the West coast, including those used here to identify EFH alternatives. These efforts have been facilitated by the development of a unifying seafloor classification system for benthic habitats (Greene et al. 1999, 2003). While these efforts represent the first delineation of rocky and unconsolidated seafloor substrata, they are just the first step in describing, quantifying, and understanding benthic habitats throughout the entire range of groundfish species on the West coast. These databases and maps currently are considered preliminary because of varying levels of data quality and verification (ground-truthing), as well as the limited spatial coverage of some of the information. Detailed mapping of groundfish habitat has been accomplished in relatively few important areas, such as offshore banks of the Southern California Bight, Monterey Bay, California, and Heceta Bank, Oregon, and is slowly being extended to other areas of the Coast. It is absolutely imperative that the databases and maps be revised and improved on a regular schedule as new information is collected, and that these valuable baseline habitat maps be maintained and made easily accessible to the greater marine resources community. These data are critical not only in the identification of EFH but in comparative risk assessment of anthropogenic impacts (e.g., fishing gears; pollution; dredging; etc.) to these habitats.

From past research we know that settled juveniles and adults of many species of groundfishes, rockfishes in particular, are difficult (or impossible) to accurately appraise with traditional survey methodologies such as surface-based fishing and acoustic gear. This is due to the close association between many of these species and their rugged, rocky heterogeneous habitats. Consequently, alternative techniques, using laser line systems and direct observations along quantitative transects conducted from submersibles in various habitats, are being developed to improve assessments over untrawlable habitats, characterize and conserve deep-water habitats, assist in designing and evaluating Marine Protected Areas, and track the recovery for some groundfish species. This approach is especially critical when focusing on benthic habitats of extreme heterogeneity and biological assemblages of high diversity.

Identifying EFH for pelagic groundfish life history stages is a critical line of research that is largely absent in the EFH assessment of alternatives. New technologies, such as airborne LIDAR, are being developed to identify near-surface pelagic stages of some species. Coastwide collection and modeling of relevant information, such as the multi-decadal databases developed from CalCOFI surveys of fish eggs and larvae and from mid-water surveys of newly recruited groundfishes and associated physical oceanographic aspects of habitat (i.e. temperature and salinity from shipboard and satellite remote sensing), are ongoing efforts to better understand the relationship between the structure and function of pelagic habitats and the recruitment, survival, and productivity of managed fish species. Enhanced oceanographic monitoring systems are being developed to meet the need to understand species and climate/ocean interactions in modifying groundfish production.

Research on the distribution and function of structure-forming invertebrates, particularly as components of EFH for groundfish, is just beginning. Only since December 2003 did scientific and technical information on presence/absence distribution and habitat associations of some of these species become available for inclusion in this EIS. Ongoing research includes the systematics, distribution, and abundance of structure-forming invertebrates (particularly corals, sponges, anemones, sea pens, etc.) in deep water. A critical need is to understand the potential role of these species as groundfish EFH in continental shelf and slope ecosystems. Because these large invertebrates enhance the diversity and structural component of fish habitat and are vulnerable to impacts by at least some fisheries, they may signify HAPC.

4.5.1.2 Research on Anthropogenic Impacts to EFH

The evaluation of anthropogenic impacts to EFH in this EIS was based on sensitivity indices of various types of benthic habitats to disturbance or influence by various types of fishing gears, and on rates of recovery from such disturbances. These indices and rates were estimated from limited information, much of which derived from studies conducted outside our West coast region of interest.

Research on impacts of fishing to groundfish habitat should include objectives to improve our understanding of the ecological effects of fishing on the biodiversity and trophodynamics of ecosystems, the evaluation of gear impacts to marine benthic habitats on the shelf and slope, and the development of ways to reduce adverse impacts, including the use of marine protected areas, modified fishing gear, and bycatch information. To date, the best available science on fishing impacts to benthic habitats is limited to observations of modification to some physical components of habitats and associated changes in biodiversity. Understanding functional impacts (i.e. how physical modification of the ecosystem effects groundfish productivity) begins with the baseline characterization and cataloging of habitats that is described in this document.

Some critical research needs related to fishing impacts and groundfish populations include:

- estimating rates of impacts of specific fishing gears on the diverse habitat types found on the West coast;
- estimating the rates of habitat recovery from both chronic and acute disturbances;

- quantifying population and ecosystem effects resulting from fishing impacts;
- describing trophodynamic changes related to fishing impacts;
- evaluating the role of MPAs in management of fisheries and habitats; and
- evaluating the influence of MPAs on production, rebuilding, and long term sustainability of groundfish.

4.5.2 Consequences of Alternative D.2 (Expanded Logbook Program)

Currently, groundfish limited entry trawl vessels are required to record information on the time and location of fishing activities, along with estimates of catch composition, in a logbook. Some of these data are entered into the Pacific Fisheries Information Network (PacFIN) data system and may be accessed by managers. Information on fishing location, albeit limited because only tow set positions have been entered into the database, has proved invaluable to managers. Tow haul positions are now being incorporated into the database as well, to provide additional spatial information on fishing location. Knowing the spatial distribution of fishing effort is especially important to an evaluation of the effects of fishing on EFH. One of the most important data gaps hampering the full development of the fishing impacts model component of the comprehensive risk assessment has been the paucity of this kind of information. Under this alternative vessels in all commercial sectors, including recreational charter (for hire) boats, will participate in an expanded logbook program.

> **Option D.2.1**: All fishing vessels maintain a logbook, recording information on fishing time, location, and catch composition similar to the current trawl logbook program.
>
> **Option D.2.2**: A representative, random sample of all fishing vessels is required to maintain logbooks, gathering the information described above.

Both options are regarded as Environmentally Positive (E+) with D.2.1 being slightly more so due to the potential for it to reduce scientific uncertainty associated with random sampling.

4.5.3 Consequences of Alternative D.3 (Expanded VMS Program)

Combining VMS data with logbook and observer data would likely result in a more complete picture of fishing activities, although information contained in observer data is not currently used in regard to monitoring or reviewing fishing location or effort. The key piece of information provided by VMS would be a higher resolution track line of a trawl or fixed gear set. In the past, PacFIN records only included trawl set positions; this limits the ability to determine precisely where fishing impacts have occurred. For example, in the Risk Assessment, information on set positions from logbooks was generalized to ten-minute by ten-minute blocks because of uncertainty about the track line of the trawls. This was one of the considerations that led the SSC not to approve the fishing impact model component of the Risk Assessment. The Council and NMFS have also been considering expanding the VMS program to additional sectors to, among other uses, monitor and evaluate the effects of fishing on groundfish habitat. This alternative is regarded as Environmentally Positive (E+) as it would foster a more complete, and less uncertain, understanding of where habitat impacts are occurring.

4.5.4 Consequences of Alternative D.4 (Research Reserve System)

If fishing is restricted in specific areas to minimize fishing impacts on habitat, some of those areas could be used to measure the length of time needed for habitat features and function to recover. Over time these sites could also be compared with sites where fishing is ongoing in order to research the effects of fishing. This alternative will establish a system of research reserves within closed areas established as part of any of the fishing impacts minimization alternatives. These research reserves will help to focus research efforts. By encouraging research in a discrete set of reserve areas, results can be more easily compared. A reserve system could include a representative sample of habitat types in order to allow comparison of the effects of fishing across these different types. This alternative is regarded as Environmentally Positive (E+).

4.5.5 Consequences of the Final Preferred Alternative for Research and Monitoring

The final preferred alternative for research and monitoring incorporates components of D-2, D.3, and D.4. A complete analysis of the environmental consequences of these alternatives is included in Section 4.4.9 through 4.4.14. The final preferred alternative is considered Environmentally Positive (E+).

4.6 Consequences of the Alternatives on Protected Species

The following sub-section 4.6.1 through4.6.4, examines interactions between protected species and groundfish fisheries under the alternatives being considered in this EIS.

4.6.1 Effects on Pacific Salmon

NMFS prepared a Biological Opinion (BO) in 1992 that analyzed the effects of the West Coast groundfish fishery on salmon stocks listed under the ESA established limits to bycatch of chinook salmon. Currently the limit is set at 0.05 chinook salmon per metric ton of Pacific whiting, with an associated total catch of 11,000 chinook for the coastwide Pacific whiting fishery. This BO was subsequently reviewed and the allowable chinook catch level reaffirmed in 1993, 1996 and 1999 and is currently under review for 2005.

The BO also requires the Council to provide for monitoring of salmon bycatch in the midwater trawl fishery for whiting, but not in the bottom trawl fishery for groundfish. Currently, this monitoring requirement is based on not jeopardizing the existence of listed salmon species, including the Snake River fall chinook, lower Columbia River chinook, upper Willamette River chinook, and Puget Sound chinook. At present, the at-sea whiting fishery has 100% observer coverage. In recent years, a cooperative voluntary effort between the fishing industry and management agencies has been implemented to facilitate observer coverage and collect information on directed whiting landings at shoreside processing plants. Participating vessels are issued Exempted Fishing Permits (EFPs), which allow vessels to land unsorted catch at designated processing plants. Permitted vessels are not penalized for landing prohibited species, including Pacific salmon, nor are they held liable for overages of groundfish trip limits. In 2003, 99% of the whiting catch by the shoreside fishery was landed under an EFP.

The EFH and HAPC alternatives are not likely to adversely affect salmon or adversely modify critical habitat; or, if the alternatives result in improved habitat conditions the effect would be Environmentally Positive (E+). The impacts minimization alternatives may result in geographic redistribution of fisheries that could have positive, negative, or no effects on salmon. It is not possible to say how the fishery would redistribute under closed area or gear restriction alternatives and therefore the effects to salmon are considered Unknown (U).

The final preferred alternative incorporates components of the original alternatives. Therefore the effects on salmon for the final preferred EFH and HAPC alternative are Environmentally Positive (E+) and the effects to salmon from the preferred impacts minimization alternative are Unknown (U).

4.6.2 Effects on Seabirds

Interactions between seabirds and fishing operations are wide-spread and have led to conservation concerns in many fisheries throughout the world. Abundant food in the form of offal (discarded fish and fish processing waste) and bait attract birds to fishing vessels. Of the gear used in the groundfish fisheries in the North Pacific, seabirds are occasionally taken incidentally by trawl and pot gear, but they are most often taken by longline gear. Around longline vessels, seabirds forage for offal and bait that has fallen off hooks at or near the water’s surface, and are attracted to baited hooks near the water’s surface, during the setting of gear. If a bird becomes hooked while feeding on bait or offal, it can be dragged underwater and drowned.

Besides entanglement in fishing gear, seabirds may be indirectly affected by commercial fisheries in various ways. Change in prey availability may be linked to directed fishing and the discarding of fish and offal. Vessel traffic may effect seabirds when it occurs in and around important foraging and breeding habitat and increases the likelihood of bird strikes. In addition, seabirds may be exposed to at-sea garbage dumping and the diesel and other oil discharged into the water associated with commercial fisheries.

In the West Coast groundfish fisheries, groundfish observers collect information on interactions between seabirds and groundfish fisheries. Catcher-processors and motherships participating in the Pacific whiting fishery have had full observer coverage since the mid-1970s. The non-whiting portion of the groundfish fishery has had observer coverage only since the fall of 2001. Between September 2001 and October 2002, approximately 10% of the coastwide limited entry trawl landed weight and 30% of the limited entry fixed gear landed weight was observed.

The incidental take of seabirds by the at-sea whiting fleet is rare and infrequent. The species that have been taken by the at-sea whiting fleet include black-footed albatross, northern fulmar, and unidentified puffin. In the limited entry groundfish fisheries, very few interactions with seabirds have been observed.

In response to increased national concern about the incidental take of seabirds, NMFS, USFWS, and the Department of State collaborated in 2001 to develop the U.S. *National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries*. The purpose of this plan is to provide national-level policy guidance on reducing the incidental take of seabirds in U.S. longline fisheries and to require NMFS, in cooperation with USFWS, to conduct an assessment of all U.S. longline fisheries to determine whether an incidental take problem exists. Using the West Coast Groundfish Observer Program’s first year of data, NMFS drafted a preliminary assessment of seabird interactions with the groundfish longline fleet in 2003. There were no incidental takes of seabirds by longline vessels documented by NMFS groundfish observers during September 2001 to October 2002; however, a number of interactions between seabirds and longline vessels were observed (see Table 4.3.8). Additionally, this National Plan of Action further requires NMFS, in cooperation with USFWS, to work through the regional fishery management council process in partnership with longline fishery representatives to develop and implement mitigation measures in those fisheries where the incidental take of seabirds is a problem. Therefore, NMFS will continue to work with the

USFWS to better understand the interactions between seabirds and the groundfish fisheries and evaluate the need for seabird incidental take mitigation and management measures.

In order to predict the effects of the bycatch reduction alternatives on West Coast seabird populations, it is important to have knowledge of the distribution, intensity, and duration of fishing effort associated with the groundfish fisheries. This information is currently unavailable for the groundfish fleet.

NMFS prepared a Biological Opinion in 1990 that concluded the groundfish fisheries are not likely to jeopardize the continued existence of listed seabirds. The EFH and HAPC alternatives are not likely to have an effect on seabirds; or, if the alternatives result in improved habitat conditions the effect would be Environmentally Positive (E+). The effect of the impacts minimization alternatives on seabirds (listed and non-listed) may be negative if fishing effort intensifies in areas where seabirds congregate. However, the effects of the alternatives on effort displacement are not predictable and the effects of the alternatives are Unknown (U).

The final preferred alternative incorporates components of the original alternatives. Therefore the effects on seabirds for the final preferred EFH and HAPC alternative are Environmentally Positive (E+) and the effects to seabirds from the preferred impacts minimization alternative are Unknown (U).

4.6.3 Effects on Marine Mammals

NMFS prepared a Biological Opinion in 1990 that concluded the groundfish fisheries are not likely to jeopardize the continued existence of listed marine mammals. The EFH and HAPC alternatives are not likely to have an effect on marine mammals; or, if the alternatives result in improved habitat conditions the effect would be Environmentally Positive (E+). The effect of the alternatives on marine mammals may be negative if fishing effort intensifies in areas where the animals congregate. However, the effects of the alternatives on effort displacement are not predictable and the effects of the alternatives are Unknown (U).

The final preferred alternative incorporates components of the original alternatives. Therefore the effects on marine mammals for the final preferred EFH and HAPC alternative are Environmentally Positive (E+) and the effects to marine mammals from the preferred impacts minimization alternative are Unknown (U).

Species-specific concerns are addressed below.

California Sea Lion - Incidental mortalities of California sea lions have been documented in set and drift gillnet fisheries (Carretta et al. 2001; Hanan et al. 1993). Skippers logs and at-sea observations have shown that California sea lions have been incidentally killed in Washington, Oregon, and California groundfish trawls and during Washington, Oregon, and California commercial passenger fishing vessel fishing activities (Carretta et al. 2001). Total human-caused mortality (1,352 sea lions) is less than the 6,591 sea lions allowed under the Potential Biological Removal formula (Carretta et al. 2001).

Harbor Seal - Combining mortality estimates from California set net, northern Washington marine set gillnet, and groundfish trawl results in an estimated mean mortality rate in observed groundfish fisheries of 667 harbor seals per year along Washington, Oregon, and California (Carretta et al. 2001).

Northern Elephant Seal - There are no recent estimated incidental kills of Northern elephant seals in groundfish fisheries along Washington, Oregon, and California, however they have been caught in set net fisheries (Carretta et al. 2001).

Guadalupe Fur Seal - There have been no U.S. reports of mortalities or injuries for Guadalupe fur seals (Cameron and Forney 1999; Julian 1997; Julian and Beeson 1998), although there have been reports of stranded animals with net abrasions and imbedded fish hooks (Hanni et al. 1997).

Northern Fur Seal - There were no reported mortalities of northern fur seals in any observed fishery along the West Coast of the continental U.S. during the period 1994-1998 (Carretta et al. 2001), although there were incidental mortalities in trawl and gillnet fisheries off Alaska (Angliss and Lodge 2002).

Eastern Stock Steller Sea Lion - These have been observed taken incidentally in WA/OR/CA groundfish trawls and marine set gillnet fisheries (Angliss and Lodge 2002). Total estimated mortalities of this stock (44) is less than the 1,396 Steller sea lions allowed under the Potential Biological Removal formula (Angliss and Lodge 2002).

Southern Sea Otter - During the 1970s and 1980s considerable numbers of sea otters were observed caught in gill and trammel entangling nets in central California. During 1982 to 1984, an average of 80 sea otters were estimated to have drowned in gill and trammel nets (Wendell et al. 1986). This was projected as a significant source of mortality for the stock until gill nets were prohibited within their feeding range. More recent mortality data (Pattison et al. 1997) suggest similar patterns during a period of increasing trap and pot fishing for groundfish and crabs (Estes et al. In Press). This elevated mortality appears to be the main reason for both sluggish population growth and periods of decline in the California sea otter population (Estes et al. In Press).

Sea Otter (Washington Stock) - Gillnet and trammel net entanglements were a significant source of mortality for southern sea otters (Wendell et al. 1986) and some sea otters were taken incidentally in set nets off Washington (Kajimura 1990). Evidence from California and Alaska suggests that incidental take of sea otter in crab pots and tribal set-net fisheries may also occur. Sea otters are also quite vulnerable to oil spills due to oiled fur interfering with thermoregulation, ingested oil disintegrating the intestinal track, and inhaled fumes eroding the lungs (Richardson and Allen 2000).

Harbor porpoise - Harbor porpoise are very susceptible to incidental capture and mortalities in set net fisheries (Julian and Beeson 1998). Off Oregon and Washington, fishery mortalities of harbor porpoise have been recorded in the northern Washington marine set and drift gillnet fisheries (Carretta et al. 2001). However, these fisheries have largely been eliminated.

Dall's porpoise - Observers document that Dall's porpoise have been caught in the California, Oregon and Washington domestic groundfish trawl fisheries (Perez and Loughlin 1991) but the estimated annual take is less than two porpoise per year.

White-sided Dolphin - Observers have documented mortalities in the California, Oregon, and Washington groundfish trawl fisheries for whiting (Perez and Loughlin 1991). The total estimated kill of white-sided dolphins in these fisheries averages less than one dolphin per year (Carretta et al. 2001).

Risso's Dolphin - There have been no recent Risso's dolphin moralities in West Coast groundfish fisheries (Carretta et al. 2001), although Reeves et al. (2002) report that Risso's are a bycatch in some longline and trawl fisheries.

Common Dolphin - Common dolphin mortality has been estimated for set gillnets in California (Julian and Beeson 1998); however, the two species (short-beaked and long-beaked) were not reported separately. Reeves et al. (2002) relate that short-beaked common dolphins are also a bycatch in some trawl fisheries.

Short-finned Pilot Whale - Total human-caused mortality (3) of this species is less than the 6 short-finned pilot whales allowed under the Potential Biological Removal formula (Carretta et al. 2001).

Eastern Pacific Gray Whale - These have been an incidental catch in set net fisheries, but there have been no recent takes in groundfish fisheries (Angliss and Lodge 2002).

Minke Whale Minke whales have occasionally been caught in coastal gillnets off California (Hanan et al. 1993), in salmon drift gillnet in Puget Sound, Washington, and in drift gillnets off California and Oregon (Carretta et al. 2001). There have been no recent takes in groundfish fisheries off California , Oregon, or Washington (Carretta et al. 2001).

Sperm Whale - There are no recent observations of sperm whale incidental catches in West Coast groundfish fisheries.

Humpback, Blue, Fin, and Sei Whales - There are no recent observations of incidental catches of these species in West Coast groundfish fisheries.

Killer Whale - The only incidental take recorded by groundfish fishery observers was in the Bering Sea/Aleutian Islands (BSAI) groundfish trawl (Carretta et al. 2001). There are also reports of interactions between killer whales and longline vessels (Perez and Loughlin 1991). (Longline fishers in the Aleutian Islands reported several cases where orcas removed sablefish from longlines as the gear was retrieved.) There are no other reports of killer whale takes in West Coast groundfish fisheries (Carretta et al. 2001).

California Coastal Bottlenose Dolphin - Due to its exclusive use of coastal habitats, this bottlenose dolphin population is susceptible to fishery-related mortality in coastal set net fisheries. However, from 1991-94 observers saw no bottlenose dolphins taken in this fishery, and in 1994 the state of California banned coastal set gillnet fishing within 3 nm of the southern California coast. In central California, set gillnets have been restricted to waters deeper than 30 fathoms (56 m) since 1991 in all areas except between Point Sal and Point Arguello. These closures greatly reduced the potential for mortality of coastal bottlenose dolphins in the California set gillnet fishery.

4.6.4 Effects on Sea Turtles

Numerous human-induced factors have adversely effected sea turtle populations in the North Pacific and resulted in their threatened or endangered status (Eckert 1993; Wetherall et al. 1993). Documented incidental capture and mortality by purse seines, gillnets, trawls, longline fisheries, and other types of fishing gear adversely effect sea turtles, however the relative effect of each of these sources of effect on sea turtles is difficult to assess (NMFS and USFWS 1998a; 1998b; 1998c; 1998d). Each of the sea turtle species that might interact with groundfish fisheries is listed. Little data are available estimating total annual mortalities except in the drift gillnet fishery, which is not part of the groundfish FMP. None of the alternatives is expected to result in any effects on these species. NMFS prepared a Biological Opinion in 1990 that concluded the groundfish fisheries are not likely to jeopardize the continued existence of listed sea turtles. The EFH and HAPC alternatives are not likely to have an effect on sea turtles; or, if the alternatives result in improved habitat conditions the effect would be Environmentally Positive (E+). The effect of the impacts minimization alternatives may be negative if fishing effort intensifies in areas where the animals congregate. However, the effects of the alternatives on effort displacement are not predictable and the effects of the alternatives are Unknown (U).

The final preferred alternative incorporates components of the original alternatives. Therefore the effects on sea turtles for the final preferred EFH and HAPC alternative are Environmentally Positive (E+) and the effects to sea turtles from the preferred impacts minimization alternative are Unknown (U).

Species-specific information is discussed below.

Loggerhead - The primary fishery threats to the loggerheads in the Pacific are pelagic longline and gillnet fisheries (NMFS and USFWS 1998c). These gears are not used for taking groundfish.

Leatherback - Primary threats to leatherbacks in the Pacific are the killing of nesting females and eggs at nesting beaches and incidental take in coastal and high seas fisheries (NMFS and USFWS 1998b). Groundfish fishing operations are not known to effect this species.

Olive Ridley - Occasionally these turtles are found entangled in scraps of net or other floating debris. Although they are generally thought to be surface feeders, olive ridleys have been caught in trawls at depths of 80-110 meters (NMFS and USFWS 1998d).

4.7 Consequences of the Alternatives to Minimize Adverse Fishing Impacts to EFH (Alternatives C.1-C.14) on the Socioeconomic Environment

This section summarizes the effect of the alternatives on the socioeconomic environment. This section is divided into portions that address the alternatives associated with designating EFH and HAPC areas, alternatives to minimize adverse impacts from fishing, and alternatives for researching and monitoring. The designation of EFH and HAPC areas is largely analyzed from the standpoint of consultation activities on the part of appropriate agencies since designation in itself does not necessarily trigger an action.

Ideally, a summation of social, physical, and biological costs and benefits would allow for a comparison of the net effect of each alternative. Many factors would work to change the effects associated with habitat protection. For example, a protection measure may cause negative effects in the form of displaced or lost revenues associated with fishing activity in the short-run, but the protection of that habitat may result in increased production from ecosystem based services and/or an increase in stock productivity and fishery yields over the longer term. Estimating potential benefits that may be related to stock productivity ultimately depends on the relation between habitat protection, biological productivity, and the ability of fishers to successfully target and harvest stocks whose populations may increase. Unfortunately, research quantifying potential increases in the stocks of species resulting from habitat protection does not currently exist in a manner that can be used for this analysis.

Habitat protection may induce increases in non-fishing or non-use benefits, such as an increase in ecosystem-based services. An ecosystem-based service could be described as a natural benefit to society that the ecosystem provides. Some examples may include clean water, clean air, and–in the case of a marine environment–a kelp forest that reduces the impact of storm waves on coastal property. Several studies have been done attempting to value ecosystem based services for example, but such analysis is generally fraught with uncertainties and is extremely difficult to estimate. At this time, sufficient information does not exist on non-fishing and non-use values to draw quantitative conclusions regarding the outcomes of a change in such values related to habitat protection. Due to the lack of existing data on habitat management, its relationship to social and economic considerations, and available time and resources, an estimation of values attributed to habitat protection would be outside the scope of this EIS.

Due to data limitations, the ability to estimate net effects is restricted, and in many instances the analysis is reduced to one that is largely qualitative. However, qualitative information used in this document may still be considered scientific in nature, though an assessment of which alternatives are most or least beneficial may ultimately depend on how the reader weighs certain effects and the portion of the environment that effect is attributed to.

This section is organized in a manner that introduces the reader to the concepts that are used in the alternatives for designating, protecting, and researching EFH; describes the reasonably foreseeable effects on portions of the socioeconomic environment; analyzes the application of the described concepts in the context of each alternative; and provides a description of the cumulative effect of the alternatives. These sections are designed for comparison against the no action alternative.

4.7.1 Concepts Addressed in Analytical Sections

This section describes the concepts that are associated with the alternatives analyzed in this EIS and the general influence that they have on the socioeconomic environment. The alternatives analyzed in this EIS can be categorized as 1) EFH and HAPC designation, 2) minimizing fishing impacts on EFH, and 3) research and monitoring. Within each of these categories are concepts that are analyzed as common themes or management tools for use in addressing a topic. Concepts include consultation activities associated with the designation of EFH and HAPC; the use of area closures, gear modifications, gear restrictions, effort reduction, and zoning as tools for minimizing fishing effects to EFH; and the relationship of research reserves, logbooks, and vessel monitoring systems to research and monitoring alternatives.

The general themes in the impacts minimization alternatives include area closures; gear restrictions, modifications, and incentives; and fishing zones. This section briefly discusses the approach of those tools, their relationship to marine and fishery management, and their general effect on the socioeconomic environment.

4.7.1.1 Area Closures

The approach of an area closure would be to limit some or all gear types within that area in order to protect habitat. These areas may be discrete areas similar to the YRCA and CCA, or they may be large areas similar to the RCA. These areas would differ from current area closures, which are designed to minimize the incidental take of rebuilding species, because these habitat protection areas would have immobile boundaries and would apply more generally to gear types. For example, current regulations do not allow limited entry bottom trawl effort within the rockfish conservation areas, but shrimp trawling is allowed. An area proposed for closure for habitat purposes that excludes bottom trawling would presumably exclude both limited entry and shrimp trawl gear, along with any other type of trawl designed to touch ocean bottom.

An area closure would exclude all or certain types of gears that may potentially fish that area. In many instances, areas proposed for closure would displace vessels that currently fish those areas and–as a result–effort would likely increase in other portions of the West Coast EEZ. A shift in effort or fishing location may change the cost associated with fishing activity. In addition, catch and revenues that have historically occurred in habitat protection closed areas may be made up in other areas, or that catch may–all or in part–be lost. In this document, revenues that may be displaced are referred to as "displaced revenues" or revenues put "at risk".

4.7.1.2 Gear Restrictions and Modifications

In general, gear restrictions are described as cases where certain gears are prohibited. A gear modification is where there are qualifications on the type of gear used. Gear incentives can be described as a case where there are incentives to encourage the use of certain gear types. The intention of gear requirements is to lessen the effect certain gears may have on habitat. A gear prohibition would eliminate that gear entirely, a gear modification may tend to make it more difficult for fishers to access certain areas, and gear incentives allow or encourage fishers to use gears that may cause less of an effect on groundfish habitat. For example, a qualification on the size of footrope used in bottom trawl gear would make it more difficult for trawlers to access areas with high relief substrate, thereby lessening the amount of fishing activity that occurs in more rocky areas.

Like an area closure, a gear requirement may also put revenues at risk. If a gear restriction is put in place, productive areas that have historically been fished may become inaccessible.

4.7.1.3 Effort Reduction

Effort reduction is designed to reduce the intensity of fishing effort; thereby lessening the amount of impact fishing has on habitat. Effort reduction can be accomplished through several means, including: limiting the number of hours vessels can fish, limiting the catch that vessels can retain, or reducing the number of vessels -- so long as there is no subsequent increase in effort from vessels remaining in that area. Effort reduction can have impacts in the form of reduced revenue on the part of vessels and fishing communities, and reductions in the amount of landings to processors.

4.7.1.4 Fishing Zones

Fishing zones establish areas where certain gears are allowed to fish and restrict those gears from other areas. Fishing zones behave similarly to area closures in that if gears were restricted from fishing areas where they have historically fished, revenues would be put at risk, and aggregate effort would increase in areas remaining open to certain gear types.

4.7.1.5 Prey Species

The NMFS final rule for implementing regulations to protect EFH specifies harvest limits for prey species as one potential means of protecting EFH. To the extent that prey is viewed as habitat, this EIS has analyzed the impact of prohibiting the take of krill which is a prey species for many marine species including groundfish. A fishery for prey species would reduce the amount of feed available for species that require that prey for sustenance, and a reduction in the population of available prey is therefore likely to reduce the survivability of organisms higher in the food chain.

4.7.2 Reasonably Foreseeable Effects on the Socioeconomic Environment

4.7.2.1 Reasonably Foreseeable Effects on West Coast Trawl Fisheries

Rebuilding overfished species are expected to continue to play a central role in the management of West Coast trawl fisheries. Although the manner in which overfished species are managed may presumably change, in the short-run, closed areas, constraining cumulative limits, and various gear requirements are expected to be central tools for management. However, limited entry trawl vessels are also expected to attain higher net revenues from groundfish. As a result of the trawl vessel buyback, there are fewer limited entry trawl vessels targeting groundfish, and bimonthly cumulative limits have increased as a result. In addition, new trawl technology that reduces the take of overfished species that co-occur with target species is expected to result in higher catch and revenue for vessels that target flatfish along the continental shelf.

In the long-run, different bycatch management tools may play a larger role. For example, as part of its preferred alternative for managing bycatch, the PFMC adopted a dedicated access privilege system as a long-term strategy for managing bycatch in the limited entry trawl fishery. In the long-run, a dedicated access privilege system may allow closed areas, gear requirements, and constraining cumulative limits to be of less importance as a management tool. Although there has been some discussion on imposing limited entry on the open access fleet, open access trawl fisheries are expected to remain in status quo for at least the short-term, meaning that rockfish excluder devices are expected to continue to be required for pink shrimp trawl vessels, and RCAs are expected to be applied to other exempted trawl gear.

4.7.2.2 Reasonably Foreseeable Effects on West Coast Fixed Gear Fisheries

Overfished species are expected to continue to play a central role in the management of West Coast fixed gear fisheries, though this is likely to affect the various fixed gear sectors differently. Although the way in which rebuilding species are managed may presumably change, in the short-run, closed areas and constraining cumulative limits are expected to be central tools for management of groundfish-based fixed gear fisheries. Non-groundfish fixed gear fisheries are largely expected to remain as status quo. Dedicated access privileges have not been considered for fixed gear fisheries.

4.7.2.3 Reasonably Foreseeable Effects on West Coast Recreational Fisheries

Restrictions on the recreational fishery due to overfished species concerns are expected to continue. Catch sharing agreements between states are also expected to continue, and both of these concerns mean that it is likely restrictions and current tools used to manage recreational groundfish fisheries will continue.

4.7.2.4 Reasonably Foreseeable Effects on Other Fisheries

Other fisheries of interest to groundfish EFH include any fishing activity occurring within the action area that may have an influence on EFH. Many of these fisheries are described in the effected environment (Chapter 3). Possible future effects on other fisheries are vast, and researching the many types of fishing activities along with foreseeable effects on those fisheries is not feasible given available resources, though some information is available for particular fisheries that qualify as other fisheries.

4.7.2.5 Reasonably Foreseeable Effects on Seafood Processors

The seafood processing industry has been consolidating, with the majority of processing capacity now located in a handful of ports and companies. Interest in relatively small value-added processing facilities has been growing, and some small processors have developed in recent years that specialize in certain species or product forms. The future of processing operations along the West Coast is largely conditional on available product quantity and the relationship between the harvester and buyer. Assuming that harvester-buyer relationships do not change, some processing consolidation may continue to occur in order to bring processing capacity in line with available landed catch quantities; but the degree of this consolidation is likely to be less than in the recent past since the decline in groundfish landings seems to have slowed or stopped in recent years. Notably, the Port of Astoria recently announced plans to develop processing and storage operations, largely in response to recent increases in Pacific sardine harvests. There continues to be interest in development of specialized processing activity by ports and community leaders, meaning some growth in small processing may occur in addition to Port of Astoria development.

4.7.2.6 Reasonably Foreseeable Effects on Fishing Communities

Many West Coast communities are expected to continue growing and expanding their economic base, especially in the areas of tourism and development of vacation and retirement homes. This should reduce the reliance those communities have on fishing. The portion of communities engaged in fishing will likely remain tied to the profitability and size of the fishing fleet, the quantity of fish being landed, and the profitability and number of shoreside processors.

4.7.2.7 Reasonably Foreseeable Effects on Non-Fishing Activities

Insufficient data and information is available about the numerous non-fishing activities discussed to adequately assess reasonably foreseeable trends in those industries. However population and income growth generally are expected to increase demand for recreational fishing as well as non-consumptive activities such as whale watching, kayaking and diving.

4.7.3 Consequences of the Impacts Minimization Alternatives on the Socioeconomic Environment

This section analyzes the effects of the impact minimization alternatives on the socioeconomic environment. Quantitative measures are provided where data is available to assist the reader in determining effects to the sectors of the socioeconomic environment outlined previously. Where data is not available, a qualitative discussion is provided.

The most consistent quantitative measure of alternative effects to fishing activity is displaced exvessel revenue to the limited entry trawl fleet. Socioeconomic Table 4-2 shows displaced trawl revenues for each alternative over a four-year period to illustrate the possible effects under alternatives on the trawl fleet. Impacts in Socioeconomic Table 4-2 are differentiated by the amount of revenues at risk if an entire 10x10 minute block were to be closed, and the amount of revenues at risk if revenues attributed to those 10x10 block areas are proportioned based on the criteria defining the area closure. The reader is also encouraged to read the discussion associated with each alternative as there are many other sectors and related impacts associated with those alternatives that are not captured in Socioeconomic Table 4-2. For example, although alternatives are likely have an effect on the cost of fishing, data does not exist to estimate those possible changes, so the description of alternative effects addresses potential changes in costs in a qualitative manner where possible changes can be identified.

Socioeconomic Table 4-3 summarizes the effect of each Council preferred impacts minimization alternative. These summary effects are compared against the no action alternative. Again, the reader is encouraged to read the discussion associated with each alternative as there are many factors associated with the summary determination described in the table

4.7.3.1 Alternative C.1

No action alternative (0)

4.7.3.1.1 Impact to the Socioeconomic Environment

In the short run, this alternative may have no impact on the socioeconomic environment, but if current practices harm the environment and if loss of habitat continues, then there will be negative effects in the long-run on fishermen, processors, communities, and non-market values.

4.7.3.2 Alternative C.2

Depth based gear restrictions

4.7.3.2.1 Option C.2.1

Prohibit the use of large footrope trawl gear shoreward of 200 fm and prohibit all fixed gear shoreward of 100 fm north of 40°10' N latitude and 150 fm south of 40°10' N latitude. (E-)

4.7.3.2.1.1 Impacts to Fisheries

This option is expected to behave in a manner similar to status quo for trawl vessels. Although large footrope trawl gear was permitted to depths as shallow as 150 fathoms during part of 2004, large amounts of trawl effort and catch have occurred at depths of 200 fathoms or more in recent years. If depths shallower than 200 fathoms are closed to large footrope gear, trawl vessels may be more constrained and incur higher costs than they are currently (E-).

Depth based fixed gear restrictions would tend to reduce the catch of shelf groundfish species and may eliminate some non-groundfish fixed gear fisheries, such as the Dungeness crab fishery for example–which is one of the largest fisheries on the West Coast. During the years 2001–2003, the exvessel value of Dungeness crab landings ranged from \$52.3 million to \$116.98 million (E-).

If VMS is required to monitor compliance with the closed areas, vessels that do not already carry VMS may be forced to incur costs on the order of \$1,550 - \$5,295 to purchase a unit; \$120 of annual maintenance; and \$1 - \$5 per day for the cost of transmitting location (NMFS July 2003).

This alternative may create negative distributional and spillover effects. Vessels that obtain a large portion of their income from Dungeness crab fishing would see a larger reduction in revenues compared to vessels that do not participate in crab fisheries. Vessels that engage in the Dungeness crab fishery may switch to other fisheries in an attempt to make up lost revenues. If those vessels switch to other fisheries, vessels currently engaged in those other fisheries would be adversely affected through competition and a reduction in available fishery resource per vessel. Unfortunately, it is not possible to predict which fisheries those vessels may switch to.

4.7.3.2.1.2 Impacts on Management and Enforcement

Under option C.2.1, monitoring and enforcement would be required to verify that gear types were not being used within prohibited areas. Presumably this effort would be in addition to monitoring and enforcement of the existing RCAs (U).

4.7.3.2.1.3 Impacts to Consumers, Processors, and Communities

Under option C.2.1, the Dungeness crab fishery may be effectively closed. The West Coast Dungeness crab fishery provides a large source of Dungeness crab landings worldwide, so the elimination of this fishery would likely effect consumers in a negative fashion. Processors and communities that are directly engaged in activities related to the Dungeness crab fishery would also be adversely effected (E-).

4.7.3.2.1.4 Impacts on Safety

Effects to safety are likely to occur if there is a reduction in vessel net revenues, if vessels are forced to fish under more hazardous conditions, or if vessels are required to carry additional safety equipment. Under option C.2.1 vessels are not being forced to fish in more hazardous conditions, but it is likely some vessels will see a reduction in vessel net revenues. Vessels that are required to carry a VMS may see increases in safety since a vessel in distress may be more easily located if it has VMS; however if those vessels also see a reduction in net revenues, potential safety gains from carrying VMS may be negated if lower revenues result in less repair and maintenance. Therefore, the net Impacts to Safety are unknown (U).

4.7.3.2.2 Option C.2.2

Prohibit the use of large footrope trawl gear throughout the EEZ and prohibit all fixed gear shoreward of 100 fm north of 40°10’ N latitude and 150 fm south of 40°10’ N latitude. (E-)

4.7.3.2.2.1 Impacts to Fisheries

This option would put some trawl revenues at risk because large footrope trawl gear would be excluded. Depth-based fixed gear restrictions would tend to reduce the catch of shelf groundfish species and may completely eliminate some non-groundfish fixed gear fisheries such as the Dungeness crab fishery for example–which is one of the largest fisheries on the West Coast. During the years 2001–2003, the exvessel value of Dungeness crab landings alone ranged from $52.3 million to $116.98 million.

If VMS is required to monitor compliance with the closed areas, vessels that do not already carry VMS may incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location (NMFS July 2003).

This alternative may create negative distributional and spillover effects. Vessels that obtain a large portion of their income from Dungeness crab or other fixed gear fishing would see a larger reduction in revenues compared to vessels that do not participate in crab fisheries. Vessels that engage in fixed gear fisheries may switch to other fisheries in an attempt to make up lost revenues. If those vessels switch to other fisheries, vessels currently engaged in those other fisheries would be adversely impacted through competition and a reduction in available fishery resource per vessel. Unfortunately, it is not possible to predict which fisheries those vessels may switch to.

4.7.3.2.2.2 Impacts on Management and Enforcement

Under option C.2.2, monitoring and enforcement would be required to verify that gear types were not being used within prohibited areas. This effort would probably be in addition to monitoring and enforcement of the existing RCAs.

4.7.3.2.2.3 Impacts to Consumers, Processors, and Communities

Under option C.2.2, economically important fixed gear fisheries such as the Dungeness crab fishery may be effectively closed. The West Coast Dungeness crab fishery provides a large source of Dungeness crab landings worldwide, so the elimination of this fishery would likely effect consumers in a negative fashion through higher prices at the consumer level. Processors and communities that are directly engaged in activities related to the Dungeness crab fishery (or other fixed gear fisheries) would also be adversely impacted as exvessel revenues are lost, demand for vessel services declines, and landed catch declines.

4.7.3.2.2.4 Impacts on Safety

Impacts to safety are likely to occur if there is a reduction in vessel net revenues, if vessels are forced to fish under more hazardous conditions, or if vessels are required to carry additional safety equipment. Under option C.2.2 vessels are not being forced to fish in more hazardous conditions, but it is likely some vessels will see a reduction in vessel net revenues. Vessels that are required to carry a VMS may see increases in safety since a vessel in distress may be more easily located if it has VMS, however if those vessels also see a reduction in net revenues, potential safety gains from carrying VMS may be negated if lower revenues result in less repair and maintenance. Therefore, the net Impacts to Safety are unknown (U).

4.7.3.2.3 Option C.2.3

Prohibit the use of large footrope trawl gear shoreward of 200 fm and prohibit all fixed gear shoreward of 60 fm coastwide. (E-)

4.7.3.2.3.1 Impacts to Fisheries

This option is expected to be similar to status quo for trawl vessels. Although large footrope trawl gear was permitted in depths as shallow as 150 fathoms in portions of 2004, large amounts of trawl effort–and catch - have occurred at depths of 200 fathoms or more in recent years. If the large footrope gear is prohibited in depths shallower than 200 fathoms, then trawl vessels may be more constrained and incur higher costs than they are currently.

Depth based fixed gear restrictions would tend to reduce the catch of shelf groundfish species and may eliminate large portions of some non-groundfish fixed gear fisheries such as the Dungeness crab fishery for example–which is one of the largest fisheries on the West Coast. However it is unknown how much of the Dungeness crab fishery would be effected under this option.

If VMS is required to monitor compliance with the closed areas, vessels that do not already carry VMS may incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location (NMFS July 2003).

This alternative may create negative distributional and spillover effects if revenues are lost. For example, if a prohibition on fixed gear shoreward of 60 fathoms reduces the ability of vessels to catch Dungeness crab, vessels that actively engage in crab fishing may see a larger reduction in revenues compared to vessels that do not participate in crab fisheries. If vessels that engage in the Dungeness crab fishery experience reductions in revenues, they may switch to other fisheries in an attempt to make up those revenues. If those vessels switch to other fisheries, vessels currently engaged in those other fisheries would be adversely effected through competition and a reduction in available fishery resource per vessel. Unfortunately, it is not possible to predict which fisheries those vessels may switch to.

4.7.3.2.3.2 Impacts on Management and Enforcement

Under option C.2.3, monitoring and enforcement would be required to verify that gear types were not being used within prohibited areas. This effort would probably be in addition to monitoring and enforcement of the existing RCAs.

4.7.3.2.3.3 Impacts to Consumers, Processors, and Communities

Under option C.2.3, the Dungeness crab fishery may be effectively closed or limited. The West Coast Dungeness crab fishery provides a large source of Dungeness crab landings worldwide, so a large reduction in crab catch from this fishery would likely effect consumers in a negative fashion. Processors and communities that are directly engaged in activities related to the Dungeness crab fishery would also be adversely effected (E-).

4.7.3.2.3.4 Impacts on Safety

Impacts to safety are likely to occur if there is a reduction in vessel net revenues, if vessels are forced to fish under more hazardous conditions, or if vessels are required to carry additional safety equipment. Under option C.2.3 vessels are not being forced to fish in more hazardous conditions, but it is likely some vessels will see a reduction in vessel net revenues. Vessels that are required to carry a VMS may see increases in safety since a vessel in distress may be more easily located if it has VMS; however if those vessels also see a reduction in net revenues, potential safety gains from carrying

VMS may be negated if lower revenues result in less repair and maintenance. Therefore, the net impacts to safety are unknown (U).

4.7.3.3 Alternative C.3

Close sensitive habitat

4.7.3.3.1 Option C.3.1

Under this option, for each gear type those areas where the sensitivity index value is greater than or equal to two and the recovery index value is greater than one are identified. The combined area is then screened to include only the area where the cumulative number of hours trawled from 2000 through 2002 is less than 100 hours. The resulting areas are closed to all fishing (i.e., to all gear types). (E-)

4.7.3.3.1.1 Impacts to Fisheries

This option would put revenues at risk for all fisheries occurring within the U.S. EEZ off the West Coast. Estimated trawl revenues put at risk over a four year period range from $1,011,952 if the entire area were to be closed, or $181,973 if a portion of the area is closed. If VMS is required to monitor compliance with the closed areas, vessels that do not already carry VMS systems may incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location (NMFS July 2003). Alternatives based on or adjusted for cumulative trawl hours or revenues would tend to effect vessels in the central and southern California region more than vessels in the north. This is because there are fewer trawl vessels in central and southern California, which tends to reduce trawl revenue and hours on an aggregate basis, but not necessarily on a per-vessel basis.

Depending on how various fisheries are effected, some fisheries may experience larger amounts of displaced effort than others. If displaced revenues result in lost revenue, vessels that are relatively more effected may participate more heavily in other fisheries and negatively effect vessels in those other fisheries through increased competition and reductions in available fishery resource per vessel (E-).

4.7.3.3.1.2 Impacts to Management and Enforcement

Under option C.3.1, enforcement would be required to monitor and verify compliance with new closed areas in addition to current enforcement of RCAs and existing closed areas.

4.7.3.3.1.3 Impacts to Processors and Communities

Impacts to processors and communities would occur if there is a reduction in revenues and landed catch associated with the closures occurring under this option. It is unknown if portions or all of the revenues and pounds put at risk will be lost. Therefore, the effect to communities and processors from this option is unknown, though any effect would be proportional to the effect on fishers in the short-run.

4.7.3.3.1.4 Impacts to Consumers

Impacts to consumers would result if there is a change in available product quantity or price. On the world market, West Coast groundfish make up a small proportion of total groundfish available to consumers. A potential change in product available to the market under this option is unlikely to have measurable effects on consumers.

4.7.3.3.1.5 Impacts on Safety

Impacts to safety are likely to occur if there is a reduction in vessel net revenues, if vessels are forced to fish under more hazardous conditions, or if vessels are required to carry additional safety equipment. Under this option, vessels are not being forced to fish in more hazardous conditions, but it is unknown whether there will be a reduction in vessel net revenues. Vessels that are required to carry a VMS may see increases in safety since a vessel in distress may be more easily located if it has VMS. Therefore, impacts to safety are generally positive.

4.7.3.3.2 Option C.3.2

For each gear type, those areas where both the sensitivity and recovery index values are greater than or equal to 0.5 are identified. The combined area is then screened to include only the area where the cumulative number of hours trawled from 2000 through 2002 is less than 100 hours. The resulting areas are closed to all fishing (i.e., to all gear types). (E-)

4.7.3.3.2.1 Impacts to Fisheries

This option would put revenues at risk for all fisheries occurring within the U.S. EEZ off the West Coast. Estimated trawl revenues put at risk over a four year period range from $1,531,975 if the entire area were to be closed, or $934,794 if only a portion of the area is closed. If VMS is required to monitor compliance with the closed areas, vessels that do not already carry VMS systems may incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location (NMFS July 2003). Alternatives based on or adjusted for cumulative trawl hours or revenues would tend to effect vessels in the central and southern California region more than vessels in the north. This is because there are fewer trawl vessels in central and southern California, which tends to reduce trawl revenue and hours on an aggregate basis, but not necessarily on a per-vessel basis.

Depending on how various fisheries are effected, some may experience larger amounts of displaced effort than others. If displaced revenues result in lost revenue, vessels that are relatively more effected may participate more heavily in other fisheries and negatively effect vessels in those other fisheries through increased competition and reductions in available fishery resource per vessel.

4.7.3.3.2.2 Impacts to Management and Enforcement

Under this option, enforcement would be required to monitor and verify compliance with new closed areas in addition to current RCA enforcement and existing closed areas.

4.7.3.3.2.3 Impacts to Processors and Communities

Impacts to processors and communities would occur if there is a reduction in revenues and landed catch associated with the closures occurring under this option. It is unknown if portions or all of the revenues and pounds put at risk will be lost. Therefore, the effect to communities and processors from this option is unknown, though any effect would be proportional to the effect on fishers in the short-run (U).

4.7.3.3.2.4 Impacts to Consumers

Impacts to Consumers would occur if there is a change in available product quantity or price. On the world market, West Coast groundfish make up a small proportion of groundfish available to consumers. A potential change in product available to the market under this option is unlikely to have measurable effects on consumers.

4.7.3.3.2.5 Impacts on Safety

Impacts to safety are likely to occur if there is a reduction in vessel net revenues, if vessels are forced to fish under more hazardous conditions, or if vessels are required to carry additional safety equipment. Under this option, vessels are not being forced to fish in more hazardous conditions, but it is unknown whether there will be a reduction in vessel net revenues. Vessels that are required to carry a VMS may see increases in safety since a vessel in distress may be more easily located if it has VMS. Therefore, impacts to safety are generally positive (E+).

4.7.3.3.3 Option C.3.3

The same as Option C.3.1 except no adjustment is made for trawl effort. (E-)

4.7.3.3.3.1 Impacts to Fisheries

This option would put revenues at risk for all fisheries occurring within the U.S. EEZ off the West Coast. Estimated trawl revenues potentially at risk over a four year period range from $47,115,054 to $3,723,698, depending on the proportion of the 10x10 block area that is used. If VMS is required to monitor compliance with the closed areas, vessels that do not already carry VMS systems may incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location (NMFS July 2003).

Depending on how various fisheries are effected, some may experience larger amounts of displaced effort than others. If displaced revenues result in lost revenue, vessels that are relatively more effected may participate more heavily in other fisheries and negatively effect vessels in those other fisheries through increased competition and reductions in available fishery resource per vessel.

4.7.3.3.3.2 Impacts to Management and Enforcement

Under this option, enforcement would be required to monitor and verify compliance with new closed areas in addition to current RCA enforcement and existing closed areas.

4.7.3.3.3.3 Impacts on Processors and Communities

Impacts to processors and communities would occur if there is a reduction in revenues and landed catch associated with the closures occurring under this option. It is unknown if portions or all of the revenues and pounds put at risk will be lost. Therefore, the effect to communities and processors from this option is unknown, though any effect would be proportional to the effect on fishers in the short-run.

4.7.3.3.3.4 Impacts to Consumers

Impacts to consumers would occur if there is a change in available product quantity or price. On the world market, West Coast groundfish make up a small proportion of groundfish available to consumers. A potential change in product available to the market under this option is unlikely to have measurable effects on consumers.

4.7.3.3.3.5 Impacts on Safety

Impacts to safety are likely to occur if there is a reduction in vessel net revenues, if vessels are forced to fish under more hazardous conditions, or if vessels are required to carry additional safety equipment. Under this option, vessels are not being forced to fish in more hazardous conditions, but it is unknown whether there will be a reduction in vessel net revenues. Vessels that are required to carry a VMS may see increases in safety since a vessel in distress may be more easily located if it has VMS. Therefore, impacts to safety are generally positive.

4.7.3.3.4 Option C.3.4

The same as Option C.3.2 except no adjustment is made for trawl effort. (E-)

4.7.3.3.4.1 Impacts to Fisheries

This option would put revenues at risk for all fisheries occurring within the U.S. EEZ off the West Coast. Estimated trawl revenues at risk over a four-year period range from $82,895,532 to $58,458,226 depending on what proportion of the 10x10 block area is used. If VMS is required to monitor compliance with the closed areas, vessels that do not already carry VMS systems may incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location (NMFS July 2003).

Depending on how various fisheries are impacted, some may experience larger amounts of displaced effort than others. If displaced revenues result in lost revenue, vessels that are relatively more impacted may participate more heavily in other fisheries and negatively effect vessels in those other fisheries through increased competition and reductions in available fishery resource per vessel.

4.7.3.3.4.2 Impacts to Management and Enforcement

Under this option, enforcement would be required to monitor and verify compliance with new closed areas in addition to current RCA enforcement and existing closed areas.

4.7.3.3.4.3 Effects to Processors and Communities

Impacts to processors and communities would occur if there is a reduction in revenues and landed catch associated with the closures occurring under this option. It is unknown if portions or all of the revenues and pounds put at risk will be lost. Therefore, the effect to communities and processors from this option is unknown, though any effect would be proportional to the effect on fishers in the short-run.

4.7.3.3.4.4 Impacts to Consumers

Impacts to consumers would occur if there were changes in available product quantity or price. On the world market, West Coast groundfish make up a small proportion of groundfish available to consumers. A potential change in product available to the market under this option is unlikely to have any measurable effect to consumers.

4.7.3.3.4.5 Impacts on Safety

Impacts to safety are likely to occur if there is a reduction in vessel net revenues, if vessels are forced to fish under more hazardous conditions, or if vessels are required to carry additional safety equipment. Under this option, vessels are not being forced to fish in more hazardous conditions, but it is unknown whether there will be a reduction in vessel net revenues. Vessels that are required to carry a VMS may see increases in safety since a vessel in distress may be more easily located if it has VMS. Therefore, impacts to safety are generally positive.

4.7.3.4 Alternative C.4

Restrict the potential for commercial fisheries to expand into areas that are currently uneffected or have not been fished between 2000 and 2002.

4.7.3.4.1 Option C.4.1

This alternative and option would reduce opportunities for future expansion of the trawl fishery into areas that were not fished during the 2000–2002 period. In the short-run, this option would largely act as status quo from a cost and revenue perspective, though a small amount of trawl revenues may be displaced and some changes in cost may occur. (0)

4.7.3.4.1.1 Impacts to Fisheries

According to trawl logbook data, the trawl footprint expanded in 2003 to areas seaward of those areas that were trawled during the 2000–2002 period, and those revenues would be displaced under this alternative. These revenues are differentiated by species grouping and described in Socioeconomic Table 4-4.

Assuming that the areas fished in 2003 that would be closed in this alternative were not fished before 2003, it is unlikely that these revenues would be lost since catches in proposed closed areas would have been achieved in other areas in earlier years. A change in net revenues is unlikely for limited entry trawlers since these revenues are likely to be achieved in other portions of the EEZ off the West Coast, and costs are likely to be uneffected since limited entry trawl vessels are not being forced to travel longer distances or require additional equipment. Net revenues for other bottom trawl vessels (such as shrimp trawlers) may be reduced if those vessels are required to carry VMS to monitor compliance with the area closure. If VMS is required, vessels that do not already carry VMS systems may incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location NMFS July 2003). This cost compares to approximately $69,000 of average annual gross revenue being made by vessels that made shrimp landings with shrimp trawl gear from 2000–2003 (PacFIN. July 2004)

Due to the minor effect to net revenues expected to be associated with this option, it is unlikely that this alternative would have any distributional effect (other than the possibility that additional vessels would be required to purchase VMS) on the fleet or any indirect effect to other fisheries resulting from trawl vessels shifting effort to other fishery sectors.

4.7.3.4.1.2 Impacts on Management and Enforcement

The effect of this alternative on management and enforcement would require establishing and monitoring an additional closed area. This option would essentially require that enforcement continue to monitor the shoreward RCA boundary, the seaward RCA boundary, other existing conservation areas/marine protected areas, in addition to a newly formed untrawled area boundary (E-).

4.7.3.4.1.3 Impacts on Consumers, Processors, Communities

Since there are no anticipated shifts in fishing effort, the manner in which the fishery is prosecuted is unlikely to change under this option. As this option would induce little or no change in the amount of seafood landed or associated revenues, there should be little or no effect to processors, communities, or consumers resulting from this option.

4.7.3.4.1.4 Impacts on Safety

Effects to safety are likely to occur if there is a reduction in vessel net revenues, if vessels are forced to fish under more hazardous conditions, or if vessels are required to carry additional safety equipment. Under this option, vessels are not being forced to fish in more hazardous conditions, and potential reduction in vessel net revenues is likely to be minimal. Vessels that are required to carry a VMS may see increases in safety since a vessel in distress may be more easily located if it has VMS. Therefore, impacts to safety are generally positive (E+).

4.7.3.4.2 Option C.4.2

This option would act similarly to option C.4.1, though all bottom tending gear types would be excluded from currently uneffected areas. This alternative is intended to freeze the footprint of bottom tending fishing gears. (0)

4.7.3.4.2.1 Impacts to Fisheries

In the long-term, this alternative would limit the opportunity for the fishery to expand into other areas and to target species residing in those areas. In the short-term this option would act like a status quo alternative and would displace minimal amounts of trawl revenues and little or no revenues from other bottom tending gear types. These revenues are differentiated by species grouping and described in Socioeconomic Table 4-5.

The minimal effect on fisheries would translate into little or no change in net revenues for vessels currently carrying VMS. If VMS is required for this option (in order to enforce the closed area), vessels that do not currently have VMS may incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location NMFS July 2003). This cost compares to approximately $69,000 of average annual gross revenue being made by vessels that made shrimp landings with shrimp trawl gear over the 2000–2003 year period, the approximately $63,000 of average annual gross revenues made by vessels targeting spot prawns with pot gear, and the approximately $64,000 average annual gross revenues made by vessels landing Dungeness crab with pot gear over the 2001–2003 period (PacFIN. July 2004).

Due to the minor effect to net revenues expected to be associated with this option, it is unlikely that this alternative would have any distributional effect (other than the possibility that additional vessels would be required to purchase VMS) on the fleet or any indirect effect to other fisheries resulting from trawl vessels shifting effort to other fishery sectors.

4.7.3.4.2.2 Impacts on Management and Enforcement

The effect of this alternative on management and enforcement would require establishing and monitoring an additional closed area. This option would essentially require that enforcement continue to monitor the existing RCA, and other existing conservation areas/marine protected areas, in addition to a newly formed unfished area boundary.

4.7.3.4.2.3 Impacts to Consumers, Processors, and Communities

Like option C.4.1, this option is expected to have a minimal effect on net revenues and little or no effect on gross revenues and volume of groundfish landed. The fact that the volume of groundfish landed is not expected to change means that there are no expected effects to processors or consumers. Little or no effect to fishers or processors means that communities should not be effected under this alternative.

4.7.3.4.2.4 Impacts on Safety

Impacts to safety are likely to occur if there is a reduction in vessel net revenues, if vessels are forced to fish under more hazardous conditions, or if vessels are required to carry additional safety equipment. Under this option, vessels are not being forced to fish in more hazardous conditions, and potential reduction in vessel net revenues is likely to be minimal. Vessels that are required to carry a VMS may see increases in safety since a vessel in distress may be more easily located if it has VMS. Therefore, impacts to safety are generally positive.

4.7.3.5 Alternative C.5

Prohibit a Krill fishery (0)

4.7.3.5.1 Impacts on the socioeconomic environment

This alternative is not expected to have an effect on the socioeconomic environment, since there are no known fisheries for krill in the West Coast EEZ, and this alternative therefore establishes status quo regulations for current fisheries. This alternative may have negative effects on management and enforcement because agencies would need to establish and enforce a ban on krill harvests (E-).

4.7.3.6 Alternative C.6

Close Hotspots (E-)

4.7.3.6.1 Impacts on Fisheries

The closure of areas to fishing would tend to have negative consequences in the short term as revenue is displaced, and effort shifts to areas remaining open. The shift of effort to other areas may tend to increase competition in remaining open areas, which may result in lower catch per unit effort–as a result of localized depletion–and may result in higher costs if vessels fish more intensely or further from port to make up those revenues. Under this alternative, the amount of displaced bottom trawl revenue from the limited entry trawl fleet is estimated at $78,094,177 over a four year period if measured by revenue from the entire 10x10 block areas, or $41,622,276 if measured by a proportion of those areas. If VMS is required for this option (in order to enforce the closed area), vessels that do not currently have VMS may incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location NMFS July 2003).

Depending on how various fisheries are impacted, some may experience larger amounts of displaced revenue than others in the short run. If displaced revenues result in lost revenue, vessels that are relatively more effected impacted may participate more heavily in other fisheries and negatively impact vessels in those other fisheries through increased competition and reductions in available fishery resource per vessel. If area closures result in higher stock productivity and higher fishery yields, then this alternative may have beneficial impacts in the long run, though this relationship is still hypothetical.

4.7.3.6.2 Impacts on Management and Enforcement

Closing additional areas would put burdens on enforcement agencies to monitor those areas in addition to monitoring existing closed areas (E-).

4.7.3.6.3 Impacts on Processors and Communities

Effects to processors and communities would occur if there is a reduction in revenues and landed catch associated with the closures occurring under this option. If area closures result in higher stock productivity which leads to increased fishery yields, this alternative may positively impact processors and communities in the long run. However, it is unknown if part or all of the revenues and pounds put at risk will be lost in the short run, and it is unknown whether habitat improvements will positively impact fishery yields in the long run. Therefore, the impact to communities and processors from this option is unknown, though any impact would be proportional to the impact on fishers in the short-run (U).

4.7.3.6.4 Impacts to Consumers

Impacts to consumers would occur if there is a change in available product quantity or price. On the world market, West Coast groundfish make up a small proportion of groundfish available to consumers. A potential change in product available to the market under this option is unlikely to have measurable effects on consumers (0).

4.7.3.6.5 Impacts on Safety

Impacts to safety are likely to occur if there is a reduction in vessel net revenues, if vessels are forced to fish under more hazardous conditions, or if vessels are required to carry additional safety equipment. Under this option, vessels are not being forced to fish in more hazardous conditions, but it is unknown whether there will be a reduction in vessel net revenues. Vessels that are required to carry a VMS may see increases in safety since a vessel in distress may be more easily located if it has VMS. Therefore, impacts to safety are generally positive (E+).

4.7.3.7 Alternative C.7

Close Areas of Interest

4.7.3.7.1 Option C.7.1

Close areas to bottom trawling (E-)

4.7.3.7.1.1 Impacts to Fisheries

Closing areas to trawling would tend to have negative consequences as revenue is displaced, and effort shifts to areas remaining open. The shift of effort to other areas may tend to increase competition in remaining open areas, which may result in lower catch per unit effort–as a result of localized depletion–and may result in higher costs if vessels fish more intensely to make up those revenues. Under this alternative, the amount of displaced bottom trawl revenue from the limited entry trawl fleet is estimated to be $29,471,349 over a four year period if measured by revenue from the entire 10x10 block areas, or $12,601,536 if measured by a proportion of those areas. If VMS is required for this option (in order to enforce the closed area), vessels that do not currently have VMS may be forced to incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location (NMFS July 2003).

If displaced revenues result in lost revenue, trawl vessels may participate more heavily in non-trawl fisheries and negatively effect vessels in those other fisheries through increased competition and reductions in available fishery resource per vessel.

4.7.3.7.1.2 Impacts on Management and Enforcement

Closing additional areas would put burdens on enforcement agencies to monitor those areas in addition to monitoring existing closed areas (E-).

4.7.3.7.1.3 Impacts on Processors and Communities

Impacts to processors and communities would occur if there is a reduction in revenues and landed catch associated with the closures occurring under this option. It is unknown if part or all of the revenues and pounds put at risk will be lost. Therefore, the impact to communities and processors from this option is unknown, though any impact would be proportional to the effect on fishers in the short-run.

4.7.3.7.1.4 Impacts to Consumers

Impacts to consumers would occur if there is a change in available product quantity or price. On the world market, West Coast groundfish make up a small proportion of groundfish available to consumers. A potential change in product available to the market under this option is unlikely to have measurable effects on consumers (0).

4.7.3.7.1.5 Impacts on Safety

Impacts on safety are likely to occur if there is a reduction in vessel net revenues, if vessels are forced to fish under more hazardous conditions, or if vessels are required to carry additional safety equipment. Under this option, vessels are not being forced to fish in more hazardous conditions, but it is unknown whether there will be a reduction in vessel net revenues. Vessels that are required to carry a VMS may see increases in safety since a vessel in distress may be more easily located if it has VMS. Therefore, impacts to safety are generally positive (E+).

4.7.3.7.2 Option C.7.2:

Close areas to all bottom contact activities (E-)

4.7.3.7.2.1 Impacts on Fisheries

Closing areas to bottom tending fishing gear would tend to have negative consequences as revenue and effort is displaced, and effort shifts to areas remaining open. The shift of effort to other areas may tend to increase the amount of competition in remaining open areas, which may result in lower catch per unit effort–as a result of localized depletion–and may result in higher costs if vessels fish more intensely to make up those revenues. Under this alternative, the amount of displaced bottom trawl revenue from the limited entry trawl fleet is estimated to be $29,471,349 over a four year period if measured by revenue from the entire 10x10 block areas, or $12,601,536 if measured by a proportion of those areas. If VMS is required for this option (in order to enforce the closed area), vessels that do not currently have VMS may incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location (NMFS July 2003).

Depending on how various fisheries are effected, some may experience larger amounts of displaced effort than others. If displaced revenues result in lost revenue, vessels that are relatively more effected may participate more heavily in other fisheries and negatively effect vessels in those other fisheries through increased competition and reductions in available fishery resource per vessel.

4.7.3.7.2.2 Impacts on Management and Enforcement

Closing additional areas would put burdens on enforcement agencies to monitor those areas in addition to monitoring existing closed areas (E-).

4.7.3.7.2.3 Impacts on Processors and Communities

Impacts to processors and communities would occur if there is a reduction in revenues and landed catch associated with the closures occurring under this option. It is unknown if portions or all of the revenues and pounds put at risk will be lost. Therefore, the effect to communities and processors from this option is unknown, though any effect would be proportional to the effect on fishers in the short-run (U).

4.7.3.7.2.4 Impacts to Consumers

Impacts to consumers would occur if there is a change in available product quantity or price. On the world market, West Coast groundfish make up a small proportion of groundfish available to consumers. A potential change in product available to the market under this option is unlikely to have measurable effects on consumers (0).

4.7.3.7.2.5 Impacts on Safety

Impacts to safety are likely to occur if there is a reduction in vessel net revenues, if vessels are forced to fish under more hazardous conditions, or if vessels are required to carry additional safety equipment. Under this option, vessels are not being forced to fish in more hazardous conditions, but it is unknown whether there will be a reduction in vessel net revenues. Vessels that are required to carry a VMS may see increases in safety since a vessel in distress may be more easily located if it has VMS. Therefore, impacts to safety are generally positive (E+).

4.7.3.8 Alternative C.8

Zoning fishing activities (E-)

4.7.3.8.1 Option C.8.1

Fishing zones are established for bottom-contact trawls, dredges, and similar bottom-tending mobile fishing gear. Other bottom-contacting gear types are unaffected by the zoning system, including the prohibition outside 2,000 m.

4.7.3.8.1.1 Impacts on Fisheries

Zoning fishing activities will act similarly to area closures by designating certain areas for certain gear types, and excluding those gears from other areas. The closure of areas to bottom tending fishing gear would tend to have negative consequences as revenue is displaced, and effort increases in zones designated for those gears. Increased effort in zoned areas may tend to increase competition in those areas, which may result in lower catch per unit effort–as a result of localized depletion–and may result in higher costs if vessels fish more intensely to make up those revenues. If VMS is required for this option (in order to enforce the closed area), vessels that do not currently have VMS may incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location (NMFS July 2003).

Depending on how various fisheries are effected, some may experience larger amounts of displaced effort than others. If displaced revenues result in lost revenue, vessels that are relatively more effected may participate more heavily in other fisheries and negatively effect vessels in those other fisheries through increased competition and reductions in available fishery resource per vessel.

4.7.3.8.1.2 Impacts on Management and Enforcement

Additional area management would put burdens on enforcement to monitor those areas in addition to existing closed areas. Furthermore, this alternative would require more work on the part of administrative agencies in evaluating the impact of gear types and areas appropriate for zoning. (E-).

4.7.3.8.1.3 Impacts on Processors and Communities

Impacts to processors and communities would occur if there is a reduction in revenues and landed catch associated with the type of area management occurring under this option. It is unknown if part or all of the revenues and pounds put at risk will be lost. Therefore, the effect to communities and processors from this option is unknown, though any effect would be proportional to the effect on fishers in the short-run (U).

4.7.3.8.1.4 Impacts to Consumers

Impacts to consumers would occur if there is a change in available product quantity or price. On the world market, West Coast groundfish make up a small proportion of groundfish available to consumers. A potential change in product available to the market under this option is unlikely to have measurable effects on consumers (0).

4.7.3.8.1.5 Impacts on Safety

Impacts to safety are likely to occur if there is a reduction in vessel net revenues, or if vessels fish under more hazardous conditions. Under this option vessels are not being forced to fish in more hazardous conditions, but it is unknown whether there will be a reduction in vessel net revenues. Therefore, impacts to safety are unknown (U).

4.7.3.8.2 Option C.8.2

Fishing zones are established for all bottom-contacting gear types, including bottom longlines, traps, and pots. The immediate closure outside of 2,000 m applies to all bottom-contacting gear types. (E-)

4.7.3.8.2.1 Impacts on Fisheries

Zoning fishing activities will act similarly to area closures by designating certain areas for certain gear types, and excluding those gears from other areas. The closure of areas to bottom tending fishing gear would tend to have negative consequences as revenue is displaced, and effort increases in zones designated for those gears. Increased effort in zoned areas may tend to increase the amount of competition in those areas, which may result in lower catch per unit effort–as a result of localized depletion–and may result in higher costs if vessels fish more intensely to make up those revenues. If VMS is required for this option (in order to enforce the closed area), vessels that do not currently have VMS may incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location (NMFS July 2003).

Depending on how various fisheries are effected, some may experience larger amounts of displaced effort than others. If displaced revenues result in lost revenue, vessels that are relatively more effected may participate more heavily in other fisheries and negatively effect vessels in those other fisheries through increased competition and reductions in available fishery resource per vessel.

4.7.3.8.2.2 Impacts on Management and Enforcement

Additional area management would put burdens on enforcement to monitor those areas in addition to existing closed areas (E-).

4.7.3.8.2.3 Impacts on Processors and Communities

Impacts to processors and communities would occur if there is a reduction in revenues and landed catch associated with the type of area management occurring under this option. It is unknown if portions or all of the revenues and pounds put at risk will be lost. Therefore, the impact to communities and processors from this option is unknown, though any impact would be proportional to the effect on fishers in the short-run (U).

4.7.3.8.2.4 Impacts to Consumers

Impacts to consumers would occur if there is a change in available product quantity or price. On the world market, West Coast groundfish make up a small proportion of groundfish available to consumers. A potential change in product available to the market under this option is unlikely to have measurable effects on consumers (0).

4.7.3.8.2.5 Impacts on Safety

Impacts to safety are likely to occur if there is a reduction in vessel net revenues, or if vessels are forced to fish under more hazardous conditions. Under this option, vessels are not being forced to fish in more hazardous conditions, but it is unknown whether there will be a reduction in vessel net revenues. Vessels that are required to carry a VMS may see increases in safety since a vessel in distress may be more easily located if it has VMS. Therefore, impacts to safety are generally positive (E+).

4.7.3.9 Alternative C.9

Establish effect-reducing fishing gear requirements: This alternative encompasses a suite of effect-reducing fishing gear options including: 1) prohibit roller gear larger than 15 inches; 3) prohibit flat trawl doors; 5) limit longline groundline to 3 nm; 6) employ habitat friendly anchoring systems for fixed gear; 7) prohibit dredge gear; 8) prohibit beam trawl gear; 9) prohibit set gillnets in waters deeper than 60 fathoms; and 11) prohibit dingle bar troll gear. (E-)

4.7.3.9.1 Impacts to Fisheries

In general, the sub options may decrease opportunities or catch per unit effort for some fishers, impose a cost in the form of additional/different equipment, and may–in whole or part–eliminate some fisheries.

4.7.3.9.1.1 Option 1

The prohibition of roller gear larger than 15 inches may reduce opportunities in areas with high relief substrate where roller gear larger than 15 inches is required to successfully access those areas. However, most vessels do not currently use roller gear in excess of 15 inches (Brown, McMullen, Pettinger 2004. personal communication), so additional costs may be minimal and effects may only come in the form of reduced future opportunities for fishing in areas that require roller gear larger than 15 inches to be accessed.

4.7.3.9.1.2 Option 2

The requirement to use weak links on tickler chains would likely be a minimal accounting cost. Depending on how the gear is set up, if a weak link were to break at sea, the vessel may incur opportunity costs in the form of time required to fix the chain.

4.7.3.9.1.3 Option 3

The prohibition of flat trawl doors would have a cost effect to fishers that currently use flat trawl doors. In the northern areas, this may be 40–60% of groundfish trawl vessels, and those vessels may incur a cost in the range of $3,000 - $8,000 apiece to replace trawl doors (Pettinger 2004, personal communication). Nearly all shrimp vessels use flat trawl doors due to the associated stability and height which is needed to bring the trawl net high enough to catch shrimp (6–8 feet off the bottom). There are no known cambered doors that would be effective for shrimp trawling at this time, and experimentation would be needed to develop a cambered shrimp door. This may effectively close the shrimp trawl fishery until such a door can be created (Pettinger 2004 and McMullen 2004, personal communications). Vessels that currently use flat trawl doors would see a reduction in net revenues under this option.

4.7.3.9.1.4 Option 4

Requiring aluminum trawl doors could effect all trawl vessels in the short-run since aluminum doors are typically not currently used and purchasing these doors would require vessels to incur additional cost. Aluminum trawl doors may not be heavy enough to remain in contact with the ocean bottom, which may reduce the catch-per-unit-effort of trawl vessels, or force trawlers to place weights on the trawl doors. In the long-run, aluminum trawl doors are likely to effect bottom trawl and shrimp trawl vessels since aluminum trawl doors are likely to be less durable than steel doors and may require additional maintenance, repair, and replacement due to the stress of bottom trawling.

4.7.3.9.1.5 Option 5

Limiting the length of longline is expected to have relatively slight effect on fishers. If vessels are forced to make more longline sets to achieve the same catch, vessels may be forced to purchase more groundline anchors, buoys, and poles to affix at each end. The cost of additional polyform buoys is approximately \$20 - \$40, the cost of additional anchors is on the order of \$30, and the cost of pole weights is approximately \$17 (Go2Marine, November 2004, personal communication). This additional cost would represent a decrease in net revenues to fixed gear fishers.

4.7.3.9.1.6 Option 6

Requiring fixed gear vessels to use habitat-friendly anchoring systems may require those vessels to replace their current fixed gear anchors, and this would impose an additional cost to those fishers. A review of anchors resembling the “Bruce” anchor (an anchor design with a weak link which allows the anchor to be retrieved from the shovel instead of the shaft if it gets snagged) suggests that the costs of an imitation “Bruce” may be \$10 for a 2.2 pound anchor, while those produced by the original company may be on the order of \$110 for a 11 pound anchor. Replacing anchors would reduce net revenues.

4.7.3.9.1.7 Option 7

The prohibition of dredge gear is not expected to have an effect since there are no dredge fisheries known to be currently operating.

4.7.3.9.1.8 Option 8

The prohibition of beam trawl gear would close the California beam trawl fishery. This is likely to have negative effects to those vessels that currently participate in the beam trawl fishery. According to CDFG data, shrimp landings caught with beam trawl gear have ranged from approximately 69,000 to 15,000 pounds annually from 1990–1999, and have generated approximately \$87,000 to \$219,000 in exvessel revenues over the same period. This catch would be put at risk under a beam trawl prohibition.

4.7.3.9.1.9 Option 9

The prohibition of set gillnets deeper than 60 fathoms may put some revenues at risk if set gillnets are currently being set at those depths. In September 2000, the California Department of Fish and Game (CDFG) issued emergency regulations that prohibited set gillnet fishing inshore of 110 m (60 fm) in central California from Point Reyes to Yankee Point in Monterey Bay and from Point Arguello to

Point Sal, citing concerns over the incidental take of common murre (*Uria aalge*) and California sea otters (*Enhydra lutris*). A permanent ban on gill and trammel nets inshore of 110 m (60 fm) from Point Reyes to Point Arguello became effective in September 2002 (SWFSC, November 2004). Closing waters deeper than 60 fathoms to set gillnet fishing would therefore eliminate set gillnet fishing in those portions of the California coast. Depending on the amount of set gillnet fishing occurring in that area now, set gillnet effort may switch to other areas, or set gillnet fishermen may participate in other fisheries using other gear.

4.7.3.9.1.10 Option 10

The prohibition of stick gear and weights with hooks on the bottom may displace some revenues and effort, though the effect of this alternative is largely unknown.

4.7.3.9.1.11 Option 11

The impact of a dingle bar troll gear prohibition would come in the form of reduced future opportunity. The prohibition of dingle-bar troll gear would make it more difficult to establish the directed lingcod fishery when the lingcod stock becomes rebuilt.

4.7.3.9.2 Impacts to Management and Enforcement

The sub options identified in this alternative may increase demands on enforcement because enforcement agencies would need to verify compliance with additional gear restrictions or modifications (E-).

4.7.3.9.3 Impacts on Processors, Communities, Consumers, and Safety

The options described under this alternative are not expected to have an effect on processors, communities, consumers, or safety. Each of the sub options individually has a relatively minor effect on vessel net revenues and/or landed pounds, and this minor effect is generally translated into negligible effects to processors, communities, or consumers. However adopting several of the sub options in combination may have negative effects, especially in certain geographic areas. Effects to safety are not expected to occur because changes in vessel net revenues are expected to be minor, and vessels are not being forced to fish in more hazardous conditions (0).

4.7.3.10 Alternative C.10

The Nature Conservancy/Environmental Defense Alternative: Vessel Buyback and Central California No Trawl Zones (U).

Appendix F gives the specifics of this proposals and TNC&EDF's evaluation of their proposal. Appendix G is a very preliminary draft EA on the proposal that will be updated as additional information is developed for the proposal and as the alternative becomes more specific as a result TNC&EDF's negotiations with the industry and the discussions with the Pacific Fishery Management Council. The discussion below contains excerpts from both documents. According to TNC&EDF:

> The project aims to protect biodiversity and promote recovery of groundfish stocks through the establishment of large no-trawl zones in federal waters between Point Conception and Davenport….
>
> Our project approach would be to purchase a significant majority of the bottom trawling permits and vessels and perhaps processors in the region in exchange for a significant portion of the project area designated as no-bottom trawl zones. The no-trawl zones would be sited using a participatory process with the goal of maximizing conservation gains while minimizing adverse socio-economic effects on processors and

> fishermen and their workforces. We intend to work closely with the residual fleet to identify key fishing grounds that would remain open for bottom trawling.

As stated by TNC&EDF, it is difficult to assess the financial costs and benefits to various users because of the buyback. Therefore, qualitative comments that provide a sense of the relative effects are provided.

> "Since the no-trawl zones would be sited through a participatory process aimed at minimizing socioeconomic costs and maximizing conservation benefits (and because we do not have access to confidential trawl track information), we cannot provide an accurate appraisal of these costs and benefits at this time."

4.7.3.10.1 Impacts on Fisheries

Project Area Groundfish Trawlers: The Buyback program would involve purchasing a majority of the approximately 23-26 vessels that regularly fish in the project area. They deliver collectively about $5-6 million annually in groundfish to about 7-8 major processors of seafood. Those participating in the buyback would obviously benefit from this alternative, as participants would not agree to leave the fishery unless financial remuneration was in their favor. The remaining project area buyback vessels would benefit from the revenues associated with larger trip limits and less competition on the fishing grounds, but would also see their costs rise as they are shifted from higher CPUE grounds to lower CPUE grounds, perhaps fishing grounds further from port. If the number of vessels and area fished effects the CPUE—it is unclear how CPUE will change because there will be fewer vessels (positive effect on CPUE) but a smaller amount of area to fish (negative effect on CPUE.)

Non-Project Area Groundfish Trawlers: Should any of the project area catches be transferred to outside the area through redesign of trip limits, non-project area groundfish trawlers may benefit. On the other hand, project area trawlers may transfer their effort to other ports causing more competition on non-Project area grounds.

Other fishing groups: Since these groups will be able to fish in the reserves, they will have less competition for the available species of fish found within the reserves. Other fishing groups may benefit from the availability of excess vessels and equipment should they not be scrapped. However, if the Buyback contract with TNC&EDF does not prevent re-entry into other fisheries, participants in the Buyback could take their payments and purchase state permits to fish other species of fish such as shrimp or crab. This was a common complaint with the 2003 Groundfish Buyback Program.

4.7.3.10.2 Impacts on Processors

There are approximately 6-8 processors associated with the project area. If total catch remains the same, the flow of product to the plants should remain the same. If the reserves cause harvesting costs to increase and if the Buyback reduces the amount of vessels that are able to supply the plants, ex-vessel prices may increase as a result. Scheduling of deliveries may be problematic with a reduced number of vessels. If the Buyback results in a significant number of vessels being purchased, the Processors will have to make the choice to continue processing, offering higher prices to bid trawlers from outside the project area to relocate into their port, or purchase limited entry trawler permits themselves to guarantee an adequate supply of fish.

4.7.3.10.3 Impacts on Communities and Ports

The primary California communities that may be effected by this alternative are: Avila, Watsonville, Del Mar, Moss Landing, Monterey, and Half Moon Bay. As indicated by TNC&EDF, communities may lose revenues from trawling and funding for harbor activities but potentially gain from increase activities by other gear groups and by the potential for ecotourism. There may be an increase in existence value, option value, and enhanced heritage value from the establishment of no-trawl zones.

4.7.3.10.3.1 Impacts on Processing labor and Fishing crew

With a reduction in the number of trawlers, fishing crew will become unemployed. Processing labor may be similarly effected if the total amount of fish landed is reduced or processors choose to close the plants. Any negative effects will be counterbalanced by TNC&EDF's willingness to offer some level of mitigation:

> Bearing in mind that the buyout that we are proposing would, in and of itself, greatly reduce economic effects arising from no-trawl zones in the project area, both TNC and Environmental Defense are committed to soften the effect of shifts and consolidations in the industry that may result from the implementation of our project. We will encourage companies and fisherman who may be the beneficiaries of the private buyback to give due financial consideration to employees who may be terminated; and likewise, we will do the same and consider some type of severance and/or training programs to assist in their transition to another job or career. Vessel crews, processing employees, skippers and other industry employees will be considered for assistance.

4.7.3.10.4 Impacts on Management and Enforcement

TNC&EDF state:

> Conceptually, large no trawl zones should present no significant new law enforcement or compliance challenges. They could be enforced in the same way as other closed areas. Compliance should increase as Vessel Monitoring Systems are introduced and finalized into the fleet as planned. Enforcement capacity has been enhanced in other National Marine Sanctuaries through the cross-deputization of agents from several enforcement bodies at the state, regional and federal levels.

While VMS is a good system, the costs of monitoring will go up because in addition to monitoring the rockfish conservation areas and existing marine reserves, enforcement officials will now have to monitor an additional set of marine reserves. It is presumed that fewer, larger, and more-straight lined the proposed closed areas are, the lower the enforcement costs will be (E-).

While the proposed set of marine reserves may add extra burden on fisheries management, they could also ease management burden if they reduce need for the rockfish conservation areas or adjustments in the rockfish conservation areas. Reducing the number of participants in the groundfish fishery may make allocation decisions and trip limit decision easier, while also reducing the need for area specific in-season adjustments.

4.7.3.11 Alternative C.11

Allow fish to be harvested by any legal gear without regard to gear endorsement

This alternative would allow fishers to harvest groundfish regardless of any gear endorsement that is currently tied to a permit. Under this alternative, fishers may be permitted to change gears mid-season. A possible scenario may be one where fixed gear vessels target flatfish with trawl gear, and DTS and shelf trawlers target sablefish with fixed gear. Indeed, market incentives may encourage trawl vessels to target sablefish with fixed gear due to the higher price per pound associated with sablefish caught with fixed gear (sablefish caught with fixed gear were worth over $1.00 per pound more than sablefish caught with trawl gear in 2003). This may create a case where there is a reduction of trawl effort in some areas and a switch to fixed gear to target sablefish. However, doing so may mean a reduction in the catch of other DTS species (Dover sole and thornyheads) due to the lower effectiveness of fixed gear in catching those other species, or lower cumulative limits for sablefish if additional vessels target them. The potential for trawlers to switch to fixed gear would depend on the amount of revenue foregone that is related to trawl caught non-sablefish species versus the amount of revenue they are gaining by catching higher priced sablefish with fixed gear. Analysis of revenue and rebuilding species effects is provided in Socioeconomic Table 4-6 and 4-7. A discussion of those effects is provided below.

4.7.3.11.1 Impacts to Fisheries

This alternative is expected to have a non-negative effect on aggregate fishing revenues since vessels would only switch gear types if there is an economic incentive in doing so. However, some vessels may be adversely effected, or see less positive effects than others. If vessels switch gear types, it is more likely that trawl vessels will shift to fixed gear due to the relative cost of purchasing and installing trawl gear versus fixed gear equipment, and the inability of most fixed gear vessels to accommodate trawl gear due to size and power limitations (E-/E+).

In a single species fishery, vessels may tend toward using a single gear type because of the lower marginal costs associated with doing so. In a multi-species fishery without gear restrictions, with trip limits, constraining species, or price differentiation, vessels are more likely to use several gears to target multiple species in order to cover their fixed costs. Based on this notion, several changes in fleet structure are likely under this alternative. 1) DTS trawlers may switch to fixed gear during parts of the year to target sablefish, 2) shelf trawlers may switch to fixed gear during portions of the year to target sablefish, and 3) some fixed gear vessels may convert to trawling to target shelf flatfish.

Under this alternative, it is possible that total trawl effort would not change along the shelf. The catch per unit effort associated with fixed gear caught flatfish in combination with the price per pound for most flatfish species would tend to make it difficult for vessels to make a profit by using fixed gear to target flatfish along the shelf. Although total trawl effort may not change along the shelf (though the number of vessels may change), incentives may encourage fixed gear vessels to use trawl gear for targeting flatfish. This may not change total trawl effort since total effort on the shelf is constrained by rebuilding species and target species OYs, but the number of vessels trawling for flatfish may increase, thus reducing the pounds of flatfish harvest per vessel.

If DTS trawlers make more net revenue by using fixed gear, those vessels may use fixed gear during portions of the year. This would tend to reduce the amount of trawl effort along the slope. However, the inability of fixed gear to catch other DTS species (Dover sole and thornyheads) relative to trawl gear may make it less profitable for some–or all–of these vessels to switch gear types if the reduction in catch of Dover sole and thornyheads outweighs the benefits of the higher price for fixed gear sablefish.

Under this alternative, shelf flatfish trawlers may switch to fixed gear and target sablefish, thus increasing the number of vessels targeting sablefish and reducing available pounds per vessel. This may increase revenues for those shelf trawlers that switch gear, but may reduce revenues for DTS trawlers depending on the number of shelf trawlers that switch gear types.

Depending on the opportunities afforded to fixed gear vessels that may switch to trawling during portions of the year, the relative cost of installing trawl gear on those vessels may not be a prohibitive factor. A review of trawl gear for sale in 2004 and 2003 suggests that the cost of hydraulic pumps, deep water winches, hook line, net reel, and windlass may range from $15,000 to $20,000 (Fishermen's News, October 2004, June 2004, and December 2003), the cost of trawl net and doors may be on the order of $5,000 (Fishermen's Marketing Association, November 2004, personal communication). Unfortunately, readily available information does not exist to estimate the cost of installing this equipment, but these costs amortized over multiple years may make it feasible for some fixed gear vessels to participate in trawl fisheries. If those vessels were to then target flatfish with trawl gear, trawl vessels that have historically targeted flatfish would be adversely effected since they do not have a formal allocation for flatfish species, and the OY for many flatfish species are currently being achieved, or are projected to be achieved beginning in 2005, because of new trawl technology (PFMC 2004). Additional vessels targeting flatfish would therefore reduce the catch available to existing flatfish trawl vessels.

Socioeconomic Table 4-6 looks at the revenues that may be gained or lost on a fleet wide basis if vessels change gear types. The upper bound range of revenues shows the revenue effect assuming there are no changes in the amount of Dover sole and thornyheads being landed, and that the price differential between fixed gear and trawl caught sablefish in 2003 is maintained (a difference of over $1.00 per pound). The lower bound revenue range assumes that Dover sole and thornyhead landings would decrease as the amount of sablefish caught with fixed gear increases. This is based on the relative ratios of sablefish to Dover sole and thornyheads caught with trawl gear and longline gear. The scenarios shown in the table are hypothetical, but encompass a range of possible effects based on the allocation of sablefish amongst sectors. The revenue columns show the change in the amount of revenue that would be achieved with the switch in gear type over what would be achieved without the change in gear type under the status quo. These columns should be viewed as a revenue change relative to status quo management rather than of a total amount. It is unknown whether the lower or upper range is more likely, but the most likely scenario is somewhere between the lower and upper bounds.

4.7.3.11.2 Impacts to Management and Enforcement

Although this alternative may theoretically increase gross revenues and decrease trawl effects on slope habitat, this alternative may also have incidental catch implications that may limit the ability of this alternative to be successful with existing management tools. For example, the incidental take of Yelloweye rockfish is higher for fixed gear than for trawl gear. If trawl vessels were to switch to fixed gear, the incidental take of Yelloweye rockfish would likely increase and–depending on the take in other fishery sectors–that increase may be substantial enough to exceed the Yelloweye rockfish OY.

If existing predictive tools (e.g., the trawl bycatch model) continue to be the primary mechanism for structuring fishing regulations, these tools may be compromised because agencies may find it difficult to predict when vessels would shift gear types. The inability to predict when and to what degree vessels may shift effort between gear types would have implications for adequately predicting the catch of both target and non-target species. The inability to adequately predict catch is likely less of an issue for vessels that may switch to fixed gear from trawling, but the risk of exceeding groundfish species OYs increases if fixed gear vessels are allowed to switch to trawl gear because of the generally larger catch quantities associated with trawl gear. Furthermore, the likelihood of a disaster tow occurring increases if fixed gear vessels are allowed to use trawl gear because some of these vessels may not be familiar with locations that are commonly avoided by the existing trawl fleet due to bycatch implications.

Socioeconomic Table 4-7 shows possible implications on Yelloweye rockfish and Canary rockfish from allowing trawl vessels to switch to fixed gear. The first column represents a scenario where trawl vessels catch the listed metric tons of sablefish with fixed gear. The incidental catch columns represent the additional mortality of Yelloweye and Canary rockfish that would occur if trawl vessels were to catch that amount of sablefish with fixed gear. These estimates were generated using the NWFSC/GMT trawl and fixed gear bycatch models and assume the trawl and non-trawl RCA boundaries in effect for 2005 remain in effect under each scenario, and that the only change in trawl effort occurs seaward of the RCA. The columns referring to the remaining Canary and Yelloweye rockfish OY represent a "buffer" and are derived by using Canary and Yelloweye rockfish mortality estimates in the GMT bycatch scorecard[2] for 2005 management measures.

4.7.3.11.3 Impacts to Communities and Processors

Under this alternative, gross revenues may increase if trawl vessels switch to fixed gear to target sablefish, and the landed catch quantities of other species remain unchanged. Depending on the amount of trawl sablefish caught with fixed gear, and the change in the amount of other species previously caught by those vessels, exvessel revenues could increase by several million dollars. Communities would tend to be positively effected by an increase in exvessel revenues through additional expenditures in those communities. However while switching gear type may result in no change in vessel net revenue, it may result in a reduction in gross revenues, thereby also reducing the level of expenditures by those vessels in effected ports.

4.7.3.11.4 Impacts to Consumers

Consumers may be effected if there is a change in quantity or market price resulting from a change in West Coast fisheries. However it is unlikely that a change in the quantity and quality of groundfish caught along the West Coast under this alternative would have a noticeable effect on consumers due to the ease of product substitutability and the availability of other, similar species and products on the market.

4.7.3.11.5 Impacts to Safety

It is unlikely that safety concerns would increase under this alternative. If exvessel revenues increase, vessels may be able to afford additional safety equipment which would increase the level of safety. However, whether vessel revenues will ultimately increase is unknown. Therefore, the effect of this alternative on safety is unknown.

4.7.3.12 Alternative C.12

Comprehensive collaborative alternative (Oceana proposal): The fishing impact minimization tools of this alternative include area closures and gear restrictions. This alternative would close several areas to bottom trawling, prohibit the expansion of the trawl footprint, and set the maximum footrope size to 8 inches throughout the EEZ off the West Coast. In addition, catch reductions are mentioned as a potential tool to be used by the Council "as appropriate". (E-)

4.7.3.12.1 Impacts to Fisheries

In general, this alternative would put bottom trawl revenues at risk, and make it difficult for trawl vessels to access areas where large footrope trawl gear has been used in the past. Effects to trawl vessels would also come in the form of reduced future opportunities as trawl gear would not be allowed to fish in areas that were not trawled during the 2000–2003 period. Costs may change as vessels move to other locations. If those areas are further from port, and/or vessels are forced to fish more intensely to make up revenues, costs are likely to increase.

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[2] The GMT scorecard is a tool used for tracking and estimating the annual mortality of overfished species by fishery sector.

Socioeconomic Table 4-8 shows the estimated amount of displaced revenue over a four year period by species grouping. The sum of all areas proposed in this alternative displaces more revenue from the DTS complex than for other species groupings. The estimated proportioned block DTS revenues at risk are approximately 18% of DTS bottom trawl revenues generated by the fleet as a whole, while the estimated total block DTS revenues at risk are approximately 40% of DTS bottom trawl revenues generated by the fleet as a whole. Proportioned block Petrale revenues at risk represent slightly less than 20% of Petrale bottom trawl revenues, while total block Petrale revenues at risk represent approximately 40% of Petrale bottom trawl revenues generated by the fleet in total. Estimated proportioned rockfish revenues at risk represent approximately 25% of revenues generated by the fleet, while total block rockfish revenues at risk represent approximately 60% of revenues generated by the fleet in total.

Socioeconomic Table 4-9 shows the estimated amount of displaced revenue over a four year for individual proposed closure areas under alternative C.12. According to Socioeconomic Table 4-9, the 10 largest proposed closed areas in terms of total block revenues at risk are Olympic 1, Olympic 2, Eel River Canyon, Rogue Canyon, Astoria Canyon, Heceta Bank, Monterey Bay and Canyon, Ridges Biogenic Area 5, Mendocino Ridge, and Cordell Bank[3]. The 10 largest proposed closed areas in terms of revenues at risk for proportioned block areas are Olympic 1, Eel River Canyon, Olympic 2, Astoria Canyon, Monterey Bay and Canyon, Heceta Bank, Mendocino Ridge, Rogue Canyon, Ridges Biogenic Area 5, and Cordell Bank.

Net revenues in other bottom trawl vessels (such as shrimp trawlers) may be reduced if those vessels are required to carry VMS to monitor compliance with new area closures. If VMS is required, vessels that do not already carry VMS may be forced to incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location (NMFS July 2003). This cost compares to approximately $69,000 of average annual gross revenue being made by vessels that made shrimp landings with shrimp trawl gear over the 2000–2003 year period (PacFIN July 2004).

The distribution of effects resulting from this alternative is largely unknown. Depending on the level of change in net revenues, some trawl vessels may choose to move into other fisheries–in whole or in part–thereby negatively effecting fishers in those other fisheries. Trawl vessels that fish in regions with relatively more closed areas may have a larger portion of their historic revenues put at risk than other vessels and this may translate into a larger amount of lost revenue when compared to vessels in other areas. If displaced revenues result in lost revenue, vessels may participate more heavily in other fisheries and negatively effect vessels in those other fisheries through increased competition and reductions in available fishery resource per vessel. Vessels that currently do not have VMS are likely to be more effected by alternatives that impose additional closed areas.

4.7.3.12.2 Impacts to Management and Enforcement

The effect of this alternative on management and enforcement would require establishing and monitoring additional closed areas. This option would require that enforcement agencies monitor new closed areas in addition to existing RCAs and other existing conservation areas/marine protected areas.

- [3] A groundfish closure is currently in place for both commercial and recreational fishing on the Bank.

4.7.3.12.3 Impacts on Processors and Communities

Effects to processors and communities are largely dependent on potential changes in landed catch volume, net revenues from fishing activity, and regional shifts in revenues and landed catch. A change in landed catch volume may translate into a change in processing labor and processing revenues, while a change in net revenues may translate into a change in expenditures made within those communities. Unfortunately, the ability to predict shifts or reductions in landed catch volume and revenues does not currently exist due to data limitations, so the aggregate effect to processors and communities is unknown. However, if some portion of revenues put at risk under this alternative are lost, then processors and communities near areas that have relatively more closures may be effected to a greater degree than processors and communities in other areas. In the long-run, processors may change location and move operations to communities with relatively few closures nearby.

4.7.3.12.4 Impacts to Consumers

Impacts to Consumers may occur if changes in the volume of fish landed along the West Coast translate into a change in market price or product availability. On a global scale, West Coast groundfish represent a small portion of groundfish species available to consumers, and groundfish landed along the West Coast are easily substituted by groundfish caught in other regions. It is therefore unlikely that this alternative would have any noticeable effect on consumers.

4.7.3.12.5 Impacts on Safety

Effects to safety are unknown under this alternative since there are some factors that may increase the level of safety, and some that may decrease safety. Soft sediment exists along the continental slope areas, and large footrope trawl gear is used there to keep the trawl from digging in. Small footrope trawl gear would be more prone to dig into soft sediment in these areas and cause safety hazards if trawl nets become stuck in the bottom. In addition, a reduction in net revenues at the vessel level may make it more difficult for fishers to afford safety equipment and perform routine maintenance, and this may create a more hazardous environment at sea. Vessels that are required to carry a VMS may see increases in safety since a vessel in distress may be more easily located if it has VMS.

4.7.3.13 Alternative C.13

Comprehensive collaborative alternative but areas would be closed to all fishing: This alternative is the same as alternative C.12, but areas would be closed to all fishing instead of only being closed to bottom trawling. (E-)

4.7.3.13.1 Impacts to Fisheries

This alternative essentially establishes a set of marine reserves that would close fishing within certain areas and displace revenues from all fisheries that are active in those areas. Unfortunately spatial data does not exist for non-trawl fisheries, so quantifying displaced revenues from those fisheries is not possible. Displaced revenues may result in lost net revenues to some fishers, and depending on the degree of loss, may provide incentives for some fishers to switch fisheries, thereby negatively effecting those other fisheries due to an increase in the number of participants. Net revenues may be reduced if vessels are required to carry VMS to monitor compliance with new area closures. If VMS is required, vessels that do not already carry VMS may be forced to incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location (NMFS, July 2003). Due to the lack of data, it is uncertain whether fishers will change strategies and concentrate on other fisheries or species.

A potential benefit to this alternative is addressed in the SSC white paper on marine reserves which states:

> "*Reserves are uniquely qualified to provide a complete age structure for target species and thereby enhance persistence, i.e., the ability of fish stocks to withstand adverse effects associated with environmental variability and management uncertainty and error. In this sense, reserves have significant potential as a tool for mitigating uncertainty in stock assessments and managing unassessed stocks"* (PFMC–SSC. 2004).

This effect is likely more pronounced for this alternative than the others because the other alternatives do not exclude all gear. For example, some alternatives exclude bottom trawl gear but not bottom tending fixed gear. Proposed closed areas in alternatives that do not exclude all gears may not develop stocks with age structure required for enhanced persistence, since non-excluded gears would still induce mortality on groundfish species.

In an economic context, a decrease in future uncertainty (enhanced stock persistence) can be translated into an increase in capital wealth. That is, if fishers believe that the risk of future stock collapse has been reduced through the establishment of a system of marine reserves, the value of fishing capital (vessels and permits for example) will tend to increase assuming future net revenues do not decrease.

4.7.3.13.2 Impacts to Management and Enforcement

The effect of this alternative on management and enforcement would require establishing and monitoring additional closed areas. This option would require that enforcement agencies monitor new closed areas in addition to existing RCAs and other existing conservation areas/marine protected areas.

4.7.3.13.3 Impacts on Processors and Communities

Effects on processors and communities are largely dependent on potential changes in landed catch volume, net revenues from fishing activity, and regional shifts in revenues and landed catch. A change in landed catch volume may translate into a change in processing labor and processing revenues, while a change in net revenues may translate into a change in expenditures made within those communities. Unfortunately, the ability to predict shifts or reductions in landed catch volume and revenues does not currently exist due to data limitations, so the aggregate effect to processors and communities is unknown. However, if some portion of revenues put at risk is lost, then processors and communities near areas that have relatively more closures may be effected to a greater degree than processors and communities in other areas.

During the public comment period, comments were received stating the importance of the Bandon reef area to the communities of Bandon and Coos Bay. Although this area is not actively trawled, other gear types such as hook and line and troll fish the area routinely, and closing this area to all fishing would likely have a notable impact to the communities of Bandon and Coos Bay.

4.7.3.13.4 Impacts to Consumers

Impacts to consumers may occur if changes in the volume of fish landed along the West Coast translate into a change in market price or product availability. On a global scale, West Coast groundfish represent a small portion of groundfish species available to consumers, and groundfish landed along the West Coast are easily substituted by groundfish caught in other regions. Therefore it is unlikely that this alternative would have any noticeable effect on consumers.

4.7.3.13.5 Impacts on Safety

Effects to safety are unknown under this alternative since there are some factors that may increase the level of safety, and some that may decrease safety. Soft sediment exists along the continental slope areas, and large footrope trawl gear is used there to keep the trawl from digging in. Small footrope trawl gear would be more prone to dig into soft sediment in these areas and cause safety hazards if trawl nets become stuck in the bottom. In addition, a reduction in net revenues at the vessel level may make it more difficult for fishers to afford safety equipment and perform routine maintenance, and this may create a more hazardous environment at sea. Vessels that are required to carry a VMS may see increases in safety since a vessel in distress may be more easily located if it has a VMS.

4.7.3.14 Alternative C.14

Comprehensive collaborative alternative but areas would be closed to all bottom tending gear: This alternative is the same as alternative C.12, but excludes all bottom tending gear from proposed closed areas in addition to bottom trawling gear. (E-)

4.7.3.14.1 Impacts to Fisheries

In terms of impacts to fisheries, this alternative falls between alternatives C.13 and C.12. This alternative would displace more revenues than alternative C.12, but less than alternative C.13. Like alternative C.13, spatial information does not exist for non-trawl fisheries, so quantifying the effects to those other fisheries is not possible. Displaced revenues may result in lost net revenues to some fishers, and depending on the degree of loss, that may provide incentives for some fishers to switch fisheries, thereby negatively effecting those fisheries due to an increase in the number of participants. Net revenues may be reduced if vessels are required to carry VMS to monitor compliance with new area closures. If VMS is required, vessels that do not already carry VMS may be forced to incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location (NMFS, July 2003). Due to the lack of data, it is uncertain whether fishers will change strategies and concentrate on other fisheries or species.

4.7.3.14.2 Impacts to Management and Enforcement

This alternative would require an additional management and enforcement commitment, including existing RCAs, other existing conservation areas/marine protected areas, and the new closed areas.

4.7.3.14.3 Impacts on Processors and Communities

Effects to processors and communities are largely dependent on potential changes in landed catch volume, net revenues from fishing activity, and regional shifts in revenues and landed catch. A change in landed catch volume may translate into a change in processing labor and processing revenues, while a change in net revenues may translate into a change in expenditures made within those communities. Unfortunately, the ability to predict shifts or reductions in landed catch volume and revenues does not currently exist due to data limitations, so the aggregate effect to processors and communities is unknown. However, if some portion of revenues put at risk is lost, then processors and communities near areas that have relatively more closures may be effected to a greater degree than processors and communities in other areas.

4.7.3.14.4 Impacts to Consumers

Impacts to consumers may occur if changes in the volume of fish landed along the West Coast translate into a change in market price or product availability. On a global scale, West Coast groundfish represent a small portion of groundfish species available to consumers, and groundfish landed along the West Coast are easily substituted by groundfish caught in other regions. Therefore, it is unlikely that this alternative would have any noticeable effect to consumers.

4.7.3.14.5 Impacts on Safety

Effects to safety are unknown under this alternative since there are some factors that may increase the level of safety, and some that may decrease safety. Soft sediment exists along the continental slope areas, and large footrope trawl gear is used there to keep the trawl from digging in. Small footrope trawl gear would be more prone to dig into soft sediment in these areas and cause safety hazards if trawl nets become stuck in the bottom. In addition, a reduction in net revenues at the vessel level may make it more difficult for fishers to afford safety equipment and perform routine maintenance, and this may create a more hazardous environment at sea. Vessels that are required to carry a VMS may see increases in safety since a vessel in distress may be more easily located if it has a VMS.

4.7.3.15 Impacts Minimization Alternatives and Non-Fishing Activities

It is not known what effect impact minimization requirements placed on commercial fishing operations will have on non-fishing activities in the short-term. In the long-term, benefits associated with a decrease in damage to habitat may create positive effects from possible increases in ecosystem services as a result of habitat protection. Costanza et al (1997) identify several ecosystem services including waste treatment, biological control, genetic resources, and storm protection. Some potential examples that apply to the marine environment include the effect kelp forests have in dampening the effect of storms on coastal areas, and the ability of the marine environment to assimilate output from waste water outfalls from coastal cities.

Impact minimization restrictions placed on commercial fishing operations will have an unknown effect on non-fishing values in the short-term. Positive effects are anticipated if impact minimization options are perceived as permanent, beneficial management actions that will improve habitat quality and productivity. In the long-term, benefits associated with a decrease in damage to habitat are expected to have a positive overall effect on non-fishing values. A positive value may result due to enhanced habitat productivity. For example, if impact minimization options lead to increased habitat productivity, dive trip operators will likely benefit due to their ability to offer an enhanced experience. Passive use values are also expected to increase due to a potential increase in biodiversity, existence value and bequest value. However, it should be noted that some negative effects to social and cultural value may result due to loss of certain gear groups or fishing industry in coastal communities (U).

4.7.4 Research and Monitoring Alternatives

4.7.4.1 Alternative D.1

No Action

4.7.4.1.1 Impacts on the Socioeconomic Environment

By definition, this alternative is not expected to have an effect on the socioeconomic environment

4.7.4.2 Alternative D.2

Expanded Logbook Program

4.7.4.2.1 Option D.2.1

All vessels

4.7.4.2.2 Impacts to Fisheries

An expanded logbook program would require additional vessels to maintain spatial fishing information. This alternative would result in more time spent filling out logbooks by vessel operators. Effects to net revenues are not expected under this option.

4.7.4.2.3 Impacts to Management and Enforcement

An expanded logbook program would place additional burdens on agencies to enter logbook data into an electronic format for use in management activities. The existence of additional logbook data in a format that can be readily used by management would increase the information available for spatial management and would improve the ability of managers to model fishing activities accordingly.

4.7.4.2.4 Impacts on Processors, Communities, Consumers, and Safety

It is unlikely that an expanded logbook program would influence processors, communities, consumers, or safety. An expanded logbook program is not expected to change the manner in which fisheries occur.

4.7.4.2.5 Option D.2.2

Sample of vessels

4.7.4.2.6 Impacts to Fisheries

An expanded logbook program would require additional vessels to maintain spatial fishing information. This alternative would result in more time spent filling out logbooks by vessel operators. Effects to net revenues are not expected under this option.

4.7.4.2.7 Impacts to Management and Enforcement

An expanded logbook program would place additional burdens on agencies to enter logbook data into an electronic format for use in management activities. The existence of additional logbook data in a format that can be readily used by management would increase the information available for spatial management and would improve the ability of managers to model fishing activities accordingly.

A sample of logbooks would reduce the cost of entering and maintaining that data compared with option D.2.1, though a sample would also reduce the amount of spatial fishery information available, and reduce the level of certainty agencies have in estimating spatial effort and catch on a fleet-wide basis.

4.7.4.2.8 Impacts on Processors, Communities, Consumers, and Safety

It is unlikely that an expanded logbook program would influence processors, communities, consumers, or safety. An expanded logbook program is not expected to change the manner in which fisheries occur.

4.7.4.3 Alternative D.3

Expanded Vessel Monitoring System

4.7.4.3.1 Impacts to Fisheries

An expanded vessel monitoring system program would require additional vessels to incur the cost of installing and maintaining VMS equipment, thus reducing net revenues. Vessels that do not already carry VMS may be forced to incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location (NMFS, July 2003).

4.7.4.3.2 Impacts to Management and Enforcement

An expanded VMS program would place additional burdens on agencies to monitor and record data transmitted via additional vessel monitoring systems. If this data is made available to both management and enforcement agencies, it would improve the amount of spatial fishery information available, and would enable managers to model fisheries more effectively.

4.7.4.3.3 Impacts on Processors, Communities, Consumers, and Safety

It is unlikely that an expanded VMS program would influence processors, communities, or consumers. Safety may be enhanced of additional vessels carry VMS as those vessels may be easier to locate. An expanded VMS program is not expected to change the manner in which fisheries occur on an aggregate basis.

4.7.4.4 Alternative D.4

Research Reserves

4.7.4.4.1 Impacts to Fisheries

A system of research reserves may put fishery revenues at risk in those areas that are closed to fishing, and increase effort in areas remaining open to fishing. If revenues at risk result in lost revenue, vessels that are relatively more effected may participate more heavily in other fisheries and negatively effect vessels in those other fisheries through increased competition and reductions in available fishery resource per vessel. If vessels are required to carry a vessel monitoring system to verify compliance with the reserve system, vessels that do not already carry VMS may be forced to incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location (NMFS, July 2003).

4.7.4.4.2 Impacts to Management and Enforcement

If a research reserve system closes areas to fishing, agencies would be required to monitor new closed areas in addition to areas currently closed in order to minimize bycatch. In addition, the amount of fisheries-independent research being conducted would presumably need to increase, thereby placing additional burdens on agencies.

4.7.4.4.3 Impacts on Processors, Communities, Consumers, and Safety

Effects to processors, communities, consumers, and safety may occur if there are changes in the distribution of landed catch, if there are reductions in the amount of landed catch, if there are changes in vessel revenues, or if vessels are required to carry additional safety equipment or fish in more hazardous conditions. Changes in these factors are largely unknown, and therefore the effect to processors, communities, consumers, and safety are unknown.

4.7.4.5 Research and Monitoring Alternatives and Non-Fishing Values

In the short-term, the research and monitoring options are anticipated to have an unknown effect on non-fishing activities. In the long-term, benefits associated with a decrease in damage to habitat, resulting from better management enabled by enhanced biological data collection, may increase non-consumptive use value and passive use values due to enhanced habitat productivity.

In the longer term, the improved knowledge base that would result from increased research and monitoring may allow managers to provide for enhanced fishery production that would benefit other fisheries. Additionally, ecosystem concerns that are currently difficult or impossible to factor in to management may be more easily addressed with additional research and information. Costanza et al.

(1997) identify several ecosystem services including waste treatment, biological control, genetic resources, and storm protection. Some potential examples that apply to the marine environment include the effect kelp forests have in dampening the effect of storms on coastal areas, and the ability of the marine environment to assimilate output from waste water outfalls from coastal cities.

4.7.5 Cumulative Effects of the Alternatives on the Socioeconomic Environment

Cumulative effects must be considered when evaluating the alternatives to the issues considered in this EIS. Cumulative effects are those combined effects of an action on the quality of human environment that result from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions, regardless of whether a federal or non-federal agency undertake such actions (40 CFR 1508.7). The area that would be effected by actions discussed in this document is from the mean high tide mark to the seaward boundary of the West Coast EEZ (0 to 200 nautical miles offshore).

Unfortunately, data does not exist to quantify most potential benefits that have accrued within the recent past, though it is likely that the costs of recent management actions have outweighed the monetary benefits based on empirical evidence of recent industry consolidation. The net effects of the alternatives in this EIS are even more uncertain, but possible benefits and costs can be described from a short-term and long-term perspective. If habitat protection results in increased stock productivity and revenues to the fishing industry, it is likely that these benefits would accrue over the long-term since many groundfish species are relatively slow growing. Protecting habitat is likely to have a cost in the short-term if fishing revenues are displaced, but it may also have an effect in the long-term if habitat protection results in an opportunity cost (e.g., foregone revenues) in perpetuity.

Although potential benefits are unknown, recent management actions have been increasingly restrictive on fishing (commercial and recreational) in general. The commercial catch of groundfish (excluding Pacific whiting) had been declining for many years (though this decline may have slowed or stopped), and as a result revenues for many vessels were also declining. The implementation of the rockfish conservation areas–combined with differential catch limits designed to minimize the mortality of rockfish–displaced revenues from areas that had historically been productive for much of the commercial fishing fleet.

Several actions have worked to counter the decline in vessel revenues. In 2003, the limited entry trawl fleet participated in a vessel buyback program that reduced the number of groundfish vessels on the West Coast. Analysis before the buyback program showed that net revenues per vessel should increase post buyback as a result of lower aggregate fixed cost, and available data shows that exvessel revenues per vessel increased in 2004 over 2003 on an average vessel basis. Unfortunately, the effect of this buyback had negative consequences on some communities and processors as certain ports lost a disproportionate share of their trawl fleet and the associated landings. In 2001, NMFS implemented a permit stacking program for the limited entry fixed gear vessels, reducing the number of vessels participating in the primary sablefish fishery. As part of this permit stacking program, the Council recommended lengthening the primary sablefish season from 5-10 days to 7 months. Season participants may now choose their time and pace of fishing, affording them improved safety and product marketing flexibility. The Council is also in the process of considering a dedicated access privilege program for the limited entry trawl fishery. Vessel owners with dedicated access privileges are better able to plan for and invest in their future, including optimizing their product marketing opportunities. Implementing a dedicated access privilege program in the trawl fishery would likely improve the financial standing of the fishery's participants, making monitoring devices and personnel costs more easily borne by vessels.

In response for the need to enforce and verify compliance with RCA boundaries, limited entry vessels are now required to carry VMS, and in the near future, open access vessels may be required to carry VMS as well. Beginning in 2005, trawlers fishing shoreward of the RCA will be required to fish with a selective flatfish trawl–a gear designed to avoid rockfish while retaining more abundant flatfish. This will require vessels to incur costs of modifying their current trawl gear, but will allow those vessels to fish bimonthly cumulative limits that are larger than limits specified for the 2004 season. This is likely to increase the amount of total trawl effort occurring on the continental shelf, in areas shoreward of the trawl RCA.

The cost of many of the impact minimization and research and monitoring alternatives proposed in this EIS may include both gear and equipment modifications and requirements, and possible loss in net revenue as a result of closed areas. Some benefits may include increases in safety for alternatives that require VMS on additional vessels, since VMS would make it easier to locate vessels in distress. Other potential benefits may include increases in stock productivity and fishery yields due to habitat protection, though such benefits are still hypothetical. Unfortunately, quantifying all of the costs and benefits associated with each alternative is not possible because it is unknown how much revenue is likely to be lost (if any) as a result of an area closure and whether habitat protection will ultimately result in increased fishery yields. In the same sense, the costs and benefits of past and existing regulatory actions are largely unknown, though it can be reasonably stated that the net monetary effect of many past management measures has generally been negative based on industry consolidation and increasing demands on management agencies.

Socioeconomic Table 4-10 describes the effect of past and present factors on portions of the socioeconomic environment along with the likely effect each impact minimization and research and monitoring alternative will have on identified portions of the socioeconomic environment. The cumulative effect can be described as the sum of all of those influences, although the collective sum also depends on the weight given to each portion of the environment.

4.8 Consequences of the Final Preferred Alternative on the Socioeconomic Environment

The preferred alternative to minimize adverse impacts to EFH from fishing does so through a suite of area closures and by limiting large footrope trawl gear shoreward of 150 fathoms. Some closures are specific to trawl gear, others include all bottom contact gear or specific gear types, and others are closed to all fishing.

4.8.1 Impacts to Fisheries

All fisheries may be positively influenced over the long term due to the potential for enhanced ecosystem conditions (E+). Under this alternative, limited entry bottom trawl revenues at risk may equal to $8.4 million if proportioned block data is used or $36.3 million if entire block revenues are used. The majority of revenues put at risk are expected to be comprised of DTS species, primarily because closed areas tend toward deeper depths where these species are found (Socioeconomic Table 4-15). This alternative eliminates future opportunities for bottom trawl expansion by freezing the trawl footprint. This is expected to act as status quo since it is not believed bottom trawl vessels fish outside the area designated as the trawl footprint. Impacts to other fisheries may occur if trawl fisheries are impacted to a degree that makes other fisheries appear relatively more profitable. This alternative does not include any reductions in the amount of catch that trawl vessels are allowed to retain, but it may make it more difficult for trawl vessels to attain historic catch levels in the short run, thus making other fisheries appear more attractive. In the long run, habitat protection measures may result in greater stock productivity and actually enhance the amount of trawl catch. Unfortunately, both of these short run and long run impacts are hypothetical due to lack of information. The short and long run impacts to trawl fisheries and the potential for trawl vessels to participate in non-trawl fisheries is unknown (U) however may be consistent with the status quo (O).

Vessels using bottom tending gear may experience displaced revenues as several areas are also closed to bottom tending gear. Some areas are expected to result in little or no displaced revenues such as Thompson seamount and President Jackson seamount because it is not believed that vessels actively fish these areas with bottom tending gear to any large degree. Vessels traditionally fishing the Cordell bank area with bottom tending gear may experience some displacement of revenues, though the amount is expected to be minor because this area is relatively small and the Cordell bank area is regularly closed to groundfish fishing under status quo management because of the rockfish conservation area boundaries. Since areas closed to bottom tending gear are few and relatively small, it is expected that few, if any, vessels will participate in other fisheries. The consequences of the final preferred alternative on fixed gear fisheries is likely to be no significant change or unknown (O/U).

For recreational fisheries, on a fishery-wide basis the preferred alternative is not expected to result in a change in the aggregate level of catch. Recreational fishing may be curtailed at areas where bottom contact gear would be prohibited in the Channel Island areas and Cordell bank. It is unlikely that such restrictions are significant however the lack of spatial information for recreational fisheries limit the prediction of consequences to unknown with the potential for positive consequences due to enhanced ecosystem conditions (U/E+).

This alternative is likely to require additional vessels to carry VMS so that enforcement can adequately monitor the closed areas. This may include non-limited entry trawlers such as shrimp, sea cucumber, and California halibut trawl vessels. It may also include vessels using bottom tending gear such as open access groundfish vessels using longline, vertical hook and line, or pots; crab pot vessels; and shrimp pot vessels. In order to enforce gear restrictions around the Channel Islands, additional types of vessels in the southern California area may be required to carry VMS. If VMS is required to monitor compliance with the closed areas, vessels that do not already carry VMS may be forced to incur costs on the order of $1,550 - $5,295 to purchase a unit; $120 of annual maintenance; and $1 - $5 per day for the cost of transmitting location (NMFS July 2003)

4.8.2 Impacts on Management and Enforcement

This alternative will impact management and enforcement agencies by requiring closed areas to be enforced and to verify that certain gear types are not being used in restricted areas. Of particular note, some closed areas were drawn with highly detailed boundaries in an attempt to minimize the impact to fishers while protecting sensitive habitat. These detailed boundaries are more difficult to enforce than boundaries drawn with straight lines and few corners. Detailed trawl closure areas tend to be more focused in areas off the California coast where there are also fewer enforcement officers. However, requiring VMS of vessels subject to trawl closed areas would ease the burden of enforcing these closures (E-).

4.8.3 Impacts to Consumers, Processors, and Communities

Under this alternative, some amount of catch and revenue is likely to be displaced, and this may effect other entities reliant on that catch. It is unlikely that consumers will be impacted since any change in catch volumes potentially occurring under this alternative are likely to be made up by catch occurring in other regions or internationally, or will constitute a small portion of global groundfish catch. Processors may be affected if there is a reduction in landed catch volume or a change in the mix of species being landed. Communities may be affected if changes in exvessel revenue occur or if landings to those communities change. It is generally unknown if catch volumes will change, and therefore impacts to processors, communities, and consumers is unknown (U).

4.8.4 Impacts on Safety

Impacts to safety are likely to occur if there is a reduction in vessel net revenues, if vessels are forced to fish under more hazardous conditions, or if vessels are required to carry additional safety equipment. Under this alternative vessels are not being forced to fish in more hazardous conditions, but some vessels may see a reduction in vessel net revenues. Vessels that are required to carry a VMS may see increases in safety since a vessel in distress may be more easily located if it has VMS; however if those vessels also see a reduction in net revenues, potential safety gains from carrying VMS may be negated if lower revenues result in less repair and maintenance. Therefore, the net impacts to safety are unknown (U).

Chapter 4 Figures

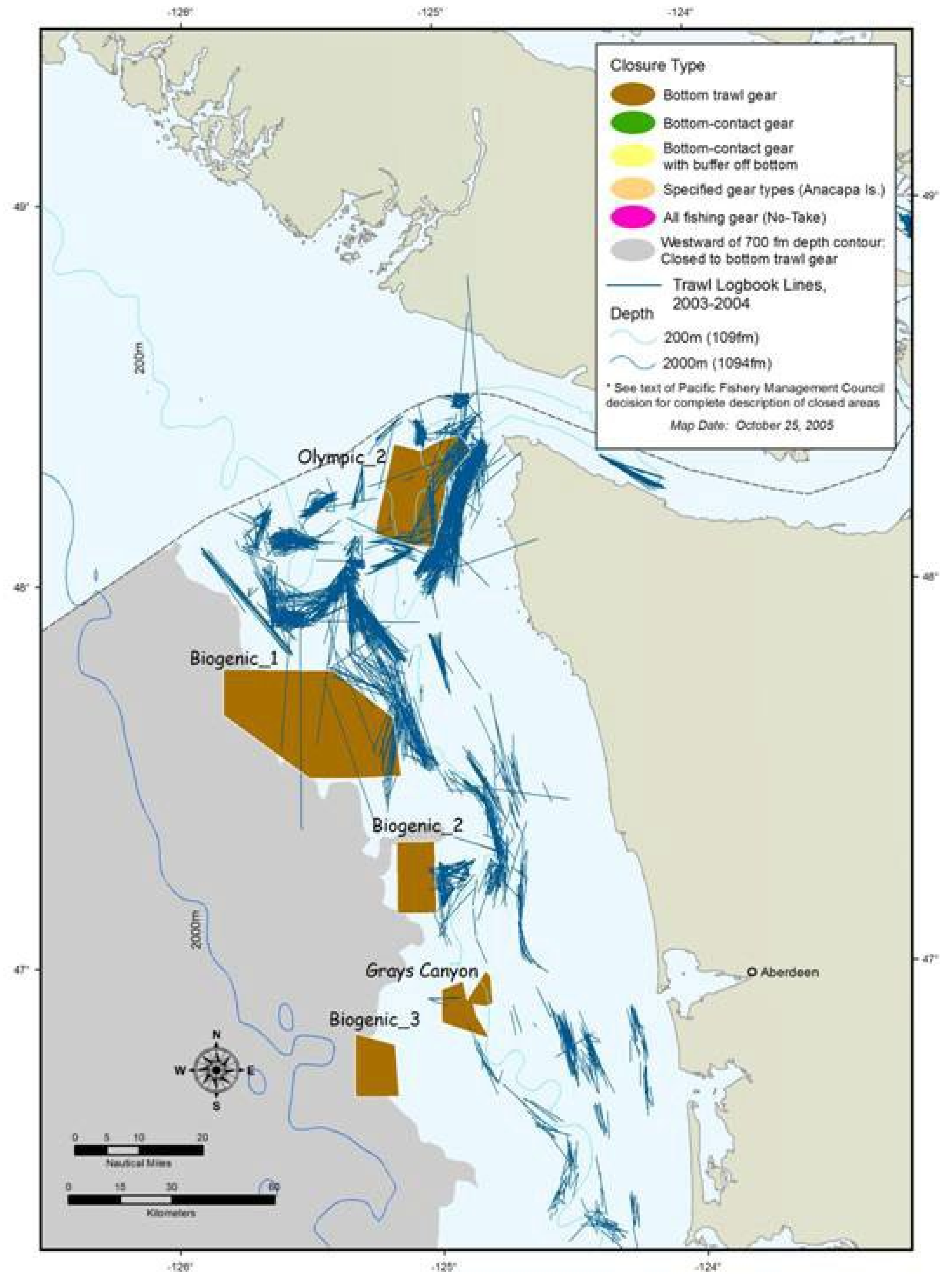

Figure 4-1: Trawl Tracks in Relation to Closure Types – Washington (added since Draft EIS)

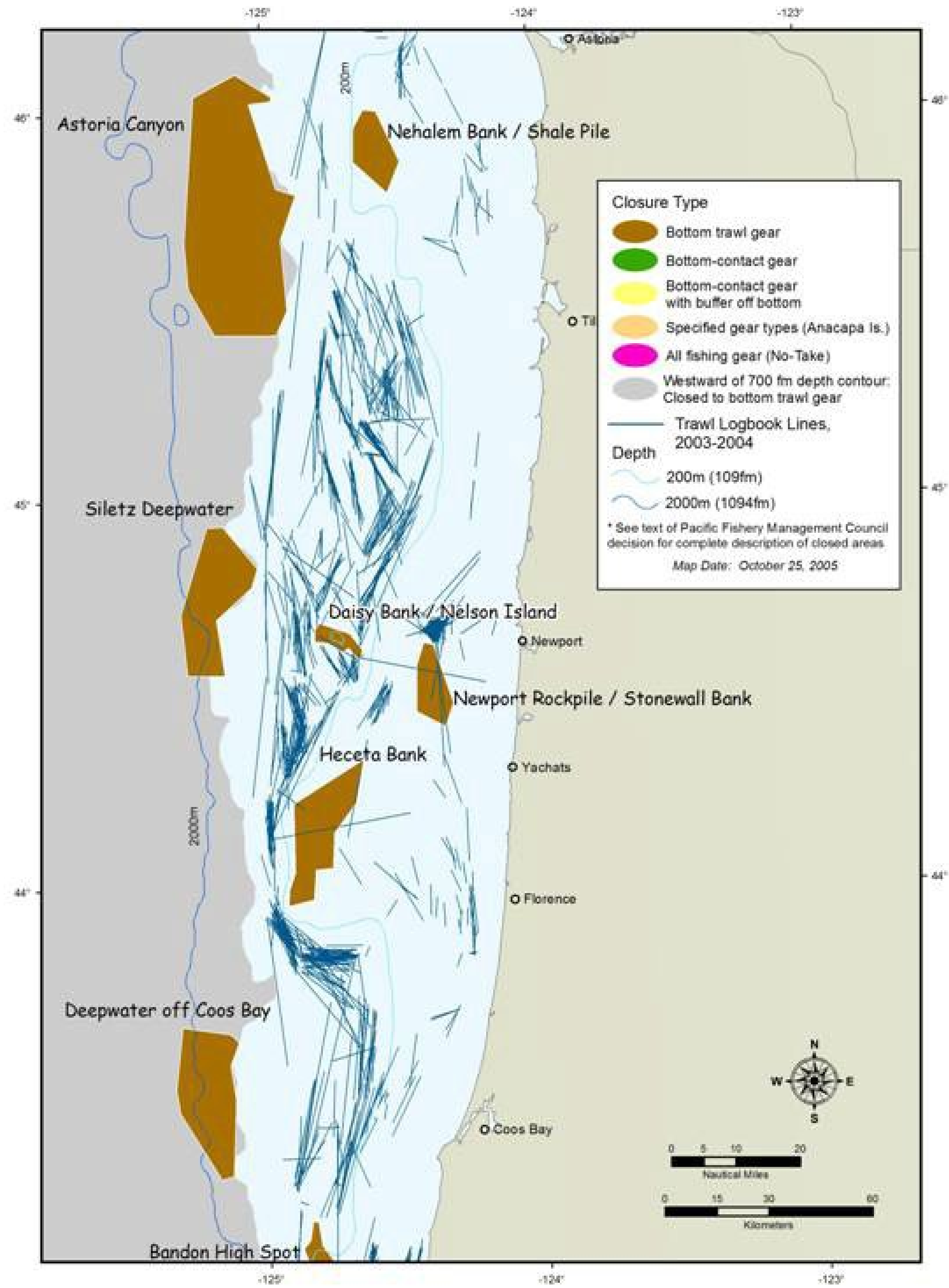

Figure 4-2: Trawl Tracks in Relation to Closure Types – Oregon (added since Draft EIS)

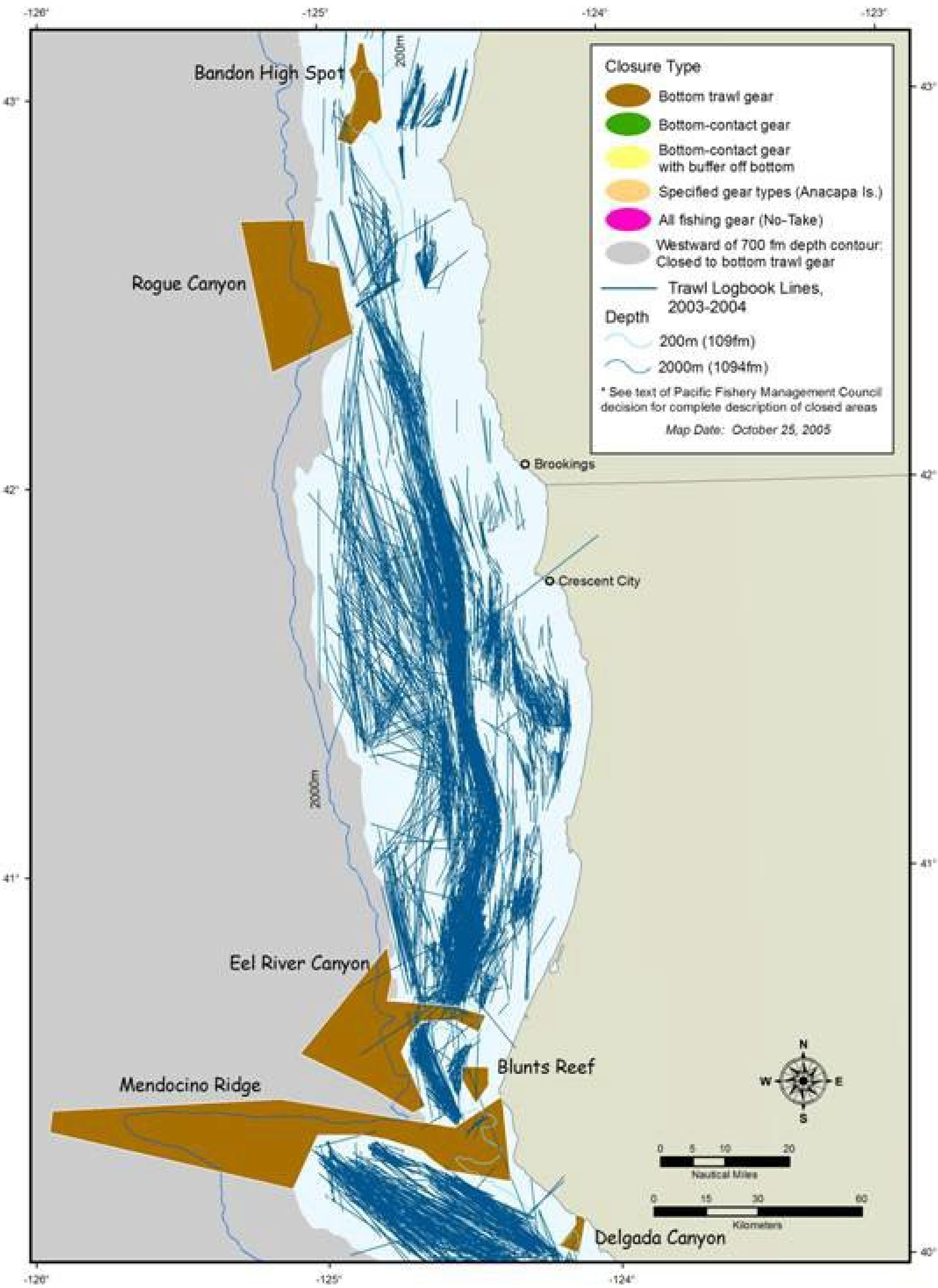

Figure 4-3: Trawl Tracks in Relation to Closure Types – Southern Oregon and Northern California (added since Draft EIS)

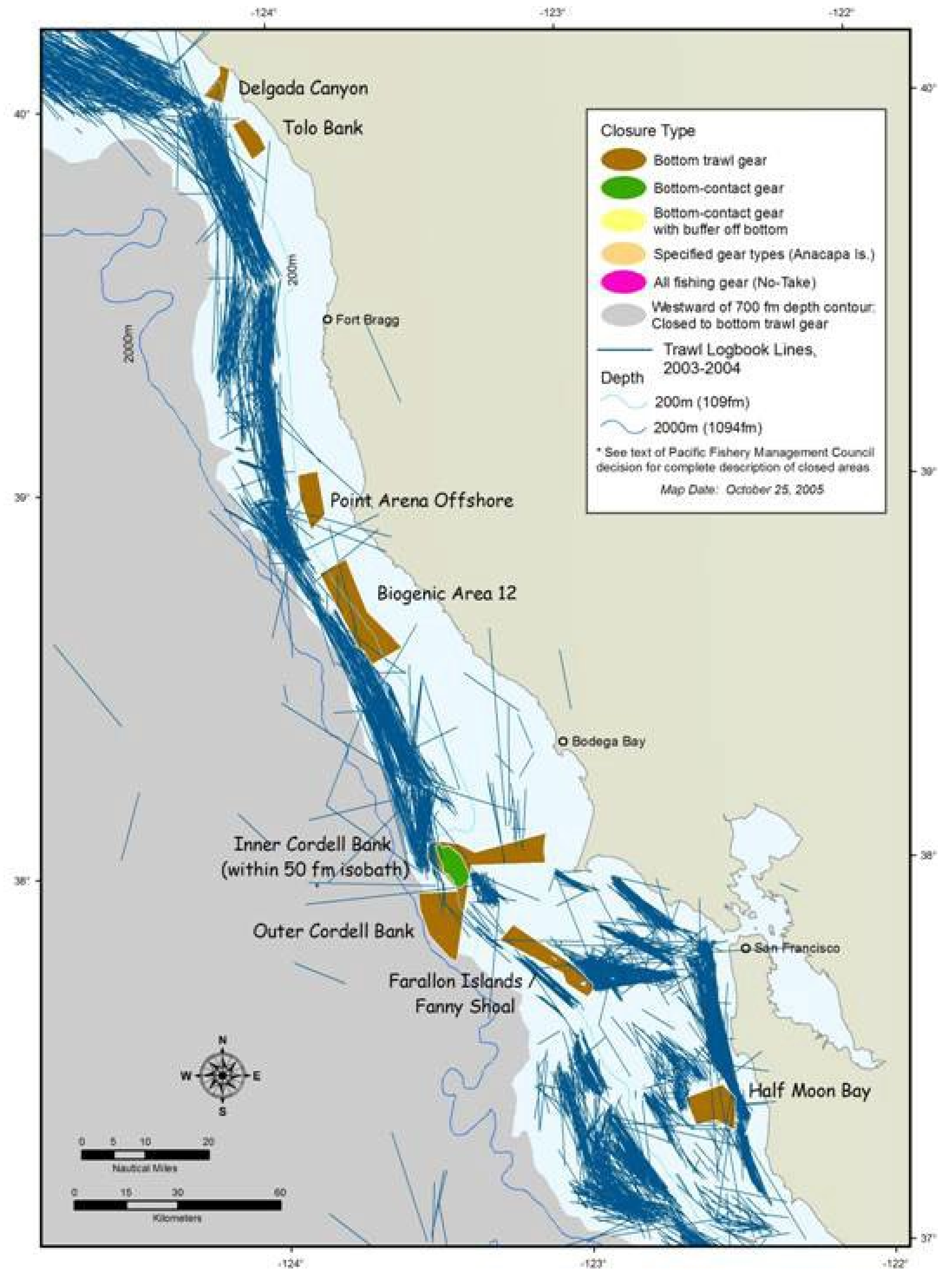

Figure 4-4: Trawl Tracks in Relation to Closure Types – Northern California (added since Draft EIS)

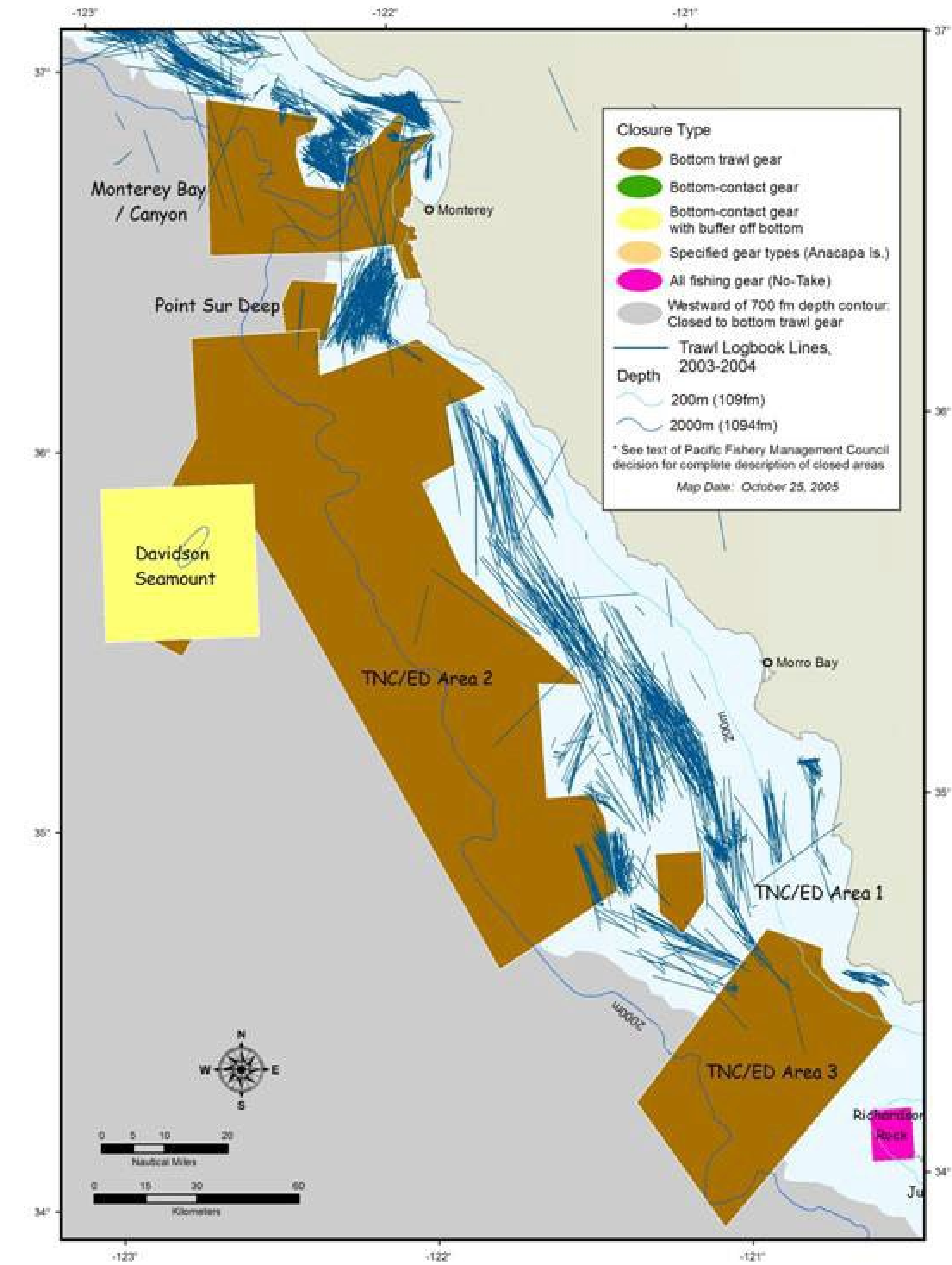

Figure 4-5: Trawl Tracks in Relation to Closure Types – Central California (added since Draft EIS)

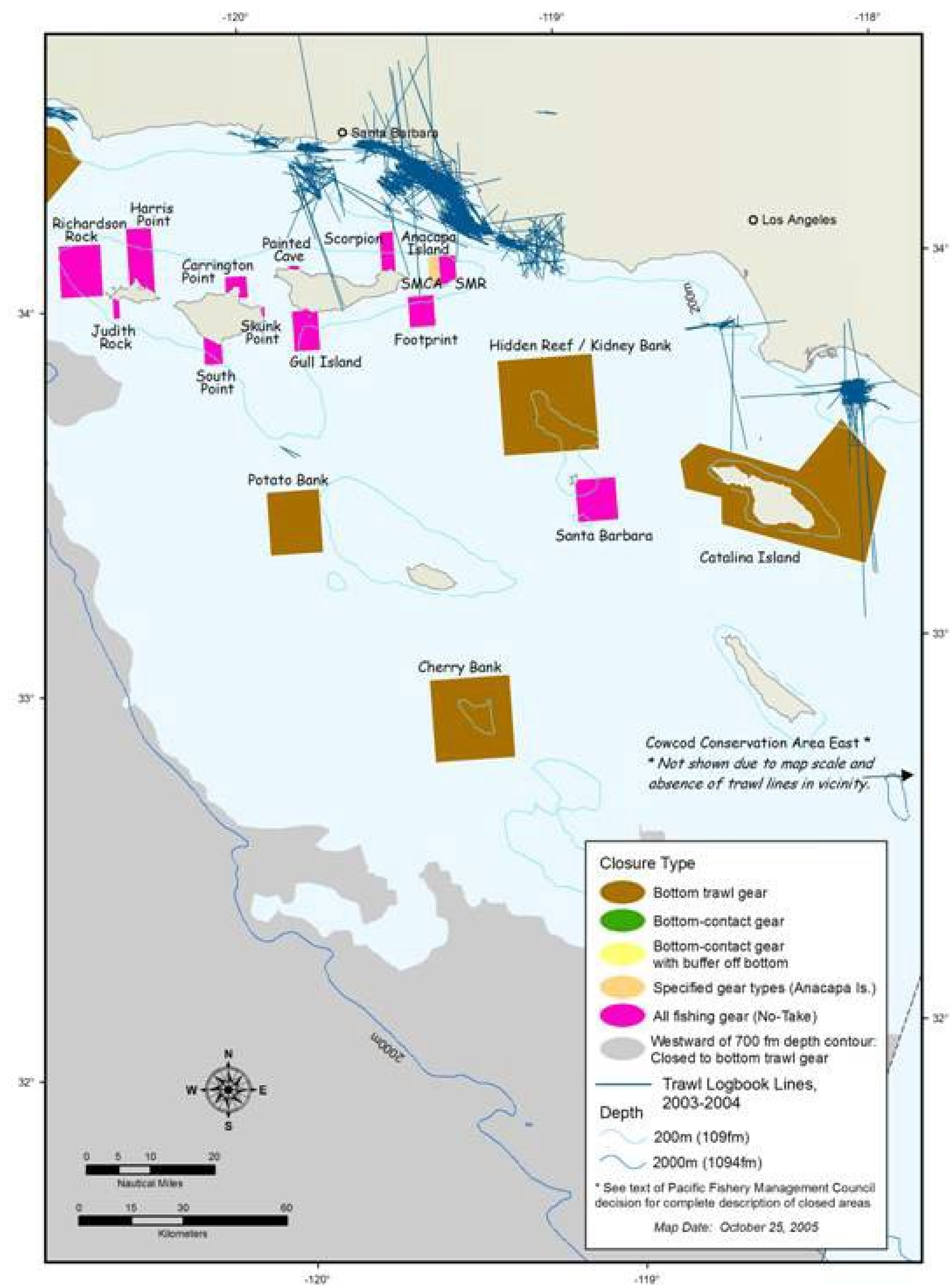

Figure 4-6: Trawl Tracks in Relation to Closure Types – Southern California (added since Draft EIS)

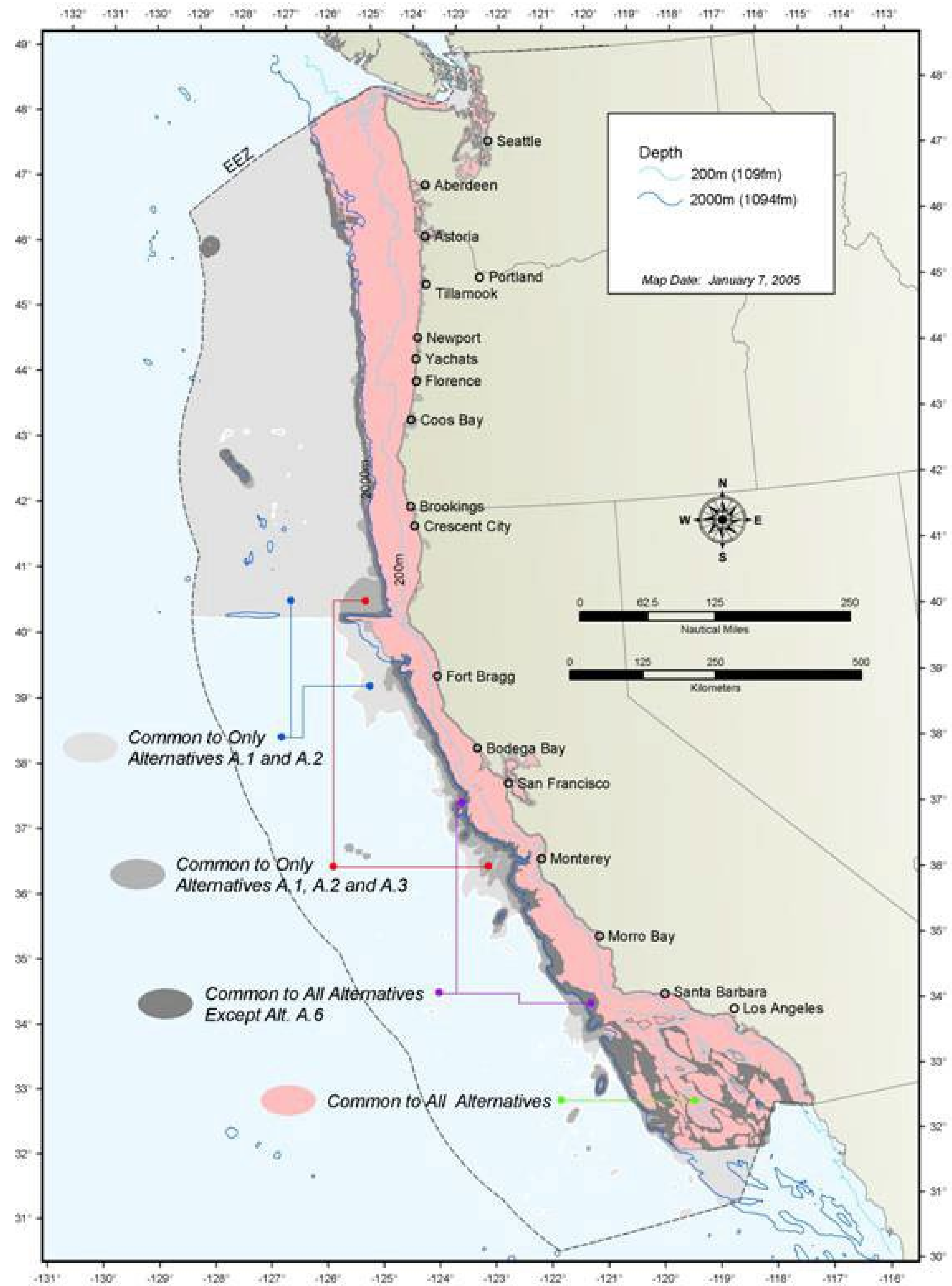

Figure 4-7: Geographic comparison of the EFH alternatives

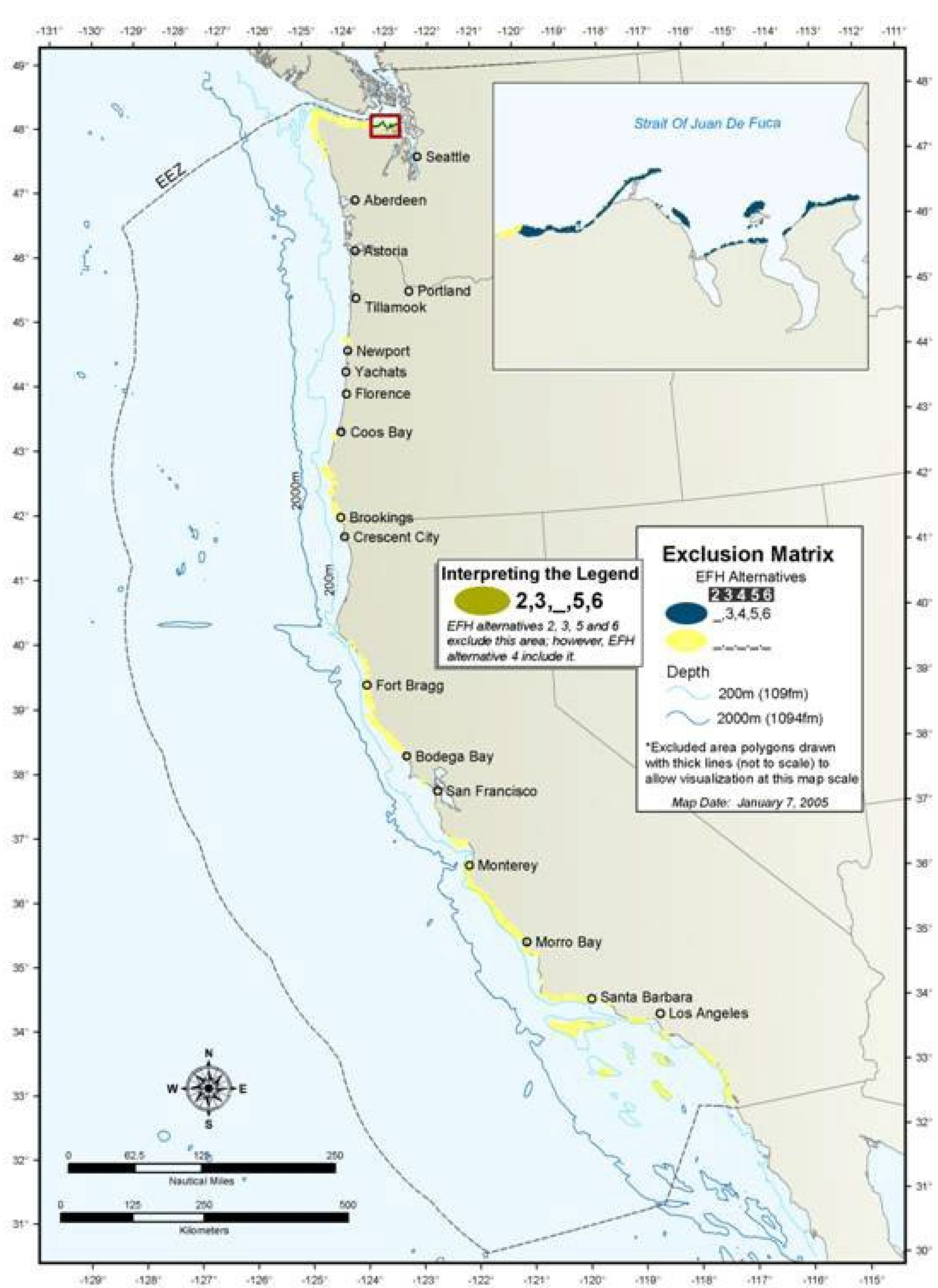

Figure 4-8: HAPC Alternative B.3, areas that may be excluded by EFH alternatives

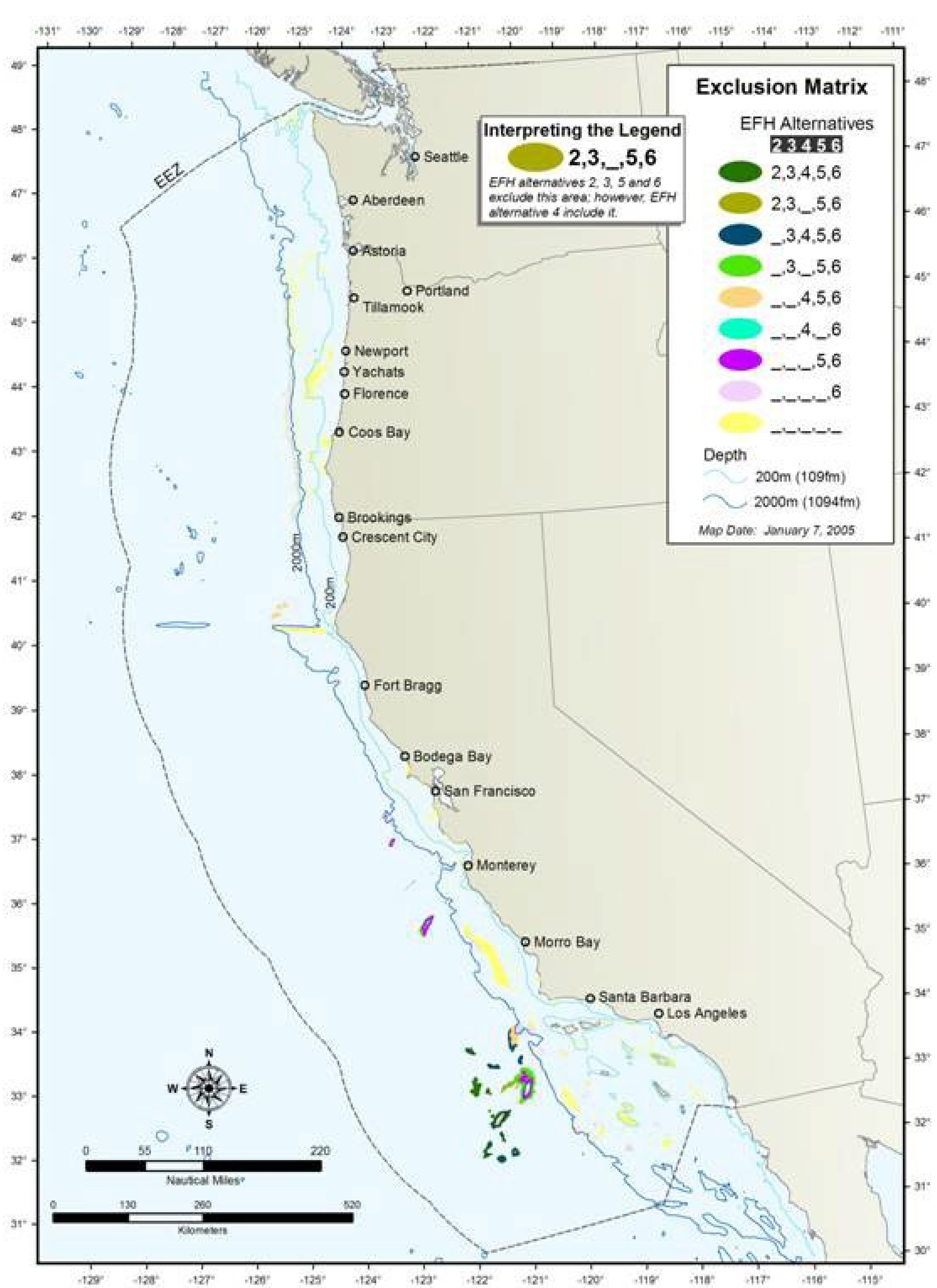

Figure 4-9: HAPC Alternative B.6, areas that may be excluded by EFH alternatives

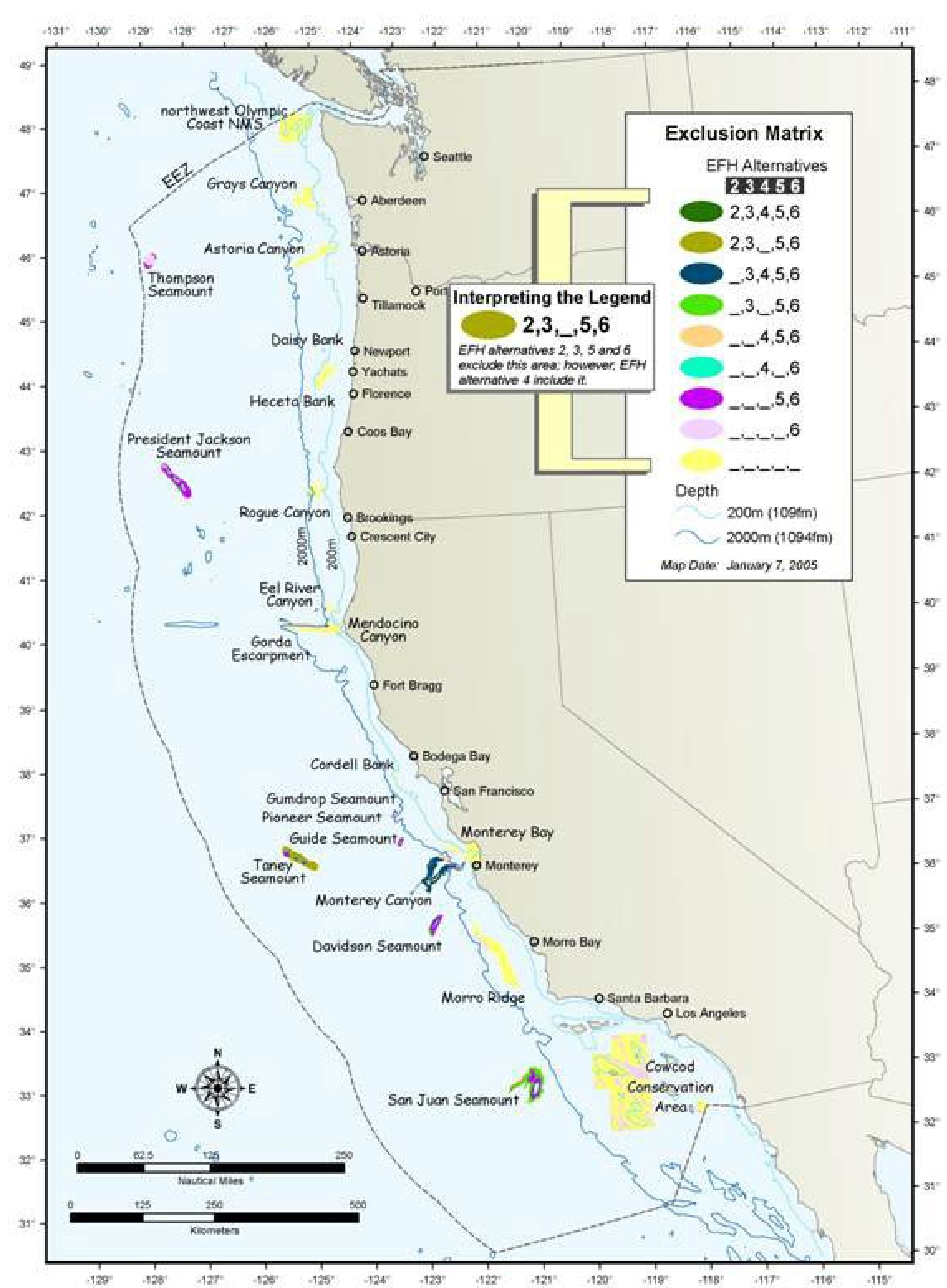

Figure 4-10: HAPC Alternative B.7, areas that may be excluded by EFH alternatives

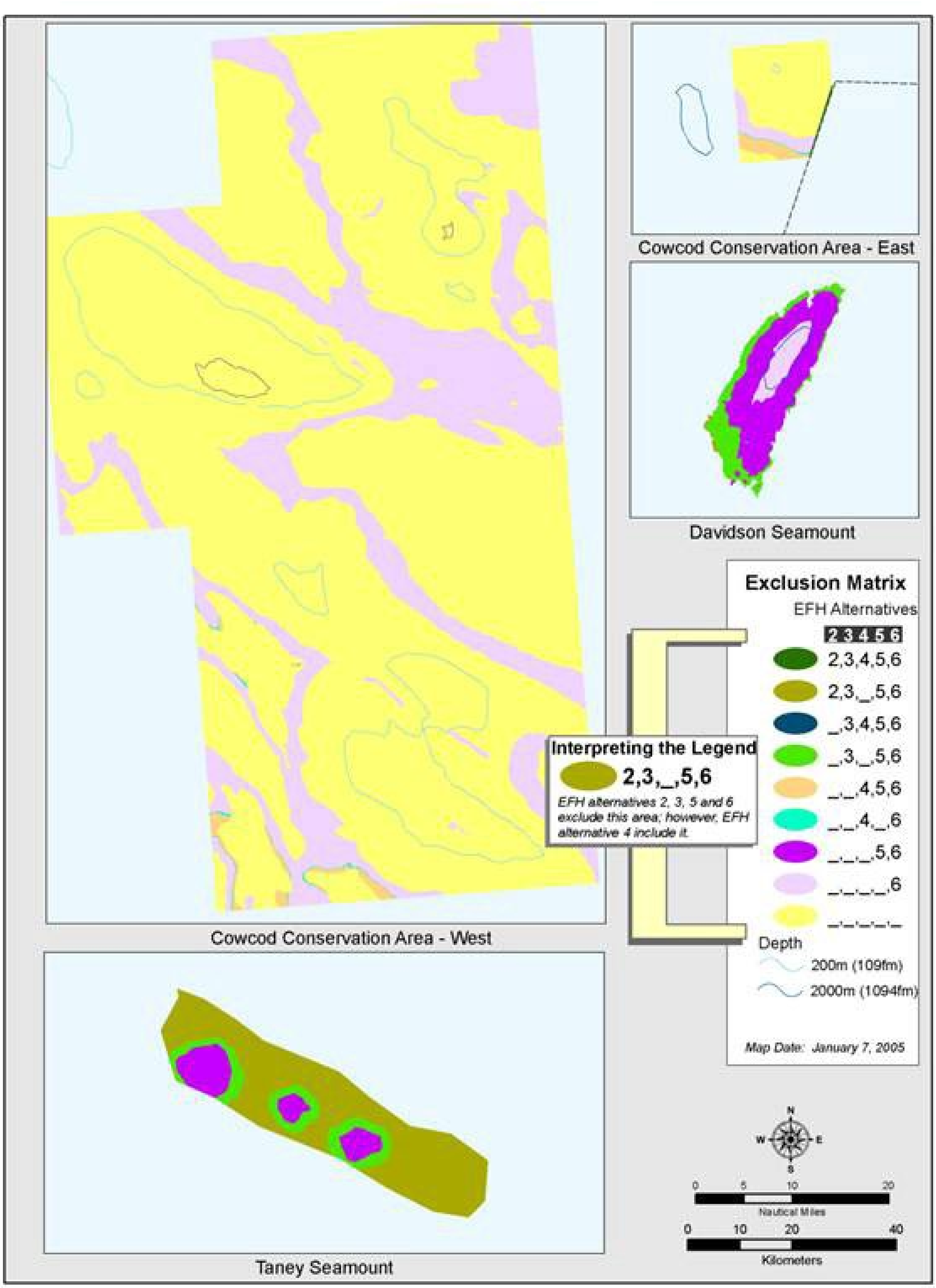

Figure 4-11: HAPC Alternative B.7, areas that may be excluded by EFH alternatives, inset 1

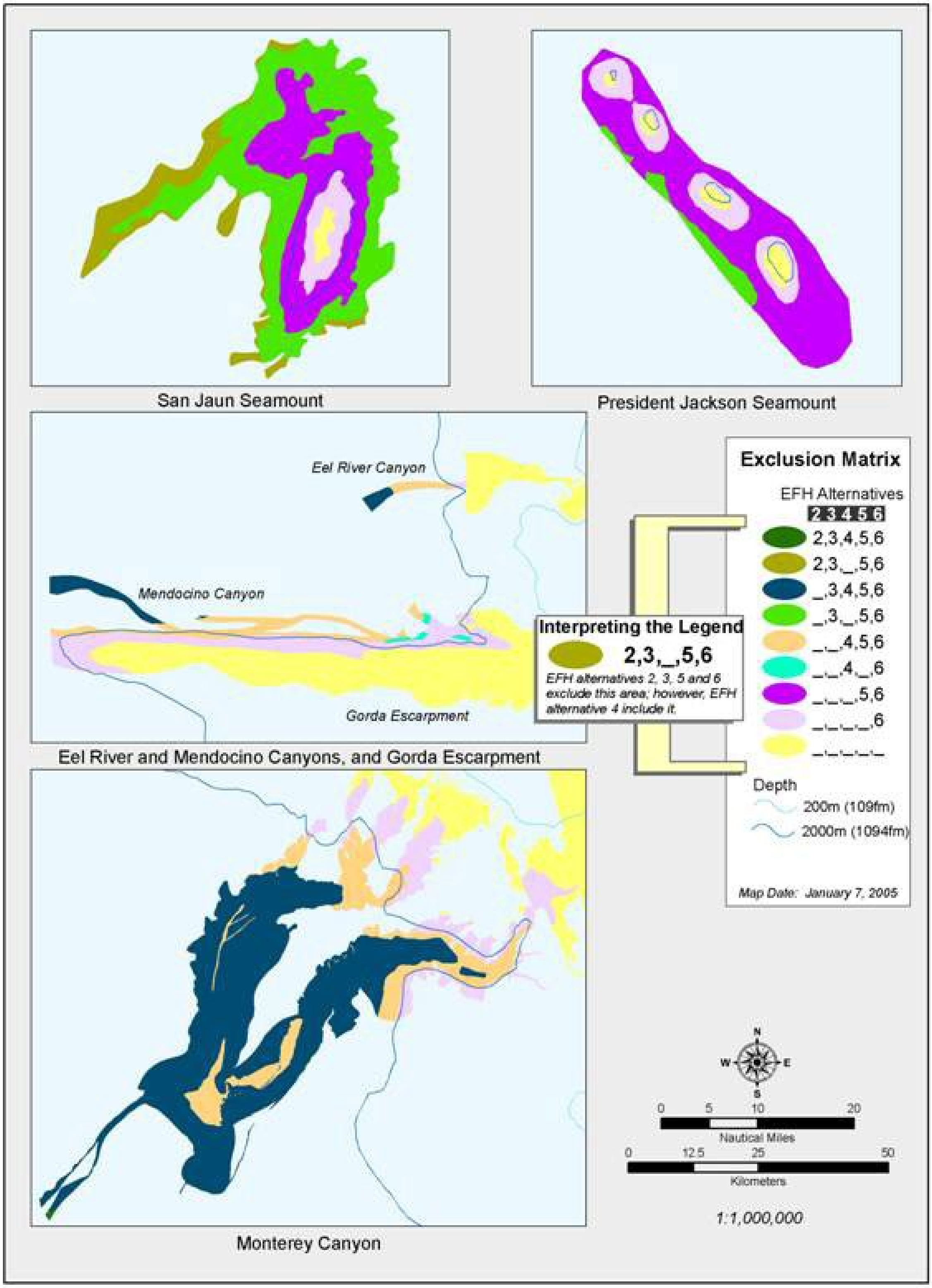

Figure 4-12: HAPC Alternative B.7, areas that may be excluded by EFH alternatives, inset 2

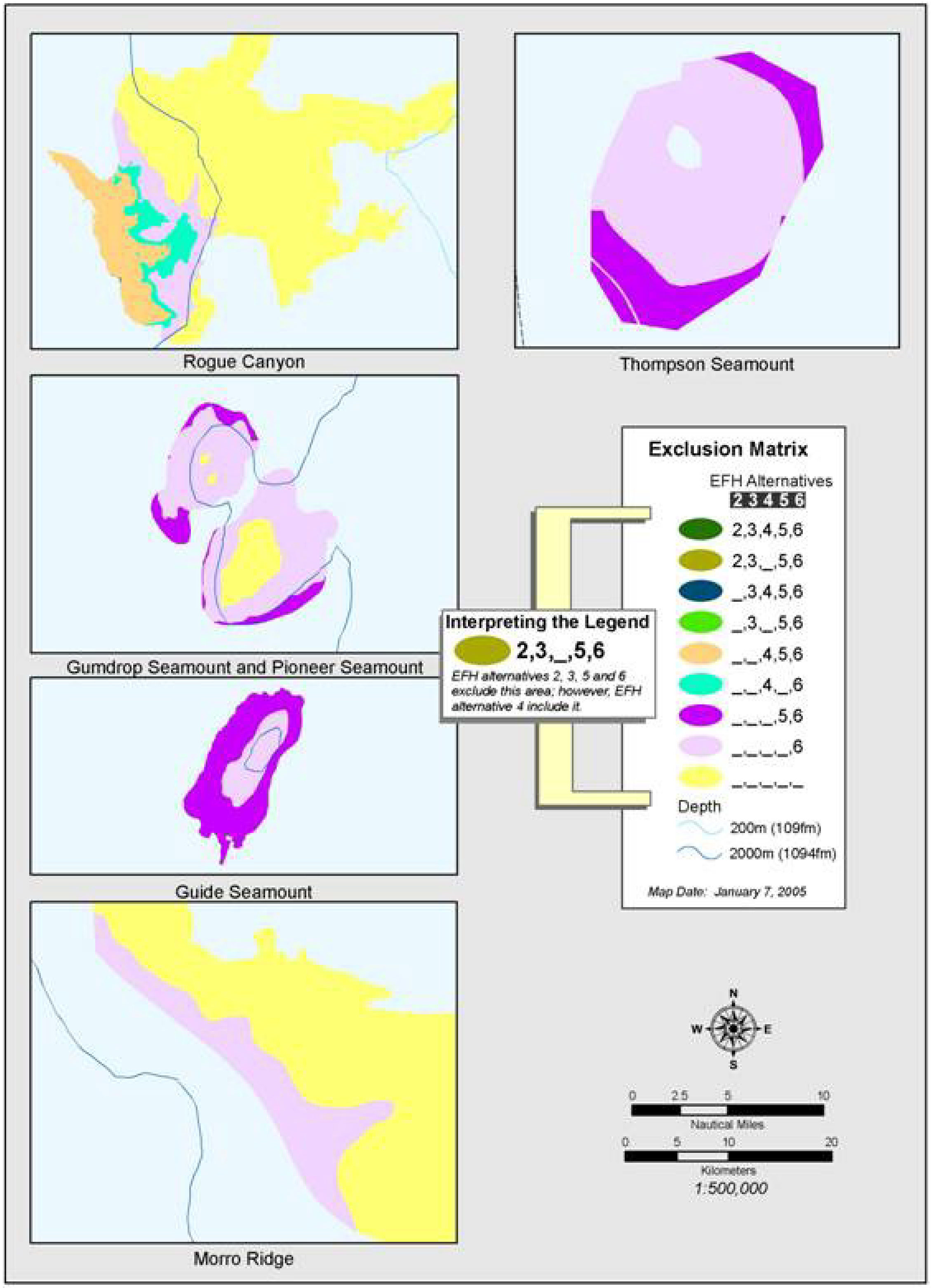

Figure 4-13: HAPC Alternative B.7, areas that may be excluded by EFH alternatives, inset 3

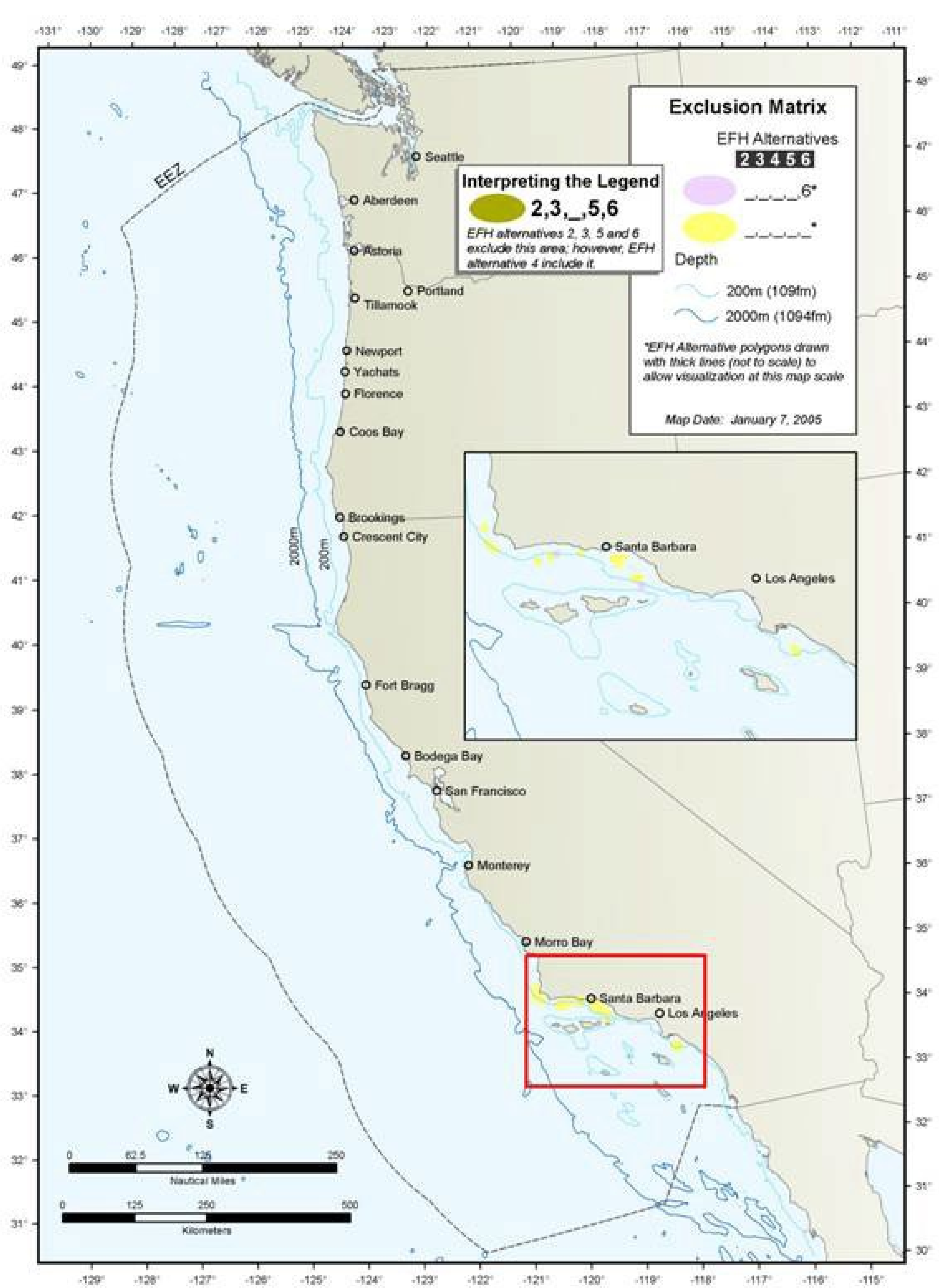

Figure 4-14: HAPC Alternative B.8, areas that may be excluded by EFH alternatives

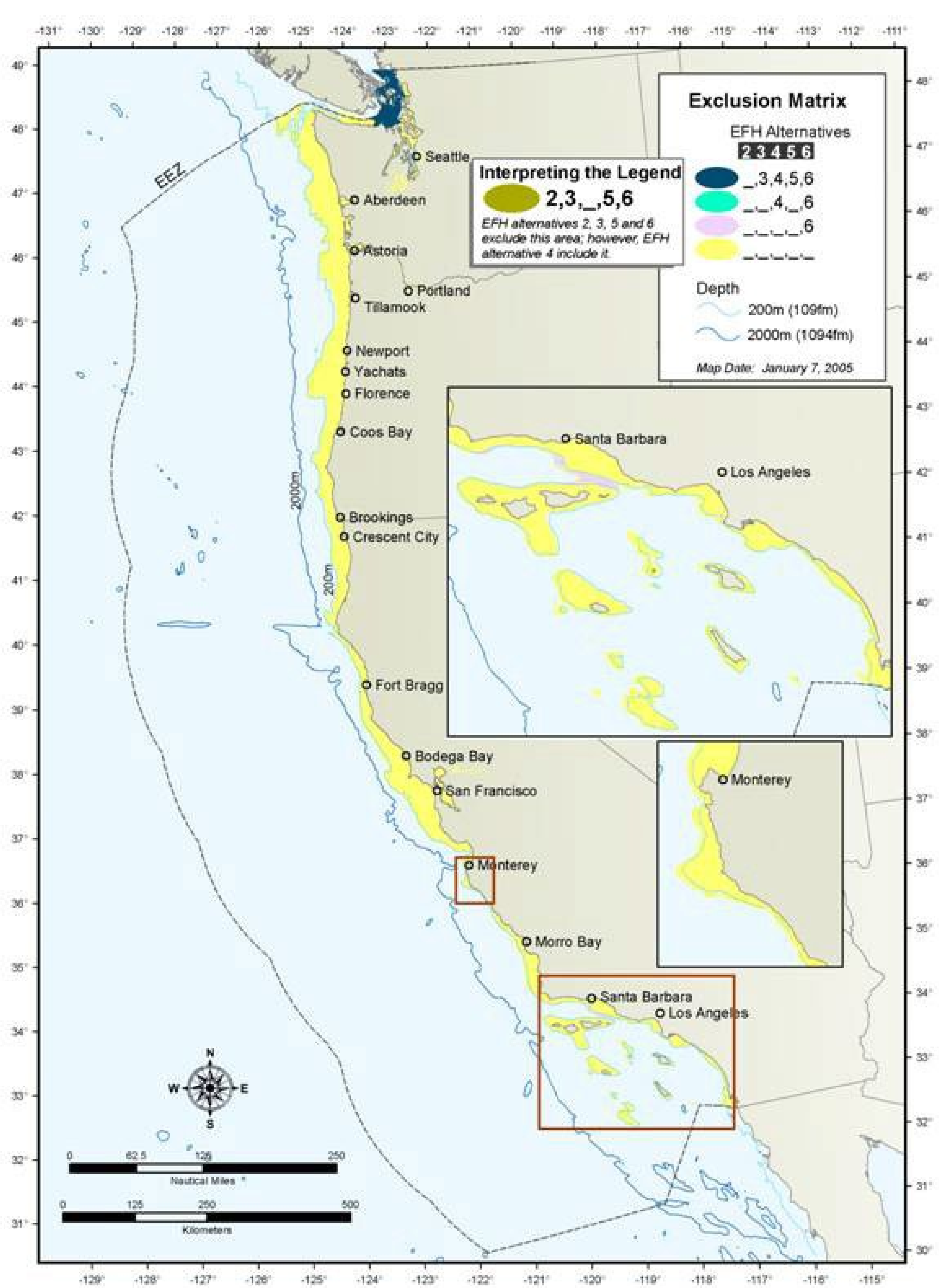

Figure 4-15: Alternative C.2.1, depth-based gear restrictions, option 1 fixed gear areas that may be excluded by EFH alternatives

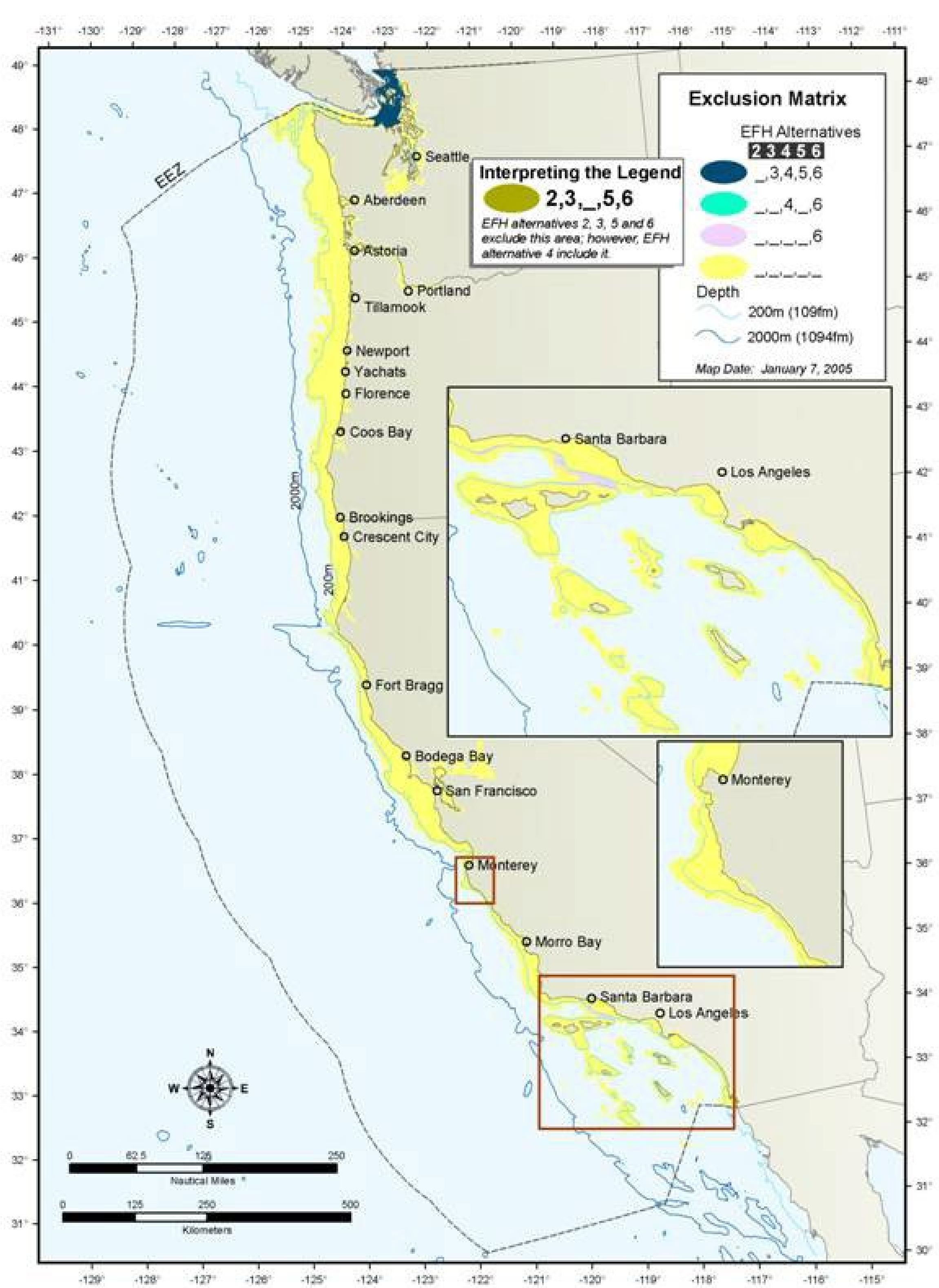

Figure 4-16: Alternative C.2.1, depth-based gear restrictions, option 1 trawl gear areas that may be excluded by EFH alternatives

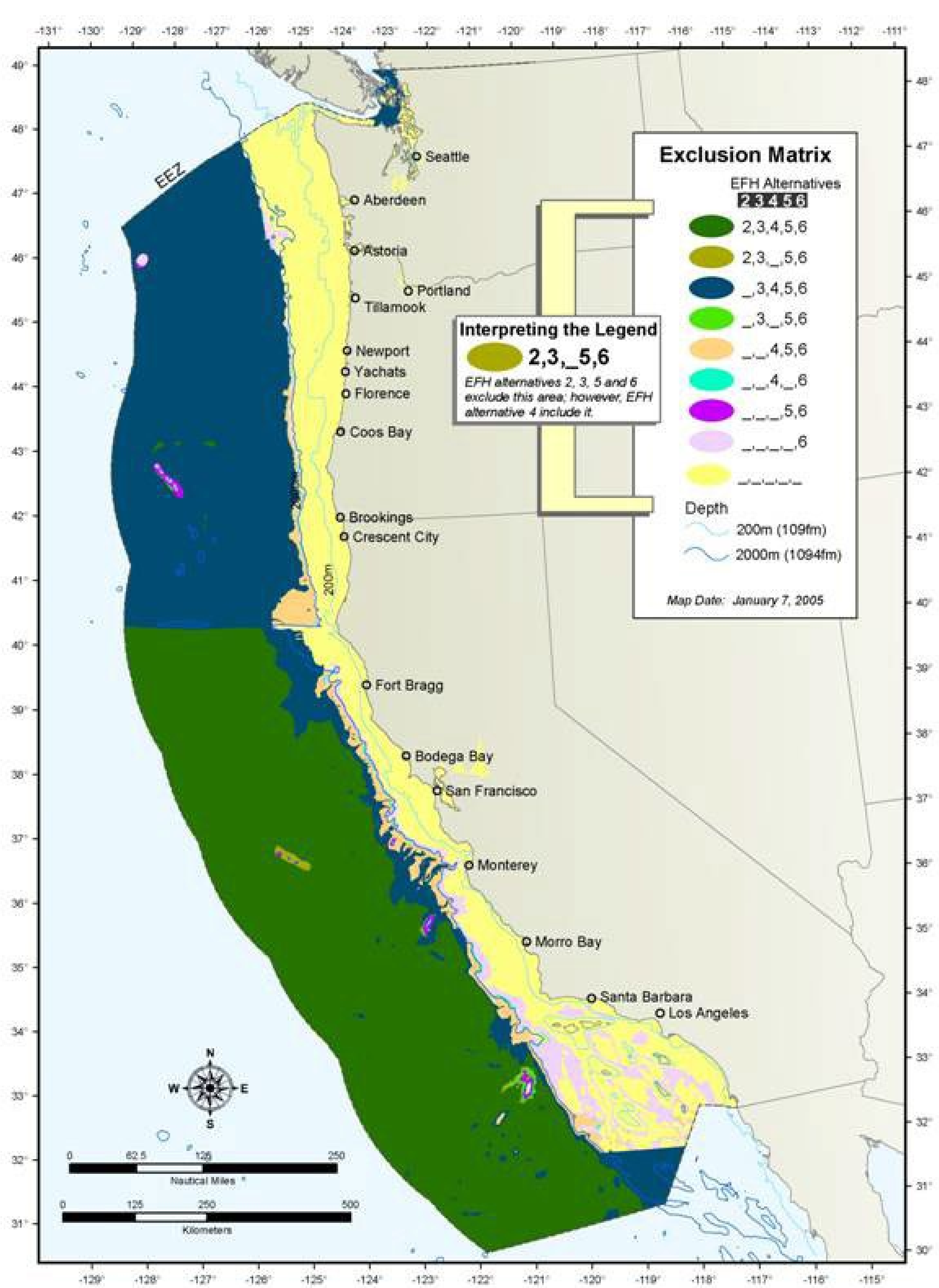

Figure 4-17: Alternative C.2.2, depth-based gear restrictions, option 2, areas that may be excluded by EFH alternatives

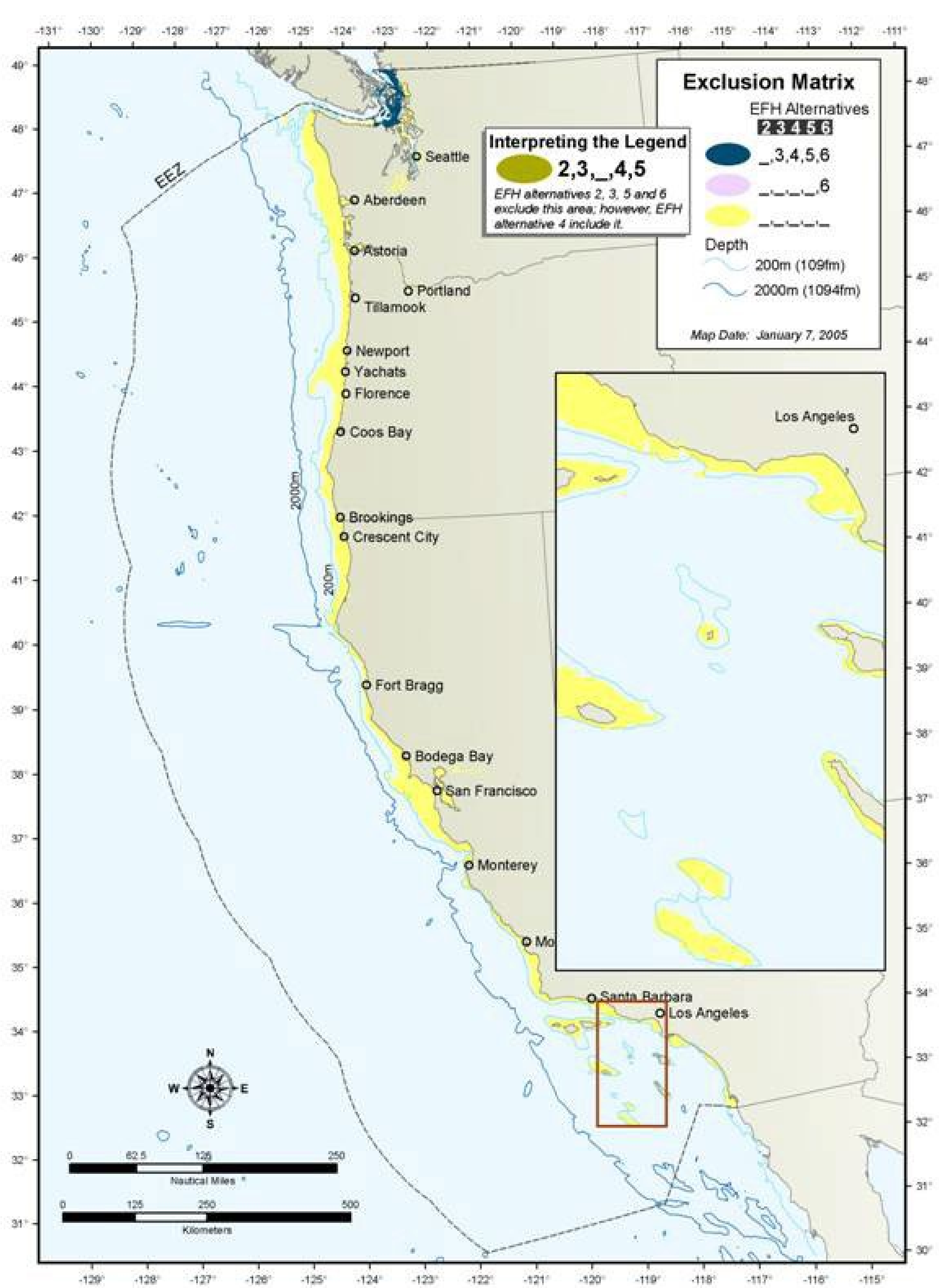

Figure 4-18: Alternative C.2.3, depth-based gear restrictions, option 3, areas that may be excluded by EFH alternatives

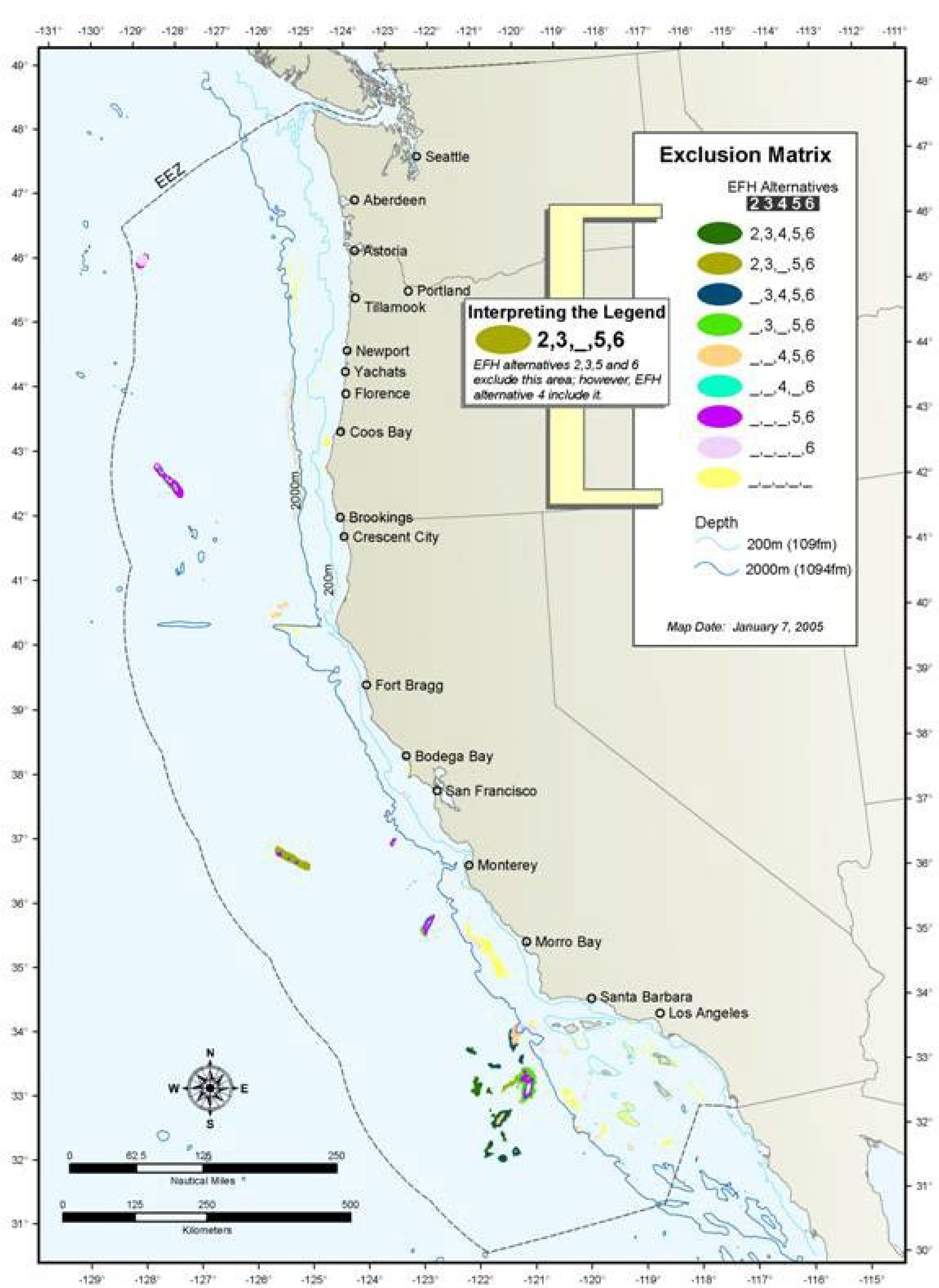

Figure 4-19: Alternative C.3.1, close sensitive habitat, option 1, areas that may be excluded by EFH alternatives

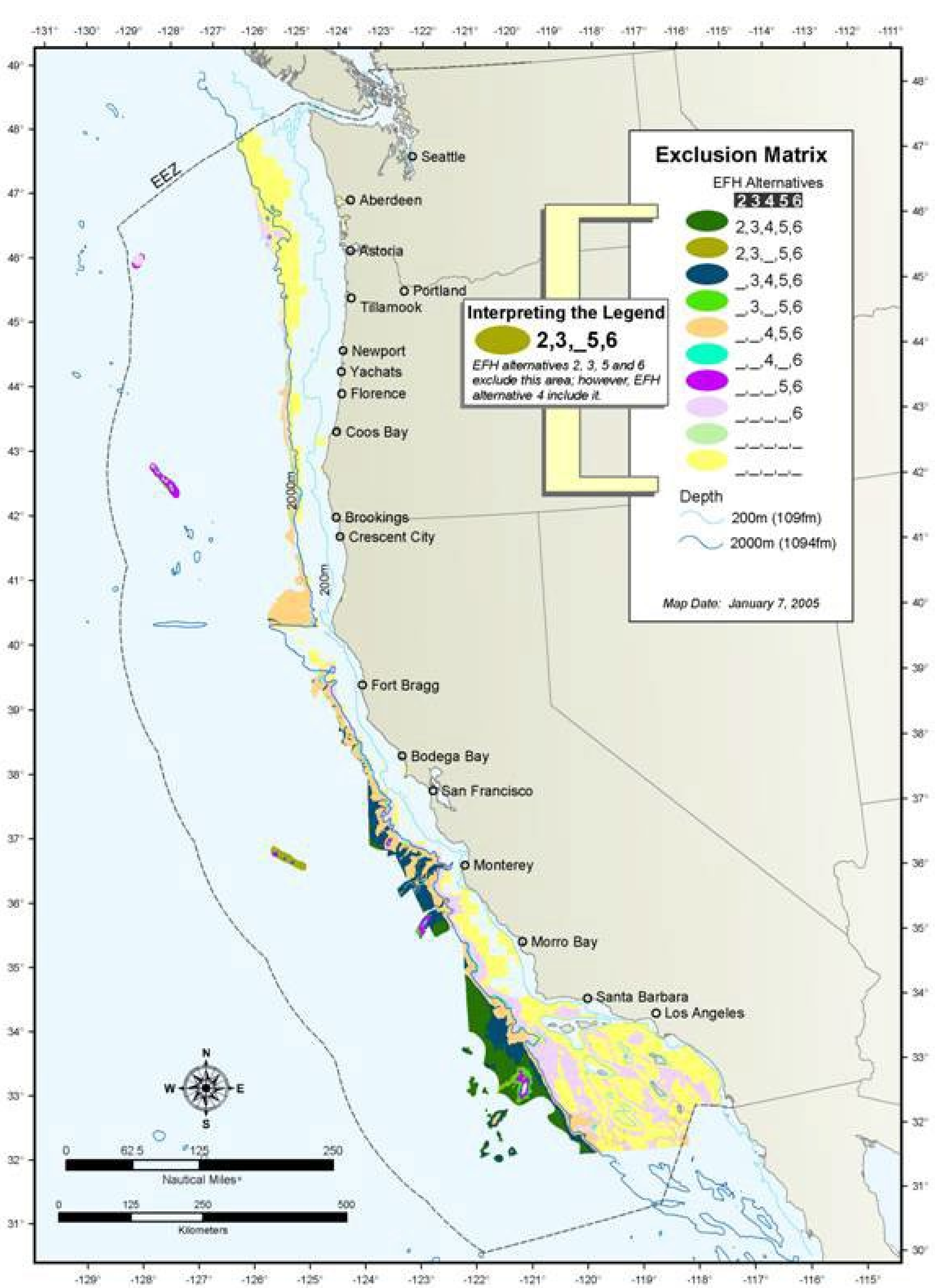

Figure 4-20: Alternative C.3.2, close sensitive habitat, option 2, areas that may be excluded by EFH alternatives

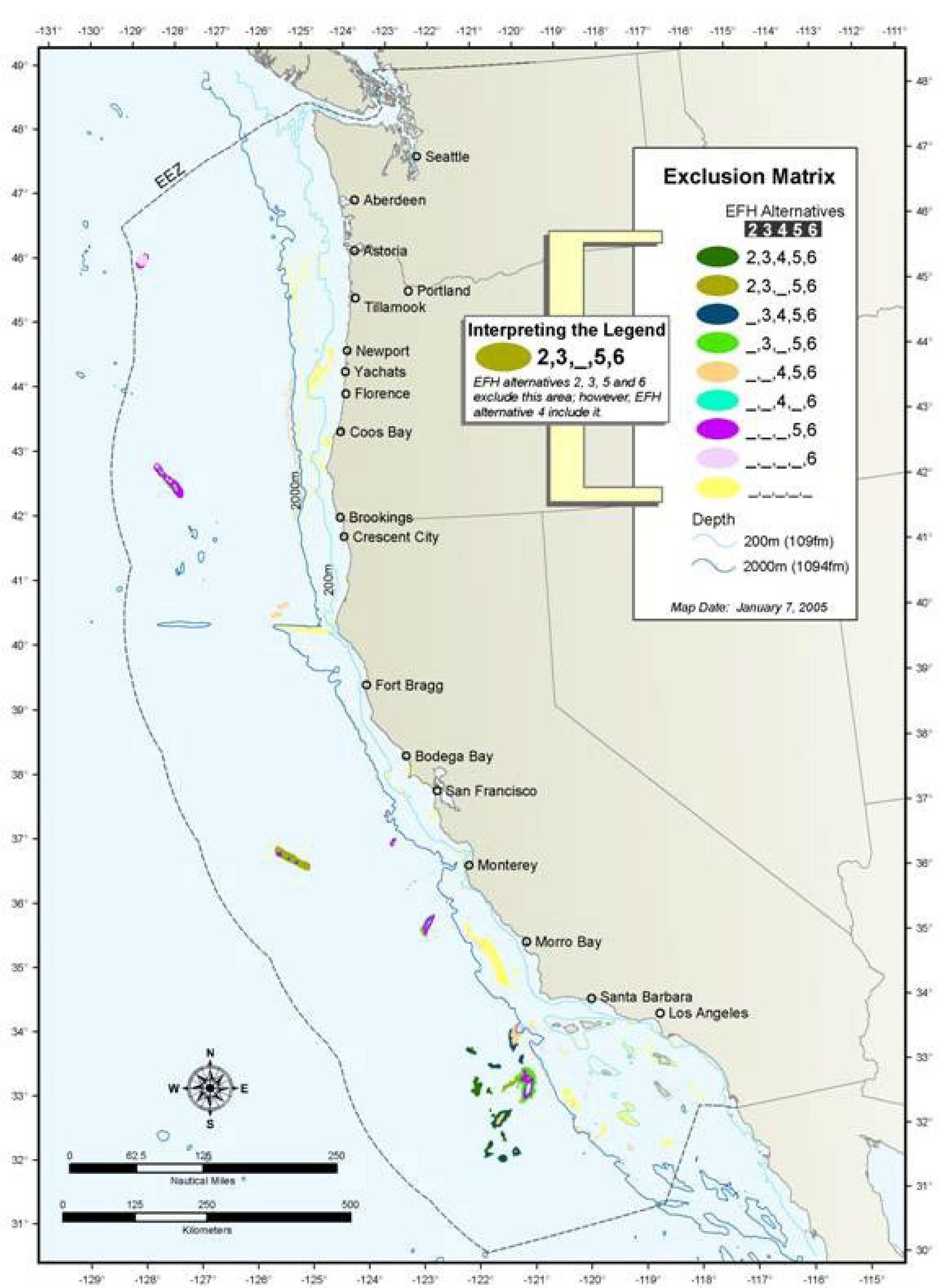

Figure 4-21: Alternative C.3.3, close sensitive habitat, option 3, areas that may be excluded by EFH alternatives

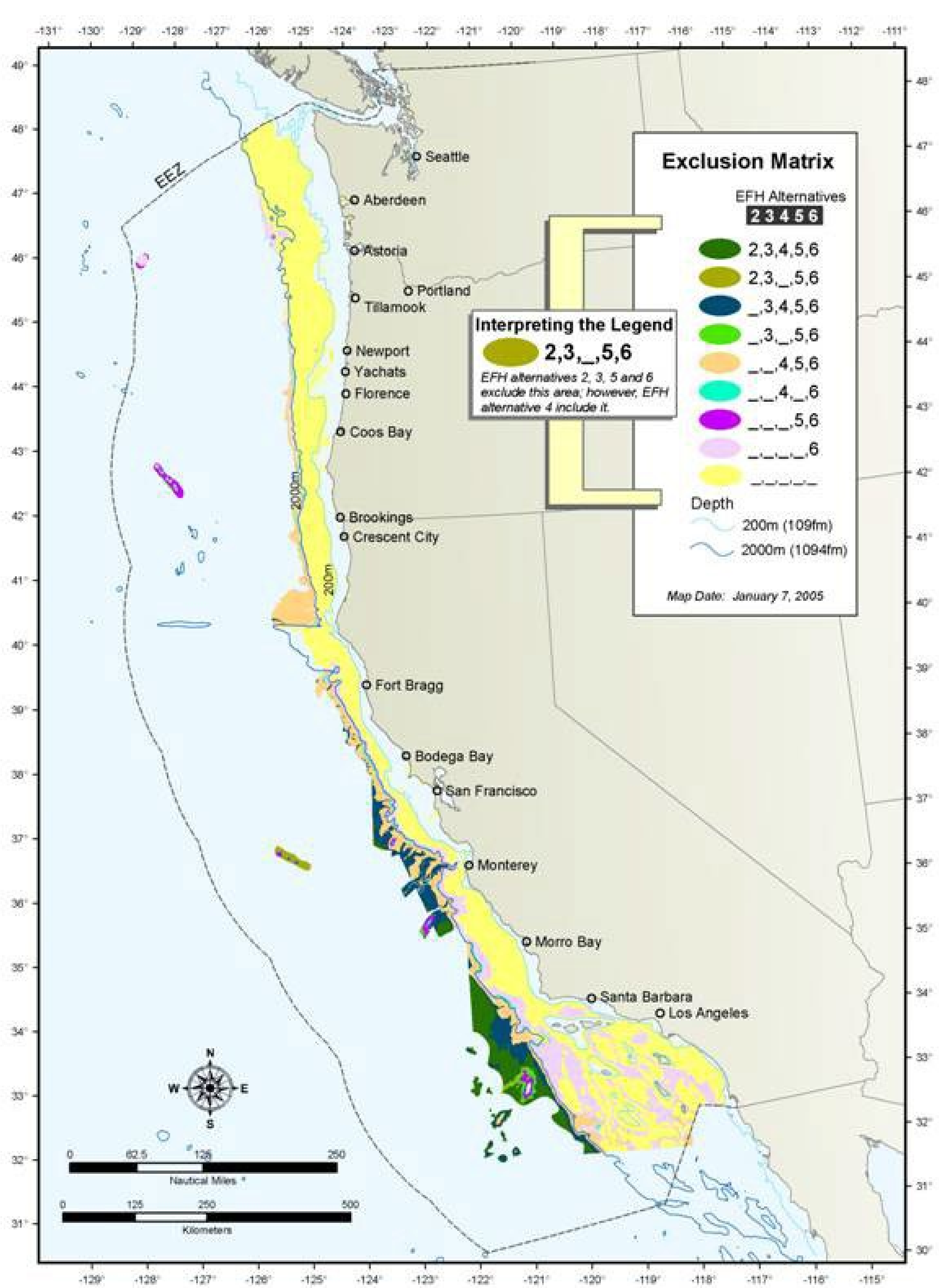

Figure 4-22: Alternative C.3.4, close sensitive habitat, option 4, areas that may be excluded by EFH alternatives

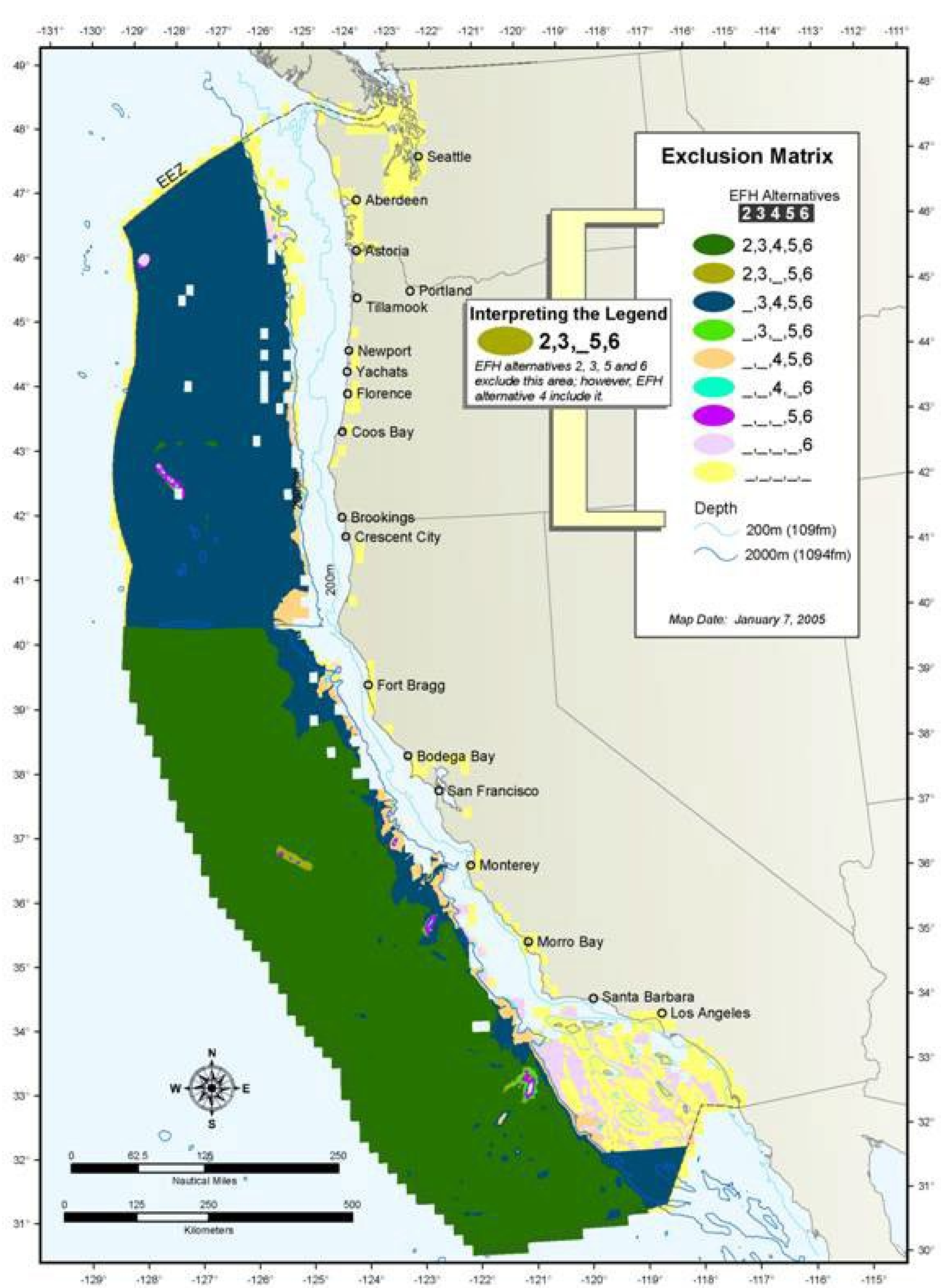

Figure 4-23: Alternative C.4.1, prohibit geographic expansion of fishing, option 1, areas that may be excluded by EFH alternatives

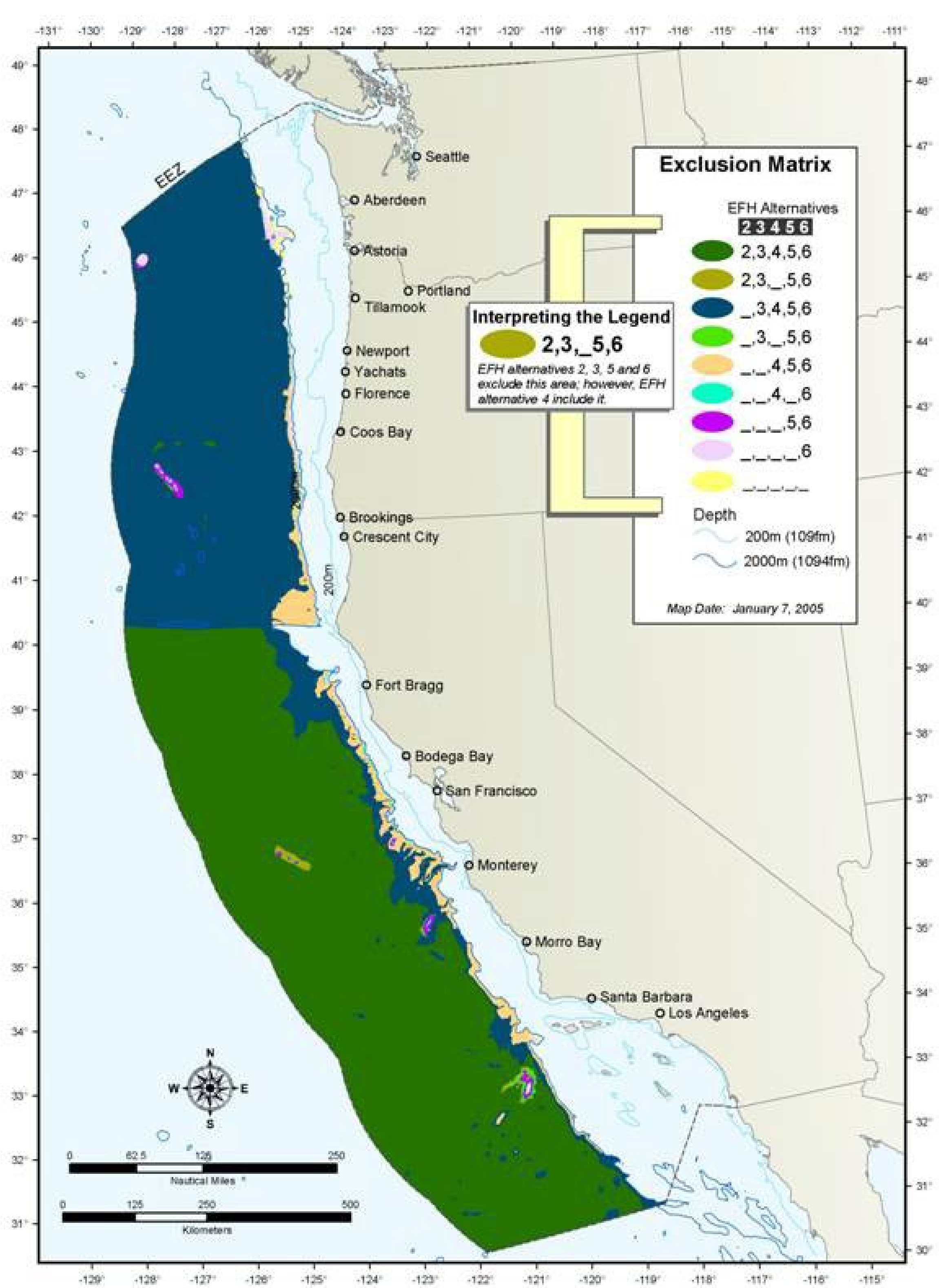

Figure 4-24: Alternative C.4.2, prohibit geographic expansion of fishing, option 1, areas that may be excluded by EFH alternatives

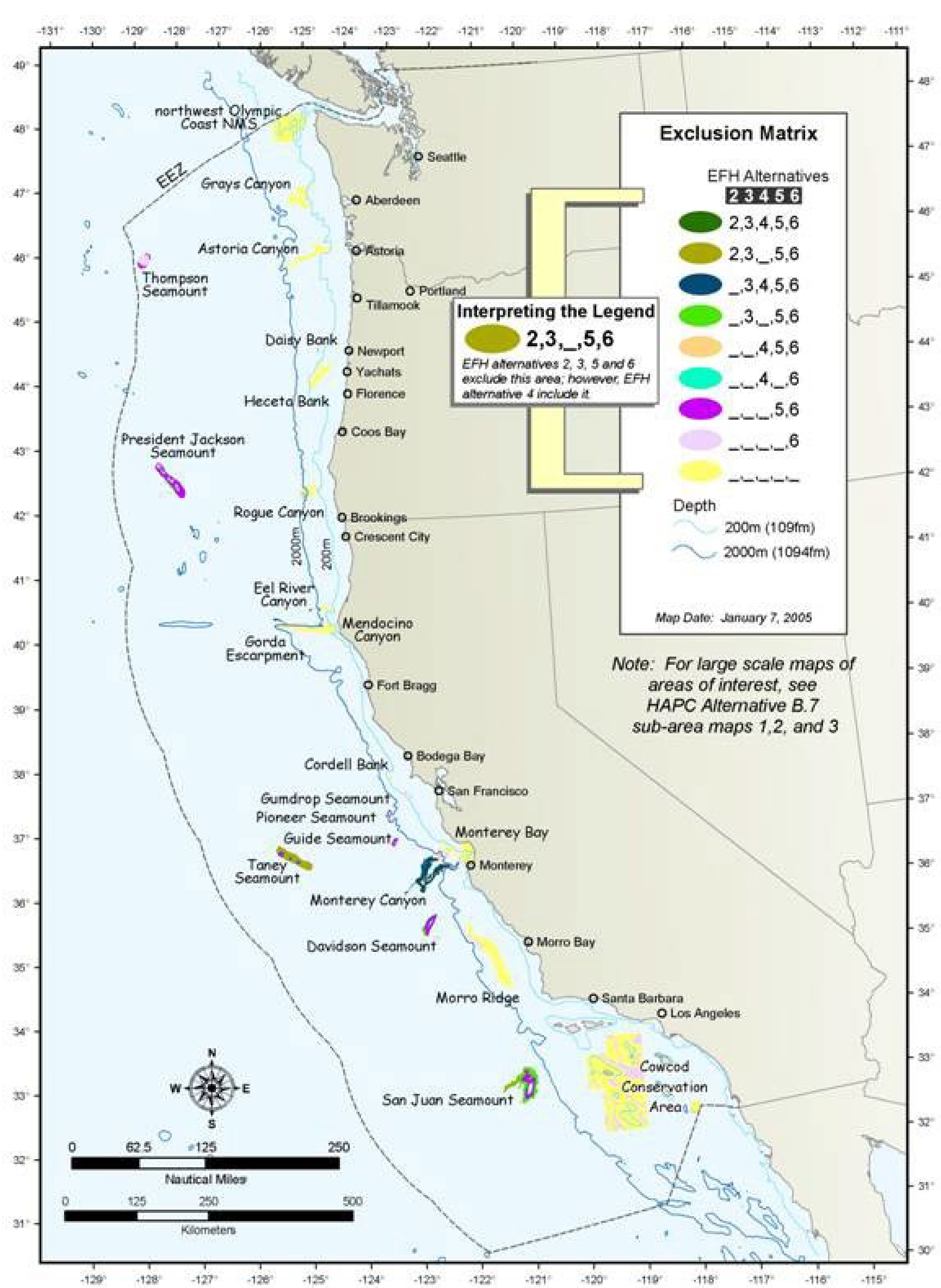

Figure 4-25: Alternative C.7, close areas of interest, areas that may be excluded by EFH alternatives

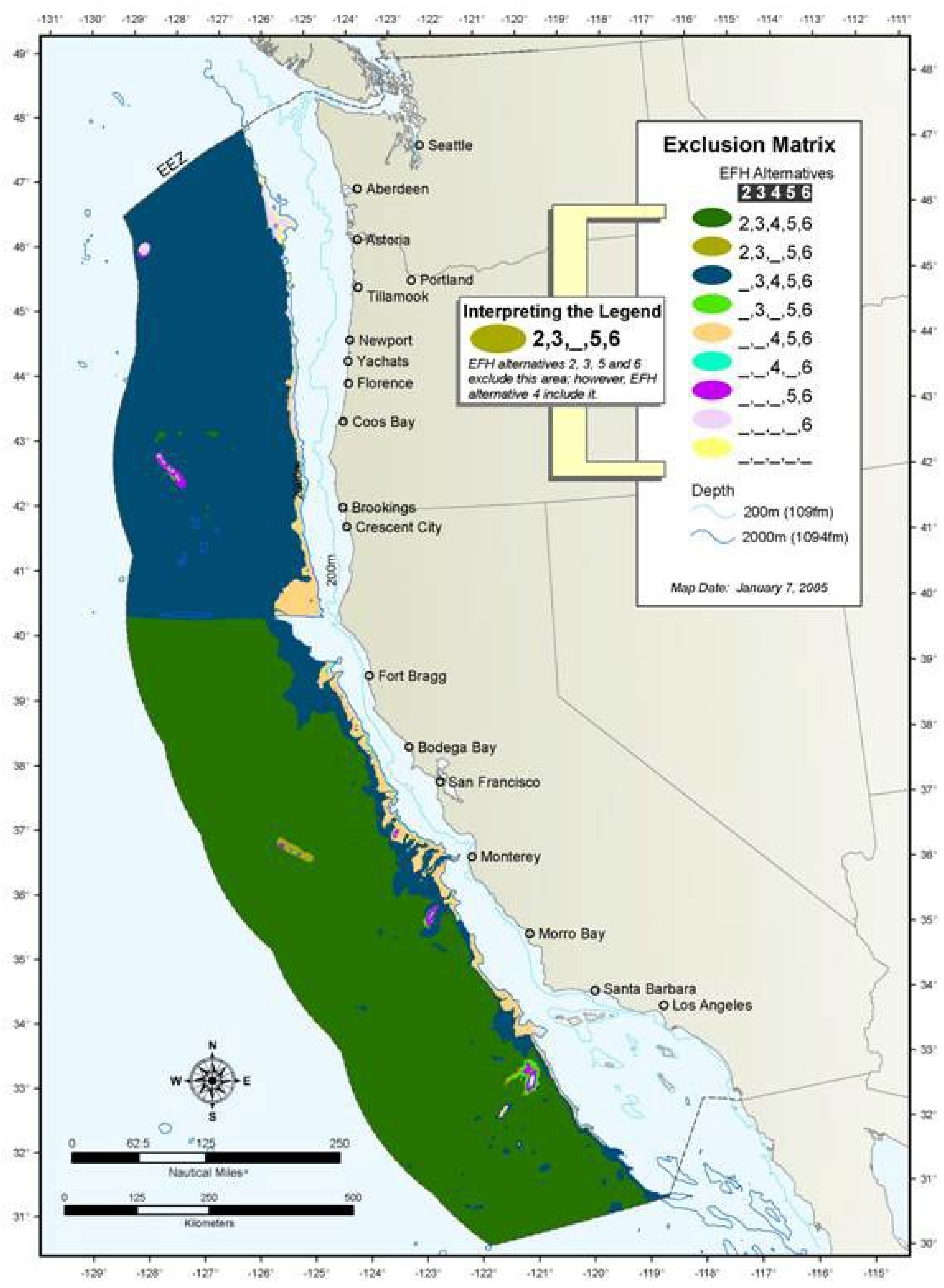

Figure 4-26: Alternative C.8.1 and C.8.2, options 1 and 2, areas that may be excluded by EFH alternatives

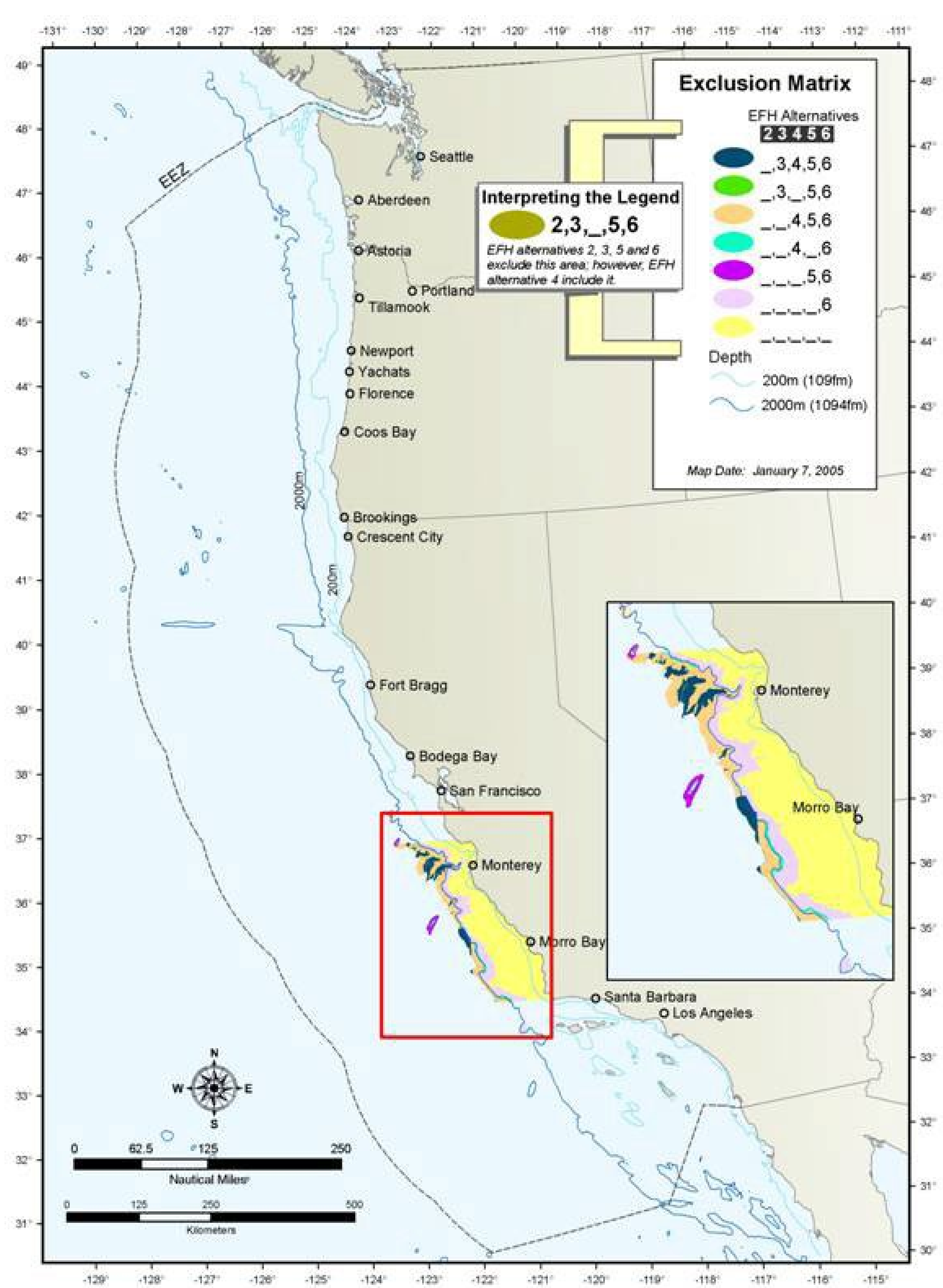

Figure 4-27: Alternative C.10, Central California no-trawl zones, areas that may be excluded by EFH alternatives

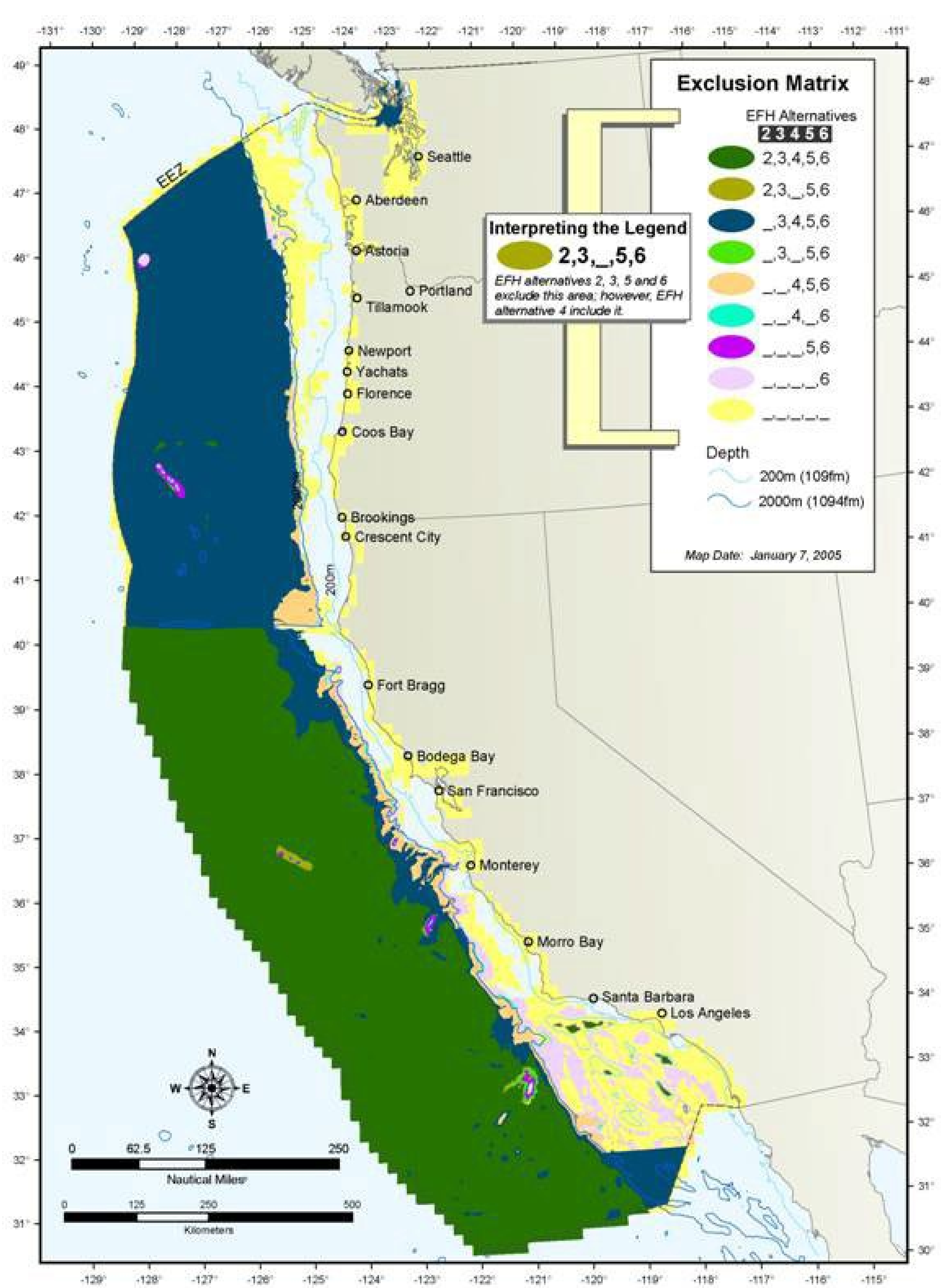

Figure 4-28: Alternative C.12, ecologically important areas to bottom trawl closed, areas that may be excluded by EFH alternatives

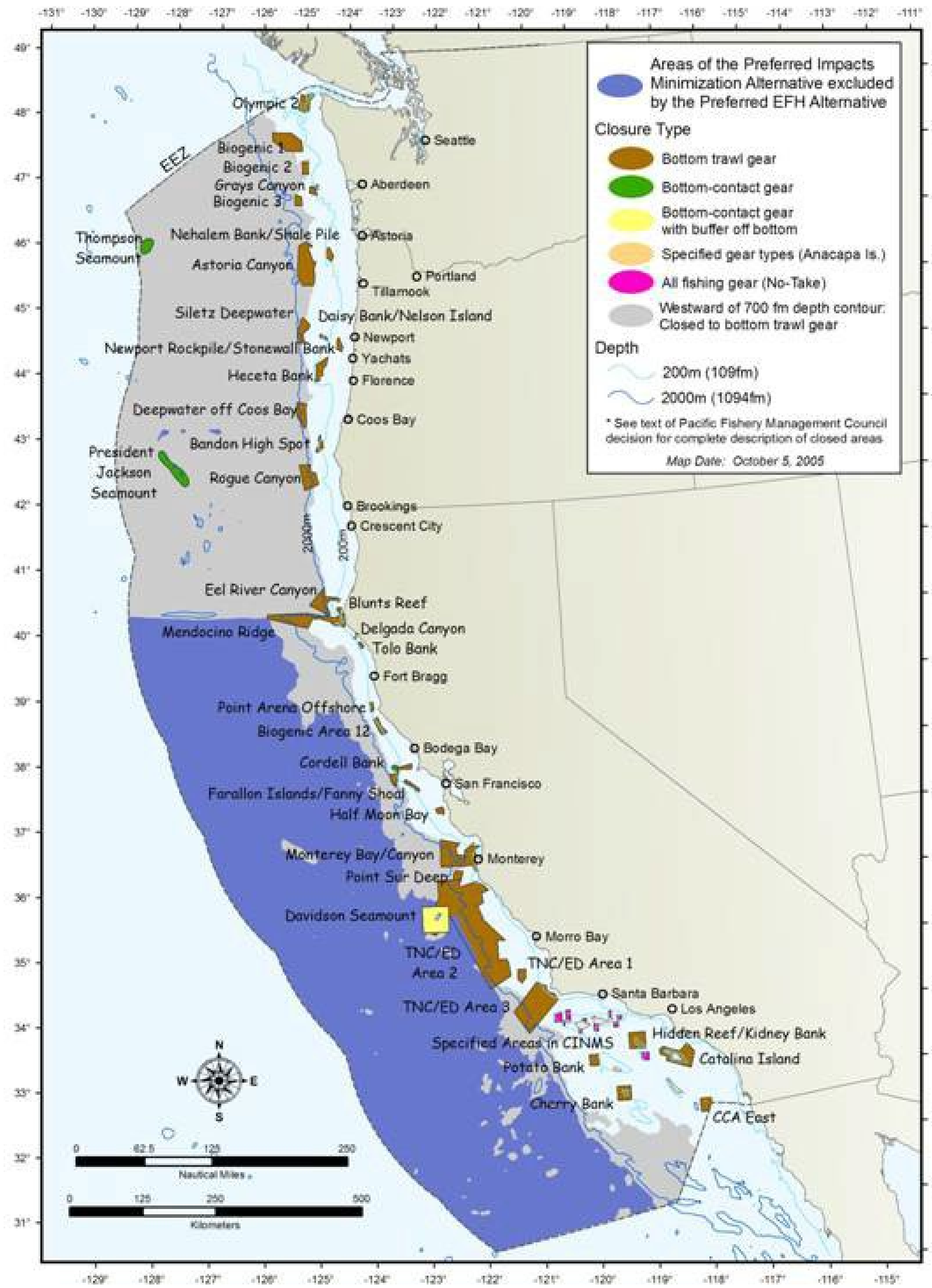

Figure 4-29: Areas of the final preferred impacts minimization alternative that may be excluded by the final preferred EFH alternative. (added since Draft EIS)

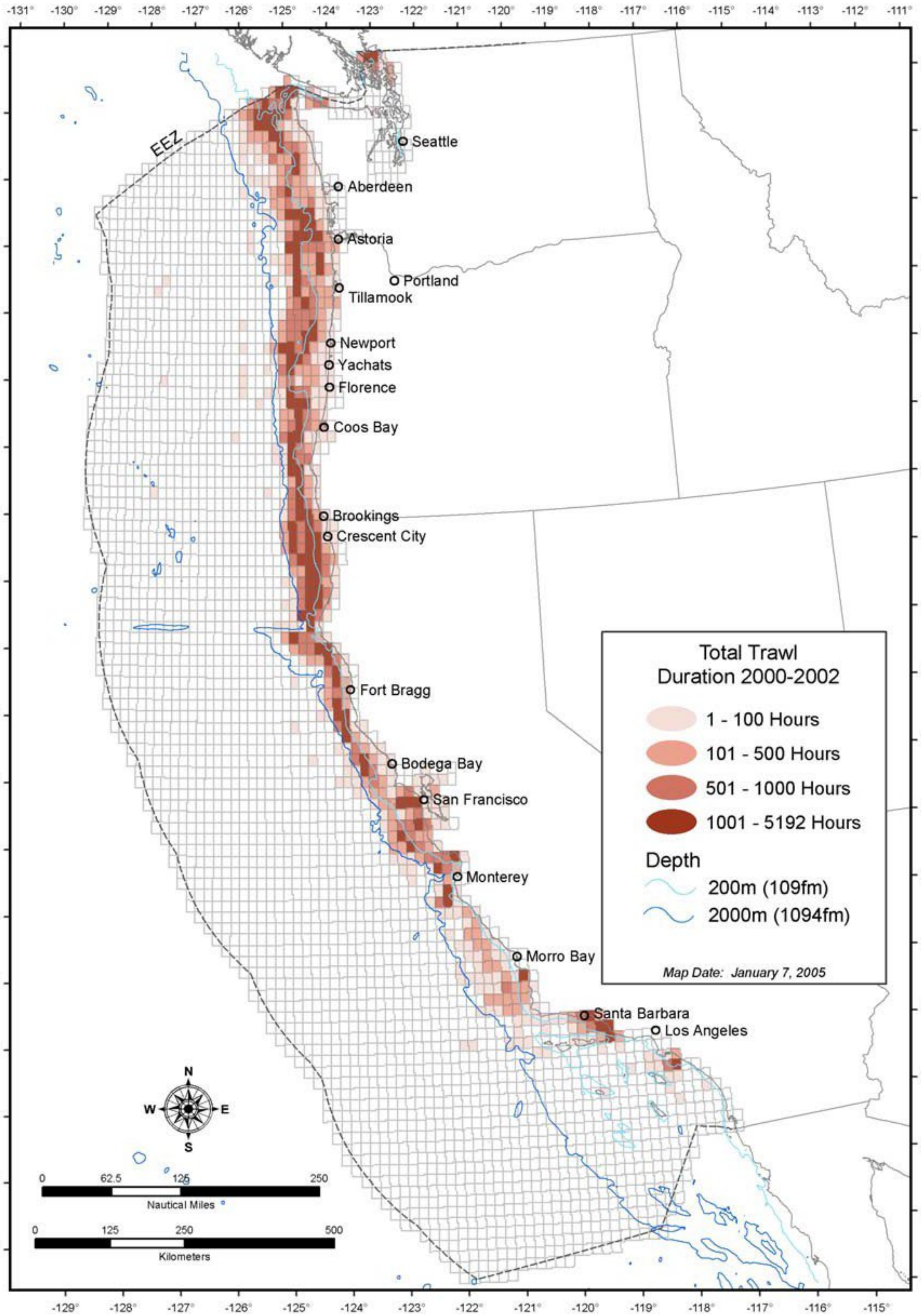

Figure 4-30: Trawl Duration

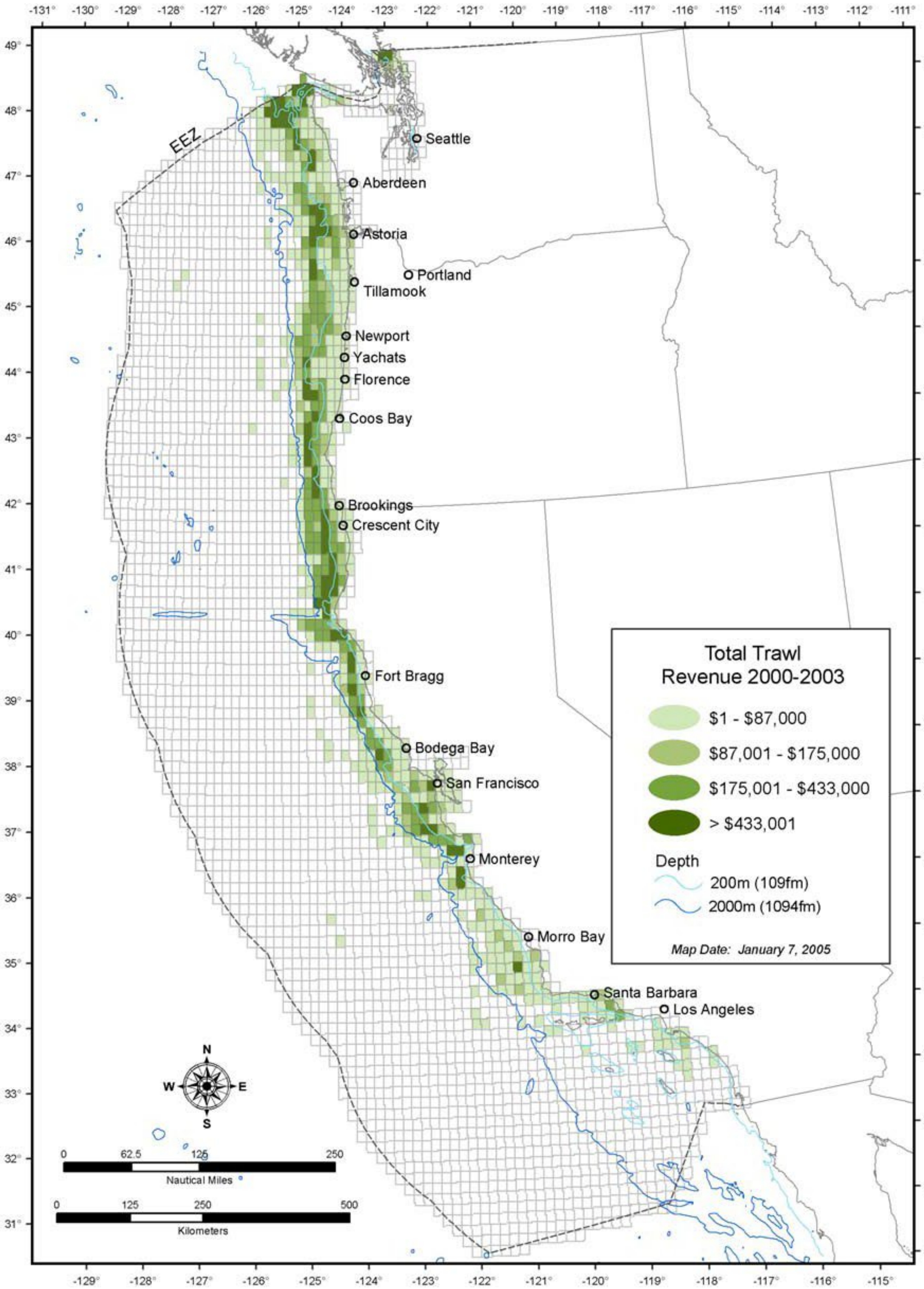

Figure 4-31: Trawl Revenue

Chapter 4 Socioeconomic Tables

Socioeconomic Table 4-1: Summary of Criteria for Evaluating Socioeconomic Consequences of the Alternatives (updated since Draft EIS).

Component of the Socioeconomic Environment	Analyses	Variables used to assess impact
Fisheries	Trawl revenues put at risk, quantitative and qualitative discussion of other sectors	Change in gross commercial revenues and costs, distribution of effects, trawl revenues put at risk, displacement of commercial and recreational effort, and impacts on other fisheries
Processors and Buyers	Qualitative discussion of impacts and analysis of changes in landed catch volume where able	Available product type and volume
Consumers	Qualitative analysis of changes in market price, product availability	Availability of seafood and changes in market price
Safety	Qualitative analysis of changes in incentives related to safety and ability to pay for equipment	Injury and fatality at sea
Management and Enforcement	Discussion of changes in demands placed upon relevant agencies	Administrative burdens
Communities	Identification and discussion of factors that may affect communities	Employment and income impacts as a result of changes to processor and fishing revenues and volume.
Non-market values	Identification and discussion of factors that may affect non-market values	The public's perception of future ecosystem viability
Non-fishing values	Identification and discussion of factors that may affect the economic viability of non-fishing sectors	Financial burdens imposed through the consultation process

Socioeconomic Table 4-2. Estimated Limited Entry Bottom Trawl Revenues at Risk by Impact Minimization Alternative (Total Revenues over a 4 year period) (updated since Draft EIS).

Alternative Set	Alternative	Revenues at Risk for total 10x10 block areas ($)	Revenues at Risk for proportioned 10x10 block areas ($)
Final Preferred Alternative		36,292,783	8,523,085
Preliminary Preferred Alternatives	C.4.1	88,941	88,941
	C.4.2	88,941	88,941
	C.9	NA	NA
	C.10	5,886,370	5,644,512
	C.11	NA	NA
	C.12	46,252,563	19,242,920
	C.13	46,252,563	19,242,920
	C.14	46,252,563	19,242,920
Other Alternatives	C.1	NA	NA
	C.2.1	UNKN	UNKN
	C.2.2	UNKN	UNKN
	C.2.3	UNKN	UNKN
	C.3.1	1,011,952	178,745
	C.3.2	1,531,975	928,950
	C.3.3	52,943,052	5,041,431
	C.3.4	87,931,024	59,044,440
	C.5	NA	NA
	C.6	78,094,177	41,622,276
	C.7.1	29,471,349	12,601,536
	C.7.2	29,471,349	12,601,536
	C.8.1	UNKN	UNKN
	C.8.2	UNKN	UNKN

Socioeconomic Table 4-3. Summary of Impacts on the Socioeconomic Environment for Council Preferred Alternatives Pertaining to Impact Minimization (updated since the Draft EIS).

	Portion of the Socioeconomic Environment					
Alt.	Fisheries	Mgmt and Enfrcmt	Processors	Communities	Consumers	Safety
Final Preferred	$8,523,085 of twl revenues at risk. Non-twl comm and rec fisheries impacted. Eliminate the potential for fishery expansion. More vessels required to carry VMS	Agencies would need to verify compliance with area closures and unfished area boundary	Processors may be negatively impacted if revenues at risk are partially lost	May be negatively impacted if there are reductions in landed catch and net revenue	No expected effect	Safety may be enhanced if more vessels carry VMS, but may decrease if revenues decrease
C.4.1	$88,941 of revenues at risk. Eliminate potential for fishery expansion. More vessels may need VMS	Agencies would need to verify compliance with unfished area boundary	Little or no expected effect	No expected effect	No expected effect	Safety may be enhanced if additional vessels are required to carry VMS
C.4.2	$88,941 of revenues at risk. Eliminate potential for fishery expansion. More vessels may need VMS	Agencies would need to verify compliance with unfished area boundary	Little or no expected effect	No expected effect	No expected effect	Safety may be enhanced if additional vessels are required to carry VMS
C.9	Vessels may be required to incur additional costs. May displace some small fisheries	Agencies would need to verify compliance with equipment and area requirements	Little or no expected effect	No expected effect	No expected effect	No expected effect
C.10	$5,644,512 - $5,886,370 of revenues at risk. Additional vessels may need to carry VMS	Agencies would need to verify compliance with trawl closures	Processors near project area negatively impacted if landings decline	Communities near project area negatively impacted by reduction in landings & revenue	No expected effect	Safety may be enhanced if additional vessels are required to carry VMS
C.11	Non-negative effect on fishing revenues. Slope trawl effort may decrease	Difficulties in predicting and managing target and non-target species. Increased probability of disaster tows	Non-negative impact expected if landed volume doesn't change. If volume changes, effect unknown	Non-negative impact expected if landed volume doesn't change. If volume changes, effect unknown	No expected effect	Non-negative impact expected. If vessel revenues increase, safety may benefit
C.12	$18,471,193 - $44,198,927 of revenues at risk. More vessels may need VMS.	Agencies would need to verify compliance with additional closed areas	Processors may be negatively impacted if revenues at risk are partially lost	May be negatively impacted if there are reductions in landed catch and net revenue	No expected effect	Safety may be enhanced if more vessels carry VMS, but may decrease if revenues decrease
C.13	$18,471,193 - $44,198,927 of revenues at risk. More vessels may need VMS.	Agencies would need to verify compliance with additional closed areas	Processors may be negatively impacted if revenues at risk are partially lost	May be negatively impacted if there are reductions in landed catch and net revenue	No expected effect	Safety may be enhanced if more vessels carry VMS, but may decrease if revenues decrease
C.14	$18,471,193 - $44,198,927 of revenues at risk. More vessels may need VMS.	Agencies would need to verify compliance with additional closed areas	Processors may be negatively impacted if revenues at risk are partially lost	May be negatively impacted if there are reductions in landed catch and net revenue	No expected effect	Safety may be enhanced if more vessels carry VMS, but may decrease if revenues decrease

Socioeconomic Table 4-4. Final Preferred Alternative LE Bottom Trawl Revenue and Pounds at Risk by Species Groups (4 year period) (added since Draft EIS)

	Proportioned 10x10 Block Area		Total 10x10 Block Area	
SPECIES GROUP	GROSS REVENUE $	LANDED POUNDS	GROSS REVENUE $	LANDED POUNDS
OTHER FLATFISH	526,409	1,788,448	2,556,767	9,179,855
OTHER FISH	296,983	581,622	1,601,950	3,053,664
ROCKFISH	611,817	1,165,649	2,509,714	4,785,398
OTHER GROUNDFISH	397,428	1,199,611	1,686,877	5,047,105
DOVER SOLE / THORNYHEAD / SABLEFISH	5,722,536	8,625,036	23,688,435	36,017,619
PETRALE SOLE	826,102	932,160	4,249,040	4,765,667
Total	8,381,276	14,292,526	36,292,783	62,849,308

Socioeconomic Table 4-5. Alternative C.4.1 LE Bottom Trawl Revenue and Pounds at Risk by Species Groups (4 year period)

	Proportioned 10x10 Block Area		Total 10x10 Block Area	
SPECIES GROUP	GROSS REVENUE $	LANDED POUNDS	GROSS REVENUE $	LANDED POUNDS
OTHER FLATFISH	14,784	17,322	14,784	17,322
OTHER FISH	1,579	3,289	1,579	3,289
ROCKFISH	6,064	10,855	6,064	10,855
OTHER GROUNDFISH	513	921	513	921
DOVER SOLE / THORNYHEAD / SABLEFISH	62,672	96,518	62,672	96,518
PETRALE SOLE	3,328	3,745	3,328	3,745
Total	88,941	132,650	88,941	132,650

Socioeconomic Table 4-6. Alternative C.4.2 Displaced LE Bottom Trawl Revenue and Pounds by Species Groups (4 year period)

	Proportioned 10x10 Block Area		Total 10x10 Block Area	
SPECIES GROUP	GROSS REVENUE $	LANDED POUNDS	GROSS REVENUE $	LANDED POUNDS
OTHER FLATFISH	14,784	17,322	14,784	17,322
OTHER FISH	1,579	3,289	1,579	3,289
ROCKFISH	6,064	10,855	6,064	10,855
OTHER GROUNDFISH	513	921	513	921
DOVER SOLE / THORNYHEAD / SABLEFISH	62,672	96,518	62,672	96,518
PETRALE SOLE	3,328	3,745	3,328	3,745
Total	88,941	132,650	88,941	132,650

Socioeconomic Table 4-7. C.11 Change in Total Exvessel Revenue if Trawl Vessels Switch to Fixed Gear

Hypothetical Scenario	Range of Additional DTS Revenue	
Hypothetical Amount of Trawl Sablefish caught w/Fixed Gear (mt)	Upper Bound Additional Exvessel Revenue ($)	Lower Bound Additional Exvessel Revenue ($)
250	522,730	-169,550
500	1,049,708	-334,852
1,000	2,107,794	-661,326
2,000	4,181,842	-1,356,397

Socioeconomic Table 4-8. C.11 Hypothetical Incidental Catch Impacts from Allowing Trawl Vessels to Switch to Fixed Gear

Hypothetical Scenario	Incidental Catch Implications			
Hypothetical Amount of Trawl Sablefish caught w/Fixed Gear (mt)	Additional Canary Mortality (mt)	Remaining Canary OY (mt)	Additional Yelloweye Mortality (mt)	Remaining Yelloweye OY (mt)
250	0.1	2.4	0.1	5.2
500	0.1	2.4	0.3	5
1,000	0.2	2.3	0.5	4.8
2,000	0.5	2	1	4.3

Socioeconomic Table 4-9. C.12 Bottom Trawl Pounds and Revenue at Risk by Species Group over a Four Year Period

	Proportioned 10x10 Block Area		Total 10x10 Block Area	
SPECIES GROUP	GROSS REVENUE $	LANDED POUNDS	GROSS REVENUE $	LANDED POUNDS
DOVER SOLE / THORNYHEAD / SABLEFISH	11,022,644	17,650,150	25,937,429	40,957,084
OTHER FISH	318,235	689,548	865,384	1,782,547
OTHER FLATFISH	1,911,679	7,834,045	4,944,494	18,315,619
OTHER GROUNDFISH	974,861	3,540,701	2,547,307	8,797,578
PETRALE SOLE	2,960,208	3,361,432	6,706,577	7,544,813
ROCKFISH	1,283,566	2,824,941	3,197,735	6,915,209
Grand Total	18,471,193	35,900,817	44,198,927	84,312,850

Socioeconomic Table 4-10. C 12 Bottom Trawl Revenues at Risk by Proposed Closed Area over a 4 year Period

	Revenue At Risk ($)	
AREA	Total 10 x 10 blocks	Proportioned 10 x 10 blocks
Astoria Canyon	2,963,671	1,848,170
Biogenic area_1	803,053	477,566
Biogenic area_11	332,603	25,049
Biogenic area_12	922,838	240,264
Biogenic area_13	961,846	49,930
Biogenic area_2	359,632	44,525
Biogenic area_3	C	C
Biogenic area_6	167,116	37,112
Biogenic area_7	1,541,517	296,876
Biogenic area_8	401,506	75,921
Channel Islands	232,244	66,370
Cordell Bank	1,623,286	555,935
Cowcod conservation area_east	-	-
Cowcod conservation area_west	C	C
Daisy Bank	573,048	46,056
Davidson Seamount	-	-
Eel River Canyon	3,772,635	2,488,998
Grays Canyon	828,166	234,938
Guide Seamount	C	C
Gumdrop Seamount	-	-
Hard bottom feature_1	584,621	56,323
Hard bottom feature_2	1,012,825	177,877
Hard bottom feature_3	408,215	17,455
Hard bottom feature_4	1,004,895	155,567
Hard bottom feature_5	161,872	12,631
Hard bottom feature_6	174,247	11,946
Heceta Bank	2,616,548	1,396,418
Mendocino Ridge	1,928,193	1,131,165
Monterey Bay and Canyon	2,393,781	1,825,593
Morrow ridge	1,528,399	469,232
Olympic_1	6,650,238	3,317,651
Olympic_2	5,656,804	2,166,960
Pioneer Seamount	C	C
President Jackson Seamount	-	-
Ridges_biogenic area_10	960,321	159,319
Ridges_biogenic area_9	235,165	52,799
Ridges_biogenic_area_5	2,287,370	675,296
Rogue Canyon	3,117,766	1,115,697
San Juan Seamount	-	-
Taney Seamount	-	-
Thompson Seamount	-	-
Grand Total	44,198,927	18,471,193

note: sum of all areas does not equal grand total because some 10x10 blocks intersect with more than one area

Socioeconomic Table 4-11: Summary of the Social and Economic Consequences of the Impacts Minimization and Research and Monitoring Alternatives.

Direction of Alternative Impacts on the Socioeconomic Environment

Environmental Component	Past and Present	External and Non-Fishing Factors	Reasonably Foreseeable Future	Impact Minimization														Research and Monitoring			
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	1	2	3	4
Trawl Fisheries	Many trawl fisheries have been constrained by rebuilding species. Buyback will help many vessels increase revenues.	Unknown	Rebuilding species constraints are expected to continue. Shelf flatfish opportunities are expected to increase	0	E-	E-	0	0	E-	E-	E-	E-	U	E-/E+	E-	E-	E-	0	0	E-	E-/0
Fixed Gear Fisheries	Fixed gear revenues have increased due to tier and permit stacking. Rebuilding species constraints are expected to continue.	Unknown	Constraints due to rebuilding species are expected to continue	0/U	E-	E-/ E+	0	0	E-	E-/ 0	0/E-	E-	U	E-/E+	0	E-	E-	0	0	E-	E-/0
Recreational Fisheries	Recreational fisheries have been expanding, but are constrained by rebuilding species.	Unknown	Recreational fisheries will continue to be constrained by rebuilding species. Future growth is unknown.	0	0	0	0	0	E-	0/E-	0/E-	E-	U	0	0	0	E-	0	0	E-	E-/0
Tribal Fisheries	Tribal groundfish fisheries have been expanding.	Unknown	Tribal fisheries are expected to continue expanding.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Fisheries	Conditional. Some fisheries have been expanding, while some have been contracting due to rebuilding species concerns.	Unknown	Rebuilding species will continue to be a constraint.	0	0	E-	0	0	E-	0/E-	0/E-	E-	U	0	0	0	E-	0	0	E-	E-/0
Consumers	Consumers have been consuming increasing amounts of seafood	Unknown	Consumers are expected to continue consuming more seafood.	0	0	0	0	0	0	0	0	0	U	0	0	0	0	0	0	o	U
Safety	Safety has been generally increasing	Unknown	The number of fishing related accidents are expected to continue decreasing.	0	U	E+	E+	0	E+	E+	E+	0	U	U	0	0	0	0	0	E+	U
Buyers and Processors	Groundfish buyers and processors have been consolidating in recent years	Unknown	The supply of groundfish to buyers and processors is expected to remain relatively stable	0	E-	0	0	0	0	0	0	0	0	0/E+	U	U	U	0	0	0	U
Communities	Many coastal communities are becoming less reliant on fishing-related activity	Unknown	As coastal economies grow and diversify, their reliance on fishing will continue to decrease.	0	0	0	0	0	0	0	0	0	U	0/E+	U	U	U	0	0	0	U
Management and Enforcement	The level of management and enforcement needed for recent management actions have been increasing in complexity	Unknown	The current level of management and enforcement is expected to continue	0	U	E-	E-	E-	E-	E-	E-	E-	E-	E-	E-	E-	E-	0	E-/E+	E-	E-
Non-Fishing Activities	The trends in non-fishing activities are unknown.	NA	Unknown	0	U	U	U	U	U	U	U	U	U	U	U	U	U	0	U	U	U
Non-Fishing Values	The trend in non-fishing values has likely been negative.	Unknown	Unknown	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U

Socioeconomic Table 4-12. Multiplicative Impact to Processors and States from LE Trawl Vessel Landings (Impact by Round Pounds of Landed Species)

	Oregon		Washington		California	
Species	Processor	State	Processor	State	Processor	State
Groundfish	0.83	1.16	0.62	0.84	0.81	1.14
Lingcod	0.96	1.30	0.87	1.19	1.20	1.70
Other rockfish and perch	0.67	1.18	0.67	0.91	0.63	0.88
Thornyheads	1.13	1.53	0.86	1.17	1.10	1.57
Sablefish	1.71	2.35	1.74	2.39	1.53	2.19
Sharks	0.49	0.63	0.54	0.69	0.78	1.10
Skates	0.56	0.71	0.49	0.62	0.60	0.84
Arrowtooth flounder	0.34	0.45	0.32	0.42	0.38	0.53
Dover sole	0.59	0.81	0.57	0.78	0.58	0.80
English sole	0.56	0.77	0.56	0.76	0.60	0.83
Other sole/flounder	1.05	1.45	0.67	0.92	1.05	1.46
Petrale sole	1.23	1.70	1.20	1.68	1.17	1.62
Rex sole	0.66	0.90	0.58	0.79	0.68	0.94
Sanddabs	0.55	0.76	0.48	0.65	0.58	0.81
Pacific whiting	0.17	0.19	0.25	0.30	0.24	0.28
Surimi	0.15	0.16	0.00	0.00	0.00	0.00
H&G	0.25	0.31	0.25	0.30	0.24	0.28

Notes Marginal impacts are measured as total personal income generated at the state level.
Marginal impacts are estimated using the PFMC Fisheries Economic Assessment Model (FEAM) developed for 2000 fisheries and adjusted to 2003 landings and ex-vessel prices. The FEAM uses 1998 IMPLAN coefficients and multipliers.
Marginal impacts are weighted across product forms and individual species using pounds.

Source Research Group, The. 2004. Fisheries Economic Assessment Model. The Research Group. Corvallis, OR
Year 2003 landings from PacFIN annual vessel summary tables August 2004 extraction

Socioeconomic Table 4-13. Multiplicative Impact to Processors, Communities, States and Region from LE Trawl Non-whiting Groundfish Landed Round Pounds in West Coast Communities

		Multiplier			
State	Community	Processor	Community	State	West Coast
Oregon	Astoria	0.81	0.94	1.10	1.17
	Tillamook	1.00	1.11	1.39	1.48
	Newport	0.85	0.97	1.20	1.28
	Coos Bay	0.85	0.98	1.20	1.27
	Brookings	0.89	0.97	1.21	1.29
Washington	North Puget Sound	0.59	0.72	0.82	0.89
	South Puget Sound	0.00	0.00	0.00	0.00
	Coastal WA North	0.70	0.79	0.98	1.06
	Coastal WA South	0.65	0.76	0.88	0.96
California	Crescent City	0.86	1.04	1.21	1.23
	Eureka	0.84	1.02	1.19	1.21
	Fort Bragg	0.80	0.97	1.13	1.15
	Bodega Bay	0.85	1.17	1.18	1.20
	San Francisco	0.82	1.11	1.12	1.13
	Monterey	0.71	0.87	0.96	0.97
	Morro Bay	0.82	1.08	1.22	1.24
	Santa Barbara	0.00	0.00	0.00	0.00
	Los Angeles	1.91	2.89	2.94	2.97
	San Diego	3.41	4.77	4.87	4.92

Notes: Marginal impacts are measured as total personal income generated at the state level.

Marginal impacts are estimated using the PFMC Fisheries Economic Assessment Model (FEAM) developed for 2000 fisheries and adjusted to 2003 landings and ex-vessel prices.

The FEAM uses 1998 IMPLAN coefficients and multipliers.

Marginal impacts are weighted across product forms and individual species using pounds.

Source: Research Group, The. 2004. Fisheries Economic Assessment Model. The Research Group. Corvallis, OR

Year 2003 landings from PacFIN annual vessel summary tables August 2004 extraction

Socioeconomic Table 4-14 Comparison of Protected Area and Trawl Revenues at Risk by Alternative (updated since Draft EIS)

DEIS Alternative	Description	% of EEZ	Area (ha)	Area (sq nm)	Revenues at Risk for total 10x10 block areas ($)	Revenues at Risk for proportioned 10x10 block areas ($)
C.1	No Action				NA	NA
Final Preferred	Close Areas to various gear types	81.72%	67,237,011	196,031	36,292,783	8,523,085
C.10	Central CA No-Trawl Zones	3.48%	2,862,458	8,345	5,886,370	5,644,512
C.11	Relax Gear Endorsements			0	NA	NA
C.12	Close Ecological Important Areas to Bottom Trawl	90.36%	74,350,701	216,769	46,252,563	19,242,920
C.13	Close Ecological Important Areas to Bottom-contacting gear	90.36%	74,350,701	216,769	46,252,563	19,242,920
C.14	Close Ecological Important Areas to Fishing	90.36%	74,350,701	216,769	46,252,563	19,242,920
C.2.1	Depth Based Gear Restrictions Option 1 - Large Footrope Depth Restriction - 200 fm	9.86%	8,109,479	23,643	UNKN	UNKN
C.2.1	Depth Based Gear Restrictions Option 1 - Fixed Gear Depth Restriction - 100/150 fm	8.46%	6,958,174	20,287	UNKN	UNKN
C.2.2	Depth Based Gear Restrictions Option 2 - Large Footrope Depth Restriction – EEZ	100.00%	82,281,491	239,892	UNKN	UNKN
C.2.2	Depth Based Gear Restrictions Option 2 - Fixed Gear Depth Restriction - 100/150 fm	8.46%	6,958,174	20,287	UNKN	UNKN
C.2.3	Depth Based Gear Restrictions Option 3 - Large Footrope Depth Restriction - 200 fm	9.86%	8,109,479	23,643	UNKN	UNKN
C.2.3	Depth Based Gear Restrictions Option 3 - Fixed Gear Depth Restriction - 60 fm	5.62%	4,620,408	13,471	UNKN	UNKN
C.3.1	Close Sensitive Habitat - Option 1	2.19%	1,805,105	5,263	1,011,952	181,973
C.3.2	Close Sensitive Habitat - Option 2	16.85%	13,861,398	40,413	1,531,975	934,794
C.3.3	Close Sensitive Habitat - Option 3	2.70%	2,221,323	6,476	47,115,054	3,723,698
C.3.4	Close Sensitive Habitat - Option 4	23.18%	19,069,623	55,597	82,895,532	58,458,226
C.4.1	Prohibit Geographic Expansion of Fishing - Option 1	82.83%	68,150,527	198,693	88,941	88,941
C.4.2	Prohibit Geographic Expansion of Fishing - Option 2	74.21%	61,060,253	178,021	88,941	88,941
C.5	Prohibit Krill Fishery			0	NA	NA
C.6	Close Hotspots	7.77%	6,389,460	18,628	78,094,177	41,622,276
C.7.1, C.7.2	Close Areas of Interest	3.67%	3,017,148	8,796	29,471,349	12,601,536
C.8.1, C.8.2	Zoning Fishing Activities, options 1 and 2	74.21%	61,060,253	178,021	UNKN	UNKN
C.9	Gear Restrictions			0	NA	NA

Socioeconomic Table 4-15. Preferred Alternative LE Bottom Trawl Revenue and Pounds at Risk by Species Groups (4 year period) (added since Draft EIS).

	Proportioned 10x10 Block Area		Total 10x10 Block Area	
SPECIES GROUP	GROSS REVENUE $	LANDED POUNDS	GROSS REVENUE $	LANDED POUNDS
OTHER FLATFISH	526,409	1,788,448	2,556,767	9,179,855
OTHER FISH	296,983	581,622	1,601,950	3,053,664
ROCKFISH	611,817	1,165,649	2,509,714	4,785,398
OTHER GROUNDFISH	397,428	1,199,611	1,686,877	5,047,105
DOVER SOLE / THORNYHEAD / SABLEFISH	5,722,536	8,625,036	23,688,435	36,017,619
PETRALE SOLE	826,102	932,160	4,249,040	4,765,667
Total	8,381,276	14,292,526	36,292,783	62,849,308

Chapter 5 Consistency with the Groundfish FMP

5.1 Consistency with FMP Goals and Objectives

The Groundfish FMP goals and objectives are listed below. The way in which the measures to minimize adverse effects to Groundfish EFH addresses each objective is briefly described in *italics* below the relevant statement.

Management Goals.

Goal 1 - Conservation. Prevent overfishing and rebuild overfished stocks by managing for appropriate harvest levels and prevent, to the extent practicable, any net loss of the habitat of living marine resources.

Implementation of the final preferred alternative should assist in providing for rebuilding of overfished stocks and will prevent net loss of habitat for groundfish.

Goal 2 - Economics. Maximize the value of the groundfish resource as a whole.

Implementation of the final preferred alternative should, over the long-term, increase numbers of managed fish, improve harvesting opportunities and result in an overall increased value of the groundfish fishery.

Goal 3 - Utilization. Achieve the maximum biological yield of the overall groundfish fishery, promote year-round availability of quality seafood to the consumer, and promote recreational fishing opportunities.

Implementation of the final preferred alternative may over the long-term increase the harvest and recreational opportunities.

Objectives. To accomplish these management goals, a number of objectives will be considered and followed as closely as practicable:

Conservation.

Objective 1. Maintain an information flow on the status of the fishery and the fishery resource which allows for informed management decisions as the fishery occurs.

Implementation of the research and monitoring components of the final preferred alternative will improve the habitat-related information available to decisionmakers. That will allow future conservation efforts to focus on getting the best results.

Objective 2. Adopt harvest specifications and management measures consistent with resource stewardship responsibilities for each groundfish species or species group.

Implementation of the final preferred alternative is not expected to influence or otherwise be inconsistent with this objective.

Objective 3. For species or species groups that are below the level necessary to produce MSY, consider rebuilding the stock to the MSY level and, if necessary, develop a plan to rebuild the stock.

Implementation of the final preferred alternative may be a positive factor in stock productivity and rebuilding.

Objective 4. Where conservation problems have been identified for nongroundfish species, and the best scientific information shows the groundfish fishery has a direct impact on the ability of that species to maintain its long-term reproductive health, the Council may consider establishing management measures to control the impacts of groundfish fishing on those species. Management measures may be imposed on the groundfish fishery to reduce fishing mortality of a nongroundfish species for documented conservation reasons. The action will be designed to minimize disruption of the groundfish fishery, in so far as consistent with the goal to minimize the bycatch of nongroundfish species, and will not preclude achievement of a quota, harvest guideline, or allocation of groundfish, if any, unless such action is required by other applicable law.

Implementation of the final preferred alternative may have positive influence in the productivity of non-groundfish stocks. The final preferred alternative is not expected to have negative consequences on non-groundfish fisheries.

Objective 5. Describe and identify EFH, adverse impacts on EFH, and other actions to conserve and enhance EFH, and adopt management measures that minimize, to the extent practicable, adverse impacts from fishing on EFH.

Implementation of the final preferred alternative would improve the description of EFH and minimize fishing impacts on such EFH.

Economics.

Objective 6. Attempt to achieve the greatest possible net economic benefit to the nation from the managed fisheries.

Implementation of the final preferred alternative should, over the long-term, improve harvesting opportunities and result in an overall increased value of the groundfish fishery.

Objective 7. Identify those sectors of the groundfish fishery for which it is beneficial to promote year-round marketing opportunities and establish management policies that extend those sectors' fishing and marketing opportunities as long as practicable during the fishing year.

Implementation of the final preferred alternative will not influence opportunities for a year round fishery or associated policies.

Objective 8. Gear restrictions to minimize the necessity for other management measures will be used whenever practicable.

Implementation of the final preferred alternative would include gear restrictions to minimize adverse impacts to EFH.

Utilization.

Objective 9. Develop management measures and policies that foster and encourage full utilization (harvesting and processing) of the Pacific Coast groundfish resources by domestic fisheries.

Implementation of the final preferred alternative will not influence, positively or negatively, the utilization of harvested fish.

Objective 10. Recognizing the multispecies nature of the fishery and establish a concept of managing by species and gear or by groups of interrelated species.

Implementation of the final preferred alternative is intended to have a positive impact on the habitat needs of all species and life stages under the FMP.

Objective 11. Strive to reduce the economic incentives and regulatory measures that lead to wastage of fish. Also, develop management measures that minimize bycatch to the extent practicable and, to the extent that bycatch cannot be avoided, minimize the mortality of such bycatch. In addition, promote and support monitoring programs to improve estimates of total fishing-related mortality and bycatch, as well as those to improve other information necessary to determine the extent to which it is practicable to reduce bycatch and bycatch mortality.

Implementation of the final preferred alternative will not influence, positively or negatively, this objective.

Objective 12. Provide for foreign participation in the fishery, consistent with the other goals to take that portion of the OY not utilized by domestic fisheries while minimizing conflict with domestic fisheries.

Groundfish stocks are fully utilized by domestic fishers and implementation of the final preferred alternative is not expected to influence this objective.

Objective 13. When conservation actions are necessary to protect a stock or stock assemblage, attempt to develop management measures that will affect users equitably.

The final preferred alternative is not expected to impact user groups in a significant way. Any socioeconomic impacts are expected to be distributed equitably among groups.

Objective 14. Minimize gear conflicts among resource users.

The final preferred alternative is not expected to create gear conflicts among resource users.

Objective 15. When considering alternative management measures to resolve an issue, choose the measure that best accomplishes the change with the least disruption of current domestic fishing practices, marketing procedures, and the environment.

The final preferred alternative is not expected to significantly disrupt domestic fishing practices or marketing procedures. Environmental effects are expected to be positive.

Objective 16. Avoid unnecessary adverse impacts on small entities.

Implementation of the final preferred alternative is not expected to have a significant adverse impact on small entities.

Objective 17. Consider the importance of groundfish resources to fishing communities, provide for the sustained participation of fishing communities, and minimize adverse economic impacts on fishing communities to the extent practicable.

The implementation of the final preferred alternative is expected to enhance the long-term sustainability of the groundfish fishery and have an overall positive impact on fishing communities.

Objective 18. Promote the safety of human life at sea.

Implementation of the final preferred alternative is not expected to influence safety at sea.

Chapter 6 Cross-Cutting Mandates

6.1 Other Federal Laws

6.1.1 Coastal Zone Management Act

Section 307(c)(1) of the federal Coastal Zone Management Act (CZMA) of 1972 requires all federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. The *preliminary preferred Alternatives* would be implemented in a manner that is consistent to the maximum extent practicable with the enforceable policies of the approved coastal zone management programs of Washington, Oregon, and California. This determination has been submitted to the responsible state agencies for review under Section 307(c)(1) of the CZMA. The relationship of the groundfish FMP with the CZMA is discussed in Section 11.7.3 of the Groundfish FMP. The Groundfish FMP has been found to be consistent with the Washington, Oregon, and California coastal zone management programs. The recommended action is consistent and within the scope of the actions contemplated under the framework FMP.

Under the CZMA, each state develops its own coastal zone management program that is then submitted for federal approval. This has resulted in programs that vary widely from one state to the next. Harvest specifications and management measures for 2005-2006 are not expected to affect any state's coastal management program.

6.1.2 Endangered Species Act

NMFS issued BOs under the ESA on August 10, 1990, November 26, 1991, August 28, 1992, September 27, 1993, May 14, 1996, and December 15, 1999 pertaining to the effects of the groundfish fishery on chinook salmon (Puget Sound, Snake River spring/summer, Snake River fall, upper Columbia River spring, lower Columbia River, upper Willamette River, Sacramento River winter, Central Valley spring, California coastal), coho salmon (Central California coastal, southern Oregon/northern California coastal), chum salmon (Hood Canal summer, Columbia River), sockeye salmon (Snake River, Ozette Lake), and steelhead (upper, middle and lower Columbia River, Snake River Basin, upper Willamette River, central California coast, California Central Valley, south-central California, northern California, southern California). During the 2000 Pacific whiting season, the whiting fisheries exceeded the chinook bycatch amount specified in the Pacific whiting fishery BO (December 15, 1999) incidental take statement estimate of 11,000 fish, by approximately 500 fish. In the 2001 whiting season, however, the whiting fishery's chinook bycatch was about 7,000 fish, which approximates the long-term average. After reviewing data from, and management of, the 2000 and 2001 whiting fisheries (including industry bycatch minimization measures), the status of the affected listed chinook, environmental baseline information, and the incidental take statement from the 1999 whiting BO, NMFS determined in a letter dated April 25, 2002 that a re-initiation of the 1999 whiting BO was not required. NMFS has concluded that implementation of the FMP for the Pacific Coast groundfish fishery is not expected to jeopardize the continued existence of any endangered or threatened species under the jurisdiction of NMFS, or result in the destruction or adverse modification of critical habitat. The proposed action is within the scope of these consultations.

6.1.3 Marine Mammal Protection Act

The MMPA of 1972 is the principle federal legislation that guides marine mammal species protection and conservation policy in the United States. Under the MMPA, NMFS is responsible for the management and conservation of 153 stocks of whales, dolphins, porpoise, as well as seals, sea lions, and fur seals; while the U.S. Fish and Wildlife Service is responsible for walrus, sea otters, and the West Indian manatee.

Off the West Coast, the Steller sea lion (*Eumetopias jubatus*) eastern stock, Guadalupe fur seal (*Arctocephalus townsendi*), and Southern sea otter (*Enhydra lutris*) California stock are listed as threatened under the ESA. The sperm whale (*Physeter macrocephalus*) Washington, Oregon, and California stock, humpback whale (*Megaptera novaeangliae*) Washington, Oregon, and California - Mexico Stock, blue whale (*Balaenoptera musculus*) eastern north Pacific stock, and Fin whale (*Balaenoptera physalus*) Washington, Oregon, and California stock are listed as depleted under the MMPA. Any species listed as endangered or threatened under the ESA is automatically considered depleted under the MMPA.

The West Coast groundfish fisheries are considered a Category III fishery, indicating a remote likelihood of or no known serious injuries or mortalities to marine mammals, in the annual list of fisheries published in the *Federal Register*. Based on its Category III status, the incidental take of marine mammals in the West Coast groundfish fisheries does not significantly impact marine mammal stocks. The proposed action will affect the intensity, duration, and location of groundfish fisheries through implemented management measures. But these changes would not change the effects of the groundfish fisheries on marine mammals.

6.1.4 Migratory Bird Treaty Act

The MBTA of 1918 was designed to end the commercial trade of migratory birds and their feathers that, by the early years of the 20th century, had diminished the populations of many native bird species. The MBTA states that it is unlawful to take, kill, or possess migratory birds and their parts (including eggs, nests, and feathers) and is a shared agreement between the United States, Canada, Japan, Mexico, and Russia to protect a common migratory bird resource. The MBTA prohibits the directed take of seabirds, but the incidental take of seabirds does occur. The proposed action is unlikely to affect the incidental take of seabirds protected by the MBTA.

6.1.5 Paperwork Reduction Act

Alternatives D.2, Expanded Logbook Program, and D.3, Expanded Vessel Monitoring System program, would require collection of information subject to the Paperwork Reduction Act. Clearance of related requirements would be initiated prior to publication of a proposed rule if the either of the alternatives is selected as an FMP amendment.

6.1.6 Regulatory Flexibility Act

The purpose of the RFA is to relieve small businesses, small organizations, and small governmental entities of burdensome regulations and record-keeping requirements. Major goals of the RFA are; (1) to increase agency awareness and understanding of the impact of their regulations on small business, (2) to require agencies communicate and explain their findings to the public, and (3) to encourage agencies to use flexibility and to provide regulatory relief to small entities. The RFA emphasizes predicting impacts on small entities as a group distinct from other entities and the consideration of alternatives that may minimize the impacts while still achieving the stated objective of the action. An IRFA is conducted unless it is determined that an action will not have a "significant economic impact on a substantial number of small entities." The RFA requires that an IRFA include elements that are similar to those required by EO 12866 and NEPA. The information and analyses in Chapter 4 of this EIS would be relevant to RFA analyses on future regulations developed from this process. An IRFA for the regulatory components of the final preferred alternative is contained in Appendix J of this document.

6.1.7 EO 12866 (Regulatory Impact Review)

EO 12866, Regulatory Planning and Review was signed on September 30, 1993, and established guidelines for promulgating new regulations and reviewing existing regulations. The EO covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. Section 1 of the EO deals with the regulatory philosophy and principles that are to guide agency development of regulations. It stresses that in deciding whether and how to regulate, agencies should assess all of the costs and benefits across all regulatory alternatives. Based on this analysis, NMFS should choose those approaches that maximize net benefits to society, unless a statute requires another regulatory approach. The information and analyses in Chapter 4 of this EIS would be relevant to a Regulatory Impact Review (RIR) analyses on future regulations developed from this process. An RIR is contained in Appendix J of this document.

6.1.8 EO 12898 (Environmental Justice)

EO 12898 obligates federal agencies to identify and address "disproportionately high adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations in the United States" as part of any overall environmental impact analysis associated with an action. NOAA guidance, NAO 216-6, at §7.02, states "consideration of EO 12898 should be specifically included in the NEPA documentation for decision-making purposes." Agencies should also encourage public participation—especially by affected communities—during scoping, as part of a broader strategy to address environmental justice issues.

The environmental justice analysis must first identify minority and low-income groups that live in the project area and may be affected by the action. Typically, census data are used to document the occurrence and distribution of these groups. Agencies should be cognizant of distinct cultural, social, economic, or occupational factors that could amplify the adverse effects of the proposed action. (For example, if a particular kind of fish is an important dietary component, fishery management actions affecting the availability, or price of that fish, could have a disproportionate effect.) In the case of Indian tribes, pertinent treaty or other special rights should be considered. Once communities have been identified and characterized, and potential adverse impacts of the alternatives are identified, the analysis must determine whether these impacts are disproportionate. Because of the context in which environmental justice is developed, health effects are usually considered, and three factors may be used in an evaluation: whether the effects are deemed significant, as the term is employed by NEPA; whether the rate or risk of exposure to the effect appreciably exceeds the rate for the general population or some other comparison group; and whether the group in question may be affected by cumulative or multiple sources of exposure. If disproportionately high adverse effects are identified, mitigation measures should be proposed. Community input into appropriate mitigation is encouraged. Community level impacts are considered in section 4.7.3. It should be noted that fishery participants make up a small proportion of the total population in these communities, and their demographic characteristics may be different from the community as a whole. However, information specific to fishery participants is not available. Furthermore, different segments of the fishery-involved population may differ demographically. For example, workers in fish processing plants may be more often from a minority population while deckhands may be more frequently low income in comparison to vessel owners.

Participation in decisions about the proposed action by communities that could experience disproportionately high and adverse impacts is another important principle of the EO. The Council offers a range of opportunities for participation by those affected by its actions and disseminates information to affected communities about its proposals and their effects through several channels. In addition to Council membership, which includes representatives from the fishing industries affected by Council action, the GAP, a Council advisory body, draws membership from fishing communities affected by the proposed action. While no special provisions are made for membership to include representatives from low income and minority populations, concerns about disproportionate effects to minority and low-income populations could be voiced through this body or to the Council directly. Although Council meetings are not held in isolated coastal communities for logistical reasons, they are held in different places up and down the West Coast to increase accessibility. In addition, fishery management agencies in Oregon and California sponsored public hearings in coastal communities to gain input on the proposed action. The comments were made available to the Council in advance of their decision to choose a preferred alternative.

The Council disseminates information about issues and actions through several media. Although not specifically targeted at low income and minority populations, these materials are intended for consumption by affected populations. Materials include a newsletter, describing business conducted at Council meetings, notices for meetings of all Council bodies, and fact sheets intended for the general reader. The Council maintains a postal and electronic mailing list to disseminate this information. The Council also maintains a website (http://www.pcouncil.org) providing information about the Council, its meetings, and decisions taken. Most of the documents produced by the Council, including NEPA documents, can be downloaded from the website.

6.1.9 EO 13132 (Federalism)

EO 13132, which revoked EO 12612, an earlier federalism EO, enumerates eight “fundamental federalism principles.” The first of these principles states “Federalism is rooted in the belief that issues that are not national in scope or significance are most appropriately addressed by the level of government closest to the people.” In this spirit, the EO directs agencies to consider the implications of policies that may limit the scope of or preempt states’ legal authority. Preemptive action having such “federalism implications” is subject to a consultation process with the states; such actions should not create unfunded mandates for the states; and any final rule published must be accompanied by a “federalism summary impact statement.”

The Council process offers many opportunities for states (through their agencies, Council appointees, consultations, and meetings) to participate in the formulation of management measures. This process encourages states to institute complementary measures to manage fisheries under their jurisdiction that may affect federally managed stocks.

The proposed action does not have federalism implications subject to EO 13132.

6.1.10 EO 13175 (Consultation and Coordination With Indian Tribal Government)

EO 13175 is intended to ensure regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, to strengthen the United

States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.

The Secretary recognizes the sovereign status and co-manager role of Indian tribes over shared federal and tribal fishery resources. At Section 302(b)(5), the Magnuson-Stevens Act reserves a seat on the Council for a representative of an Indian tribe with federally-recognized fishing rights from California, Oregon, Washington, or Idaho.

The U.S. government formally recognizes the four Washington coastal tribes (Makah, Quileute, Hoh, and Quinault) have treaty rights to fish for groundfish. In general terms, the quantification of those rights is 50% of the harvestable surplus of groundfish available in the tribes' U and A fishing areas (described at 50 CFR 660.324). Each of the treaty tribes has the discretion to administer their fisheries and to establish their own policies to achieve program objectives.

Accordingly, harvest specifications and management measures for 2005-2006 have been developed in consultation with the affected tribe(s) and, insofar as possible, with tribal consensus.

6.1.11 EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds)

EO 13186 supplements the MBTA (above) by requiring federal agencies to work with the USFWS to develop memoranda of agreement to conserve migratory birds. NMFS is in the process of implementing a memorandum of understanding. The protocols developed by this consultation will guide agency regulatory actions and policy decisions in order to address this conservation goal. The EO also directs agencies to evaluate the effects of their actions on migratory birds in environmental documents prepared pursuant to the NEPA.

Chapter 4 in this EIS evaluates impacts to seabirds and concludes that the effects of the proposed action on seabirds is unknown.

Chapter 7 List of Preparers

7.1 List of Preparers

Gretchen Arentzen; NMFS, Northwest Region

Allison Bailey; Sound GIS

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David MacDuffee; NMFS, Office of Habitat Conservation

Graeme Parkes; Marine Resources Assessment Group

Bill Peterson; NMFS, Northwest Fisheries Science Center

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Suzanne Russell; NMFS, Northwest Fisheries Science Center

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Kathryn Quigley; NMFS, Northwest Region

Waldo Wakefield; NMFS, Northwest Fisheries Science Center

Mary Yoklavich; NMFS, Southwest Fisheries Science Center

7.2 Roles of Key Organizations and Committees

This section provides an overview of the roles played by key organizations and committees who have participated in the development of the draft EIS.

<u>Pacific States Marine Fisheries Commission</u>

The Pacific States Marine Fisheries Commission (PSMFC), through a grant from NOAA, is responsible for production of the risk assessment and EIS. In cooperation with NMFS and the Council, they assembled a team of contractors and partners to implement the decisionmaking framework and phased approach described in the preceding sections.

Chapter 8 Agencies, Organizations, and Persons to Whom Copies of this Statement Were Sent

The Council makes both the DEIS and FEIS available on its website, so anyone with computer access may download an electronic copy. Electronic copies on CD-ROM and paper copies are made available upon request. The Council distributes a notice of availability for the DEIS and FEIS through its electronic mailing list, which include state and federal agencies, tribes, and individuals. Copies of the FEIS are sent to anyone who comments on the DEIS. In addition, NMFS distributes copies of the DEIS to the following agencies:

Department of Interior

Department of State

U.S. Coast Guard, Commander Pacific Area

Marine Mammal Commission

Pacific States Marine Fisheries Commission

Washington Coastal Zone Management Program, Shoreline Environmental Assistance, Department of Ecology, Washington State

Ocean-Coastal Management Program, Department of Land Conservation and Development, State of Oregon

California Coastal Commission

MRAG Americas

MRAG Americas, under contract to PSMFC, is responsible for analytical components of the risk assessment and EIS specific to EFH and with a primary emphasis on statistical modeling and assessment.

TerraLogic GIS

TerraLogic GIS, under contract to PSMFC, is responsible for analytical components of the risk assessment and EIS specific to EFH with a primary emphasis on GIS data consolidation and analysis.

University of New Hampshire

The University of New Hampshire is a partner of MRAG Americas and has provided senior level consultation and analysis of habitat impacts and recovery.

Ecotrust

Ecotrust, under contract to PSMFC, initially had lead in developing a spatial profile of fishing activity off the west coast.

Oregon Sea Grant

Oregon Sea Grant participated in a project with PSMFC, Pacific Cable Commission, and NMFS to profile a subset of spatial patterns of fishing activity off the west coast based on the experience of fishermen.

Oregon Fishermen's Cable Committee

The Oregon Fishermen's Cable Committee participated in a project with PSMFC, Pacific Cable Commission, and NMFS to profile a subset of spatial patterns of fishing activity off the west coast based on the experience of fishermen.

University of Oregon

The University of Oregon, under contract to PSMFC, provided benthic substrate data for the areas off Oregon and Washington.

Moss Landing Marine Laboratory

The Moss Landing Marine Laboratory, under contract to PSMFC, provided benthic substrate data for the areas off California.

NOAA

- NMFS, Northwest Region is the government organization responsible for NEPA compliance for this action and regulation of the groundfish fishery and has provided project management for the risk assessment and EIS.

- NMFS, Southwest Region is a partner in developing the EIS and has EFH consultation responsibilities on non-fishing activities.

- NMFS' Northwest and Southwest Fisheries Science Centers have provided consultation and analytical services in the development of the risk assessment and EIS.

- The NOS Biogeography Program has provided consultation in the development of the risk assessment.

- The NOAA MPA Center has provided spatial data on status quo habitat protection measures.

<u>Council</u>

The Council is the Regional Fishery Management Council that has stewardship responsibilities for the project area and provided guidance and key decisions throughout the project.

- The full Council is structured to incorporate state, tribal, and federal agencies in addition to representatives from commercial and recreational fishing groups. The Council follows a highly public process that fosters input prior to guidance and final decisions.

- The TRC is a Council committee that was created to guide implementation of the data consolidation and assessment phases of the decisionmaking framework. The committee will also provide for validation of model results and technical review of the range of alternatives in the EIS. The membership of the TRC was chosen to reflect the broad range of expertise necessary to follow the decisionmaking framework and includes geologists, fish ecologists, environmentalists, fishermen, and experts in statistical modeling.

- The SSC is a Council committee that serves as the body responsible for determining the scientific adequacy of any analysis on which Council decisions are based. The SSC held public meetings to review the risk assessment and provided comments and caveats for its application to the Council. The membership of the SSC is chosen to reflect an independent, well-qualified academic committee.

- The EIS Oversight Committee is a Council Committee that was created to respond to the risk assessment and develop alternatives for the EIS. Membership of the committee is structured to incorporate senior representatives of the three coastal states, industry representatives, and environmental representatives including a representative of the plaintiff's in *AOC v. Daley*.

- The GMT, GAP, and HC are Council committees that were created to participate in the development and review of fishery management actions. The committees, in public meetings, have reviewed and commented on the risk assessment and EIS as it has developed. Membership on the committees is diverse and ranges from federal representatives, recreational and commercial fishing representatives, and academics.

Chapter 9 Acronyms and Glossary

ABC acceptable biological catch. The ABC is a scientific calculation of the sustainable harvest level of a fishery, and is used to set the upper limit of the annual total allowable catch. It is calculated by applying the estimated (or proxy) harvest rate that produces maximum sustainable yield to the estimated exploitable stock biomass (the portion of the fish population that can be harvested).

AKFSC Alaska Fisheries Science Center

B_{MSY} The biomass that allows maximum sustainable yield to be taken.

BO Biological Opinion

B_0 Unfished biomass; the estimated size of a fish stock in the absence of fishing.

BOD Biochemical oxygen demand

BRD Bycatch Reduction Device

CalCOFI California Cooperative Oceanic Fisheries Investigations

CC California Current

CCA Cowcod Conservation Area

CDFG California Department of Fish and Game

CDP Census designated places

CEQ Council on Environmental Quality

CFGC California Fish and Game Commission

CFR Code of Federal Regulations. A codification of the regulations published in the *Federal Register* by the executive departments and agencies of the federal government. The CFR is divided into 50 titles that represent broad areas subject to federal regulation Title 50 contains wildlife and fisheries regulations.

CINMS Channel Islands National Marine Sanctuary

Council Pacific Fishery Management Council

CPFV commercial passenger fishing vessel

CPS coastal pelagic species. Coastal pelagic species are schooling fish, not associated with the ocean bottom, that migrate in coastal waters. They usually eat plankton and are the main food source for higher level predators such as tuna, salmon, most groundfish, and humans. Examples are herring, squid, anchovy, sardine, and mackerel.

CPUE Catch per unit effort

CRFS California Recreational Fisheries Survey

CV coefficients of variation

CZMA Coastal Zone Management Act

DBCA Darkblotched Rockfish Conservation Area

DDT Dichlorodiphenyltrichloroethane

DEIS Draft Environmental Impact Statement

DNR Department of Natural Resources

DPEIS Draft Programmatic Environmental Impact Statement

DTS Dover sole, thornyhead(s), and trawl-caught sablefish complex

E+ Environmentally Positive

EA environmental assessment. As part of the National Environmental Policy Act (NEPA) process, an EA is a concise public document that provides evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact.

ED Environmental Defense

EEZ Exclusive Economic Zone. A zone under national jurisdiction (up to 200 nautical miles wide) declared in line with the provisions of the 1982 United Nations Convention of the Law of the Sea, within which the coastal state has the right to explore and exploit, and the responsibility to conserve and manage, the living and non-living resources.

EFH essential fish habitat. Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

EFP exempted fishing permit

EIS environmental impact statement. As part of the National Environmental Policy Act (NEPA) process, an EIS is an analysis of the expected impacts resulting from the implementation of a fisheries management or development plan (or some other proposed action) on the environment. EISs are required for all fishery management plans as well as significant amendments to existing plans.

EO Executive Order

EPA U.S. Environmental Protection Agency

ESA Endangered Species Act. An act of federal law that provides for the conservation of endangered and threatened species of fish, wildlife, and plants. When preparing fishery management plans, councils are required to consult with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service to determine whether the fishing under a fishery management plan is likely to jeopardize the continued existence of an ESA-listed species, or to result in harm to its critical habitat.

ESI Environmental Sensitivity Index

F The instantaneous rate of fishing mortality. The term "fishing mortality rate" is a technical fishery science term that is often misunderstood. It refers to the rate at which animals are removed from the stock by fishing. The fishing mortality rate can be confusing because it is an "instantaneous" rate that is useful in mathematical calculations, but is not easily translated into the more easily understood concept of "percent annual removal."

FEAM Fisheries Economic Assessment Model

FEIS final environmental impact statement

fm fathom

FMP Fishery management plan. A plan, and its amendments, that contains measures for conserving and managing specific fisheries and fish stocks.

FMP Fishery Management Plan

FONSI Finding of No Significant Impact. As part of the National Environmental Policy Act (NEPA) process, a finding of no significant impact (FONSI) is a document that explains why an action that is not otherwise excluded from the NEPA process, and for which an environmental impact statement (EIS) will not be prepared, will not have a significant effect on the human environment.

FPEIS final programmatic environmental impact statement

FRFA Final Regulatory Flexibility Analysis. the FRFA includes all the information from the initial regulatory flexibility analysis. Additionally, it provides a summary of significant issues raised by the public, a statement of any changes made in the proposed rule as a result of such comments, and a description of steps taken to minimize the significant adverse economic impact on small entities consistent with stated objectives.

FWS U.S. Fish and Wildlife Service

GAM General Additive Model

GAP Groundfish Advisory Subpanel. The Council established the GAP to obtain the input of the people most affected by, or interested in, the management of the groundfish fishery. This advisory body is made up of representatives with recreational, trawl, fixed gear, open access, tribal, environmental, and processor interests. Their advice is solicited when preparing fishery management plans, reviewing plans before sending them to the Secretary, reviewing the effectiveness of plans once they are in operation, and developing annual and inseason management.

GCA Groundfish Conservation Area

GIPC Ad Hoc Groundfish Information Policy Committee

GIS Geographic information system

GMT Groundfish Management Team. Groundfish management plans and annual and inseason management recommendations are prepared by the Council's GMT, which consists of scientists and managers with specific technical knowledge of the groundfish fishery.

GPS Global Positioning System

HAPC Habitat areas of particular concern

HC Habitat Committee

HMS highly migratory species

HSP Habitat suitability probability

IAC Interagency Committee

IPHC International Pacific Halibut Commission. A commission responsible for studying Pacific halibut stocks and the halibut fishery. The IPHC makes proposals to the U.S. and Canada concerning the regulation of the halibut fishery.

IRFA Initial Regulatory Flexibility Analysis. Anytime an agency publishes a notice of proposed rule making and the rule may have a significant impact on a substantial number of small entities, an IRFA is required. It describes the impact of the proposed rule on small entities and includes a description of the action, why it is necessary, the objectives and legal basis for the action, the small entities that will be impacted by the action, and the projected reporting, record-keeping, and other compliance requirements of the proposed rule. Rules that duplicate, overlap, or conflict with the proposed rule are also identified.

ITQ individual transferable quota

IUCN International Union for the Conservation of Nature and Natural Resources

kg kilogram

m meter

Magnuson-Stevens Act Magnuson-Stevens Fishery Conservation and Management Act. The MSA, sometimes known as the "Magnuson-Stevens Act," established the 200-mile fishery conservation zone, the regional fishery management council system, and other provisions of U.S. marine fishery law.

MBTA Migratory Bird Treaty Act

mean generation time A measure of the time required for a female to produce a reproductively-active female offspring.

MFMT maximum fishing mortality threshold. A limit identified in the National Standard Guidelines. A fishing mortality rate above this threshold constitutes overfishing.

MHHW mean high high water

mixed stock exception In "mixed-stock complexes," many species of fish swim together and are caught together. This becomes a problem when some of these stocks are healthy and some are overfished, because even a sustainable harvest of the healthy stocks can harm the depleted stock. In order to avoid having to shut down all fisheries to protect one particular overfished stock, the national standard guidelines allow a "mixed-stock" exception to the "overfished" definition. This would allow higher catches of some overfished species than ordinarily allowed in order to avoid severe hardship to fishing communities.

MMPA Marine Mammal Protection Act. The MMPA prohibits the harvest or harassment of marine mammals, although permits for incidental take of marine mammals while commercial fishing may be issued subject to regulation. (See "incidental take" for a definition of "take".)

MMS Minerals Management Service

MPA Marine protected area

MRFSS Marine Recreational Fisheries Statistical Survey

MRPZ Marine Resources Protection Zone

MSA Magnuson-Stevens Fishery Conservation and Management Act (see Magnuson-Stevens Act, above).

MSI Marine Science Institute

MSST minimum stock size threshold. A threshold biomass used to determine if a stock is overfished. The Council proxy for MSST is $B_{25\%}$.

MSY maximum sustainable yield. An estimate of the largest average annual catch or yield that can be continuously taken over a long period from a stock under prevailing ecological and environmental conditions. Since MSY is a long-term average, it need not be specified annually, but may be reassessed periodically based on the best scientific information available.

mt metric ton. 1,000 kilos or 2,204.62 pounds.

NAO NOAA Administrative Order

NEPA National Environmental Protection Act

NETS NorEastern Trawl Systems

NMFS National Marine Fisheries Service. A division of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA). NMFS is responsible for conservation and management of offshore fisheries (and inland salmon). The NMFS Regional Director is a voting member of the Council.

NOAA National Oceanic and Atmospheric Administration

NOI Notice of Intent

NOS National Ocean Service

NPDES National Pollutant Discharge Elimination System

NPFMC North Pacific Fisheries Management Council

NPOA National Plan of Action

NRC National Research Council

NRDC Natural Resources Defense Council

NSG National Standard Guidelines

NWI National Wetlands Inventory

NWR Northwest Region

OAL Office of Administrative Law

OAR Oregon Administrative Rules

ODFW Oregon Department of Fish and Wildlife

OFWC Oregon Fish and Wildlife Commission

ORBS Ocean Recreational Boat Survey (Oregon Department of Fish and Wildlife)

OSP Ocean Sampling Program (Washington)

OSU Oregon State University

overfished Any stock or stock complex whose size is sufficiently small that a change in management practices is required to achieve an appropriate level and rate of rebuilding. The term generally describes any stock or stock complex determined to be below its overfished/rebuilding threshold. The default proxy is generally 25% of its estimated unfished biomass; however, other scientifically valid values are also authorized.

overfishing Fishing at a rate or level that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis. More specifically, overfishing is defined as exceeding a maximum allowable fishing mortality rate. For any groundfish stock or stock complex, the maximum allowable mortality rate will be set at a level not to exceed the corresponding MSY rate (B_{MSY}) or its proxy.

OY optimum yield. The amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems. The OY is developed on the basis of the MSY from the fishery, taking into account relevant economic, social, and ecological factors. In the case of overfished fisheries, the OY provides for rebuilding to a level that is consistent with producing the MSY for the fishery.

OY Optimum yield

PacFIN Pacific Coast Fisheries Information Network

PDO Pacific Decadal Oscillation

PE Polyethylene

PEIS Programmatic Environmental Impact Statement

PFMC Pacific Fisheries Management Council

P_{MAX} The estimated probability of reaching T_{MAX}. May not be less than 50%.

POP Pacific ocean perch

Precautionary principle The management principle that reduces human impacts to a resource if cause and effect relationships are not fully established and the result of such impacts may foreclose future options.

PSMFC Pacific States Marine Fisheries Commission

QSM quota species monitoring

RCA Rockfish Conservation Area

RCW Revised Code of Washington

Rebuilding Implementing management measures that increase a fish stock to its target size.

RecFIN Recreational Fishery Information Network

RFA Regulatory Flexibility Act (see IRFA and FRFA above). The Regulatory Flexibility Act (5 U.S.C. 601-612) requires federal agencies to consider the effects of their regulatory actions on small businesses and other small entities and to minimize any undue disproportionate burden.

RIR Regulatory Impact Review. RIRs are prepared to determine whether a proposed regulatory action is "major." The RIR examines alternative management measures and their economic impacts.

RLMA Rockfish/Lingcod Management Area

RMP Resource Management Plan

ROD Record of Decision

ROV Remotely operated vehicle

SAFE Stock Assessment and Fishery Evaluation. A SAFE document is a document prepared by the Council that provides a summary of the most recent biological condition of species in the fishery management unit, and the social and economic condition of the recreational and commercial fishing industries, including the fish processing sector. It summarizes, on a periodic basis, the best available information concerning the past, present, and possible future condition of the stocks and fisheries managed in the FMP.

SCUBA Self-contained Underwater Breathing Apparatus

Secretary U.S. Secretary of Commerce

SEIS supplemental environmental impact statement

SFA Sustainable Fisheries Act (see Magnuson-Stevens Act, above).

SFFT selective flatfish trawl

SSC Scientific and Statistical Committee. An advisory committee of the Council made up of scientists and economists. The Magnuson-Stevens Act requires that each council maintain an SSC to assist in gathering and analyzing statistical, biological, ecological, economic, social, and other scientific information that is relevant to the management of Council fisheries.

STAR Stock Assessment Review Panel. A panel set up to review stock assessments for particular fisheries. In the past there have been STAR panels for sablefish, rockfish, squid, and other species.

STAT	Stock Assessment Team. Stock assessment authors from the National Marine Fisheries Service fisheries science centers.
SWOP	Shoreside Whiting Observation Program
TAC	total allowable catch
T_{MAX}	The maximum time period to rebuild an overfished stock, according to National Standard Guidelines. Depends on biological, environmental, and legal/policy factors.
T_{MIN}	The minimum time period to rebuild an overfished stock, according to National Standard Guidelines. Technically, this is the minimum amount of time in which a fish stock will have a 50% chance of rebuilding if no fishing occurs (depends on biological and environmental factors).
TNC	The Nature Conservancy
TRC	Technical Review Committee
T_{TARGET}	The target year, set by policy, for a fish stock to be completely rebuilt.
U and A	usual and accustomed
UCSB	University of California at Santa Barbara
USEPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VMS	Vessel monitoring systems
VMSC	Ad Hoc Vessel Monitoring System Committee
WAC	Washington Administrative Code
WCGOP	West Coast Groundfish Observer Program
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WFWC	Washington Fish and Wildlife Commission
WOC	Washington/Oregon/California

WWTIT Western Washington Treaty Indian Tribes

YOY Young-of-the-year

YRCA Yelloweye Rockfish Conservation Area

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Chapter 11 Public Comment

11.1 Introduction

The NEPA regulations at 50 CFR 1503.1 require the action agency, in this case NMFS, to solicit public comment on a Draft EIS prior to preparing a Final EIS. NMFS should obtain comments from Federal, State and local agencies, Indian tribes and those persons or organizations who may be interested or affected.

The public comment period for Draft EIS was from February 11, 2005 (70 FR 7256) through May 11, 2005. In addition to announcements in the Federal Register, comments were solicited via e-mail.

NMFS received an overwhelming response to solicitations for public comment. Over 39,500 comment letters were received during the 90-day public comment period. NMFS received comments from Federal and State agencies, local governments, industry leaders and participants, public and environmental interest groups, Indian Tribes, and local citizens.

The format of comments varied greatly, and included e-mails, letters, and postcards. All comment letters are reproduced in Section 11.3.

11.2 Process for Responding to Public Comments

11.2.1 Introduction

Due to the volume of comments received, NMFS formulated a method, described below, to adequately consider the comments, and efficiently and effectively respond. The remainder of this section describes that method and is intended to guide the reader in understanding how each comment was specifically addressed.

11.2.2 Response Process

NMFS staff read, and separated out specific comments from within each letter by subject matter. The comments are included in this FEIS in Section 11.3. These specific comments were entered into a table (Section 11.2.4) with a reference to the page of the source comment letter they were extracted from. This table allowed subject matter experts to organize and respond to comments in an efficient manner to allow adequate time for agency consideration and comments.

The agency's response to the comments is in the following table. In some cases sections in the EIS has been revised. In other cases, commenters are referred to existing text. For each of these cases, specific chapters or sections are cited in our response table in Section 11.2.4.

11.2.3 How to Use the Response to Comments Table

The Response to Comments Table (Section 11.2.4) lists all the comments received on the Draft EIS. The first column lists a reference number for the comment. The second column of the table, "Comment" restates the specific comment from the letter. In some cases the comment is listed word for word, in others it is restated for brevity. The page of the comment letter that the comment was taken from is listed in the third column. The fourth column references the original letter the comment was taken from. To save space, comment letters were assigned an index number. The key to this index can be found at the beginning of Section 11.3. The “Response” column gives a general response to the comment, telling what action we took for the Final EIS. Support for this response is given in the “Rationale for response” column. Where appropriate, the rationale is abbreviated and we refer the reader to sections of the text where additional information can be found. These sections are listed in the last column where applicable

11.2.4 Response to Comment Table

All of the comments received regarding the Pacific Coast Groundfish Essential Fish Habitat (EFH) Draft EIS are listed in the following table, along with NMFS responses. In many cases, the rationale for the response is abbreviated and defers to sections of the text where additional information can be found. These sections are listed where applicable.

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
1	Why would anyone assume areas not fished between 2000 and 2002 are "potentially pristine" given the long history of fishing on our coast?	11	S-12	Supplement, Improve or Modify Analyses	NMFS agrees that fishing may have occurred prior to 2000 that would have impacted the areas defined in alternative C.4. The final preferred alternative was modified to close areas to trawl fishing seaward of the 700 fathom contour rather than the line described in the DEIS because of this concern. That notwithstanding, NMFS acknowledges fishing impacts may have occurred seaward on the 700 fathom contour and that the final preferred alternative represents an informed estimate of pristine habitat that is subject to uncertainty. See applicable section(s).	2.5, Alternative C.4, 2.7
2	The 2000-2002 base period used in alternatives C.3 and C.4 should be expanded to the past 10 or 20 years.	8	S-13	Supplement, Improve or Modify Analyses	NMFS agrees this timeframe is problematic; however, the years were chosen to reflect industry concern expressed during public scoping that fishing effort has changed significantly as a result implementing Rockfish Conservation Areas and that the best estimate of industry practices be derived from the 2000-2002 time period. Where appropriate however, the socioeconomic analysis was developed from more comprehensive data. See applicable section(s).	4.4.4, 4.7.5
3	The use of the 100 hours rule and the limited time period (i.e., 2000-2002) is not reasonable. We strongly suggest that the period be expanded to include at least the past ten - if not the past twenty - years of trawling.	general	S-13	No change to FEIS	NMFS believes that 2000-2002 is an appropriate period. This period encompasses years where regulations designed to protect overfished species were put in place, and these rebuilding efforts will continue for several years to come. NMFS believes that fishery patterns during this period are more reflective of what will occur in the future.	N/A
4	The one hundred hour rule may be sufficient, but we would request that the NMFS and PFMC take into consideration the trawl fleet reply for this central coast area on this matter. There is a limited fleet here and the time periods (hours and years) used may not be applicable to our small fleet.	general	S-13	No change to FEIS	NMFS has used multiple metrics (both qualitative and quantitative) for determining impacts to the bottom trawl fleet. While NMFS believes that hours are a good metric to assist decision-makers, additional information is available - such as revenues at risk and trawl track information - to assist in the decision making process.	N/A
5	The base years used in minimizing alternatives are questionable due to the fact that these years were being significantly impacted already.	general	S-27	No change to FEIS	NMFS agrees this timeframe is problematic; however, the years were chosen to reflect industry concern expressed during public scoping that fishing effort has changed significantly as a result implementing Rockfish Conservation Areas and that the best estimate of industry practices be derived from the 2000-2002 time period. Where appropriate however, the socioeconomic analysis was developed from more comprehensive data. See applicable sections.	4.4.4, 4.7.5

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
6	Base years of 2000-2002 are questionable measures of fishing.	general	S-27	Supplement, Improve or Modify Analyses	NMFS agrees this timeframe is problematic; however, the years were chosen to reflect industry concern expressed during public scoping that fishing effort has changed significantly as a result implementing Rockfish Conservation Areas and that the best estimate of industry practices be derived from the 2000-2002 time period. Where appropriate however, the socioeconomic analysis was developed from more comprehensive data. See applicable section(s).	4.4.4, 4.7.5
7	Please provide additional information on potential approaches for determining significance of habitat impacts (under alternative C.8)	general	S-01, S-04	No change to FEIS	Additional information on how adverse impacts would be determined under alternative C.8 is not available. The alternative is structured so that adverse impacts would be determined in the future with the best information available at that time which may be an improved version of what is available now for the FEIS if more research becomes available. NMFS notes that alternative C.8 is not a component of the final preferred alternative. Complete discussions of the basis for selecting and evaluating the alternatives were included in the DEIS at the appropriate sections (see next column).	2.5.1, 4.1.1, Appendix A
8	The Final EIS must describe the criteria used to identify preferred alternatives and must explain how the final preferred alternatives meet the criteria, as well as why rejected alternatives are rejected.	4	S-03	Supplement, Improve or Modify Analyses	Section 4.1 in the FEIS describes the criteria used to evaluate the alternatives. These criteria are applied in the rest of Chapter 4. CEQ regulations at 40 CFR 1502.14 require agencies to "objectively evaluate" alternatives and "evaluate their comparative merits." Regulations at 40 CFR 1502.16 require agencies to discuss "any adverse impacts which cannot be avoided." The choice of a preferred alternative and the rejection of other reasonable alternatives may be based on criteria, such as practicability, in addition to the environmental consequences. These considerations form the basis of the evaluation, but there is no statutory requirement to explain the rationale for identifying the preferred alternative beyond the evaluation of the environmental consequences of the alternatives and their consistency with the purpose and need for the proposed action. Please see applicable section(s).	2.7, 4.1
9	"The Range and Quality of Alternatives Considered is Inadequate… the Fisheries Service may not consider or adopt any alternate proposals not included within the range of alternatives presented within the DEIS absent full NEPA review."	3	S-05	No change to FEIS	NMFS disagrees that the range of alternatives is inadequate and notes that the final preferred alternative is within the scope of the alternatives analyzed in the DEIS as discussed.	N/A

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
10	Alternative A.1 revised to include more than simply a description of status quo EFH ID. Describe fully why this alternative was chosen and fully compare and contrast with HSP model-based alternatives and depths >3400m.	7	S-05	No change to FEIS	Alternative A.1 was included because analysis of the status quo is a required component of an EIS. NMFS disagrees that additional description is necessary as the language is specifically excerpted from the FMP where the status quo is established. The requested comparisons to other alternatives, including HSP and depth > 3400m is contained in Chapter 4 of the EIS. In addition, peer review comments on the status quo are contained in the appendices. Please see applicable section(s).	4.2, Figure 4 1, Appendix D
11	the description of Alternative A.2 should include a more explicit description of how this alternative provides better assurance that groundfish EFH is properly identified and also clearly convey that the extra 100 meter depth helps buffer the uncertainties surrounding the HSP modeling effort and major prey species habitat requirements.	7	S-05	Supplement, Improve or Modify Analyses	The FEIS has been updated to include additional information has been added to the description of Alternative A.2. Please see applicable section(s).	2.3.1, 2.7
12	"Therefore, the description of the development of the alternatives should be revised to clearly state the definition of adverse impacts and that the tools necessary to identify and minimize the adverse effects of fishing gears on EFH are contained within the EIS…" (page 10, paragraph 5)	10	S-05	No change to FEIS	NMFS disagrees with the need to revise the description of the development of the alternatives. The DEIS describes adverse impacts and the tools available for minimization of such impacts. NMFS notes that the best available science is insufficient to provide a spatially explicit analysis of where adverse impacts occur throughout the EEZ. To overcome this data gap, all the best available information was presented in the DEIS that NMFS used as the basis for the alternatives. The alternatives are based on the information that shows that there is the potential for adverse effects that are mo re than minimal and not temporary. Because of the possibility of adverse impacts, NMFS is acting in a precautionary manner to protect EFH from adverse impacts from fishing.	N/A
13	It is not clear how the D Alternatives will further the objectives of EFH.	general	S-27	No change to FEIS	The DEIS includes an extensive discussion of how these measures would further the objective of identifying, describing, and mitigating impacts to EFH. In particular, the discussion under the description of the Alternative D.1 (No Action) describes current data gaps, some of which could be filled by the measures proposed under the action alternatives. Please see applicable section(s).	2.6
14	All alternatives to minimize impacts to EFH are problematic because it is not clear how they will mitigate fishing effects.	general	S-27	Supplement, Improve or Modify Analyses	NMFS agrees that the performance of the alternative is not explicitly predictable; however, a full discussion of the environmental consequences of the alternatives is provided in the EIS. To account for the concern, a research and monitoring regime is included in the final preferred alternative. See applicable sections.	2.7, 4.7.6

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
15	"We support the need for comprehensive mapping of surf grass habitats in regions where beach replenishment programs are being initiated by coastal city governments."	3	S-04	Supplement, Improve or Modify Analyses	NMFS acknowledges the support expressed for additional research. A detailed research plan is outside the scope of this analysis; however, the FEIS has been updated with a preferred alternative that includes a conceptual research plan. See applicable sections.	2.7
16	Allow NGO's to continue working with the trawl fishermen and accept and support any alternatives submitted through these efforts	1	G-06	Supplement, Improve or Modify Analyses	During development of the final preferred alternative, the Council accommodated this request through collaboration with both NGO's and commercial fishermen. The FEIS has been updated to include the final preferred alternative that reflects this collaboration. See applicable section(s).	2.7
17	Work with the fishing industry on alternatives to protect EFH that will increase access to abundant and sustainable fishery resources in our area.	2	G-18	Supplement, Improve or Modify Analyses	During development of the final preferred alternative, the Council collaborated with both NGO's and commercial fishermen. Please see the preferred alternative.	2.7
18	Coordinate with current and future federal and state MPA design to provide a framework for adaptive management [in the California Bight].	2	S-04	No change to FEIS	NMFS agrees that MPA design should be coordinated throughout state and federal waters. To that end, the Council includes representatives from the federal government and each coastal state and relies on the Council process as a key coordinating body as described in the EIS. See applicable section.	1.6
19	We strongly support the collaborative efforts of NGOs and commercial fishermen efforts to agree on designating no-trawl zones in the central California coast study area. We ask that any alternative submitted by this group be included as a preferred alternative in the EIS.	2	S-13	Supplement, Improve or Modify Analyses	During development of the final preferred alternative, the Council accommodated this request through collaboration with both NGO's and commercial fishermen. The FEIS has been updated to include the final preferred alternative that reflects this collaboration. See applicable section(s).	2.7
20	Adopt measures to protect critical and sensitive habitats.	1	G-12	Supplement, Improve or Modify Analyses	The FEIS has been updated to include a final preferred alternative that would protect a significant portion of sensitive habitat. See applicable section.	2.7
21	Protect a representative sample of habitats and sensitive habitats.	1	G-15	Supplement, Improve or Modify Analyses	The FEIS has been updated to include a final preferred alternative that would protect a representative sample of habitat. The analysis is included in the document. See applicable section.	2.7, Ch. 4 Habitat Tables
22	Protect sensitive and unique habitat types.	1	G-21	Supplement, Improve or Modify Analyses	The FEIS has been updated to include a final preferred alternative that would protect sensitive and unique habitat. The analysis is included in the document. See applicable section.	2.7, Ch. 4 Habitat Tables

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
23	A primary concern of the Council must be to assure a viable future for the industry while advising and assisting fishermen to develop practices that promote sustainable fishing.	general	G-12	Supplement, Improve or Modify Analyses	The MSA requires NMFS to manage fisheries sustainably. The FEIS has been updated to include a final preferred alternative intended to contribute to establishment of sustainable fisheries. See applicable section.	2.7
24	We believe that an ecosystem-based management plan that truly protects the long-term health of the marine environment offers the only promise for the future of fishing here on the West Coast, both as an important local industry, and as an essential economic resource for the country as a whole.	1	G-12, G-15, G-21	Supplement, Improve or Modify Analyses	NMFS notes that the groundfish FMP is designed to accomplish the suggested goals within the limits of NMFS' authority. The Magnuson-Stevens Act does not explicitly authorize ecosystem management; however, NMFS believes the final preferred alternative has potential ecosystem level benefits. The FEIS has been updated to include the final preferred alternative and potential ecosystem benefits. See applicable sections.	2.7, 4.4
25	Clarify in the EIS that ONLY NMFS (not the Council) can provide EFH recommendations to state and federal agencies.	general	S-01	No change to FEIS	NMFS disagrees. The Magnuson Act, at sec. 305 (b)(3)(a) and (b), states Each Council shall comment on and make recommendations to the Secretary and any Federal or State agency concerning any activity authorized, funded or undertaken, or proposed to be authorized, funded or undertaken, by any Federal or State agency that, in the view of the Council, may affect habitat, including EFH, of a fishery resource under its authority.	1.5
26	Discuss how EFH recommendations from NMFS will impact the Council and its processes	general	S-01	Supplement, Improve or Modify Analyses	The FEIS has been updated to discuss EFH recommendations and the Council process. See applicable section.	1.5
27	PFMC should develop an ecologically based management plan that considers the entire ecosystem, including humans, and protects the long-term health of the marine environment.	6	S-14	No change to FEIS	NMFS notes that the groundfish FMP is designed to accomplish the suggested goals within the limits of NMFS' authority.	N/A
28	Fishermen feel that the Council is operating in fear of environmental group lawsuits and are willing to sacrifice coastal communities, all over a question of NEPA procedure…	general	S-16	Supplement, Improve or Modify Analyses	The FEIS has been updated with a final preferred alternative that is not expected to have significant impacts on coastal communities.	2.7

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
29	"We recommend an alternative reconfiguring the CINMS reserves taking into account the cumulative harvest control and fleet reduction in our region.... This would be followed by adjusting the Existing Cow Cod Closure to open area for slope fisheries and creating a more scientifically based MPA network spatially designed by habitats that are high quality diversity areas."	2	S-04	No change to FEIS	NMFS disagrees an additional alternative is necessary and notes that the DEIS contained a reasonable range of alternatives to support decisionmaking.	N/A
30	Expand analysis of relative efficacy of alternatives. Need more than vague suggestion that the EIS might be incorporated into a decision that results in "on the water" EFH protections.	2	S-05	Supplement, Improve or Modify Analyses	The FEIS has been updated to include a final preferred alternative that, if enacted, will result in the actions described. The description of the final preferred alternative details exactly what types of "on the water" protections would be implemented. See applicable sections.	2.7
31	Environmental impacts and cumulative effects analyses are not adequately analyzed, especially with regard to a cumulative analysis of all past fishing activities within EFH. Must predict potential consequences of actions - may not shirk responsibility due to limitations in available data.	5	S-05	No change to FEIS	NMFS disagrees additional analysis is required. The analysis of adverse effects was narrowed during scoping to focus on benthic habitats and to focus decisionmaking on those areas most likely to be at risk of impact. A complete literature review of groundfish prey species was performed however and is available in Chapter 3 and the Life Histories Appendix (see next column for appropriate section). NMFS believes that the range of alternatives is sufficient to minimize potential adverse effects, and that future proposals for protection of groundfish prey may be considered during periodic EFH reviews. Please see applicable section(s).	3.6, 3.7, 4.7.5, Appendix A
32	Alternative C.1 should include the fact that RCA is in place as a bycatch reduction management tool and changes in size and shape frequently	11	S-05	Acknowledge	The EIS includes this information. Please see applicable section(s).	1.6.4, 3.6, 4.4.1
33	Need to provide analysis of past, present and reasonable foreseeable future actions on EFH and discuss ecological risks of cumulative impacts of these actions	5, 11	S-05, S-13	No change to FEIS	NMFS asserts that the cumulative effects analysis utilizes the best available information and is fully adequate to support decisionmaking. The Risk Assessment and Environmental Consequences Chapter include a full description of all activities that are relevant to assessing past, present, and future impacts to EFH; including, non-fishing impacts, fishing impacts, and historical and current management measures. In cases where the effects could not be quantified, a visual and qualitative analysis was performed within the limits of the best available information. See applicable section(s).	Sections 3.6, 3.7, 4.7.5, of the EIS; Section 2.4 of Appendix A and Appendix 10 of Appendix A

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
34	Address how habitat management would fit into current [area-based, e.g. RCA's] management framework [Supplement with map(s) and overlays in the Final EIS].	11	S-13	Supplement, Improve or Modify Analyses	The current management framework is fully described in the FEIS. Modification of the harvest specifications and management measures that may be necessary as a result of this EFH process will be considered during the development of harvest specifications and management measures. See applicable section(s).	Ch. 1
35	More discussion concerning cumulative effects is necessary.	general	S-15	Supplement, Improve or Modify Analyses	The FEIS has been updated to better describe cumulative effects of the socioeconomic and cultural impact to communities is included in the FEIS as well as effects related to habitat and the marine ecosystem. Unfortunately, data limitations restrict these discussions. See applicable sections.	3, 4.3, 4.4, 4.7, 4.8
36	“The EFH DEIS provides no justification that the two main limitations described in the Risk Assessment are valid nor does it provide a rationale for using relative indices rather than best estimates from the literature”.	12	S-02.3	Supplement, Improve or Modify Analyses	NMFS disagrees that the data limitations described in the Risk Assessment are not justified. A full description of available information and data gaps is provided based on comprehensive literature search and data consolidation. However, the FEIS has been updated with additional information resulting from peer review conducted during the public comment period. See applicable sections.	Appendix A, Appendix D.
37	Council decisions will be uninformed as to the trade-offs between habitat protection and impacts of restricting fisheries due to data limitations	1	S-07	No change to FEIS	NMFS disagrees decisions are or will be uninformed. While data limitations are an important consideration, the Council and NMFS use the best available information, as described in Appendix A and other applicable sections to make fully informed decisions. See applicable sections.	App. A, Ch. 3
38	More research and monitoring is needed to understand connections between habitat and fishery resource productivity. Gaps and uncertainty in data etc.	general	S-07, S-12	Acknowledge	Section 5.3 of Appendix A is a detailed data gaps analysis that brings the EIS into compliance with the CEQ requirement at 1502.22. NMFS agrees that more research and monitoring is needed, and incorporated the Research and Monitoring alternatives. See applicable section(s).	2.6, 2.7
39	The best information on fisheries other than bottom trawl cannot provide the Council or the public with the necessary understanding of the need for protection, nor the distribution of likely impacts to non-trawl fishing (an estimate of practicability). Lack of spatial data on habitat impact of various gear types (excluding trawl).	general	S-07, S-12, S-20, S-24 G-07	Supplement, Improve or Modify Analyses	NMFS agrees there are important data gaps on specific gear impacts to habitat. A complete discussion of the best available information is included in the DEIS that includes a information on how it was applied in the analysis. See applicable sections.	Section 3.7 of the EIS, Section 2.4 of Appendix A and Appendix 10 of Appendix A

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
40	The data sets used were gathered from trawl but applied in some alternatives to fixed gear.	general	S-08	No change to FEIS	The lack of data regarding the use of non-trawl gear made expansion of the use of trawl impact data necessary. A complete analysis of fishing effort, including data gaps is included in the DEIS. See applicable sections.	Section 3.7 of the EIS, Section 2.4 of Appendix A and Appendix 10 of Appendix A
41	Lack of data to determine the functional relationship between habitat condition and fish population or community response.	3	S-12	Acknowledge	NMFS has used available quantitative and qualitative information to describe fishery impacts to EFH and habitat condition impacts to fish assemblages on the West Coast. Efforts are underway to expand our knowledge of these relationships. Please see applicable section(s).	2.9, Appendix A
42	Lack of data to provide strong empirical evidence/justification for the large areas affected by alternatives C.12-C.14	10	S-12	No change to FEIS	NMFS disagrees. A complete justification for inclusion of alternative C.12-C.14 was included in the DEIS. See applicable sections.	2.5.1
43	The Panel developed and ranked a series of general research needs that included our own judgments as well as specific alternatives from the DEIS: 1) Ground-truthing habitat suitability probability 2) Habitat recovery monitoring 3) Research reserves [Alt D.4] 4) Expanded logbook to include data from other fisheries [Alt D.2] 5) Gear impact experiments 6) Vessel Monitoring System effort distribution analysis [D.3] 7) Alternative sampling methodologies Recommendations 5, 6, and 7 received equivalent mean ranks from Panel members. Note that all of these research needs are important, but restricted funding will likely require some prioritization.	13	S-12	Acknowledge	Efforts are underway to expand our knowledge through additional research regarding groundfish EFH. The FEIS has been updated with a final preferred alternative that incorporates HSP but with a precautionary adjustment to address these concerns based on known species distribution. The final preferred alternative encourages research on the affects of area closures. The FEIS has also been updated with a conceptual research plan to address these issues. Please see the preferred alternative and applicable section(s).	2.6, 2.7

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
44	Given that there already have been major reductions in trawl impacts and that we lack objective data to base decisions on it would be prudent to take an incremental approach to develop meaningful regulatory measures.	1	S-27	No change to FEIS	NMFS has used available quantitative and qualitative information to describe fishery impacts to EFH and habitat condition impacts to fish assemblages on the West Coast. Efforts are underway to expand our knowledge of these relationships. Please see applicable section(s).	Appendix A
45	Minimization alternatives impact all bottom gear, not just trawl. There is no data to evaluate these effects.	general	S-27	No change to FEIS	NMFS disagrees there is not data to evaluate the effects of the alternatives that include multiple gear types. The EIS utilizes the best available information to make informed conclusions on the predicted effects of the alternatives. Information sources are described in the EIS. See applicable section(s).	Ch. 4
46	"..observer data can and should be used to both evaluate the impacts of fishing on EFH and develop mitigation measures in the EFH EIS."	10	S-02.3	No change to FEIS	NMFS disagrees that observer data is necessary for the EIS which already incorporates the best available information. The utility of observer data will however, be evaluated for incorporation into the 5-year review cycle for groundfish EFH.	N/A
47	"The EIS should utilize information in the Bycatch EIS and groundfish observer data to identify direct removal of prey species by fishing and incorporate discussion of adverse impacts to prey species and their habitats into the description and environmental consequences of alternatives to minimize adverse impacts of fishing on EFH."	12	S-05	No change to FEIS	NMFS disagrees that additional information is necessary for the EIS which currently incorporates the best available information. The utility of observer data will however, be evaluated for incorporation into the 5-year review cycle for groundfish EFH. NMFS further disagrees additional analysis is required. The analysis of adverse effects was narrowed during scoping to focus on benthic habitats due to limitations in time and budget and to focus decisionmaking on those areas most likely to be at risk of impact. A complete literature review of groundfish prey species was performed however and is available to the decisionmaker in Chapter 3 and the Life Histories Appendix (see next column for appropriate section). NMFS believes that the range of alternatives is sufficient and that future proposals for protection of groundfish prey may be considered during periodic EFH reviews.	N/A
48	Dingle-bar gear should not be prohibited because it is highly selective, has high landing prices and minimal bottom impact.	general	S-21	Modified Alternative	A prohibition of dingle bar gear was not included in the final preferred alternative.	2.7
49	It is difficult to quantify the socioeconomic impacts of the proposed action on ports and harbors, especially cumulative effects.	2	G-06	No change to FEIS	NMFS has used available quantitative and qualitative information to describe impacts to communities, however available data limits the ability to analyze impacts to communities and efforts are underway to expand our knowledge of fishing-dependent communities.	4.7
50	Do not eliminate the fisheries for nearshore live fish and spot prawns.	1	G-13	Supplement, Improve or Modify Analyses	NMFS notes the FEIS has been updated with a final preferred alternative that avoids impracticable negative socioeconomic consequences. See applicable sections.	2.7, 4.7.6, Appendix J

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
51	Consider economic impact to coastal communities.	1	G-17	No change to FEIS	NMFS has used available quantitative and qualitative information to describe impacts to communities, however available data limits the ability to analyze impacts to communities.	4
52	Fisheries Economic Assessment Model: The EIS needs to provide additional information.	general	S-01	Supplement, Improve or Modify Analyses	NMFS agrees that additional information describing the Fisheries Economic Assessment Model is useful. Additional description has been added to the FEIS. Please see applicable section(s).	Socioeconomic Appendix
53	Any viable economic analysis of minimization measures should include not only the short-term costs of management measures, but also the long-term costs of habitat damage as well as the long-term benefits of habitat protection	general	S-05	No change to FEIS	The FEIS has been updated to better describe potential long-term costs and benefits related to habitat. See applicable section.	4.7
54	The economic impact analysis in Chapter 4 must be revised to include the expected future economic gains by groundfish trawl vessels due to the buyback program.	general	S-05	Supplement, Improve or Modify Analyses	NMFS agrees. Additional information has been added to chapters 3 and 4 to account for impacts of the buyback.	4.7
55	A significant shortcoming of the analysis to date is the limited amount of economic impact analysis for most of the alternatives under consideration. There is essentially no data on alternatives related to non-trawl fishery economic impacts.	general	S-07	No change to FEIS	NMFS agrees and is concerned with the lack of data on non-trawl fisheries. For instances where there is not data available, the EIS includes a qualitative discussion of economic impacts.	4.7, 4.8
56	The absence of spatial data on fisheries other than bottom-trawl puts the Council in a very difficult position…	general	S-07	No change to FEIS	NMFS agrees and is concerned with the lack of data on non-trawl fisheries. For instances where there is not data available, the EIS includes a qualitative discussion of economic impacts.	4.7, 4.8
57	Dungeness crab and CA spiny lobster would be affected by the restrictions posed here	general	S-12	Supplement, Improve or Modify Analyses	The EIS has been updated to include a description of the CA spiny lobster and Dungeness crab fishery as part of the environment potentially affected by EFH actions. See applicable sections	3.7

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
58	We do not believe that the long term cumulative socioeconomic effects on harbors in the designation of EFH's were fully explored	2	S-13	No change to FEIS	The FEIS has been updated to provide additional information to fully analyze relevant socioeconomic effects on harbors. NMFS agrees that communities may lose revenues from trawling, tourism, and funding for harbor activities. Some negative effects to social and cultural value may result due to loss of certain gear groups or fishing industry in coastal communities (see Section 4.7.3.15). In the long term, communities could potentially gain from the increases in ecotourism. There may be increases in existence value, option value, and enhanced heritage value from the establishment of closed areas. We acknowledge that there is a limited amount of information available to describe cumulative effects to communities. Please see applicable section(s).	4.7.3.15
59	The EIS does not include the relevant information on SC Trawlers Association fisheries on which the Council can make an informed decision that accounts for our fisheries	1	S-15	Supplement, Improve or Modify Analyses	The FEIS has been updated with a final preferred alternative and socioeconomic information to account for the issues raised in this comment. See applicable sections.	2.7, 4.7, 4.8, Appendix J
60	For Southern California Trawlers, a closure of 1-4% might actually represent an additional erasure of 20, 30, 40 or even 50% of our remaining trawl grounds.	general	S-15	Supplement, Improve or Modify Analyses	The FEIS has been updated to better describe potential geographical variation in impacts to fishermen and fishing communities. The FEIS has been updated with a final preferred alternative that, in part, is designed to distribute socioeconomic impacts throughout the coast so that no one group suffers disproportionately. See applicable sections.	2.7, 4.7
61	Under alternative C.12, C.13, C.14 there is only one nearshore area listed for Oregon… but this area is the only area available to recreational and hook and line vessels. Closing this area would be a real blow to Coos Bay and Bandon	general	S-21	Supplement, Improve or Modify Analyses	We acknowledge the possibility of geographical variation in impacts to fishermen and fishing communities. Attempts were made in the FEIS to better describe some of those potential impacts to coastal ports such as Coos Bay and Bandon. NMFS also notes that the FEIS was updated with a final preferred alternative that is designed to provide for recreational fisheries throughout the coast. See applicable sections.	2.7
62	Alternative 6.9 (Option 9.2) would eliminate the pink shrimp fishery. Option 9.5 would curtail the scallop fishery. Option 9.8 would create problems in the troll fishery.	general	S-26	Supplement, Improve or Modify Analyses	The FEIS has been updated with a final preferred alternative are designed to minimize impact to fisheries while protecting essential fish habitat as well as additional analyses of the socioeconomic consequences. The final alternative is not expected to significantly impact the pink shrimp, scallop, or troll fisheries based on analyses of the final preferred alternative in the FEIS. See applicable section.	2.7, 4.7, 4.8, Appendix J

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
63	We ask that both the PFMC and NMFS carefully consider the socioeconomic effects of any further regulations in the Central California region.	2	G-06	No change to FEIS	NMFS has used all available information to describe impacts to communities. With regard to closures, NMFS agrees that communities may lose revenues from trawling, tourism, and funding for harbor activities. Some negative effects to social and cultural value may result due to loss of certain gear groups or fishing industry in coastal communities (see Section 4.7.3.15).The communities could potentially gain from the increases in ecotourism. There may be increases in existence value, option value, and enhanced heritage value from the establishment of closed areas.	Ch. 4
64	In central California the past few years' actions have had a drastic effect on the economics of the fleets. This impacts communities, harbors and marinas. New actions will do the same. Fishing boats will be replaced by yachts, like in southern California.	general	G-06	No change to FEIS	We acknowledge that there is a limited amount of information available to describe cumulative effects to communities. NMFS has used all readily available information and efforts are underway to expand our knowledge of fishing-dependent communities for future analyses. NMFS has used available quantitative and qualitative information to describe impacts to communities, however available data limits the ability to analyze impacts to communities.	N/A
65	Sport fishing has been the lifeblood of many small communities on the Oregon coast and supports local and state economies.	1	G-07	Supplement, Improve or Modify Analyses	NMFS has used available quantitative and qualitative information to describe impacts to communities, however available data limits the ability to analyze impacts to communities and efforts are underway to expand our knowledge of fishing-dependent communities. NMFS acknowledges the importance of recreational fishing to state and local economies. Section 3.7.3 contains information on recreational fishing participation by state. Section 3.7.3.2. contains discussion on the economic impact of recreational fishing. The FEIS has been updated to include a final preferred alternative that is designed to minimize negative socioeconomic effects. See applicable section(s).	2.7, 3.7.3, Ch. 4
66	I feel the state/feds are too biased towards the environmental community and letting the fishing communities die on the vine.	1	G-13	Supplement, Improve or Modify Analyses	The intention of the EFH final preferred alternatives is to protect essential fish habitat while maintaining sustainable fishing. The FEIS has been updated to include a final preferred alternative that contains options developed in concert with the fishing industry and environmental community representatives. See applicable section.	2.7
67	If fishing ends here, we will import fish from unhealthy farms or unregulated fisheries.	general	G-13	Supplement, Improve or Modify Analyses	The FEIS has been updated with a final preferred alternative intended to leave fishing opportunities largely intact. The intention of the EFH final preferred alternatives is not to end fishing but instead to protect essential fish habitat while maintaining sustainable fishing. See applicable section(s).	2.7
68	Local restaurants can't get local fresh fish and buy overseas from environmentally damaging, unregulated fisheries	general	G-18	Supplement, Improve or Modify Analyses	The FEIS has been updated with a final preferred alternative that is designed to minimize impacts to fisheries while protecting essential fish habitat. The alternative is not expected to impact the availability of domestically caught fish to local buyers. See applicable sections.	2.7

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
69	Many of the alternatives in the DEIS would appear to close fishing grounds to the extent that would eliminate consistent landings in Morro Bay and finally put an end to our commercial fishing harbor.	general	G-18	Supplement, Improve or Modify Analyses	As part of practicability, NMFS considers whether regulatory actions will have dramatic impacts to communities. If an alternative "ends a commercial fishing harbor" it could be considered impractical. Additionally, the FEIS has been updated to include a final preferred alternative that is designed to maintain healthy socioeconomic conditions throughout the coast. See applicable section(s).	2.7, 4.8, Appendix J
70	Morro Bay has suffered from reduction in quotas, seasonal restriction and area closures resulting from the local groundfish market collapsing. Just a few traditional shore-side support businesses hang on. (some additional detail provided on infrastructure	general	G-18	Supplement, Improve or Modify Analyses	NMFS acknowledges that past regulatory actions have had negative impacts to fishing communities. However, the final preferred alternatives are intended to maintain sustainable fisheries while protecting essential fish habitat.	3, Cumulative effects
71	Some alternatives do not comply with certain national standards (minimize adverse economic impacts on fishing communities).	1	S-08	Supplement, Improve or Modify Analyses	NMFS notes that the alternatives were developed to provide for a comparison of effects to facilitate decisionmaking. N.S. 8 requires that the importance of fishing resources to fishing communities are taken into account when implementing conservation and management measures. We acknowledge that there is a limited amount of information available to describe effects to communities. NMFS has used all readily available information and efforts are underway to expand our knowledge of fishing-dependent communities for future analyses. The FEIS has been updated to include a final preferred alternative that is intended to comply with national standards and applicable law. See applicable section(s).	2.7, Ch. 4
72	…many [alternatives] have large economic impacts to the down side on fishing sectors and communities	general	S-09	Supplement, Improve or Modify Analyses	NMFS agrees. The final preferred alternative was designed to eliminate the large economic impacts that were evident in several of the draft alternatives. See applicable section.	2.7
73	EIS should detail effects that might occur to coastal communities of EFH designation.	3	S-13	No change to FEIS	EFH designation does not necessarily equate to any regulatory or management action, therefore we cannot predict any impacts to communities as a result of the designation. The socioeconomic consequences of measures to minimize adverse effects to EFH are fully explored in the EIS. See applicable sections.	Ch. 4
74	Several alternatives including Alt. D.3, fail to consider economic impact on fishing communities	1	S-19	No change to FEIS	We acknowledge that there is a limited amount of information available to describe cumulative effects to communities. NMFS has used all readily available information and efforts are underway to expand our knowledge of fishing-dependent communities for future analyses. The economic impacts on commercial and recreational fishermen is difficult to quantify since there exists very little cost and earnings data from either sector. Without information on revenues, we cannot predict what impact VMS costs will have on a vessel's operations or a recreational fishermen's activities.	Ch. 4

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
75	The economic impact that closures would inflict on coastal economies will be devastating. Closured would impact local fishers and tourists enormously.	1	S-24	Supplement, Improve or Modify Analyses	NMFS has used all available information to describe impacts to communities and fishermen from closures. NMFS agrees that communities may lose revenues from trawling, tourism, and funding for harbor activities. Some negative effects to social and cultural value may result due to loss of certain gear groups or fishing industry in coastal communities (see Section 4.7.3.15). The communities could potentially gain from the increases in ecotourism and long-term sustainable increase in harvest due to improved marine conditions. There may be increases in existence value, option value, and enhanced heritage value from the establishment of closed areas. The FEIS has been updated to include a final preferred alternative that is designed to minimize negative socioeconomic effects. See applicable section(s).	2.7, 4.7.3.15
76	Under C.12 the FEIS should consider where displaced fishermen may move and what communities may be impacted.	general	S-11	Supplement, Improve or Modify Analyses	A reliable estimate of effort redistribution is not possible given the best available information. An assessment of NMFS capabilities in this regard, and a generalized assessment of effort redistribution is contained in the EIS. See applicable section(s).	Appendix 12 to Appendix A.
77	We have concerns about the potential redistribution of fishing effort if closures are enacted	3	S-12	No change to FEIS	A reliable estimate of effort redistribution is not possible given the best available information. An assessment of NMFS capabilities in this regard, and a generalized assessment of effort redistribution is contained in the EIS. See applicable section(s).	4.7.3
78	Adoption of any Minimal Impacts to EFH alternatives that include closures should include an assessment of likely effort redistribution	12	S-12	Supplement, Improve or Modify Analyses	A reliable estimate of effort redistribution is not possible given the best available information; however, an assessment of NMFS capabilities in this regard is contained in the EIS. See applicable section(s).	Appendix 12 to Appendix A.
79	Please consider the importance of marine algae and diatoms (aside from kelps) as a source of shelter and food, and an important component of groundfish EFH, especially in Estuaries.	1	G-14	Acknowledge	Groundfish EFH is composed of many trophic levels, including primary producers. Unfortunately, limited time and resources do not allow model levels of detail, such as a complete analysis of every possible component of the marine environment that may be relevant to groundfish. Therefore the analysis was narrowed during public scoping to focus on habitat types most likely to be at risk of adverse impact. Please see applicable section(s).	2.4, 2.7
80	The EIS needs more analyses on the effects of designating Estuaries as HAPC, i.e. for effects on ports, harbors and marinas and their ability to perform basic maintenance such as dredging and repairs.	5	S-13	Supplement, Improve or Modify Analyses	The FEIS has been updated to better describe the effects of designating estuaries as HAPC. The specific concerns raised by the commenter are outside the scope of the FEIS as explained in the document. In general, HAPC designations are not expected to have impacts on basic maintenance of ports, harbors, and marinas.	4.3

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
81	Figure 2-7 omits the longest undeveloped estuary in California: the Big River Estuary. Please include this estuary in Alternative B.2	general	S-18	No change to FEIS	We used the National Wetlands Inventory GIS data, the best available information for mapping estuaries for the West Coast. However, NWI data are unavailable in a digital format for four coastal counties in California, Del Norte, Humboldt, Mendocino, and Sonoma. These type of data gaps occur and are acknowledged for many of the data layers included in the EFH EIS. Fortunately, for purposes of the Fisheries Management Plan, HAPC's are defined through specific characteristics and the maps are used only has a guideline for where they might occur. Therefore, Big River Estuary is included as part of the Estuary HAPC even though it is not depicted on the map.	2.4
82	Better information to support future Council decision-making is needed on the following topics: the spatial distribution of fishing effort, the location of critical habitat, the impacts of fishing activities, and the efficacy of measures to protect EFH adopted by the Council through this EIS. It is essential that NMFS support funding requests for efforts to obtain this information to support the mandated five-year review of EFH provisions.	2	S-07	Supplement, Improve or Modify Analyses	NMFS agrees that additional information through research is important to improve our ability to effectively manage EFH and fisheries. NMFS will seek to obtain such information; however, specific funding initiatives are outside the scope of this analysis. A conceptual research plan has been included in the FEIS. See applicable section(s).	2.9
83	Alternative D.4 should have additions for reserve management, i.e. management by NOAA only, only federal funding, reauthorization of reserves every 5 years, no extractive activities except for research purposes	general	S-09	No change to FEIS	NMFS disagrees. The alternatives presented in the DEIS present a reasonable range of options for the decisionmaker, including alternative C.14 which presents areas where fishing would be completely prohibited. A complete ban on extraction, including non-fishing activities, is outside the scope of this analysis.	N/A
84	Funding for implementation of Alternative C.8.1 should not be taken from that which is dedicated to any other fishing sector, nor cause a lowering of % normally allocated to another sector.	general	S-09	Supplement, Improve or Modify Analyses	The FEIS has been updated to explain that funding or sector allocations for alternative C.8.1, if adopted, would not be expected to differ in any way from the overall funding of related research under other alternatives.	Ch. 4
85	To the extent possible, the cost of VMS units and transmission costs should be paid by the federal government.	5	S-11	No change to FEIS	The specific costs of a VMS program are outside the scope of this analysis and are being considered in a separate rulemaking.	N/A

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
86	Retrospective evaluation of the efficacy of measure to protect EFH adopted by the PFMC at its upcoming June meeting. Support funding for mandated 5 year review.	5	S-12	Supplement, Improve or Modify Analyses	NMFS agrees that additional information through research is important to improve our ability to effectively manage EFH and fisheries. NMFS will seek to obtain such information; however, specific funding initiatives are outside the scope of this analysis. NMFS agrees that a retrospective evaluation of any measure that result from this analysis are important. A conceptual research plan has been included in the FEIS. See applicable section(s).	2.9
87	NMFS should adopt a management plan based on the natural ecosystems. This is an essential foundation for managing fisheries over the long term, so we will have a productive marine fishery in the future.	1	G-08	Acknowledge	NMFS notes that the groundfish FMP is designed to accomplish the suggested goals within the limits of authority.	N/A
88	Protect deep water coral and sponges and other sensitive habitat from destructive fishing gear, by prohibiting the expansion of bottom trawling into known areas of coral and sponge.	1	G-08, G-09, G-19	Supplement, Improve or Modify Analyses	The final preferred Alternative includes a prohibition on bottom trawling in depths greater than 700 fm. This bottom trawl footprint closure is intended to prevent the expansion of bottom trawl fishing into areas not previously fished. This closes a large proportion of the EEZ and will minimize adverse impacts of fishing on deepwater corals and other biogenic habitat occurring in the area. Please see the preferred alternative.	2.7
89	I urge you to close ecologically important areas to destructive gears, such as bottom trawls and create areas where groundfish and their habitat are protected	1	G-16	Supplement, Improve or Modify Analyses	The FEIS has been updated to include a final preferred alternative that contains fishery closures of ecologically important areas. See applicable section.	2.7
90	We must take steps to restore our oceans so that our fisheries can thrive in the future.	general	G-16	Supplement, Improve or Modify Analyses	NMFS acknowledges the support for action to ensure thriving fisheries in the future and notes that the FEIS has been updated to include a final preferred alternative designed to provide long-term protection for EFH. See applicable section(s).	2.7
91	NMFS needs to preserve fishing opportunities for future anglers	1	G-17	Supplement, Improve or Modify Analyses	None of the alternatives to mitigate fishing impacts to EFH completely eliminate future opportunities for anglers. While some impact minimization alternatives place restrictions on recreational fisheries, all alternatives are designed to achieve the goal of long term sustainable fisheries and rebuilding stocks. The FEIS has been updated to include a final preferred alternative that minimizes adverse socioeconomic consequences. See applicable section(s).	2.7, Ch. 4
92	Implement EFH designation without unforeseeable implications for low/no impact vertical gear and traps.	2	G-18	Supplement, Improve or Modify Analyses	The FEIS has been updated to include a final preferred alternative. The impact to fisheries that utilize vertical gear and traps was considered in the practicability analysis. See applicable section(s).	2.7, Appendix J

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
93	In your plan to minimize the adverse effects of such gear to essential fish habitat, please close ecologically sensitive areas to bottom trawling and other bottom contact gear, establish a process for setting a limit on the bycatch of habitat-forming invertebrates, such as corals and sponges, and create other provisions agreed upon by conservationists and scientists to protect the health of our oceans for future generations.	1	M-01	Supplement, Improve or Modify Analyses	The final preferred alternative would close extensive areas in the West Coast EEZ to specified gear types to minimize fishing impacts on sensitive habitats. The final preferred alternative designates kelp as an HAPC and protects biogenic habitats from adverse effects of bottom trawling. The final preferred Alternative does not contain measures to limit the bycatch of habitat-forming invertebrates. However, a separate action, evaluated in the Bycatch Mitigation Program FEIS published by NMFS in September 2004 makes measures available to the Council to reduce bycatch. Although focusing on overfished species, the measures adopted by the Council by Amendment 18 to the groundfish FMP, pursuant to this FEIS, could be used to limit bycatch of habitat-forming invertebrates.	2.7
94	I support protecting ecologically sensitive areas of the Pacific seafloor such as corals and sponges; and special places such as seamounts, biogenic areas, and deep sea canyons from destructive fishing practices. As you consider the Essential Fish Habitat Draft Environmental Impact Statement, please adopt a management alternative that protects these ecologically sensitive habitats necessary to maintain vibrant fisheries.	1	M-02	Supplement, Improve or Modify Analyses	NMFS agrees. The FEIS has been updated to include a final preferred alternative that is designed to minimize fishing impacts on sensitive habitats.	2.7
95	I support protecting ecologically sensitive areas of the Pacific seafloor such as corals and sponges; and special places such as seamounts, biogenic areas, and deep sea canyons from destructive commercial fishing. As you consider the Essential Fish Habitat Draft Environmental Impact Statement, please adopt Alternative 12, which protects habitat and maintains vibrant fisheries.	1	M-02.1	Supplement, Improve or Modify Analyses	NMFS agrees that ecologically important areas should be protected from adverse impact. The FEIS has been updated to include a final preferred alternative that is designed to minimize fishing impacts on sensitive habitats.	2.7

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
96	I urge you to close ecologically important areas to destructive gears, such as bottom trawls, and to create areas where all groundfish and their habitats are protected. I also support actions that would help fishermen move away from destructive gears to more sustainable fishing.	1	M-03	Supplement, Improve or Modify Analyses	NMFS agrees. The FEIS has been updated to include a final preferred alternative that is designed to minimize fishing impacts on sensitive habitats.	2.7
97	I urge you to protect ecologically important and sensitive ocean habitats, including deep water corals and sponges, from destructive fishing practices in the Pacific Ocean. I urge you to protect these areas from further damage by prohibiting the expansion of bottom trawling and protecting known areas of coral and sponge.	1	M-04	Supplement, Improve or Modify Analyses	NMFS agrees. The FEIS has been updated to include a final preferred alternative that is designed to minimize fishing impacts on sensitive habitats.	2.7
98	"We request that the Northwest region designate a point person to serve as liaison to our organization and the NMFS Southwest region to insure we have the best level of communication possible on developing the EFH analysis for our area over the next year."	3	S-04	Acknowledge	NMFS acknowledges the request and notes that the NWR is pleased to provide support if it is within our means to do so. A detailed communication plan is outside the scope of the final preferred alternative; however, the commenter is encouraged to contact Joe Scordino, Deputy Regional Administrator, NMFS Northwest Region, for further discussions.	N/A
99	The DEIS alternatives cannot be adequately analyzed without the definition of a baseline in habitat protection. Need specified overall goals for which various alternatives were proposed and can be compared.	3, 15, 1	S-04, S-12, G-02	Supplement, Improve or Modify Analyses	The DEIS includes a discussion of the goals of each alternative as well as an analysis of the consequences of the alternatives for comparison among alternatives. The scientific rationale for deriving alternatives in general is provided in addition to specific goals relative to each alternative. NMFS improved these descriptions for the FEIS. See applicable sections.	Ch. 2
100	"The fundamental purpose of the DEIS is the detailed consideration of the environmental effects of implementing all practicable minimization measures. The DEIS fails to accomplish this."	4	S-05	No change to FEIS	NMFS disagrees. The range of alternatives analyzed in the EIS presents a reasonable range of choices for decisionmaking. Chapter 4 in the FEIS provides the environmental consequences of the range of alternatives.	4

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
101	"…the Fisheries Service must examine any and all impacts that reduce the quality or quantity of the habitat itself. These impacts include considerations of benthic organisms, prey species and their habitat, and other ecosystem components."	5	S-05	No change to FEIS	NMFS disagrees additional analysis is required. The analysis of adverse effects was narrowed during scoping to focus on benthic habitats and to focus decisionmaking on those areas most likely to be at risk of impact. A complete literature review of groundfish prey species was performed however and is available in Chapter 3 and the Life Histories Appendix (see next column for appropriate section). NMFS believes that the range of alternatives is sufficient to minimize potential adverse effects, and that future proposals for protection of groundfish prey may be considered during periodic EFH reviews. Please see applicable section(s).	3.2.2, 3.2.3, 3.3.3
102	NMFS must examine any and all impacts that reduce the quality or quantity of the habitat itself. These impacts include considerations of benthic organisms, prey species and their habitat, and other ecosystem components. In other words, the adverse effects inquiry is a broad one, focused on the effects of fishing on habitat and elements of the ecosystem, and not limited to the effects of fishing on fish stocks themselves.	5	S-05	No change to FEIS	NMFS disagrees additional analysis is required. The analysis of adverse effects was narrowed during scoping to focus on benthic habitats due to limitations in time and budget and to focus decisionmaking on those areas most likely to be at risk of impact. A complete literature review of groundfish prey species was performed however and is available to the decisionmaker in Chapter 3 and the Life Histories Appendix (see next column for appropriate section). NMFS believes that the range of alternatives is sufficient and that future proposals for protection of groundfish prey may be considered during periodic EFH reviews.	3.2.2, 3.2.3, 3.3.3
103	The EIS should cite and discuss the NRC report to support choices to include global literature in the description of sensitivity and recovery indices. as well as the Auster and Langton paper and others, by incorporating the discussion in Appendix A	10	S-05	Made Factual Corrections	NMFS agrees. The EIS incorporates an complete analysis of relevant global literature pursuant to recommendations of the NRC. See applicable section.	Appendix A
104	The EIS incorrectly states that Alternatives C.12-C.14 are mutually exclusive and that only one could be contained in a final preferred alternative. The mitigation strategies identified in the different alternatives can be mixed and matched for the specific areas contained in alternatives C.12-14.	11	S-05	Made Factual Corrections	NMFS agrees that alternatives C.12-C.14 are not mutually exclusive. Revisions have been made to the text. Please see revised section(s).	2.5

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
105	We believe that the EIS represents a comprehensive compilation of the best information currently available	3	S-07	Acknowledge	NMFS concurs that the EIS utilizes a comprehensive compilation of the best available information.	N/A
106	Failure to identify appropriate response variables to assess the likely success or failure of a proposed action.	3	S-12	Supplement, Improve or Modify Analyses	NMFS acknowledges that development of a response variable is not possible given the best available science. The Council and NMFS will encourage new research on the effects of area closures on habitat recovery and the fishing industry. The FEIS has been updated to include a general research plan for monitoring the response of habitat to any actions that result from this process. Please see applicable section(s).	2.6, 2.7, 2.9
107	Mitigation efforts should be nested within EFH and HAPC designations, w/explicit language linking mitigation issues to attributes of concern	14	S-12	No change to FEIS	The alternatives to minimize adverse fishing effects to EFH are analyzed for their spatial overlap with EFH in Chapter 4. The has been updated to better describe the scientific and policy rationale behind each alternative relative to issues of concern. See applicable section(s).	2.5, Ch. 4
108	The DEIS Alternatives are disjoint, requiring overwhelming appendices of tables and maps. The result is inefficient and difficult to interpret.	14	S-12	No change to FEIS	Analyzing each of the alternatives separately allowed the option to group various alternatives in different combinations without repeating impacts analysis, resulting in a large quantity of information to be synthesized without repeating analysis. NMFS made the utmost attempt to make this complicated analysis user friendly.	N/A
109	Develop framework for action following a hierarchy: Broad EFH designation, ground truthed and may not be species specific; HAPC designation for areas with unique function; THEN impact reduction actions that target critical area within these combined designations	14	S-12	Supplement, Improve or Modify Analyses	The alternatives in the DEIS were developed in a fashion consistent with the comment. The FEIS has been updated with a final preferred alternative that, if implemented through an FMP amendment, would broadly describe EFH, designate specific HAPC, and impact minimization measures intended to target specific areas. See applicable section.	2.7
110	We request that you continue to allow human use of the resources to the greatest extent feasible for the benefit of both fishing and harbors	4	S-13	Supplement, Improve or Modify Analyses	The FEIS has been updated to include a final preferred alternative that would not impose significant curtailments of human use of the resource. See applicable section(s).	2.7
111	More analysis is needed on the benefits and costs of regulatory actions with regard to the designation of EFH and HAPC. The designation of HAPCs should be adopted only if the socioeconomic and historic uses of those areas are seriously considered in the FEIS. The cumulative effects of HAPCs were not fully explored in the DEIS.	5	S-13	No change to FEIS	Designation of EFH and HAPC do not directly impact fishing practices. However, designation could potentially result in consultation costs for federal agencies. These consultation costs are difficult to estimate without detailed information about the depth of consultation discussions required. A full analysis, consistent with the best available information, is presented in the applicable sections.	Ch. 4

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
112	Alternative C.8 states that "zoning system will be regularly modified to incorporate new information". This statement requires a follow up mitigation measure and policy to ensure it is implemented	9	S-13	No change to FEIS	NMFS agrees that alternative C.8 would require significant follow-up if adopted. Alternative C.8 was not included in the final preferred alternative so no further analysis was provided beyond what is contained in the DEIS.	N/A
113	Modify Alternative C.10 to allow for a NGO and fisherman collaborative pilot project	10	S-13	No change to FEIS	Alternative C.10 does not preclude collaborative pilot projects. No change was made to the analysis.	N/A
114	There is no groundfish fishery in the Santa Barbara Channel Area due to market and infrastructure changes, NOT stock declines. However, many of the alternatives for mitigating impacts to groundfish EFH will affect the small-boat artesianal fisheries for the remaining species we fish for.	1	S-15	Supplement, Improve or Modify Analyses	The final preferred alternative was designed to allow for the continuation of all current fisheries. The FEIS has been updated to include a full description of the socioeconomic consequences of the final preferred alternative. Please see applicable section(s).	2.7, 4.7.6
115	FEIS should include a definition of "precautionary management principals" in Chapter 9	general	S-18	Supplement, Improve or Modify Analyses	The FEIS has been updated to include a description of precautionary management principles.	9
116	Clarify and reword to make clear the fact that there is no commercial abalone fishery and abalone taken as sport cannot use dive gear.	general	S-17	Supplement, Improve or Modify Analyses	NMFS has supplemented the FEIS to address this concern. See applicable section.	3.7.1.4.12, 3.5.10.1
117	Retain the seven composite areas identified in the 1998 EFH designation, but consider other habitat designations based on structure, function and impacts. For example, splitting nearshore rocky shelf habitat (<100m depth) into a separate category is supported because of the importance of these shallow reef areas as juvenile fish habitat and increased impacts of recreational fishing gear.	7	S-12	Supplement, Improve or Modify Analyses	NMFS acknowledges the support for alternative A.1 with suggested modifications. The final EIS has been updated to include a final preferred alternative that would describe EFH based on habitat suitability profiles and includes a precautionary adjustment. The final preferred alternative is based on the best available information and allows for a more refined EFH description than the 7 composite areas described in 1998. See applicable section.	2.7
118	Alternatives C.3.4 and C.13 best meet those goals, and could be modified to reduce socioeconomic impacts.	12	S-12	Supplement, Improve or Modify Analyses	NMFS agrees. The FEIS has been updated to include a final preferred alternative that contains elements of Alternatives C.3.4 and C.13. Please see applicable section(s).	2.7

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
119	Encourage less destructive gear types	1	G-08	Supplement, Improve or Modify Analyses	The FEIS has been updated with a final preferred alternative that includes gear restrictions to limit the use of destructive gear. See applicable sections.	2.7
120	Make it easier for fishermen to change to less destructive gear.	2, 1, 1	G-10, G-15, G-21	No change to FEIS	NMFS believes this suggestion has positive attributes, however, under the current management structure and agency resources, this is not practicable.	N/A
121	We hope the Council will be able to assist fishermen to develop and employ fishing gear and techniques that are less destructive than those that have caused so much damage.	1	G-12	Supplement, Improve or Modify Analyses	NMFS acknowledges the comment. Please see the preferred alternative.	2.7
122	Incentives should be offered to encourage use of gear that least damages habitat.	general	S-11	No change to FEIS	NMFS notes that such a program to offer incentives for the use of less destructive gear types is not explicitly part of the final preferred alternative. The commenter is encouraged to bring specific incentive proposals to the Council and NMFS for consideration.	2.7
123	Investment should be made in cooperative research that offers opportunity for fishermen to design and participate in studies to demonstrate the effective use of gear that minimizes damage to sensitive habitat.	general	S-11	No change to FEIS	NMFS agrees. The commenter is encouraged to take advantage of opportunities through existing grants and proposal processes to pursue this type of research.	N/A
124	Please do not close Santa Lucia Banks to vertical hook-and-line gear	1	G-03	Supplement, Improve or Modify Analyses	As part of it's preferred alternative to minimize fishing impacts to EFH, the PFMC established non-trawl areas near Morro Bay, but did not close those areas to vertical hook and line gear. Please see preferred alternative.	2.7, 4.8
125	I am opposed to closure of vast areas because there is no justifiable rationale or sufficient analysis of the impacts.	1	G-17	No change to FEIS	NMFS acknowledges the opposition of the commenter to fishery closures. The justification for considering large-scale closures is described in the Purpose and Need for action and also as part of the scientifc rationale for the minimization alternatives. Seeapplicable sections.	Ch. 1, 2.5

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
126	Statement of Purpose and Need is narrow and vague. (1) The Fisheries Service must implement all practicable measures to minimize adverse effects on EFH and must fully explore and evaluate those options in its EIS. (2) The DEIS fails to recommend to the Council which measures the agency believes would be most practicable in minimizing adverse effects to EFH, and more generally those actions necessary to comply with the requirements of Section 303(a)(7) of the MSA.	1	S-05	Supplement, Improve or Modify Analyses	The statement of purpose and need provides adequate rationale for the proposed action, which is substantially based on the legislative mandate in the Magnuson-Stevens Act at §303(a)(7). The MSA requires FMPs to "minimize to the extent practicable adverse effects on [EFH] caused by fishing." There are undoubtedly a wide range of measures that may be considered practicable, if considered individually. However, the practicability standard should be applied to the suite of management measures as implemented in toto, as we did in our practicability analysis. In this respect the DEIS provides a reasonable range of minimization measure alternatives (some 14 distinct alternatives, some of which have further sub-options) from which the Council was able to craft a practicable suite of management measures to minimize the adverse effects of fishing on EFH. [RESPONSE CONTINUED BELOW]	1, Appendix J
127	Statement of Purpose and Need is narrow and vague. (1) The Fisheries Service must implement all practicable measures to minimize adverse effects on EFH and must fully explore and evaluate those options in its EIS. (2) The DEIS fails to recommend to the Council which measures the agency believes would be most practicable in minimizing adverse effects to EFH, and more generally those actions necessary to comply with the requirements of Section 303(a)(7) of the MSA.	1	S-05	Supplement, Improve or Modify Analyses	[RESPONSE CONTINUED:] The DEIS, combined with advice received from its advisory bodies and the public, is sufficient for the Council to identify alternatives that are compliant with §303(a)(7) of the MSA. NMFS may identify an "agency-preferred alternative" but it is neither necessary nor appropriate for NMFS to make a recommendation in the DEIS as to which alternatives the Council should choose, as suggested by the commenter. NMFS did include possible parts of the preferred alternative in the DEIS. NMFS also provided general information for the practicability analysis in the DEIS. The FEIS includes NMFS' practicability analysis for the preferred alternative.	1, Appendix J
128	NMFS must determine if action is or is not necessary to comply with section 303(a)(7) of the Magnuson Act - must be included in statement of purpose and need. May not delay consideration of decision until issuing ROD because analysis leading up to the decision needs to be incorporated into NEPA process.	2	S-05	Supplement, Improve or Modify Analyses	The FEIS has been updated to include a final preferred alternative that will be considered in the ROD and associated FMP and regulatory amendments. NMFS final decision on what is necessary to satisfy the mandate to minimize adverse effects to EFH will be detailed in the ROD and the decision documents for the FMP amendment. The FEIS is the appropriate place to consider environmental impacts of alternative but not an agencies final decision which must be detailed in the ROD. See applicable section(s).	2.7

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
129	The Purpose and Need section has a few elements missing, such as the definition of EFH and habitat-related mandates of the Sustainable Fisheries Act.	15	S-12	Made Factual Corrections	Section 1.5 in the DEIS provides an overview of the habitat-related mandates of the Sustainable Fisheries Act. This section also references those sections in federal regulations (50 CFR 600, Subpart J) providing guidance on the identification and description of EFH. This guidance is quite detailed while Chapter 1 of the EIS is intended to provide a succinct overview of the proposed action and the context for that action.	1
130	Purpose and Need section should include description of current regs designed to reduce impacts on overfished stocks (info on these closures is only included in Chapter 2)	15	S-12	No change to FEIS	Much of Section 1.6.4 describes the measures NMFS and the Council have put in place to reduce the bycatch of overfished species. The implementation of Groundfish Closed Areas for this purpose is mentioned at the end of this section. Chapter 1, in addition to describing the proposed action, is intended to provide the broad context for that action; or, as the commenters state elsewhere "set the stage for the action." For this reason a detailed description of the current regulatory framework, which is complex, is not included.	1.6.4
131	The purpose and need does a poor job of linking the management framework to EFH designation.	15	S-12	Supplement, Improve or Modify Analyses	The statement of purpose and need provides adequate rationale for the proposed action, which is substantially based on the legislative mandate in the Magnuson-Stevens Act at §303(a)(7). The MSA does not require FMPs to implement all practicable measures, but to "minimize to the extent practicable adverse effects on [EFH] caused by fishing." There are undoubtedly a wide range of measures that may be considered practicable, if considered individually. However, the wording of the MSA suggests that the practicability standard should be applied to a suite of a management measures as implemented in toto.	Ch. 1
132	Address how habitat management would fit into current management framework [in the Purpose and Need].	15	S-12	Supplement, Improve or Modify Analyses	The current management framework is fully described in the FEIS. Modification of the harvest specifications and management measures that may be necessary as a result of this EFH process will be considered during the development of harvest specifications and management measures. See applicable section(s).	Ch. 1
133	A research plan for ground-truthing those maps should be a top priority for the first 5 years.	7	S-12	Supplement, Improve or Modify Analyses	Efforts are underway to expand our knowledge through additional research regarding groundfish EFH. The preferred alternative incorporates HSP but with a precautionary adjustment to address these concerns based on known species distribution. Please see the preferred alternative and applicable section(s).	2.7, 2.9
134	Alternative 12 entirely closes Monterey Bay to trawling, ignoring the sandy bottom area seasonally fished for California Halibut. They request that this area remain open. Map included in comment letter.	4	S-15	Supplement, Improve or Modify Analyses	Formulation of the final preferred alternative was responsive to this and other similar concerns to maintain economically viable fisheries. The FEIS has been updated to include a description of the final preferred alternative and the associated environmental consequences. See applicable sections.	2.7, 4.7.6

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
135	Areas historically fished for halibut is requested to stay open: From Point Buchon to Pt. Arguello outside 3-mile state water, inside 60 fathom contour.	4	S-15	Supplement, Improve or Modify Analyses	Formulation of the final preferred alternative was responsive to this and other similar concerns to maintain economically viable fisheries. The FEIS has been updated to include a description of the final preferred alternative and the associated environmental consequences. See applicable sections.	2.7, 4.7.6
136	Referring to the HAPC alternatives, "ecological function" has not really been measured for any of the habitats listed.	7	S-12	Supplement, Improve or Modify Analyses	Quantitative measurement of ecological function is not available given the best available information nor is it a requirement of implementing regulations. The EIS includes a complete description of the function of specific habitat types for each species and life stage where such information is available. See applicable sections.	2.4, Appendix H
137	The designation of HAPCs is a good idea but they should be adopted only if the socioeconomic and historic uses of those areas are seriously consider in the FEIS. The FEIS should focus on the probability of further restrictions on fisheries.	5	S-13	Supplement, Improve or Modify Analyses	A full analysis of the consequences of HAPC designation is included in the EIS. It is not reasonably foreeseeable that HAPC designations would lead to additional fishery restrictions and it was therefore not analyzed. The FEIS has been updated to include a final preferred alternative that includes all the reasonabley forseeable fishery restrictions related to groundfish EFH. See applicable section(s).	2.7, 4.3
138	Supplemental EIS needed for "biogenic areas" methodologies?	general	S-01	Made Factual Corrections	Biogenic areas and associated methodology were discussed in the DEIS so supplementation is not necessary. Alternatives C.12-C.14 were based in part on biogenic areas. The methodology was discussed in Ch 3 and 4 with review occurring during the public comment period. The results of the review are included in the FEIS.	Appendix D.
139	Need improved information/ecological research on biogenic habitat features such as kelp and seagrass beds	2	S-07	Supplement, Improve or Modify Analyses	NMFS agrees that more research and monitoring is needed, and the final preferred alternative incorporates research and monitoring. Additional information has been added regarding the ecological role of kelp and seagrasses. Please see applicable section(s).	2.7, 3.2.2.1.2
140	All of these [HAPC] designations lack specific consideration of biogenic habitat associated with soft bottom habitat. Hard-substrate habitats are probably more sensitive to some effects of fishing, but focus on these areas may be at the expense of soft-bottom habitat.	8	S-12	No change to FEIS	NMFS disagrees. The HAPC alternatives include habitat types that, when combined, have spatial overlap and incorporate biogenic habitats such as sea grass that occur on soft bottom.	N/A

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
141	"While the discussion and figures in Chapter 4 of the EIS provide information on what HAPC areas would be excluded under each EFH alternative, it is not clear which EFH alternatives would be excluded by selecting all of the HAPC alternatives." This needs to be clarified in the EIS. Clarification needed as to the interaction between HAPC Alts and EFH alternatives, i.e. how HAPC could limit EFH alternatives	general	S-01	Supplement, Improve or Modify Analyses	Essential Fish Habitat is identified and described in the final preferred alternative. The description includes all areas designated as HAPC. Please see applicable section(s).	2.3, 2.4, 2.7, 4
142	"Considering HAPC as a Subset of EFH Leads to Illogical and Arbitrary Results…… the number of HAPC alternatives that can be considered fully is limited by the agency's insistence that HAPC be a subset of EFH."	4	S-05	No change to FEIS	NMFS disagrees. Regulations at 50 CFR 600.815(a)(8) define HAPCs as a subset of EFH that should be identified in an FMP. To address this issue, a full analysis of the overlap of the HAPC alternatives with each of the EFH alternatives was included in the DEIS. In addition, the FEIS has been updated with a final preferred alternative that contains elements which may be interpreted as applying outside EFH. A description of NMFS strategy for considering this issue is contained in the EIS. See applicable sections.	2.7, 4.3
143	The Council's designation of HAPC could be circumscribed by its contemporaneous designation of EFH if the HAPC alternative selected does not fit within the chosen EFH.	4	S-05	Supplement, Improve or Modify Analyses	The FEIS has been updated to include a final preferred alternative that includes language such that all HAPCs are to be included in the description of EFH.	2.7
144	"The EIS should make clear that the identification of HAPCs for groundfish should not be limited by alternatives for identifying and describing EFH." (page 9, paragraph 2)	9	S-05	No change to FEIS	NMFS disagrees. Regulations at 50 CFR 600.815(a)(8) define HAPCs as a subset of EFH that should be identified in an FMP. To address this issue, a full analysis of the overlap of the HAPC alternatives with each of the EFH alternatives was included in the DEIS.	N/A
145	Table 4-4 shows that only Alternative A.6 would not include B.6… but table 4-3 shows that B.6 areas are not included in several of the EFH ("A") Alternatives	14	S-12	No change to FEIS	The tables are accurate, but table 4-3 was misinterpreted by the commenter. Table 4-3 is a comparison of EFH Alternatives to each other, not a comparison of HAPC Alternatives to EFH	Appendix/Habitat Tables
146	The apparent conflicts between EFH and HAPC designation shown in Chapter 4 are of particular concern and difficult to understand.	14	S-12	Supplement, Improve or Modify Analyses	Essential Fish Habitat is identified and described in the final preferred alternative. The description includes all areas designated as HAPC. Please see applicable section(s).	2.7, Chapter 4 Figures

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147	Alternative C.7 may need to exclude some areas to allow historic and existing fishing and harbor functions	8	S-13	Supplement, Improve or Modify Analyses	The FEIS has been updated to include a final preferred alternative that incorporates some of the areas considered in C.7 but not those areas where historical or current use indicates significant economic importance. The alternative is designed to establish a system of trawl closures in the project area that account for recent fishing activity to maintain fisheries while protecting EFH. See applicable section.	2.7
148	FEIS should discuss the EFH habitat maps regarding corrections made due to known data inaccuracies. What were the results of those corrections	general	S-01	Supplement, Improve or Modify Analyses	The FEIS has been updated to include new EFH maps as well as maps of habitat for individual species and a report that details the peer review process utilized to make the improvements. See applicable sections.	2.3, Appendix D, Appendix J.
149	HSP used as a proxy for "essential" but NMFS fails to define a threshold level for making this determination. Identify the point at which habitat should be considered "essential" within the meaning of the law	4	S-05	Supplement, Improve or Modify Analyses	The FEIS has been updated to include a final preferred alternative for designation of EFH that is based on the best available science. The final preferred alternative incorporates a precautionary adjustment to account for data gaps that complicate description based on a quantitative threshold. See applicable section(s).	2.3.1, 2.7, Appendix A
150	Limitations and uncertainties in HSP should be clearly stated in the description of the Alternatives. Include more information in body of EIS on HSP modeling process from Appendix A	8	S-05	Supplement, Improve or Modify Analyses	The FEIS has been updated to better describe the limitations and uncertainties associated with HSP. In addition to updates to the body of the EIS, a peer review report has been added.	2.3.1, Appendix D
151	Too much emphasis on failure of EFH impacts model to model the relationship between fishing effort intensity and habitat effects. Model is not the best or only way to assess adverse effects. Quantitative studies not needed to meet MSA requirements	10	S-05	No change to FEIS	NMFS agrees quantitative studies are not necessary to meet MSA requirements. The discussion of issues associated with the impact model were presented to emphasize the limits of the best available science and focus decisionmakers on relevant qualitative information.	N/A
152	We urge the PFMC to utilize the GIS-based model carefully and to acknowledge the uncertainty that accumulates with each data layer by avoiding decisions that require a high level of precision.	3	S-12	Supplement, Improve or Modify Analyses	The FEIS has been updated with a final preferred alternative that incorporates HSP but with a precautionary adjustment to address these concerns based on known species distribution. The basis for the adjustment is described in the appropriate section of the FEIS and should account for uncertainty. See applicable section(s).	Section 2.7 of the EIS, Section 5.3 of Appendix A
153	Refinements to the HSP model using a tiered assessment approach are encouraged.	7	S-12	Supplement, Improve or Modify Analyses	NMFS acknowledges the encouragement to refine habitat suitability modeling. The information presented in the EIS represents the best available. Information regarding uncertainty in the information is provided. See applicable sections.	Section 5.3 of Appendix A

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
154	Use of the HSP models for identifying habitat is a reasonable approach, but subject to limitations of the data used in the analysis. Because of the inherent problems in identifying "essential fish habitat" as it has been defined, perhaps the highest purpose of this section (EFH designation) should be to recognize the diversity of species and the habitats utilized, and allow for the broadest context for the identification of really, really essential (and vulnerable) habitat in the designation of HAPC and of measures to minimize adverse impacts to EFH.	14	S-12	Supplement, Improve or Modify Analyses	NMFS shares the commenters concerns with data limitations. The preferred alternative incorporates HSP but with a precautionary adjustment to address these concerns based on known species distribution. The basis for the adjustment is described in the appropriate section of the FEIS. See applicable section(s).	Section 2.7 of the EIS, Section 5.3 of Appendix A
155	Current habitat models used in the EIS analysis are not up to the task at hand, primarily due to the lack of data. However, some Panel members believe that the fishing impacts model could be use as long as the results are presented qualitatively.	15	S-12	Supplement, Improve or Modify Analyses	NMFS shares the commenters concerns with data limitations but disagrees the impacts model could be used for qualitative analysis. The limitations associated with the impacts model are described in the SSC report on their review of the model. See applicable section(s).	Section 2.7 of the EIS, Section 5.3 of Appendix A
156	Too many alts rely too heavily on HSP to identify EFH.	general	S-01, S-05	Supplement, Improve or Modify Analyses	The preferred alternative incorporates HSP but with a precautionary adjustment to address these concerns based on known species distribution. The basis for the adjustment is described in the appropriate section of the FEIS. See applicable section(s).	2.3.1, Alt. A.2, 2.7
157	Concerned with alternatives based on HSP due to data limitations and inaccuracies.	general	S-01, S-05, S-12	Supplement, Improve or Modify Analyses	NMFS shares the expressed concerns with data limitations. The preferred alternative incorporates HSP but with a precautionary adjustment to address these concerns based on known species distribution. The basis for the adjustment is described in the appropriate section of the FEIS. See applicable section(s).	2.3.1, Alt. A.2, 2.7
158	FEIS should explain why the SSC didn't approve the impact function component (of the HSP model) and if there are plans to obtain their approval prior to selection of the preferred alternatives by NMFS	general	S-01	No change to FEIS	A complete explanation of the uncertainties associated with the impacts model is contained in the EIS in Appendix D. The final preferred alternative does not rely on the impacts model.	Appendix D

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
159	“The Recovery Index used in the EFH DEIS omits several key studies and published information on the recovery of corals and sponges.”	13	S-02.3	No change to FEIS	NMFS disagrees. The recovery index is based on a comprehensive review of the global literature on empirical studies of the effects of fishing gear and associated time to recovery. The studies cited by the commenter are primarily life history studies of corals and sponges. Similar information is presented in the sections of the EIS that describe corals and sponges. See applicable sections.	3.2.3.3
160	“It is unclear why the recovery index distinguishes between gear types in its estimates of habitat recovery. Recovery should be based on the estimated time it takes for a fully damaged habitat to return to a pre-impacted state, independent from the source of damage.”	14	S-02.3	Supplement, Improve or Modify Analyses	NMFS agrees that fishing gear is only one factor to consider in assessing impacts to habitat. To that end, a full analysis of non-fishing impacts and current protective measures is included in the EIS. See applicable sections.	3.6, 3.10.3, Appendix 14 to Appendix A
161	Support Sensitivity index however, concerned with alternatives based on Sensitivity Index due to data limitations and inaccuracies.	general	S-01	Supplement, Improve or Modify Analyses	The preferred alternative incorporates HSP but with a precautionary adjustment to address these concerns based on known species distribution. The basis for the adjustment is described in the appropriate section of the FEIS. See applicable section(s).	2.3.1, Alt. A.2, 2.7
162	“Since age does not include recolonization time between impact and settlement of new biogenic structures, all recovery times used in the EFH DEIS that were derived from literature on ages are systematically underestimated.”	14	S-02.3	Supplement, Improve or Modify Analyses	NMFS acknowledges the potential for underestimation of recovery times and notes that a similar potential exists for overestimation. The EIS includes a description of uncertainty in the analysis as well as full disclosure of data gaps. See applicable sections.	Section 3.7 of the EIS, Section 2.4 of Appendix A and Appendix 10 of Appendix A
163	"SRI" values/model limits consideration of benthic habitat. Include quantitative analysis to supplement SRI model. EIS text should include discussion of methodology to develop this index.	6	S-05	Supplement, Improve or Modify Analyses	NMFS agrees. The EIS incorporates the full discussion of the methodology for calculating habitat sensitivity and recovery indices that is included in the Risk Assessment. See applicable section(s).	2.5.1, Ch. 3, Ch. 4, Appendix 10 to Appendix A of the EIS

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
164	The agency must include qualitative analysis in addition to its sensitivity and recovery index that considers all of the best available science pertaining to prey species and their habitat and other important ecosystem components not captured by the SRI model in order to evaluate impacts more than minimal and not temporary (MMNT).	6	S-05	Supplement, Improve or Modify Analyses	The EIS contains a full analysis of the impacts of fishing gear to habitat. The SRI index provides information on impacts to biodiversity (including prey species and other components of the ecosystem) to the extent it is found in the global literature. See applicable section.	Appendix 10 of Appendix A to the EIS
165	“It is important that all available studies and sources of information are included in the EIS, regardless of whether or not they are considered useful for the SRI”	11	S-05	No change to FEIS	NMFS agrees. The Risk Assessment includes a complete literature review of global literature that was utilized in the analysis.	Appendix A
166	“the sensitivity values do not incorporate the relationship between fishing impacts and depth.”	12	S-05	Supplement, Improve or Modify Analyses	NMFS acknowledges the general lack of information on the relation between fishing impacts and depth, however notes that the information available has been fully explored in the EIS. In addition the FEIS has been updated with a final preferred alternative that would protect habitat across a wide range of depths to account for this lack of information. Please see applicable section(s).	2.7, Appendix 10 of Appendix A
167	“Finally, the SRI does not consider the issue of fishing intensity or frequency of disturbance of the bottom by fishing gear.”	12	S-05	Supplement, Improve or Modify Analyses	The SRI was designed as an index of the sensitivity of specific habitat types and associated recovery times. The issues of fishing intensity and frequency of disturbance were fully assessed however in the fishing impacts model to which the SRI is an input. A complete and thorough discussion is contained in the document and appendices. See applicable section(s).	2.5, Section 4 of Appendix A
168	Postpone adoption of groundfish EFH so coastal communities/fishing industry can fully engage in discussion with NMFS and Environmental NGO's.	2	G-18	No change to FEIS	NMFS disagrees that a postponement is necessary. The Council process incorporates representatives of affected states and communities. To the extent that communities interests were not represented, they are encouraged to provide public comment on the expected forthcoming FMP Amendment and Proposed Rule to implement the final preferred alternative.	N/A
169	All of the above facts lead to a feeling of lack of empowerment and even distrust of the process that is not conducive to a positive collaborative process.	general	G-18	No change to FEIS	NMFS notes that the PFMC process is designed to be an open and transparent process with participation by members of the public. After the DEIS was published, meetings were held on the West coast with communities that were likely to be impacted by EFH impact minimization alternatives. The reason these meetings were held in local communities was to encourage participation by residents of coastal communities by making the meetings easily accessible and inexpensive to travel to. Please see applicable section(s).	1.7

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
170	Extend timeline for EFH so that coastal communities/fishing industry can fully engage in discussion with NMFS and environmentalists	general	G-18	No change to FEIS	NMFS notes that it does not have legal discretion to change the timeline. A description of the relevant mandates is contained in the EIS. See applicable section(s).	1.1, 1.7
171	A feeling of disappointment with respect to public comment process in general and certain aspects of the trawl buyback program specifically. Two buyback boats are in arrears to the City. Reallocation of quotas hasn't happened as we felt promised	general	G-18	Supplement, Improve or Modify Analyses	NMFS, the Council, and State fisheries agencies conducted an outreach effort and provided for extensive public comment as evidenced by the large number of comments received. The effects of the buyback program are included in the description of the affected environment, and considered as part of practicability and cumulative effects.	3, 4, Appendix J
172	EIS should describe all efforts made to inform all low income and minority communities about proposed action and potential impacts it will have on their communities. How were these groups specifically targeted?	9	S-01	No change to FEIS	Section 1.7 describes the process that was followed in development of this EIS. After the DEIS was published, NMFS worked with stakeholders to participate in meetings in coastal communities that were likely to be impacted by EFH impact minimization alternatives. In addition, the PFMC process utilizes advisory bodies which have representative seats for groups of stakeholders. Section 3.9.4.5 details the process and results of identifying Minority and Low Income Communities and Addressing Environmental Justice. Please see applicable sections.	1.7, 3.9.4.5
173	Lack of Federally sponsored public education on the Alternatives	2	S-07, G-18	No change to FEIS	NMFS believes the public outreach for the EIS has been extensive and sufficient. The PFMC process is designed to be an open and transparent process with participation by members of the public. After the DEIS was published, meetings were held on the West coast with communities that were likely to be impacted by EFH impact minimization alternatives. Meetings were held in local communities to encourage participation by residents of coastal communities. For more information, see applicable section(s).	1.7
174	More effort should have been made to communicate the short and long term impacts on fisheries and coastal communities of these alternatives.	1	S-11	No change to FEIS	NMFS notes the Council system is designed to incorporate stakeholder representation. In addition, after the DEIS was published, meetings were held on the West coast with communities that were likely to be impacted by EFH impact minimization alternatives. NMFS has used available quantitative and qualitative information to describe impacts to communities, however available data limits the ability to analyze impacts to communities and efforts are underway to expand our knowledge of fishing-dependent communities.	N/A
175	Final designation of EFH should be based on maps that include the most recent information from multiple sampling sources.	7	S-12	Supplement, Improve or Modify Analyses	The FEIS has been updated to include a final preferred alternative for EFH description that relies on the best available information. Appropriate updates have been made from the DEIS and are described in the FEIS. See applicable section.	2.7, Appendix D

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
176	Area from Santa Barbara Point to Pitas Point from 1-2 miles offshore is predominantly soft mud bottom, NOT gravel bottom.	2	S-15	Acknowledge	NMFS used the best available information but acknowledges uncertainties where they exist. Underlying data can be updated for the 5-year EFH review process. A full description of data uncertainty is contained in the FEIS. See applicable section.	Section 5.3 of Appendix A
177	Areas noted in the DEIS as gravelly or rocky bottom are grossly inaccurate for the SCB. This information disconnect should be corrected (Southern California Trawlers Assn. is available for consultation)	2	S-15	No change to FEIS	NMFS used the best available information but acknowledges uncertainties where they exist. Underlying data can be updated for the 5-year EFH review process. A full description of data uncertainty is contained in the FEIS and was considered prior to selecting the final preferred alternative. See applicable section.	Section 5.3 of Appendix A
178	Discussion in Alternative [C.] 12 lacks any of the habitat typing specificity readily available from the CINMS website. This results in erroneous assumptions.	2	S-15	No change to FEIS	The habitat classification scheme (habitat typing) utilized for this analysis was developed specifically for this EIS and does not track exactly to other systems such as that described on the CINMS website. NMFS disagrees this is a weakness. Conversely, it is a strength because the classification scheme tracks specifically to the FMP species which are the subject of the EIS. To the extent that erroneous assumptions are possible, a full discussion of data uncertainty is included in the EIS. See applicable section.	Section 5.3 of Appendix A
179	Provide approximate coordinate points for potential closed areas, especially for complex impacts minimization alternatives (C.12-C.14)	2	S-07	Supplement, Improve or Modify Analyses	NMFS agrees. Coordinates are expected to be published in a proposed rule to implement appropriate components of the final preferred alternative.	2.7
180	There is a comparable mismatch between the general text description of areas potentially closed to fishing by one or more gear types, the depiction of these areas in figures of EIS Chapter 2, and the very detailed estimates of proportion of substrate type or habitat area protected in the habitat tables of Chapter 4. (go on to suggest adding coordinate point to clarify)	2	S-07	Supplement, Improve or Modify Analyses	More detailed maps of the preferred alternative for impacts minimization have been developed for the Final EIS. In addition, the precise coordinates for each of these closures are available on the Northwest Region's website and as part of the Proposed Rule.	4.1.2.1
181	Better to more closely match the geographic scales of habitat feature distribution and fishing activity.	2	S-07	No change to FEIS	NMFS agrees. Unfortunately, existing data do not support trawl information at same scale as habitat data. The data were considered together in a GIS analysis that incorporated issues of scale. See applicable section(s).	App. A, Ch. 3
182	Unclear which areas are open/closed to trawling in the western Santa Barbara Channel.	2	S-15	No change to FEIS	NMFS disagrees the information is unclear. The alternatives are presented in the EIS in mapped form that show the precise areas that would be affected. See applicable sections.	Ch. 2

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
183	"The Fisheries Service must implement all practicable measures to minimize adverse effects on EFH and must fully explore and evaluate those options in its EIS."	2	S-05	Supplement, Improve or Modify Analyses	NMFS notes that the FEIS has been updated with a final preferred alternative that addresses the requirement to minimize adverse effects to EFH from fishing to the extent practicable. See applicable section(s).	2.7, Appendix J
184	NMFS provides no guidance about which adverse effects of fishing on EFH must be minimized, despite clear evidence that there are negative effects of fishing on EFH that is more than MMNT, therefore minimization is required. (pg. 2-12 - 2-13, 4-2)	6	S-05	Supplement, Improve or Modify Analyses	NMFS formulated this analysis using the best available scientific information and, at this point, there is no conclusive evidence that adverse effects have occurred or are occurring. The FEIS has been updated to include a final preferred alternative that includes measures to minimize adverse effects to EFH. The ROD that will follow the FEIS will include NMFS final determination of what actions within NMFS authority are necessary to comply with the mandate to minimize adverse effects that are than more than minimal and not temporary. See applicable section(s).	2.5.1, 2.7
185	The agency must include qualitative analysis in addition to its sensitivity and recovery index that considers all of the best available science pertaining to prey species and their habitat and other important ecosystem components not captured by the SRI model in order to evaluate impacts more than minimal and not temporary (MMNT).	6	S-05	Supplement, Improve or Modify Analyses	The EIS contains a full analysis of the impacts of fishing gear to habitat including thorough quantitative and qualitative analyses of fishing effects on habitat to the extent that it is possible given available information. The SRI index provides information on impacts to biodiversity (including prey species and other components of the ecosystem) to the extent it is found in the global literature. See applicable section.	Appendices 8 and 10 of Appendix A to the EIS
186	The description of the development of the alternatives should be revised to clearly state the definition of adverse impacts and that the tools necessary to identify and minimize the adverse effects of fishing gears on EFH are contained within the EIS as opposed to couching the alternatives as "precautionary" by using a groundfish production and quantifiable impacts standard.	9	S-05	Supplement, Improve or Modify Analyses	The best available information does not allow for a geographically explicit conclusion regarding an MMNT threshold and therefore, it was not included in the DEIS. A full discussion of this limitation is presented in the rationale for alternatives and the Risk Assessment. To overcome this data gap, all the best available information was presented in the DEIS as a tool for decisionmaking that provides the basis for the final preferred alternative. Please see applicable section(s).	2.5.1, 2.7, Appendix A

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
187	"These minimal and temporary thresholds are arbitrary. In the absence of evidence that can demonstrate that these values do in fact equate to minimal and temporary, the proper standard should be values of 0 for sensitivity and recovery in the SRI." (page 13, paragraph 1)	13	S-05	No change to FEIS	The MMNT standard is not arbitrary and is explained in the preamble to the EFH regulations. Second, for groundfish EFH, the best available information does not allow for a geographically explicit conclusion regarding an MMNT threshold and therefore, it was not included in the DEIS. To overcome this data gap, all the best available information was used in considering the environmental consequences of the alternatives and the practicability of the alternatives . There is no basis to use a SRI of 0 instead of the MMNT threshold.	N/A
188	Define MMTT (MM Temporary Threshold).	13	S-05	Supplement, Improve or Modify Analyses	The best available information does not allow for a geographically explicit conclusion regarding an MMNT threshold and therefore, it was not included in the DEIS. A full discussion of this limitation is presented in the rationale for alternatives and the Risk Assessment. To overcome this data gap, all the best available information was presented in the DEIS as a tool for decisionmaking, please see applicable section(s).	2.5.1, 2.7, Appendix A
189	The EIS needs to provide additional information in its analysis in order to improve the precision of its EFH model, such as coral and sponge records.	3	S-05	No change to FEIS	The information used in the EIS to support decisionmaking represents the best available information. A complete description of the information used in the EFH model, why it represents the best available information, and data gaps, is described in the FEIS and appendices. See applicable sections.	2.3, Appendix A
190	We support expanding the logbook, vessel monitoring system (VMS) and research reserve programs, and also increasing observer coverage and manned and remote sensing devices that are nondestructive to marine habitats (which were not in the original alternatives).	general	S-01	Supplement, Improve or Modify Analyses	NMFS agrees with the need for additional monitoring and research. The FEIS has been updated with a final preferred alternative that includes research and monitoring components. See applicable section(s).	2.7
191	Establish a network of marine reserves	1, 1	G-15, G-21	Supplement, Improve or Modify Analyses	The FEIS has been updated to include a final preferred alternative that does not include marine reserves, but does contains areas that are closed to certain fishing activities. See applicable section.	2.7
192	We strongly encourage the PFMC to include a network of research reserves in its effort to designate, protect and understand present and future EFH.	5	S-14	Supplement, Improve or Modify Analyses	NMFS notes that the FEIS has been updated to include a final preferred alternative that contains a network of marine protected areas and research and monitoring components. See applicable section.	2.7
193	Include Fishermen's Marketing Association proposal to protect EFH while minimizing impacts to the trawl fishery as an alternative.	general	G-02	Supplement, Improve or Modify Analyses	NMFS notes that, while it is not included as a formal alternative, an comparison of proposal to the final preferred alternative is included in the FEIS. In addition, the Council considered the proposal during the development of the final preferred alternative. See applicable section.	2.7.3.2.2

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
194	There should be a defined alternative for insuring the fishing heritage of each port by adaptively managing the fisheries with experimental zone harvest policies with no take representative habitat heritage reserves as monitoring control sites.	general	S-04	No change to FEIS	NMFS disagrees that another alternative is required. The DEIS analyzed a reasonable range of alternatives and their consequences on the human environment.	N/A
195	Range of alternatives (1): While the agency and Council clearly may consider alternatives refined in response to public comment, and refine or combine alternatives in response to public comments, the Fisheries Service may not consider or adopt any alternate proposals not included within the range of alternatives presented within the DEIS absent full NEPA review.	2	S-05	Supplement, Improve or Modify Analyses	The final preferred Alternative is within the range of alternatives described in the DEIS. The EFH identification and description preferred alternative incorporates Alternative A.2. The HAPC designation preferred alternative incorporates Alternatives B.2, B.3, B.4, and B.6, and a subset of the areas of interest described in Alternative B.7 and the oil production platforms described in Alternative B.8. Alternative B.9, process for new HAPC designations, was adopted with a modification to allow review of existing designations. [RESPONSE CONTINUED BELOW]	2.7
196	Range of alternatives (1): While the agency and Council clearly may consider alternatives refined in response to public comment, and refine or combine alternatives in response to public comments, the Fisheries Service may not consider or adopt any alternate proposals not included within the range of alternatives presented within the DEIS absent full NEPA review.	2	S-05	Supplement, Improve or Modify Analyses	[RESPONSE CONTINUED] The minimization measures preferred alternative incorporates modifications of alternatives including; Alternative C.2, applying footrope restrictions, C.4, closing deepwater areas to trawling, Alternative C.10, Central California no-trawl zones, and Alternatives C.12, C.13, and C.14, which close areas to different gear types. Based on public comment, the number and configuration of areas adopted from C.12, C.13, and C.14 were modified, but the resulting impacts are within the range predicted in the DEIS. Research and monitoring alternatives were adopted at an advisory level with the idea that these measures will be adopted as part of ongoing programs, subject to broad priorities.	2.7
197	Fishery managers should use simple tools to regulate the groundfishery, i.e. seasonal closures, size limits on the nearshore, quotas, gear modifications, mammal population controls, etc.	1	G-13	Supplement, Improve or Modify Analyses	NMFS notes that the FEIS has been updated to include a final preferred alternative that includes fishery management measures. See applicable section.	1.6.4, 2.7

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
198	We support expanding the logbook, vessel monitoring system (VMS) and research reserve programs, and also increasing observer coverage and manned and remote sensing devices that are nondestructive to marine habitats (which were not in the original alternatives).	general	S-01	Supplement, Improve or Modify Analyses	NMFS agrees with the need for additional monitoring and research. The FEIS has been updated with a final preferred alternative that includes research and monitoring components. See applicable section(s).	2.7
199	There should be an alternative for insuring the fishing heritage of each port thru adaptive management, i.e. experimental zonal harvest policies conducted w/no-take representative habitat as a control (Key elements to proposal are listed in the comment letter).	2	S-04	Supplement, Improve or Modify Analyses	The commenter describes a proposal with a variety of elements that was not included during scoping for the DEIS, which would make it difficult for the Council to consider the proposal as part of their final action. Many of the elements are beyond the scope of the proposed action. However, these could be implemented separately as part of ongoing programs, depending on agency priorities. (For example, the NMFS NWFSC has an ongoing project to develop socioeconomic profiles of West Coast ports.) Groundfish management has assumed a strong spatial element in response to the bycatch of overfished species with the implementation of GCAs, which will be increased through the implementation of EFH closed areas. This may in part address the commenter's recommendation for "zonal harvest policies." The final preferred Alternative includes support for coordinating research efforts through the identification of research areas, which allow experimental designs with treatment (i.e., fishing) and control (i.e., nonfishing) sites. Please see preferred alternative.	2.7
200	No alternative considers reduced harvest limits as a means of minimizing adverse effects to EFH. DEIS also fails to give basis to omit this from consideration. Effort reduction is a reasonable management tool that NMFS must add to its suite of minimization measures under consideration.	7	S-05	Supplement, Improve or Modify Analyses	NMFS disagrees that a reduction in harvest limits is an effective tool for minimizing adverse effects to EFH unless such limits are accompanied by a decrease in fishing effort on sensitive habitat. To that end, an alternative to reduce fishing effort was included in the DEIS. The FEIS has been updated with a final preferred alternative that incorporates appropriate components of the effort reduction alternative. Please see applicable section(s).	2.5.2, 2.7
201	The EIS should have more consideration and analysis of other management measures that will reduce the risks to EFH. (see comment letter for list of actions starting on page 2, ending on page 4). Request the actions are combined into a new alternative and analyzed in the FEIS.	3	S-15	No change to FEIS	NMFS disagrees additional alternatives (management measures) are necessary. The EIS contains a reasonable range of alternatives that were developed in an open and transparent process. The FEIS has been updated to include a final preferred alternative and analysis of how it reduces risks to EFH. See applicable section.	2.7, 4.1

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202	Since 1994 75% of trawl effort has been removed by limited entry permit retirement, vessel buyback program and migration of part of the fleet to Alaska. This along with changes in fishing practices has significantly reduced fishing effects. For this reason no new mitigation measures are necessary.	1	S-27	No change to FEIS	New mitigation measures are necessary to comply with provisions in the Magnuson-Stevens Fishery Conservation and Management Act (MSA), requiring that FMP's include a comprehensive strategy to conserve EFH, including its identification and the implementation of measures to minimize adverse impacts to EFH from fishing, to the extent practicable. For additional information, please see applicable section(s).	1.3, 1.5, 1.6.4
203	Logbooks and VMS should be addressed in the normal regulatory process.	2	S-27	Supplement, Improve or Modify Analyses	The final preferred Alternative incorporates elements of the research and monitoring alternatives that will be implemented through other, ongoing processes. A specific example is the expansion of VMS currently being evaluated under a separate NEPA process. As part of their preferred alternative, the Council directed that the environmental assessment for this action consider expansion to bottom trawl vessels other than those participating in the limited entry groundfish fishery.	2.7
204	Modify alt. B.8 to address concerns of oil platforms. Need to analyze both pluses and minuses. Update and add citations.	general	S-01	Supplement, Improve or Modify Analyses	NMFS has clarified language and presented both views so that they are available to decisionmakers. Please see applicable section(s).	3.2.2.2.4, 4.3.3
205	We use “platform reefs” (in reference to oil platforms) to emphasize the need for decision-makers to consider the habitat value of the underwater portion of the platform structure, and that both future groundfish fishery management and platform decommissioning decisions should consider their potential impact on the habitat that the platform reefs provide.	1	S-03	Acknowledge / No change to FEIS	NMFS finds the term "platform reefs" somewhat misleading when discussing HAPC designation. HAPC designation does not create a reefing program.	N/A

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
206	A careful, thorough and balanced analysis of potential positive and negative consequences associated with this alternative is essential to enable decision-makers to make informed decisions among the alternatives. The Final EIS should acknowledge and evaluate the environmental consequences of the decision whether or not to adopt Alternative B.8	1	S-03	Supplement, Improve or Modify Analyses	NMFS agrees that assessment of environmental consequences of designating oil platform habitat as HAPC deserves careful consideration . The FEIS has been updated to more fully inform the reader. Please see applicable section(s).	2.4, 3.2.2.2.4, 4.3.3
207	The Final EIS should acknowledge and evaluate the environmental consequences of the decision whether or not to adopt Alternative B.8 based on the information discussed in these (CARE) comments.	1	S-03	Supplement, Improve or Modify Analyses	NMFS agrees that assessment of environmental consequences of designating oil platform habitat as HAPC deserves full and fair consideration. The FEIS has been updated to more fully inform the reader. Please see applicable section(s).	4.3.3
208	Cross-reference "oil rig as habitat" discussion on p.2-10 and p.3-8 - 3-10 with the discussion in Chapter 4	2	S-03	Made Factual Corrections	Cross references to discussion in chapters 1 and 2 have been added within the chapter 4 text. Please see applicable section(s).	2.4, 3.2.2.2.4, 4.3.3
209	"We are very disappointed with the lack of attention in the "Environmental Consequences" analysis to the scientific evidence supporting the important ecological role of platform reefs and the need for their protection….. The Final EIS must be revised to take into account the information presented in our prior comments and in these comments in order to present an unbiased basis for decision-making."	2	S-03	Supplement, Improve or Modify Analyses	NMFS agrees that assessment of environmental consequences of designating oil platform habitat as HAPC deserves full and fair consideration . The FEIS has been updated to more fully inform the reader. Please see applicable section(s).	4.3.3
210	Inclusion of information on groundfish populations at platform reefs in the "Alternatives" and "Affected Environment" sections is not an adequate substitute for full and fair consideration of this information in the evaluation of environmental consequences.	2	S-03	Supplement, Improve or Modify Analyses	NMFS agrees that assessment of environmental consequences of designating oil platform habitat as HAPC deserves full and fair consideration . The FEIS has been updated to more fully inform the reader. Please see applicable section(s).	4.3.3

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
211	The Final EIS should acknowledge and evaluate these environmental consequences of Alternative A.6 on limiting the designation of some oil platforms as HAPC.	3	S-03	Supplement, Improve or Modify Analyses	The environmental consequences of limiting the designation of oil platforms as HAPC is discussed in Chapter 4 of the FEIS. The FEIS has been updated to more fully inform the reader. Please see applicable section(s).	4.2.3, 4.3.3
212	The analysis presented of environmental consequences is inadequate by failing to take into account the “one-way” nature of those consequences: If HAPC designation indirectly leads to any adverse consequences from the presence of the platform reefs, those consequences can be addressed in future decisions. If lack of HAPC designation indirectly leads to adverse consequences from elimination of the platform reefs, they and their existing groundfish populations cannot be restored.	3	S-03	Supplement, Improve or Modify Analyses	NMFS agrees that there are 'one way' consequences of platform removal. The HAPC designation would not in and of itself affect decommissioning. Such a designation only ensures that issues associated with groundfish habitat are fully explored before decommissioning can occur. The FEIS has been updated to more fully inform the reader. Please see preferred alternative and applicable section(s).	4.3.3
213	The one-sided discussion on DEIS p. 4-13 (re oil platforms) fails "to provide the Council and NMFS with the information they need to better account for the function of Pacific Coast groundfish EFH when making fishery management decisions" as stated in the purpose and need.	3	S-03	Supplement, Improve or Modify Analyses	NMFS agrees that assessment of environmental consequences of designating oil platform habitat as HAPC deserves full and fair consideration . The FEIS has been updated to more fully inform the reader. Please see applicable section(s).	4.3.3
214	Only in the analysis of alternative B.8 is the “lack of conclusive research” cited as an objection to HAPC designation. Any scientific uncertainties should be a basis for conservative assumptions in favor of protecting platform reefs.	4	S-03	Supplement, Improve or Modify Analyses	NMFS agrees. The FEIS has been updated to more fully inform the reader. Please see preferred alternative and applicable section(s).	2.7, 4.3.3

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
215	Concerns were raised during the Council meeting that designating platform reefs as HAPC would set a precedent that would allow discarded articles, such as furniture, oil cans and sunken boats to be left in the ocean as artificial reefs. This is not the case.	5	S-03	Acknowledge	Although the concern was raised during the Councils deliberation, the Council did not reject designation of oil platforms as HAPC because of concerns that it would allow discarded articles to be left in the ocean as artificial reefs. See preferred alternative.	N/A
216	To the extent that concerns raised by Council members at the November 2004 Council meeting may be considered in evaluating the alternative, they should be disclosed to the public readers of the EIS and addressed in its analysis.	5	S-03	Supplement, Improve or Modify Analyses	Concerns raised at the November 2004 Council meeting were considered in evaluating alternative B.8 and in crafting the preferred alternative. Briefing books, agendas and other information regarding PFMC meetings can be obtained from the Council website (www.pcouncil.org) or by contacting the Council directly.	2.7
217	The “motives” of those who advocate designating platform reefs as HAPC are irrelevant. The only relevant issue is whether a suggested course of action conserves and enhances EFH and assists in the recovery of fish populations.	5	S-03	Supplement, Improve or Modify Analyses	NMFS notes that although the concern was raised during the Councils deliberation, the Council did not reject designation of oil platforms as HAPC due to the motivation behind advocates for designating oil platforms as HAPC. See preferred alternative.	2.7
218	The Council raised a concern with Alternative B.8 as to whether “man-made” habitat should be preferred over “natural” habitat in EFH and HAPC designations. To reject platform reefs as HAPC for the reason that they are artificial would be inconsistent with the EFH regulations and the purposes of the Magnuson-Stevens Act.	6	S-03	Supplement, Improve or Modify Analyses	Although the concern was raised during the Councils deliberation, the Council did not reject designation of oil platforms as HAPC because of concerns that it would allow discarded articles to be left in the ocean as artificial reefs. The FEIS has been updated with a final preferred alternative that would designate oil platforms as HAPC. See preferred alternative.	2.7
219	In order to fully inform the decision makers and the public of the alternatives being considered, the DEIS should clearly state which platform reefs would be included in and excluded from the area identified as EFH under Alternative A.6.	6	S-03	Supplement, Improve or Modify Analyses	NMFS agrees. A new table has been added and the FEIS has been updated to more fully inform the reader. Please see applicable section(s), table(s), and figure(s).	Table 2-1, Figure 2-13, 4.2.3, Figure 4-8

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220	The "uniqueness" of the platform reef habitat should be emphasized and considered in evaluating the environmental consequences of designating platform reefs as HAPC.	7	S-03	Acknowledge	"Rarity of the habitat type" is one of the considerations for designating areas as HAPC, however NMFS feels that 50 CFR 600.815 (a)(8)(i), ecological importance, is the most appropriate consideration to designate HAPC under this alternative. Please see applicable section(s).	3.2.2.2.4
221	High concentrations of groundfish are associated with platform reefs, including overfished species. These facts must be considered in evaluating the environmental consequences of designating platform reefs as HAPC and provide support for the environmental benefits of Alternative B.8.	7	S-03	Supplement, Improve or Modify Analyses	NMFS agrees that there is evidence of high concentrations of groundfish at oil platforms. The FEIS has been updated to more fully inform the reader. Please see applicable section(s).	3.2.2.2.4, 4.3.3
222	The DEIS states that Alternative B.8 was developed to be consistent with 50 CFR § 600.815(a)(8)(i), but does not explain the reasoning behind this statement.	8	S-03	supplement, Improve or Modify Analyses	The FEIS has been updated to provide additional rationale for the justification of this alternative under 50 CFR 600.815 (a)(8)(i). Please see applicable section(s).	2.4, 4.3.3
223	Expand the environmental consequences analysis in chapter 4 regarding the importance of ecological function provided by habitat (see details in CARE comment letter, Specific Comment 11, Page 8)	8	S-03	Supplement, Improve or Modify Analyses	The FEIS has been updated to indicate that NMFS agrees there is evidence that oil platforms provide important ecological functions. Please see applicable section(s).	3.2.2.2.4, 4.3.3
224	Platform reefs provide important ecological functions that must be addressed in the environmental consequences analysis of the Final EIS	8	S-03	Supplement, Improve or Modify Analyses	NMFS agrees that there is evidence that oil platforms provide important ecological functions. Please see applicable section(s).	3.2.2.2.4, 4.3.3

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225	The DEIS's understatement of the number of managed species that utilize platform reefs as habitat reflects the failure to rely on the best available scientific information on the habitat value of platform reefs. List of 31 managed species known to use offshore artificial structures is understated. Annual surveys indicate 42 species have been ID'd around platform reefs.	9	S-03	Made Factual Corrections	NMFS acknowledges that the list of species associated with oil platforms was incomplete, however it was not intended to be an exhaustive list. It should also be noted that the 42 species identified around oil platforms are not all managed under the Groundfish FMP, and so fall outside the scope of this EIS. Please see applicable section(s).	3.2.2.2.4
226	Analysis in section 2.4 (page 2-10) should state that Alt. B.8 is consistent with [50 CFR 600.815 (a)(8)(ii)], i.e. that "Platform reefs are sensitive to human-induced environmental degradation by removal of the structures"	9	S-03	supplement, Improve or Modify Analyses	The FEIS has been updated to provide additional rationale for the justification of this alternative under 50 CFR 600.815 (a)(8)(i). Please see applicable section(s).	2.4
227	The DEIS does not mention the fact that the current platform decommissioning regulations require complete removal of the platforms.	9	S-03	Supplement, Improve or Modify Analyses	The FEIS has been updated to discuss the decommissioning process. Please see applicable section(s).	4.3.3
228	"... to reject platform reefs as HAPC for the reason that they are artificial would be inconsistent with the EFH regulations and the purposes of the Magnuson-Stevens Act."	12	S-03	Supplement, Improve or Modify Analyses	Oil platforms were not rejected as HAPC for the reason that they are artificial. The FEIS has been updated with a final preferred alternative that would designate oil platforms as HAPC. For complete discussion on oil platforms, please see the preferred alternative and applicable section(s).	2.7, 3.2.2.2.4, 4.3.3
229	"It appears that these personal communications relied solely on Holbrook (2000) ... to support their assertions. To the extent that the Final EIS relies on these personal communications, it should explain the qualifications of the persons cited and identify any supporting evidence for their statements."	12	S-03	Supplement, Improve or Modify Analyses	Concerns raised by Mr. Charter and Mr. Chabot during public scoping are restated in Section 4.3.3 as a personal communication. Information on personal communications can be found in Chapter 10. For additional analysis and updated text, please see applicable section(s).	4.3.3, 10

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
230	Contradicting statements need clarification: artificial reefs could attract increased fishing effort or act as defacto marine refuges. CARE argues that physical platform structure restricts fishing gear, and that the Coast Guard restricts access.	13	S-03	Supplement, Improve or Modify Analyses	The FEIS has been updated to clarify contradicting language. Please see applicable section(s).	2.4, 4.3.3
231	CARE does not support speculation that HAPC designation of oil platforms would prevent restoration of SOFT-BOTTOM hiding places, since soft-bottom have none to begin with. This should be mentioned as an exception to what was published in the DEIS. Comments directed to page 4-13 of the DEIS. NOTE: Love (2003) states that platform reefs create hard bottom habitat in areas that are primarily soft-bottom habitat.	13	S-03	Supplement, Improve or Modify Analyses	NMFS agrees that restoration of natural, soft-bottom, habitat would not be likely to also create hiding places for groundfish and that the underlying concern of preventing the return of platform areas to natural habitat is a legitimate one and has updated the FEIS to present this information to the decisionmaker. Please see applicable sections.	4.3.3
232	Designation of platform reefs as HAPC would not increase the potential hazards to navigation, no formal complaints have been made etc.	14	S-03	Supplement, Improve or Modify Analyses	NMFS agrees that HAPC designation will not directly affect potential hazards to navigation. Please see applicable section(s).	4.3.3
233	"To the extent that the Final EIS relies on his assertions, it should explain Mr. Charter's qualifications and any supporting evidence for his statement."	13, 14-15	S-03	Made Factual Corrections	Concerns raised by Mr. Charter during public scoping are restated in Section 4.3.3 as a personal communication. Information on Mr. Charter can be found in Chapter 10. NMFS found no published scientific studies on mercury contamination of oil and gas platforms off of the Southern California Coast to either support or contradict Mr. Charters concerns. For additional analysis and updated text, please see applicable section(s).	4.3.3, 10
234	CARE does not support claim that platform reefs could increase predation: fish assemblages are distributed differently, physically separating adults (predators) and juveniles (prey); other natural predators do not appear to be attracted (Love 2005, personal communication). The DEIS gave no contradicting evidence to these points.	13-14	S-03	Supplement, Improve or Modify Analyses	NMFS agrees that there is scientific evidence suggesting age-depth stratification at oil platforms. However that the underlying concern of the potential for attraction of natural predators to aggregates of fishes around platforms is a legitimate one. The FEIS has been updated to address these concerns. Please see applicable section(s).	4.3.3

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
235	No scientific evidence cited as basis for assertions of increased mercury levels in fish populations residing at oil platforms.	14-15	S-03	Supplement, Improve or Modify Analyses	NMFS agrees that there is little direct scientific evidence for mercury contamination in fish surrounding oil platforms. However, the underlying concern of the potential for contamination is a legitimate one. Please see applicable sections.	4.3.3
236	Consider how platforms would qualify as HAPC under 50 CFR 600.815 (a)(8)(iii) due to environmental consequences of complete removal of platforms as they are decommissioned .	8, 9	S-03	Supplement, Improve or Modify Analyses	NMFS feels that 50 CFR 600.815 (a)(8)(i) is the most appropriate consideration to designate HAPC under this alternative. Please see applicable section(s).	2.4, 4.3.3
237	The Final EIS should acknowledge and evaluate the environmental consequences of the decision whether or not to adopt Alternative B.8 based on the information discussed in these (CARE) comments.	general	S-03	Supplement, Improve or Modify Analyses	NMFS has taken all of your comments into consideration. Please see the preferred alternative and applicable sections.	2.4, 2.7, 3.2.2.2.4, 4.3.3
238	The EIS should consider decommissioning of oil reefs which will kill fishes in the vicinity when the explosives are detonated.	general	S-03	Supplement, Improve or Modify Analyses	NMFS disagrees. The decommissioning process is not within NMFS authority and so outside the scope of this EIS. The FEIS has been updated to better describe the relationship of designating oil platforms as HAPC and the decommissioning process, including the generic consequences of HAPC designations. See applicable sections	4.3.1, 4.3.3
239	The Final EIS should acknowledge and evaluate these environmental consequences of Alternative A.6, which would not include some platform reefs.	general	S-03	Supplement, Improve or Modify Analyses	The environmental consequences of limiting the designation of oil platforms as HAPC is discussed in Chapter 4 of the FEIS. The FEIS has been updated to more fully inform the reader. Please see applicable section(s).	4.2, 4.3.3
240	The EIS should include a review of studies quantifying the benefits of previous area closures.	general	S-02.3	Supplement, Improve or Modify Analyses	NMFS agrees. The FEIS has been updated with additional information specifically related to the practicability of the final preferred alternative. See applicable sections.	4.7, 4.8, Appendix J
241	With respect to long-term ecological costs of failing to protect habitat, any analysis of practicability must include a discussion of the long-term ecological costs and benefits of habitat protection.	general	S-02.3	Supplement, Improve or Modify Analyses	The FEIS has been updated to provide additional information on the practicability of the final preferred alternative. See applicable section.	Appendix J

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
242	Manage and make these (EFH) decisions on a precautionary principle.	2, 2	G-08, G-10	Acknowledge	NMFS has used the precautionary principle in its rationale for the alternatives. For references to NMFS' use of precautionary approaches, please see applicable section(s).	1.6.3, 2.3.1, 2.4, 2.5.1.1, 2.5.2, 2.7, 4.1.1.3, 4.1.1.5, 4.4.8, Appendix J
243	Apply "precautionary management principles" in all cases where information needed for decision making is unavailable.	general	G-15	Acknowledge	NMFS has used the precautionary principle in its rationale for the alternatives. For references to NMFS' use of precautionary approaches, please see applicable section(s).	1.6.3, 2.3.1, 2.4, 2.5.1.1, 2.5.2, 2.7, 4.1.1.3, 4.1.1.5, 4.4.8, Appendix J
244	We urge that management of groundfish on the Pacific coast be governed by the "precautionary principle."	1	G-21	Acknowledge	NMFS has used the precautionary principle in its rationale for the alternatives. For references to NMFS' use of precautionary approaches, please see applicable section(s).	1.6.3, 2.3.1, 2.4, 2.5.1.1, 2.5.2, 2.7, 4.1.1.3, 4.1.1.5, 4.4.8, Appendix J
245	We feel it is imperative for the PFMC to take a precautionary approach to management of Pacific groundfish, while we improve our limited understanding of the impacts of fishing on diverse habitats and the ability of habitats to recover from fishing impacts.	5	S-14	Acknowledge	NMFS has used the precautionary principle in its rationale for the alternatives. For references to NMFS' use of precautionary approaches, please see applicable section(s).	1.6.3, 2.3.1, 2.4, 2.5.1.1, 2.5.2, 2.7, 4.1.1.3, 4.1.1.5, 4.4.8, Appendix J
246	We feel it is important that all possible EFH protection measures be adopted in the near-term, rather than deferring measures for future understanding.	6	S-14	Supplement, Improve or Modify Analyses	NMFS notes that the FEIS has been updated with a final preferred alternative that includes a comprehensive suite of practicable measures to protect EFH. If appropriate, NMFS will publish a proposed rule to implement the measures as quickly as is practicable. See applicable section(s).	2.7, Appendix J

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
247	Evaluate extent to which freshwater habitat should be considered EFH due to abundance of prey species	general	S-01	No change to FEIS	Unfortunately, limited time and resources do not allow model levels of detail, such as a complete analysis of every possible component of EFH. Therefore the analysis was narrowed during public scoping. Estuaries were included in the HAPC designations for the final preferred alternative. Estuaries and prey species are addressed in the EIS. Please see applicable section(s).	2.7, 3.2.2.1, 3.3.3
248	Is incorporating krill as a Coastal Pelagic Species (CPS) in the FMP as effective as Alt. C.5? If equally protective, choose the one which could be implemented more quickly	general	S-01	Supplement, Improve or Modify Analyses	The FEIS has been updated to include a final preferred alternative. The krill harvest ban, alternative C.5, is not contained within the final preferred alternative; however, the Council chose to address krill through the CPS FMP and has initiated a process to do so. The results of that process are not final so it is not knowable at this time if it will be "more protective" or when the process will be complete. See applicable section.	2.7
249	There should be more discussion on habitat for major prey species included in the range of alternatives. If no information is available, clearly state this. Also include information on direct harm or capture (as done for krill).	9	S-05	Supplement, Improve or Modify Analyses	Other than krill, as represented in alternative C.5, the analysis of adverse effects was narrowed during scoping to focus on benthic habitats and to focus decisionmaking on those areas most likely to be at risk of impact. A complete literature review of groundfish prey species was performed however and is available in Chapter 3 and the Life Histories Appendix (see next column for appropriate section) and can be used for subsequent EFH consultations. NMFS believes that the range of alternatives is sufficient and that future proposals for protection of groundfish prey may be considered during periodic EFH reviews. Please see applicable section(s).	1.1, 2.5, Alternative C.5, 3.3.3, Appendix H
250	Sport fishing has been the lifeblood of many small communities on the Oregon coast and supports local and state economies.	1	G-07	Supplement, Improve or Modify Analyses	NMFS has used available quantitative and qualitative information to describe impacts to communities, however available data limits the ability to analyze impacts to communities and efforts are underway to expand our knowledge of fishing-dependent communities. NMFS acknowledges the importance of recreational fishing to state and local economies. Section 3.7.3 contains information on recreational fishing participation by state. Section 3.7.3.2. contains discussion on the economic impact of recreational fishing. The FEIS has been updated to include a final preferred alternative that is designed to minimize negative socioeconomic effects. See applicable section(s).	2.7, 3.7.3, Ch. 4
251	Take into account that the sport fishery has positive socioeconomic impacts and minimal environmental impacts when considering closed areas	1	G-07	No change to FEIS	Section 3.7.3.2 contains discussion on the economic impact of recreational fishing. Additional data on sport angler expenditures will be collected in 2006. The data will be used in an economic impact model to describe the contribution of the sport fishery to communities and regional economies. Appendix A, Section 2.4 contains information on the impact of various types of fishing gear. Please see applicable section(s).	2.4, 3.7.3.2, Appendix A

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
252	Ban on all bottom-contact fishing is a very severe measure. Consider sport fishing and crabbing and their lack of evidence for impact on EFH.	1, 2	G-07, G-18	Supplement, Improve or Modify Analyses	The FEIS has been updated with a final preferred alternative that bans bottom contact gear in a much smaller area than described in alternative C.14. The impacts of sport and crab fisheries have been fully considered in the EIS. Please see preferred alternative and applicable section(s).	2.7, Appendix 10 to Appendix A
253	NMFS has not fully analyzed the potential impacts on the anglers who harvest and recreate these areas	1	G-17	No change to FEIS	NMFS has used available quantitative and qualitative information to describe impacts to recreational fishers. Available data limitations constrain NMFS's ability to analyze impacts to recreational fishers. However, a new data collection effort will begin in 2006 aimed at estimating the value of fishing trips and catch to recreational anglers. The data will also be used how these values and participation rates vary due to regulatory and environmental changes.	4
254	Sportfishing needs to be discussed more because it has, in many cases, an equal or greater community impact	1	S-20	No change to FEIS	NMFS has used available quantitative and qualitative information to describe impacts to recreational fishers. However available data limits the ability to analyze impacts to recreational fishers. Please see applicable section(s).	Ch. 3
255	Identify examples of habitat types to serve as ecological benchmarks.	1	G-08	Supplement, Improve or Modify Analyses	NMFS acknowledges the concept of using specific habitat types as benchmarks in a research and monitoring plan. The FEIS has been updated to include a general research plan; however, the level of specificity requested by the commenter is beyond the scope of this analysis.	2.6, 2.7, 2.9
256	Establish reference reserves for researchers to identify fishing impacts.	general	G-08, G10	Supplement, Improve or Modify Analyses	The Council and NMFS will encourage new research on the effects of area closures on habitat recovery and the fishing industry. The FEIS has been updated to include a general research plan. Please see applicable section(s).	2.6, 2.7, 2.9
257	Include connectivity between habitat types as a criteria for designating EFH	general	G-10	Supplement, Improve or Modify Analyses	NMFS acknowledges the comment however chose not to add additional alternatives for describing EFH based on the fact that the EIS contains a full and reasonable range of alternatives. Modification of the criteria for designating EFH may be the subject of the required 5-year review of EFH descriptions.	N/A
258	A partnership of NMFS, PFMC, and Sea Grant should initiate a pilot strategic plan for habitat mapping in the California Bight.	3	S-04	Supplement, Improve or Modify Analyses	NMFS agrees that additional habitat mapping is an important part of ongoing research to fill data gaps related to groundfish EFH. A detailed research plan is outside the scope of this analysis; however, the FEIS has been updated to include a general research plan. See applicable section(s).	2.9
259	We strongly recommend intensive pre- and post-closure monitoring of any closed areas that may result from adoption of the alternatives outlined in this DEIS.	13	S-12	Acknowledge	NMFS will encourage new research on the effects of area closures on habitat recovery and the fishing industry. A specific research plan is beyond the scope of this analysis; however, the FEIS has been updated to include a general research plan. Please see applicable section(s).	2.6, 2.7, 2.9

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
260	Many of these areas on the continental shelf and slope have already been closed to fishing, some for up to 6 years. During that time there have been no efforts to evaluate if these closures were beneficial, detrimental, or neutral for fish production.	1	S-27	Supplement, Improve or Modify Analyses	NMFS acknowledges the need for additional research on the effects of area closures on habitat recovery and the fishing industry. Closures contained in the final preferred alternative may function well as research areas; however, A specific research plan is beyond the scope of this analysis; however, the FEIS has been updated to include a general research plan. Please see applicable section(s).	2.6, 2.7
261	It is premature for the Council to establish a research “reserve system” without consideration of the effectiveness of this system and its effect on fishing.	2	S-27	Supplement, Improve or Modify Analyses	NMFS disagrees that it is premature to implement fishery closures. The FEIS has been updated to include a final preferred alternative that incorporates well-reasoned management measures. See applicable section(s).	2.6, 2.7
262	NMFS must determine if action is or is not necessary to comply with section 303(a)(7) of the Magnuson Act - must be included in statement of purpose and need. May not delay consideration of decision until issuing ROD because analysis leading up to the decision needs to be incorporated into NEPA process.	2	S-05	Supplement, Improve or Modify Analyses	The FEIS has been updated to include a final preferred alternative that will be considered in the ROD and associated FMP and regulatory amendments. NMFS final decision on what is necessary to satisfy the mandate to minimize adverse effects to EFH will be detailed in the ROD and the decision documents for the FMP amendment. The FEIS is the appropriate place to consider environmental impacts of alternative but not an agencies final decision which must be detailed in the ROD. See applicable section(s).	2.7
263	NMFS must decide which alternatives best satisfy its mandate to minimize adverse effects on EFH.	2	S-05	Supplement, Improve or Modify Analyses	The FEIS has been updated to include a final preferred alternative that will be considered in the ROD and associated FMP and regulatory amendments. NMFS final decision on what is necessary to satisfy the mandate to minimize adverse effects to EFH will be detailed in the ROD and the decision documents for the FMP amendment. See applicable section(s).	2.7
264	NMFS provides no guidance about which adverse effects of fishing on EFH must be minimized, despite clear evidence that there are negative effects of fishing on EFH that is more than minimal and not temporary (MMNT), therefore minimization is required. (pg. 2-12 - 2-13, 4-2)	6	S-05	Supplement, Improve or Modify Analyses	There is no conclusive evidence that adverse effects have occurred or are occurring. The alternatives are based on a precautionary response to the inability to determine adverse effects. The FEIS has been updated to include a final preferred alternative that includes measures to minimize adverse effects to EFH. The ROD that will follow the FEIS will include NMFS final determination of what actions within NMFS authority are necessary to comply with the mandate to minimize adverse effects that are than more than minimal and not temporary. See applicable section(s).	2.5.1, 2.7
265	We find that many of the alternatives in the EFH DEIS do not comply with MSA National Standards 2 and 8.	general	S-09	Supplement, Improve or Modify Analyses	NMFS notes that the alternatives were developed to provide for a comparison of effects to facilitate decisionmaking. The FEIS has been updated to include a final preferred alternative that is intended to comply with national standards and applicable law. See applicable section.	2.7

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
266	The commenters found it confusing to have the EIS presented as a document describing the effects of conservation action on habitat when the mandate is to determine the effects of fishing on habitat.	15	S-12	No change to FEIS	NMFS regrets the confusion. The purpose of the EIS involved not only assessing the effects of fishing on EFH, but consideration of alternatives to minimize such effects, if adverse, to the extent practicable. The requirements for the contents of the EIS are described in the applicable sections.	Ch. 1
267	NMFS should expand the discussion of EO 12866 and provide additional analysis of the impacts of proposed regulations on fishing fleets, harbors, and marinas in the central California coast study area.	13	S-13	Supplement, Improve or Modify Analyses	This analysis has been expanded and is addressed in the RIR/RFA. Please see applicable section(s).	Ch. 4, Appendix J
268	EFH process should allow for both closing and reopening of areas to fishing activity	16	S-12	Supplement, Improve or Modify Analyses	NMFS agrees. The FEIS has been updated with a final preferred alternative that includes a procedural element to establish a process for evaluating the EFH measures based on the receipt of new scientific information to determine whether specific areas should be modified or eliminated or new areas implemented. See applicable sections.	2.7
269	Modify alternative B.9 to have a process for removing HAPC designation if science supporting original designation is not longer valid	general, 8, 6	S-09, S-12, S-13	Supplement, Improve or Modify Analyses	The Council incorporated this provision into its preferred alternative as part of a procedural measure that would also allow evaluation of areas closed to bottom trawl. Please see preferred alternative.	2.7
270	Please exclude Scottish seine from any fishing prohibition as it has minimal impact to groundfish EFH	general	S-22, S-23, S-25, G-04, G-05	Modified Alternative	The final preferred Alternative exempts Scottish seine from the Ecologically Important Habitat Closed Areas applicable to bottom trawl gear in waters off of California. (Currently, this gear type is only used off of California.) Scottish seine gear would be prohibited in those Ecologically Important Habitat Closed Areas closed to all bottom contact gear or all gear types. Other measures intended to minimize the adverse effects of fishing on EFH included in the final preferred Alternative (gear restrictions, effort reduction) do not affect the use of Scottish seine gear. Please see the preferred alternative.	2.7
271	There does not appear to be a human dimension to what is essential fish habitat	general	S-04	Supplement, Improve or Modify Analyses	NMFS disagrees there is a required human dimension to the description of EFH, which is a function of the biology and habitat associations of fish. NMFS notes however that the FEIS includes a section describing the socioeconomic component of the fishery is included as part of the Affected Environment chapter (Chapter 3) and that the FEIS has been updated with a final preferred alternative that was designed to minimize adverse effects to EFH while maintaining healthy socioeconomic conditions.	2.7, Ch. 3

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
272	Language in section 2.5.2 regarding "Tribal Fisheries" should be made consistent with Section 2.2 or removed altogether as section 2.2 would provide necessary exemption. (pg. 2-27)	1	S-08	Made Factual Corrections	The NMFS position on the application of the alternatives to tribal fisheries is stated in section 2.2 and is clear that the alternatives would not apply to tribal fisheries. The text in Section 2.5.2 cited by the commenter is appropriate.	2.2, 2.5.2
273	Paragraph 11, 2nd sentence reads, “In developing these trawl fisheries, the tribes . . .”. It should read, “In developing these trawl fisheries, the Makah . . .” as they are the only tribe with trawl fisheries.	1	S-08	Made Factual Corrections	Changes have been made, please refer to appropriate section(s) (next column).	3.7.2
274	Paragraph 14, change “Tribe’s” or “the Tribe” to tribes as this philosophy of sustainability is shared by all coastal tribes.	1	S-08	Made Factual Corrections	Changes have been made, please refer to appropriate section(s) (next column).	3.7.2
275	Paragraph 3, 1st sentence begins, “Twelve western Washington. . .”. This should be changed to “Thirteen”.	1	S-08	Made Factual Corrections	Changes have been made, please refer to appropriate section(s) (next column).	3.7.2
276	Section 3.7.2, “Tribal Fisheries” (p.3-164 to 168): Paragraph 2, 2nd sentence reads, “ . . .the tribes annually . . .”. For groundfish this is now biennially.	1	S-08	Made Factual Corrections	Changes have been made, please refer to appropriate section(s) (next column).	3.7.2
277	Paragraph 2, 3rd sentence reads, “ . . .occurs primarily with hook and line and pots. . .”. This should be changed to, “ . . .hook and line and trawl . . .”. Pots are for crab only (see tables 3-55 and 3-56).	1	S-08	Made Factual Corrections	Changes have been made, please refer to appropriate section(s) (next column).	3.7.2, Tables 3-56 and 3-57

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
278	Several important scientific studies of the habitat value provided by platform reefs located off of California have been published since the 1999 MMS Report…… The DEIS fails to present the best available scientific information on pp. 3 8 to 3-10, and disregards the breadth and depth of this research in concluding that there is a "lack of conclusive research" regarding these issues specifically for the West Coast.	10	S-03	Supplement, Improve or Modify Analyses	NMFS has conducted a literature review and has updated sections of the EIS with results of recent scientific research. Please see applicable section(s).	3.2.2.2.4, 4.3.3
279	"The DEIS, relying on the outdated reference to Holbrook et al., wholly fails to take into account these crucial findings in discussing the environmental consequences of Alternative B.8."	10	S-03	Supplement, Improve or Modify Analyses	NMFS has conducted a literature review and has updated sections of the EIS with results of recent scientific research. Please see applicable section(s).	3.2.2.2.4, 4.3.3
280	The DEIS, in discussing the environmental consequences of Alternative B.8 fails to take into account the crucial findings that platform reefs are important habitat for rockfish and function just as natural reefs do, in that they both produce and attract fish depending on species, site, season and ocean conditions.	10	S-03	Supplement, Improve or Modify Analyses	NMFS has conducted a literature review and has updated sections of the EIS with results of recent scientific research.	3.2.2.2.4, 4.3.3
281	The Final EIS should rely on the most up-to-date research in order to evaluate environmental consequences, and should consider the 7 findings identified by CARE (pp. 11-12) from Love et al. (2003) and Love (2005) with respect to as to the habitat value of platform reefs.	11	S-03	Supplement, Improve or Modify Analyses	NMFS has conducted a literature review and has updated sections of the EIS with results of recent scientific research. Please see applicable section(s).	3.2.2.2.4, 4.3.3

Comment ID #	Comment	Page of Comment letter	Commenter ID	Response	Rationale for response	Applicable Chapter/ Section(s)
282	“In sum, the uncertainty as to the habitat value of platform reefs discussed in Holbrook (2000) has been rebutted by more recent research.…the Final EIS should rely on the most up-to-date research in order to evaluate environmental consequences, and should consider each of the above findings.”	12	S-03	Supplement, Improve or Modify Analyses	NMFS has conducted a literature review and has updated sections of the EIS with results of recent scientific research. Please see applicable section(s).	3.2.2.2.4, 4.3.3

11.3 Public Comment Letters

Table 11-2: Public Comments Received

Comment	Source	Signed By	File Type	Comments
S-1	EPA	Reichgott	**Comment**	
S-2	Oceana	Jim Ayers	**Comment**	Oceana provided 6 Attachments, listed below
S-2.1	~	~	Attachment	
S-2.2	~	~	Attachment	
S-2.3	~	~	Attachment	
S-2.4	~	~	Attachment	
S-2.5	~	~	Attachment	
S-2.6	~	~	Attachment	
S-3	CARE	George Steinbach	**Comment**	CARE provided reference materials, Exhibits 1-11 listed below
n/a*	~	~	Reference Material	no response necessary
n/a	~	~	Reference Material	no response necessary
n/a	~	~	Reference Material	no response necessary
n/a	~	~	Reference Material	no response necessary
n/a	~	~	Reference Material	no response necessary
n/a	~	~	Reference Material	no response necessary
n/a	~	~	Reference Material	no response necessary
n/a	~	~	Reference Material	no response necessary
n/a	~	~	Reference Material	no response necessary
n/a	~	~	Reference Material	no response necessary
n/a	~	~	Reference Material	no response necessary
S-4	California Lobster and Trap Fishermen's Assn.	Chris Miller	**Comment**	Miller provided 3 figures, listed below
S-4.1	~	~	Figure	
S-4.2	~	~	Figure	
S-4.3	~	~	Figure	

Table 11-2: Public Comments Received (continued)

Comment	Source	Signed By	File Type	Comments
S-5	Oceana/NRDC/Ocean Conservancy	Ayers/Newman /Dorsett	**Comment**	
S-6	NRDC/Ocean Conservancy	Garrison / Dorsett	**Comment**	
S-7	ODFW	Burke	**Comment**	
S-8	NWIFC	Jones	**Comment**	
S-9	Oregon Anglers	Holloway	**Comment**	
S-10	Coastside Fishing Club	Wolford	**Comment**	
S-11	PMCC	Blouser / Huhtala	**Comment**	
S-12	PMCC	Huhtala	**Comment**	
S-13	Port San Luis Harbor District	Elder	**Comment**	
S-14	Audubon Society of Portland	Ash / Murray / Englemeyer	**Comment**	
S-15	Southern CA Trawlers Assn.	McCorkle	**Comment**	The last page of the PDF is a correction to their analysis of Alternative C.10
S-16	Coos Bay Trawlers Assn., Inc.	Bodnar	**Comment**	
S-17	Marine Life Conservancy	Cozens	**Comment**	
S-18	Marine Life Conservancy	Cozens	**Comment**	
S-19	Public	Craven	**Comment**	
S-20	Advisory Committee	Green	**Comment**	
S-21	F/V Adante	Heikkila	**Comment**	
S-22	Market Seafood Inc.	Johnson / Worthington	**Comment**	comments regarding Scottish Seine
S-23	Ports Seafood	Ports	**Comment**	comments regarding Scottish Seine
S-24	Public	Lee	**Comment**	
S-25	Osprey Seafood of CA, Inc.	Weinberg-Lynn	**Comment**	comments regarding Scottish Seine
S-26	Public	Rock	**Comment**	
S-27	F/V Excalibur	Retherford	**Comment**	
G-1	Oregon State University	Hixon	Endorsement	Endorsement of PMCC's Independent review panel comments

Table 11-2: Public Comments Received (continued)

Comment	Source	Signed By	File Type	Comments
G-2	Fisherman's Marketing Assn.	Leipzig	**Comment**	
G-3	F/V Regina	Stickle	**Comment**	
G-4	Exclusive Fresh, Inc.	Bruno	**Comment**	
G-5	Exclusive Fresh, Inc.	Bruno	**Comment**	
G-6	Moss Landing Harbor Dist.	McIntyre	**Comment**	
G-7	Public	Keene	**Comment**	
G-8	Public	Alderson	**Comment**	
G-9	Public	Aldridge	**Comment**	
G-10	Public	Anspacher-Meyer	**Comment**	
G-11	Public	Capozzelli	**Comment**	
G-12	Public	Feldman	**Comment**	
G-13	Public	Hafer	**Comment**	
G-14	Public	Hansen	**Comment**	
G-15	Public	Kitchen	**Comment**	
G-16	Public	Lish	**Comment**	
G-17	Recreational Fishing Alliance	Merriman	**Comment**	
G-18	City of Morro Bay	Peters	**Comment**	
G-19	Public	Savlove	**Comment**	
G-20	DOI	Sleeger	**Comment**	Statement of "No Comment"
G-21	Rogue Valley Audubon Society	Trail	**Comment**	
M-1	~	~	**Mass Mailing**	We received about 3486 copies of this general support e-mail.
M-2	~	~	**Mass Mailing**	We received about 9891 copies of this general support e-mail/postcard.
M-2.1	~	~	**Mass Mailing**	We received about 17478 copies of this e-mail, identical to Mass E-mail 2 except it specifically indicates support for Alternative C 12.
M-3	~	~	**Mass Mailing**	We received about 4232 copies of this general support e-mail.
M-4	~	~	**Mass Mailing**	We received about 4614 copies of this general support e-mail/fax.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

May 11, 2005

Reply To
Attn Of: ETPA-088 Ref: 05-008-NOA

D. Robert Lohn, Regional Administrator
NMFS/NOAA - Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115-0070

Dear Mr. Lohn:

The U.S. Environmental Protection Agency (EPA) has reviewed the draft Environmental Impact Statement (EIS) for **Essential Fish Habitat Designation and Minimization of Adverse Impacts** (CEQ No. 20050049) in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. Section 309, independent of NEPA, specifically directs EPA to review and comment in writing on the environmental impacts associated with all major federal actions and the document's adequacy in meeting NEPA requirements.

The draft EIS evaluates the effects of a strategy to conserve and enhance essential fish habitat (EFH) for fish managed under the Pacific Coast Groundfish Fishery Management Plan (FMP). The EIS includes alternatives for identification of EFH and Habitat Areas of Particular Concern (HAPC), measures to minimize adverse impacts to EFH from fishing activities, and research and monitoring actions to encourage the conservation and enhancement of EFH. The proposed action is to ensure compliance with section 303(a)(7) of the Magnuson-Stevens Act and will amend the Pacific Coast Groundfish FMP.

The EIS provides six alternatives for identifying and designating EFH, nine alternatives for designating HAPC, fourteen alternatives with various options for minimizing adverse fishing impacts to EFH and four alternatives with two expanded logbook program options for research and monitoring. The following tables provide ratings for each of the alternatives and options provided in the EIS.

An overall rating of EC-2 (Environmental Concerns - Insufficient Information) along with a summary of our comments will be published in the *Federal Register*. A copy of the rating system used in conducting our review is enclosed for your reference.

Pacific Coast Groundfish Fishery Management Plan Essential Fish Habitat Designation and Minimization of Adverse Impacts Draft Environmental Impact Statement			
Alternative Designation	**Alternative Name**	**Preliminary Preferred Alt. (Yes/No)**	***Rating**
Category: Essential Fish Habitat			
A.1	No Action	No	LO
A.2	Depths less than 3,500 m	Yes	EC-2
A.3	100% Habitat Suitability Probability Area	Yes	EC-2
A.4	Habitat Suitability Probability Based on Management Status	No	EC-2
A.5	70% Habitat Suitability Probability Area	No	EC-2
A.6	30% Habitat Suitability Probability Area	No	EC-2
Category: Habitat Areas of Particular Concern			
B.1	No Action	No	EC-2
B.2	Estuaries	Yes	LO
B.3	Canopy Kelp	Yes	LO
B.4	Seagrass	Yes	LO
B.5	Core Habitat	No	EC-2
B.6	Rocky Reefs	Yes	LO
B.7	Areas of Interest	No	LO
B.8	Oil Production Platforms	No	EC-2
B.9	Process for new Habitat Areas of Particular Concern	No	LO

*LO – Lack of Objection
EC-2 Environmental Concerns – Insufficient Information

Pacific Coast Groundfish Fishery Management Plan
Essential Fish Habitat Designation and Minimization of Adverse Impacts
Draft Environmental Impact Statement

Alternative Designation	Alternative Name	Preliminary Preferred Alt. (Yes/No)	*Rating
Category: Minimize Adverse Fishing Impacts to Essential Fish Habitat			
C.1	No Action	No	EC-2
C.2.1	Depth-based Gear Restrictions – Option 1	No	EC-2
C.2.2	Depth-based Gear Restrictions – Option 2	No	LO
C.2.3	Depth-based Gear Restrictions – Option 3	No	EC-2
C.3.1	Close Sensitive Habitat – Option 1	No	EC-2
C.3.2	Close Sensitive Habitat – Option 2	No	EC-2
C.3.3	Close Sensitive Habitat – Option 3	No	EC-2
C.3.4	Close Sensitive Habitat – Option 4	No	EC-2
C.4.1	Prohibit Geographic Expansion of Fishing – Option 1	Yes	EC-2
C.4.2	Prohibit Geographic Expansion of Fishing – Option 2	Yes	LO
C.5	Prohibit a Krill Fishery	No	LO
C.6	Close Hotspots	No	EC-2
C.7.1	Close Areas of Interest – Option 1	No	EC-2
C.7.2	Close Areas of Interest – Option 2	No	EC-2
C.8.1	Zoning Fishing Activities – Option 1	No	EC-2
C.8.2	Zoning Fishing Activities – Option 2	No	EC-2
C.9.1	Gear Restrictions: Prohibit Roller Gear Larger than 15 inches	Yes	LO
C.9.2	Gear Restrictions: Prohibit Flat Trawl Doors	Yes	LO
C.9.3	Gear Restrictions: Limit Longline Groundline Length to 3 nm	Yes	LO
C.9.4	Gear Restrictions: Employ Habitat-Friendly Anchoring Systems	Yes	LO
C.9.5	Gear Restrictions: Prohibit Dredge Gear	Yes	LO
C.9.6	Gear Restrictions: Prohibit Beam-Trawl Gear	Yes	LO
C.9.7	Gear Restrictions: Prohibit Set-Gillnets in Waters Deeper than 60 fm	Yes	LO
C.9.8	Gear Restriction: Prohibit Dingle Bar Gear (Troll Groundfish Gear)	Yes	LO
C.10	Central California No-Trawl Zones	Yes	LO
C.11	Relax Gear Endorsement Requirements	Yes	LO
C.12	Close Ecologically Important Areas to Bottom Trawl	Yes	EC-2
C.13	Close Ecologically Important Areas to Bottom-Contacting Gear	Yes	EC-2
C.14	Close Ecologically Important Areas to Fishing	Yes	LO

*LO – Lack of Objection
EC-2 Environmental Concerns – Insufficient Information

Pacific Coast Groundfish Fishery Management Plan Essential Fish Habitat Designation and Minimization of Adverse Impacts Draft Environmental Impact Statement			
Alternative Designation	**Alternative Name**	**Preliminary Preferred Alt. (Yes/No)**	***Rating**
Category: Research and Monitoring			
D.1	No Action	No	EC-2
D.2.1	Expanded Logbook Program – All Fishing Vessels	No	LO
D.2.2	Expanded Logbook Program – Random Sample	No	EC-2
D.3	Expanded Vessel Monitoring System Program	No	LO
D.4	Research Reserve System	No	LO

*LO – Lack of Objection
EC-2 Environmental Concerns – Insufficient Information

Our concerns with the EIS focus on data limitations and inaccuracies, the roles of NOAA-Fisheries and the Pacific Fisheries Management Council in the development and selection of alternatives, and the need for additional information on the Fisheries Economic Assessment Model and the Environmental Justice analysis. Detailed comments discussing our concerns and the alternatives are provided in the enclosure. EPA recognizes it might not be possible to address all data limitations prior to completion of the final EIS. Consequently, our ratings of the alternatives presented in the EIS reflect our concerns and recommend a protective approach to identifying and minimizing impacts to EFH in light of the stated uncertainties.

Thank you for the opportunity to review this draft EIS. If you would like to discuss these comments in detail, please contact Mike Letourneau at (206) 553-6382.

Sincerely,

/S/ Peter Contreras for

Christine Reichgott, Manager
NEPA Review Unit

cc: J. DeVore, PFMC
K. Dahl, PFMC

Enclosure

Pacific Coast Groundfish Fishery Management Plan
Essential Fish Habitat Designation and Minimization of Adverse Impacts
Draft Environmental Impact Statement

General Comments

We support the Habitat Suitability Probability (HSP) approach utilized in the EIS for identifying Essential Fish Habitat (EFH) and the associated sensitivity index approach used for identifying habitat for closure under Alternative C.3. However, due to the current data limitations and reported inaccuracies in some of the data used in the HSP and sensitivity indices, we have concerns about selecting alternatives that utilize these approaches.

We support your efforts to obtain additional high quality data and correct inaccuracies. In addition to expanding the logbook, vessel monitoring system (VMS) and research reserve programs, we support increasing observer coverage and manned and remote sensing devices that are nondestructive to marine habitats. We agree that combining VMS, logbook and observer data would result in a more complete picture of fishing activities and that VMS data with a higher resolution track line of trawl and fixed gear sets would be a significant benefit. We also support efforts to develop new fishing gear that is less destructive of EFH.

We appreciate the discussion on the non-fisheries related activities in the EIS. These activities described in the upland, riverine, estuarine, coastal and marine sections provide good information for evaluating cumulative impacts to EFH. While the suite of groundfish does not include anadromous species, like krill, they are prey species of groundfish and are impacted by the groundfish fishing activities. Consequently, the EIS would benefit from evaluating the extent to which freshwater habitats should be considered essential groundfish habitat and techniques and opportunities for identifying freshwater HAPC.

The EIS states that EFH recommendations from the National Marine Fisheries Service (NMFS) or a Fisheries Management Council (Council) to federal or state agencies are non-binding. The EIS needs to clarify that only the NMFS, not the Council, can provide EFH recommendations to federal or state agencies. In addition, the EIS should discuss how EFH recommendations from NMFS will impact the Council and its processes.

Alternatives for Identification and Description of Essential Fish Habitat (EFH)

As discussed above, we support the HSP approach utilized for identifying EFH, however, the limitations and inaccuracies of the data utilized in this approach could leave some essential habitat for groundfish species unprotected. Therefore, we support the No Action alternative that designates all waters from the mean higher high water line, and upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon and California to the seaward boundary to the U.S. Exclusive Economic Zone (EEZ) as EFH.

The EIS states that some of the essential fish habitat maps generated from the information collected on the managed species and utilized in some of the Identification and Description EFH alternatives were incorrect. The final EIS should discuss if the essential fish habitat maps generated from the information collected on the managed species inaccuracies have been corrected and if so, the results of those corrections.

The EIS states that the Council and NMFS will attempt to have the methodology for calculating “biogenic areas” peer-reviewed by the Council’s Scientific and Statistical Committee (SSC) during the draft EIS review period, and that the methodology may be incorporated into the formal adoption of a Fisheries Management Plan (FMP) amendment and regulatory action. The EIS should clarify if such an action would require the development of a supplemental EIS.

The EIS discusses how the Scientific and Statistical Committee (SSC) approved the methodology for developing the indices used in the HSP model, but did not approve the impact function component of the model used for developing the alternatives. The EIS needs to explain why the SSC did not approve the impact function component of the model and if there are plans to obtain their approval prior to the selection of preferred alternatives by the NMFS.

Alternatives for Habitat Areas of Particular Concern (HAPC)

The EIS states that the HAPC alternatives are not mutually exclusive and that all of the action alternatives could be included in a final preferred alternative, even if some of the designated areas were to overlap. While the EIS is clear that HAPC must be a subset of EFH, it must also be clear that if all of the HAPC action alternatives (Alternatives B.2 through B.9) were selected, selection of a preferred EFH alternative would be limited. While the discussion and figures in Chapter 4 of the EIS provide information on what HAPC areas would be excluded under each EFH alternative, it is not clear which EFH alternatives would be excluded by selecting all of the HAPC alternatives. This needs to be clarified in the EIS.

While we support the approach of combining alternatives into a final preferred alternative, we have concerns with Alternatives B.5 (Core Habitat) and B.8 (Oil Production Platforms). The Core Habitat under Alternative B.5 is defined as the upper 10% area of an HSP greater than 0%, for the juvenile and adult life history stages of overfished and precautionary zone groundfish species. Because of the limitations and inaccuracies of the data utilized in the HSP analyses, there is a potential that some HAPC for some of the overfished and precautionary zone groundfish might not be protected under this alternative. Consequently, we have environmental concerns with this proposed alternative.

While there have been high concentrations of groundfish observed in association with many of the oil platforms off the coast of California, including overfished species, it is uncertain if this is a net benefit to the ecosystem. These unnatural structures may be attracting fish populations away from natural reefs, exposing fish to mercury contamination, attracting predators resulting in a net loss to the fish populations, and increasing fishing effort in the area. We recommend that Alternative B.8 be modified to address these concerns. Once it is determined that decommissioned platforms scheduled for removal do not pose a mercury contamination threat, we recommend that the platforms remain in place until such time that it is demonstrated that adequate natural habitat exists and overfished species meet maximum sustainable yield (MSY). Such an alternative would include the benefits these platforms provide to the groundfish species, address the mercury contamination and the potential attraction of fish from natural reefs, and protect the species from increased effort by fishers.

We support a process for new HAPC designations such as the one proposed in Alternative B.9. As additional information is obtained there is the potential for identifying new areas that are important to the survival and sustainability of a species. This information should undergo a technical and public review for consideration as HAPC. Alternative B.9 provides for such reviews in a streamlined process for designating new HAPC.

Alternatives to Minimize Adverse Fishing Impacts to EFH

The proposed alternatives for minimizing adverse fishing impacts on EFH include gear modifications, area closures and fishing effort reductions. Alternative C.2 includes three options for

Depth-based Gear Restrictions. Alternative C.2.2 would prohibit the use of large footrope trawl gear throughout the EEZ and prohibit all fixed gear shoreward of 100 fm north of 40°10' N latitude and 150 fm south of 40°10' N and consequently would be the most protective of EFH. We recommend that Alternative C.2.2 be selected as the preferred alternative.

Alternative C.3 (Close Sensitive Habitat) includes four options all based on sensitivity and recovery indices developed as part of the fishing impact model component of the comprehensive risk assessment. Of the four options, Alternative C.3.4 would provide the most protection, however, because of the limitations and inaccuracies of the data utilized in this modeling effort, there is a potential that some sensitive habitats might not be protected under this alternative. Therefore, we have concerns with these proposed alternatives.

Alternative C.4 (Prohibit Geographic Expansion of Fishing) has two options which generally cover the same geographic area. However, Alternative C.4.1 prohibits fishing in areas that were not trawled between 2000 and 2002, leaving some 10 minute blocks westward of the 2000m contour vulnerable to fisheries impacts. In addition, Alternative C.4.2 accounts for all bottom-tending gear and addresses the lack of geo-referenced fishing effort data for fixed-gear fisheries. Therefore, we recommend that that Alternative C.4.2 be selected as the preferred alternative.

Despite the prohibition of krill fishing in Washington, Oregon and California waters and the lack of a krill fishery in Council managed waters, we believe Alternative C.5 (Prohibit a Krill Fishery) would be a good preventative measure to protect this important prey species and its habitat. We understand that the Council has elected to address this issue by incorporating krill as a management unit species in the Coastal Pelagic Species FMP, potentially eliminating the need for Alternative C.5. The EIS should discuss if incorporating krill as a Coastal Pelagic Species in the FMP would be as effective as Alternative C.5 and which process could be implemented in the shortest amount of time. If both processes are equally protective of krill, the least time consuming process should be implemented.

Alternative C.6 (Close Hotspots) would prohibit trawling in habitat that has a high probability of being EFH for a large number of groundfish based on the HSP modeling analyses. Because of the limitations and inaccuracies of the data utilized in the HSP modeling, there is a potential that some EFH might not be protected under this alternative. Alternative C.2.2 would prohibit trawling and all fixed gear over a larger geographic area including the area that would be protected by Alternative C.6. Therefore, we recommend selecting Alternative C.2.2 as the preferred alternative instead of Alternative C.6.

Alternative C.7 (Close Areas of Interest) calls for closing the areas of interest designated under Alternative B.7 to fishing either to bottom trawling (Alternative C.7.1) or to all bottom-contacting activities (Alternative C.7.2). These areas of interest would be based on various HSP sensitivity values depending on gear types. While we recommend that Alternative C.7.2 be given preference above C.7.1 as it would protect more EFH from impacts by fishing gear, we have concerns that some areas might not be protected due to the limitations and inaccuracies in the data utilized in the HSP analyses.

Alternative C.8 (Zoning Fishing Activities) would limit the use of bottom-tending gear to specified zones where the agency determines that such activities can be conducted without altering or destroying a significant amount of habitat. Bottom tending fishing gear would be prohibited in all areas deeper than the 2,000 m contour along the continental slope extending to the maximum westward range of groundfish EFH. There would be a five-year transition period to gear specific zones for the remaining area inside the 2,000 m contour, which would remain open to bottom-tending fishing gear.

During the five-year transition period, NMFS would conduct research to delineate zones where specified fishing activities would be permitted. Alternative Option C.8.1 would establish fishing zones for bottom-contact trawls, dredges, and similar bottom-tending mobile fishing gear. Other bottom-contacting gear including bottom longlines, traps, and pots would not be restricted. Alternative Option C.8.2 would establish fishing zones for all bottom-contacting gear types including bottom longlines, traps, and pots. This alternative would include a gear modification and substitution program that cooperatively involves fishers in the design and testing of new gear. The western boundary of the geographic area covered by Alternative C.8 would be dependent on the Identification and Description EFH alternative selected. If the Alternative A.1 (No Action) Identification and Description EFH were selected, the western boundary of Alternative C.8 would be the boundary of the EEZ.

Alternative C.8 in combination with Alternative A.1 would provide a protective approach westward of the 2000 m contour and control fishing activities within the 2000 m through the establishment of fishing zones that would not be significantly impacted by various bottom contact gear types. While we support the adaptive management approach and the inclusion of fishers in the gear research aspects of the program, the EIS does not provide information on how the NMFS will define 'significant' when determining the amount of habitat that can be altered or destroyed under this alternative. The EIS states that the best scientific information available will be utilized for determining whether unavoidable adverse impacts would be minimal and temporary, however, it does not discuss if the HSP model inputs or other information will be used to make these determinations. It is recommended that the EIS provide additional information on potential approaches for determining the significance of habitat impacts under this alternative.

We support the selection of Gear Restriction Alternative C.9 (all options) as a preferred alternative and believe that all the options should be combined into a single alternative. We also support Alternatives C.10 (Central California No-Trawl Zones), and C.11 (Relax Gear Endorsement Requirements). Alternatives C.12 (Close Ecological Important Areas to Bottom Trawl), C.13 (Close Ecological Important Areas to Bottom-Contacting Gear), and C.14 (Close Ecologically Important Areas to Fishing) are variations of the Comprehensive Collaborative Mitigation Alternative. While Alternatives C.12 and C.13 would restrict trawl fishing and bottom contact gear fishing in these ecologically important areas, they would be left vulnerable to some fisheries impacts. Therefore, we recommend that Alternative C.14 be selected as the preferred alternative.

Research and Monitoring Alternatives

Currently, there is limited data on the distribution of groundfish species and their associated habitats, and habitat-specific productivity. In addition, habitat-specific densities are only available for a few species. We agree that there is a critical need for comprehensive, detailed and accurate information on benthic habitats and associated groundfish assemblages on spatial scales relevant to fisheries management and habitat production. Core nursery grounds and spawning areas need to be identified and protected and there is a need to better understand the relationship between climatic events and abundance, growth, spawning success and survival of groundfish species.

We support the Research and Monitoring alternatives that will obtain information that will better define and minimize impacts to EFH. Including all fishing vessels in the Expanded Logbook Program Alternative (Alternative D.2.1) would provide the largest amount of data for updating and increasing the precision and accuracy of the model inputs used for identifying and minimizing EFH. We acknowledge the added economic impacts expanding the Vessel Monitoring System (VMS) Program (Alternative D.3) would have on fishers. However, the EIS is clear that minimizing impacts to EFH will increase enforcement needs and the VMS program could be utilized to address some of these needs. In addition, combining VMS, logbook and observer data would result in a more complete picture of fishing activities and VMS data with a higher resolution track line of trawl and fixed gear sets would be a significant benefit. Finally, we support the Research Reserve System (Alternative D.4) as a means of better understanding the effects of fishing on habitat. The EIS is clear that additional information is needed regarding the length of time needed for habitat features and functions to cover from fisheries impacts. Alternative D.4 provides a mechanism to obtain such information.

Fisheries Economic Assessment Model

The EIS needs to provide additional information on the Fisheries Economic Assessment Model. Specifically, the EIS should include a detailed description of the model, the assumptions used in the model and the process that was utilized to rectify the model with groundfish fishery economic data. While the EIS discusses potential economic impacts to fishers, processors and fishing communities based on this model, it also needs to discuss the uncertainty of these predicted economic impacts and how the model, originally developed for the limited entry trawl sector, has been adapted to project economic impacts in all groundfish fisheries.

Environmental Justice

While we agree that the geographic scope of the EIS results in some difficulties in identifying and determining if low income or minority populations will be disproportionately impacted by the proposed actions, we believe that the EIS would benefit from additional discussion on how it obtained meaningful public participation from low income and minority populations that may be impacted by the proposed action. The information presented in Appendix E demonstrates that some areas have higher minority and low income populations than others. For example, The Hispanic Population by State, Port Group, County and Port data presented in Appendix E shows that the percentage of the population in Santa Barbara that is Hispanic (54.28%) is higher than any other area. The EIS should discuss what measures were taken to assure that the Hispanic population in the Santa Barbara area was afforded the opportunity for meaningful participation in the process for the proposed action. In particular, the EIS should describe what was done to target the Hispanic communities of Santa Barbara, whether materials regarding the proposed action were translated into Spanish, and if there were translators present during public meetings held in the Santa Barbara area. In addition, the EIS should describe what feedback was received from the Santa Barbara Hispanic communities and how that was incorporated into the decisions for the proposed action.

The EIS should describe what was done to inform all low income and minority communities about the proposed action and the potential impacts in will have on their communities (notices, mailings, fact sheets, briefings, presentations, exhibits, tours, news releases, translations, newsletters, reports, community interviews, surveys, canvassing, telephone hotlines, question and answer sessions, stakeholder meetings, and on scene information), what input was received from the communities, and how that input was utilized in the decisions that were made regarding the proposed action.

OCEANA | Protecting The World's Oceans.

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Juneau, AK 99801 USA www.oceana.org

May 11, 2005

Mr. D. Robert Lohn
NOAA Fisheries Regional Administrator
7600 Sand Point Way NE
BIN C15700, Bldg. 1
Seattle, WA 98115-0700

Mr. Donald Hansen, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Re: Comments on Pacific Coast Groundfish Fishery Management Plan Essential Fish Habitat Designation and Minimization of Adverse Impacts Draft Environmental Impact Statement

Dear Mr. Lohn and Mr. Hansen:

Thank you for the opportunity to comment on the Essential Fish Habitat Draft Environmental Impact Statement for Pacific Coast groundfish. We urge the National Marine Fisheries Service (Fisheries Service) to adopt and implement designation Alternative A.2 plus seamounts. We further urge adoption and implementation of Revised Alternative C.12 as the minimization alternative. Revised Alternative C.12 is thoroughly documented and discussed in Attachment 1: Detailed Description, Discussion, and Comparison of Original Alternative C.12 and Revised Alternative C.12. This attachment includes detailed maps of Revised Alternative C.12. We will fax and mail copies to your office since the file size exceeds the capacity for many email systems to accommodate.

The National Environmental Policy Act ("NEPA") is the "basic national charter for protection of the environment." 40 C.F.R. 1500.1. Congress' goal in enacting the statute was "to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore and enhance the environment." Id. To meet this purpose, NEPA requires that agencies prepare an Environmental Impact Statement (EIS) for all "major Federal actions significantly affecting the quality of the human environment." 42 U.S.C. 4332(C); see also American Oceans Campaign v. Daley, 183 F.Supp.2d 1 (D.D.C. 2000). One of the cornerstones of NEPA is the solicitation and consideration of informed public views of agency decisionmaking.

Since the original development of Alternative C.12, we have gathered and analyzed more data and information to refine the alternative to better reflect the current bottom trawl footprint, decrease potential displacement to bottom trawl fishermen, and provide practicable protection for Essential Fish Habitat on the West Coast. We have ensured that the alternative is based on the

Mr. Robert Lohn
Mr. Don Hansen
May 11, 2005
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best available information and protects sensitive habitats while maintaining vibrant fisheries. As part of our public comments on the Essential Fish Habitat Draft Environmental Impact Statement ("EFH DEIS"), Oceana is submitting an updated, revised Alternative C.12. Revised Alternative C.12 is well within the scope of the original Alternative 12 as described in the EFH DEIS, and is fully consistent with NEPA's purposes in soliciting public comment. 40 C.F.R. 1503.4. Inclusion, selection and implementation of Revised Alternative C.12 in the Final EFH EIS does not require a supplemental Environmental Impact Statement.

The changes reflected in Revised Alternative C.12 are the result of recommendations by the Scientific and Statistical Committee to pay closer attention to the presence of corals, sponges, and other living seafloor substrates in NOAA trawl survey and other data; analysis of spatial distribution of trawl track information from logbooks; and information provided by the bottom trawlers on areas they suggest be open or closed. By adopting the Revised Alternative C.12, the Fisheries Service and Pacific Fishery Management Council (Council) are able to maintain vibrant fisheries and provide important practicable mitigation measures for protecting Essential Fish Habitat.

The Revised Alternative C.12 is based on the Oceana Approach and is substantially similar to the version submitted in 2004 with some boundary changes which accommodate information referenced above. Though some boundaries have been modified to accommodate commercial trawlers and protect habitat, all management provisions proposed in the original Alternative C.12 remain intact in the Revised Alternative C.12.

As a steward for public resources, the Fisheries Service has an obligation to conserve, protect, and manage living marine resources responsibly. In the Sustainable Fisheries Act of 1996, Congress amended the federal statute governing fishing in the waters off of America's coasts by adding conservation provisions. The Magnuson-Stevens Act requires that the Fisheries Service describe and identify Essential Fish Habitat, and minimize the adverse effects of fishing on that habitat to the extent practicable. It was the Fisheries Service's non-compliance with the law that resulted in a court order to conduct the EFH EIS process now in progress. In particular, the Court noted, "There is no substantive discussion of how fishing practices and gear may damage corals, disrupt fish habitat, and destroy benthic life that helps support healthy fish populations." (District Court Order at 41).

The Fisheries Service has acknowledged the importance of living benthic substrates in a variety of fora. In addition, numerous scientific papers, including those published by Fisheries Service scientists, describe the importance of corals, sponges, and other living substrates to both commercial and noncommercial fish species and marine life. Further, over the past several years, the body of science concerning both the importance of intact marine habitat and the effects of fishing gear on habitat has grown substantially. The National Academy of Sciences (2002) clearly identifies the adverse impacts of bottom trawling on corals, sponges, and other living seafloor animals. The Academy recommends fishing effort reduction, gear modifications, and area closures to mitigate the adverse impacts of bottom trawling on seafloor habitats.

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Despite the recognition of the importance of corals, sponges, and other living substrates as keystones of the ocean ecosystem and Essential Fish Habitat; and the clear scientific reports of threats of bottom trawling to this sensitive long-lived habitat, the Fisheries Service still has not adopted or implemented measures for mitigation to stop this destruction. Revised Alternative C.12 provides a strong, viable, practicable action to do so.

The Fisheries Service and the Pacific Fishery Management Council urged Oceana privately and criticized us publicly to move away from litigation and become more involved in the EFH EIS process by helping develop viable and practicable alternatives. We have done so in good faith. Over the past three years, we have developed a viable and practicable management alternative for the Pacific by working with the Fisheries Service, the Pacific Fishery Management Council, other conservation organizations, commercial fishermen, recreational fishermen, state officials from Washington, Oregon, and California, scientists, local residents, and critics. Revised Alternative C.12 recognizes both the importance of corals, sponges, and other living seafloor animals as essential fish habitat, and the importance of maintaining healthy vibrant fisheries in the Pacific.

As the Fisheries Service and the Pacific Fishery Management Council consider adoption and implementation of minimization alternatives, we ask that you keep in mind that bottom trawling is a privilege granted by the American people through the Secretary of Commerce and the Council. It is not the right of a few to risk unmitigated destruction with long-term consequences to ocean ecosystems simply to achieve a short-term financial gain. We request the agency and Council adopt Revised Alternative C.12 as the preferred alternative in the Final EIS and implement it through regulations.

Sincerely,

Jim Ayers
Oceana, Pacific Regional Director

cc: Pacific Fishery Management Council Chair Don Hansen and Council Members

Attachments:
1. Detailed Description, Discussion, and Comparison of Original Alternative C.12 and Revised Alternative C.12
2. Displacement Comparison Chart of Original Alternative C.12 and Revised Alternative C.12
3. Detailed Support and Justification of Revised Alternative C.12
4. Bibliography
5. AAAS International Scientist Letter, February 15, 2004
6. North Pacific EFH EIS Scientist Letter, April 15, 2004

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Revised Alternative C.12 **May 11, 2005**

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Revised Comprehensive Alternative C.12

Preface: Overview of Modifications to the November 2004 original Alternative C.12 proposal

Modifications based on Washington, Oregon, and California Trawl Logbook Analysis

The Washington Department of Fish and Wildlife (WDF&W) generated maps of the areas closed to bottom trawling proposed in original Alternative C.12 overlaid with all 2003 bottom trawl logbook data, which mostly consisted of set points and haul out points, however in some cases, only the set points were available. WDF&W also performed an economic analysis using the set points only of the trawl logbook data, which attributed catch to a closed area when the set point fell within that closed area. It is interesting to note that the displaced 2003 revenue estimated by WDF&W with the set point method was higher than Oceana's estimate using the proportional overlap method using the mean revenue from 2000 to 2003 in 10 by 10 minute blocks. For original Alternative C.12, WDF&W estimated the 2003 displaced bottom trawl revenue represented by the proposed bottom trawl closures at $5,463,659 and Oceana estimated the annual displaced revenue at $4,810,730. The Oregon Department of Fish and Wildlife (ODF&W) provided tables with an economic analysis of the 2000-2003 trawl logbook set points contained within the closed areas proposed in original Alternative C.12. The California Department of Fish and Game (CDF&G) provided maps of the entire California coast that displayed all bottom trawl logbook data, including set points and haul points. Also displayed were the state fisheries for California halibut, and some shrimp and sea cucumber trawl information.

The information provided above was used to modify the boundaries of the proposed closed areas, and to improve the accuracy of the existing bottom trawl footprint. Modifications to the boundaries of closed areas where made by visually comparing the spatial pattern of the 2000-2004 trawl set points to the existing boundaries. With the finer level of detail, it was possible to identify specific important fishing areas within the 10 by 10 minute blocks and modify boundaries as appropriate to reopen areas containing clusters of set points and to exclude additional untrawled areas from the trawl footprint. The finer level of detail also allowed for greater refinement of the bottom trawl footprint, particularly in California. The result is Revised Alternative C.12, a practicable, comprehensive conservation alternative that protects essential fish habitat while maintaining vibrant fisheries.

Modifications based on greater incorporation of presence/absence information on habitat forming invertebrates (Scientific and Statistical Committee suggestion)

At the March Pacific Fishery Management Council (PFMC) meeting, the Scientific and Statistical Committee suggested paying greater attention to presence/absence data from the National Marine Fisheries Service (NMFS) trawl survey information that was used in the identification of biogenic areas. As such, a few additional closure areas were identified using information on habitat-forming invertebrates as the primary criterion.

Other modifications

- An additional seamount (located outside of the trawl footprint), Rodriguez Seamount, is included in Alternative C.12.
- Some proposed closed areas were split into parts by reopening high value trawl areas.
- Several nearshore rocky reefs were added to the proposed closed areas.
- Canyons in Northern California were added to the suite of trawl closures based on additional habitat information.
- Based on input from trawl fishermen at the March PFMC meeting in Tacoma, an area of rugged bottom terrain with pinnacles outside of the Rogue Canyon area was added.
- Based on input from trawl fishermen at the April 29 Morro Bay EFH Meeting, a significant area in the northern area of the proposed Monterey Bay trawl closure was reopened, as well as a section of the "Morro Ridge" proposed closure.
- The trawl industry also suggested some areas for closure in April 2005, and we attempted to include consideration of those boundaries.
- Some of the previously proposed areas were renamed to better describe the habitat features in question.

Introduction

Revised Alternative C.12, the Comprehensive Collaborative Alternative seeks to maintain vibrant fisheries while protecting habitat and biodiversity. The Alternative focuses on reducing the impacts of bottom trawling on Essential Fish Habitat (EFH). Using the mandate of the Sustainable Fisheries Act of 1996 to identify and protect EFH, Oceana developed this science-based alternative using all available data and information which included a comprehensive literature review of fish habitat studies, habitat-fishery linkages, and fishing impacts. This approach was recently used by the North Pacific Fishery Management Council to minimize adverse impacts to EFH in Alaska's Aleutian Islands region. The currently available fisheries data, habitat data, and economic data from the U.S. West Coast, while not perfect, allowed us to design a cost-effective Alternative that is precautionary yet practicable.

According to the National Academy of Sciences (2002), bottom trawling reduces habitat complexity, causes shifts in benthic (bottom-dwelling) communities, and reduces productivity of benthic habitats. The Academy recommends three management measures to reduce the effects of bottom trawling: area closures, gear modifications, and effort reduction. Revised Alternative C.12 employs all three of these management measures while maintaining commercial fishing opportunities.

Specifically, the Revised Alternative C.12 includes the following management measures:

1. Prohibit bottom trawling outside the current trawl footprint (defined by using spatially explicit trawl logbook data from 2000-2004 with methodology to draw boundaries as described in this document).
2. Implement 61 year-round bottom trawl area closures in known sensitive habitat areas (identified in maps appended to this document).
3. Extend the 8 inch maximum roller size trawl footrope restriction to all bottom trawling. throughout the U.S. West Coast EEZ. The footrope restriction is made permanent instead of re-authorized on an annual basis.
4. Bottom trawl effort reductions as developed by the Pacific Fisheries Management Council ("PFMC").
5. Consideration by the PFMC of gear conversion opportunities for bottom trawlers.
6. Comprehensive monitoring of individual vessel performance and habitat damage including:
    a. Increase onboard observer coverage on bottom trawl vessels to a level determined to be necessary by NOAA to estimate annual bycatch of habitat-forming invertebrates and quantify habitat interactions with fishing gear;
    b. Require vessel Monitoring Systems (VMS) on all vessels using bottom trawl gear to catch groundfish in the U.S. West Coast EEZ with positions recorded at a time stamp of every 5 minutes (time);
    c. Improve electronic logbooks to provide better fishing effort information to NOAA and state authorities;
    d. Annual publication of a NMFS *West Coast Groundfish Habitat Status Report* to make habitat impact and bycatch data available to the Council, the public and the fleet at as high a spatial and temporal resolution as possible; and
    e. Establish baseline data and a process for setting and implementing bycatch limits on structure-forming invertebrates and/or other habitat performance standards.
7. Comprehensive research and benthic mapping program to improve EFH information levels.

a. Funding for additional gear impacts research;
b. Coastwide biogenic seafloor mapping project; and
c. Ecological and behavioral studies of habitat use by commercial fish and invertebrate species.

This document provides a summary of the approach, science, methodology, and data used to develop and modify Alternative C.12.

The Precautionary Approach

Revised Alternative C.12 is a precautionary approach to mitigate the effects of fishing on habitat. When undertaking the task of identifying and protecting EFH in Alaska, NMFS contracted the Center for Independent Experts (CIE) to review their assessment of fishing effects on EFH in the North Pacific Region (Drinkwater 2004). The CIE panel repeatedly emphasized the need to be precautionary, both when assessing effects on habitat and when taking management actions.

> *Use the **precautionary approach** especially where the data are unclear, where recovery times are long (e.g. for corals and sponges), or where habitat reduction is high even if the abundance levels are above MSST. Since it is likely difficult to detect an influence on the stock until after the habitat is damaged, perhaps even until much of the habitat is destroyed, the use of the **precautionary approach** is paramount. This is especially true for those habitats with long recovery times, e.g. hard corals and sponges*

(Drinkwater 2004).

On the U.S. West Coast, the recent discovery of a new species of deep-sea coral (*Antipathes dendrochristos*) (Opresko 2005), is an example that highlights the very real possibility that Essential Fish Habitat may be destroyed before researchers know anything about it. Since very little benthic habitat on the U.S. West Coast has been explored to date, the potential for adverse impacts is enormous. The loss of Essential Fish Habitat may have devastating long-terms consequences for U.S. West Coast fisheries. Therefore, the high risk inherent in conducting the groundfish fisheries with bottom trawl gear justifies prescriptive, precautionary management measures to protect EFH.

Spatial Management Measures

The spatial management measures of the Comprehensive Alternative define the areas that are open and closed to bottom trawling. These management measures are in addition to all existing closures in the Pacific Groundfish Fishery Management Plan ("FMP") and implementing regulations. These areas are determined based on several criteria described in detail in the following sections. Areas closed to bottom trawling are based on the locations of sensitive and complex habitat areas and/or areas with low economic value to the bottom trawl fleet. Boundaries were drawn to minimize overlap with high value fishing areas and to follow closely the sensitive habitat features. The proposed closures incorporate the Pew Oceans Commission (2003) Final Report (Ch 11, Sections 3-4) recommendations to:

- Prohibit bottom trawling on corals, sponges, and seamounts;
- Allow bottom trawling only in designated areas; and

- Close all other areas to bottom trawling.

The overall formulation of the spatial management measures is based on a combination of various data layers provided by NMFS and other data sources.

Summary of Methods

1. Determine the spatial extent of recent bottom trawl effort (setting the existing bottom trawl footprint);
2. Assess the distribution of fishery value within the footprint;
3. Determine where areas containing complex sensitive habitat occur;
4. Close areas of complex sensitive habitat within the footprint with consideration of displaced revenue; and
5. Establish bottom trawl permitted open area.

[Area of bottom trawl footprint] **minus** [Complex sensitive habitats] **minus** [Existing management closures] **equals** [Area open to bottom trawling]

Spatial Management Summary

Delineating the bottom trawl footprint

To define the boundaries of the U.S. West Coast bottom trawl footprint, we examined bottom trawl logbook records from PACFIN of groundfish catch occurring from 2000-2003. We selected this time span to include annual variability of trawl activity, which incorporates transitions that may have resulted from recent management measures. For example, in 2000 a footrope restriction in some areas altered the distribution of trawl effort (Bellman and Heppell, EFH DEIS Appendix 19). Trawl restrictions in the Rockfish Conservation Areas ("RCA") also altered distribution of trawl effort over this period. However, Bellman and Heppell (Appendix A-19) conclude that trawl effort along the U.S. west coast is patchy and has been consistent in its overall distribution over their entire study period (1995-2002). They state (p. 30):

> *Overall, fishing effort exhibited patchy distribution and maintained similar statewide patterns over the entire study period. This consistency is common when fishermen return to areas previously known to harbor high abundances of target species and suitable seafloor for trawling.*
>
> *From a conservation standpoint, this patchiness may be desired if fishing efforts do not also expand into the unaffected areas. Patchy distribution of trawl effort disturbs the same areas of seabed frequently, but in turn leaves large areas unaffected by the impacts of fishing gear. Spatial management measures, such as closed areas, can have the effect*

of shifting fishing activity to areas that were previously lightly fished or very rarely fished.

This provides both rationale and justification for identifying the bottom trawl footprint as accurately as possible to protect “previously lightly fished or very rarely fished” areas. Therefore, the objective of closing all areas outside the trawl footprint is threefold:

1. To prevent further geographic expansion of bottom trawling;
2. To prevent unintended displacement of trawl effort into new areas; and
3. To maintain the trawl industry’s ability to harvest their allocated quota in remaining open areas.

Fishing vessels are required to record their catches in electronic logbooks and/or fish tickets which are then gathered and maintained by the Fisheries Service. The agency provided a dataset aggregated in 10 by 10 minute blocks with species or species group resolution, and excluding any information which the Fisheries Service asserted to be confidential. Given these constraints, a spatial resolution of 10-minute blocks was selected to ensure consistency with the analyses performed by Terralogic and MRAG for the Pacific Groundfish EFH EIS, and to minimize data loss due to confidentiality. Data with a finer resolution is preferable and is much more useful for spatial analysis, but the public faces a tradeoff when requesting spatial fishery data from the Fisheries Service. Requesting data on a fine scale results in a significant loss of data, since the Fisheries Service withholds information if fewer than 3 fishing vessels operate in the area for which fishing information is requested.

The footprint was further refined in 2005 by analyzing the spatial arrangement of trawl track information within the blocks. State agencies provided maps of the proposed areas closed to bottom trawling overlaid with set point and haul back points of commercial bottom trawl hauls. This information confirmed that trawl effort is not uniform across a block, but occurs in specific discrete, patchy areas. The footprint was refined by removing portions of blocks where no or very little trawl effort was recorded. The footprint excludes the area within 3 nm of shore in the state waters of Washington and California that are already closed to bottom trawling. The total area of the revised delineated bottom trawl footprint was estimated at 82,000 km^2 using the best available data.

Distribution of bottom trawl fishery ex-vessel revenue

The dataset described above was also used to estimate the distribution of fishery value within the footprint. For each 10 by 10 minute block, we calculated the total catch of each species throughout the four-year period. The dollar value for each unit of catch of each species was determined from the *PFMC INPFC Area Report: Groundfish Estimated Ex-vessel Prices-per-pound for 2004 for all Gears*. We multiplied the total catch of each species in each block over the four year period by each species’ respective value per unit, and summed the values for all species in each block. This allowed us to calculate the total ex-vessel value for the total bottom trawl catch in each block for the four year period from 2000-2003.

Due to data limitations, this method inherently assumes an even distribution of trawl effort throughout each entire block. Since the modified closed areas are intentionally drawn to avoid the concentrations of trawl effort within each block, the results of this method will consistently overestimate the actual displaced revenue in the analysis of our proposed closures.

Areas of sensitive habitat

Boundaries of areas of complex sensitive habitat were identified using the best available datasets (see footnotes) and applying the following criteria:

- Hard substrate, including rocky ridges and rocky slopes[1]
- Habitat-forming invertebrates[2]
- Submarine canyons and gullies[1]
- Untrawlable areas (trawl hangs and abandoned trawl survey stations)[3]
- Seamounts[1]
- Highest 20% habitat suitability for overfished groundfish species as defined by NOAA[4]

Boundaries were developed to reflect most precisely the specific habitat features identified, while attempting to minimize the number of way points for the sake of enforceability. The justifications for considering these areas as complex sensitive habitat are discussed below.

Hard substrates

Hard substrates, which include rocky ridges and rocky slopes, are one of the least abundant benthic habitats, yet they are among the most important habitats for fishes (Hixon et al. 1991, Pacific EFH PDEIS 2005). Hard substrates are also the seafloor substrate type most sensitive to bottom trawling and take the longest to recover (NAS 2002, Pacific EFH PDEIS 2005).

The EFH DEIS states:

> *Many managed species are dependent on hard bottom habitat during some portion of their life cycle. Typically, deeper water hard bottom habitats are inhabited by large, mobile, nektobenthic fishes such as rockfish, sablefish, Pacific hake, spotted ratfish, and spiny dogfish (MMS 2002). Cross and Allen (1993) estimated that about 30% of the fish species and 40% of the families occur over hard substrates. Many managed groundfish species use hard bottom habitats during one or more life stages including aurora rockfish, bank rockfish, black rockfish, black-and-yellow rockfish, blackgill rockfish, blue rockfish, bocaccio, bronzespotted rockfish, brown rockfish, cabezon, calico rockfish, California scorpionfish, canary rockfish, chilipepper, China rockfish, copper rockfish, cowcod, dusky rockfish, flag rockfish, gopher rockfish, grass rockfish, greenblotched rockfish, greenspotted rockfish, greenstriped rockfish, harlequin rockfish, honeycomb rockfish, kelp greenling, kelp rockfish, leopard shark, lingcod, Mexican rockfish, olive rockfish, Pacific cod, Pacific ocean perch, pink rockfish, quillback rockfish, redstripe*

[1] *Consolidated GIS Data, Volume 1, Physical and Biological Habitat data disk* (PFMC 2003).
[2] AFSC slope and shelf trawl surveys from 1977 to 2001; NWFSC slope and shelf trawl surveys from 2001 to 2003; MCBI's database of deep sea coral records (Etnoyer and Morgan 2003).
[3] Zimmerman (2003).
[4] Habitat Comprehensive Risk Assessment (PFMC 2004).

> *rockfish, rosethorn rockfish, rosy rockfish, rougheye rockfish, sharpchin rockfish, shortbelly rockfish, shortraker rockfish, silvergray rockfish, speckled rockfish, spotted ratfish, squarespot rockfish, starry rockfish, stripetail rockfish, tiger rockfish, treefish, vermilion rockfish, widow rockfish, yelloweye rockfish, yellowmouth rockfish, and yellowtail rockfish.*
>
> *Ch.3, p. 3-7*

> *Managed species known to use hard bottom habitat in the coastal zone include black rockfish, black-and-yellow rockfish, brown rockfish, cabezon, calico rockfish, California scorpionfish, chilipepper, copper rockfish, gopher rockfish, kelp greenling, leopard shark, lingcod, olive rockfish, quillback rockfish, redstripe rockfish, rosethorn rockfish, shortbelly rockfish, silvergray rockfish, and spotted ratfish.*
>
> *Ch3. p. 3-5*

Over 10,000 hard substrate polygons from the *Consolidated GIS Data, Volume 1, Physical and Biological Habitat data disk* (PFMC 2003) were plotted in GIS to determine where hard substrate habitat occurred.

Habitat-forming invertebrates

> *The planet's life-support systems are the source of stability for all peoples, all nations. Cold-water coral reefs are emerging as a new piece in this vital web of life which now requires our urgent attention.*
>
> *-Klaus Toepfer, Executive Director, UNEP*

Deep sea corals and sponges provide three dimensional structures that form habitat for commercial groundfish, shellfish, and other marine life in the Pacific (Krieger and Wing 2002; Malecha et al. 2002; Heifetz 2002) and other parts of the world (Costello et al. 2003; Scott and Risk 2003; Sulak et al. 2003; Rocha et al. 2000; Mortensen et al. 1995; Buhl-Mortensen and Mortensen 2004; Husebo et al. 2002; Sainsbury 1987). Structure-forming invertebrates (or biogenic habitat) are sensitive to impacts from bottom trawl gear (NAS 2002, Anderson et al. 2003, Engel and Kvitik 1998, Krieger 2001, Malecha and Stone 2003, MacDonald et al. 1996, Kaiser et al. 2000, Mortensen et al. 2003, Van Santbrink and Bergman 1994). Deep-sea corals and sponges, including species found on the U.S. West Coast, have been shown to be extremely long-lived (Leys and Lauzon 1998, Risk et al. 2002, Roark et al. 2005, Andrews et al. 2003). Recently, more than 1,100 scientists from around the world signed a statement (attached) on protecting deep sea coral and sponge ecosystems:

> "*In short, based on current knowledge, deep-sea coral and sponge communities appear to be as important to the biodiversity of the oceans and the sustainability of fisheries as their analogues in shallow tropical seas.*"

Throughout this DEIS process, perhaps no other criterion has generated as much discussion as the data on habitat-forming invertebrates. Despite the growing global concern for these species evidenced by the United Nations Report on Cold-water corals (Freiwald et al. 2004), consideration of the available data on habitat forming invertebrates has been viewed with trepidation and skepticism during the Pacific EFH process. We recognize that there are some limitations with the coral and sponge data, as with all marine and fisheries databases.

Nevertheless, because of the importance and sensitivities of these habitats, and the recognized need to be precautionary in management decisions in general and with regard to sensitive habitats in particular, we developed a reasonable approach using all available data.

In fact, a repeated criticism of the Alaska Region EFH DEIS by the Center for Independent Experts was that coral, sponge, and bryozoan bycatch from observer records were not analyzed, utilized, or incorporated (Drinkwater 2004). Specifically, the Center for Independent Experts recommended that NMFS "…analyze catch and effort data, observer bycatch data, field studies and consult with the industry to assess the damage done to the long-lived corals and sponges as well as the possible encroachment of fishing trawls into new areas containing corals and sponges" (Drinkwater 2004). It is worth noting that several studies to date have used trawl survey and observer bycatch records to assess distribution of these invertebrates and adverse impacts of trawling (Heifetz 2002, Heifetz et al. 2005, Anderson and Clark 2003).

Due to apparent confidentiality constraints, NMFS has not shared the Pacific observer bycatch dataset with the public. However, an analysis of the data images shows that the observer bycatch records for habitat-forming megafaunal invertebrates corroborates the areas identified for mitigation measures in the Comprehensive Alternative.

The validity of any data source depends on whether the methods used to collect the data are able to meet the objective of its use. Our specific policy objective in using the trawl survey data is to determine areas have high likelihood of containing corals and sponges within "trawlable" areas of the bottom trawl footprint. This is because areas outside the footprint and "untrawlable" areas are already protected in Revised Alternative C.12.

While direct submersible observations are the most accurate source of data for coral and sponge locations, the extremely limited spatial extent of submersible exploration on the U.S. west coast and the need to use the best available data requires the use of additional data sources. The most extensive data source containing records of habitat-forming invertebrates is the trawl survey database. Since sampling effort in the Pacific has not been uniformly distributed across habitat types, our intent in utilizing this data is not to predict the distribution of these animals across unsampled habitats, but merely to focus on regions where repeated samples have occurred. We are aware of the potential limitations in using bottom trawl surveys to identify precise abundances of habitat-forming invertebrates. Therefore, we have been extremely cautious in our use of the data. It stands to reason that an area which contains repeated samples of corals and sponges contains habitat suitable for corals and sponges. In fact, the PFMC's Science and Statistical Committee recommended that a reasonable approach is to focus on areas where corals and sponges have been documented, either from trawl surveys or other sources.

Coral and sponge records from trawl surveys must be considered a conservative estimate of the presence of biogenic habitat. Unfortunately, little information exists to ground-truth the extensive trawl survey databases with seafloor habitat. Of the thousands of NOAA trawl survey hauls that have occurred through the years, only one trawl survey track has been crossed by known submersible dive transects. The survey track, which occurred in 1986, was crossed by three dive transects on Heceta Bank in 2002. That 1986 trawl survey haul recorded 4 kg of an unidentified sponge species, or an estimated CPUE of 1 kg/hr. In 2002, the three dive transects that crossed this survey track recorded high densities of sponge of up to 167 vase sponges/ $100 m^2$ (Wakefield, unpublished data). This reflects that a coral or sponge record from a trawl survey is indicative of areas of biogenic habitat. An initial focus on regions where corals and sponges have been documented, either from trawl surveys or other sources, is a reasonable approach, and was specifically recommended by the PFMC Scientific and Statistical Committee in its review of Alternative C.12. Given the importance and sensitivities of these habitats, and the recognized need to be precautionary in management decisions, we developed a responsible and reasonable approach to consider all available data in making management decisions.

We also recognize the trawl survey sampling and statistical design creates a possibility for false negatives. In other words, the data sets may fail to identify habitat-forming invertebrates in many places where they actually occur. We are aware that sampling invertebrates is not the primary goal of trawl surveys. This may result in failing to sample "untrawlable" areas where habitat-forming invertebrates occur and/or failing to record occurrences at sampled sites. The former, as discussed, does not appear to pose a problem since we are only using the data for identifying positive locations. The latter possibility is likely to be reduced significantly by repeated sampling at the same location, which is a sampling strategy used in the trawl survey.

Trawl surveys do not pinpoint exact locations, but rather transects. Therefore a positive record of habitat-forming invertebrates means that the habitat may be found anywhere along the trawl track. Therefore, in drawing boundaries, we attempted to include the entire trawl track inside the closure boundary for each record we used to justify a biogenic area closure. Furthermore, invertebrate identification is recorded at the taxonomic group level rather than at the species level. This does not pose a significant problem because identification to taxonomic group level is sufficient to classify an invertebrate as "habitat-forming".

An extensive database was used to determine "hotspots" where the presence of habitat-forming invertebrates (corals, sea whips, sea pens and sponges) was frequently recorded or large samples of these invertebrates occurred. The database comprised records from Alaska Fisheries Science Center slope and shelf trawl surveys from 1977 to 2001, Northwest Fisheries Science Center slope and shelf trawl surveys from 2001 to 2003, and MCBI's database of deep-sea coral records. MCBI's database was commissioned by NOAA and includes coral records from the California Academy of Sciences, Smithsonian Institution, MBARI, and Scripps compiled from various research cruises and scientific collections (Etnoyer and Morgan 2003).

Two types of point density analyses were performed using the ArcView 9.0 Spatial Analyst Point Density Tool (ESRI 2004) to determine clusters of coral and sponge records. The first analysis explored the density of records, with each point weighted equally. A total of 3,691 coral and sponge records were used in the analysis. For trawl survey data (3,291 records), the start point of the trawl was used to plot points. For other coral and sponge data (400 records from MCBI dataset) the sample location point was plotted. Using a cell size of 2,000 meters and a search radius of 10,000 meters, the point density function outputs the mean density per kilometer of coral and sponge records. This approach identifies areas that have had numerous records of habitat-forming invertebrates.

The second analysis explored clusters of coral and sponge records with high survey catches. Only trawl survey data, with associated records for catch weight and CPUE, were used in the analysis. A total of 3,291 survey start points from NOAA trawl surveys from 1977-2003 were plotted. This density analysis weighted the points by the rounded integer of the catch of coral or sponge. For example, a CPUE of 10 kg/km^2 would be counted ten times. This approach identifies areas with the highest relative weights of coral and sponge sample records. Both analyses were useful for identifying "hotspots" of records of habitat-forming invertebrates.

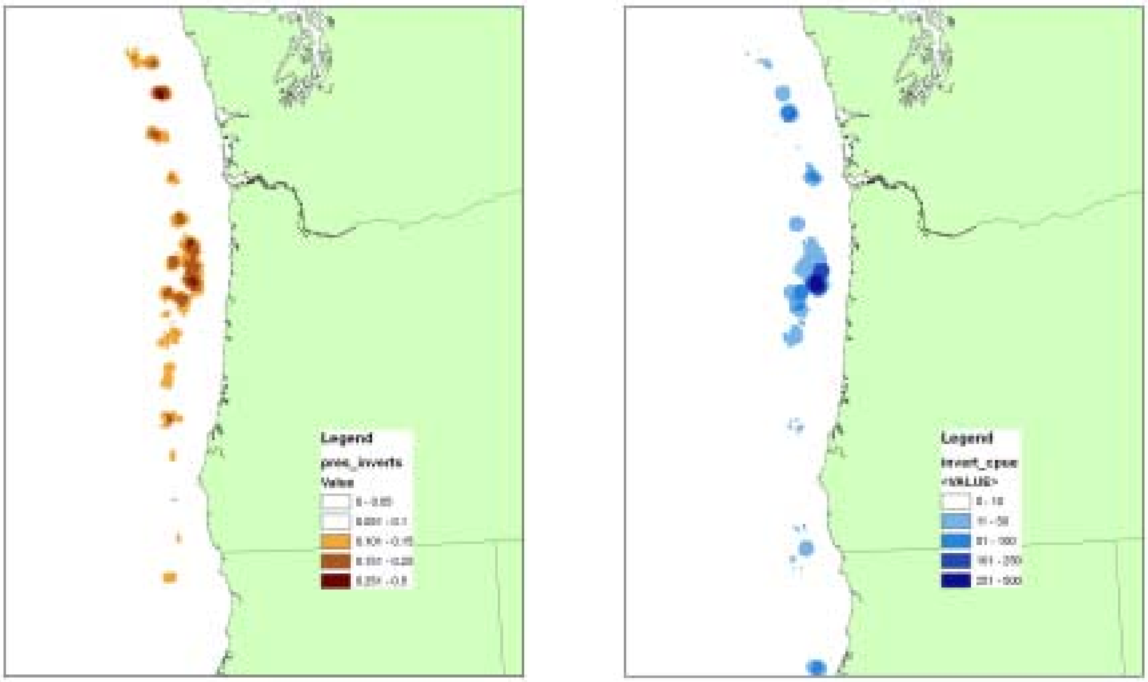

Figure 1: Point density analysis of coral and sponge records. The figure on the left displays output when all points are weighted equally. The legend shows density of points per square kilometer. The figure on the right displays output from point density analysis with points weighted by CPUE. The legend shows mean CPUE per square kilometer.

At the March 2005 PFMC meeting, the Scientific and Statistical Committee suggested paying greater attention to presence data from the NMFS trawl survey information that was used in the identification of biogenic areas. As such, a few additional closure areas were identified using information on habitat-forming invertebrates as the primary criterion.

Submarine canyons and gullies

Submarine canyons are known to be areas of enhanced productivity due to current upwelling zones (Freeland and Denman 1982). For this reason, canyons show enhanced concentrations of benthic invertebrates (Haedrich et al. 1980; Sarda et al. 1994; Vetter and Dayton 1999), plankton (Cartes et al. 1994; Macquart-Moulin and Patriti 1996), demersal fishes (Stefanescu et al. 1994), and whales (Kenney and Winn 1987; Schoenherr 1991) relative to surrounding areas on the slope and shelf. Brodeur (2001) found dense concentrations of Pacific ocean perch (*Sebastes alutus*) and krill associated with biogenic habitats in a Bering Sea submarine canyon, while areas with damaged biogenic structures had far fewer rockfish, and areas in the canyon without biogenic structure had no rockfish. In the North Pacific Ocean, rockfishes in the genus *Sebastes* often inhabit the offshore edges of banks or canyons and are known to capitalize on advected prey resources such as euphausiids (Pereyra et al. 1969; Brodeur and Pearcy 1984; Chess et al. 1988; Genin et al. 1988). Therefore, submarine canyons provide essential habitat for groundfish that is highly vulnerable to fishing impacts.

Vetter and Dayton (2001) found that submarine canyons in Southern California provide large quantities of food in aggregated form on the deep sea floor by acting as conduits for marine macrophyte production produced in the intertidal and shallow subtidal zone. This study also found elevated abundance of Pacific hake and turbot in these canyons. Starr et al. (2002) found evidence for site fidelity in green-spotted rockfish (*S. chlorostictus*) and suggested large-scale reserves for boccacio (*S. paucispinus*) at a canyon in Monterey Bay.

Submarine canyons provide habitat for larger sized rockfish that seem to prefer structures of high relief such as boulders, vertical walls, and ridges. Yoklavich et al. (2000) found high abundance of large rockfish associated with complex structural habitat in Soquel Canyon with lower size and abundance in fished areas. Canyon heads are the upper, shallower portions of submarine canyons where coastal upwelling fronts have been shown to contain high abundance of rockfish larvae (Bjorkstedt 2002). Additionally, Hooker (1999) found higher abundance of cetaceans in a submarine canyon known as “The Gully” off Nova Scotia relative to surrounding areas of the shelf and slope. The cover and protection offered by submarine canyons allow pockets of rockfish populations to flourish, in contrast to more exposed areas where the populations are more easily fished. Because submarine canyons on the U.S. West Coast are typically upwelling zones, they often contain higher abundances of filter feeding invertebrates, such as corals, sponges, tunicates, and bryozoans, which contribute to the structural complexity of the seafloor.

Canyon habitat polygons from the *Consolidated GIS Data, Volume 1, Physical and Biological Habitat data disk* (PFMC 2003) were plotted in GIS.

Untrawlable areas

The Zimmerman (2003) database includes all records from the NMFS West Coast Triennial Trawl Survey where major trawl net hangs and untrawlable survey stations were recorded. These areas are considered unsuitable for trawling due to areas of high structural complexity, such as boulders or rock outcrops (Zimmerman, pers. com.). Substrates or structures that induce a trawl hang provide habitat for juvenile fish (Link and Demarest 2003). The study found that a buffer of 3.7 km (2 nautical miles) around these features would encompass 17-30% of juvenile fish. Since most trawl net hangs are concentrated, these authors recommend a methodology of identifying these concentrations and establishing a no-trawl buffer around them. Other work on this topic suggests that such a methodology would only close 1-4% of the ocean bottom to trawling (Link 1997).

Furthermore, it is expensive to fisherman to replace trawl gear that has been damaged or lost due to contact with benthic structure. Since fishermen wish to avoid hangs, closing areas with high relative densities of areas known to be “untrawlable” will help avoid damage to trawl nets and close areas fishermen probably avoid anyway. Therefore, the economic effects of bottom trawl closures based on the Zimmerman dataset are likely to be negligible.

The GIS data used in the manuscript by Zimmerman (2003) was plotted in GIS.

Seamounts

Seamounts are sites of enriched biological activity relative to the surrounding waters (Mullineaux and Mills 1997, Dower and Perry 2001, Haney et al. 1995). Koslow et al. (2001) conducted a survey of Tasmanian seamounts where 30% of species identified were new to science and 30-60% were found nowhere else on earth. Studies indicate that seamounts function as deep-sea islands of localized species distributions, dominated by suspension feeders like corals and sponges which can be easily damaged by fishing gear that makes contact with the bottom (Monterey Bay National Marine Sanctuary, Sanctuary Integrated Monitoring Network, URL: www.mbnmssimon.org/sections/seamounts/overview.php).

Recent studies conducted by the Monterey Bay Aquarium Research Institute on West Coast seamounts have documented unique and diverse biological communities. (http://www.mbari.org/volcanism/seamounts/seamountsresearchtop.htm). Along the crests and slopes of several seamounts, MBARI scientists observed long-lived coral and sponge habitats. DeVogelaere et al. (2003) found 24 coral taxa on Davidson Seamount off California and described numerous species associations, particularly that *Paragorgia sp*. were found in areas with highest species diversity. Guyots are a type of volcanic seamount with a flat top or plateau. Because the tops are flat, they may be particularly vulnerable to trawling due to the relative ease of setting trawl gear. The rarity, uniqueness, and vulnerability of seamount faunal communities provide strong scientific justification for a highly precautionary approach (de Forges et al. 2000, Stocks 2004, Probert et al. 1997).

Eight seamounts have been identified within the jurisdiction of the PFMC. These are President Jackson, Thompson, San Juan, Guide, Pioneer, Gumdrop, Davidson, and Rodriguez Seamounts. The location and area delineation of most of the seamounts were plotted in GIS from data on the *Consolidated GIS Data, Volume 1, Physical and Biological Habitat data disk* (PFMC 2003). Rodriguez Seamount was not included in the dataset but has been incorporated into the revised alternative.

Highest 20% habitat suitability for overfished groundfish species

Several major groundfish species have been designated as overfished and are currently being fished pursuant to rebuilding plans. Most of these species have been documented to use complex structural habitat. Protecting habitats specifically for these species will aid in their recovery.

Habitat suitability modeling performed in the Habitat Comprehensive Risk Assessment (PFMC 2004) identified areas of the highest suitability for overfished groundfish species. The proposed spatial management measures in Alternative C.12 were selected to ensure protection of habitat important for overfished groundfish species.

Consideration of all available data

With data in hand, we began to construct the spatial management component of Alternative C.12, identifying areas that would be open or closed to bottom trawling. Because we recognized that it was not practicable to close every area of sensitive habitat to bottom trawling, we attempted to reach a reasonable solution that is as cost-effective and equitable as possible. In other words, we attempted to protect as much important habitat as possible while minimizing short-term economic costs. Many factors were carefully considered while drawing boundaries for the open/closed areas to bottom trawling:

- Avoid high fishery value areas when considering closed areas;
- When habitat features overlapped high fishery value areas, minimize the overlap of the resultant boundary;
- Distribute open/closed areas equitably among regions; and
- Draw closed area boundaries that conform to the habitat feature, minimizing closure area

Results

Overview

Table 1: Summary Statistics of Revised Alternative C.12

Area Description	Square kilometers	Square miles (nautical)
Area within Pacific EEZ	826,680	241,021
Area of existing bottom trawl footprint (fished area)	82,000	23,908
Area remaining open to bottom trawling	70,000	20,409
Area to be closed within the existing footprint	12,000	3,499
Area closed outside existing footprint (unfished)	745,000	217,207
Total area closed	757,000	220,706

Freezing the existing bottom trawl footprint resulted in approximately 745,000 km^2 of untrawled or lightly trawled habitat within PFMC jurisdiction closed to bottom trawling. Most of this area comprises habitat prohibitively deep for trawl fisheries to fish with current technology. Additionally, 61 areas of sensitive habitat were identified for potential bottom trawl closures. In many cases, portions of the above-mentioned areas were located outside of the trawl footprint, and would be closed by freezing the footprint. Sensitive habitat areas proposed for closure within the trawl footprint (i.e. trawled areas that would be closed) totaled approximately 12,000 km^2 of habitat. The total area where bottom trawling would be permitted (the "open" area) totaled approximately 70,000 km^2.

The spatial management component of Revised Alternative C.12 provides substantial protection of sensitive habitat features while allowing for continued bottom trawling opportunities. A large proportion of sensitive habitat types are protected by the areas selected. In other words, Revised Alternative C.12 is a practicable alternative to minimize the adverse impacts of bottom trawling on Essential Fish Habitat. The following maps (Figure 2 to Figure 7) display the spatial management component of Revised Alternative C.12 and illustrate the areas open or closed to bottom trawling. For a detailed illustration of individual areas and the criterion used to develop boundaries of the open or closed areas, see the figures at the end of this document (Figures 8 through 61).

Overview maps of Revised Alternative C.12

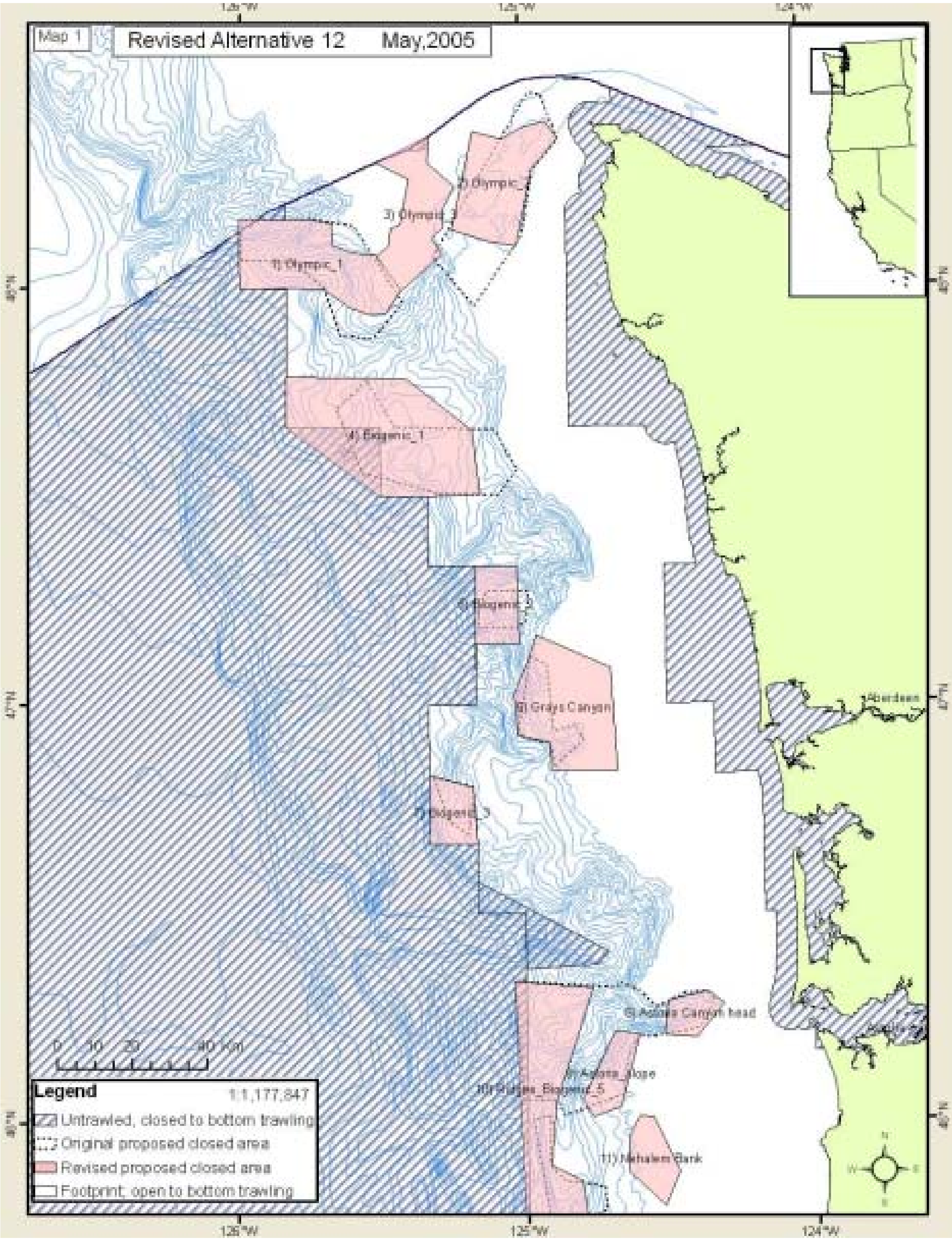

Figure 2: Revised Alternative C.12, Overview Map 1

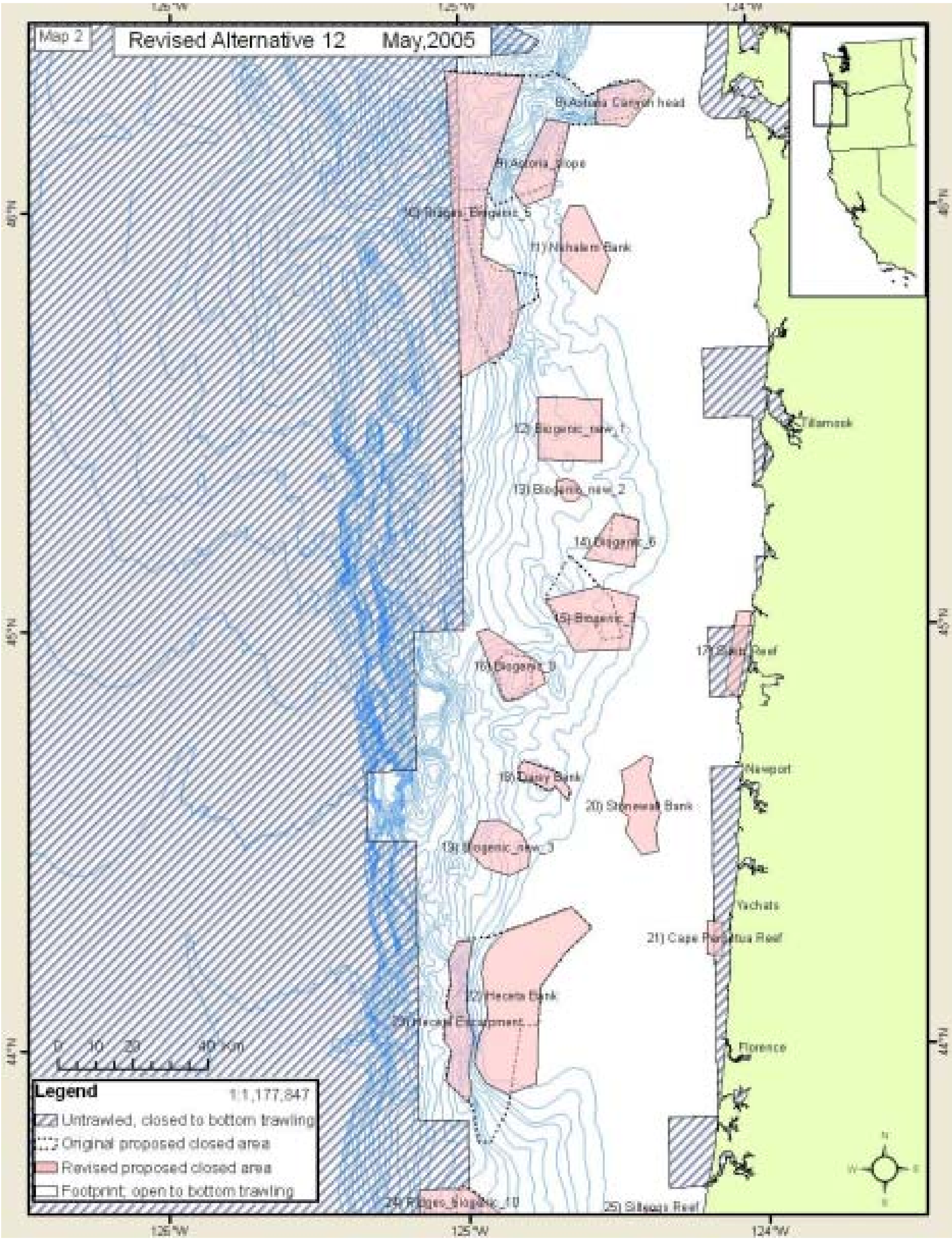

Figure 3: Revised Alternative C.12, Overview Map 2

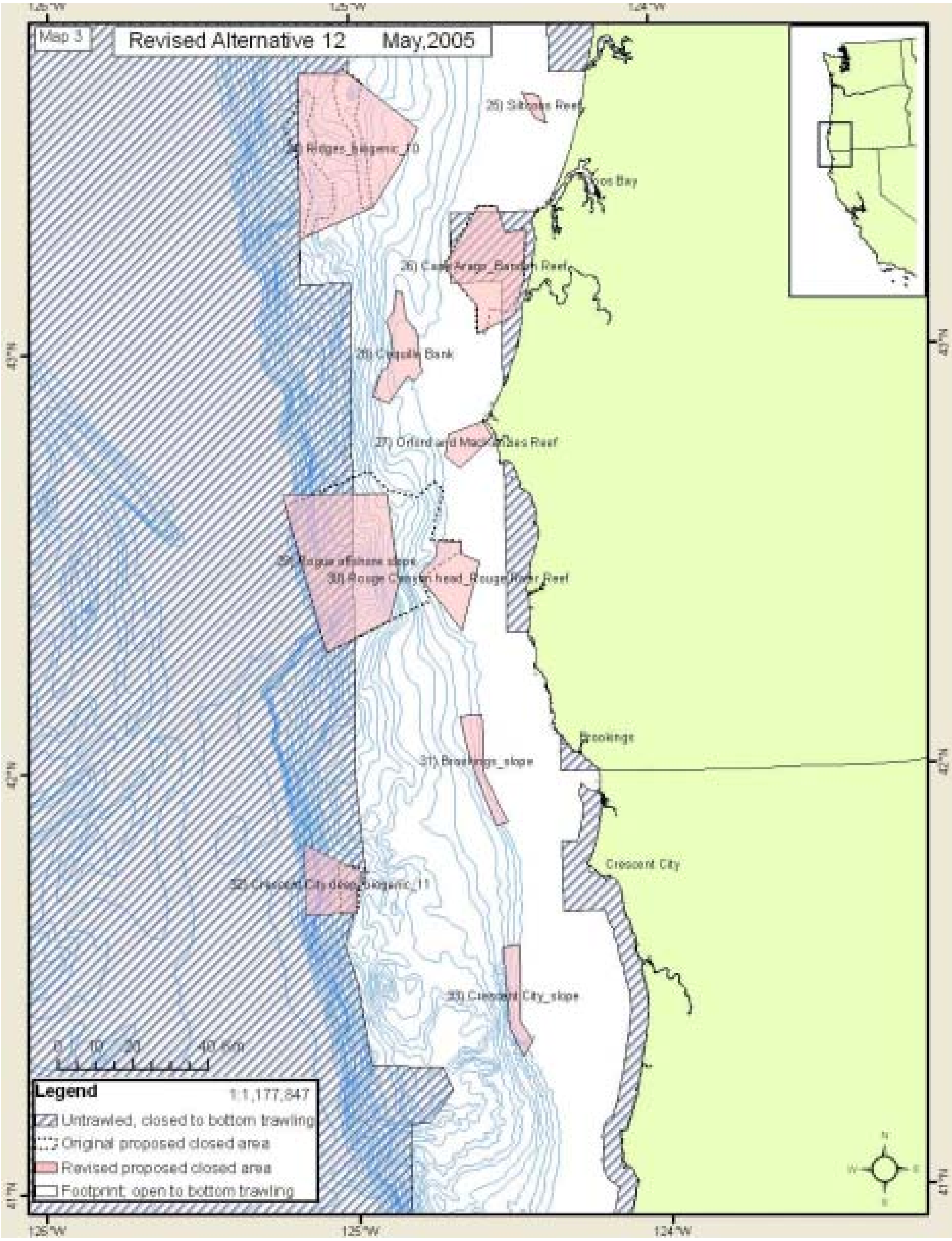

Figure 4: Revised Alternative C.12, Overview Map 3

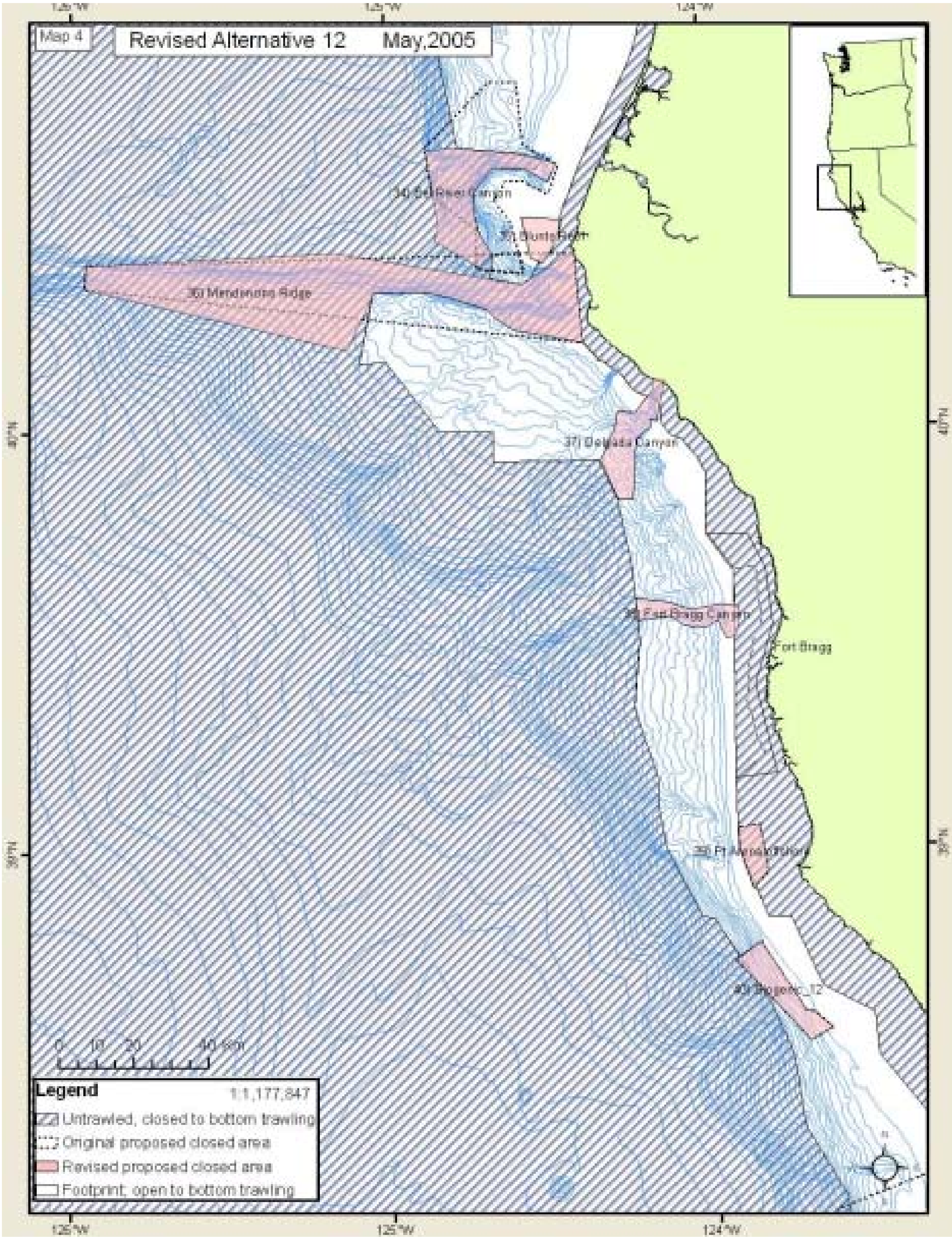

Figure 5: Revised Alternative C.12, Overview Map 4

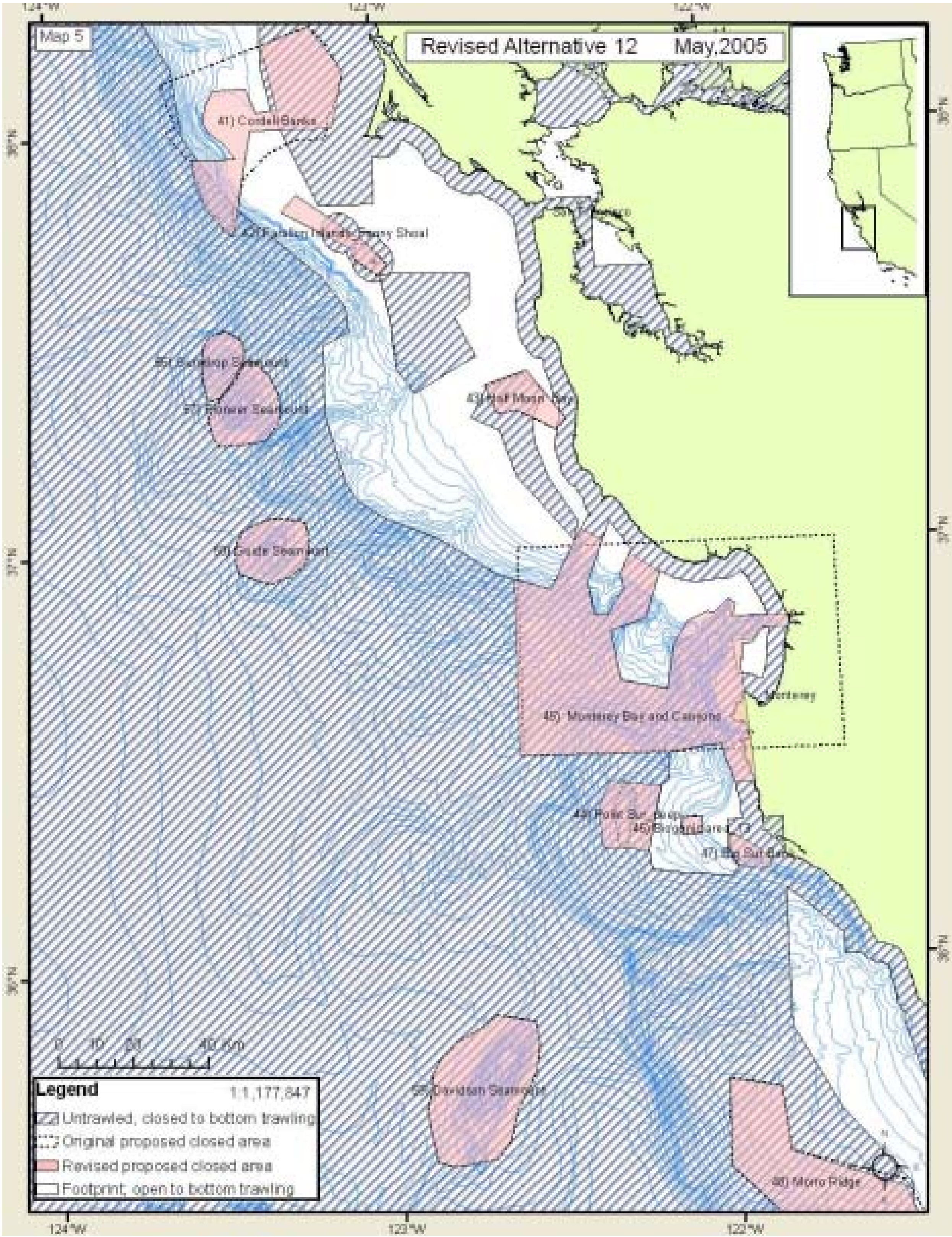

Figure 6: Revised Alternative C.12, Overview Map 5

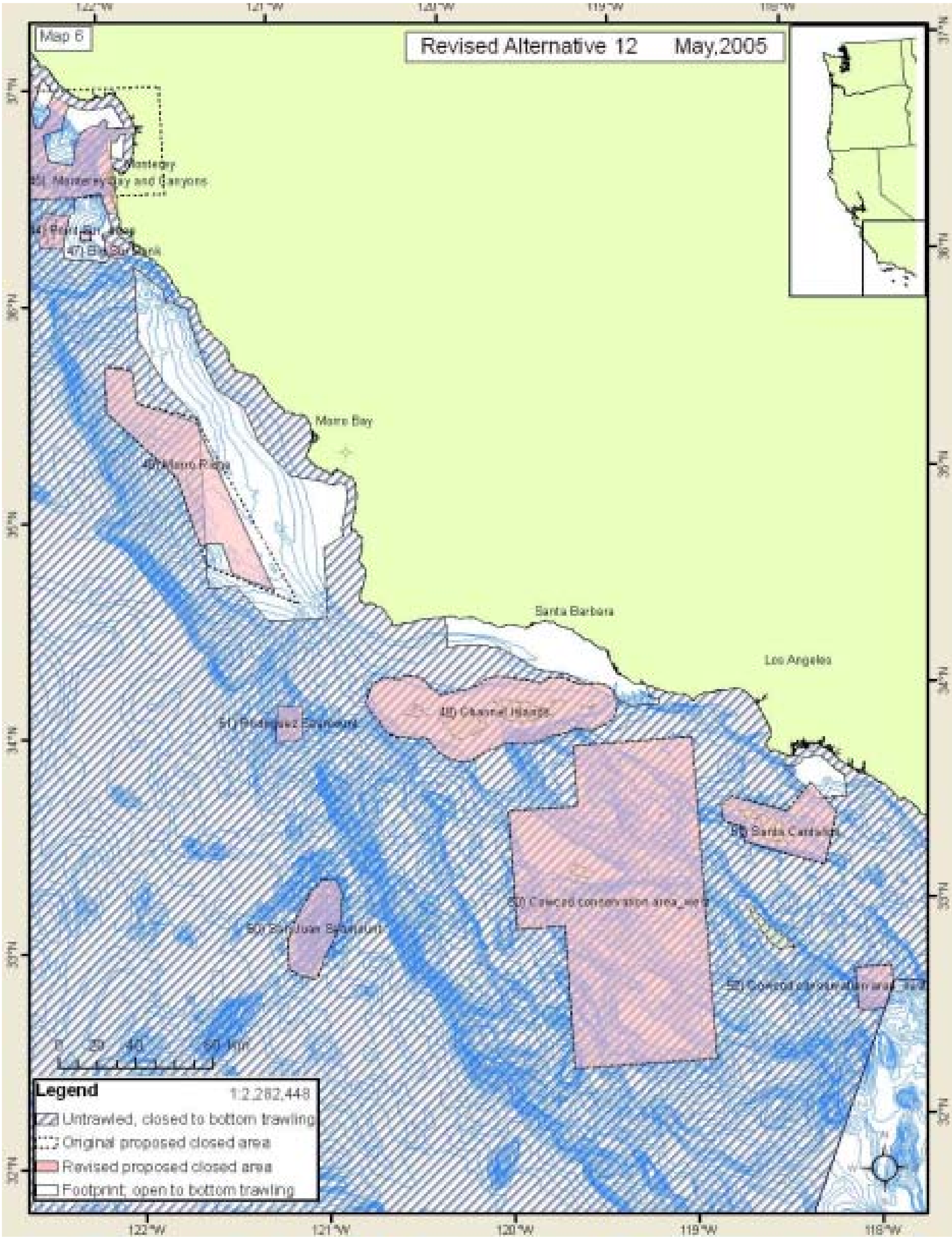

Figure 7: Revised Alternative C.12, Overview Map 6

Habitat-forming invertebrate data

NOAA bottom trawl surveys from 1977 to 2003 document 3,270 occurrences, totaling 16,765 kilograms, of habitat-forming invertebrates (corals, sponges, sea whips and sea pens) off the Pacific coast. Revised Alternative C.12 would close a significant portion of areas where those animals occurred. The area closed to bottom trawling under Revised Alternative C.12 contains 1,288 records of habitat-forming invertebrates (39% of all occurrences documented during NOAA trawl surveys). Further, the proposed closed areas contain a larger proportion of high density records, encompassing areas where 11,275 kg, or over 67% of the invertebrate biomass, was sampled. Deep sea coral records from other sources (Etnoyer and Morgan 2003) are well represented in the proposed closed areas with 356 of 400 coral records (89%) located within the proposed closed areas.

Unfortunately, this metric of analysis to consider important seafloor habitat was not used in the EFH DEIS to evaluate most of the other mitigation alternatives. As such, Revised Alternative C.12 encompasses far more records of this habitat type than other alternatives that did not consider this criterion.

Table 2: Records[5] of habitat-forming invertebrates (corals, sponges, sea whips and sea pens) in proposed areas. Areas where no or low numbers of records exist are likely due to lower sampling effort and do not indicate the absence of these animals in that area.

Number	Name	total records
1	Olympic_1	54
2	Olympic_2	18
3	Olympic_3	9
4	Biogenic_1	140
5	Biogenic_2	64
6	Grays Canyon	48
7	Biogenic_3	46
8	Astoria Canyon head	10
9	Astoria_slope	13
10	Ridges_Biogenic_5	118
11	Nehalem Bank	4
12	Biogenic_new_1	77
13	Biogenic_new_2	26
14	Biogenic_6	24
15	Biogenic_7	71
16	Biogenic_8	50
17	Siletz Reef	0
18	Daisy Bank	7
19	Biogenic_new_3	39
20	Stonewall Bank	2
21	Cape Perpetua Reef	0
22	Heceta Bank	16

[5] The database comprised records from Alaska Fisheries Science Center slope and shelf trawl surveys from 1977 to 2001, Northwest Fisheries Science Center slope and shelf trawl surveys from 2001 to 2003, and MCBI's database of deep-sea coral records. MCBI's database was commissioned by NOAA and includes coral records from the California Academy of Sciences, Smithsonian Institution, MBARI, and Scripps compiled from various research cruises and scientific collections (Etnoyer and Morgan 2003).

23	Heceta Escarpment	50
24	Ridges_biogenic_10	103
25	Siltcoos Reef	0
26	Cape Arago_Bandon Reef	2
27	Orford and MacKenzies Reef	1
28	Coquille Bank	6
29	Rogue offshore slope	26
30	Rogue Canyon head_ Rogue River Reef	2
31	Brookings_slope	4
32	Crescent City deep_ biogenic_11	35
33	Crescent City_slope	5
34	Eel River Canyon	7
35	Blunts Reef	0
36	Mendocino Ridge	6
37	Delgada Canyon	7
38	Fort Bragg Canyon	0
39	Pt Arena offshore	0
40	Biogenic_12	40
41	Cordell Bank	20
42	Farallon Islands_ Fanny Shoal	3
43	Half Moon Bay	0
44	Point Sur_deep	11
45	Monterey Bay and Canyons	303
46	Biogenic area_13	21
47	Big Sur Bank	1
48	Morro Ridge	81
49	Channel Islands	10
50	Cowcod conservation area_west	5
51	Santa Catalina	10
52	Cowcod conservation area_east	0
53	Thompson Seamount	0
54	President Jackson Seamount	0
55	Taney Seamount	0
56	Gumdrop Seamount	1
57	Pioneer Seamount	1
58	Guide Seamount	0
69	Davidson Seamount	27
60	San Juan Seamount	0
61	Rodriguez Seamount	0
	Total records in revised closed areas	1624

Untrawlable areas

The closed areas in Revised Alternative C.12 encompass 4,935 of 8,943 polygons, or 1,057 km^2 (over 57%) of 1,847 km^2, of "untrawlable" area (trawl hangs, pinnacles) as defined by Zimmerman (2003).

Estimated displaced tows, catch, and ex-vessel revenue

The estimates of displaced revenue of the original Alternative C.12 proposal were provided by the WDF&G, who estimated displaced revenue by summing catch from 2003 trawl logbook set points contained within the closed area. The estimates of the revised Alternative C.12 were made by determining the proportional overlap of a closed area with 2000-2003 trawl effort data that was provided in 10 x 10 minute blocks. The proportional method assumes a uniform distribution of fishing effort across a block. However, the revised closed area boundaries were made with the spatial distribution of trawl tracks. The estimates of displaced revenue from the revised Alternative C.12 reported below are likely grossly overestimated (Table 3). The methodology used to determine displaced revenue relied on the assumption that trawl effort and catches were distributed uniformly within the block area for which economic information was provided. Analysis of trawl logbook set and haul back points indicated that this is not the case. Trawl activity is patchy, and is located in discrete areas. This was confirmed by the overlay maps of the set points with the proposed closed areas. Since the boundaries of closed areas were refined to avoid patches of heavy trawl effort, the actual displaced revenue is minimized much more than simply reducing the area would indicate. Nonetheless, even assuming uniform fishing effort across a block, our modified closed areas reduced the previously estimated displaced revenue by over 30% from displaced revenue of $5.4 million in original Alternative C.12 to $3.4 million in Revised Alternative C.12 (Table 3).

As a result of analyses of the spatial distribution of trawl track information from logbooks, input from trawl fishermen, and comments from the SSC, areas of Alternative C.12 were revised to provide for expanded trawl grounds while protection of habitat areas. This revised Alternative C.12 reduces revenue displacement across the EFH area while maintaining integrity of protection/mitigation. The revised Alternative C.12 results in displacement of less than 15% and far less loss in any actual revenue.

Table 3: Revised Alternative C.12 revenue displacement comparison to original Alternative C.12

		Estimated displaced ex-vessel revenue	
Number	Name	**Original**	**Revised**
1	Olympic_1	1,286,058	431,115
2	Olympic_2	326,284	280,685
3	Olympic_3	N/A *	395,676
4	Biogenic_1	172,849	36,486
5	Biogenic_2	31,982	15,438
6	Grays Canyon	5,917	34,512
7	Biogenic_3	2,351	4,554
#8	Astoria Canyon head	509,857	33,399
#9	Astoria_slope		74,755

10	Ridges_Biogenic_5	189,585	136,537
11	Nehalem Bank	N/A *	8,824
12	Biogenic_new_1	N/A *	69,960
13	Biogenic_new_2	N/A *	5,969
14	Biogenic_6	3,585	29,402
15	Biogenic_7	76,470	91,908
16	Biogenic_8	36,172	41,852
17	Siletz Reef	N/A *	132
18	Daisy Bank	0	11,768
19	Biogenic_new_3	N/A *	70,573
20	Stonewall Bank	N/A *	7,252
21	Cape Perpetua Reef	N/A *	125
#22	Heceta Bank	379,291	200,810
#23	Heceta Escarpment		28,665
24	Ridges_biogenic_10	12,121	94,628
25	Siltcoos Reef	N/A *	383
26	Cape Arago_Bandon Reef	2,016	12,018
27	Orford and MacKenzies Reef	N/A *	3,929
28	Coquille Bank	N/A *	75,004
#29	Rogue offshore slope	491,706	81,296
#30	Rouge Canyon head_ Rouge River Reef		63,876
31	Brookings_slope	N/A *	48,884
32	Crescent City deep_biogenic_11	2,734	9,635
33	Crescent City_slope	N/A *	49,779
34	Eel River Canyon	551,397	201,696
35	Blunts Reef	N/A *	25,495
36	Mendoncino Ridge	201,902	108,769
37	Delgada Canyon	N/A *	79,978
38	Fort Bragg Canyon	N/A *	51,128
39	Pt Arena offshore	N/A *	47,324
40	Biogenic_12	109,117	61,321
41	Cordell Banks	140,883	49,064
42	Farallon Islands_Fanny Shoal	78	9,967
43	Half Moon Bay	580	41,073
44	Point Sur_deep	0	10,173
45	Monterey Bay and Canyons	645,196	191,468
46	Biogenic area_13	26,257	11,282
47	Big Sur Bank	N/A *	1,694
48	Morro Ridge	258,779	30,125
49	Channel Islands	0	11,016
50	Cowcod conservation area_west	0	0
51	Santa Cantalina	0	2,315
52	Cowcod conservation area_east	0	0
53	Thompson Seamount	0	0
54	President Jackson Seamount	0	0
55	Taney Seamount	0	0
56	Gumdrop Seamount	0	0
57	Pioneer Seamount	0	0
58	Guide Seamount	0	0
59	Davidson Seamount	0	0

60	San Juan Seamount	0	0
61	Rodriguez Seamount	0	0
	Grand Total	5,463,659	3,408,709
Percent of annual revenue displaced		22%	14%

* Indicates areas in the revised Alternative C.12 proposal which were not identified in the original Alternative C.12.
# Indicates areas in the original Alternative C.12 proposal which were split into component areas in the revised Alternative C.12

Table 4: Estimated annual displaced tows, catch, and ex-vessel revenue for Revised Alternative C.12 based on the proportional overlap of closed areas with fishing effort blocks generated from logbook data from 2000-2003.

Number	Name	Estimated tows	Estimated catch (mt)	Estimated value ($)
1	Olympic_1	1,972	597.9	431,115
2	Olympic_2	1,809	277.2	280,685
3	Olympic_3	1,990	595.9	395,676
4	Biogenic_1	248	20.3	36,486
5	Biogenic_2	57	9.7	15,438
6	Grays Canyon	1,051	56.7	34,512
7	Biogenic_3	8	2.0	4,554
8	Astoria Canyon head	686	30.7	33,399
9	Astoria_slope	534	61.6	74,755
10	Ridges_Biogenic_5	675	83.4	136,537
11	Nehalem Bank	71	6.7	8,824
12	Biogenic_new_1	390	50.9	69,960
13	Biogenic_new_2	32	3.8	5,969
14	Biogenic_6	172	18.0	29,402
15	Biogenic_7	518	57.8	91,908
16	Biogenic_8	189	27.8	41,852
17	Siletz Reef	1	0.1	132
18	Daisy Bank	81	9.4	11,768
19	Biogenic_new_3	344	47.8	70,573
20	Stonewall Bank	53	5.7	7,252
21	Cape Perpetua Reef	1	0.1	125
22	Heceta Bank	873	151.5	200,810
23	Heceta Escarpment	98	18.1	28,665
24	Ridges_biogenic_10	294	62.2	94,628
25	Siltcoos Reef	4	0.4	383
26	Cape Arago_Bandon Reef	109	12.8	12,018
27	Orford and MacKenzies Reef	27	3.6	3,929
28	Coquille Bank	401	59.5	75,004
29	Rogue offshore slope	204	49.4	81,296
30	Rogue Canyon head_Rogue River Reef	310	52.1	63,876
31	Brookings_slope	347	39.4	48,884
32	Crescent City deep_biogenic_11	15	4.5	9,635

33	Crescent City_slope	318	36.0	49,779
34	Eel River Canyon	630	147.6	201,696
35	Blunts Reef	86	21.3	25,495
36	Mendocino Ridge	248	77.6	108,769
37	Delgada Canyon	261	56.4	79,978
38	Fort Bragg Canyon	145	30.7	51,128
39	Pt Arena offshore	226	34.3	47,324
40	Biogenic_12	137	45.8	61,321
41	Cordell Bank	262	33.0	49,064
42	Farallon Islands_Fanny Shoal	42	4.3	9,967
43	Half Moon Bay	292	12.1	41,073
44	Point Sur_deep	24	5.6	10,173
45	Monterey Bay and Canyons	913	156.7	191,468
46	Biogenic area_13	35	7.8	11,282
47	Big Sur Bank	2	1.5	1,694
48	Morro Ridge	52	22.6	30,125
49	Channel Islands	265	1.8	11,016
50	Cowcod conservation area_west	0	0.0	0
51	Santa Catalina	142	0.5	2,315
52	Cowcod conservation area_east	0	0.0	0
53	Thompson Seamount	0	0.0	0
54	President Jackson Seamount	0	0.0	0
55	Taney Seamount	0	0.0	0
56	Gumdrop Seamount	0	0.0	0
57	Pioneer Seamount	0	0.0	0
58	Guide Seamount	0	0.0	0
69	Davidson Seamount	0	0.0	0
60	San Juan Seamount	0	0.0	0
61	Rodriguez Seamount	0	0.0	0
	Grand Total	17,653	3,114.4 mt	$3,408,709

Overall, the spatial management components of Revised Alternative C.12 represents an estimated displacement of $3,408,709 in annual trawl revenue, protects areas containing 1,624 records of habitat-forming invertebrates (corals, sponges, sea whips, and sea pens). Of the approximately 82,000 km^2 bottom trawl footprint identified using the best available logbook data, 12,000 km^2 (under 15%) is closed to bottom trawling in this alternative leaving a total open area to bottom trawling of 70,000 km^2.

Other management measures

Trawl effort reduction

Dinmore et al. (2003) found that without commensurate reductions in fishing effort, closing off a heavily trawled area may result in significant displacement of trawled effort into remaining open areas, including previously untrawled areas. For this reason, the NRC (2002) report on the effects of bottom trawling notes that effort reduction is the "cornerstone of habitat protection". While there may be several ways to reduce bottom trawl effort, the crucial factor is that the total area swept by bottom trawl gear is reduced. Alternative C.12 specifically attempts to avoid closing heavily trawled areas in order to minimize displacement of trawl effort in to new areas. Also, recent measures enacted by the PFMC have reduced trawl effort to rebuild overfished species. Recent buyouts have also reduced the total annual trawl effort on the U.S. west coast. However, as stated in the NRC (2002) recommendations, trawl effort may still need to be reduced to ensure the adequacy of any measures to fully mitigate the adverse impacts of trawl gear. Revised Alternative C.12, therefore, recommends Council-developed bottom trawl effort reductions.

Gear restrictions

In 2000, the Pacific Fishery Management Council adopted regulations designating where different size bottom trawl gear may be fished. Only bottom trawls with footrope diameter 8 inches or smaller (including rollers, bobbins, or other material along the length of the footrope) may be used shoreward of the Rockfish Conservation Areas (RCA). Footrope restrictions are linked to fish trip limits as a means of management by the PFMC. The Bellman and Heppel study (Appendix A-19) provides evidence that an 8 inch roller maximum roller size gear restriction can be an effectively reduce trawl effort over rocky substrate. This study suggests that adverse impacts in some specific areas have been reduced as an indirect effect of roller size restrictions. It is crucial that this gear restriction remain permanent to ensure continued protection to Essential Fish Habitat, and be expanded to encourage further mitigation of adverse impacts.

A loophole exists in that while fishing for species without trip limits, the footrope restrictions do not apply. Also, the existing footrope restrictions area not permanent, and be reinstated annually by the PFMC. Seaward of the RCA, there are no restrictions on trawl gear. A four seam Aberdeen trawl is commonly used for the deepwater fleet with rollers or rockhoppers up to 14 inches in diameter (Recht, 2003). These vessels target dover sole, sablefish, and thornyheads.

The Revised Comprehensive Alternative includes an 8 inch roller size restriction for all bottom trawl gear deployed in the U.S. West Coast EEZ. Limitations on the roller size of bottom trawl gear provide an effective management measure to reduce bottom trawl effort on rocky substrates with substantial structural complexity. Bellman and Heppell (in press) found that the 8 inch roller size restriction implemented by the Pacific Fishery Management Council in 2000 effectively reduced bottom trawl effort at five sites with hard, rocky substrate on the U.S. West Coast by 86%. This gear restriction, however, was only implemented in specific depth ranges and therefore does not protect rocky substrate types in areas where it was not implemented. Therefore, expanding this existing gear restriction throughout the entire U.S. west coast EEZ is an effective way to prevent trawl damage to complex rocky substrates in areas that remain open in this alternative.

The Comprehensive Alternative includes the following footrope restrictions:

- Bottom trawling within the open bottom trawl area may only use footropes 8 inches or smaller in diameter;

- The footrope restriction must be applied for all bottom trawling, regardless if the target species has trip limits; and
- Footrope restrictions are made permanent instead of re-authorized on an annual basis.

While gear modifications must be an integral component of a comprehensive strategy to mitigate the adverse effects of trawling on Essential Fish Habitat, they are not a substitute for bottom trawl closures. The International Council for the Exploration of the Seas (ICES) released a statement that “the only proven method of preventing damage to deep-water biogenic reefs from fishing activities is through spatial closures to towed gear that potentially impact the bottom” (cited in Christiansen and Lutter 2003).

Comprehensive research and benthic mapping

Basic biology and life history information is lacking for many deep sea coral and sponge species. Understanding growth rates, reproduction, dispersal, and ages of deep sea corals and sponges and other habitat-forming invertebrates will provide estimates of recovery time for different habitat types. EFH identification research should explore the community ecology of coral and sponge habitats, including the production functions between the biogenic habitat features and commercial fish species, and prey species for commercial fish species, among other functions. Basic biology and life history information is lacking for many deep sea coral and sponge species. Understanding growth rates, reproduction, dispersal, and ages of deep sea corals and sponges will provide estimates of recovery time for different habitat types.

The distribution of sensitive habitat types off the Pacific Coast can be determined through a combination of seafloor mapping projects and developing Habitat Suitability Indices for biogenic substrates. Leverette (2003) developed a methodology for predicting likely areas of deep sea coral concentrations off Atlantic Canada by identifying key ecological determinants of the known distribution of these habitat types. Using sidescan sonar and multibeam scanning techniques, these habitat suitability models can be ground-truthed to determine their precision and accuracy. While the habitat suitability modeling approach is being used for fish species in the current EFH EIS, the Comprehensive Alternative explicitly includes this type of modeling and groundtruthing for living habitat features that are vulnerable to trawling.

Research and benthic mapping should be also designed to provide opportunity for reevaluating the open and closed areas to bottom trawling to protect EFH. Criteria for opening areas would include that they have been mapped or thoroughly observed in situ, do not contain sensitive habitats, and it can be demonstrated that bottom trawling may occur in the area without adversely impacting habitat. In addition, new areas of sensitive habitat may be discovered within the open-bottom trawl areas and become candidates for new closed areas.

The components of Revised Alternative C.12 described in this section emphasize the need for adequate funding dedicated specifically to EFH research, mapping, and observer coverage. While this research will require a substantial allocation of agency resources, the rationale for this expenditure is that more spatially explicit information will allow more cost effective management in the future. This is because higher spatial resolution can be used to develop fine scale management measures that allow fishermen to adequately obtain their catch without damaging the habitat, its ecological functions, or the underlying productivity of the fish they are harvesting.

Monitoring the habitat impacts of the bottom trawl fleet

NMFS and the PFMC must include in any mitigation alternative a framework to measure and monitor habitat impacts. A direct approach for measuring habitat impacts of fishing is to examine bycatch, or incidental catch, of habitat-forming invertebrates. Bycatch can be monitored by onboard observers. While it may be difficult to estimate the total reduction in habitat quality caused by each per unit reduction in these habitat indicators, this approach allows a comparison of habitat damage over different areas and using different gear types.

The Revised Comprehensive Alternative includes the following monitoring and enforcement components:

1. Increase onboard observer coverage on bottom trawl vessels to a level determined to be necessary by NOAA to estimate annual bycatch of habitat-forming invertebrates and quantify habitat interactions with fishing gear;
2. Require vessel Monitoring Systems (VMS) on all vessels using bottom trawl gear to catch groundfish in the U.S. West Coast EEZ with positions recorded at a time stamp of every 5 minutes (time);
3. Improve electronic logbooks to provide better fishing effort information to NOAA and state authorities;
4. Annual publication of a NMFS *West Coast Groundfish Habitat Status Report* to make habitat impact and bycatch data available to the Council, the public and the fleet at as high a spatial and temporal resolution as possible; and
5. Establish baseline data and a process for setting and implementing bycatch limits on structure-forming invertebrates and/or other habitat performance standards.

Monitoring habitat impacts of individual vessels allows fishery managers to evaluate the effectiveness of management measures, reveal vessels or areas of concern, and provide future management options that utilize performance standards and incentive-based regulations. Fishermen control many factors that determine the degree to which their activities impact the seafloor. The placement (physical location) of their nets and the specific type of gear they use are largely at the discretion of individual vessel captains. The various factors that play into this decision are the likelihood of catching valuable target species and the likelihood that they will damage the gear they are using. By using state-of-the-art sounders and fish-finders, fishermen are able to identify schools of particular species of fish and obtain information about bottom type before setting their gear. While some seafloor types cause major damage to trawl nets, such as large, sharp boulders, there is little evidence that vulnerable habitat types such as living substrates damage trawl gear. Therefore, there exists no immediate incentive to avoid such habitats in the pursuit of fish, particularly if there are higher abundances of fish in these areas.

A direct approach for measuring habitat impacts of fishing is to examine bycatch, or incidental catch, of habitat features. Since each habitat feature may vary in its catchability, indicators that are caught by fishing gear should be used. Bycatch can be monitored by onboard observers. In Alaska, for example, observers routinely report bycatch of corals and sponges. While it may be difficult to estimate the total reduction in habitat quality caused by each per unit reduction in these habitat indicators, this approach allows a comparison of habitat damage over different areas and using different gear types.

Bycatch data availability

There is no question that observer bycatch data should be used to the fullest extent in groundfish management. Habitat-related observer bycatch data are important tools for protecting sensitive habitats and the long-term productivity and sustainability of the groundfish fisheries. Such data should be made available on a regular basis to the Council, the fleet and the public in as spatially and temporally explicit a format as possible. We recommend this information be released annually by NMFS in a *West Coast Groundfish Habitat Status Report.*

Monitoring habitat impacts with VMS

The Comprehensive Alternative includes a vessel monitoring system (VMS) requirement with positions recorded at a time stamp of every 5 minutes for all vessels fishing for groundfish using bottom trawl gear. Vessel monitoring systems (VMS) track the location and speed of vessels in real time, allowing managers to assess more accurately where trawling actually occurs. This data can be used to enforce bottom trawl closed areas and can be combined with other data to provide detailed spatial information on individual vessel catch, bycatch, and habitat impacts.

Conclusion

Revised Alternative C.12 considers the interrelatedness and spatial arrangement of complex sensitive habitat criteria in relation to areas prosecuted by bottom trawl fisheries to develop an approach to manage the effects of bottom trawling on habitat. Revised Alternative C.12 is a comprehensive approach to protect Essential Fish Habitat, as required by law, while maintaining vibrant commercial fisheries for the Pacific Coast.

Descriptions of specific closed areas
Detailed maps of the respective areas for Revised Alternative C.12 reflect the modifications to boundaries for each area.

1. Olympic_1
Original Alternative C.12 estimated displaced revenue= $1,286,058
Revised Alternative C.12 estimated displaced revenue= $431,115 (likely overestimated, trawl tracks fall outside of area, see Figure below)

According to 2003 bottom trawl logbook data, several heavily fished areas were located within the proposed closed area of *Olympic_1* (Figure A) in Original Alternative C.12. Boundaries to *Olympic_1* were adjusted in Revised Alternative C.12 to avoid heavily trawled areas in the northeast and southern end of the original proposed closed area (Figure 8). The closed area in Revised Alternative C.12 also expands eastward to encompass deeper, lightly fished areas.

Revised Alternative C.12 contains 330 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003).

As indicated by databases supplied by NOAA, every trawl survey haul performed within the proposed area has recorded habitat-forming invertebrates. A total of 54 records of habitat-forming invertebrates have been recorded in the area since 1979. These include *Calcigorgia sp.* and *Swiftia sp.* gorgonian corals, black corals, sea pens, sea whips, and Hexactinellid sponges.

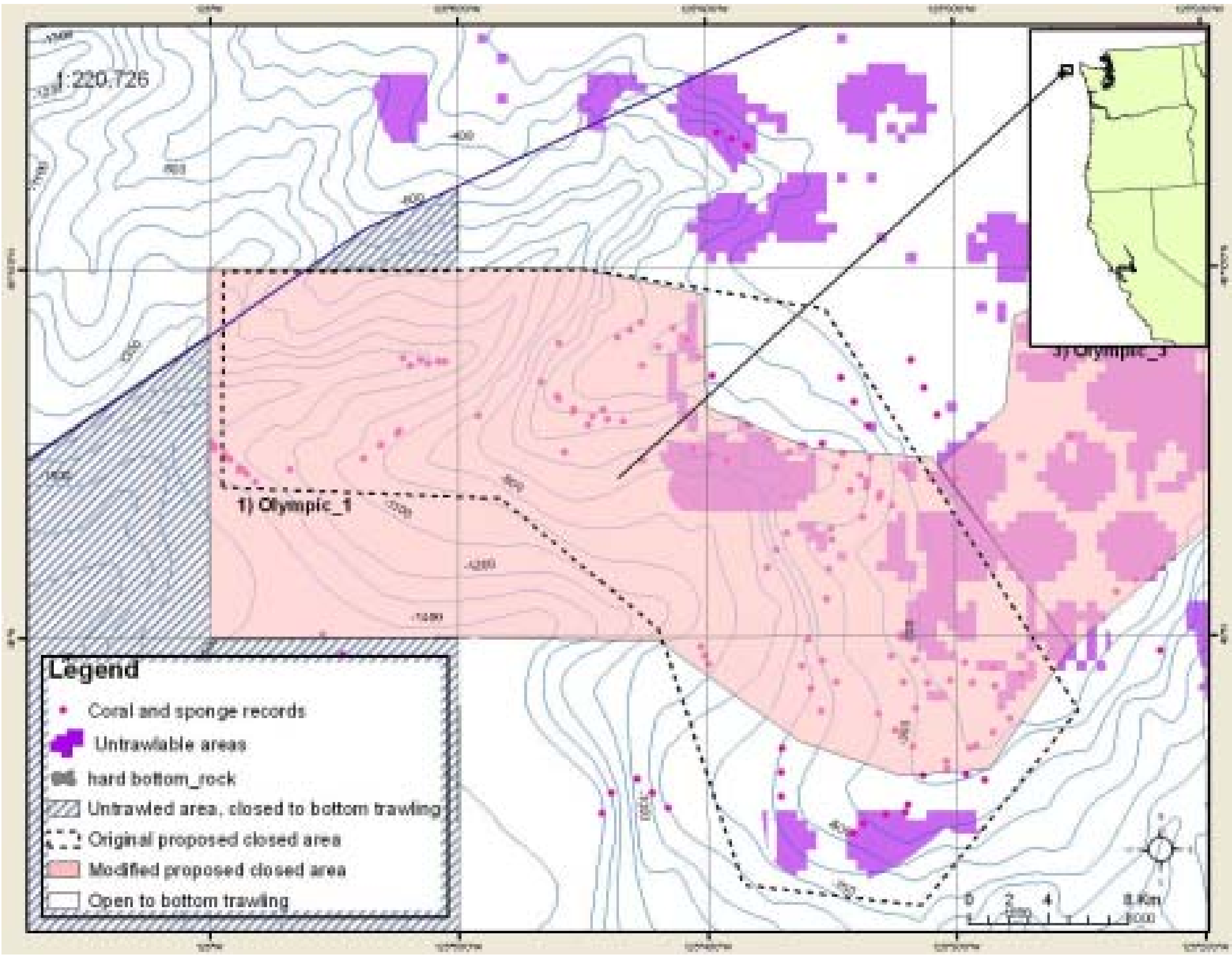

Figure 8: Olympic_ 1

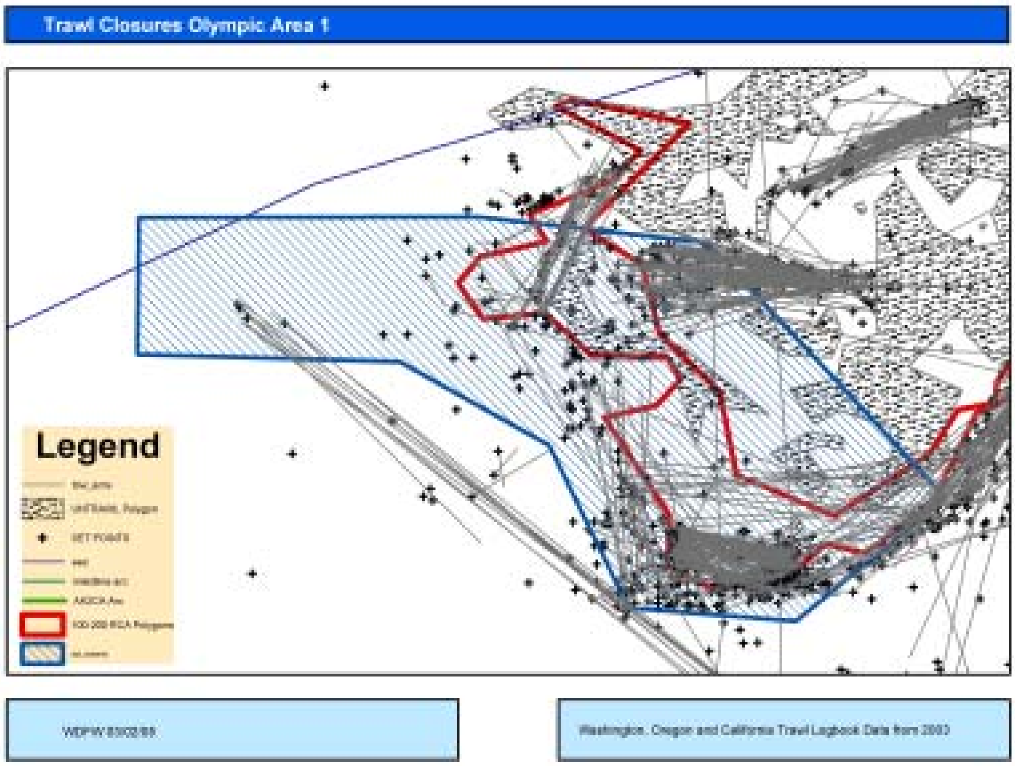

Figure A: 2003 bottom trawl logbook set points (courtesy WDF&W).

Oceana Attachment 1: Revised Alternative C.12 **May 11, 2005**

2. Olympic_2

Original Alternative C.12 estimated displaced revenue= $326,284
Revised Alternative C.12 estimated displaced revenue= $280,685 (likely overestimated, trawl tracks fall outside of area, see Figure below)

Trawl logbook data from 2003 indicated some fishing in the northern and southern portion of the Original Alternative C.12 closed area (Figure B). The boundary for the proposed closed area in Revised Alternative C.12 was adjusted to avoid those fishing areas (Figure 9).

The proposed closed area contains the only known location in the Northwest Pacific of *Lophelia pertusa*, a reef-forming deep-sea coral. Observation of the reef in 2004 indicated a large proportion of the reef was broken, and both trawl tracks and derelict fishing gear were observed nearby (Hyland et al. 2004). Research in the Atlantic shows that reefs of *Lophelia* are extremely susceptible to damage by bottom trawl gear (Fossa et al. 1999).

A total of 18 records of habitat-forming invertebrates have been recorded in the Revised Alternative C.12 closed area by NOAA trawl surveys. These include *Alcyonacea* soft corals, other gorgonian corals, scleractinian corals, and Hexactinellid sponges. A larger number of records and greater sample weights occurred in the 1980's than more recent surveys, which may indicate evidence of habitat destruction.

The proposed closed area contains 523 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003).

Oceana Attachment 1: Revised Alternative C.12 **May 11, 2005**

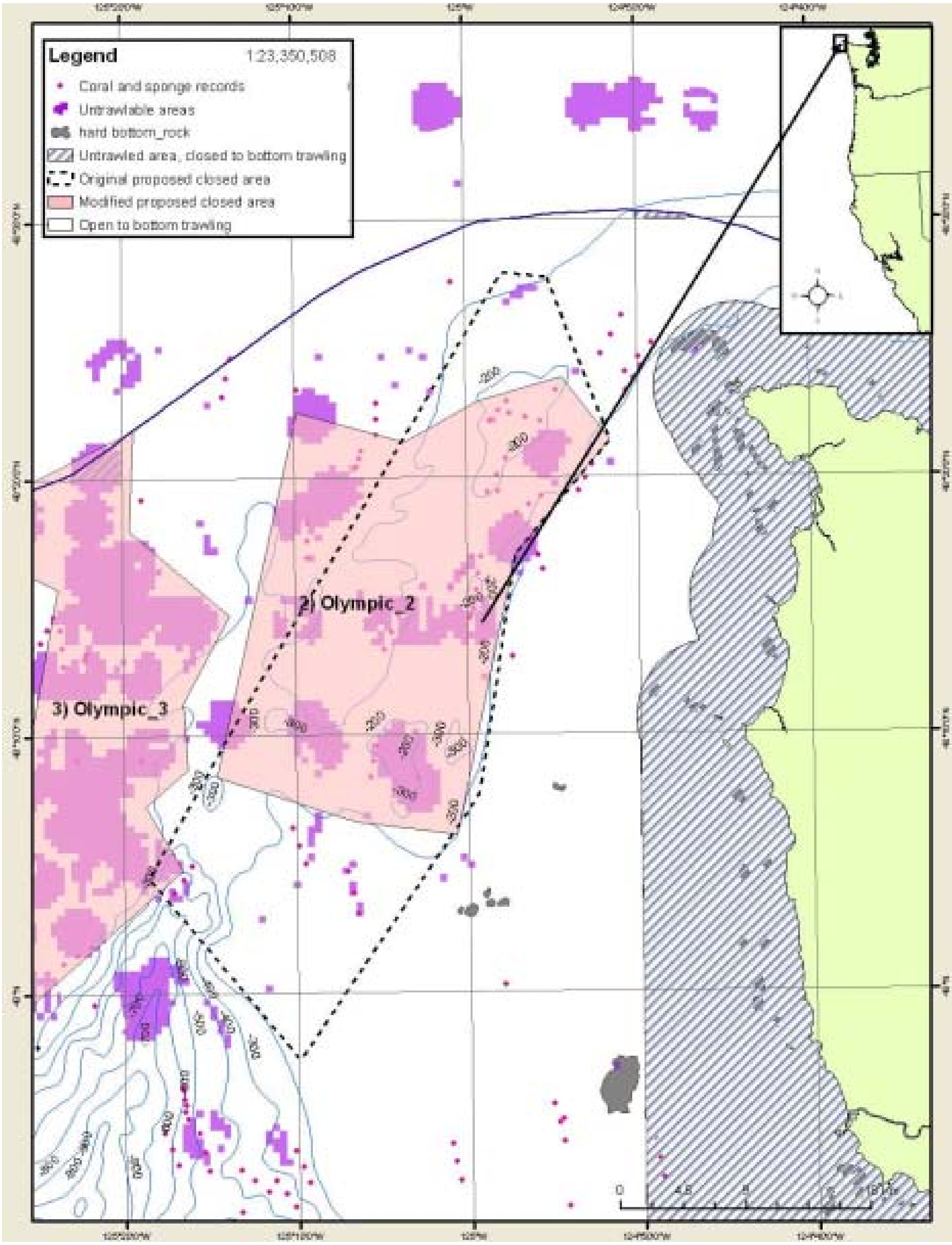

Figure 9: Olympic_2

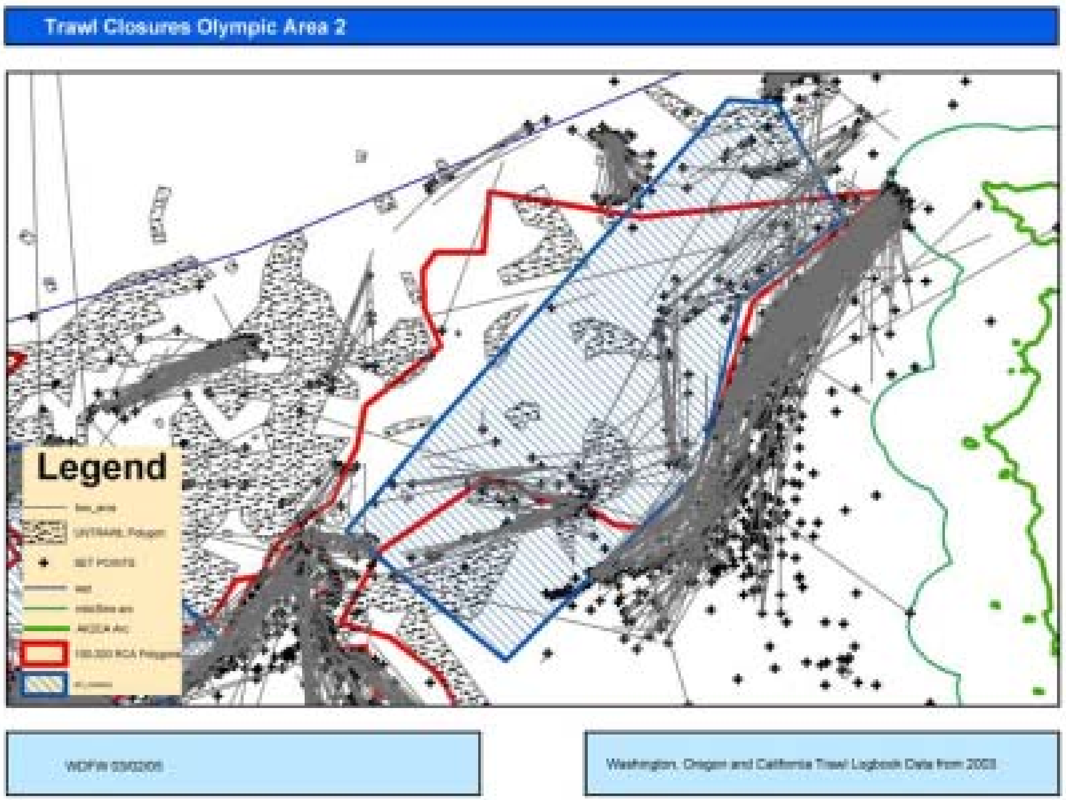

Figure B: 2003 bottom trawl logbook set points (courtesy WDF&W).

3. Olympic_3_untrawlable

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $395,676 (likely overestimated, trawl tracks fall outside of area, see Figure C below)

This portion of the Olympic Marine Sanctuary is located between proposed areas *Olympic_1* and *Olympic_2* (Figure 10). This area had not been previously identified as a closed area.

Localized multibeam mapping indicates the area contains pinnacles and high relief, rocky habitat (Steve Intelmann, GIS analyst, Olympic Marine Sanctuary, pers. comm.). Zimmerman (2003) indicates that much of this area is untrawlable, as very few NOAA trawl surveys have successfully been deployed in this area. Trawl logbook data from 2003 shows that the area appears to be avoided by the bottom trawl fleet (Figure C). This is corroborated by the Zimmerman (2003) "untrawlable areas" database, which shows the area to contain 1,098 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up. Although the area is not well surveyed, a total of nine records of habitat-forming invertebrates have been recorded in the area by NOAA trawl surveys. These include scleractinian corals, sea pens, and Hexactinellid sponges. A larger number of records and greater sample weights occurred in the 1980's than more recent surveys, which may indicate evidence of habitat destruction.

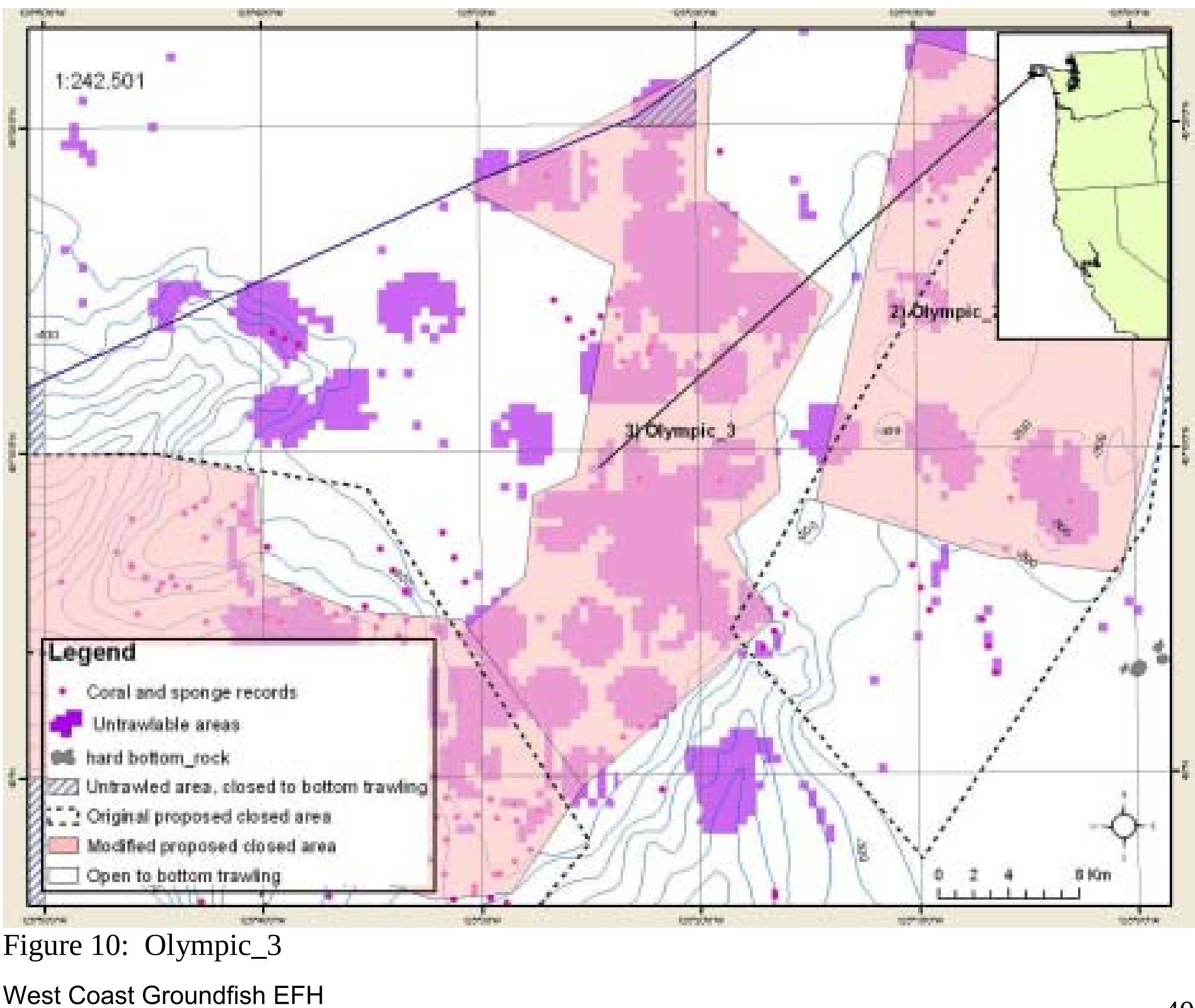

Figure 10: Olympic_3

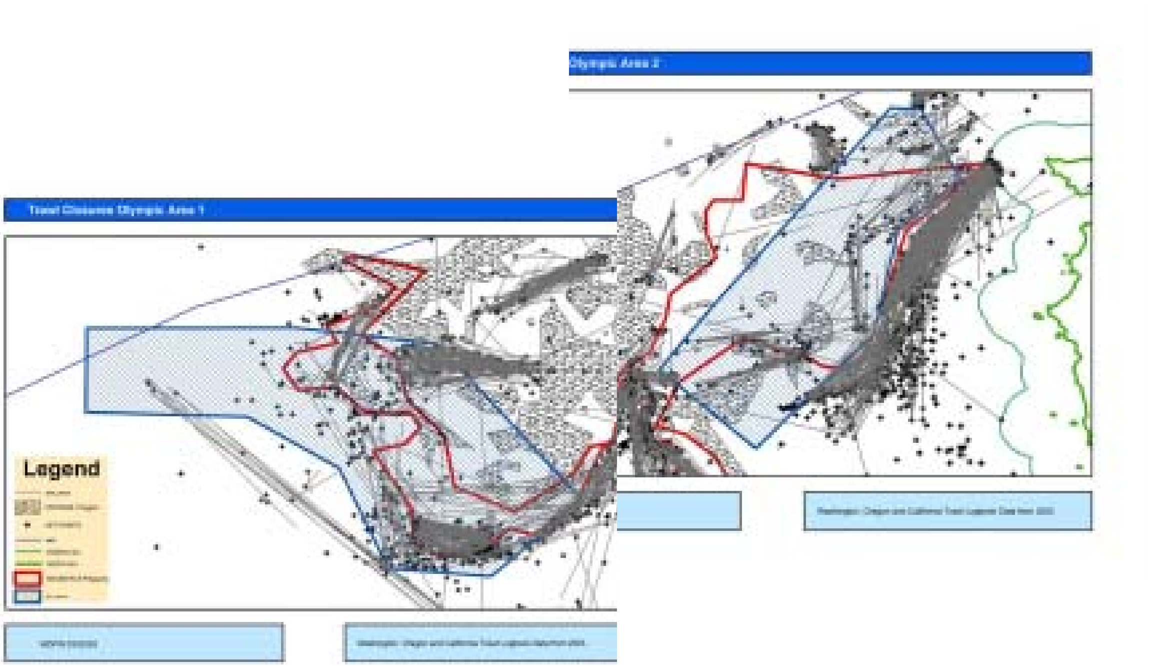

Figure C: 2003 bottom trawl logbook set points (courtesy WDF&W).

4. Biogenic_1

Original Alternative C.12 estimated displaced revenue= $172,849
Revised Alternative C.12 estimated displaced revenue= $36,486 (likely overestimated, trawl tracks fall outside of area, see Figure below)

Bottom trawl logbook data from 2003 indicates that bottom trawling mainly occurred in the eastern portion of the previously proposed closed area (Figure D). The boundary for the proposed closed area in Revised Alternative C.12 excludes this fished area (Figure 11). It is likely that the displaced revenue previously attributed to the closed area is mitigated by excluding that eastern portion. The new boundary also expands northward and deeper to include lightly fished and unfished areas, and include more records of habitat-forming invertebrates.

Every NOAA trawl survey haul performed in the proposed area has recorded the presence of habitat-forming invertebrates. NOAA slope surveys from 1992 onwards have documented 141 records of habitat-forming invertebrates in the proposed area including black corals, scleractinian corals, Hexactinellid sponges, bamboo corals, and sea whips. Records were more numerous and sample weights of sponges were larger in earlier surveys than more recent ones, which may indicate that habitat has been impacted.

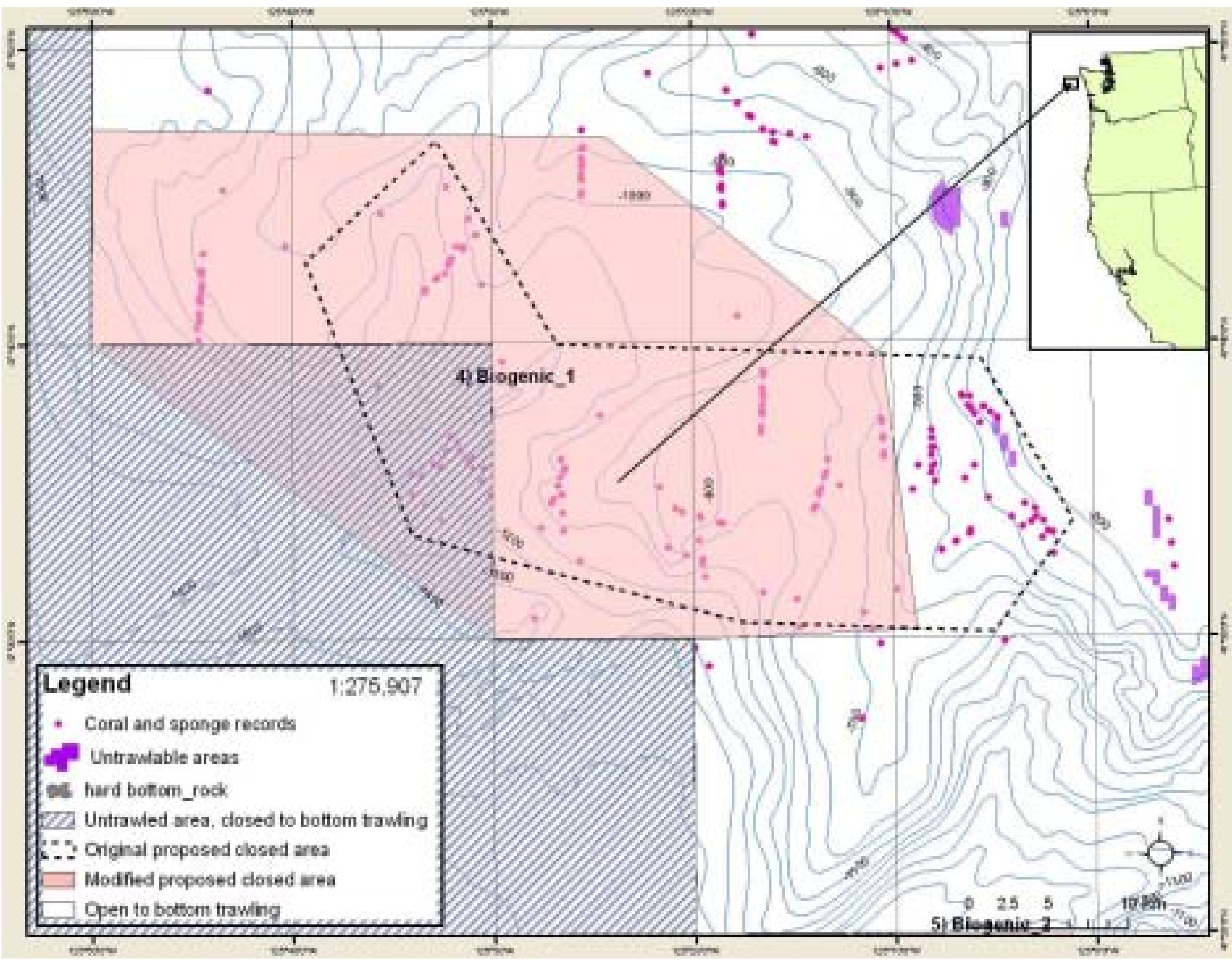

Figure 11: Biogenic_1

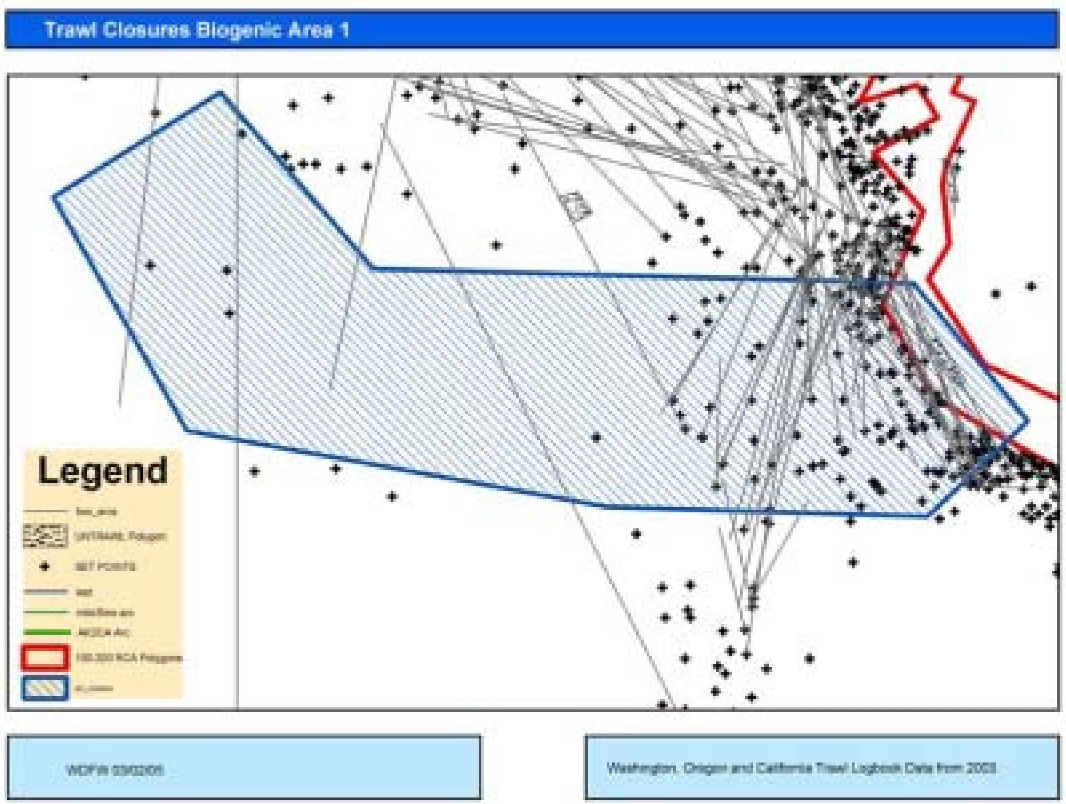

Figure D: 2003 bottom trawl logbook set points (courtesy WDF&W)

5. Biogenic_2
Original Alternative C.12 estimated displaced revenue= $31,982
Revised Alternative C.12 estimated displaced revenue= $15,483 (likely overestimated, trawl tracks fall outside of area, see Figure below)

Bottom trawl logbook data from 2003 indicates that bottom trawling occurred across a small eastern portion of the previously proposed closed area (Figure E). The Revised Alternative C.12 boundary for the proposed closed area excludes this fished area (Figure 12). The new boundary also extends north and south into unfished and lightly fished areas, as well as deeper to provide continuity with the area closed by freezing the trawl footprint.

Every NOAA trawl survey haul performed in the proposed area has documented the presence of habitat-forming invertebrates. NOAA trawl surveys have documented 64 records of habitat-forming invertebrates in the proposed closed area, including black corals, gorgonians, Hexactinellid sponges, and sea pens.

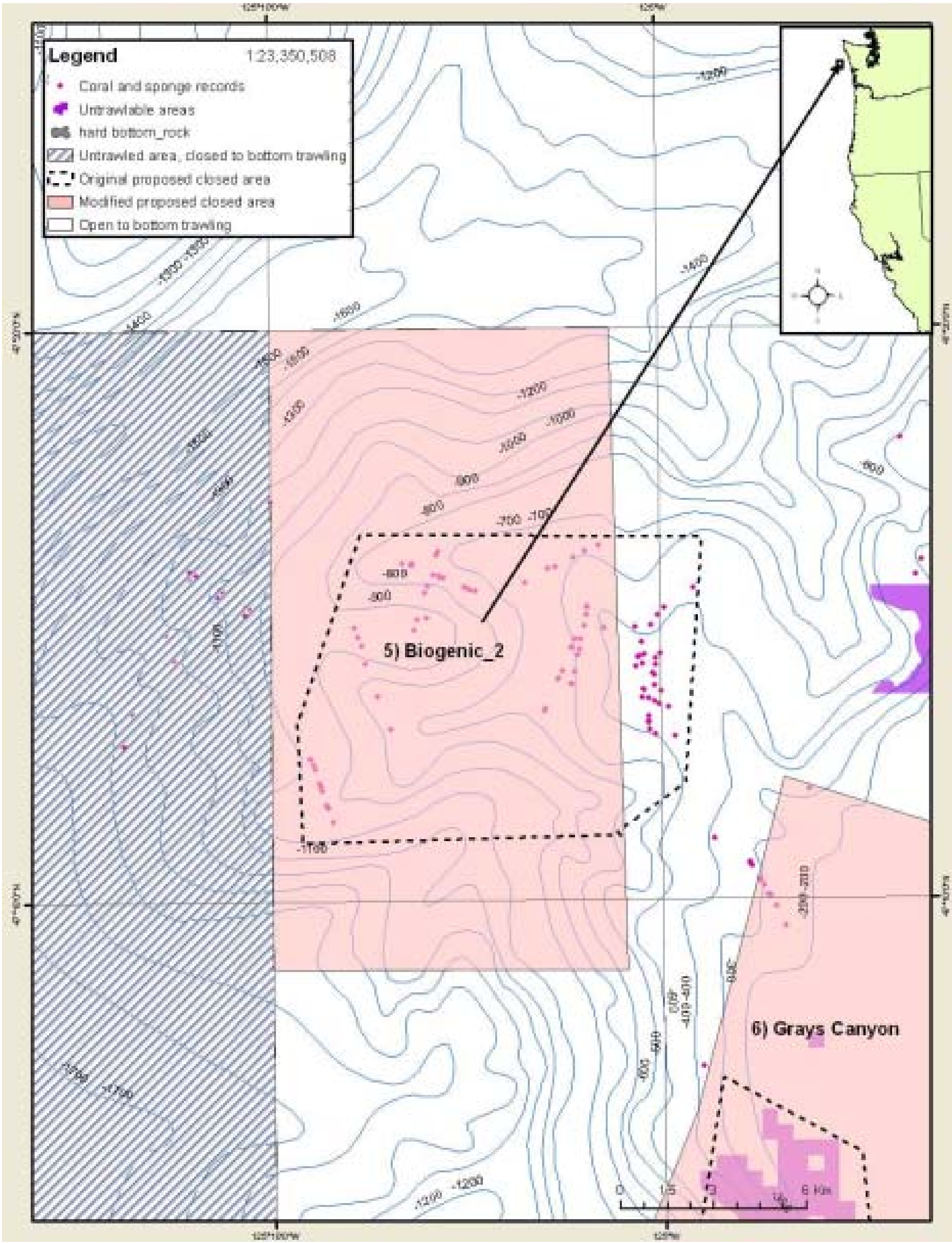

Figure 12: Biogenic_2

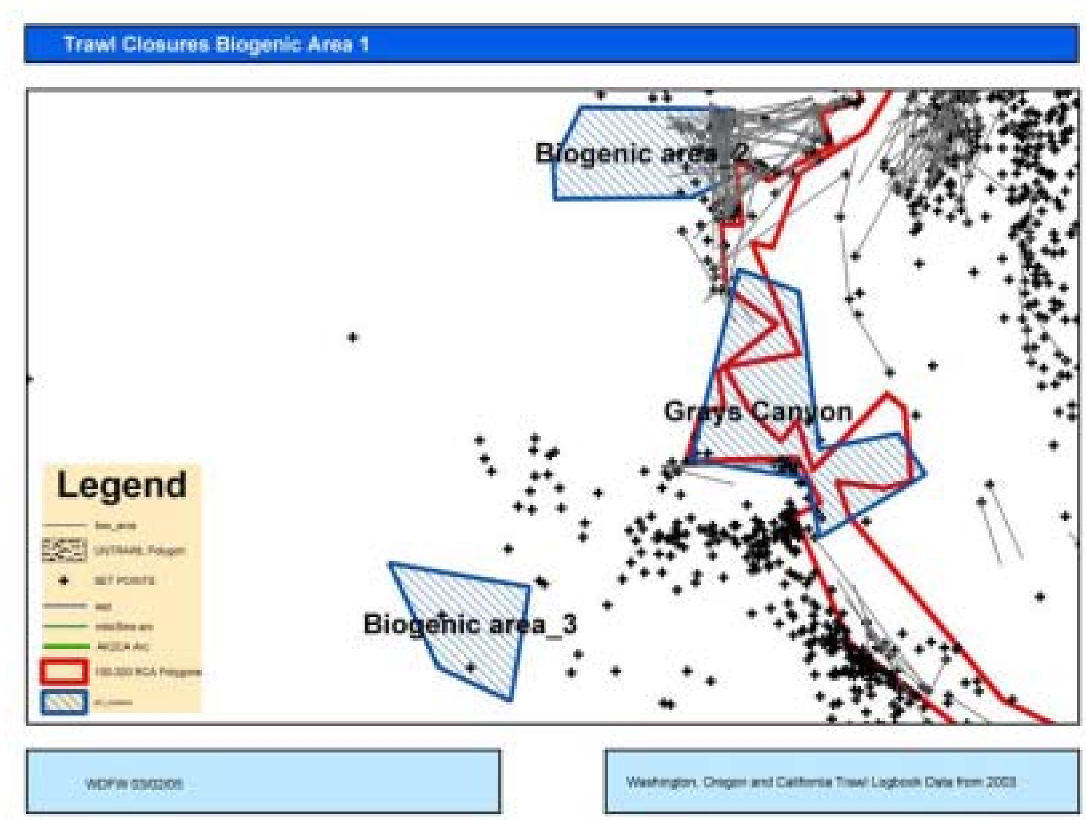

Figure E: 2003 bottom trawl logbook set points (courtesy WDF&W)

6. Grays Canyon

Original Alternative C.12 estimated displaced revenue= $5,917
Revised Alternative C.12 estimated displaced revenue= $34,512 (likely overestimated, trawl tracks fall outside of area, see Figure below)

This canyon was selected based on its high abundance of hard substrate and "untrawlable areas." This site is known to have high upwelling and to be one of the most productive offshore sites off the Washington coast. It is also the site of major ecotourism and birdwatching operations.

Bottom trawl logbook data from 2003 indicates little bottom trawling occurred in the region of the proposed closed area (Figure E). The boundary for the Revised Alternative C.12 proposed closed area follows bathymetric contours and encompasses more of the canyon area (Figure 13).

Most NOAA trawl survey hauls in the proposed closed area documented habitat-forming invertebrates. There have been 48 records of black corals, gorgonian corals, scleractinian corals, and Hexactinellid sponges. In some cases, individual survey hauls recorded large densities of sponges, up to 907 kg per haul in 1985 and 505 kg per haul in 1983. There have been fewer records and lower sample weights of sponges in the more recent surveys, which may be an indication of adverse impacts of fishing on this habitat.

The proposed area contains 344 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003).

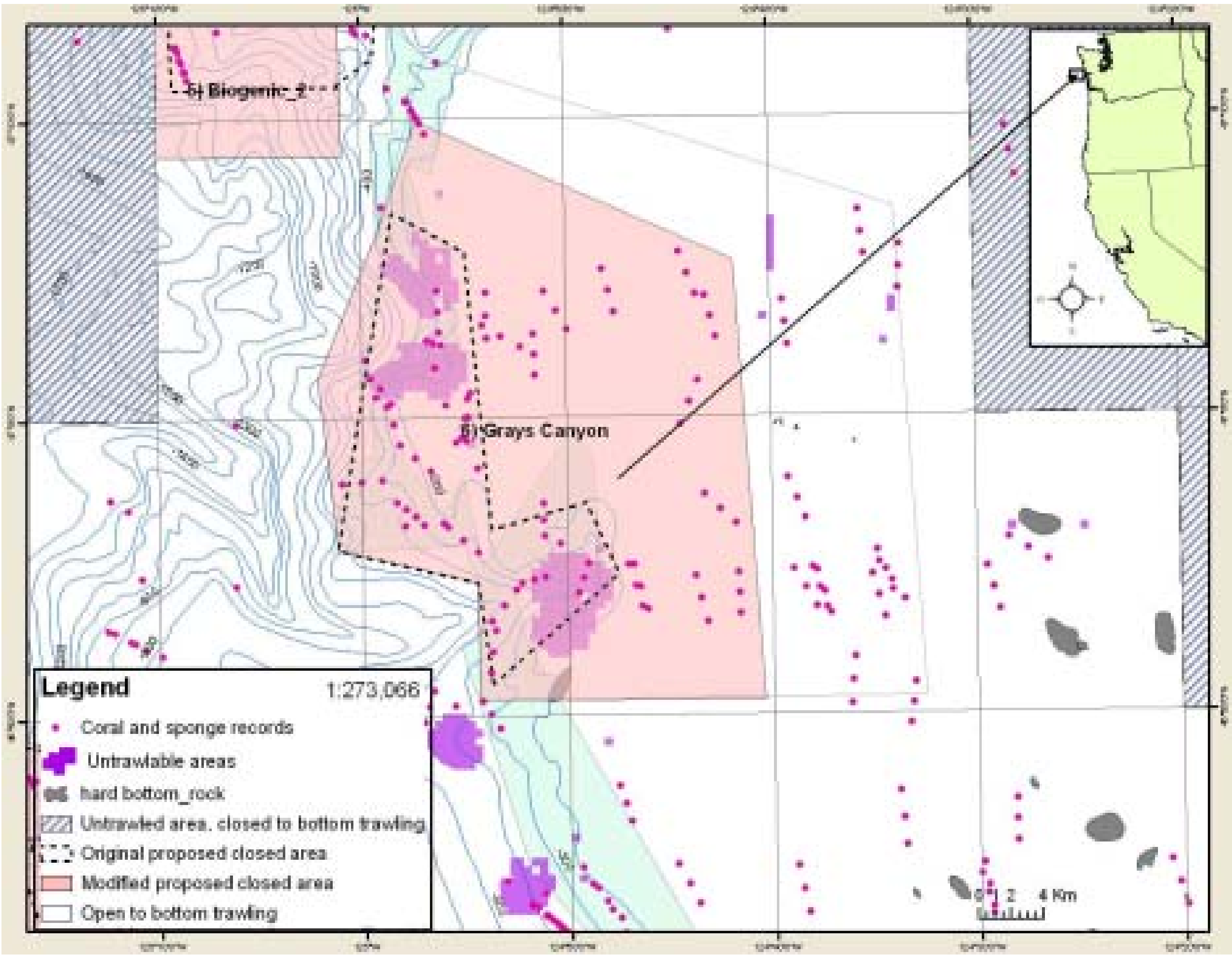

Figure 13: Grays Canyon

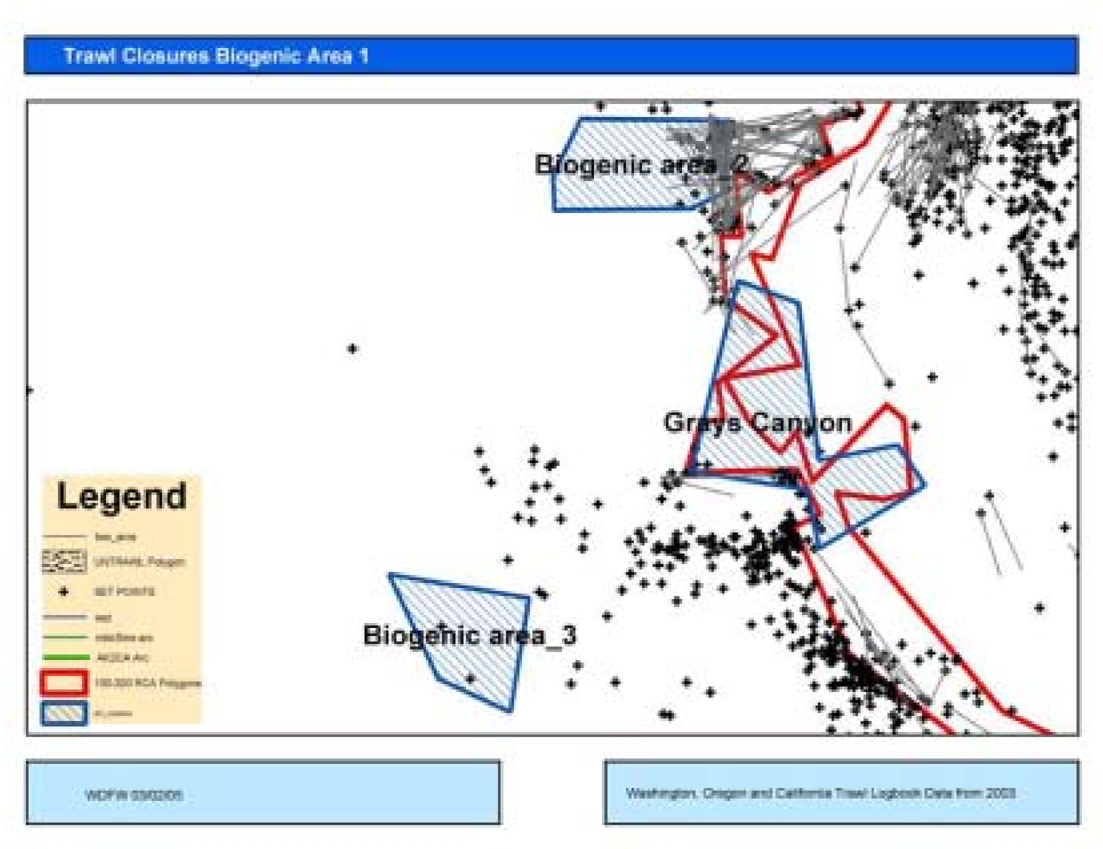

Figure E: 2003 bottom trawl logbook set points (courtesy WDF&W)

7. Biogenic_3

Original Alternative C.12 estimated displaced revenue= $2,351
Revised Alternative C.12 estimated displaced revenue= $4,554

According to trawl logbook data, little bottom trawling occurred in 2003 in the proposed closed area (Figure E). The boundary of the proposed area was expanded to provide continuity with areas closed by freezing the trawl footprint (Figure 14). The proposed closure spans an area of the slope from 900 to 1600 meters depth.

Every NOAA trawl survey haul performed within the proposed area has documented habitat-forming invertebrates. NOAA trawl surveys have documented 46 records of habitat-forming invertebrates within the proposed area, including black corals, gorgonian corals, sea whips, and sponges.

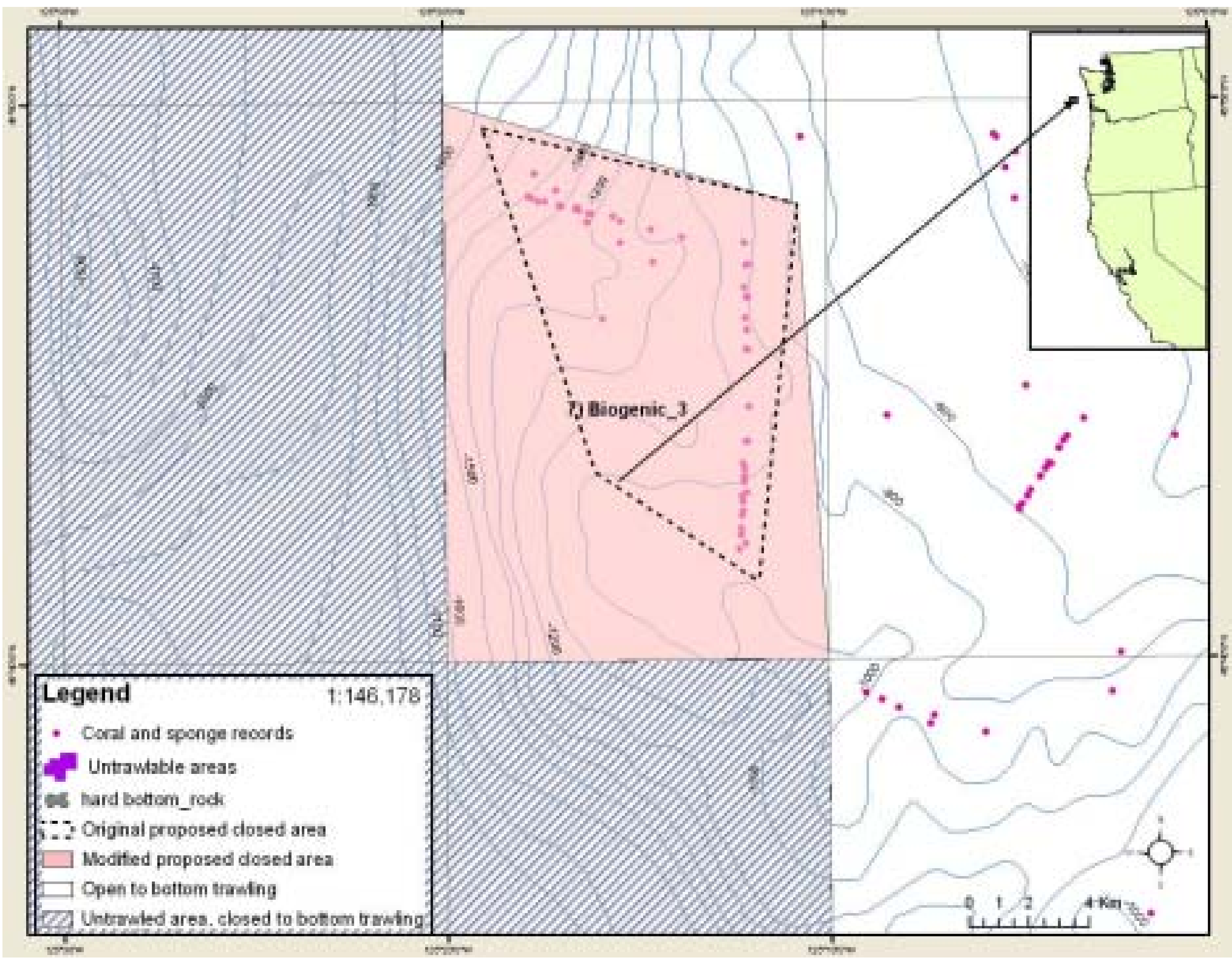

Figure 14: Biogenic_3

8. & 9. Astoria Canyon Region
Original Alternative C.12 estimated displaced revenue= $509,857
Revised Alternative C.12 estimated displaced revenue= $108,154 (likely overestimated, trawl tracks fall outside of area, see Figure below)

The largest submarine canyon in the Pacific Northwest is Astoria Canyon, off the mouth of the Columbia River. This canyon contains a range of habitat types from sand and mud bottom to hard rock canyon walls. There are several records of biogenic habitats in this canyon from the NMFS dataset (Clarke 2004). This canyon has been studied using ROPOS submersibles.

According to analysis of trawl logbook data by the WDF&W, a significant amount of bottom trawl catches were made 2003 in the previously proposed closed area encompassing Astoria Canyon (Figure F). We attempted to mitigate displaced catches by splitting the previously closed area of Astoria Canyon into two areas while avoiding fishing areas identified by WDF&W's logbook analyses (Figure 15).

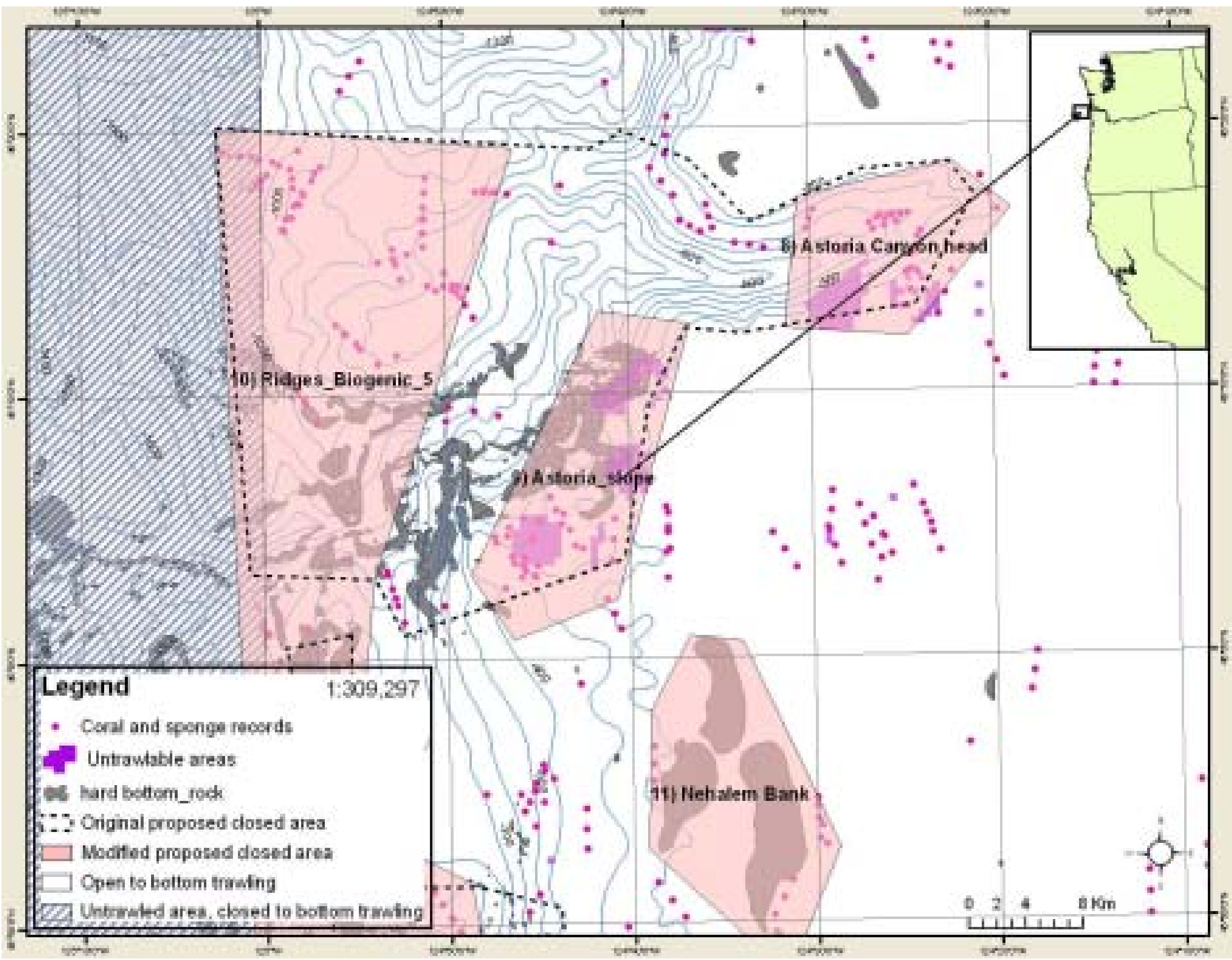

Figure 15: Astoria Canyon_head and Astoria_slope

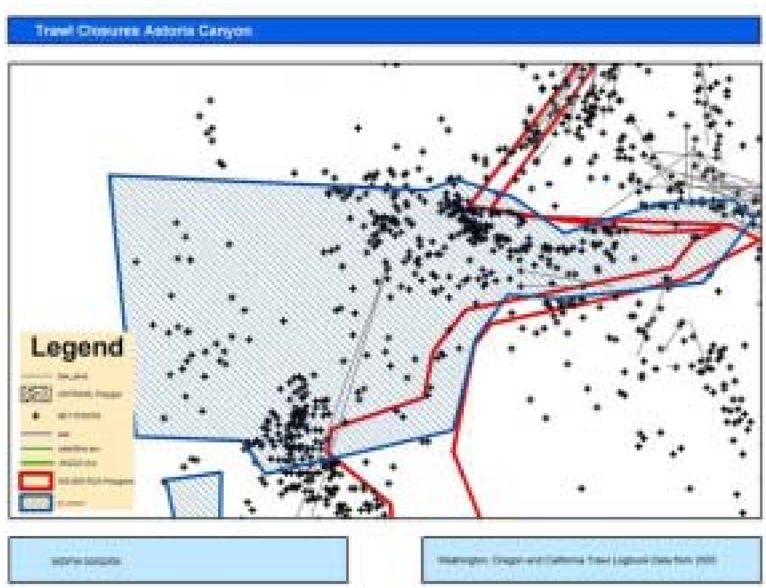

Figure F: 2003 bottom trawl logbook set points (courtesy WDF&W)

8. Astoria Canyon head

This area encompasses the head of the deepwater Astoria Canyon. Areas of untrawlable habitat (17.5 km^2) and habitat-forming invertebrates are located within the Revised Alternative C.12 proposed closed area (Figure 15). The proposed area contains 108 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). Habitat-forming invertebrates were documented in 10 of 33 NOAA trawl survey hauls in the proposed closed area of the Astoria Canyon head. The largest sample weights of sponges and scleractinian corals occurred in the 1980's. The area spans canyon habitat from 200 to 500 meters depth.

9. Astoria Canyon slope

Areas of untrawlable habitat (31.8 km^2) and habitat-forming invertebrates are located within the Revised Alternative C.12 proposed closed area (Figure 15). Habitat-forming invertebrates were documented in 14 of 21 NOAA trawl survey hauls in the proposed closed area, and include records of sea pens, sea whips, and Hexactinellid sponges. The proposed area contains 170 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). The area spans habitats from 200 to 800 meters depth.

10. Ridges_biogenic_5

Original Alternative C.12 estimated displaced revenue= $189,585
Revised Alternative C.12 estimated displaced revenue= $136,537 (likely overestimated, trawl tracks fall outside of area, see Figure below)

Trawl logbook data indicates bottom trawl activity in the eastern portion of the previously proposed closed area (Figure G). The boundary in Revised Alternative C.12 excludes this area of fishing and expands over lightly fished area to be continuous with the area closed by the trawl footprint and the Astoria canyon closure above (Figure 16).

The proposed closed area contains habitat-forming invertebrates. NOAA trawl survey hauls have documented 118 records of habitat-forming invertebrates in the proposed closed area, and up to 249 kg of sponges per survey haul. Black corals, sea pens, sea whips, and sponges have been documented here.

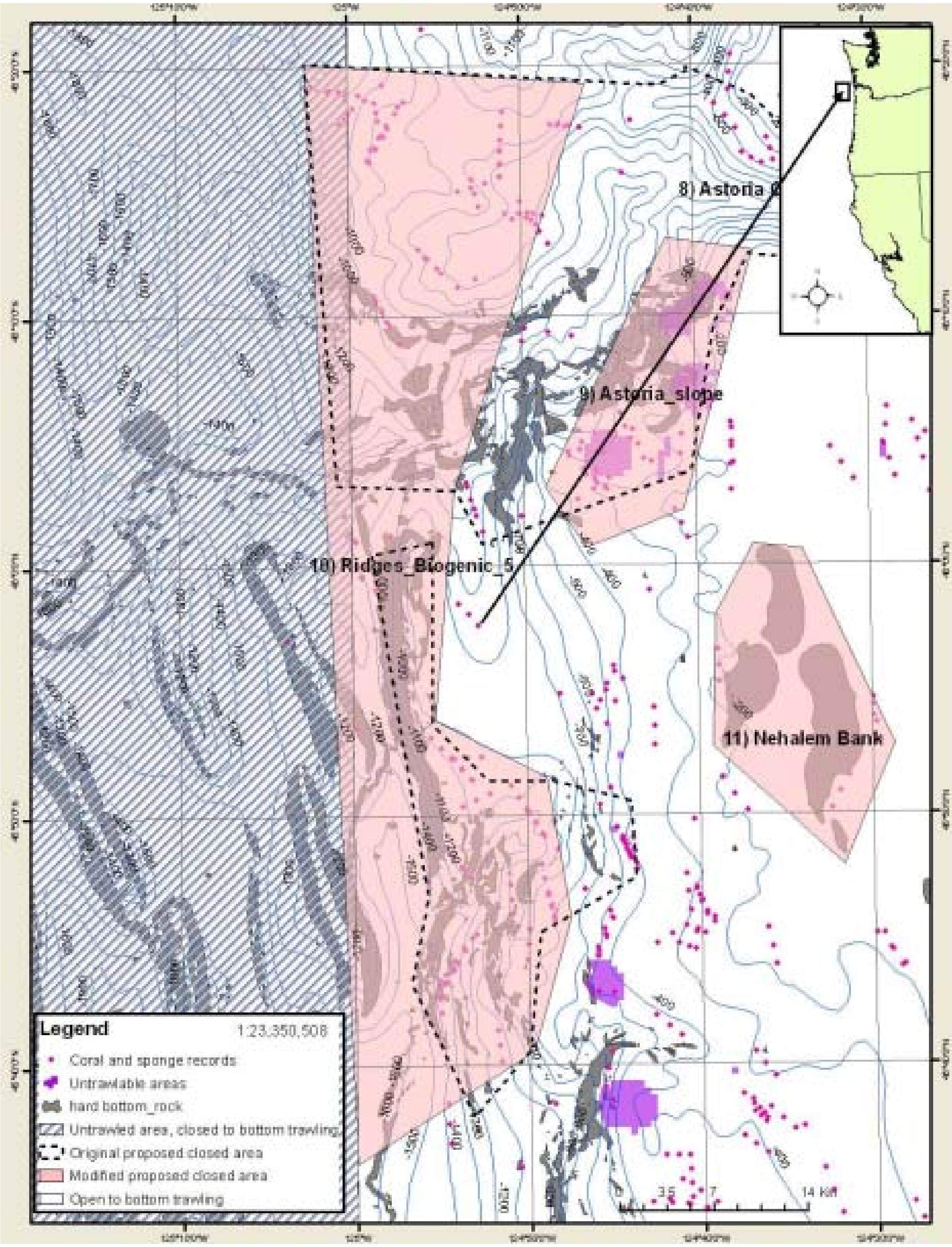

Figure 16: Ridges_biogenic_5

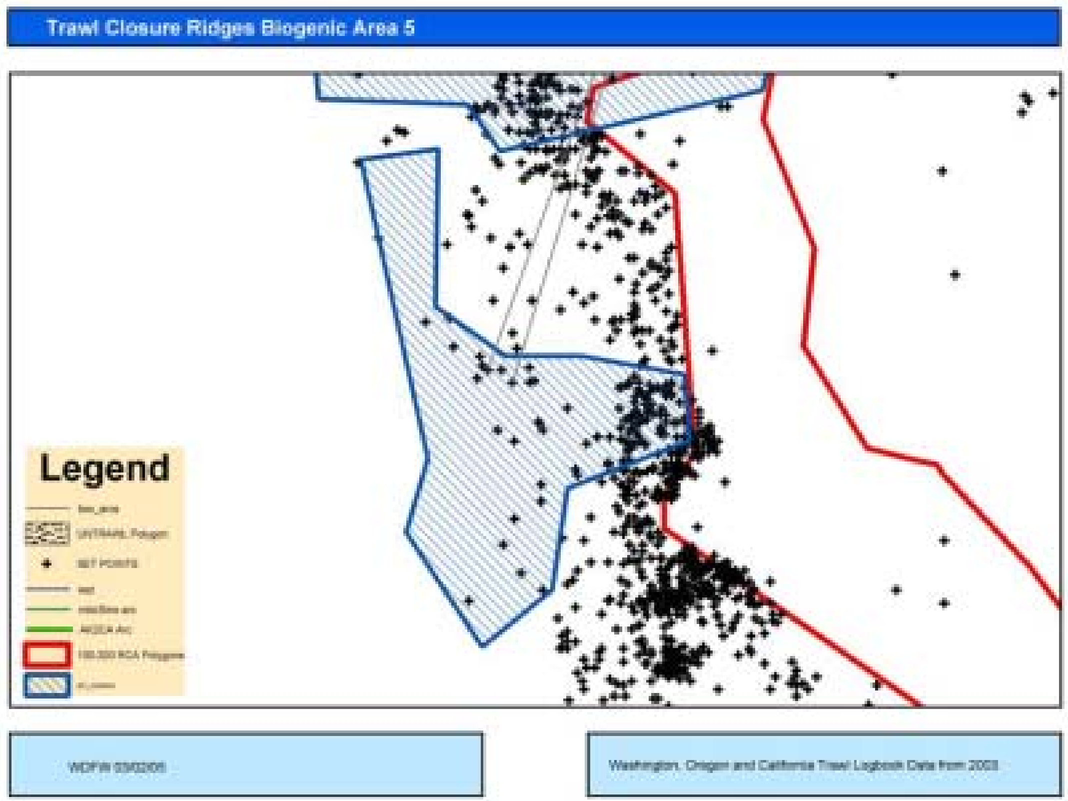

Figure G: 2003 bottom trawl logbook set points (courtesy WDF&W)

11. Nehalem Bank

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $8,824 (likely overestimated, trawl tracks fall outside of area, see Figure below)

These rocky banks are 23 offshore of the Oregon coast (Figure 17). Marine nautical charts designate the features as rocky shale. The area has not been well sampled by NOAA trawl surveys, but 4 records of habitat-forming invertebrates (sponges and sea pens) have been recorded in the area. In the past, these banks were trawled upon by commercial fishing boats. Since trawl footrope restrictions were enacted in 2000, much less trawl effort has focused on the banks (Figure H) (Bellman and Hepel 2004). However, logbook information indicates that the occasional trawl was set on the bank even while footrope restrictions were in place (Figure H). Closing these banks to trawling would allow for recovery of previously impacted habitat, and prevent the occasional trawl set from compromising habitat recovery. Little current bottom trawl effort would be displaced by this proposed closure.

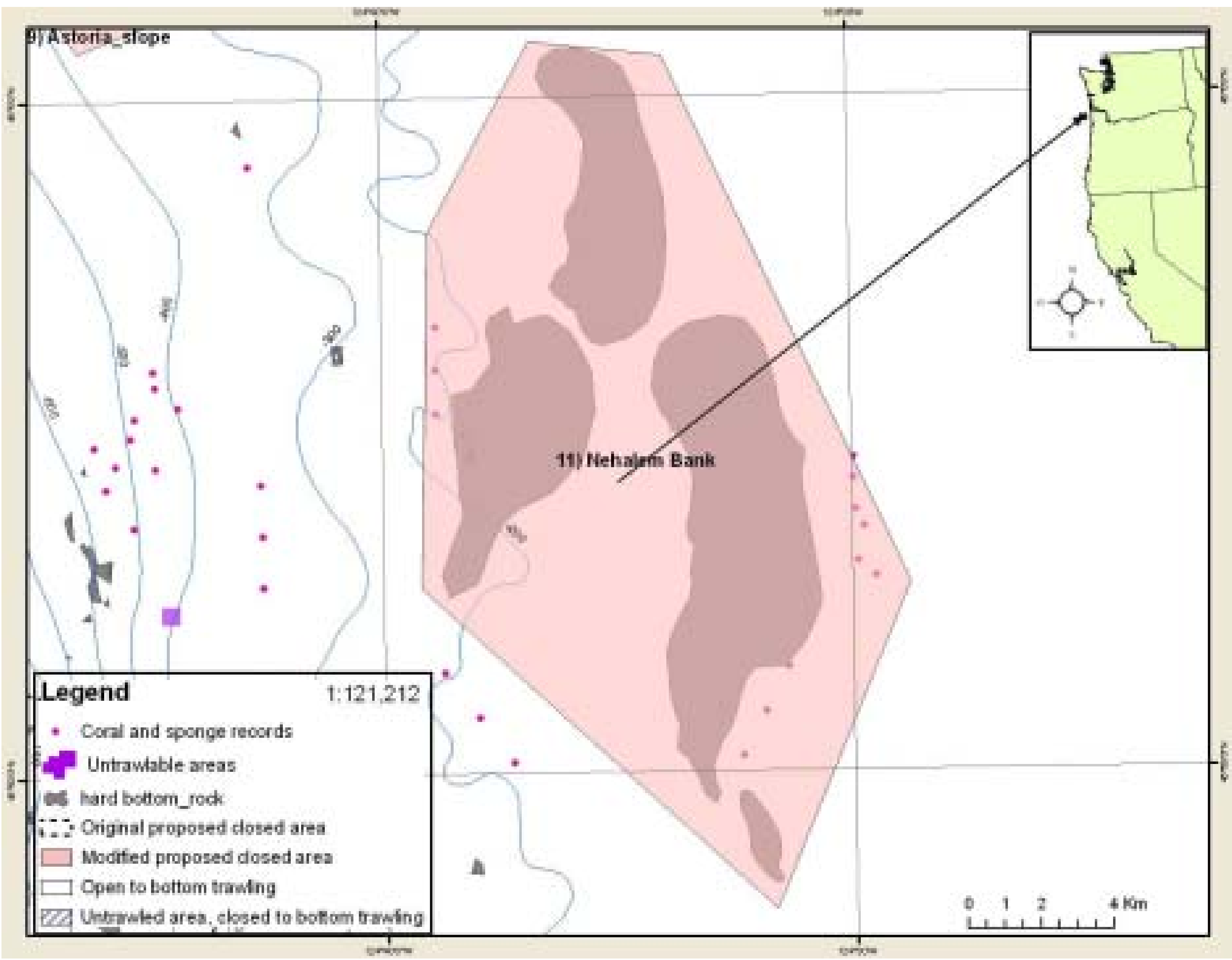

Figure 17: Nehalem Bank

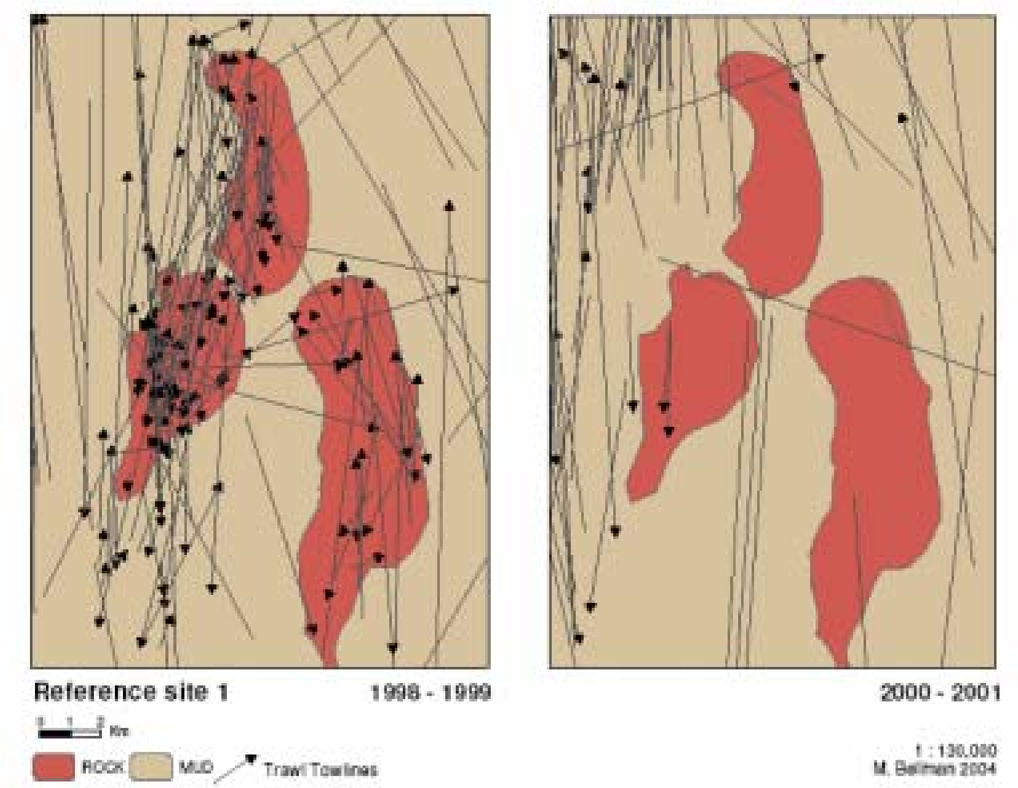

Figure H: Nehalem Bank reference site showing trawl logbook set and haul points prior to and following footrope restrictions (Bellman and Heppel 2004).

12. Biogenic_new_1
Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $69,960

This area contains spans habitat from 400 to 600 meters depth and contains records of habitat-forming invertebrates (Figure 18). NOAA trawl surveys have documented 77 records of habitat-forming invertebrates in the proposed closed area, including sponges, sea whips, sea pens, and gorgonian corals. Every trawl survey haul performed in the area has documented habitat-forming invertebrates. Trawling that has occurred in the area has impacted habitat. Data from the West Coast Observer Program in the area noted a mean of 105 pounds of corals and sponges per haul in commercial bottom trawl hauls where corals or sponges were observed as bycatch.

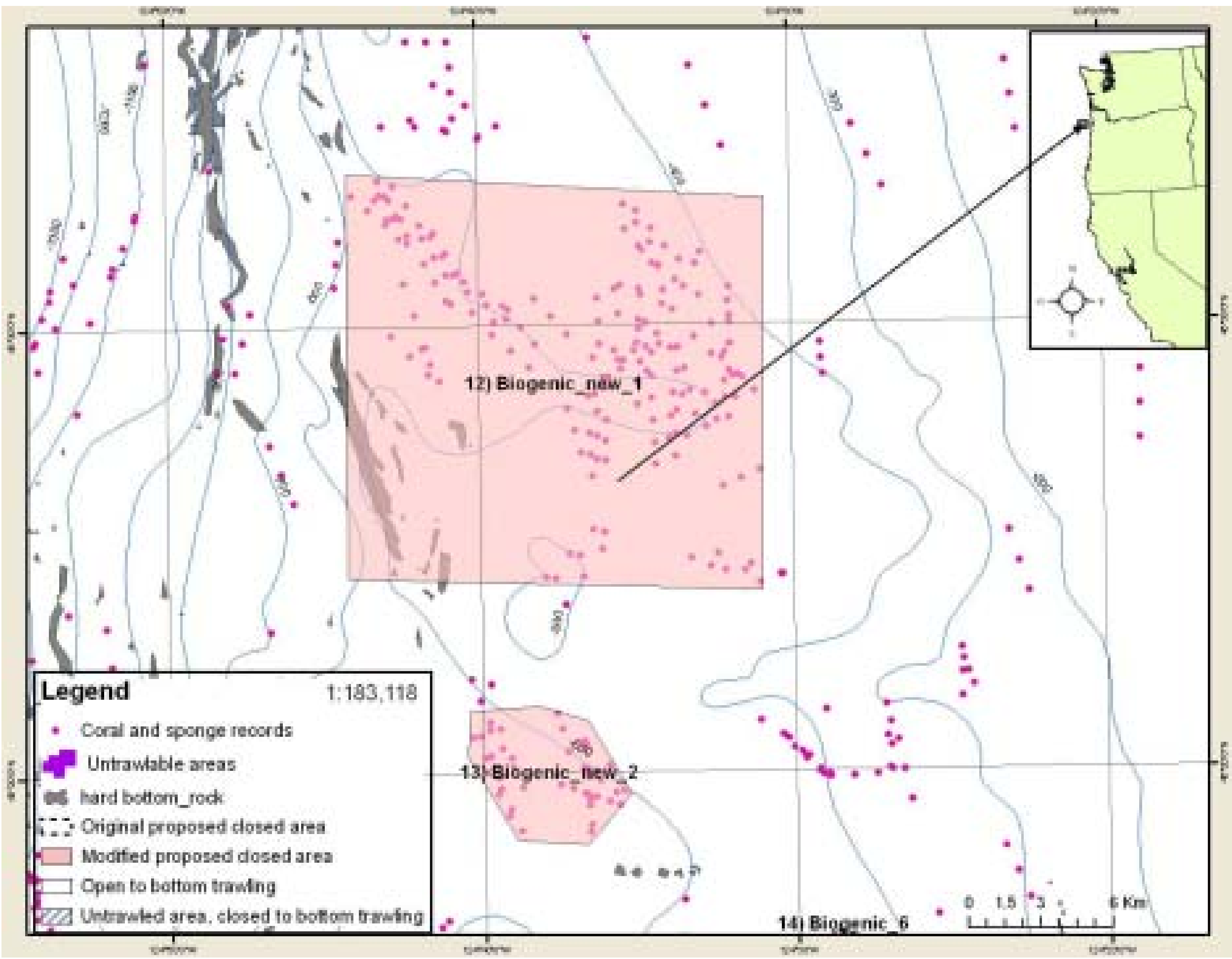

Figure 18: Biogenic_new_1 and Biogenic_new_2

13. Biogenic_new_2
Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $5,969

This area is located at 500 meters depth and contains records of habitat-forming invertebrates (Figure 18). Every NOAA trawl survey haul in the proposed area has recorded habitat-forming invertebrates. NOAA trawl surveys have documented 26 records of habitat-forming invertebrates in the proposed area, and up to 118 kg (260 lbs) of sponges per survey haul.

14. Biogenic area_6
Original Alternative C.12 estimated displaced revenue= $3,585
Revised Alternative C.12 estimated displaced revenue= $29,402 (likely overestimated, trawl tracks fall outside of area, see Figure below)

Analysis of trawl logbook data from 2003 indicated that little bottom trawling activity occurred in the vicinity of the proposed area (Figure I). As such, the boundaries of the proposed area were expanded in Revised Alternative C.12 to include more records of habitat-forming invertebrates (Figure 19).

This area contains habitat conducive to the growth of Hexactinellid sponges. NOAA trawl surveys have documented 25 records of habitat-forming invertebrates in the proposed area, and particularly dense records of sponges. Survey hauls have documented up to 312 kg (686 lbs) of sponges per haul in 1988, 281 kg (618 lbs) per haul in 1984, and 226 kg (497 lbs) per haul in 1977. Survey hauls in 2001, however, recorded a maximum of 22 kg (48 lbs) of sponges per haul, which may indicate habitat degradation in recent years that needs to be mitigated. Data from the West Coast Observer program in the proposed area noted a mean of 103 pounds of corals and sponges per haul in commercial bottom trawl hauls where corals or sponges were observed as bycatch (NWFSC, unpublished data).

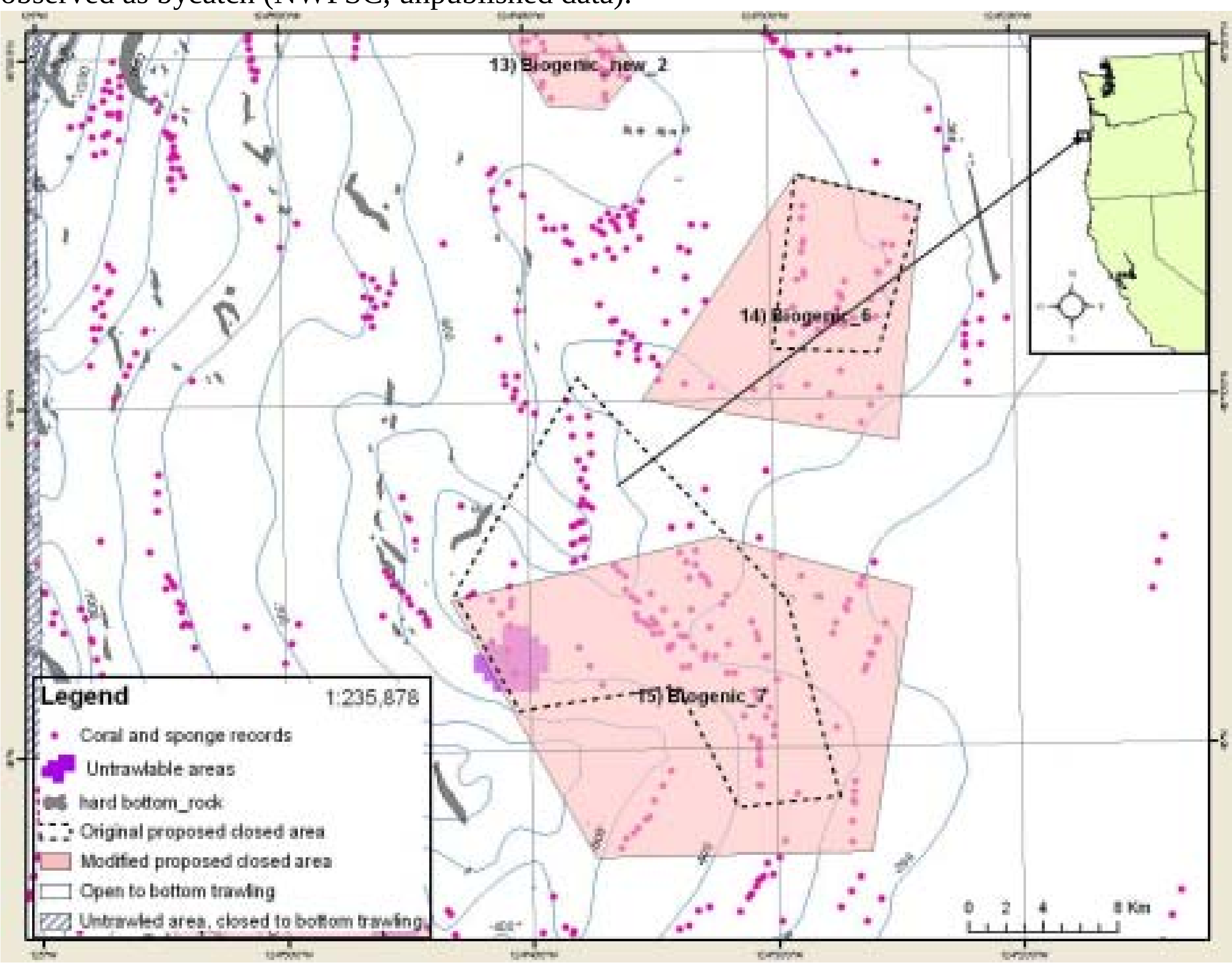

Figure 19: Biogenic area_6 and Biogenic area_7

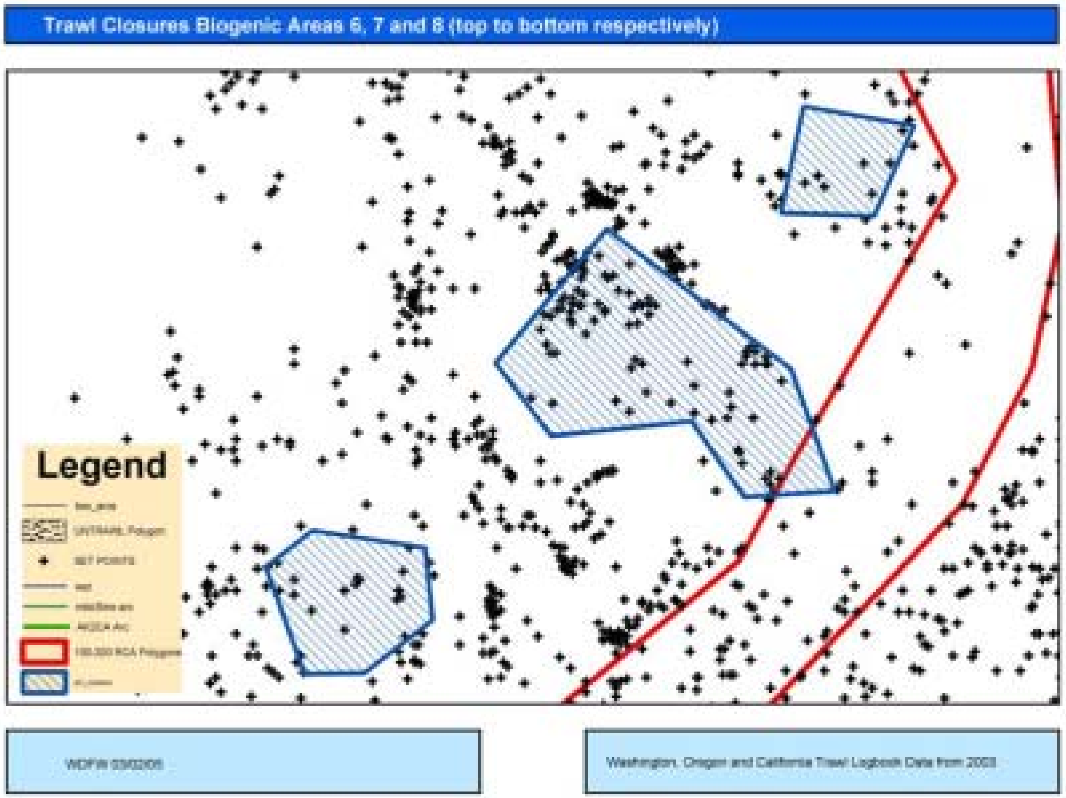

Figure I: 2003 bottom trawl logbook set points (courtesy WDF&W)

15. Biogenic area_7

Original Alternative C.12 estimated displaced revenue= $76,470
Revised Alternative C.12 estimated displaced revenue= $91,908 (likely overestimated, trawl tracks fall outside of area, see Figure I above)

Analysis of trawl logbook data from 2003 indicates some bottom trawl effort occurred in the northern portion of the proposed area and little activity south and east of the area (Figure I). The boundaries of Revised Alternative C.12 exclude the fishing area in the northern portion, and expand south and east to include more records of habitat-forming invertebrates in the less trawled area (Figure 19).

NOAA trawl surveys have documented 73 records of habitat-forming invertebrates in the proposed area, including dense records of sponges. Survey hauls documented up to 1,274 kg (2,803 lbs) of sponges per haul in 1988 and 334 kg (735 lbs) of sponges per haul in 1996. Survey hauls in 2001 recorded a maximum of 61 kg (134 lbs) of sponges per haul, which may indicate habitat degradation in recent years. Data from the West Coast Observer Program in the proposed area noted a mean of 304 pounds per haul in commercial bottom trawl hauls where corals or sponges were observed as bycatch (NWFSC, unpublished data).

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The proposed area contains 40 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003).

16. Biogenic area_8

Original Alternative C.12 estimated displaced revenue= $36,172
Revised Alternative C.12 estimated displaced revenue= $41,852 (likely overestimated, trawl tracks fall outside of area, see Figure I above)

The boundaries of the proposed closed area in Revised Alternative C.12 expand northward to include more records of habitat forming invertebrates (Figure 20). Trawl logbook information indicated little activity in the area (Figure I). Every NOAA trawl survey haul in the proposed area has documented habitat-forming invertebrates, including gorgonian corals, sea pens, and Hexactinellid sponges. A total of 51 records of habitat-forming invertebrates have been documented in the proposed area, with up to 160 kg (352 lbs) of sponges per haul.

The proposed area contains 40 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the “untrawlable” polygons determined by Zimmerman (2003).

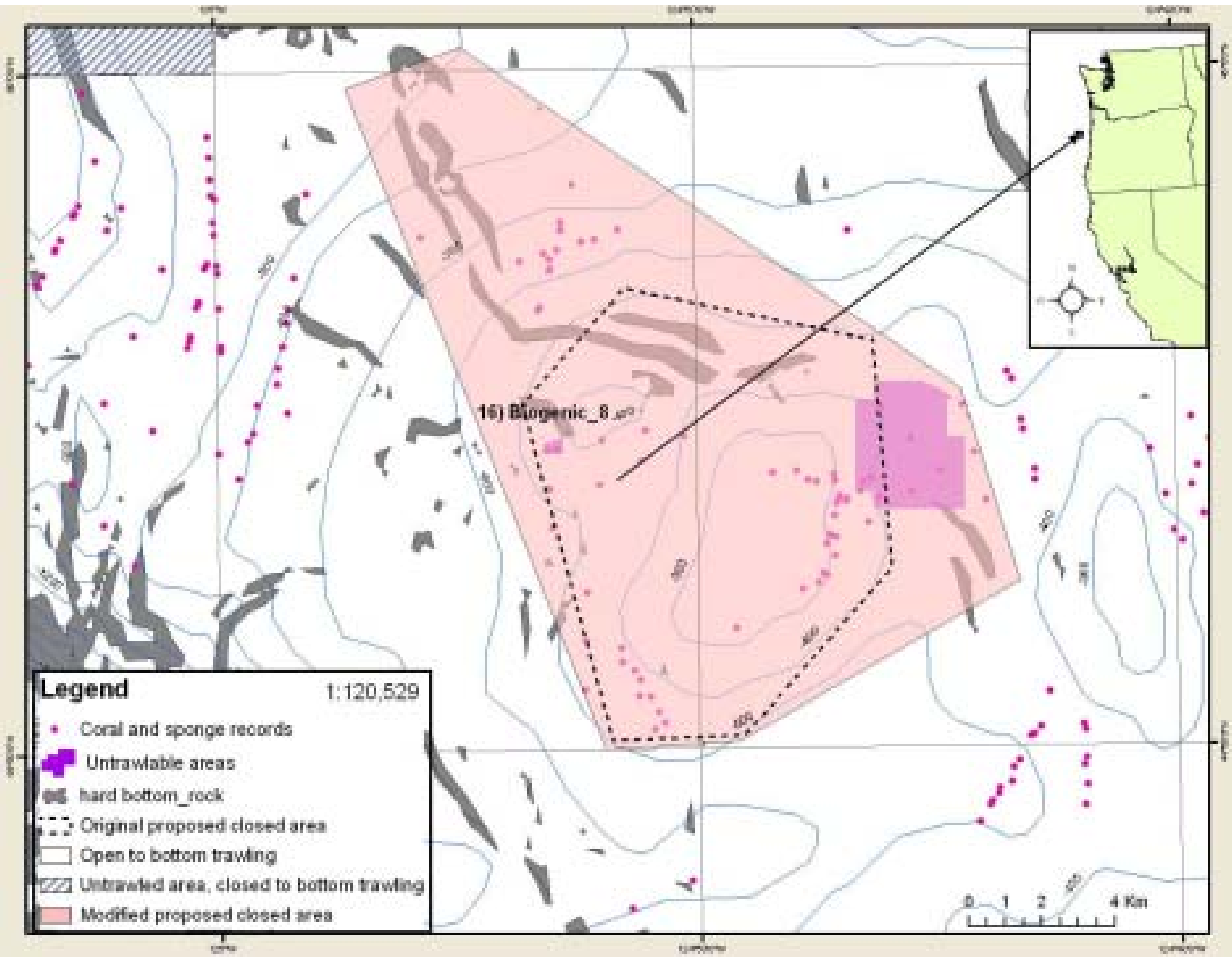


Figure 20: Biogenic area_8

17. Siletz Reef
Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $132

Siletz Reef is a rocky reef located within the 3 nm Oregon state waters boundary (Figure 21). While it is unlikely that this reef is targeted by bottom trawl fishermen, the 2000-2003 bottom trawl logbook data indicated that the northern portion of the reef fell within the bottom trawl footprint. Part of the reef is known locally as "Tacklebuster Reef" as massive rock structures easily snag fishing gear. Depths range from 10-45 meters with vertical relief at the northern end punctuated by dramatic, massive structures up to 20m high and tens of meters across.

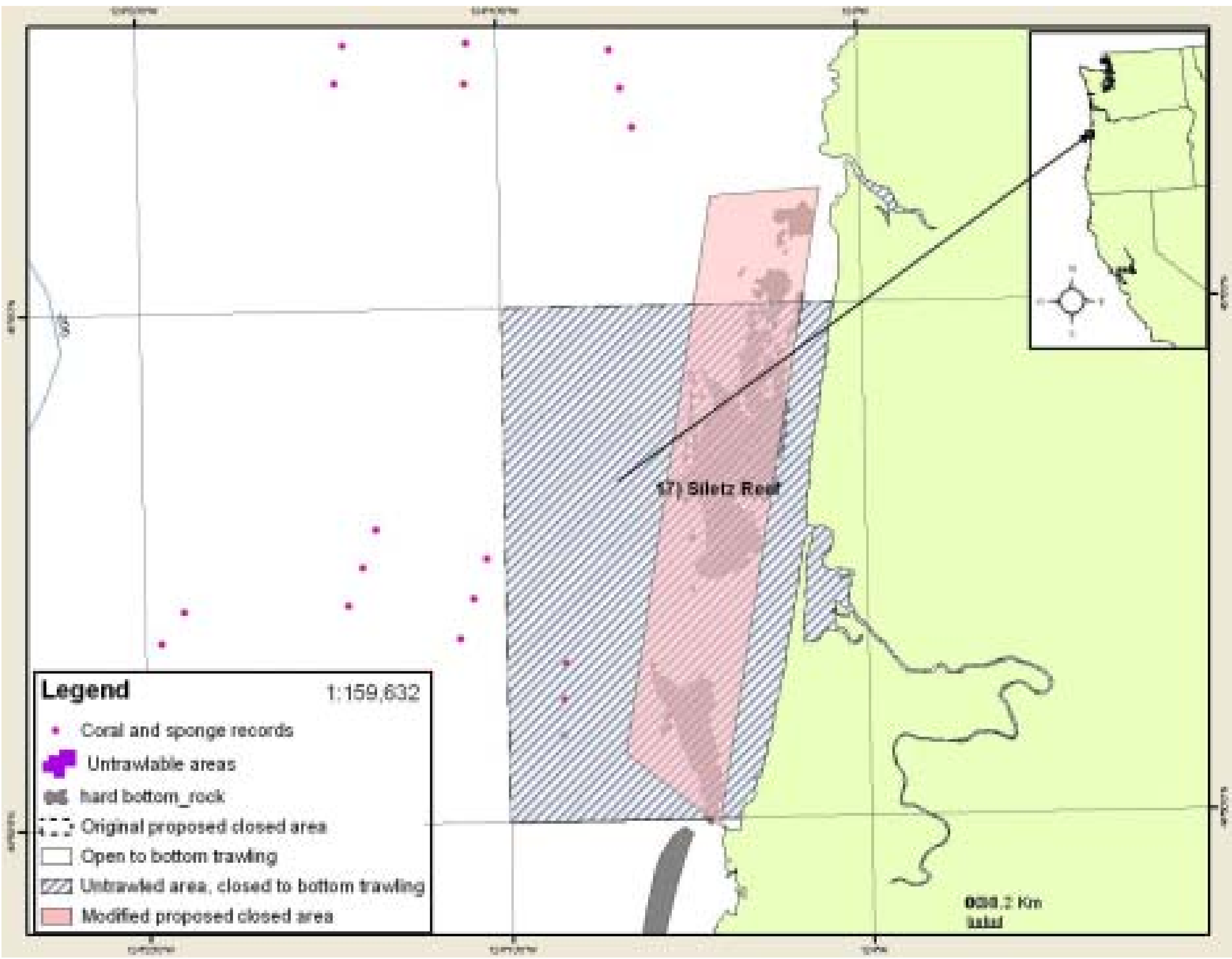


Figure 21: Siletz Reef

18. Daisy Bank

Original Alternative C.12 estimated displaced revenue= $0
Revised Alternative C.12 estimated displaced revenue= $11,768 (likely overestimated, trawl tracks fall outside of area, see Figure J below)

Daisy Bank, a 100 km^2 area north of Heceta Bank, has been less heavily fished and is also comprised largely of hard bottom habitat (Figure 22). Hixon (1991) documented large sponge beds on this bank. Since it is less heavily fished than Heceta Bank, a larger portion of Daisy Bank can be protected from bottom trawling with fewer negative impacts.

NOAA trawl surveys have documented 7 records of habitat forming invertebrates on the bank, including sponges, black coral, and scleractinian coral. However, the bank is not easily sampled with trawl gear. The proposed area contains 15 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). The bank has been explored with submersible and video; Hixon et al. (1990) observed sponges to be prevalent on Daisy Bank, with some over a meter tall. Daisy bank is currently located within the fishery closures associated with the Rockfish Conservation Area, yet some trawl setpoints in 2003 did approach the bank (Figure J).

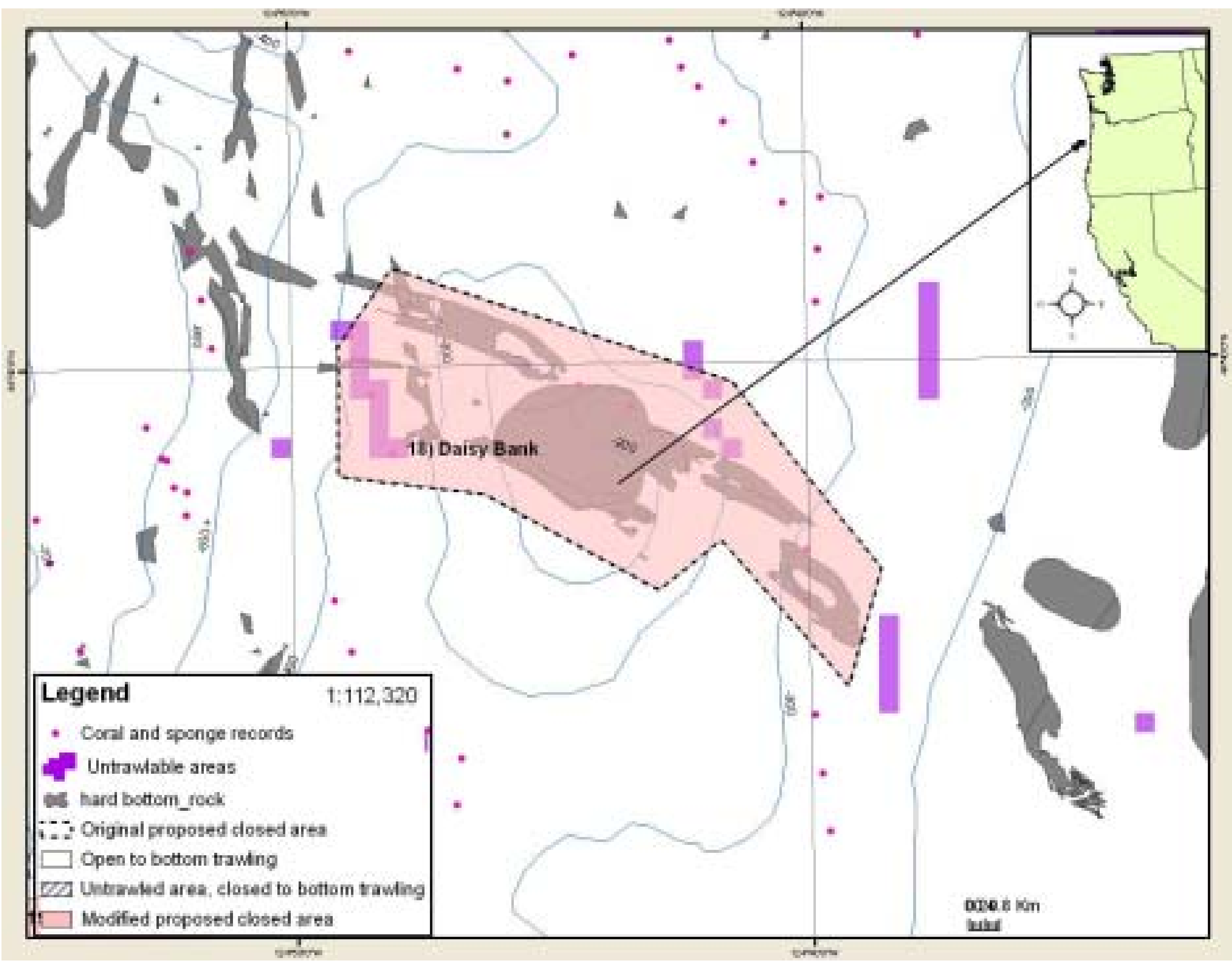


Figure 22: Daisy Bank

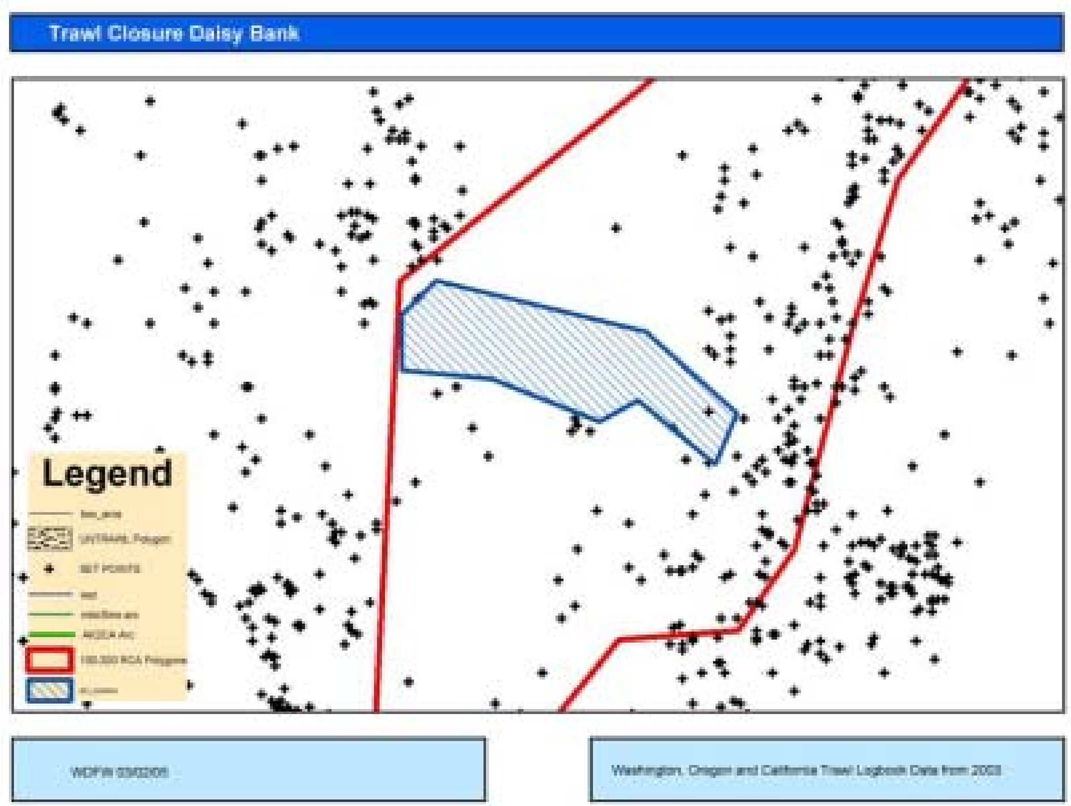


Figure J: 2003 bottom trawl set points from logbook data compiled by WDF&G

19. Biogenic_new 3

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $70,573

This area contains records of biogenic habitat (Figure 23). NOAA trawl surveys have documented 39 records of habitat-forming invertebrates in the proposed closed area, including black corals, gorgonian corals, sea whips, sea pens, and sponges. Sampling by the West Coast Observer program indicates that the area contains records where up to 211 pounds of corals or 55 pounds of sponges were recorded as bycatch per haul.

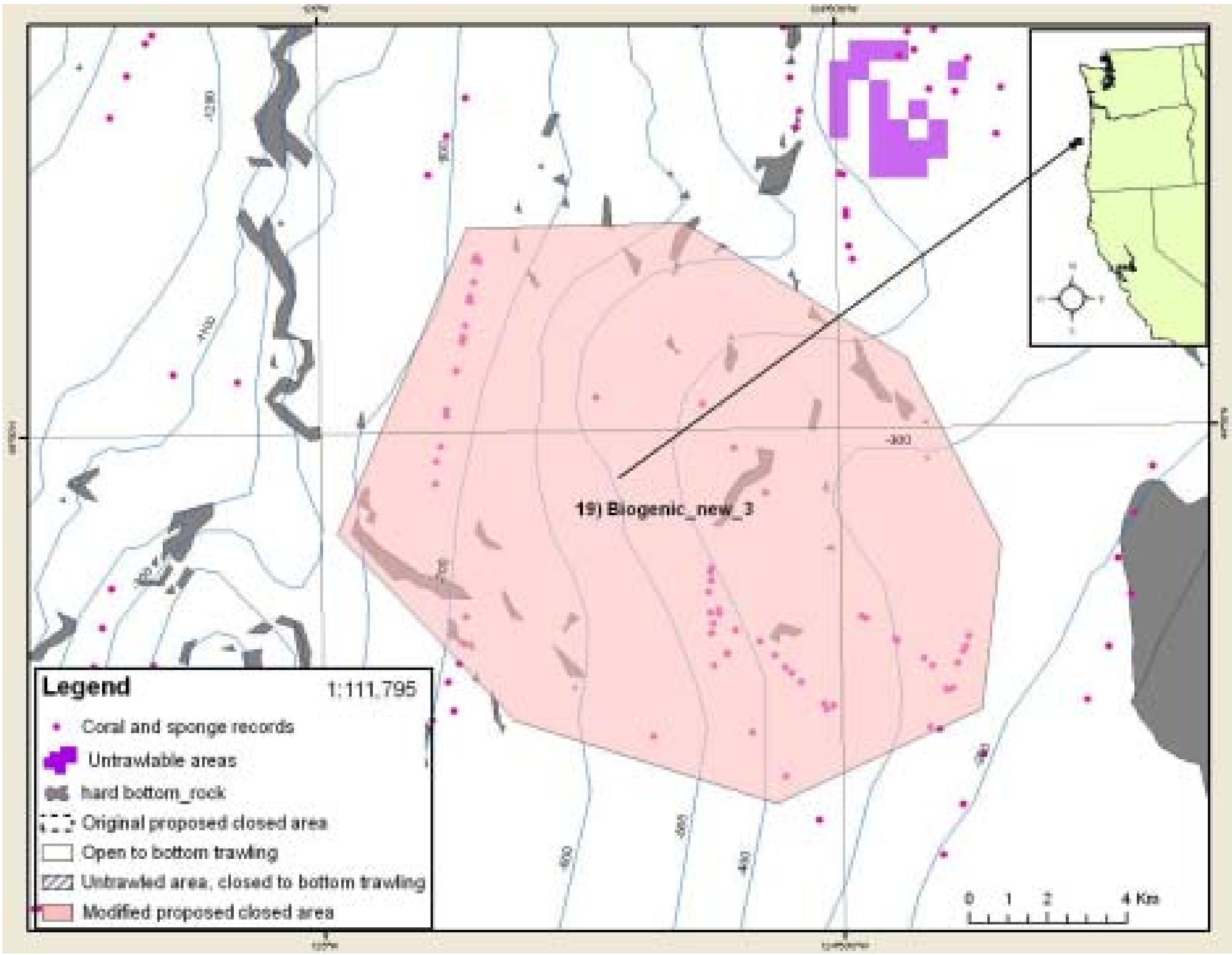


Figure 23: Biogenic_new_3

20. Stonewall Bank

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $7,252

Stonewall Bank is designated as a Rockfish Conservation Area to protect yelloweye and canary rockfish (Figure 24). Little bottom trawl activity occurs on the bank, and closing the bank to trawling would result in minimal displaced revenue.

The proposed area contains 116 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). As it is difficult to trawl here, the bank has not been well sampled by NOAA trawl surveys. However, 2 records of sponges were documented here.

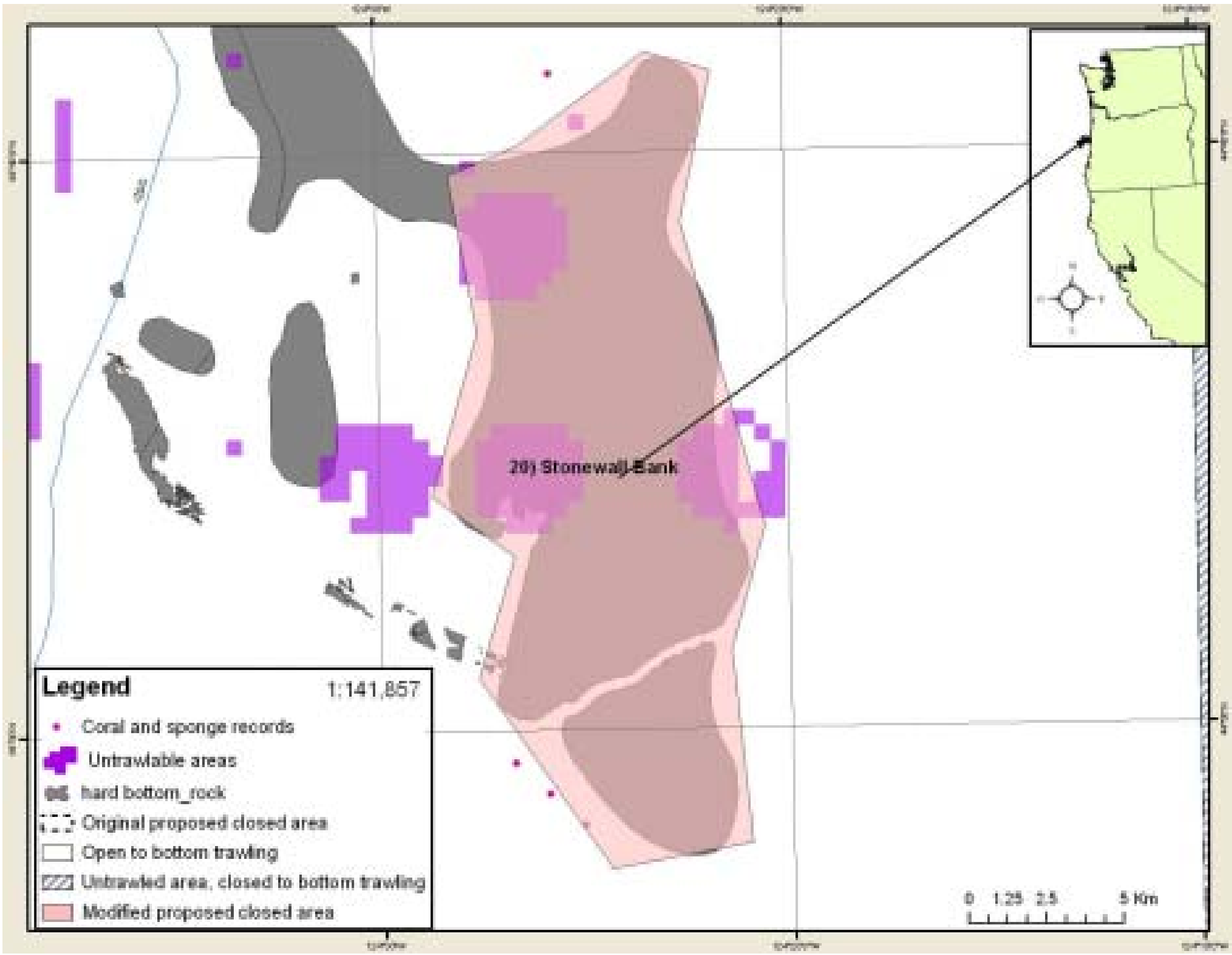


Figure 24: Stonewall Bank

21. Cape Perpetua Reef

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $125

Cape Perpetua Reef is a rocky reef off the Oregon coast (Figure 25). Oregon State's Nearshore Rocky Reef Project mentions the Cape Perpetua Reef as the most undisturbed and pristine reef off the Oregon coast Little trawl activity occurs near the bank and closing the bank to bottom trawling would result in minimal displaced revenue. As it is likely difficult to trawl here, the bank has not been sampled by NOAA trawl surveys.

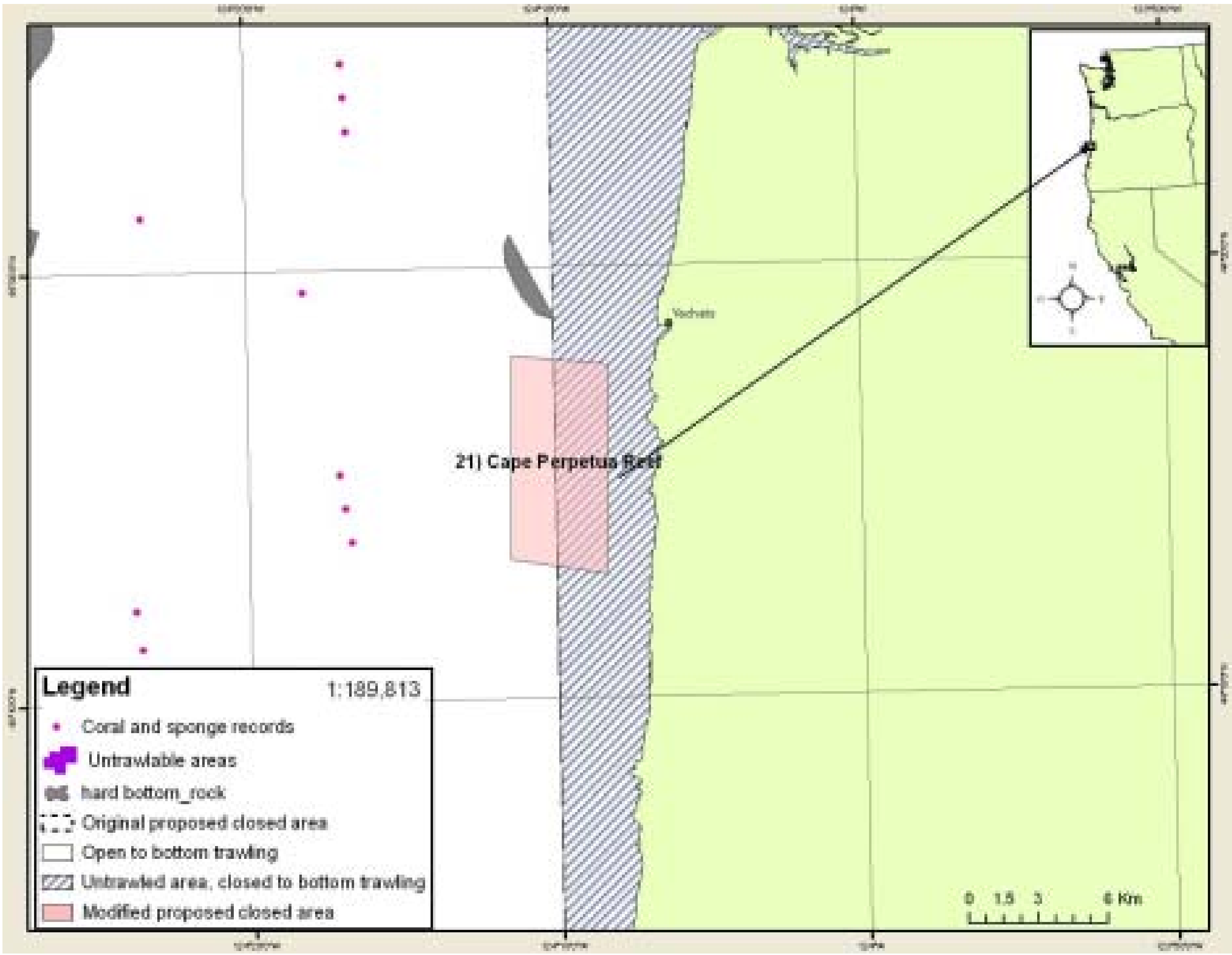


Figure 25: Cape Perpetua Reef

22. & 23. Heceta Bank area

Original Alternative C.12 estimated displaced revenue= $379,291
Revised Alternative C.12 estimated displaced revenue= $229,475 (likely overestimated, trawl tracks fall outside of area, see Figure K below)

Trawl logbook data indicated trawl activity within the previously proposed boundaries of the Heceta bank closed area. Trawl effort appeared concentrated on the slope off Heceta Bank and south (Figure K). The proposed area was split into the 2 areas below, which avoids much of the trawl effort and likely results in less displaced effort from the closure (Figure 26).

22. Heceta Bank

Revised Alternative C.12 estimated displaced revenue= $200,810 (likely overestimated, trawl tracks fall outside of area, see Figure K below)

Heceta Bank is the largest rocky reef off the U.S. Pacific Coast. It is composed largely of hard bottom substrate. The proposed area contains 591 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the “untrawlable” polygons determined by Zimmerman (2003). NOAA trawl surveys have documented 16 records of sponges on the bank, but the bank has not been well-sampled with trawl survey gear. Recent explorations have documented key areas of sponges and crinoids. Video from submersible dives have noted some dense areas of habitat forming invertebrates on the bank (Hixon et al. 1990, Waldo Wakefield unpublished data).

23. Heceta Escarpment
Revised Alternative C.12 estimated displaced revenue= $28,665

NOAA trawl surveys have documented 50 records of habitat-forming invertebrates in the proposed closed area, including black corals, gorgonian corals, sea whips, sea pens, and sponges.

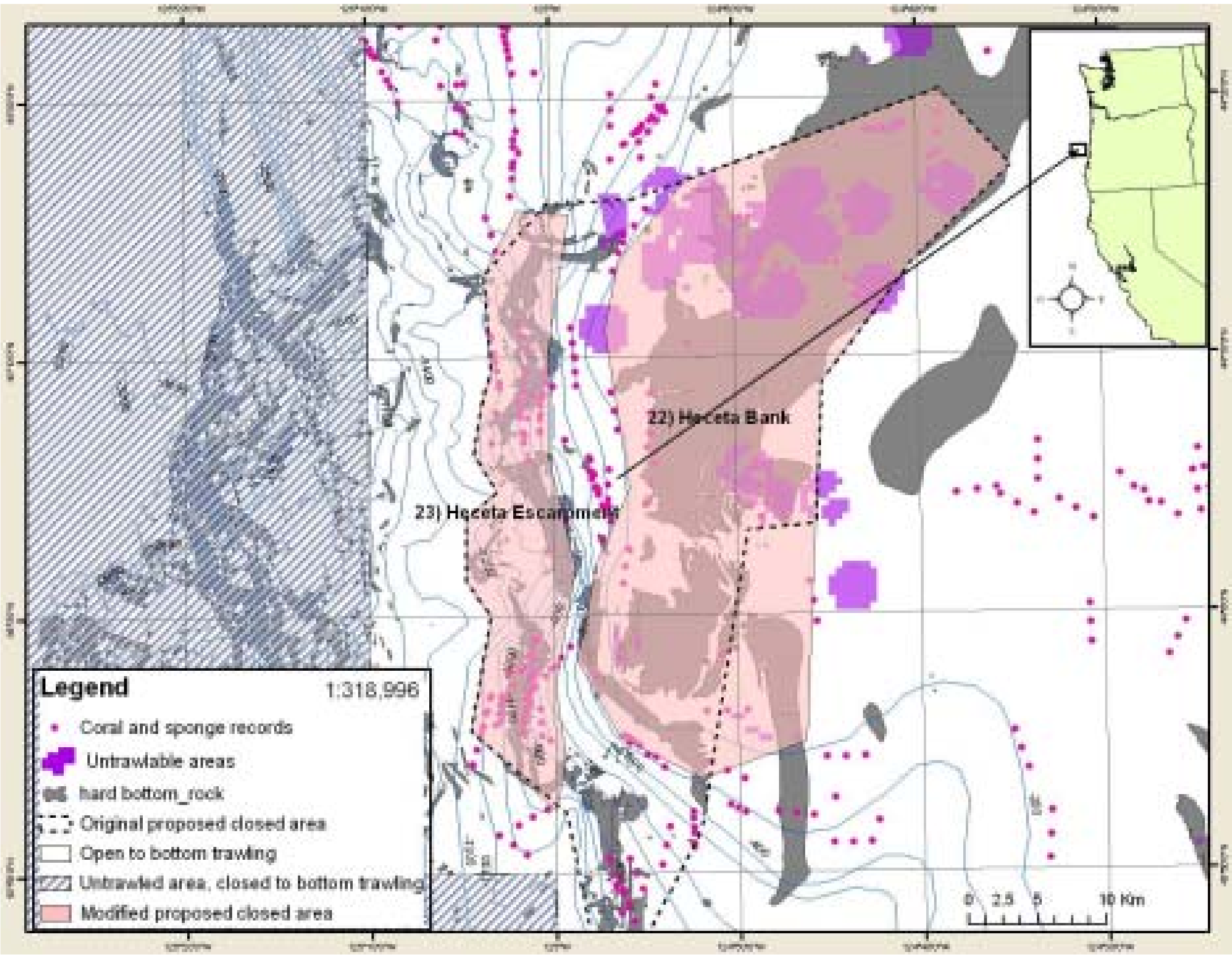


Figure 26: Heceta Bank and Heceta Escarpment

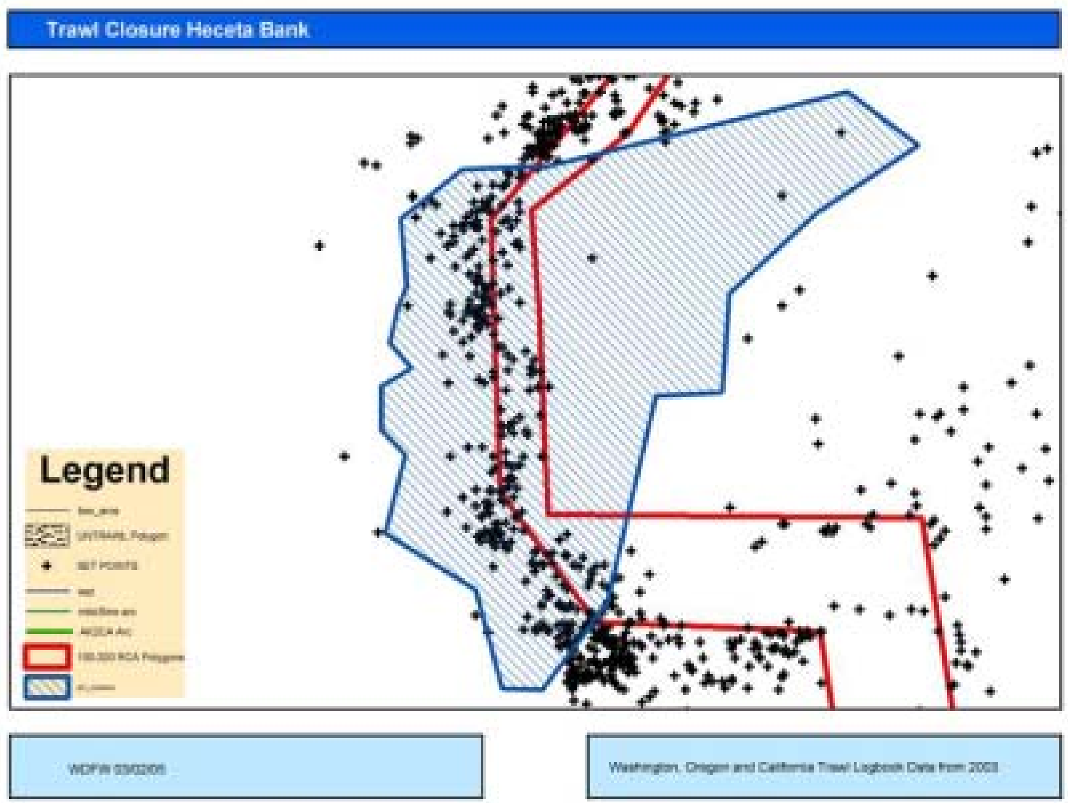


Figure K: 2003 bottom trawl logbook set points (courtesy WDF&W)

24. Ridges_biogenic_10

Original Alternative C.12 estimated displaced revenue= $7,114
Revised Alternative C.12 estimated displaced revenue= $94,628 (likely overestimated, trawl tracks fall outside of area, see Figure L below)

The two previously proposed closed areas were combined into one area and boundaries extended to encompass more records of habitat-forming invertebrates (Figure 27). Trawl logbook data from 2003 indicated little overlap of bottom trawl activity within the proposed area (Figure L). The proposed closed area encompasses habitat from 700 to 1500 meters depth. NOAA trawl surveys have documented 103 records of habitat-forming invertebrates within the proposed closed area. Hexactinellid sponges, black corals, sea whips, and bubblegum corals have been documented in the proposed area.

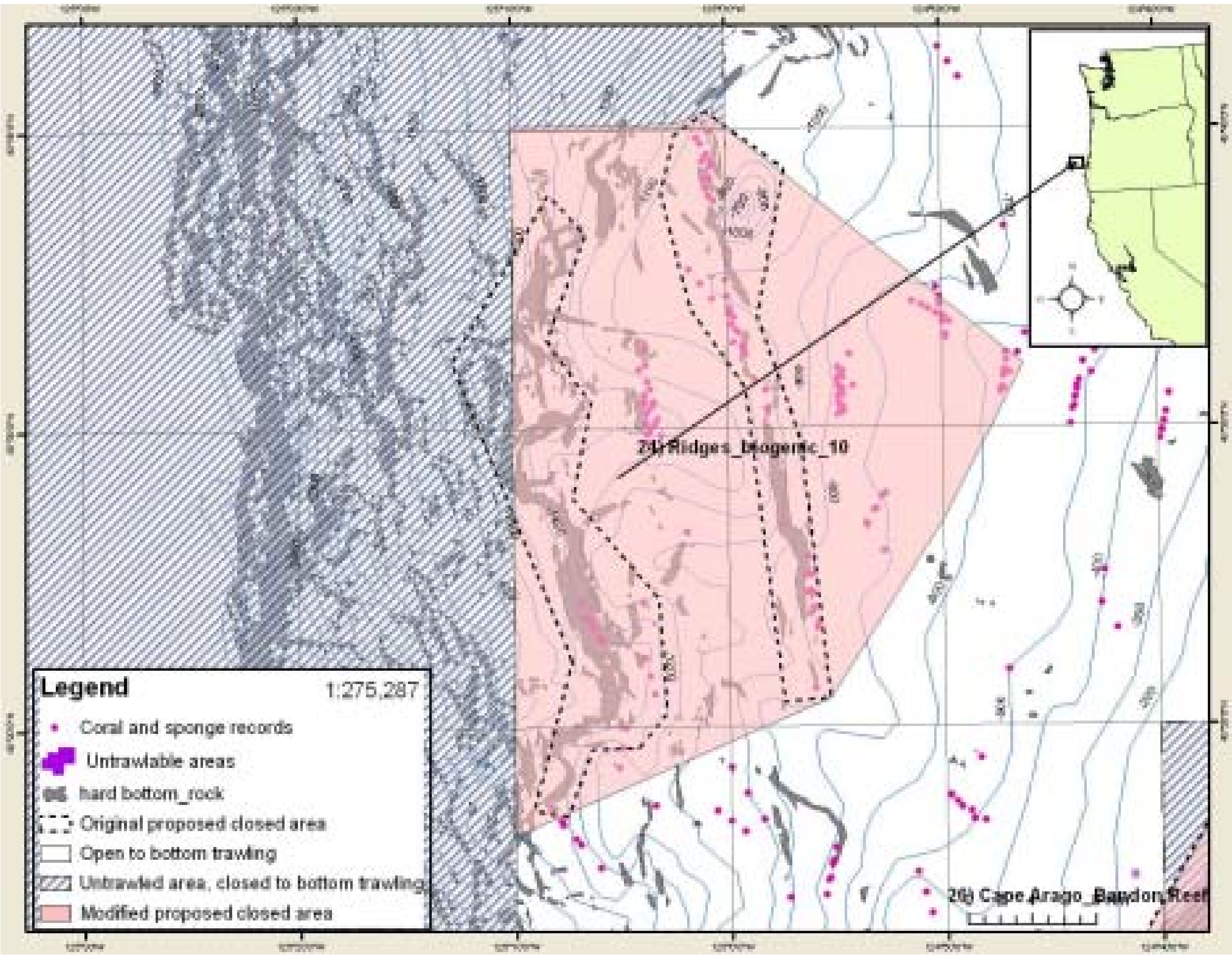


Figure 27: Ridges_biogenic_10

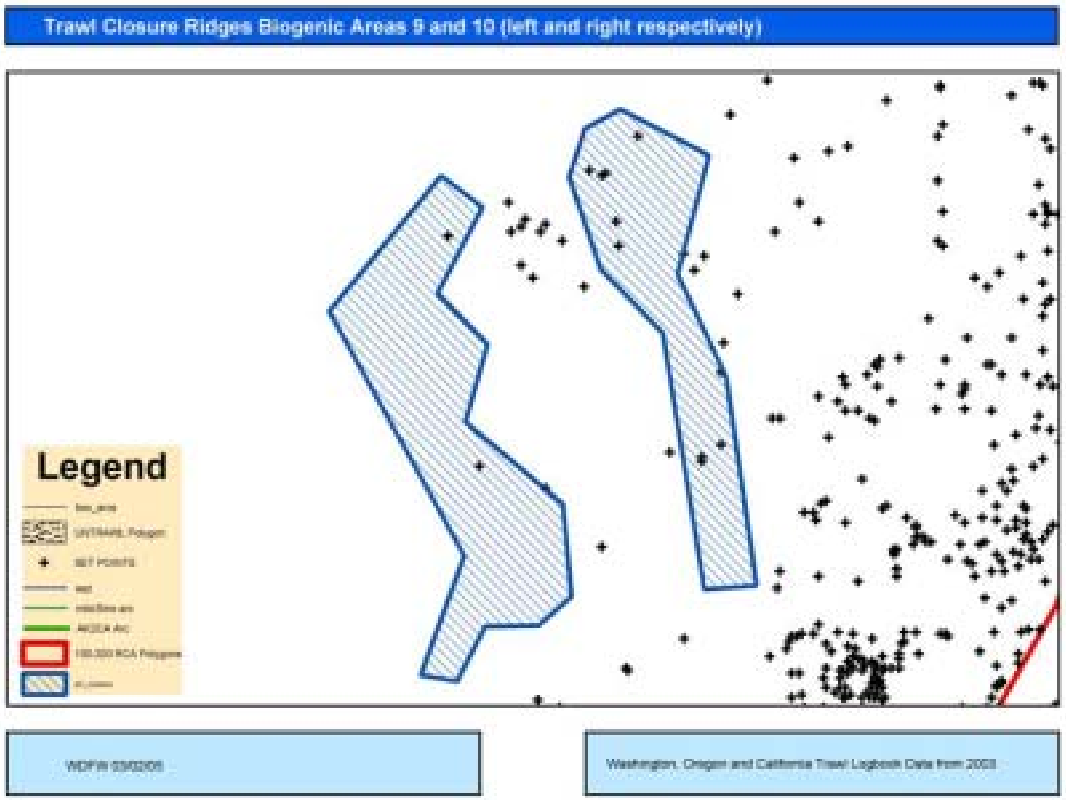


Figure L: 2003 bottom trawl logbook set points (courtesy WDF&W)

25. Siltcoos Reef

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $383

Siltcoos Reef is a rocky reef off the Oregon Coast (Figure 28). The proposed area contains 30 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the “untrawlable” polygons determined by Zimmerman (2003). As it is difficult to trawl here, the area has not been well surveyed by NOAA trawl surveys. It is also likely that little bottom trawling occurs on the reef, and closing the area would result in minimal displaced effort.

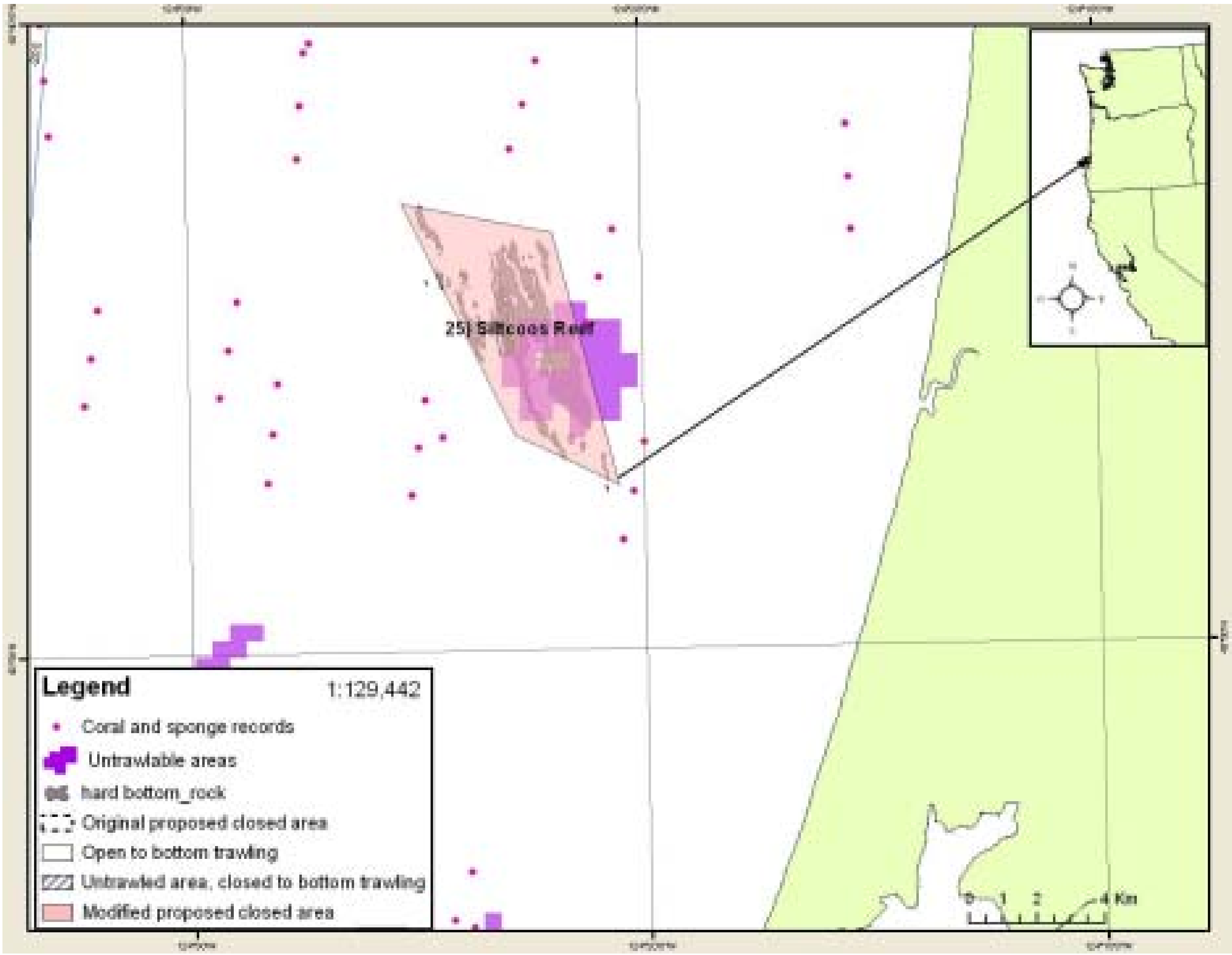


Figure 28: Siltcoos Reef

26. Cape Arago_Bandon Reef

Original Alternative C.12 estimated displaced revenue= $2,016
Revised Alternative C.12 estimated displaced revenue= $12,018

This area was previously identified as "hard-bottom feature_1". The proposed area contains a large proportion of rocky and hard bottom habitat and pinnacles (Figure 29). The proposed closed area in Revised Alternative C.12 contains 253 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). As it is difficult to trawl here, the area has not been well surveyed by NOAA trawl surveys, but 2 records of sponges were documented in 1980.

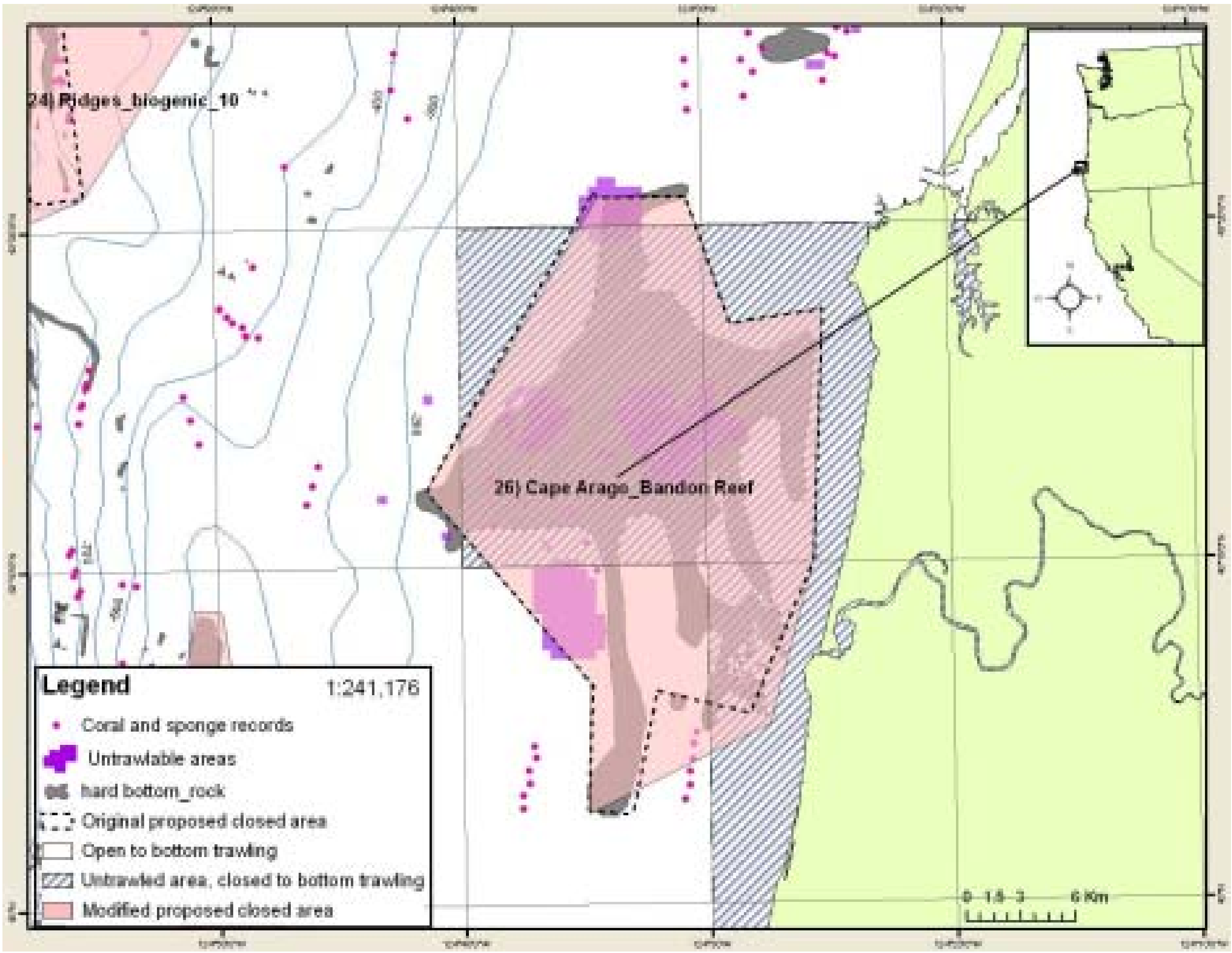


Figure 29: Cape Arago_Bandon Reef

27. Orford and McKenzies Reef

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $3,929

The area around Orford Reef contains extensive bull kelp beds and rockfish habitat. Orford Reef is also an important rookery for the endangered Steller sea lions and is the second largest rookery south of Alaska. This area is located within the 3nm limit of Oregon state waters. Trawl logbooks from 1997-2002 did not document any trawling activity on the reef (Bellman and Heppel 2004). It is likely that it is difficult to trawl on the reef complex. The proposed area contains 108 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the “untrawlable” polygons determined by Zimmerman (2003). Few successful NOAA trawl survey hauls have occurred on the bank, but one record of sea pens was noted.

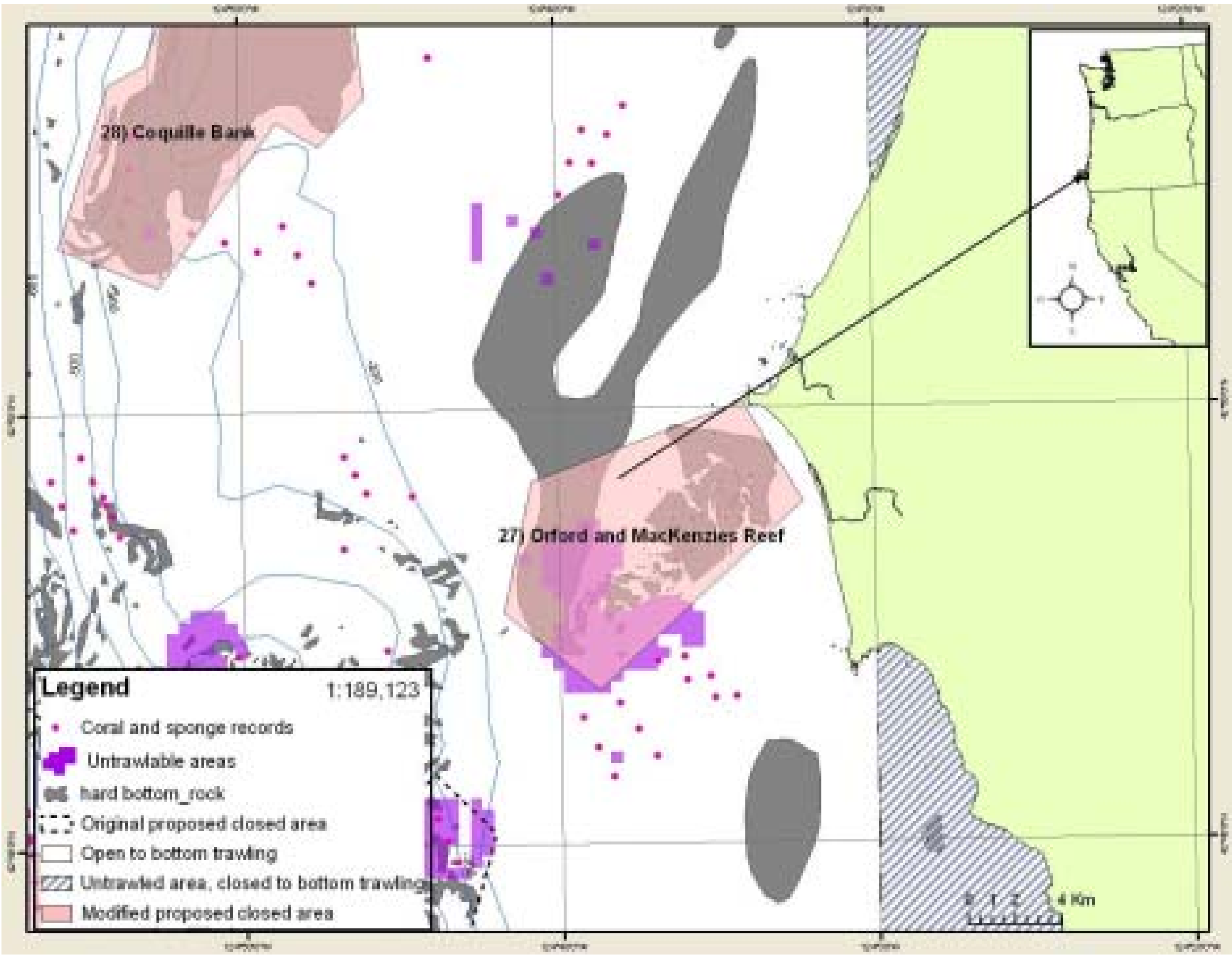


Figure 30: Orford and McKenzies Reef

28. Coquille Bank

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $75,004

The proposed area contains 3 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the “untrawlable” polygons determined by Zimmerman (2003). Six records of sponges were documented on the bank by NOAA trawl surveys, and four of the six records occurred in the 1980’s.

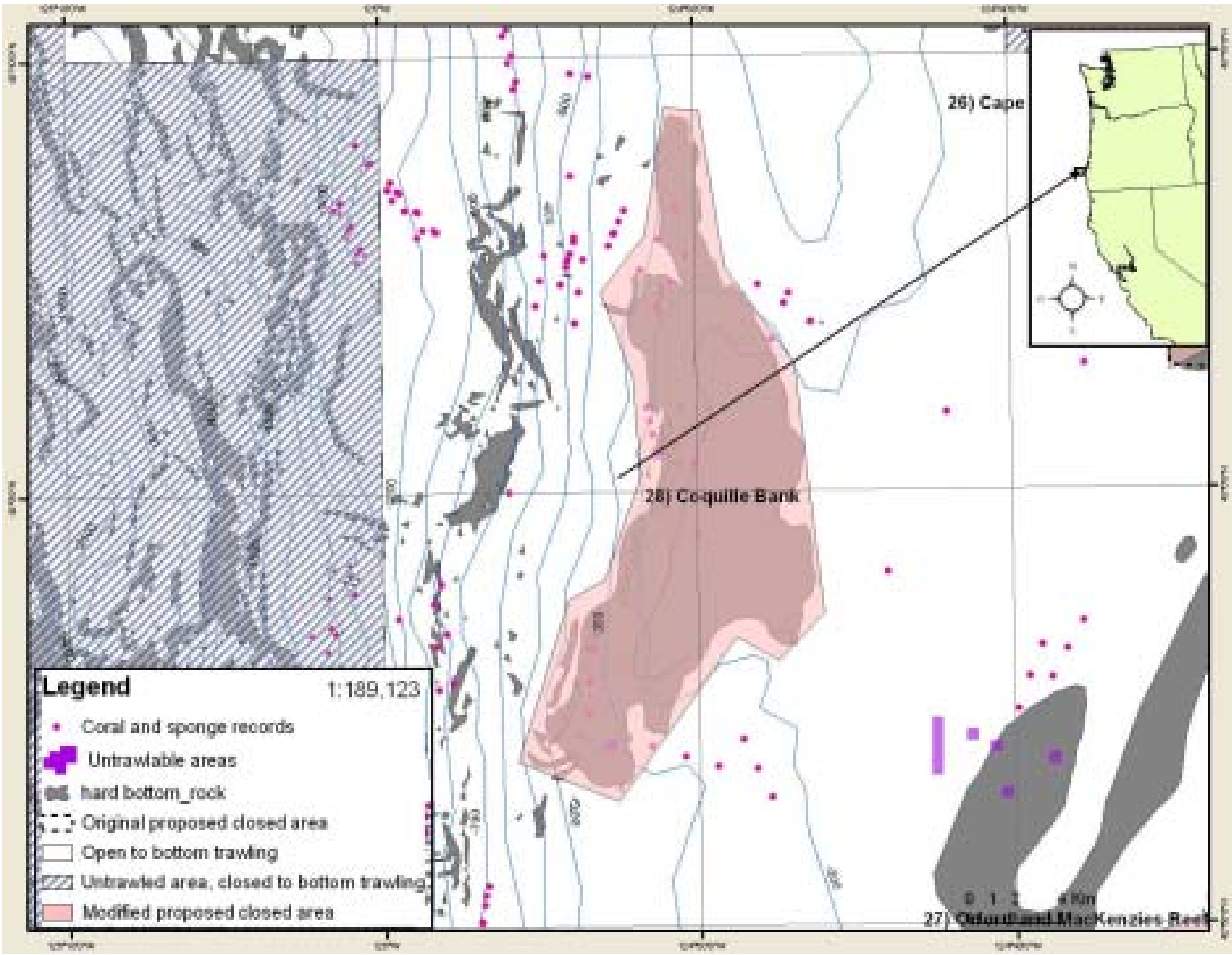


Figure 31: Coquille Bank

29. & 30. Rogue Canyon area

Original Alternative C.12 estimated displaced revenue= $491,706
Revised Alternative C.12 estimated displaced revenue= $145,172 (likely overestimated, trawl tracks fall outside of area, see Figure M below)

Trawl logbook data indicated trawl activity within the previously proposed boundaries of the Rogue Canyon closed area (Figure M). Bottom trawl fishermen indicated a preferred tow area within the proposed closed area, and suggested some areas for change. The proposed closed area was split into the two areas below for Revised Alternative C.12, which avoids much of the trawl effort and likely results in less displaced effort from the closure (Figure 32).

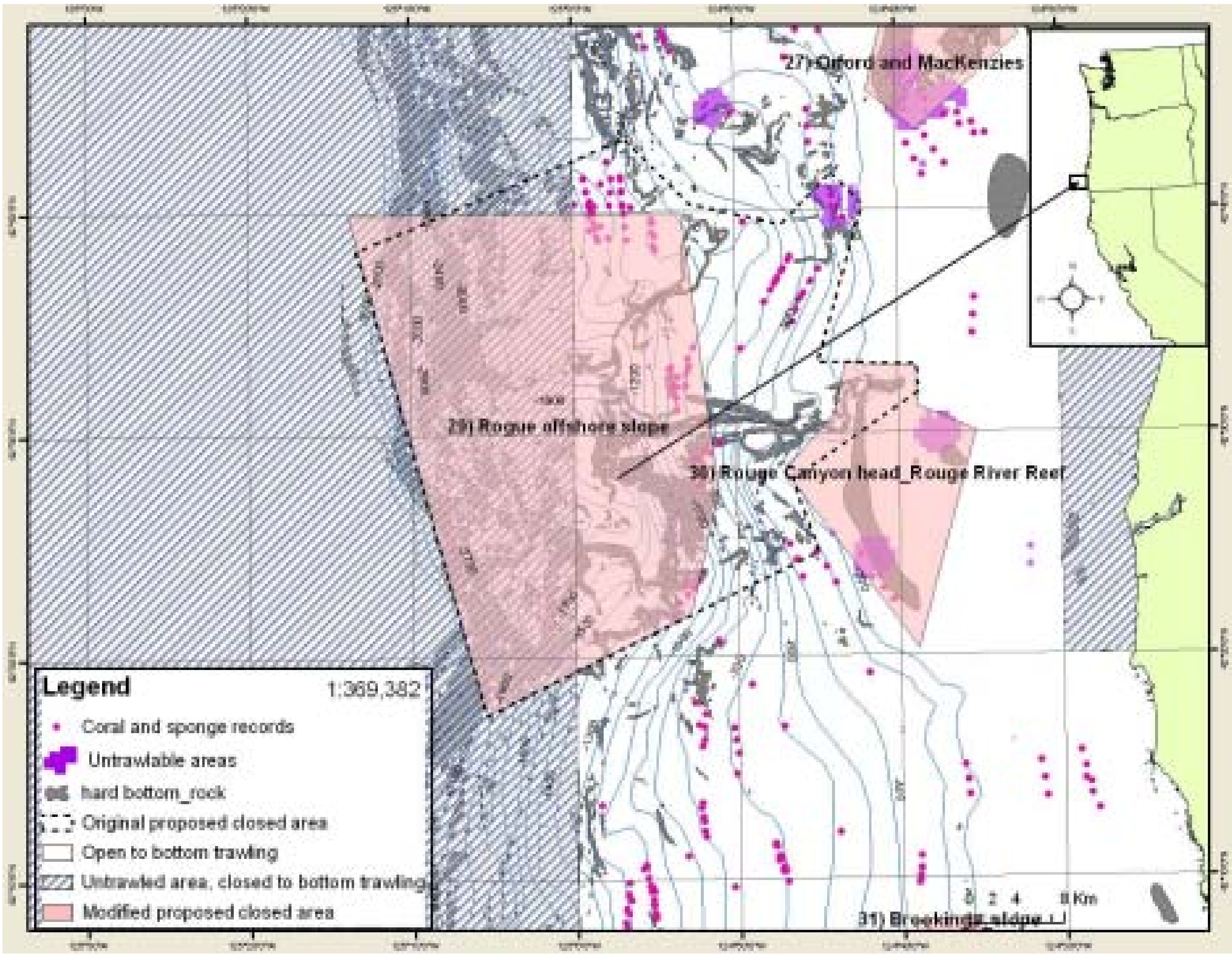


Figure 32: Rouge offshore slope and Rogue canyon head

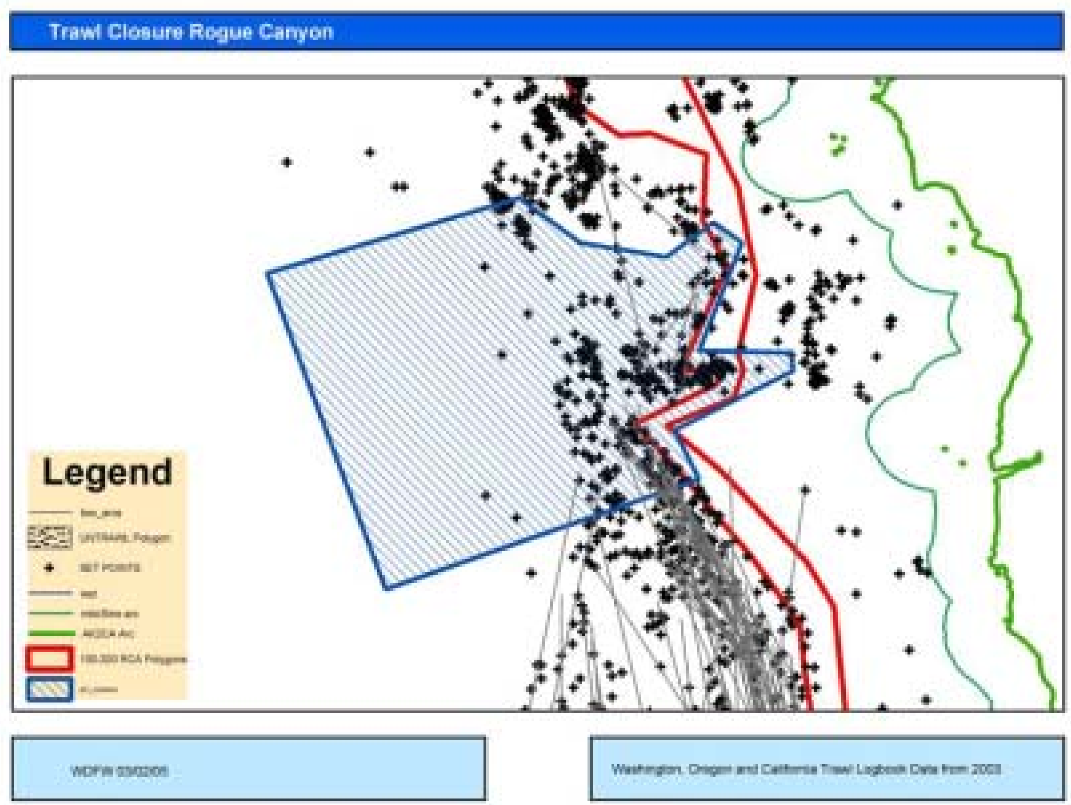


Figure M: 2003 bottom trawl logbook set points (courtesy WDF&W)

29. Rogue offshore slope
Revised Alternative C.12 estimated displaced revenue= $81,296

NOAA trawl surveys have documented 26 records of habitat-forming invertebrates within the proposed closed area. Hexactinellid sponges, black corals, sea whips, and gorgonian corals have been documented in the proposed area.

30. Rogue Canyon head_ Rogue River Reef
Revised Alternative C.12 estimated displaced revenue= $63,876

The proposed area contains 86 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the “untrawlable” polygons determined by Zimmerman (2003). NOAA trawl surveys have not sampled the area well, as the area is likely difficult to trawl. However, two records of sponges have been noted by successful survey hauls (Figure 33).

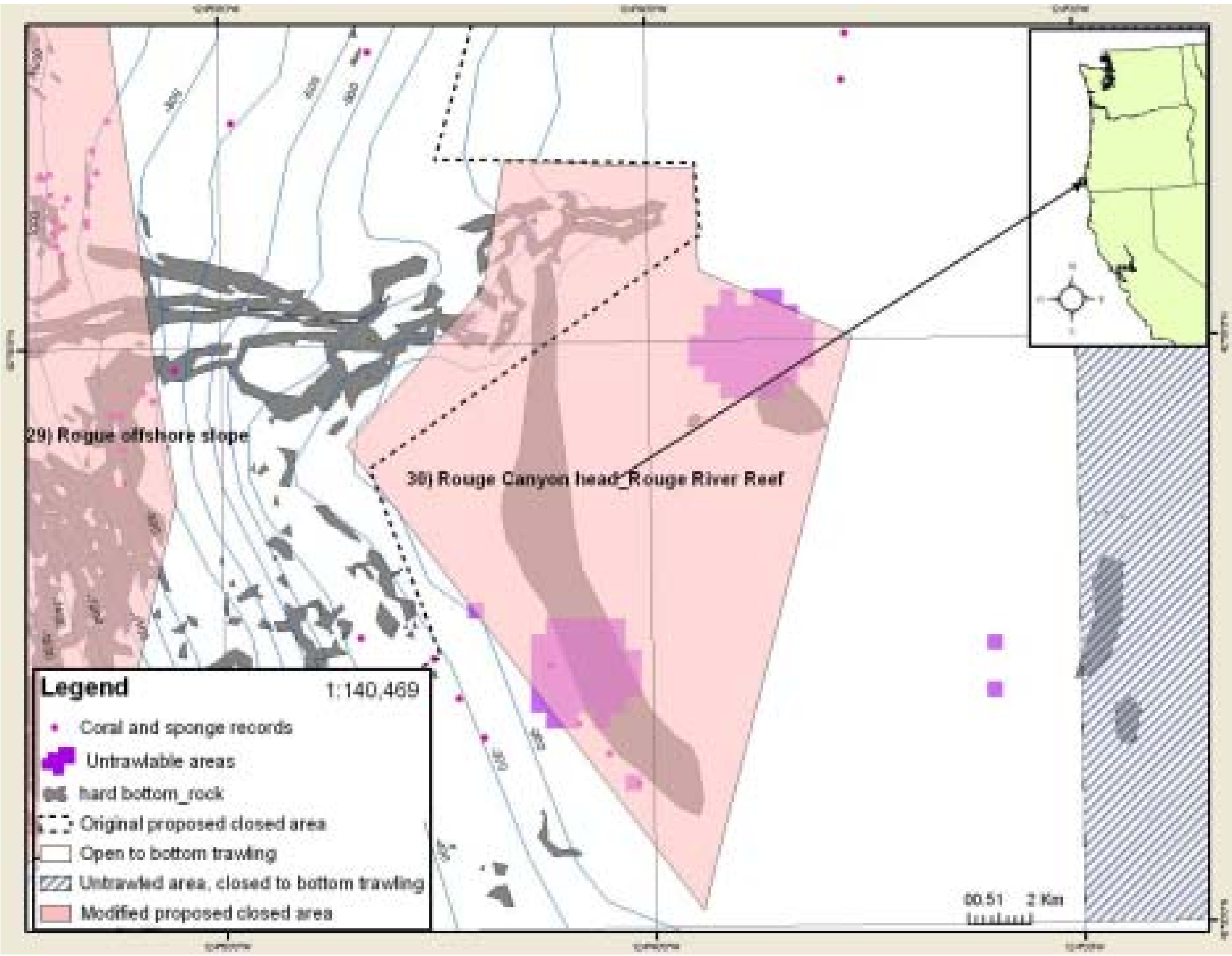


Figure 33: Rogue Canyon head_Rogue River Reef

31. Brookings_slope

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $48,884

This area encompasses slope habitat that is currently closed to bottom trawling in the rockfish conservation area (RCA), and as such, there is likely to be much less displace revenue than estimated. The proposed area contains 55 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). NOAA trawl surveys have not sampled the area well, but four records of sponges and sea pens have been documented in the proposed area (Figure 34).

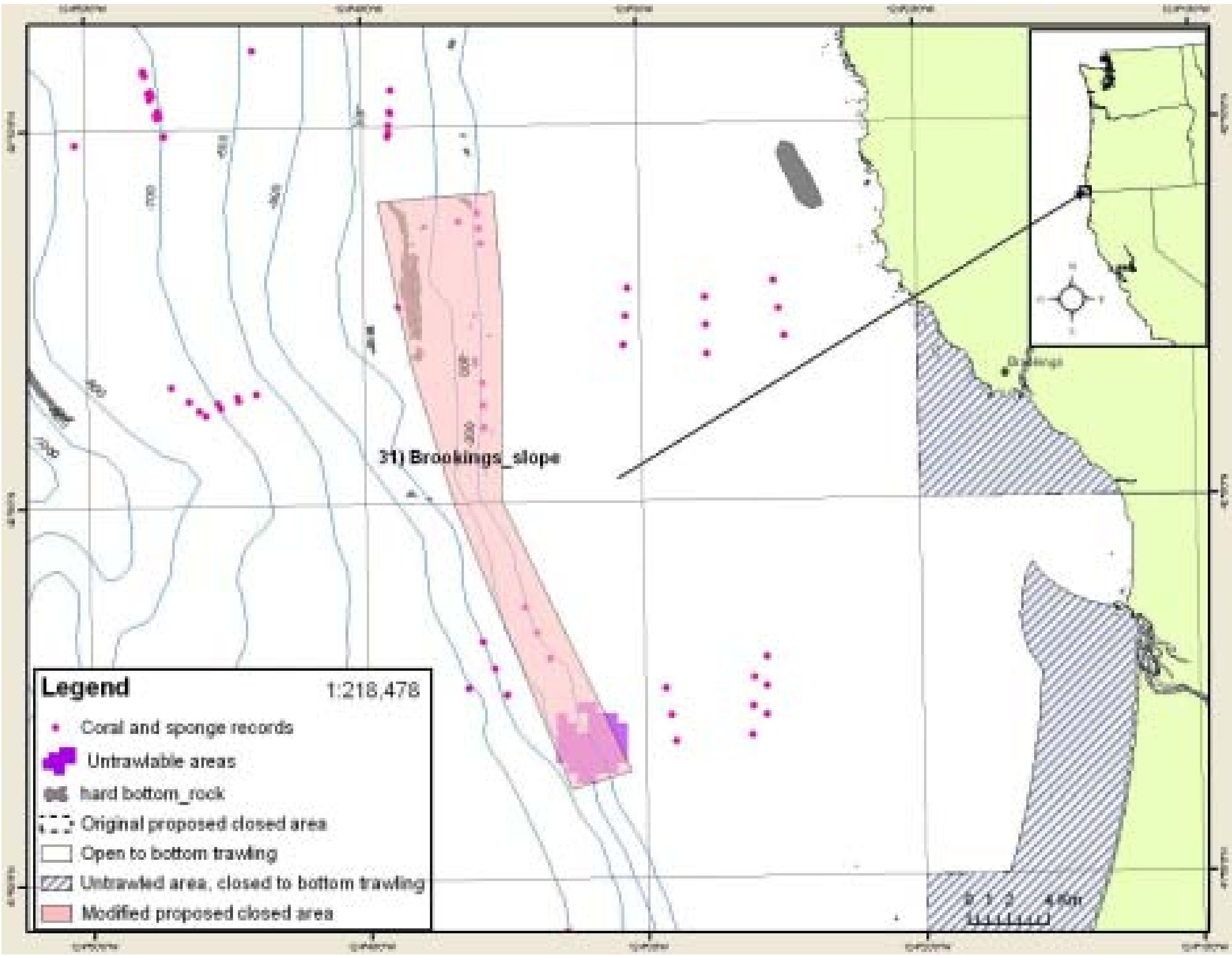


Figure 34: Brookings_slope

32. Crescent City deep_Biogenic_11

Original Alternative C.12 estimated displaced revenue= $2,734
Revised Alternative C.12 estimated displaced revenue= $9,635

This area is in deep water, and is located outside of the bottom trawl footprint (Figure 35). As such, there is likely to be much less displaced revenue than estimated here. This area was also proposed by the trawl industry as a candidate for closure. NOAA trawl surveys have documented 35 records of habitat-forming invertebrates within the proposed closed area. Hexactinellid sponges, black corals, sea whips, and gorgonian corals have been documented in the proposed area.

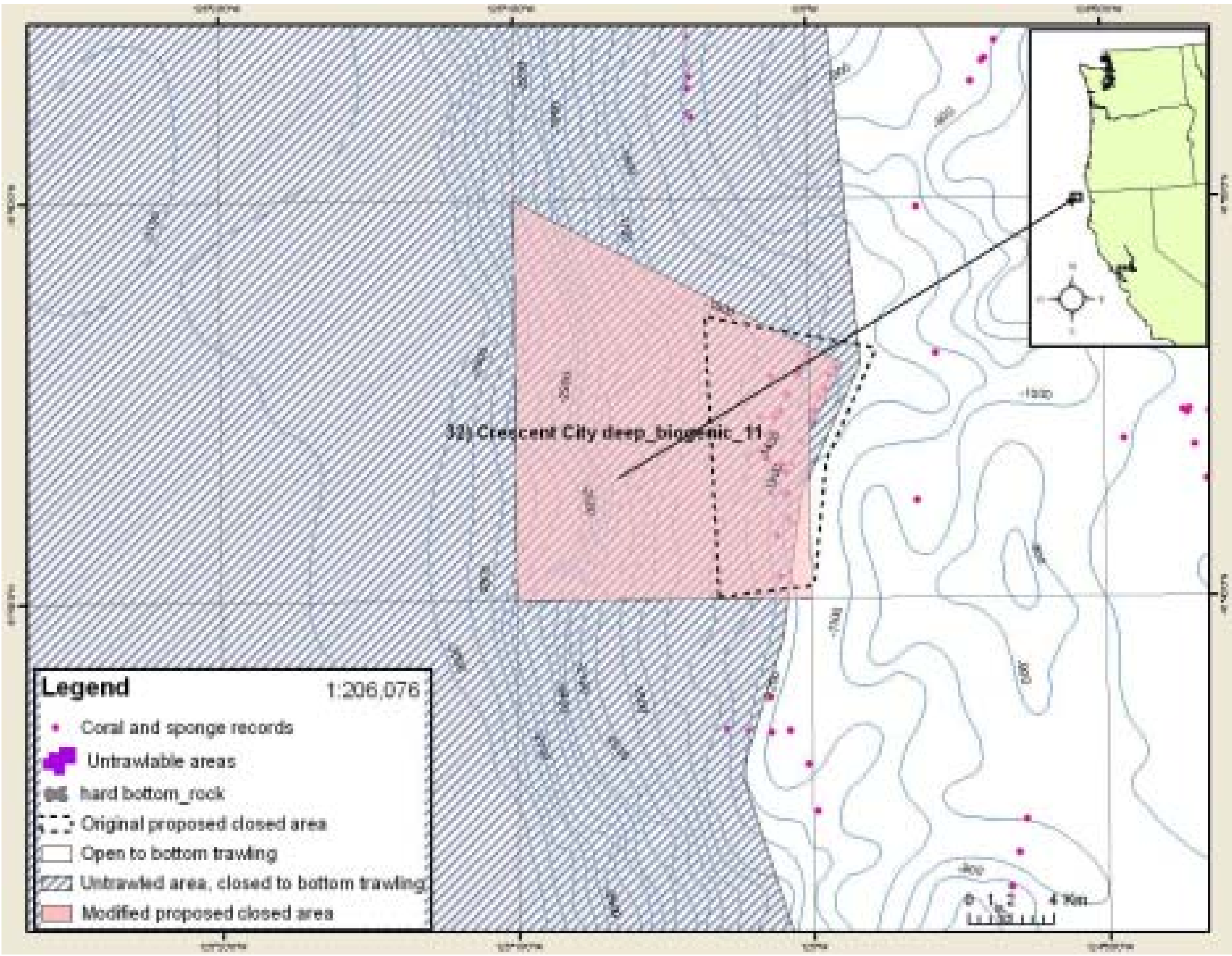


Figure 35: Crescent City deep_Biogenic_11

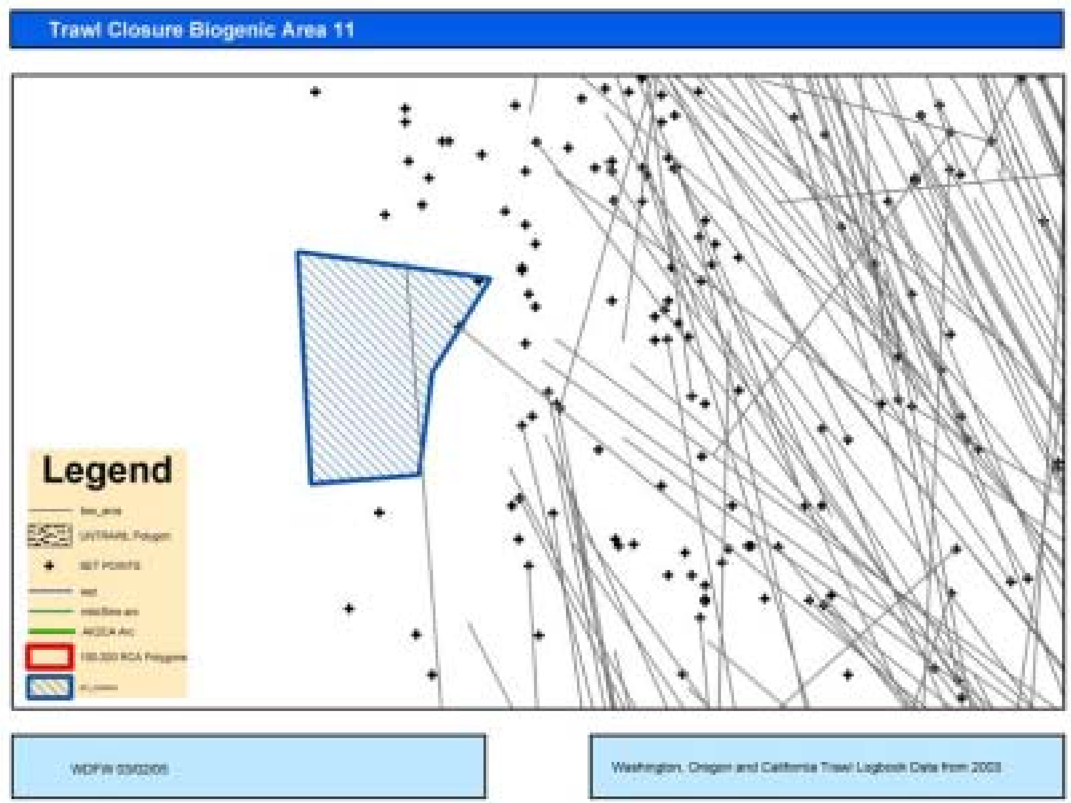


Figure N: 2003 bottom trawl logbook set points (courtesy WDF&W)

33. Crescent City slope

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $49,779

This area encompasses slope habitat located within the rockfish conservation area that is currently closed to bottom trawling. As such, there is likely to be much less displaced revenue than estimated here. The proposed area contains 72 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the “untrawlable” polygons determined by Zimmerman (2003). While the area is not well sampled by NOAA trawl survey gear, 5 records of sponges and sea pens have been documented (Figure 36).

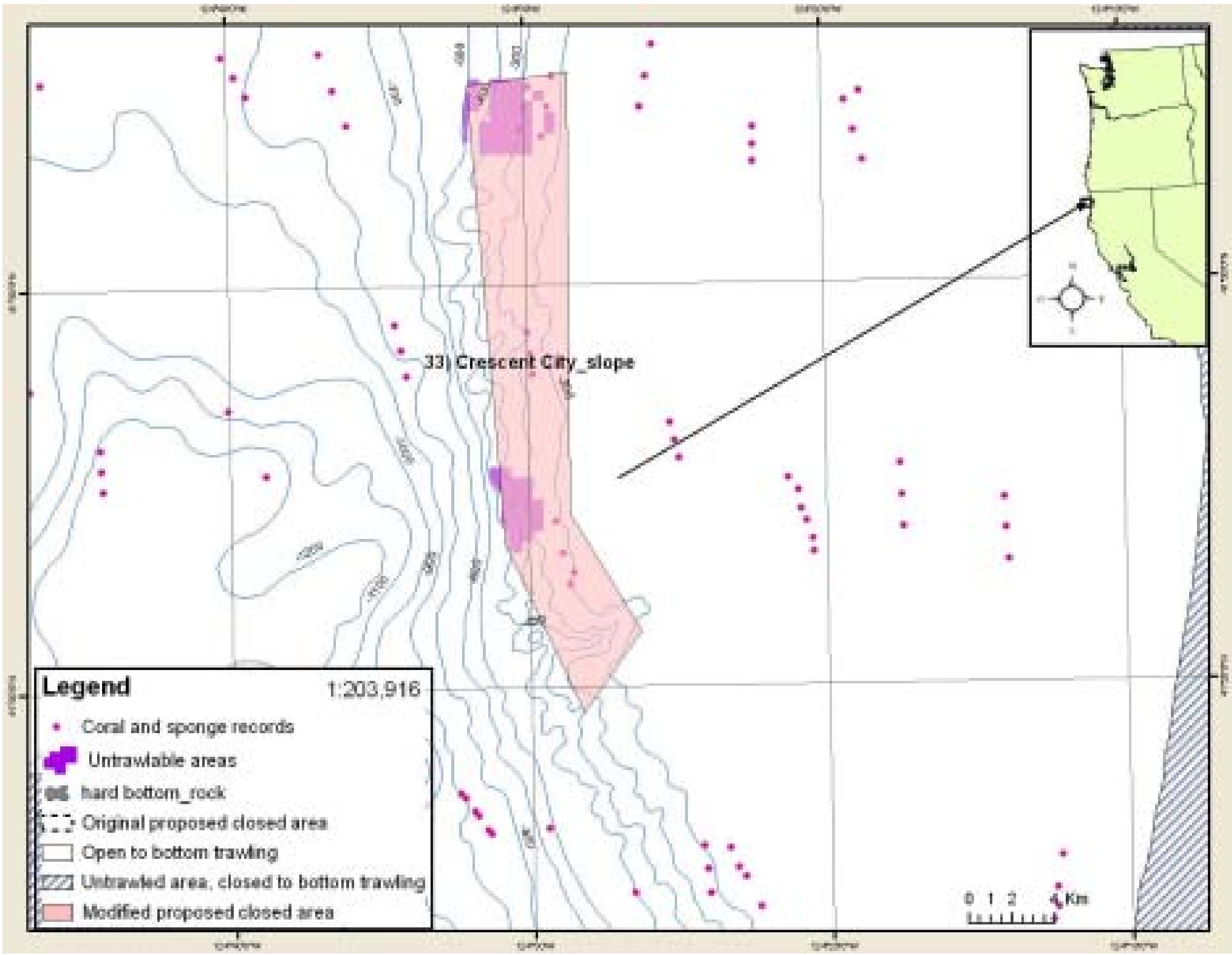


Figure 36: Crescent City slope

34. Eel River Canyon

Original Alternative C.12 estimated displaced revenue= $551,397
Revised Alternative C.12 estimated displaced revenue= $201,696 (likely overestimated, trawl tracks fall outside of area, see Figure O below)

Eel River canyon is a deepwater canyon located north of Mendoncino Ridge (Figure 37) The boundary of this area for Revised Alternative C.12 avoids some trawled areas along the canyon edge (Figure O). The boundary closely follows the closed area boundary suggested by representatives of the bottom trawl industry. Therefore, the closure should result in minimal displaced bottom trawl effort, probably much less than we estimate here. The proposed area contains 53 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the “untrawlable” polygons determined by Zimmerman (2003). NOAA trawl surveys have documented 7 records of gorgonian corals and sea pens.

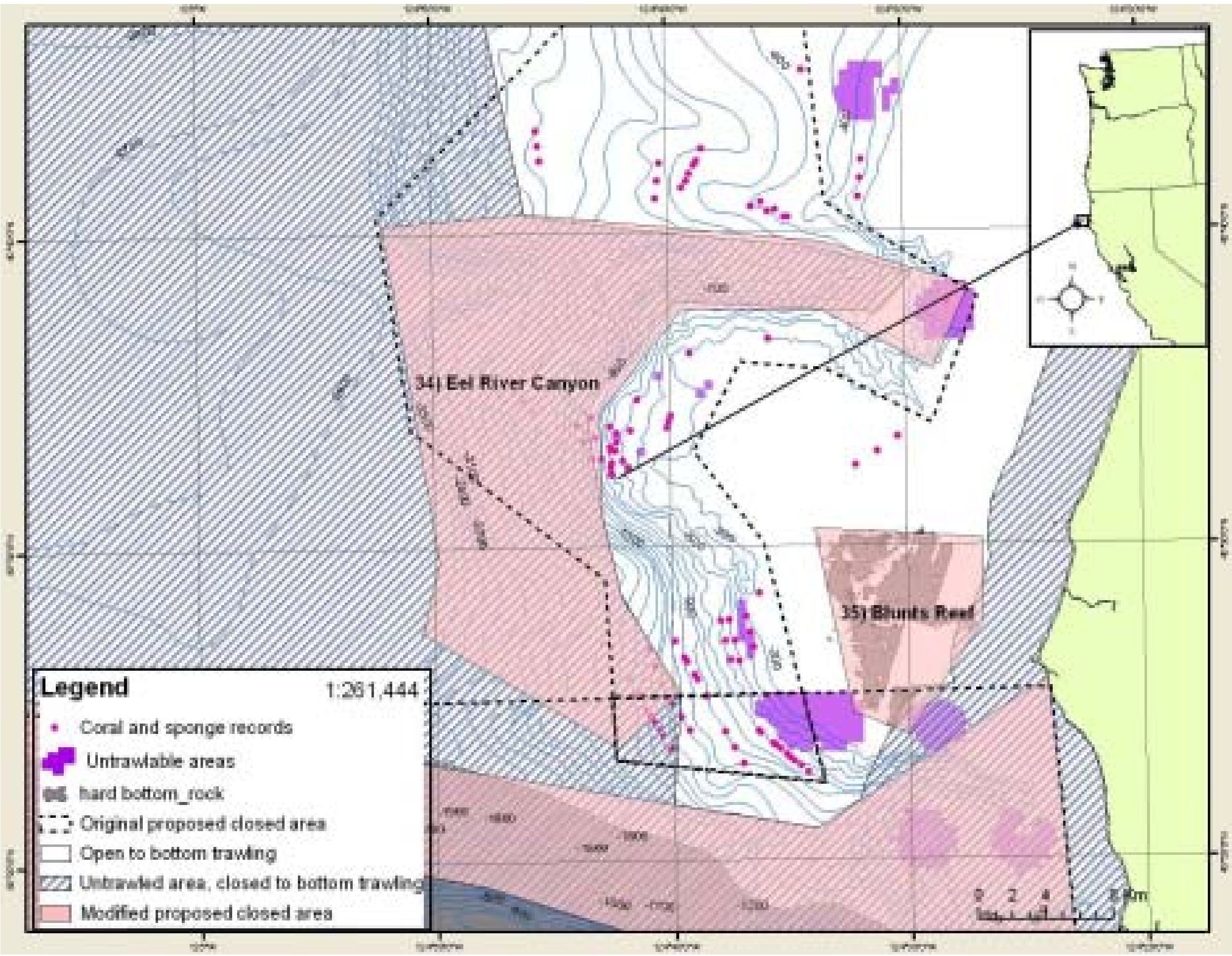


Figure 37: Eel River Canyon

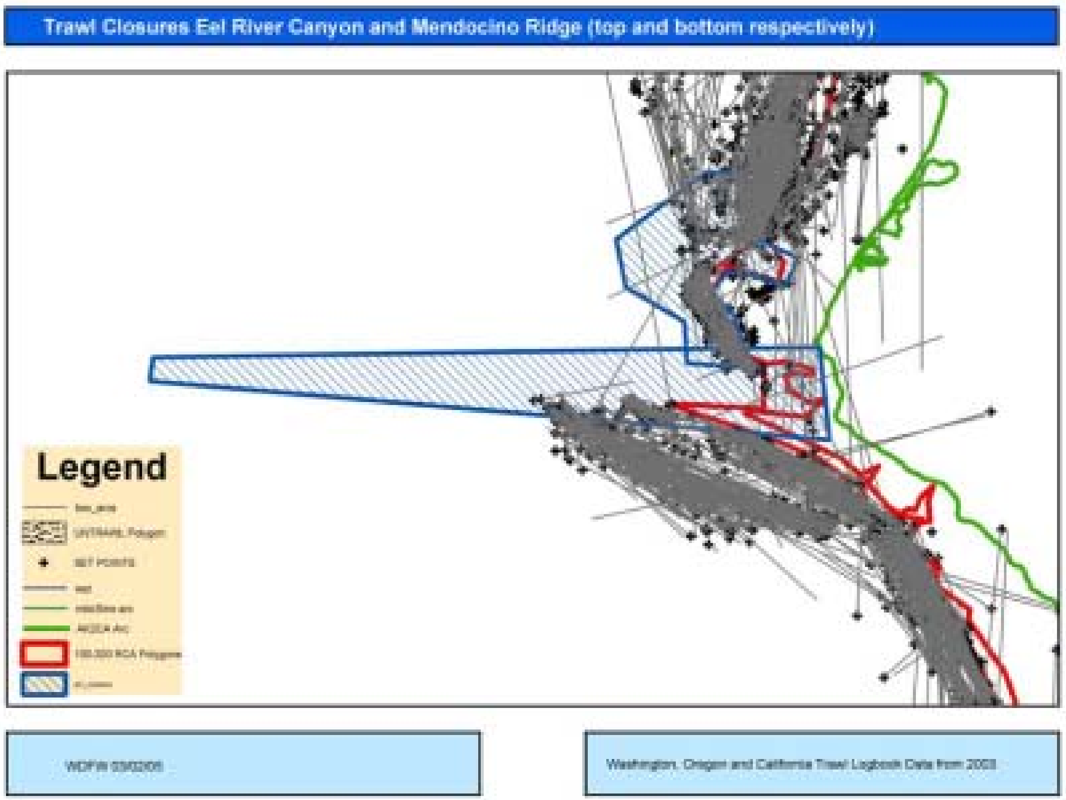


Figure O: 2003 bottom trawl logbook set points (courtesy WDF&W)

35. Blunts Reef

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $25,495 (likely overestimated, trawl tracks fall outside of area, see Figure O above)

This rocky reef off the shelf is located north of Mendocino Ridge (Figure 38). The proposed area contains 13 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the “untrawlable” polygons determined by Zimmerman (2003). Logbook information (Figure O) indicates that little bottom trawling occurred in the area, and little effort should be displaced by this suggested closure.

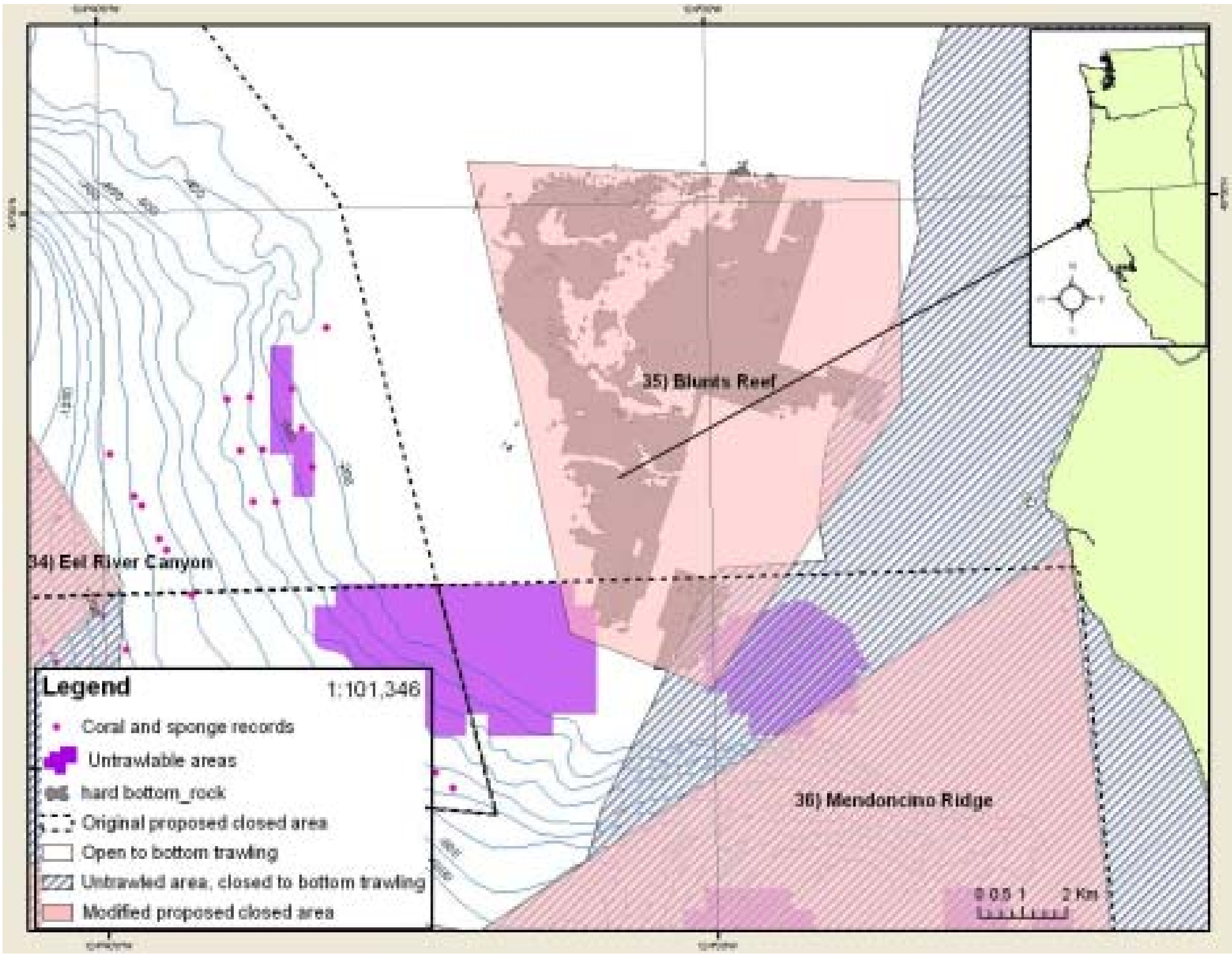


Figure 38: Blunts Reef

36. Mendocino Ridge

Original Alternative C.12 estimated displaced revenue= $201,902
Revised Alternative C.12 estimated displaced revenue= $108,769 (likely overestimated, trawl tracks fall outside of area, see Figure O above)

Mendocino Ridge, also known as the Gorda Escarpment, is a large underwater ridge running east to west separating two major marine ecological provinces (Figure 39). The boundary of the area as it was previously proposed contained some trawl activity (Figure 0). The boundary in Revised Alternative C.12 was modified to avoid some trawled areas along the north and south end of the ridge and this closely follows the closed area boundary suggested by representatives of the bottom trawl industry (Figure 39). As such, little bottom trawl effort should be displaced by this suggested closure and displacement is probably less than what is estimated here. The proposed area contains 279 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). The area has not been well sampled by NOAA trawl surveys, but 5 records of gorgonian corals, sea pens, and sponges have been documented.

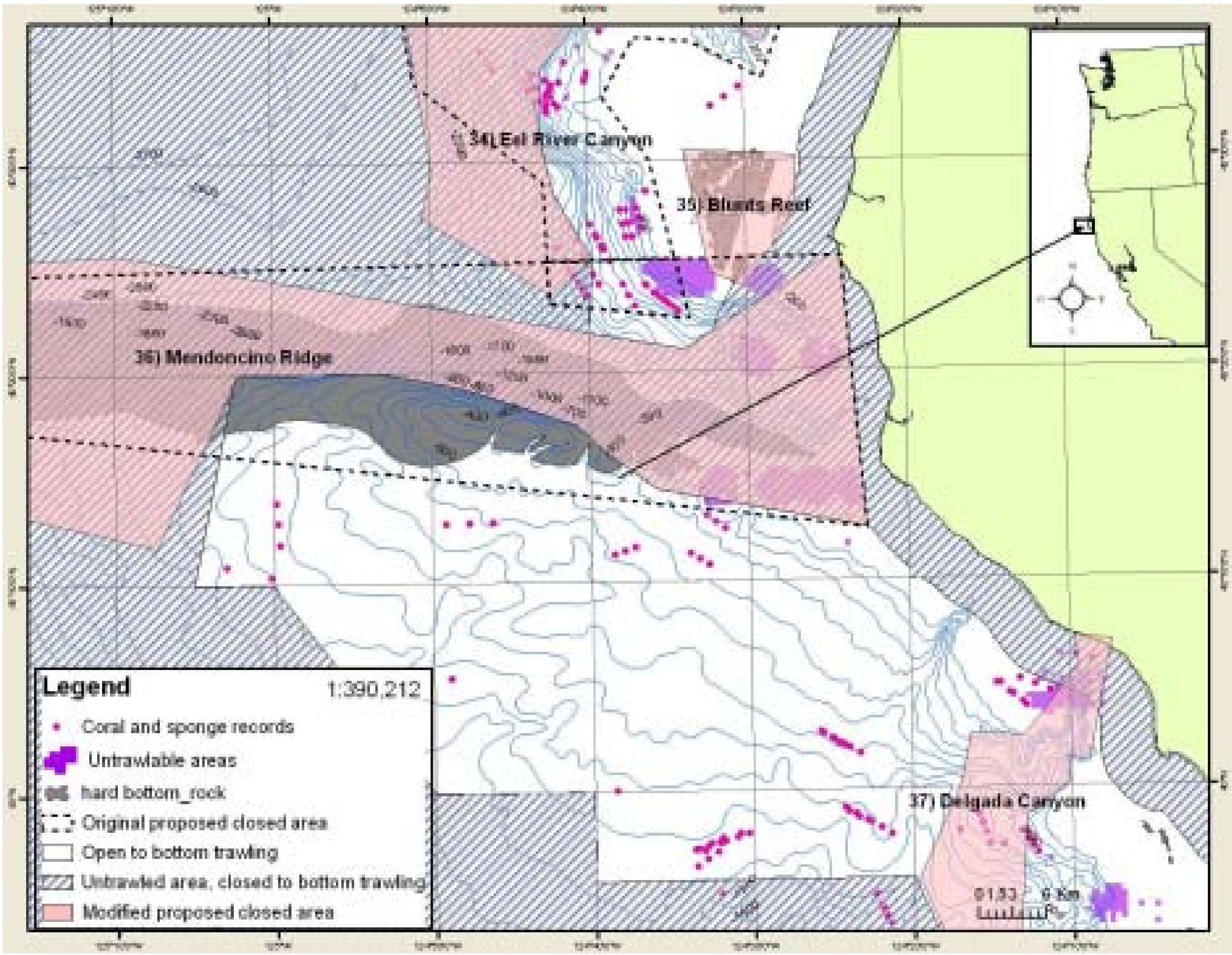


Figure 39: Mendocino Ridge

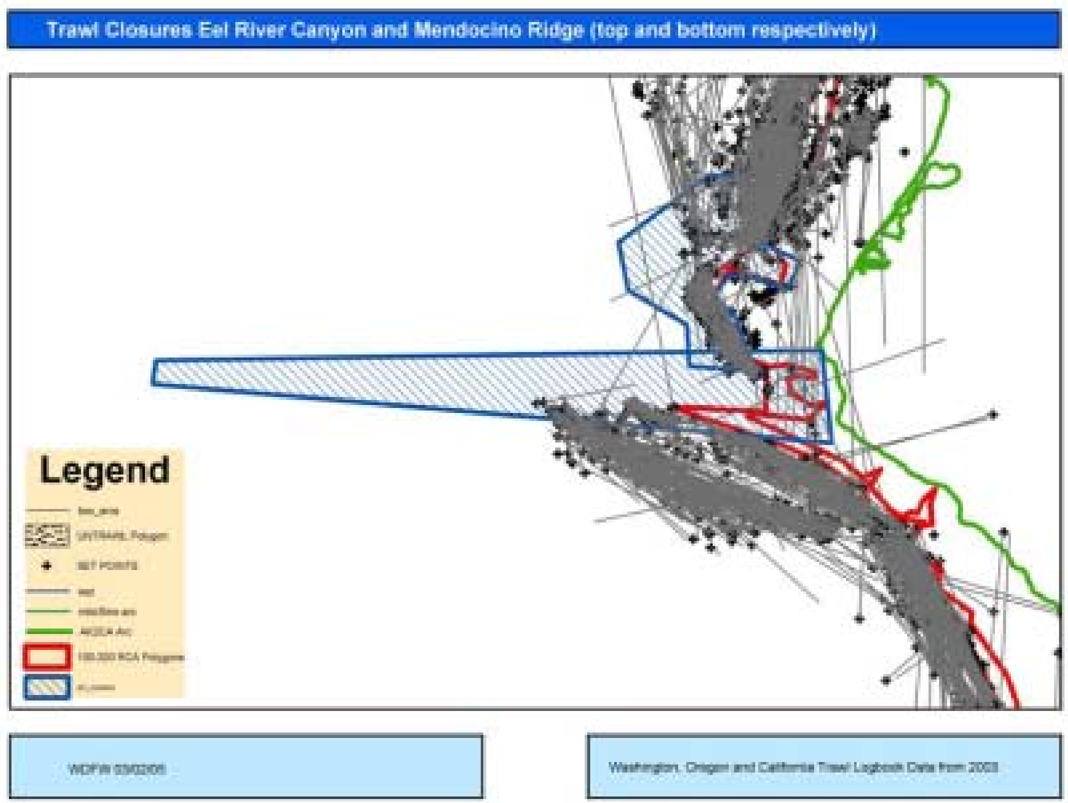


Figure P: 2003 bottom trawl logbook set points (courtesy WDF&W)

37. Delgada Canyon

Original Alternative C.12 estimated displaced revenue=N/A
Revised Alternative C.12 estimated displaced revenue= $79,978

This deep canyon begins close to shore on the Northern California coast (Figure 40). The proposed area contains 99 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). While no NOAA trawl surveys have sampled within the canyon itself, 7 records of sea pens and sea whips have been documented along the edge of the canyon. To our knowledge, the canyon has not been explored by scientific surveys, but scuba divers have noted some fantastic sights in the canyon head:

> *I have never seen areas of filter feeding organisms so thick in one spot in my life. Strawberry anemones so thick that it would make Amentos Reef in Monterey look barren…. As I shined my light into the cracks more I was seeing all sorts of baby rock fish of 6-8 different species laying inverted on the shelves…. It was essentially nothing more than a giant maternity ward for sea life…. I wonder if any marine scientists know about this place?*

http://diver.net/seahunt/fend/f_ericdelgada.htm

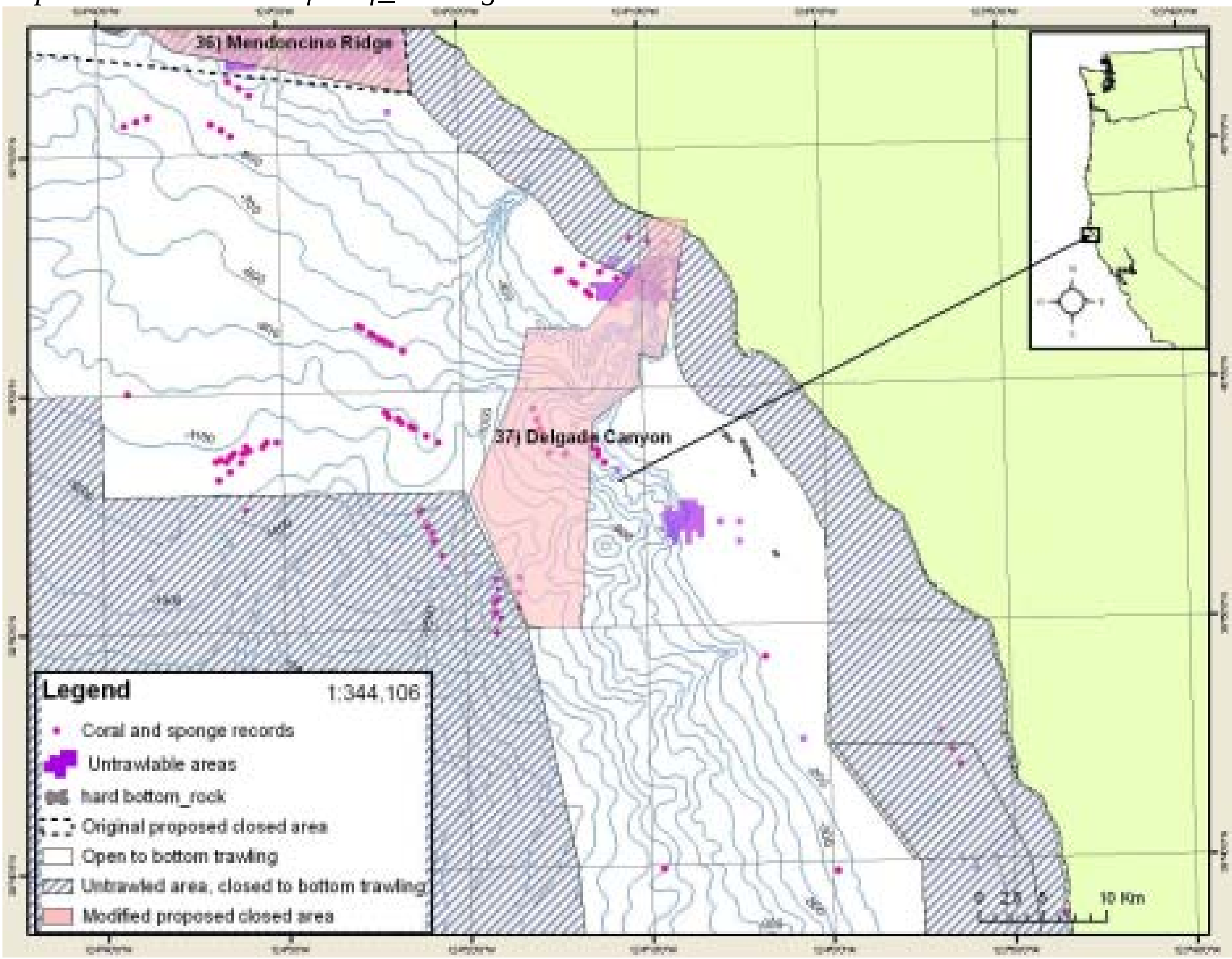


Figure 40: Delgada Canyon

38. Fort Bragg Canyon

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $51,128

This canyon begins offshore of Fort Bragg and extends into deep water outside the bottom trawl footprint (Figure 41). While no NOAA trawl surveys have sampled within the canyon itself, two records of sea pens and sea whips have been documented along the edge of the canyon.

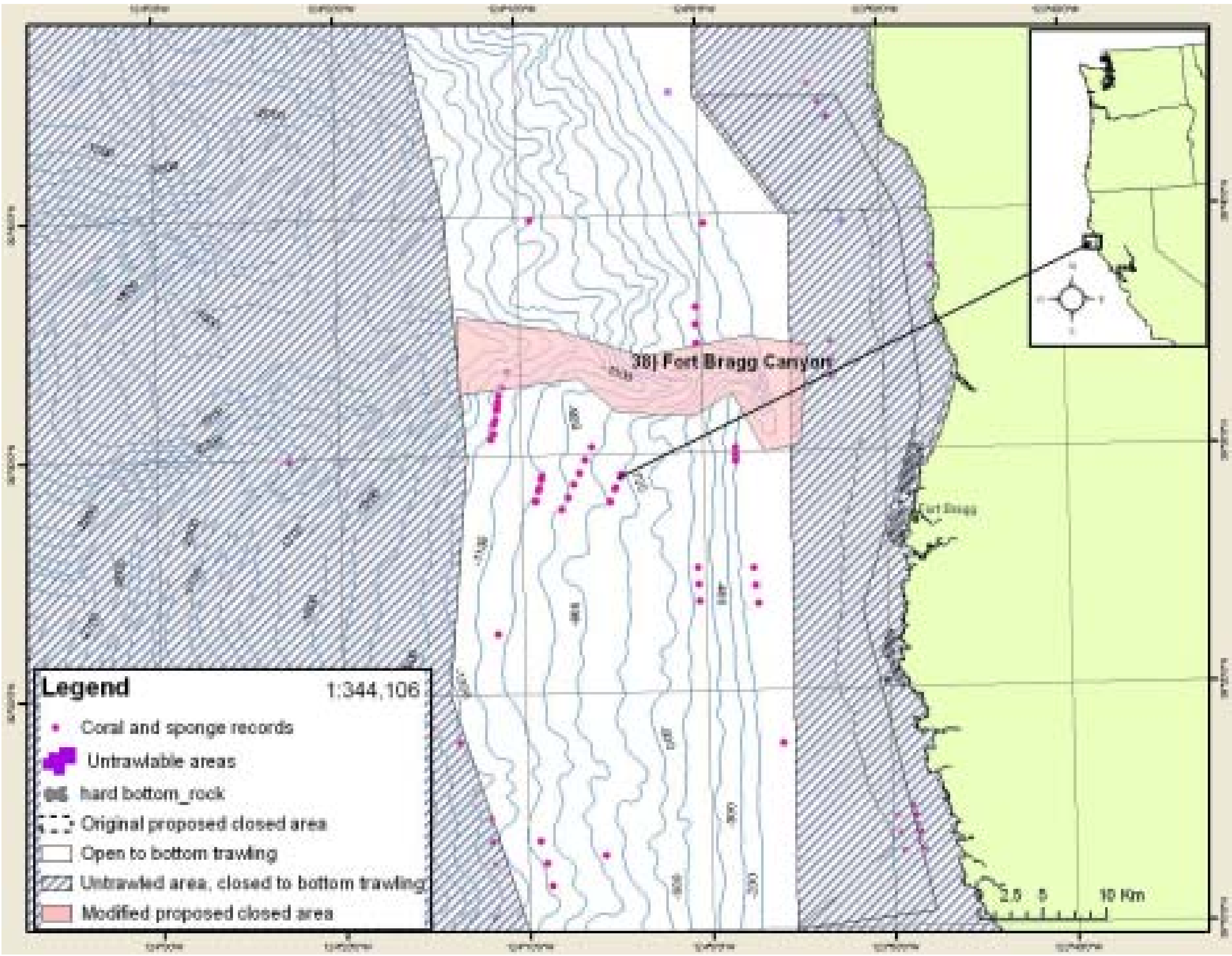


Figure 41: Fort Bragg Canyon

39. Point Arena offshore

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $47,324 (likely overestimated, trawl tracks fall outside of area, see Figure below)

This rocky shelf area is located offshore of Point Arena (Figure 42). Trawl logbook information indicates that no activity occurred in the area (Figure Q), and the area is located outside of the bottom trawl footprint. Minimal bottom trawl effort should be displaced by this suggested closure and the displaced revenue reported here is likely overestimated.

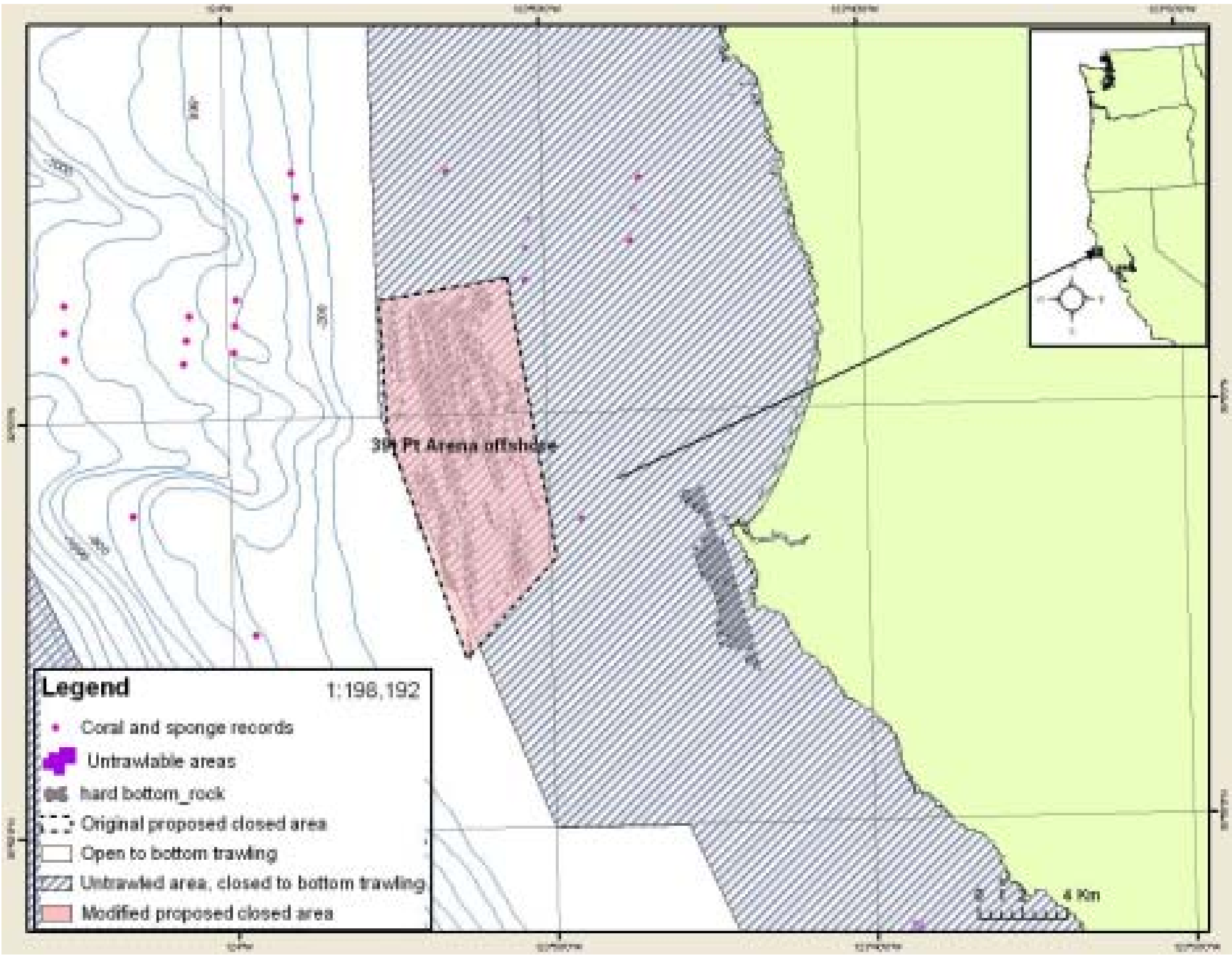


Figure 43: Point Arena offshore

40. Biogenic_ 12

Original Alternative C.12 estimated displaced revenue= $109,117
Revised Alternative C.12 estimated displaced revenue= $61,321 (likely overestimated, trawl tracks fall outside of area, see Figure Q below)

This proposed closed area in Revised Alternative C.12 spans slope habitat from 300 to 1200 meters in depth (Figure 44). NOAA trawl surveys have documented 40 records of habitat-forming invertebrates, including gorgonian corals, sea pens, sea whips, and sponges. The proposed area contains 40 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the “untrawlable” polygons determined by Zimmerman (2003). Logbook information indicates that little bottom trawling occurs in the area, and minimal bottom trawl effort should be displaced by this suggested closure (Figure Q).

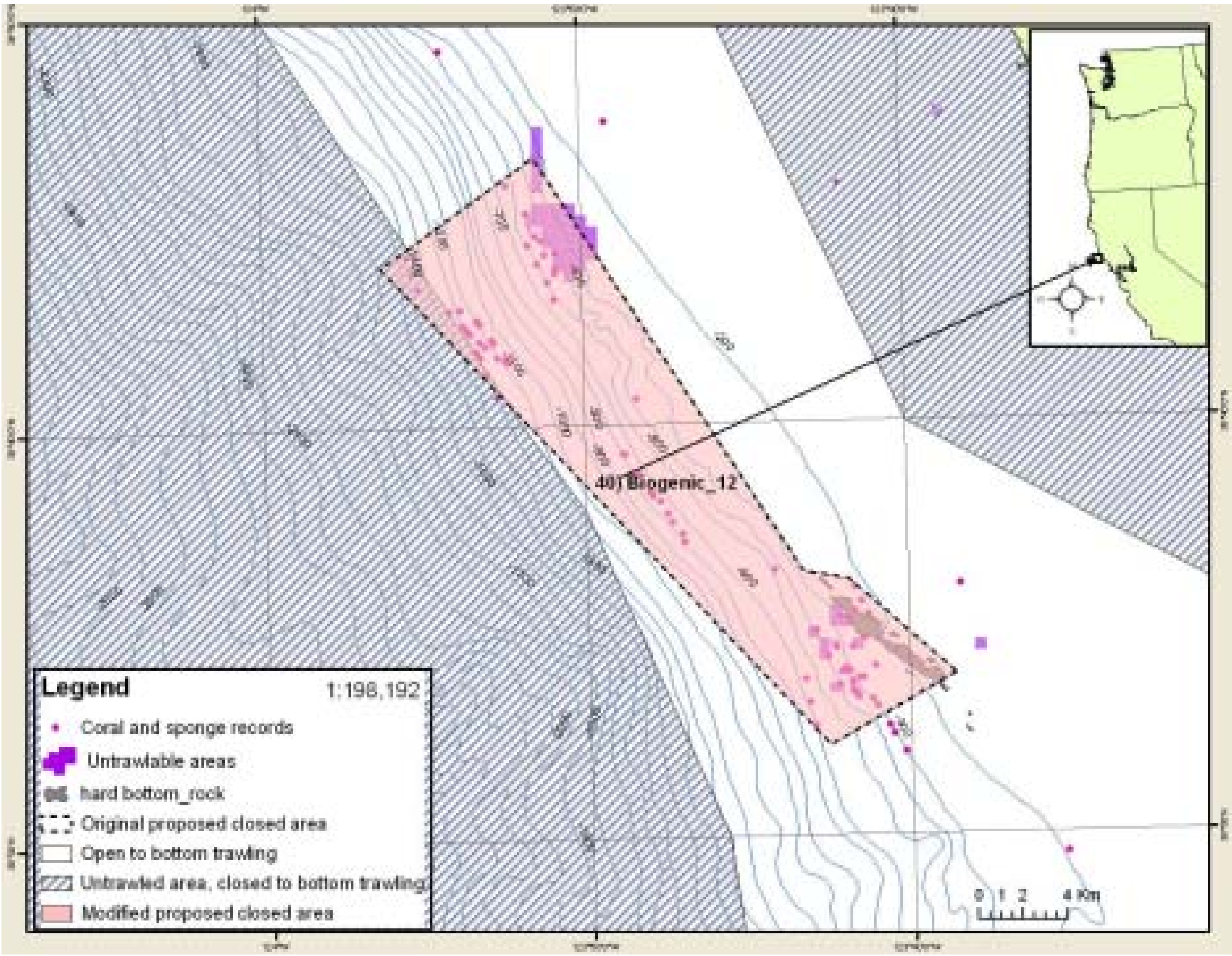


Figure 44: Biogenic_12

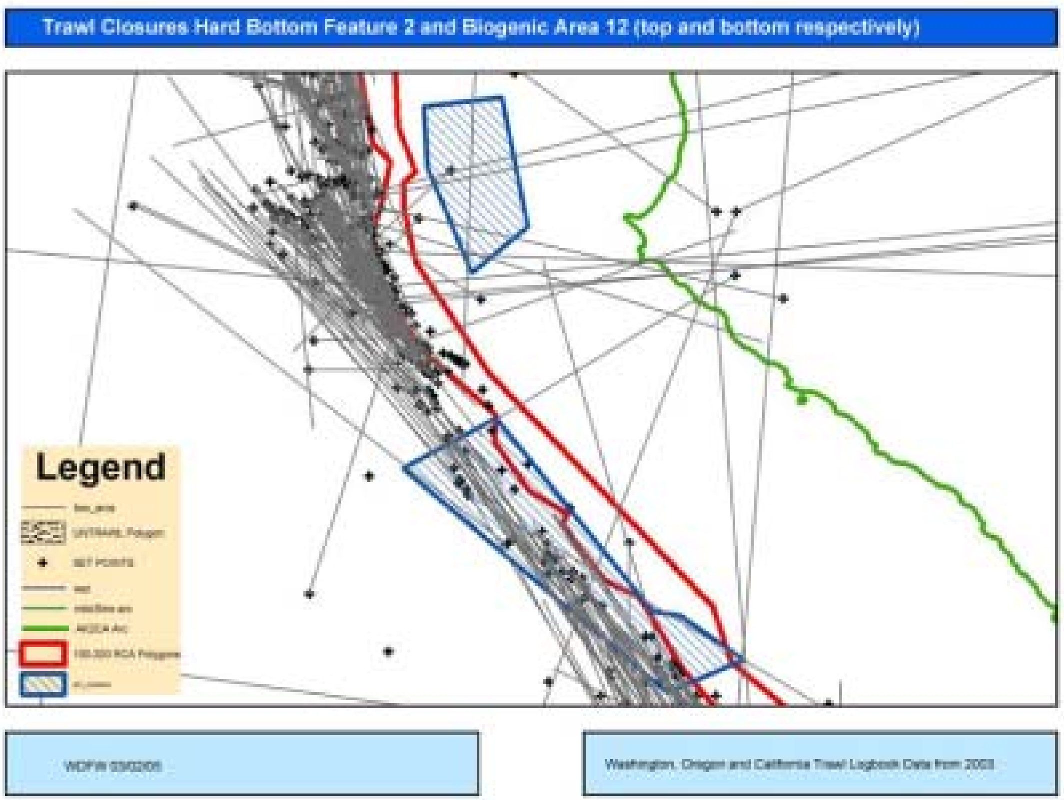


Figure Q: 2003 bottom trawl logbook set points (courtesy WDF&W)

41. Cordell Bank

Original Alternative C.12 estimated displaced revenue= $140,883
Revised Alternative C.12 estimated displaced revenue= $49,064 (likely overestimated, trawl tracks fall outside of area, see Figure R below)

Cordell Bank is an underwater island 7 km by 15 km surrounded by deep water on three sides. Due to a unique combination of topographic and oceanographic features, this area is extremely productive. At depths between 35 and 50 meters, the rocky habitats are carpeted with sponges, ascidians, hydrocorals, anemones, and sea stars. Fed by the productive currents, this seafloor habitat creates complex living structures for juvenile rockfish, lingcod, and many species of adult rockfish.

Designated as a National Marine Sanctuary in 1989, Cordell Bank is one of the most productive offshore areas in the United States. The combination of the California current, upwelling of nutrient rich ocean waters and the topography of the area provides for a flourishing ecosystem. This area is thickly covered by sponges, anemones, hydrocorals, and other invertebrates. It also hosts 180 species of fish, providing spawning habitat for lingcod. Finally this area hosts twenty six resident and migratory species of marine mammals.[6]

[6] Cordell Bank State of the Sanctuary Report. http://sanctuaries.nos.noaa.gov/oms/omscordell/omscordell.html

The boundary of area as it was proposed in Original Alternative C.12 was modified in Revised Alternative C.12 to avoid some trawled areas (Figure R) along the western slope and a south portion of the shelf. The Revised Alternative C.12 boundary closely follows the closed area boundary suggested by representatives of the bottom trawl industry (Figure 45). As such, minimal bottom trawl effort should be displaced by this suggested closure.

The ridges and pinnacles covered with structure forming invertebrates provides complex habitat which is sensitive to bottom tending gears. The proposed area contains 58 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). NOAA trawl surveys have documented 20 records of habitat-forming invertebrates, including gorgonian corals, sea pens, sea whips, and sponges.

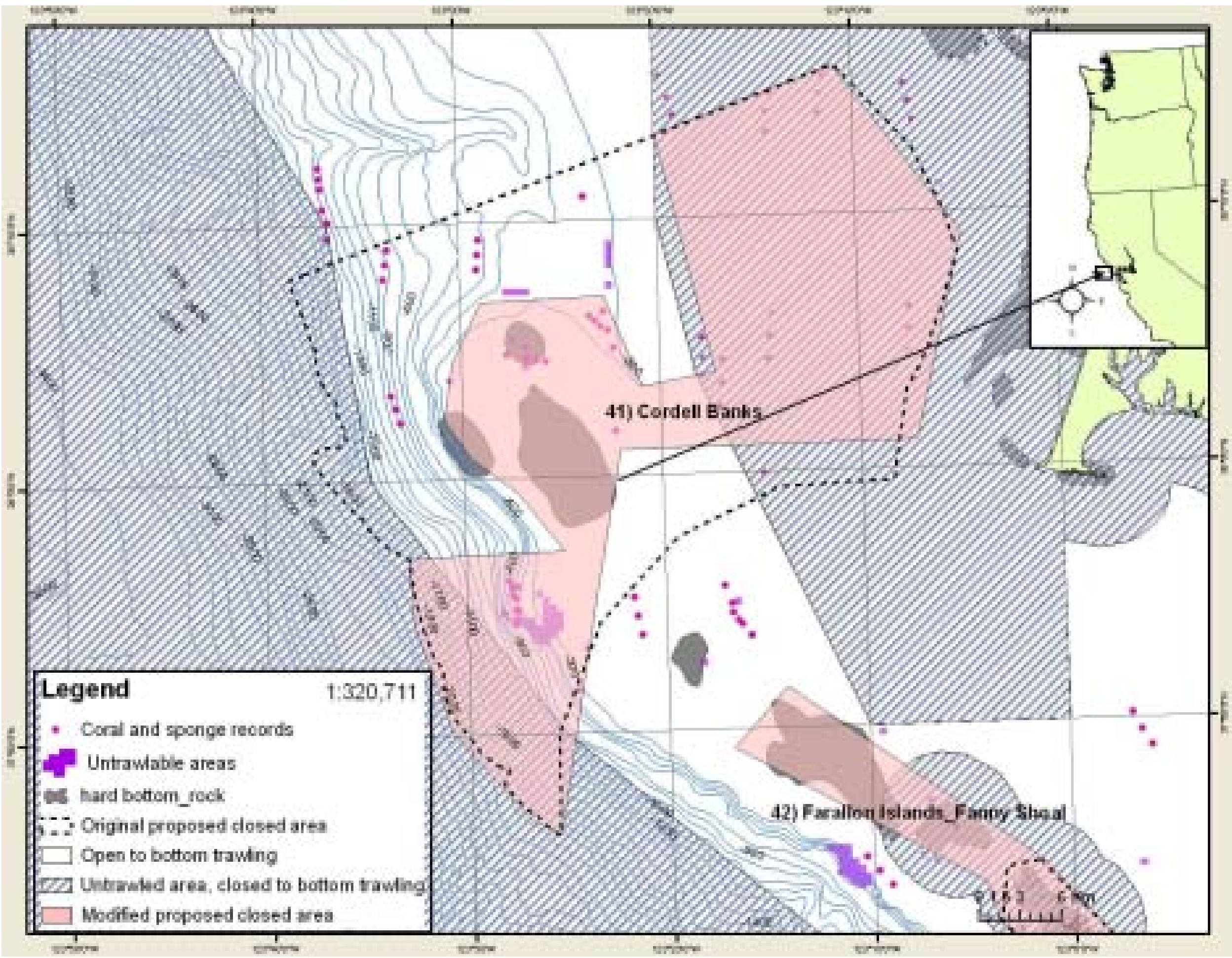


Figure 45: Cordell Bank

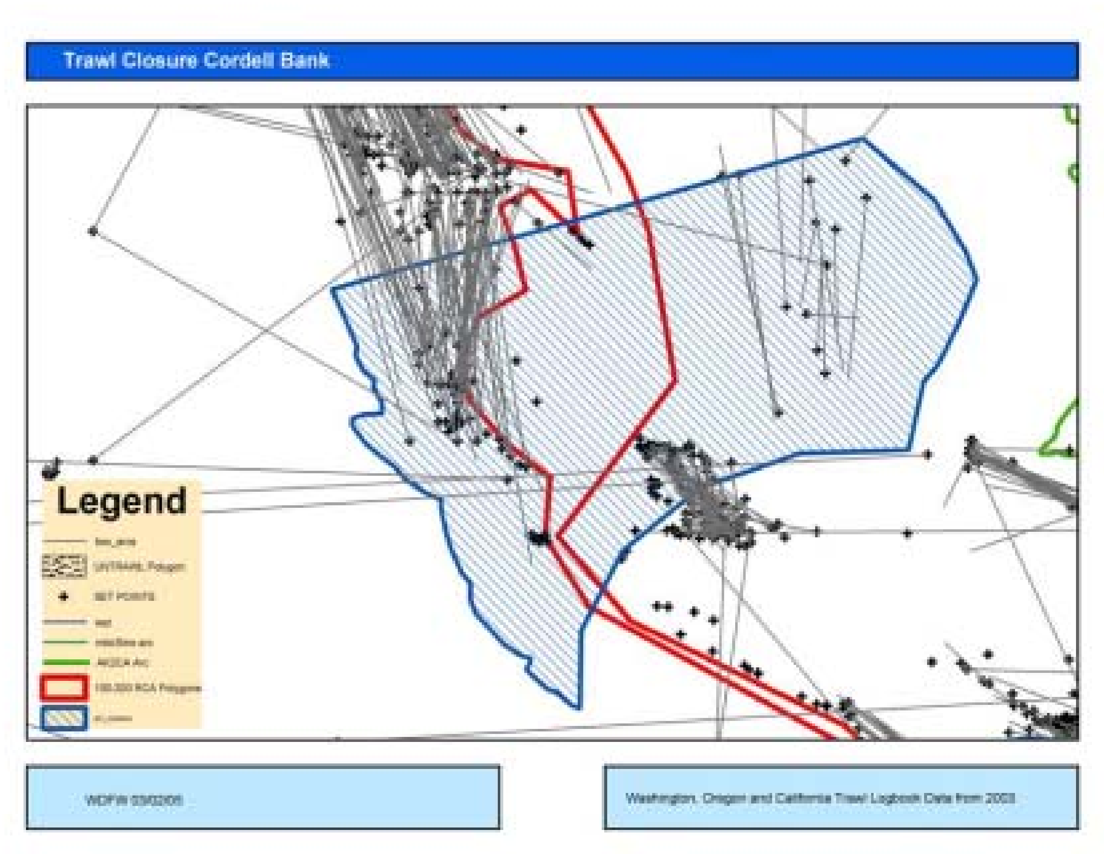


Figure R: 2003 bottom trawl logbook set points (courtesy WDF&W)

42. Farallon Islands_Fanny Shoal

Original Alternative C.12 estimated displaced revenue= $78
Revised Alternative C.12 estimated displaced revenue= $9,967 (likely overestimated, trawl tracks fall outside of area, see Figure S below)

This area was previously proposed as "*hard bottom feature_3*". The boundary of the proposed closure was modified to encompass more areas of hard bottom habitat to the north (Figure 46). Much of the proposed area falls within existing state of California bottom trawl closures. Trawl logbook information indicates little bottom trawl effort occurs in the area (Figure S), and minimal effort should be displaced by this suggested closure. The displaced revenue reported here is likely overestimated. This area around the Farallon Islands has not been well sampled by NOAA trawl surveys. The proposed area contains one record of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003). The California Academy of Sciences collected 3 specimens of coral in the area; the bubblegum coral *Paragorgia*, *Callagorgia*, and the stylasteridae coral *Stylantheca sp*.

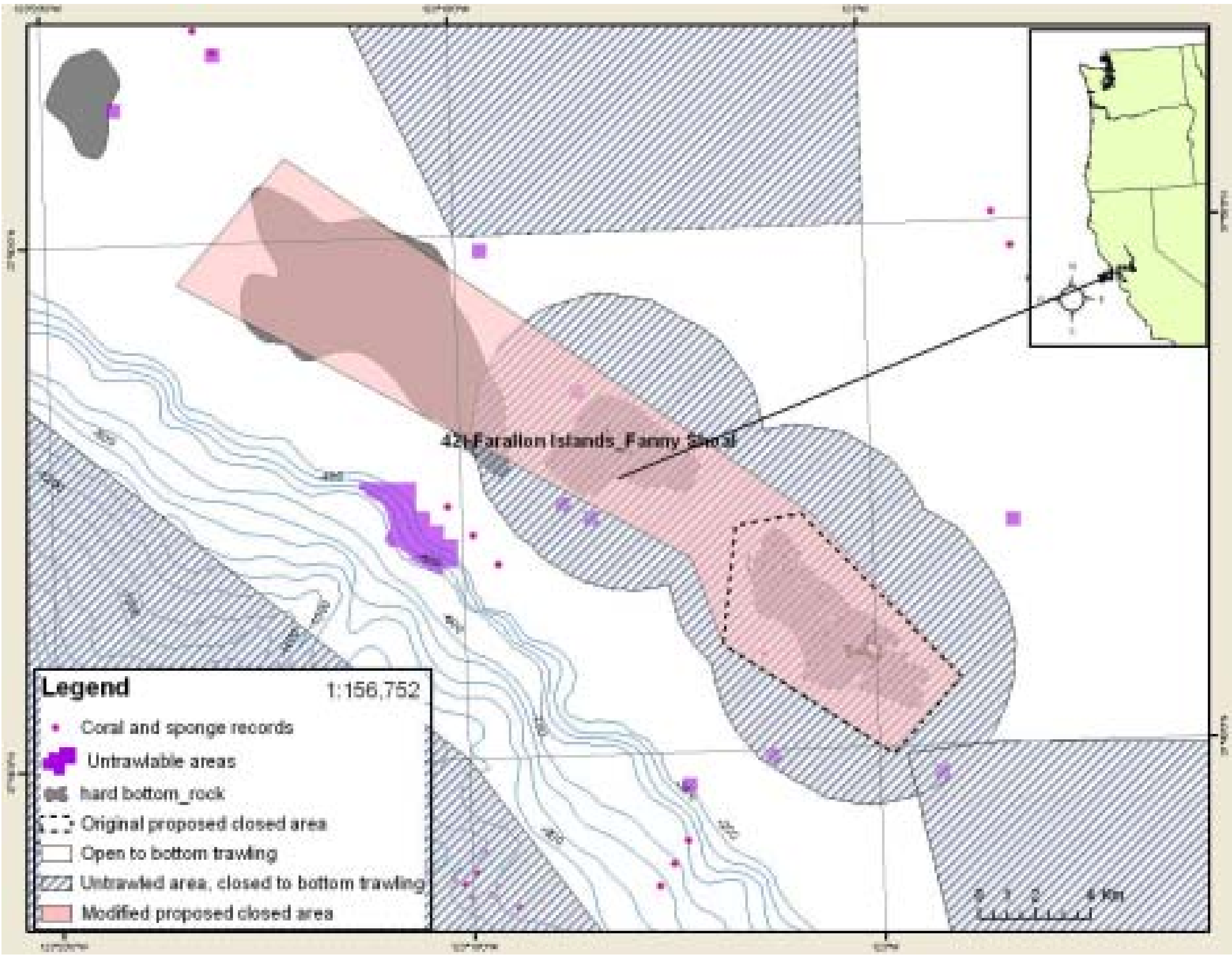


Figure 46: Farallon Islands_Fanny Shoal

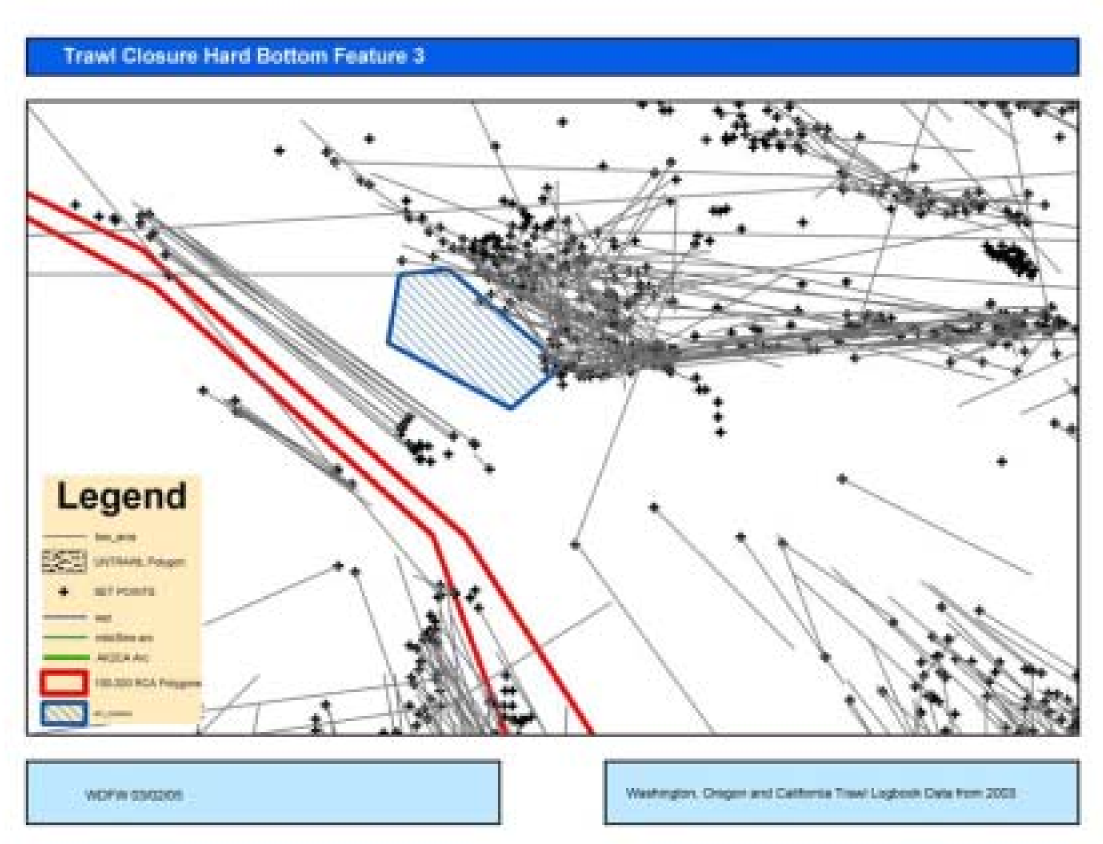


Figure S: 2003 bottom trawl logbook set points (courtesy WDF&W)

43. Half Moon Bay

Original Alternative C.12 estimated displaced revenue= $580
Revised Alternative C.12 estimated displaced revenue= $41,073 (likely overestimated, trawl tracks fall outside of area, see Figure T below)

This area was previously proposed as "*hard bottom feature_4*". This area of rocky shelf habitat is located offshore of Half Moon Bay (Figure 47). It is likely difficult to trawl in this area, and logbook information indicates that little bottom trawl effort occurred in the area. As such, the displaced revenue reported here is likely overestimated. The proposed area contains 6 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003).

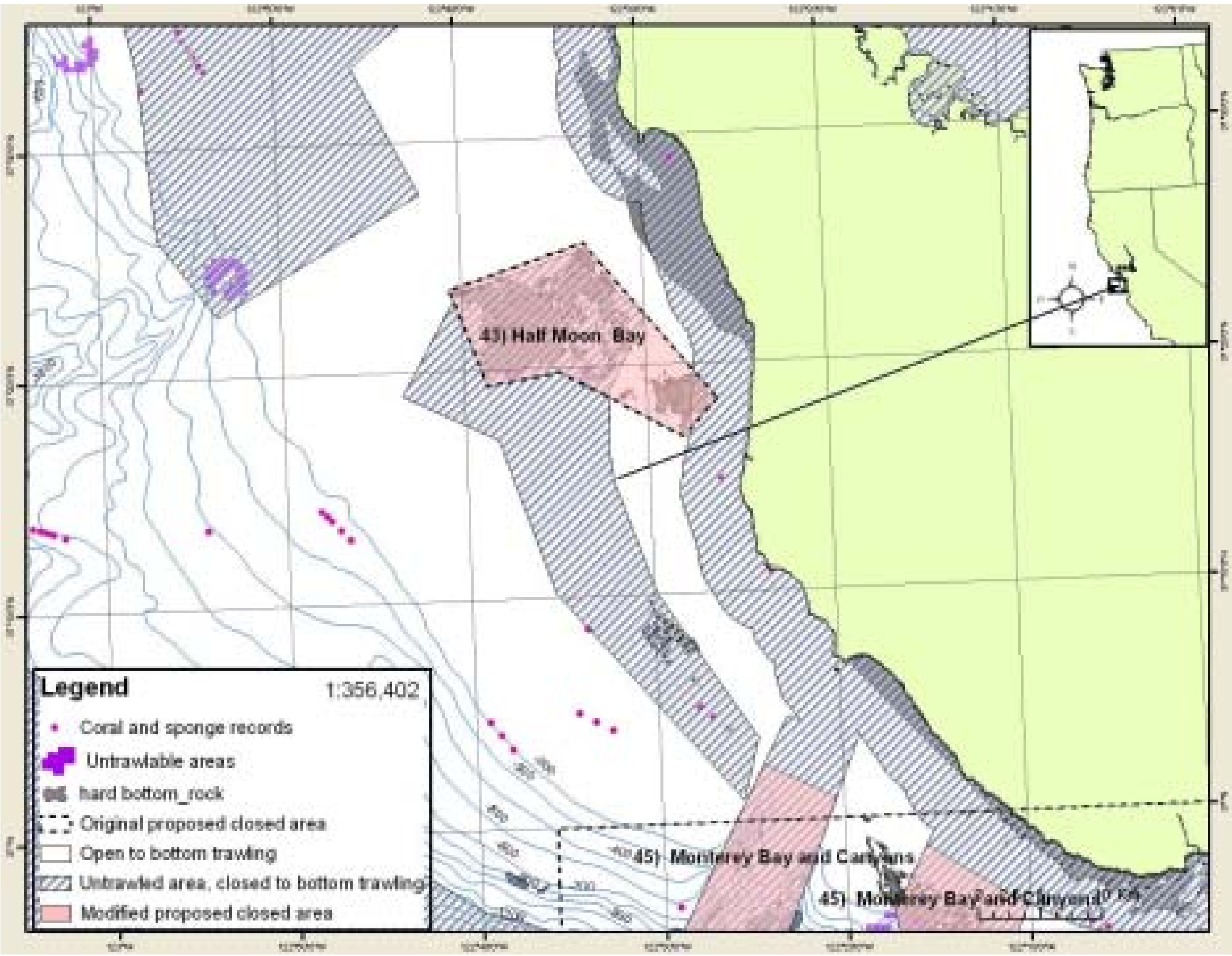


Figure 47: Half Moon Bay

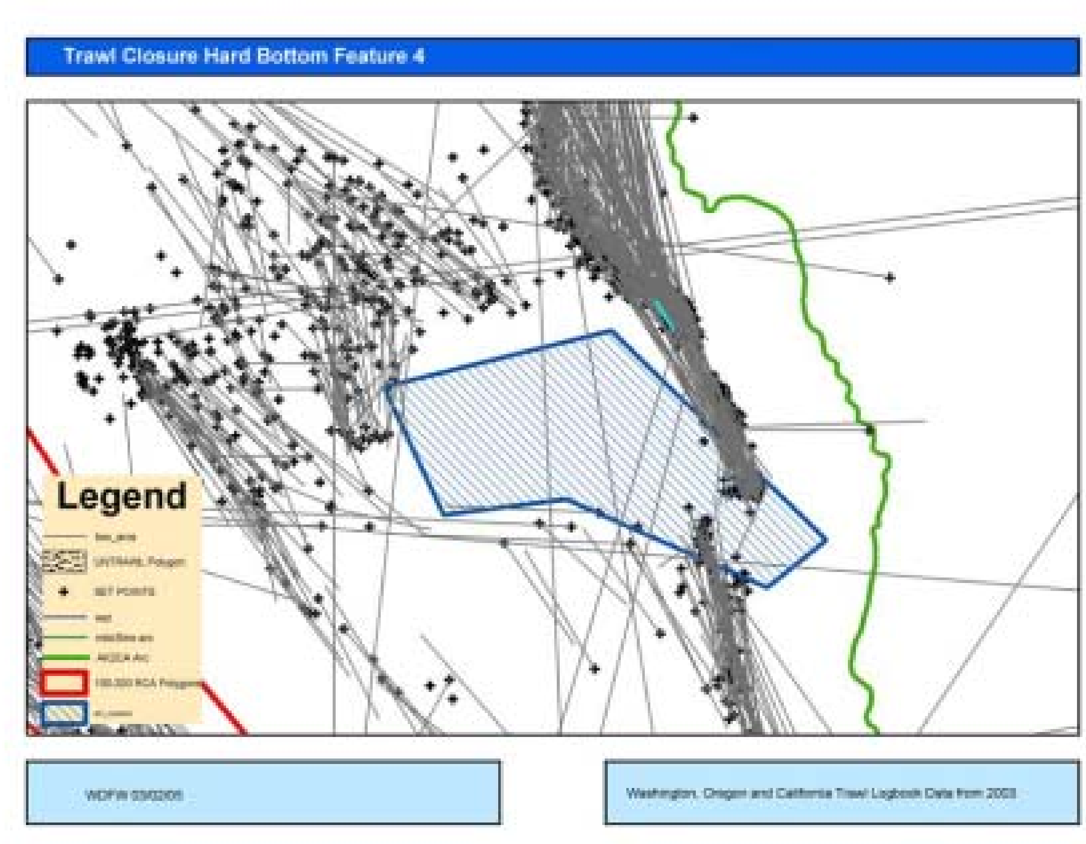


Figure T: 2003 bottom trawl logbook set points (courtesy WDF&W)

44. Point Sur_deep

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $10,173 (likely overestimated, trawl tracks fall outside of area, see Figure U below)

This area is located offshore in deep water, and was also suggested as an area for closure by the bottom trawl industry. A rocky escarpment rises 400 meters in the middle of the area, and the proposed area contains habitat from 1000 to 1400 meters depth (Figure 48). Eleven records of habitat-forming invertebrates, including sea pens and sea whips, have been documented in the area by NOAA trawl surveys. The proposed area is located outside the trawl footprint, and minimal effort should be displaced by this suggested closure.

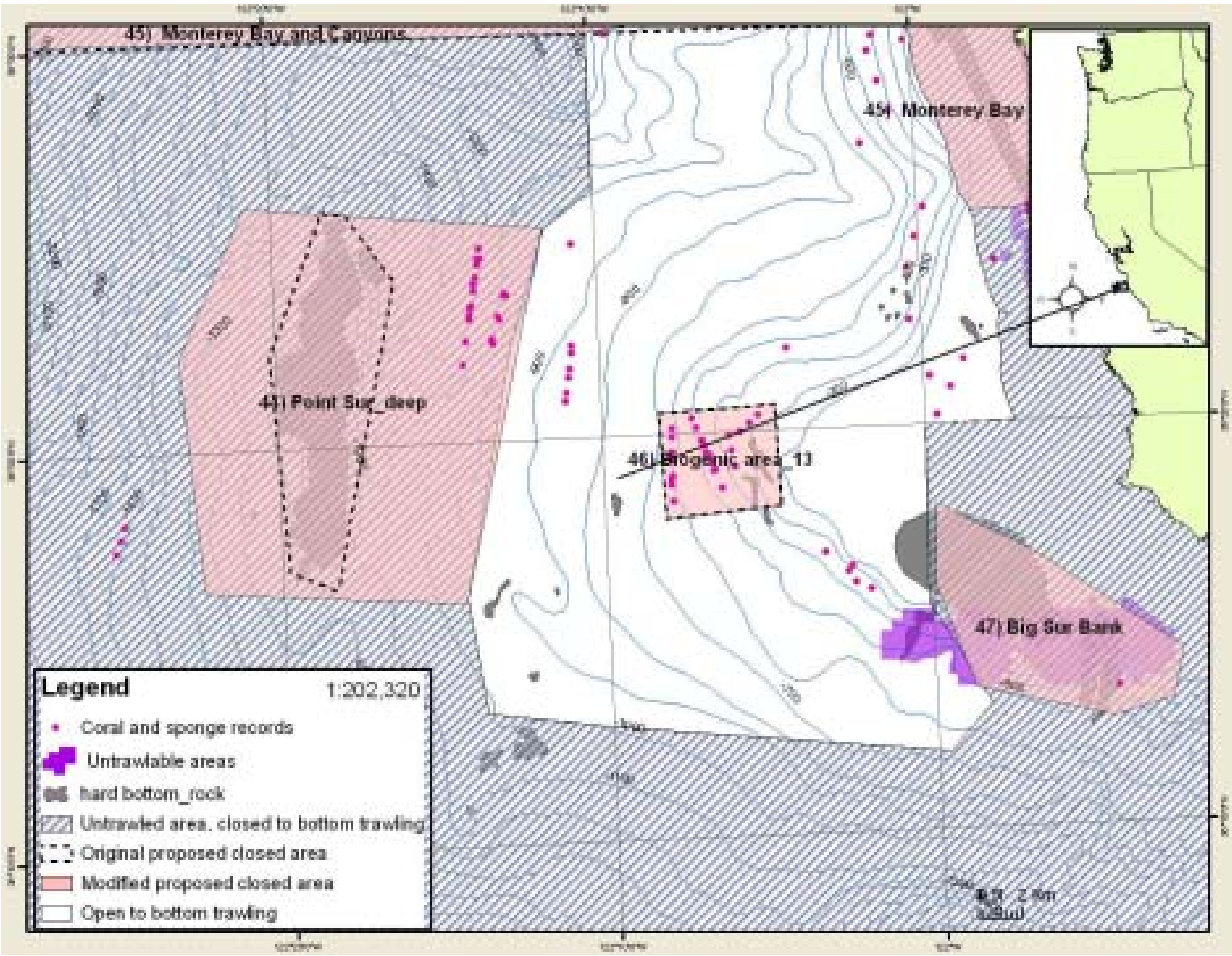


Figure 48: Point Sur_deep

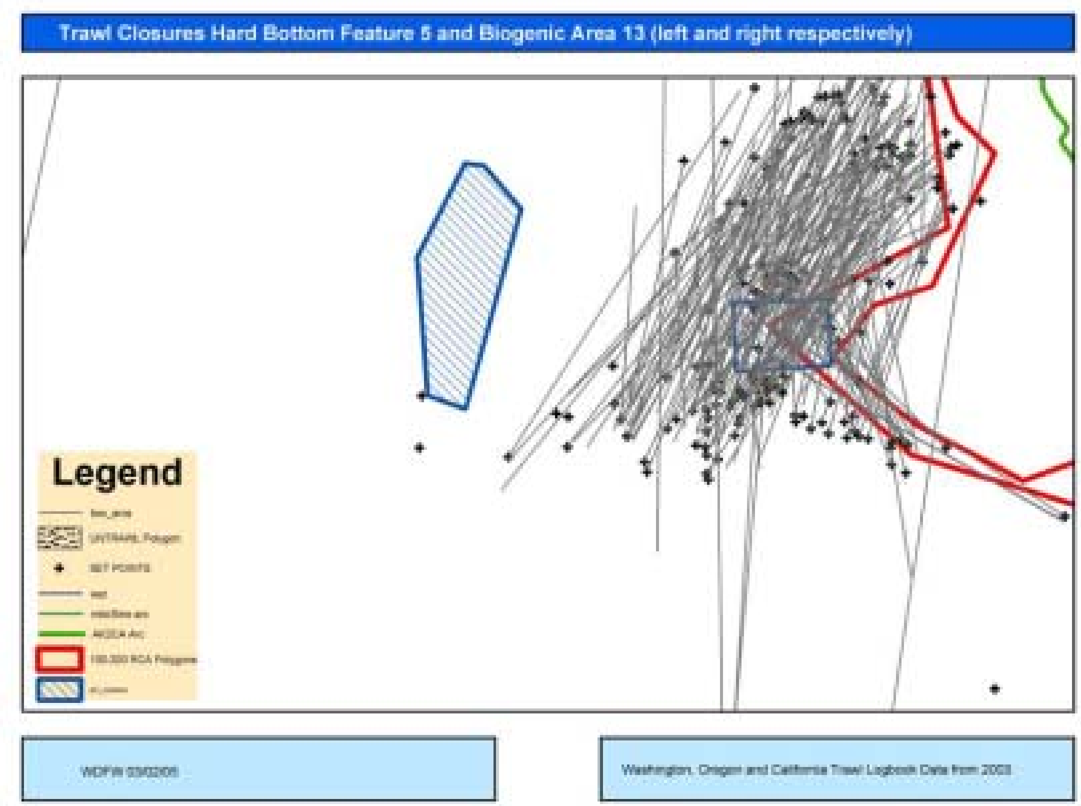


Figure U: 2003 bottom trawl logbook set points (courtesy WDF&W)

45. Monterey Bay and canyons

Original Alternative C.12 estimated displaced revenue= $645,196
Revised Alternative C.12 estimated displaced revenue= $191,468 (likely overestimated, trawl tracks fall outside of area, see Figure V below)

The deepest and largest submarine canyon on the coast of North America is the Monterey Canyon, just south of San Francisco, California (Figure 48). This canyon is 470 km long, approximately 12 km wide at its widest point, and has a maximum rim to floor relief of 1700 m, making it much larger than Arizona's Grand Canyon.

Monterey Bay and Canyon are part of the Monterey Bay National Marine Sanctuary designated in 1992. These areas contain a rich array of habitats from rugged rocky shores and lush kelp forests and one of the largest underwater canyons in North America. The sanctuary supports thirty three species of marine mammals, ninety-four species of seabirds, 345 species of fish, four species of sea turtles and thousands of species of invertebrates.[7] The area contains complex, canyon habitat and pinnacles. The proposed closed area in Revised Alternative C.12 contains 185 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003).

[7] State of the Sanctuary Report. Monterey Bay National Marine Sanctuary. http://www.mbnms.nos.noaa.gov

Oceana Attachment 1: Revised Alternative C.12 **May 11, 2005**

Trawl logbook information indicated that bottom trawling occurs in several discrete areas of the bay and off the slope (Figure V). The bottom trawl industry suggested a closure for the area that avoided closing any of these areas. As such, the boundaries of the original proposal were modified to avoid most of the trawled areas, and follows much of the boundary proposed by the trawl industry. Therefore, minimal displaced effort should result from the proposed closure and the displaced revenue reported here is likely overestimated.

The area is rich in records of habitat-forming invertebrates. NOAA trawl surveys have documented nine records of gorgonian corals, sea pens and sponges. Submersible dives by MBARI have documented 290 records of deep-sea corals in the proposed area, including bubblegum corals, black corals, and bamboo corals. The California Academy of Sciences has collected samples of hydrocorals, *Plumerella sp*., *Callogorgia sp*., *Paragorgia sp*., and bamboo corals.

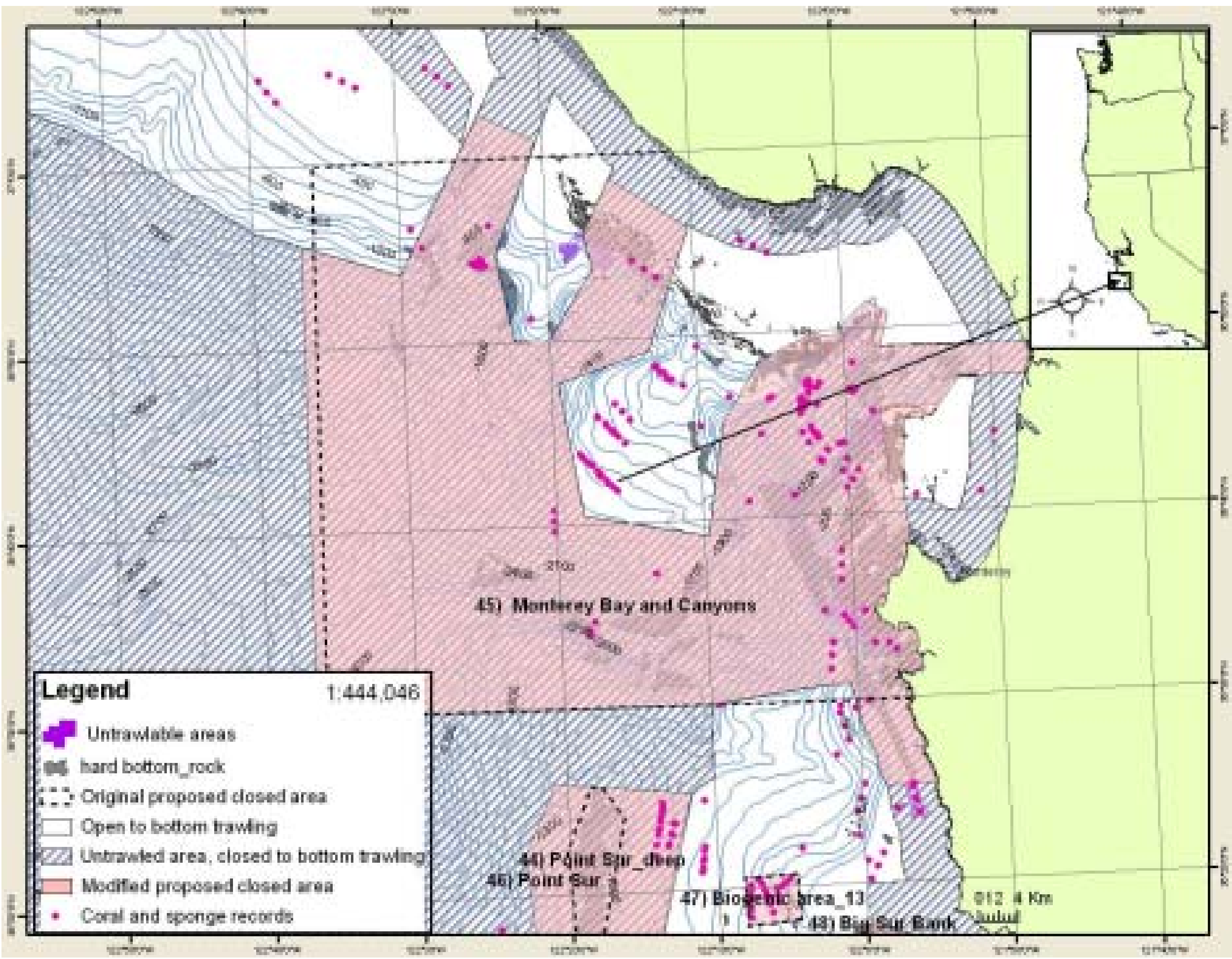


Figure 48: Monterey Bay and Canyon

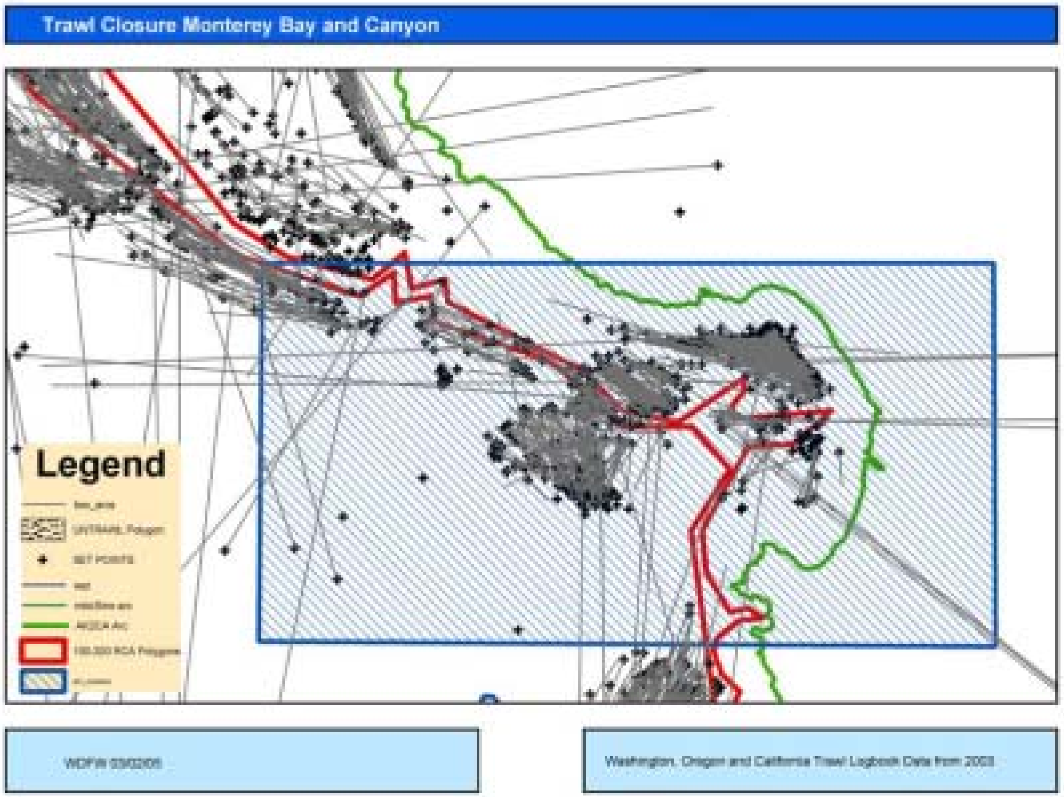


Figure V: 2003 bottom trawl logbook set points (courtesy WDF&W)

46. Biogenic_13
Original Alternative C.12 estimated displaced revenue= $26,257
Revised Alternative C.12 estimated displaced revenue= $11,282

The proposed area contains several rocky habitat features, and spans habitat from 300 to 700 meters depth (Figure 49). NOAA trawl surveys within the proposed area have documented 21 records of habitat-forming invertebrates, including black corals, gorgonian corals, sea pens, and sponges. Trawl logbook information indicates that trawling occurs across the proposed area (Figure U). However, the area suggested for closure is small relative to surrounding trawled area. This proposed area would be a good candidate for a control study site to assess the effects of bottom trawling on habitat.

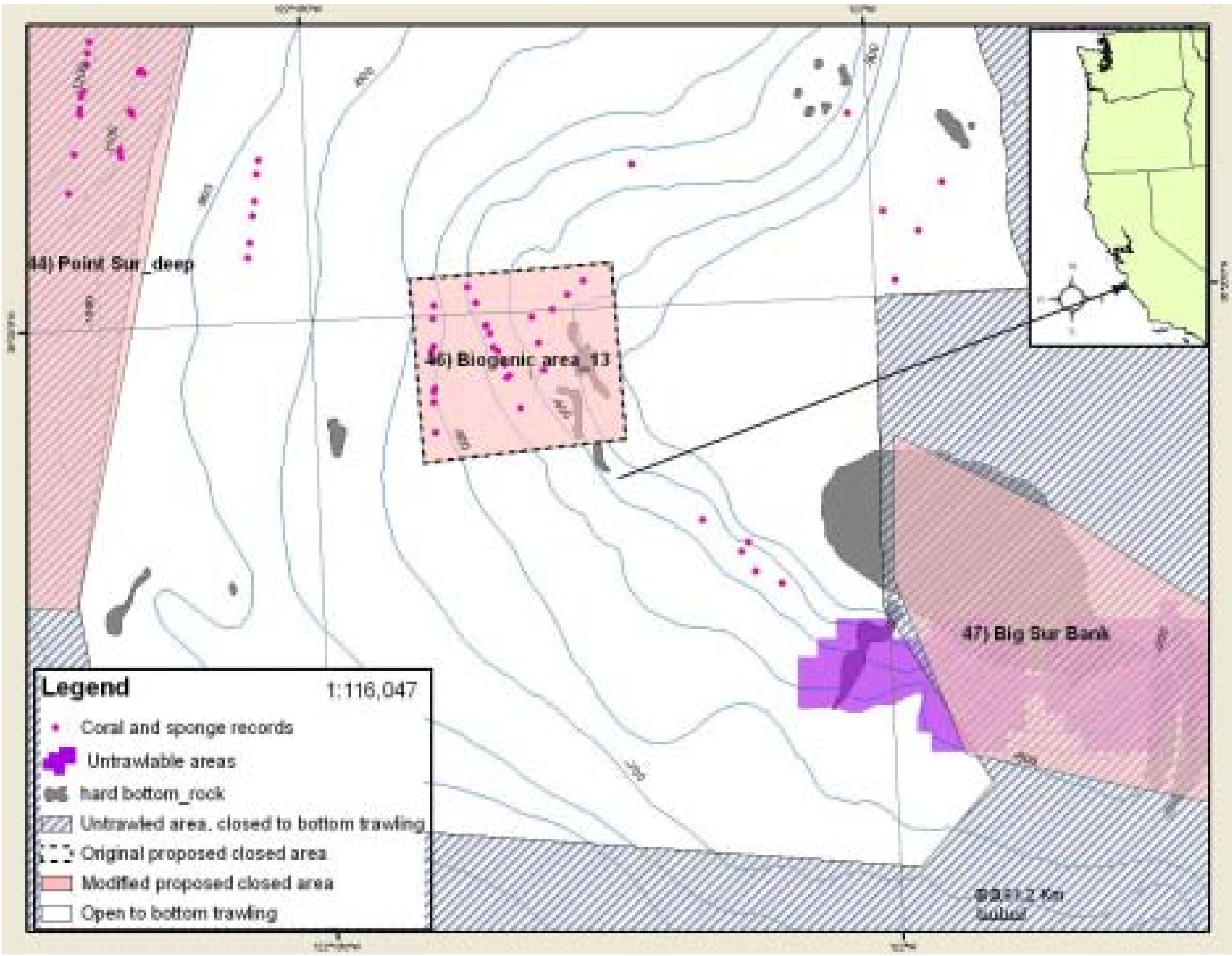


Figure 49: Biogenic_13

47. Big Sur Bank

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $41,694 (likely overestimated, trawl tracks fall outside of area, see Figure V above)

This area contains rocky shelf habitat under 200 meters depth off the coast of Big Sur point (Figure 50). Trawl logbook information indicates no trawl activity in the area, and the area is located outside the bottom trawl footprint. Therefore, minimal displaced effort should result from the proposed closure. The displaced revenue reported here is likely overestimated. The proposed area contains 175 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003).

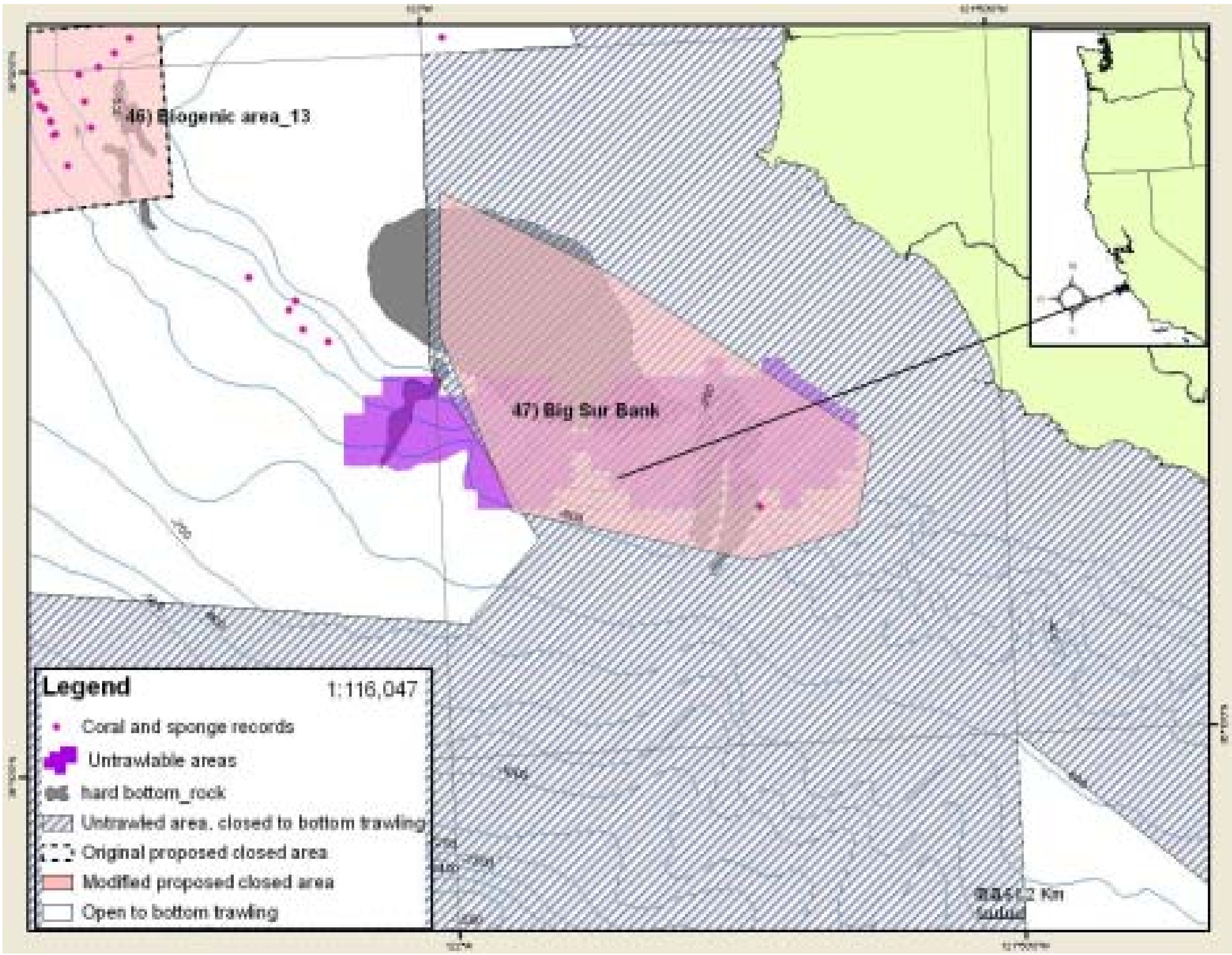


Figure 50: Big Sur Bank

48. Morro Ridge

Original Alternative C.12 estimated displaced revenue= $258,779
Revised Alternative C.12 estimated displaced revenue= $30,125 (likely overestimated, trawl tracks fall outside of area, see Figure W below)

Morro Ridge is a long ridge of hard substrate off the Central California coast (Figure 51). The southern portion of the ridge rises to 500 meters depth while the northern portion drops to 1000 meters. Trawl logbook information indicated that some trawl effort occurred along the eastern edge and south western point of the previously proposed closed area (Figure W). The proposed closed area for Revised Alternative C.12 avoids these areas, and minimal displaced effort should result from the proposed closure.

The Revised Alternative C.12 closed area contains numerous records of habitat-forming invertebrates from NOAA. NOAA trawl surveys have documented 81 records of gorgonian corals, sea pens, sea whips, and sponges. The proposed area contains 26 records of underwater obstructions, trawl hangs and areas where NOAA survey nets have hung up, identified by the "untrawlable" polygons determined by Zimmerman (2003).

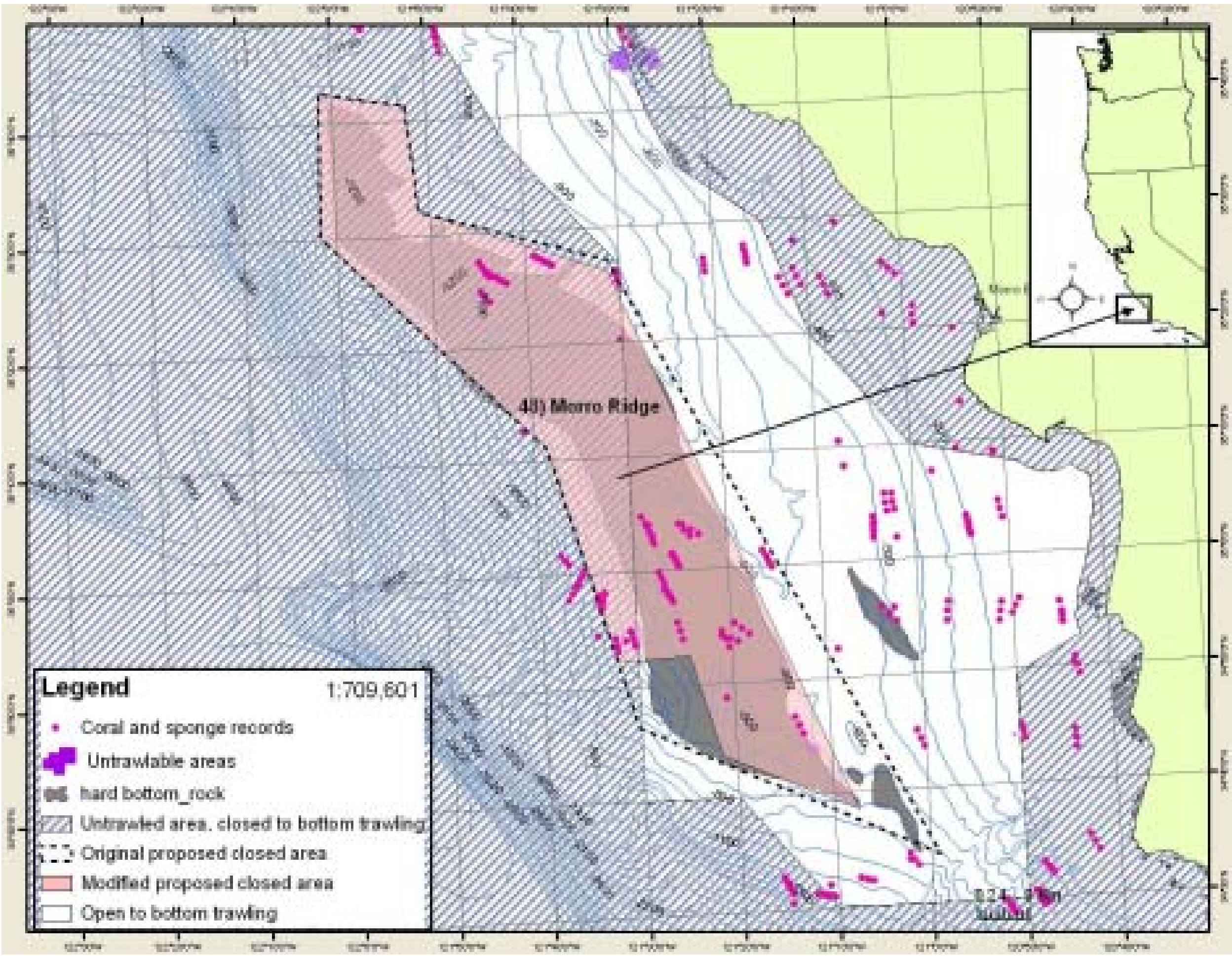


Figure 51: Morro Ridge

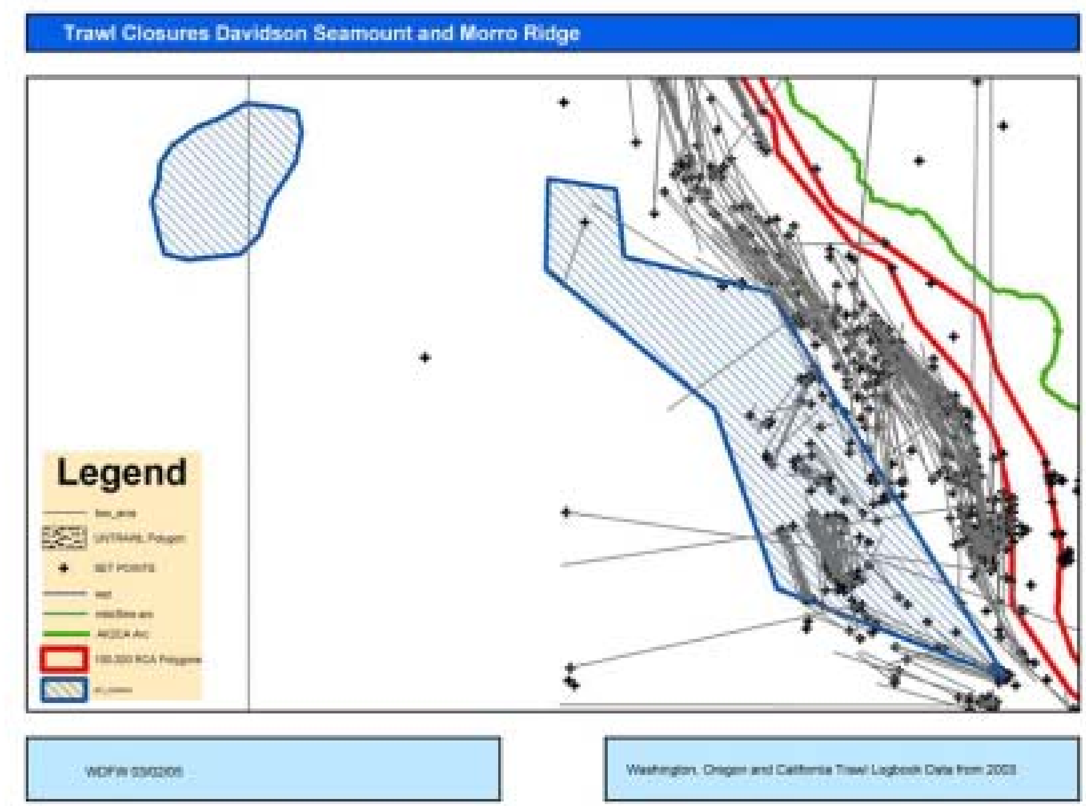


Figure W: 2003 bottom trawl logbook set points (courtesy WDF&W)

49. Channel Islands

Original Alternative C.12 estimated displaced revenue= 0
Revised Alternative C.12 estimated displaced revenue= $11,016 (likely overestimated, trawl tracks fall outside of area, see Figure X below)

The Channel Islands National Marine Sanctuary contains numerous records of biogenic habitat, particularly gorgonian corals (Figure 52). It is located at the meeting point between two major oceanographic currents, and therefore has a relatively high diversity of marine life from both tropical and temperate marine ecosystems. While the area has not been well sampled with trawl gear, NOAA trawl surveys within the proposed area have documented 6 records of Hexactinellid sponges at up to 296 kg per survey haul. The California Academy of Sciences has documented hydrocoral in the area. The Smithsonian Institution has documented three rare collections of the reef building deep-sea corals *Lophelia pertusa* and *Madrepora occulata*. Trawl logbook information indicates little trawl activity (Figure x). The proposed closed area encompasses existing state of California bottom trawl closures, therefore minimal displaced effort should result from the proposed closure. The estimated displaced revenue reported here is likely overestimated.

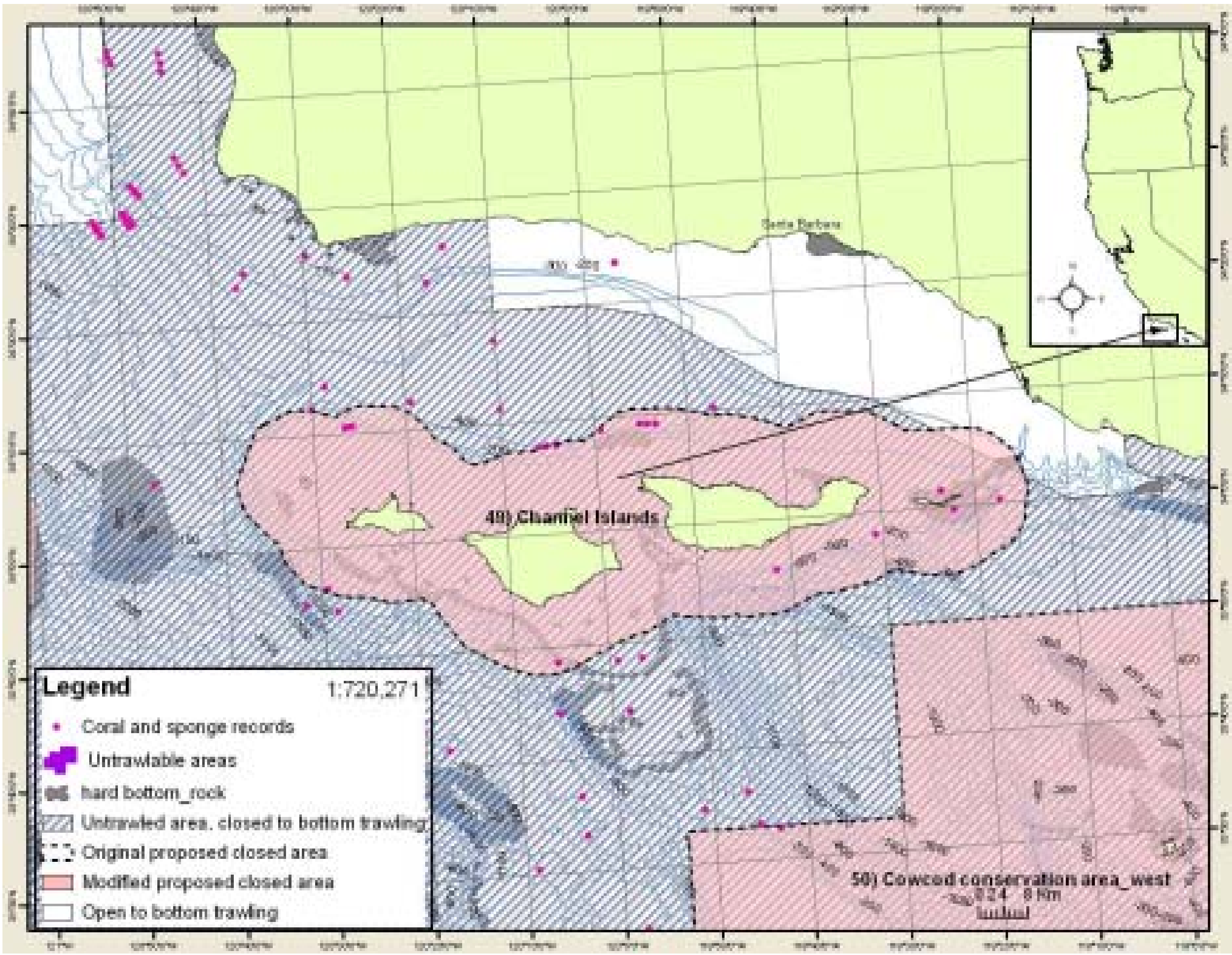


Figure 52: Channel Islands

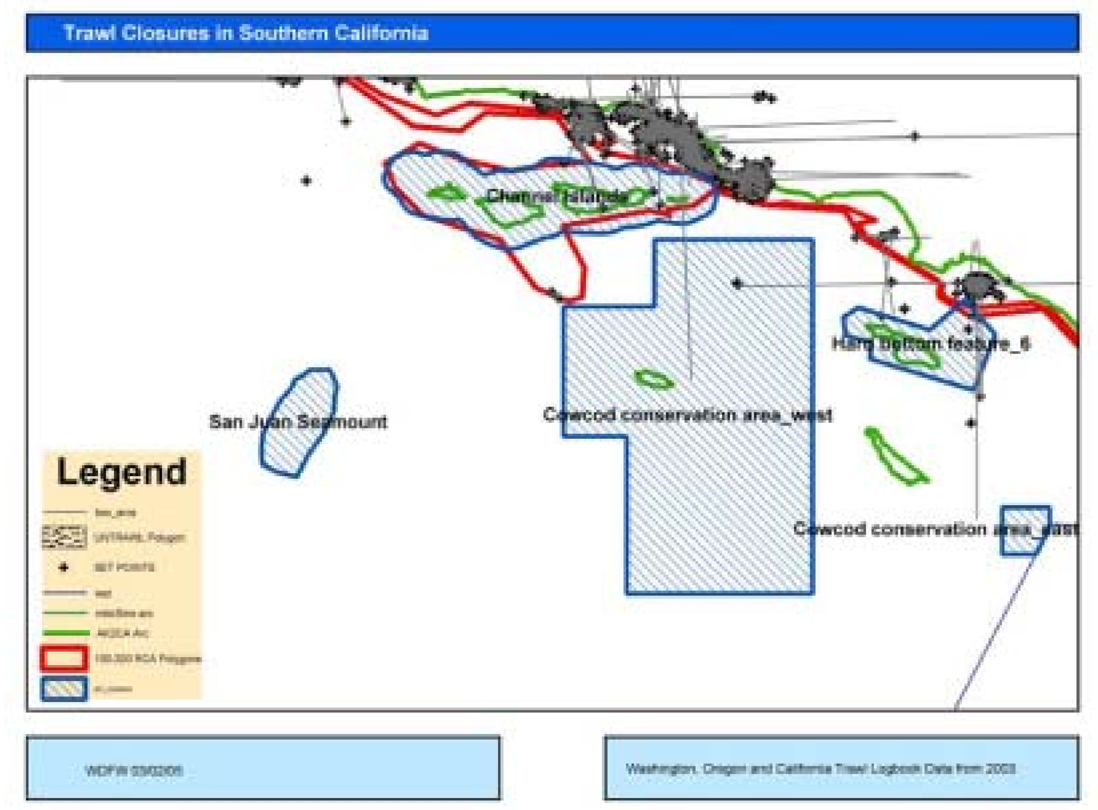


Figure X: 2003 bottom trawl logbook set points (courtesy WDF&W)

50. Cowcod conservation area_west
52. Cowcod conservation area_east
Original Alternative C.12 estimated displaced revenue=$0
Revised Alternative C.12 estimated displaced revenue= $0

The Cowcod Conservation Areas (Figure 53) were established by the Pacific Fishery Management Council and the National Marine Fisheries Service in 2001 to help protect and rebuild cowcod which have been driven down by 89 to 96 percent of unfished levels. Cowcod is a long-lived species with low productivity requiring almost a century to rebuild the population.[8] Due to the low levels of allowable mortality necessary to rebuild cowcod, the primary rebuilding strategy is avoidance.[9] These areas contain hard bottom habitats including a number of offshore banks.[10] While the area has not been well sampled with trawl gear, NOAA trawl surveys within the area have documented three records of Hexactinellid sponges. Submersible dives have also

[8] Final Environmental Impact Statement for Amendment 16-3 to the Pacific Coast Groundfish Fishery Management Plans for Bocaccio, Cowcod, Widow rockfish and Yelloweye Rockfish. July 2004. Pacific Fishery Management Council. at p. 63.
[9] *Id*. at 45.
[10] Analysis provided by NMFS for the EIS Oversight Committee in Portland, OR on August 16-18, 2004.

documented occurrences of black corals.[11] The area is not trawled due to the current closure, and logbook information indicates that little trawling has occurred in the recent past (Figure X). Therefore minimal displaced effort should result from the proposed closure.

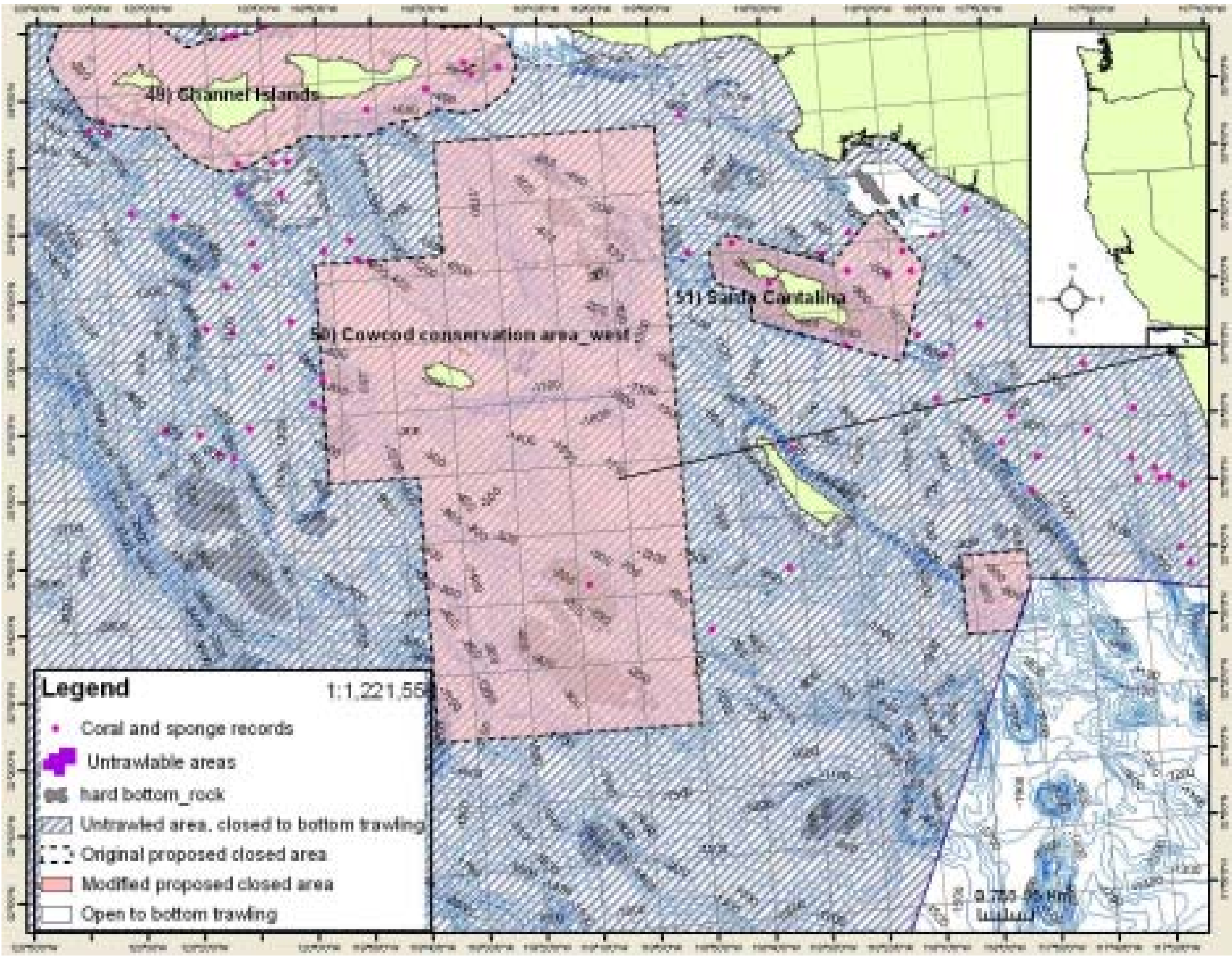


Figure 53: Cowcod conservation areas east and west

51. Santa Cantalina

Original Alternative C.12 estimated displaced revenue= $0
Revised Alternative C.12 estimated displaced revenue= $2,315

This area contains habitat around Santa Cantalina (Figure 54). This area had previously been proposed as "*hard bottom feature_6*". While the area has not been well sampled with trawl gear, NOAA trawl surveys within the area have documented 9 records of habitat-forming invertebrates including Hexactinellid sponges, sea pens, and black corals. The Santa Barbara Museum of Natural History has documented the rare reef-building deep-sea coral *Lophelia pertusa* in the proposed closed area. Trawl logbook information indicates that little trawl activity occurs in the proposed area, and most of the area is located outside the trawl footprint (Figure X). Therefore

[11] Preliminary Report on Occurrences of Structure-Forming Megafaunal Invertebrates off the West Coast of Washington, Oregon and California. Northwest Fishery Science Center. August 2004.

minimal displaced effort should result from the proposed closure and the displaced revenue reported here is likely overestimated.

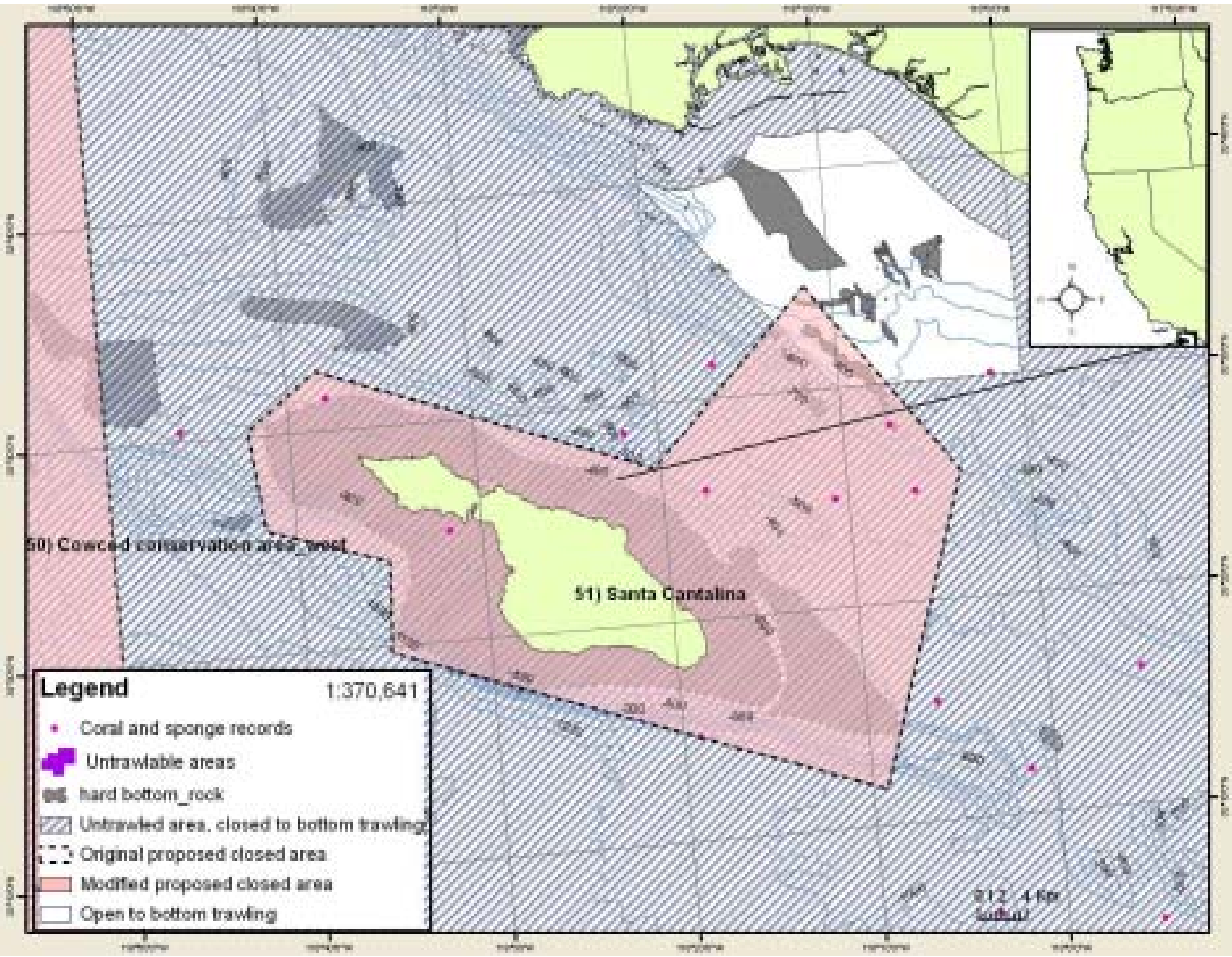


Figure 54: Santa Cantalina

Seamounts

Eight undersea structures of volcanic origin that meet the definition of seamount (those that rise up more than 1000 meters from the seafloor) have been identified within the jurisdiction of the PFMC. These are President Jackson, Thompson, San Juan, Guide, Pioneer, Gumdrop, Rodriguez, and Davidson Seamounts. The location and areal delineation of seven of the seamounts were plotted in GIS from data provided on the *Consolidated GIS Data, Volume 1, Physical and Biological Habitat data disk* (PFMC 2003). An additional seamount, Rodriguez Seamount, was not included in the GIS data disk, but was later identified and incorporated into the Revised Alternative.

Davidson Seamount has been the most well explored of the seamounts, and numerous records of bubblegum corals, black corals, and Hexactinellid sponges have been documented. DeVogelaere et al. (2003) found 24 coral taxa on Davidson Seamount and described numerous species associations, particularly that *Paragorgia sp*. were found in areas with highest species diversity. All of the seamounts off the Pacific coast have not been subject to bottom trawling and all are located outside the bottom trawl footprint. Logbook data documented no trawling on any seamounts on the U.S. West Coast. Therefore, there would be no economic impacts from bottom trawl closures that prevent future damage to these unique communities.

53. Thompson Seamount

Original Alternative C.12 estimated displaced revenue= $0
Revised Alternative C.12 estimated displaced revenue= $0

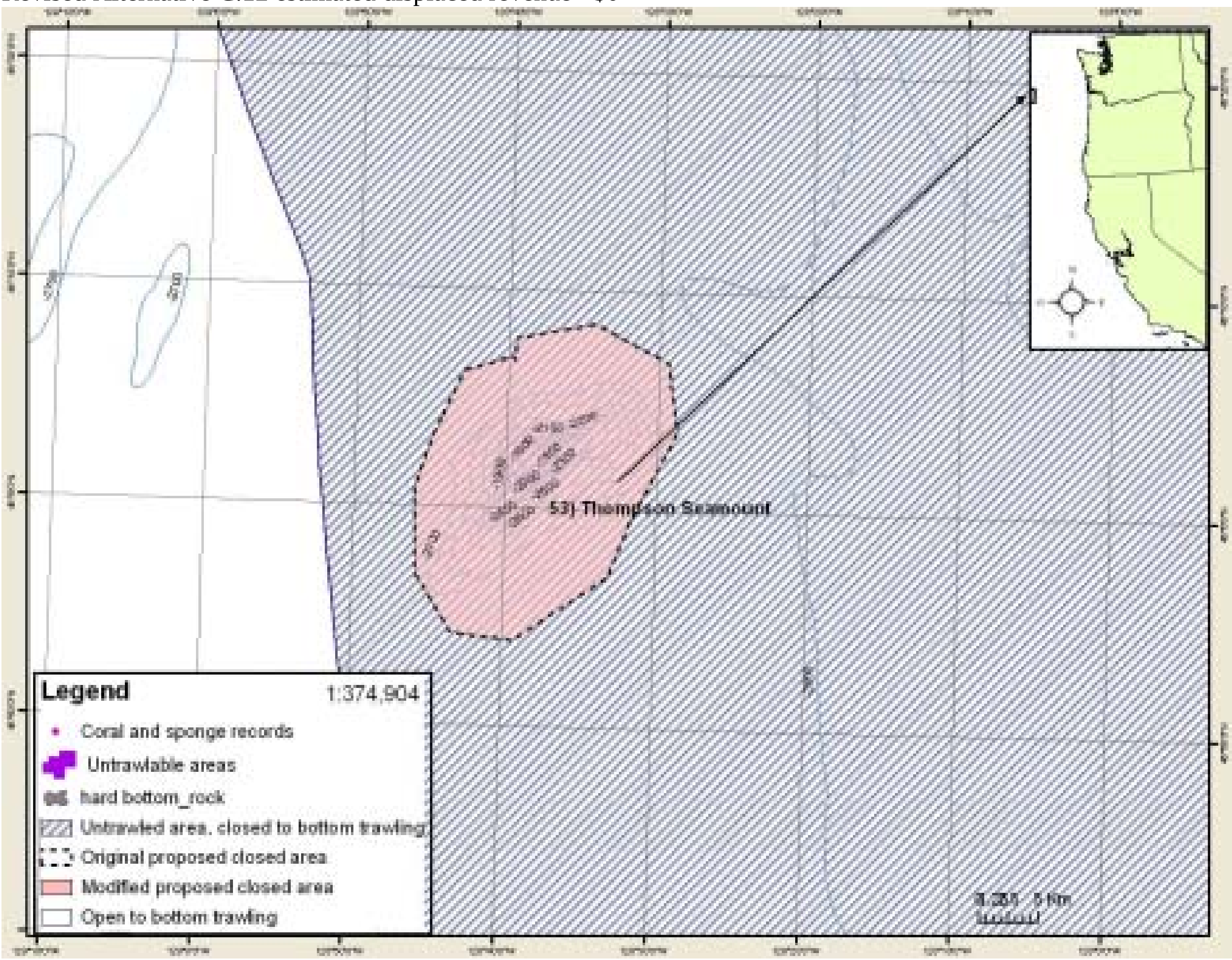


Figure 54: Thompson Seamount

54. President Jackson Seamount

Original Alternative C.12 estimated displaced revenue= $0
Revised Alternative C.12 estimated displaced revenue= $0

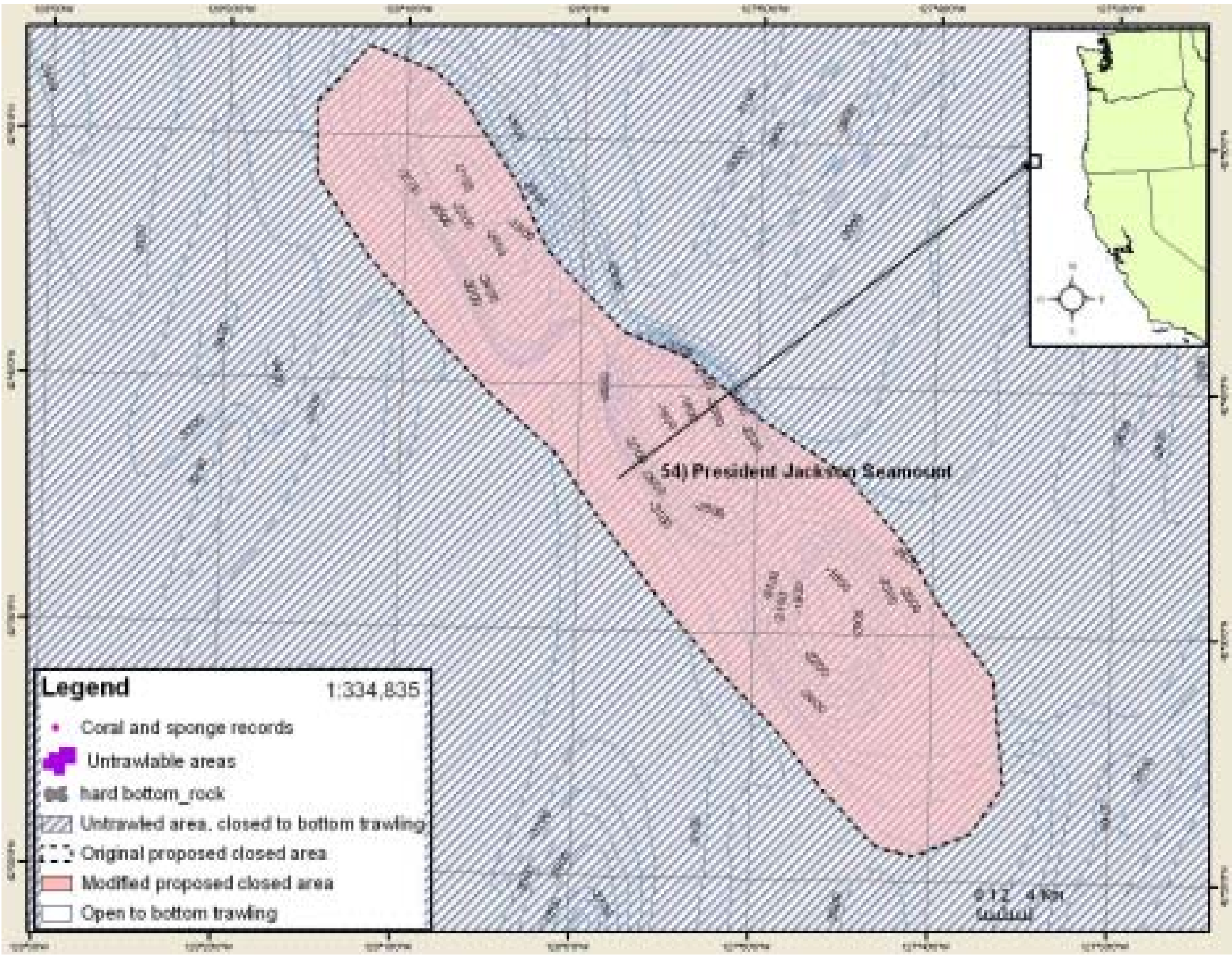


Figure 55: President Jackson Seamount

55. Taney Seamount

Original Alternative C.12 estimated displaced revenue= $0
Revised Alternative C.12 estimated displaced revenue= $0

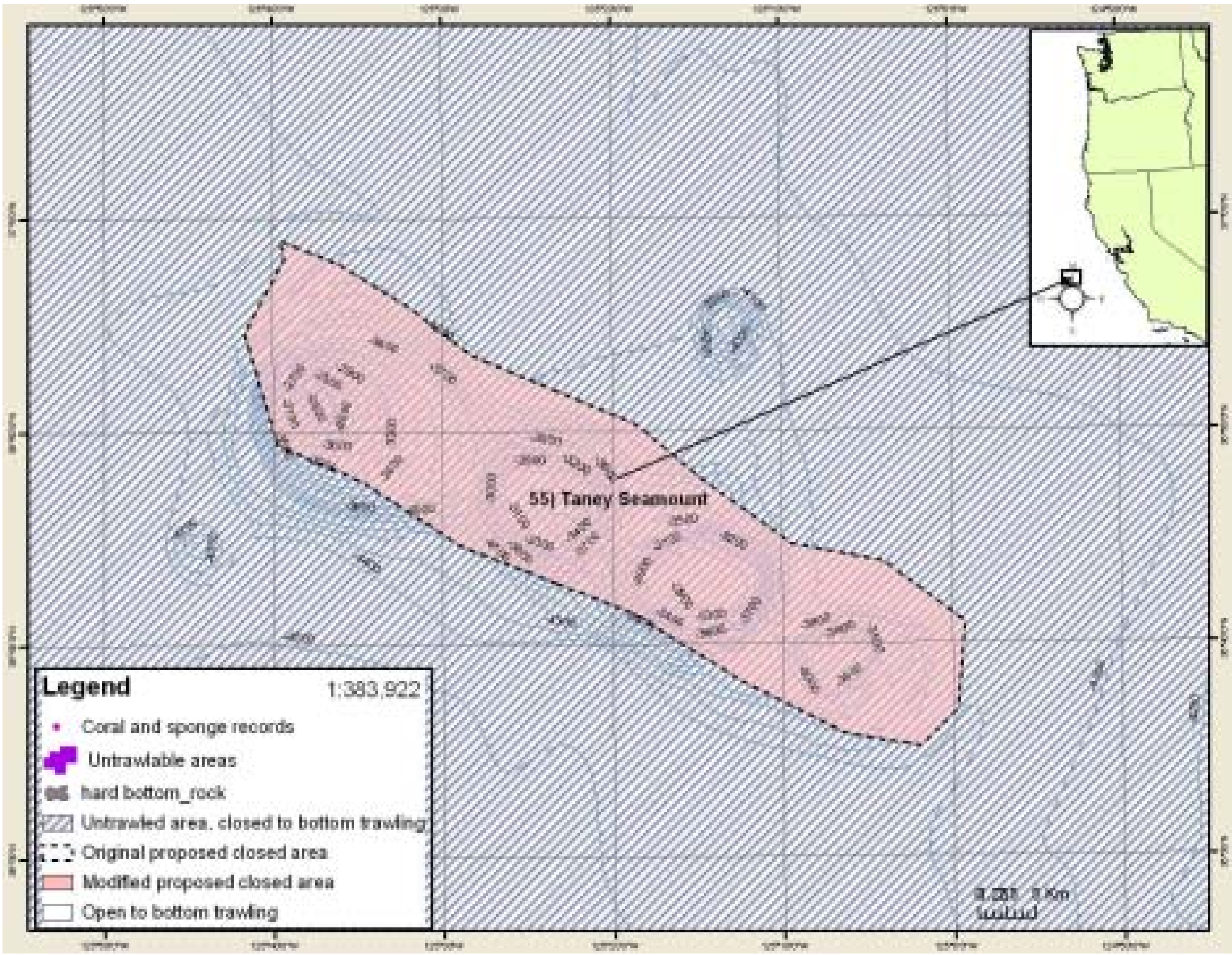


Figure 56: Taney Seamount

56. Gumdrop Seamount
57. Pioneer Seamount
58. Guide Seamount

Original Alternative C.12 estimated displaced revenue= $0
Revised Alternative C.12 estimated displaced revenue= $0

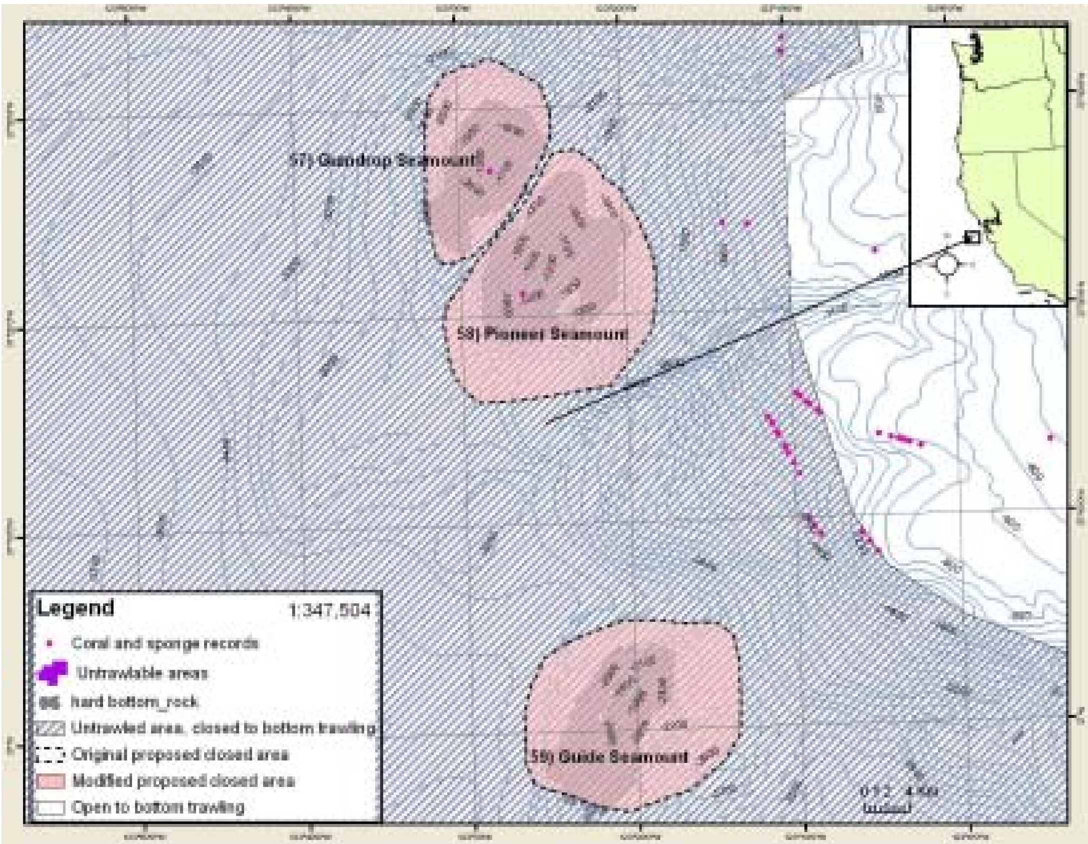


Figure 57: Gumdrop, Pioneer, and Guide Seamount

59. Davidson Seamount

Original Alternative C.12 estimated displaced revenue= $0
Revised Alternative C.12 estimated displaced revenue= $0

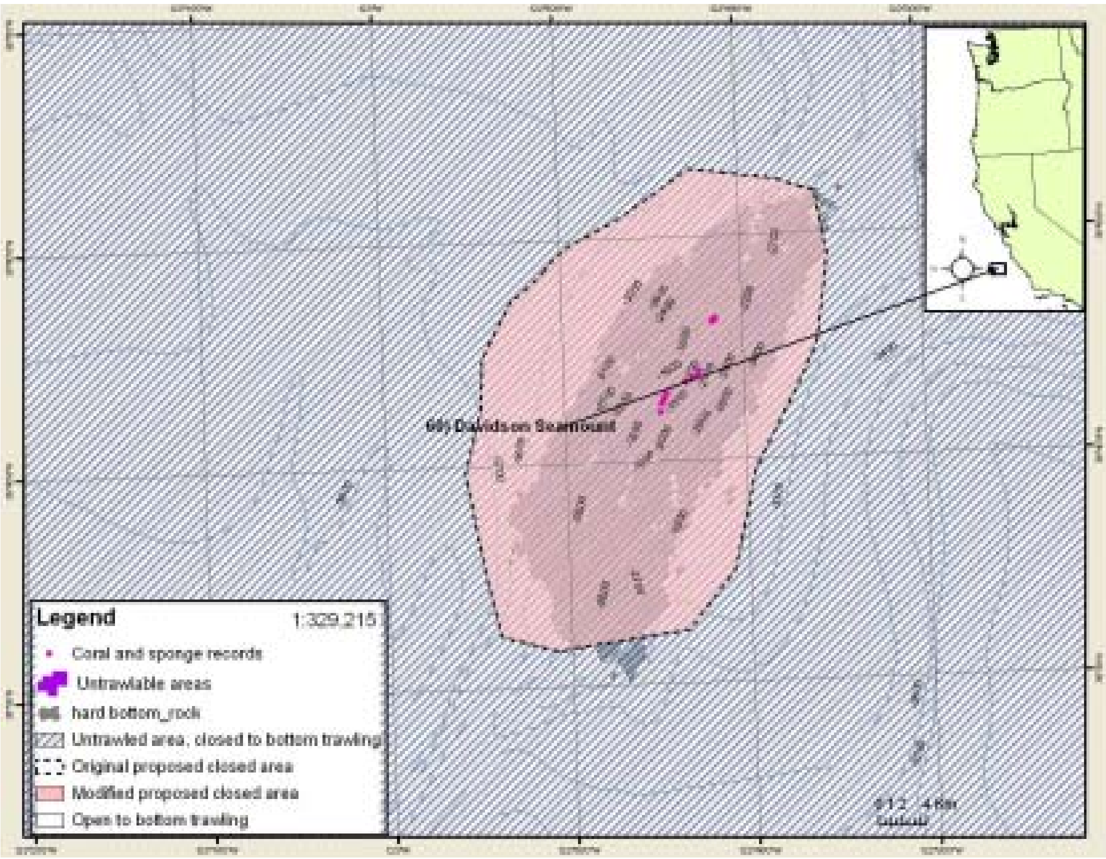


Figure 58: Davidson Seamount

60. San Juan Seamount

Original Alternative C.12 estimated displaced revenue= $0
Revised Alternative C.12 estimated displaced revenue= $0

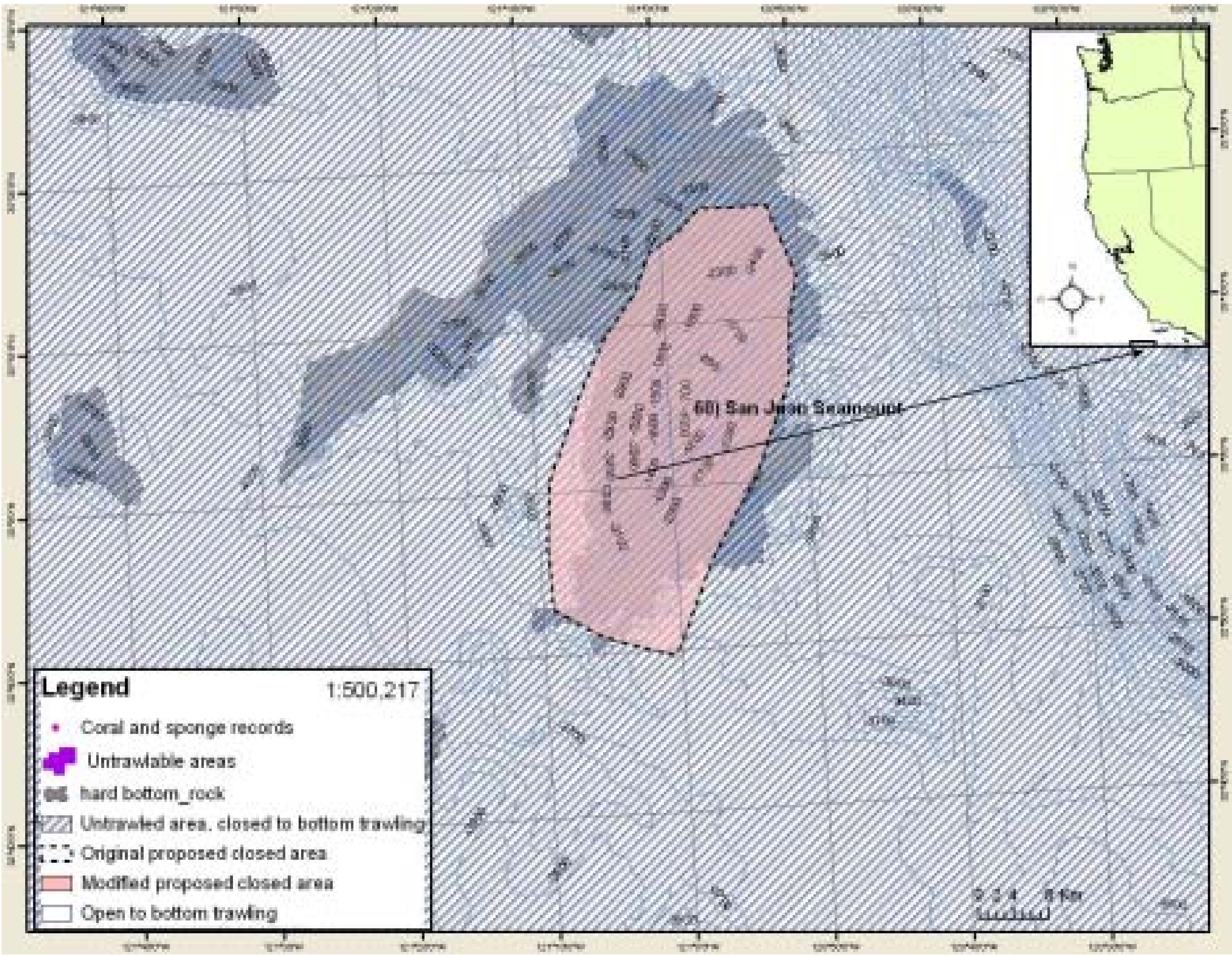
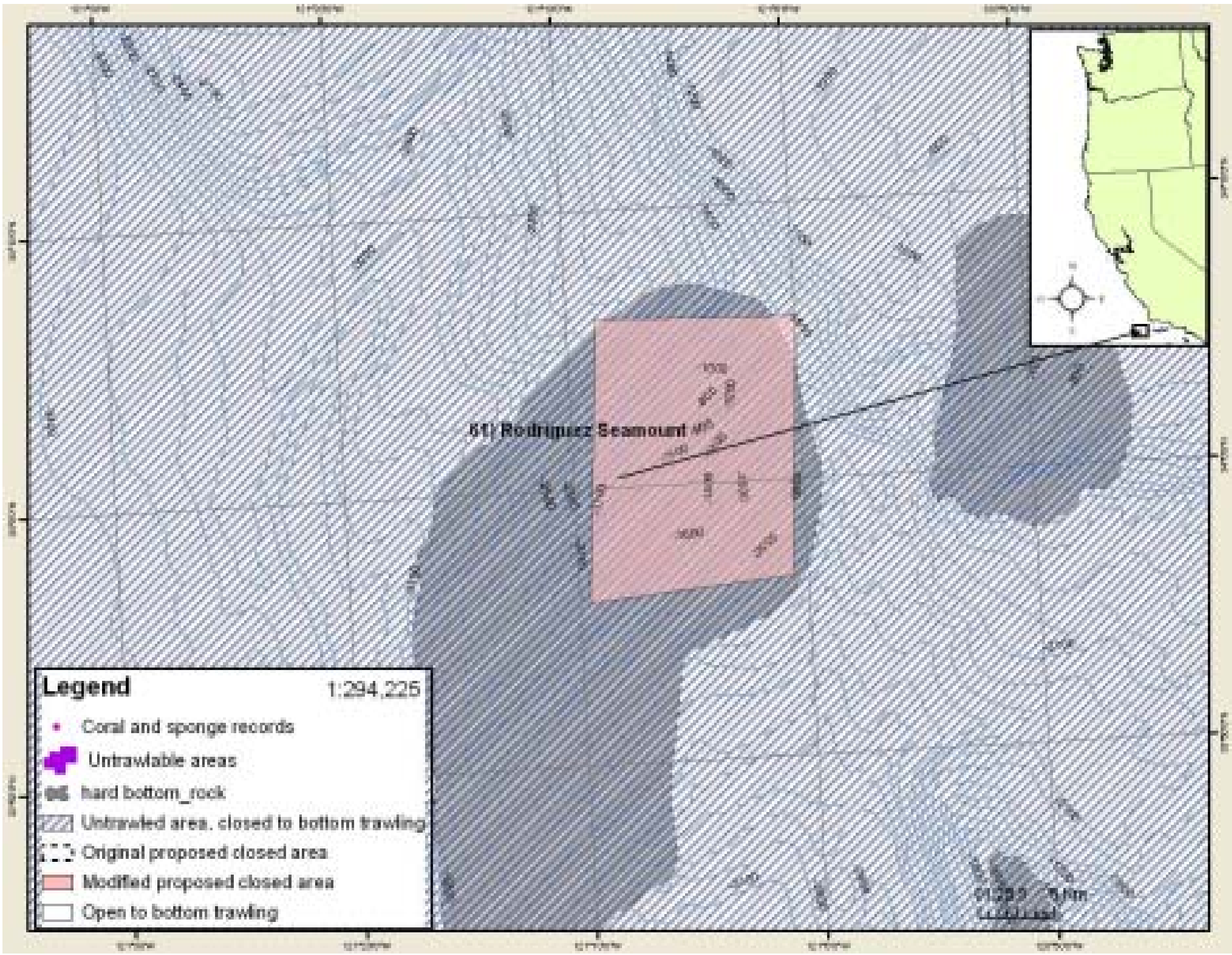


Figure 59: San Juan Seamount

61. Rodriguez Seamount

Original Alternative C.12 estimated displaced revenue= N/A
Revised Alternative C.12 estimated displaced revenue= $0



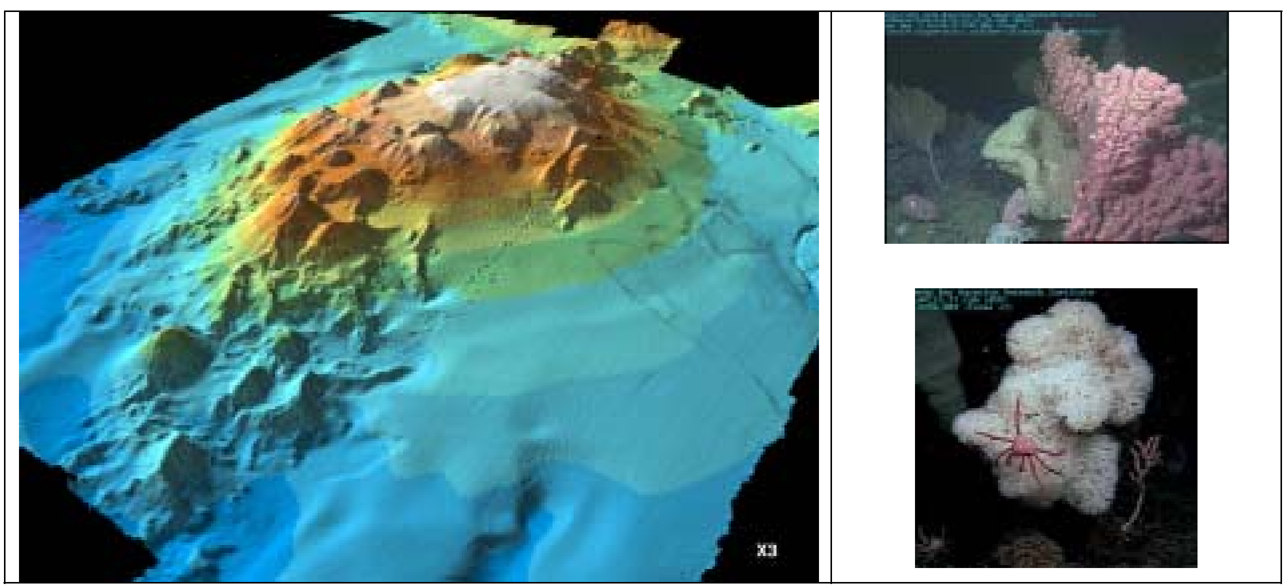


Figure 60: Multibeam image of Rodriguez Guyot off Southern California (left). Large paragorgia sp. corals (right top) and glass sponges (right bottom) are common on this guyot. Courtesy MBARI

Figure 61: San Juan Seamount

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Displacement Comparison Chart of Original Alternative C.12 and Revised Alternative C.12

		Estimated displaced ex-vessel revenue	
Number	Name	Original	Revised
1	Olympic_1	1,286,058	431,115
2	Olympic_2	326,284	280,685
3	Olympic_3	N/A *	395,676
4	Biogenic_1	172,849	36,486
5	Biogenic_2	31,982	15,438
6	Grays Canyon	5,917	34,512
7	Biogenic_3	2,351	4,554
8	Astoria Canyon head #	509,857	33,399
9	Astoria_slope #		74,755
10	Ridges_Biogenic_5	189,585	136,537
11	Nehalem Bank	N/A *	8,824
12	Biogenic_new_1	N/A *	69,960
13	Biogenic_new_2	N/A *	5,969
14	Biogenic_6	3,585	29,402
15	Biogenic_7	76,470	91,908
16	Biogenic_8	36,172	41,852
17	Siletz Reef	N/A *	132
18	Daisy Bank	0	11,768
19	Biogenic_new_3	N/A *	70,573
20	Stonewall Bank	N/A *	7,252
21	Cape Perpetua Reef	N/A *	125
22	Heceta Bank #	379,291	200,810
23	Heceta Escarpment #		28,665
24	Ridges_biogenic_10	12,121	94,628
25	Siltcoos Reef	N/A *	383
26	Cape Arago_Bandon Reef	2,016	12,018
27	Orford and MacKenzies Reef	N/A *	3,929
28	Coquille Bank	N/A *	75,004
29	Rogue offshore slope #	491,706	81,296
30	Rouge Canyon head_ Rouge River Reef #		63,876
31	Brookings_slope	N/A *	48,884
32	Crescent City deep_biogenic_11	2,734	9,635
33	Crescent City_slope	N/A *	49,779
34	Eel River Canyon	551,397	201,696
35	Blunts Reef	N/A *	25,495
36	Mendoncino Ridge	201,902	108,769
37	Delgada Canyon	N/A *	79,978
38	Fort Bragg Canyon	N/A *	51,128
39	Pt Arena offshore	N/A *	47,324
40	Biogenic_12	109,117	61,321
41	Cordell Banks	140,883	49,064

42	Farallon Islands_Fanny Shoal	78	9,967
43	Half Moon Bay	580	41,073
44	Point Sur_deep	0	10,173
45	Monterey Bay and Canyons	645,196	191,468
46	Biogenic area_13	26,257	11,282
47	Big Sur Bank	N/A *	1,694
48	Morro Ridge	258,779	30,125
49	Channel Islands	0	11,016
50	Cowcod conservation area_west	0	0
51	Santa Cantalina	0	2,315
52	Cowcod conservation area_east	0	0
53	Thompson Seamount	0	0
54	President Jackson Seamount	0	0
55	Taney Seamount	0	0
56	Gumdrop Seamount	0	0
57	Pioneer Seamount	0	0
58	Guide Seamount	0	0
59	Davidson Seamount	0	0
60	San Juan Seamount	0	0
61	Rodriguez Seamount	0	0
	Grand Total	**5,463,659**	**3,408,709**
Percent of annual estimated revenue		**22%**	**14%**

* Indicates areas in the revised Alternative C.12 proposal which were not identified in the original Alternative C.12.
\# Indicates areas in the original Alternative C.12 proposal which were split into component areas in the revised Alternative C.12.

As a result of analyses of the spatial distribution of trawl track information from logbooks, input from trawl fishermen, and comments from the SSC, areas of Alternative C.12 were revised to provide for expanded trawl grounds while protection of habitat areas. This revised Alternative C.12 reduces revenue displacement across the EFH area while maintaining integrity of protection/mitigation. The revised Alternative C.12 results in displacement of less than 15% and far less loss in any actual revenue.

The estimates of displaced revenue of the original Alternative C.12 proposal were provided by the WDF&G, who estimated displaced revenue by summing catch from 2003 trawl logbook set points contained within the closed area. The estimates of the revised Alternative C.12 were made by determining the proportional overlap of a closed area with 2000-2003 trawl effort data that was provided in 10 x 10 minute blocks. The proportional method assumes a uniform distribution of fishing effort across a block. However, the revised closed area boundaries were made with the spatial distribution of trawl tracks

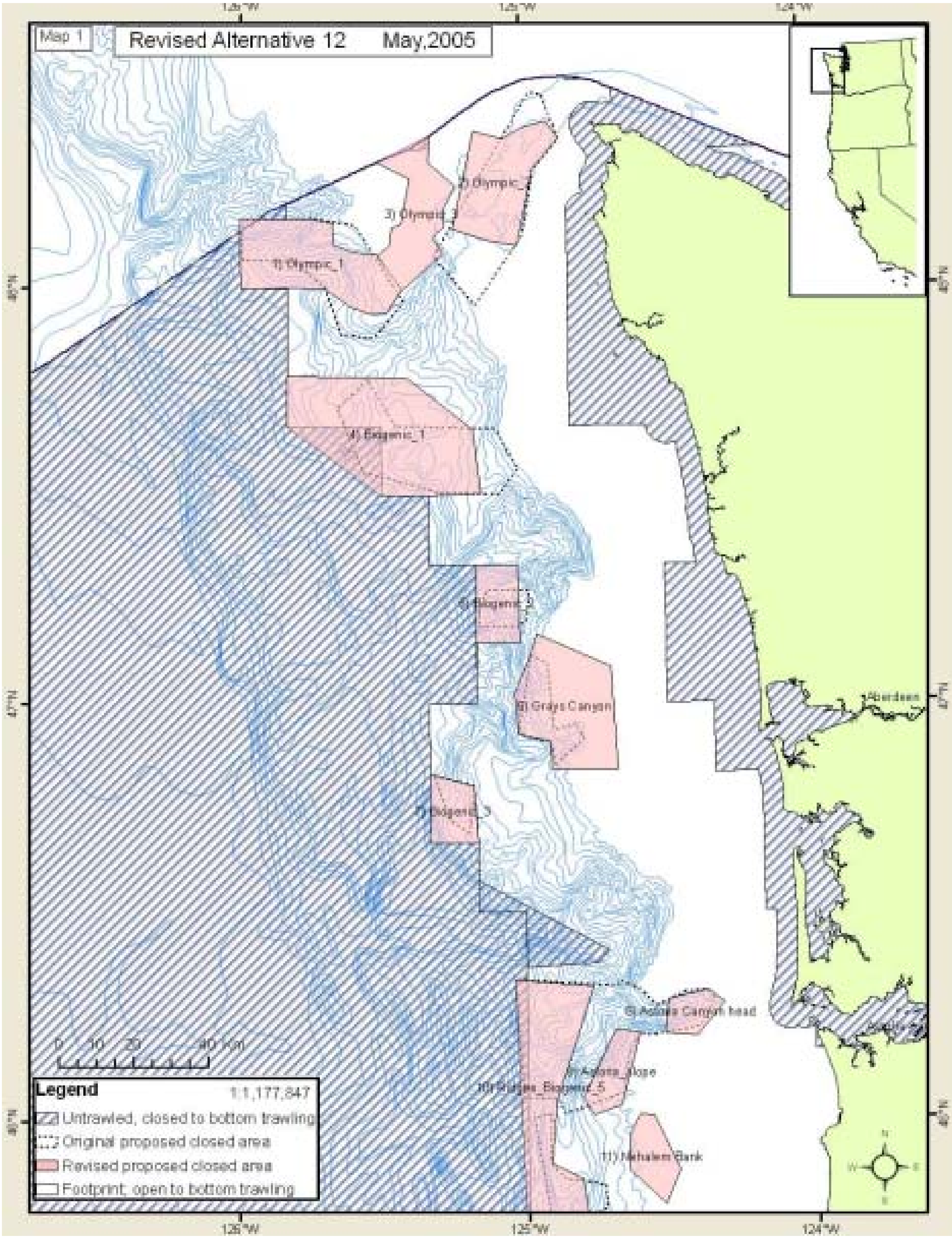

Figure 2: Revised Alternative C.12, Overview Map 1

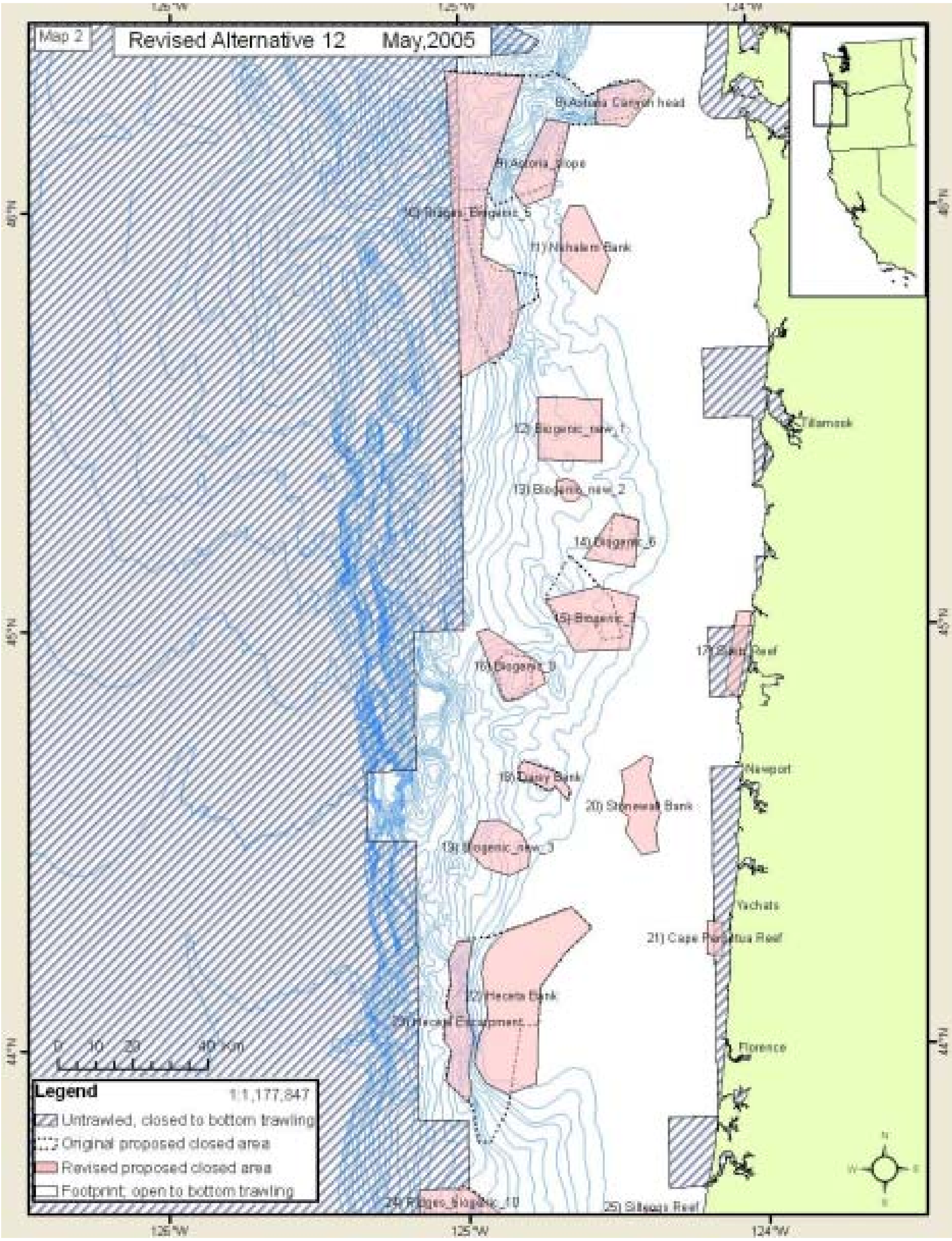

Figure 3: Revised Alternative C.12, Overview Map 2

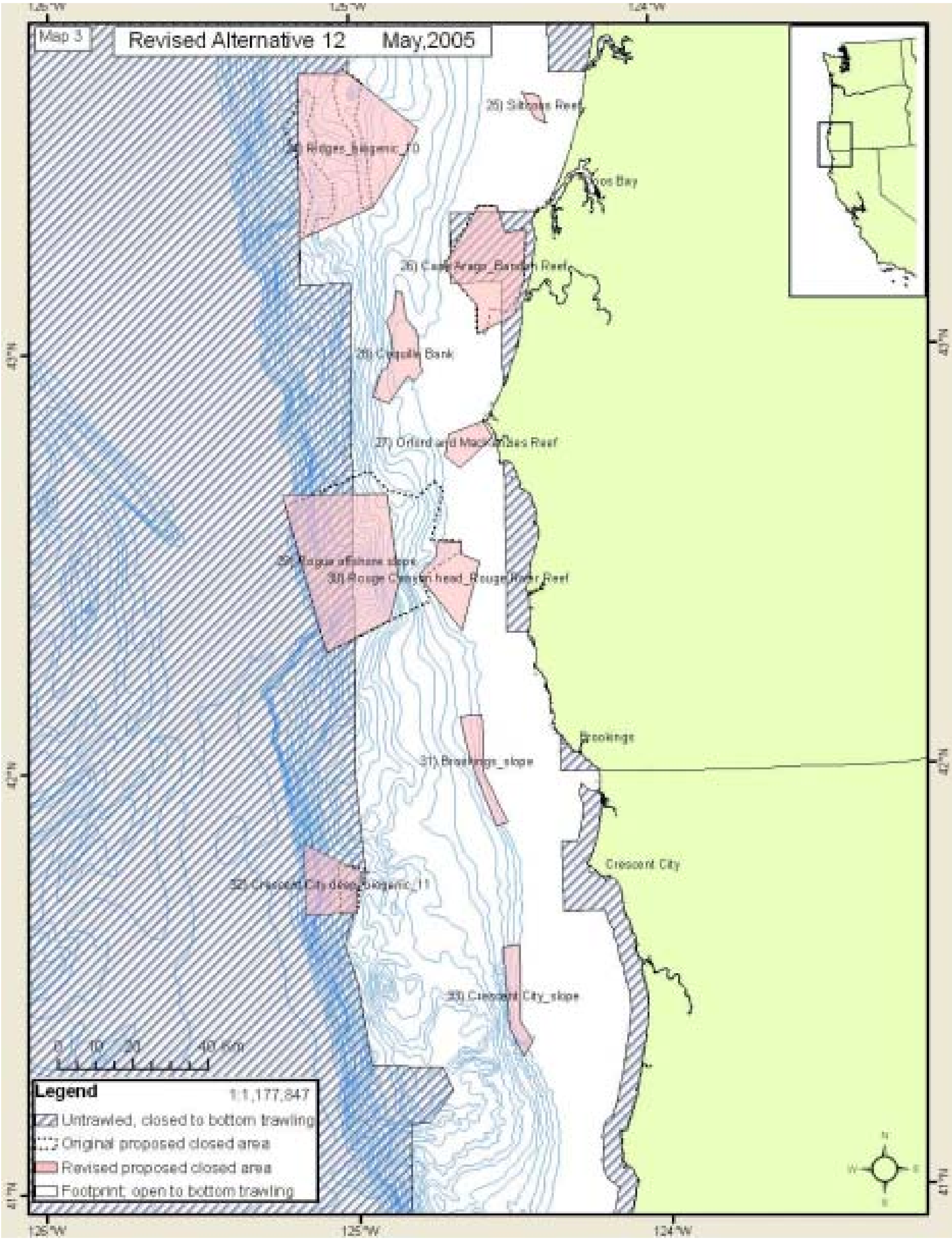

Figure 4: Revised Alternative C.12, Overview Map 3

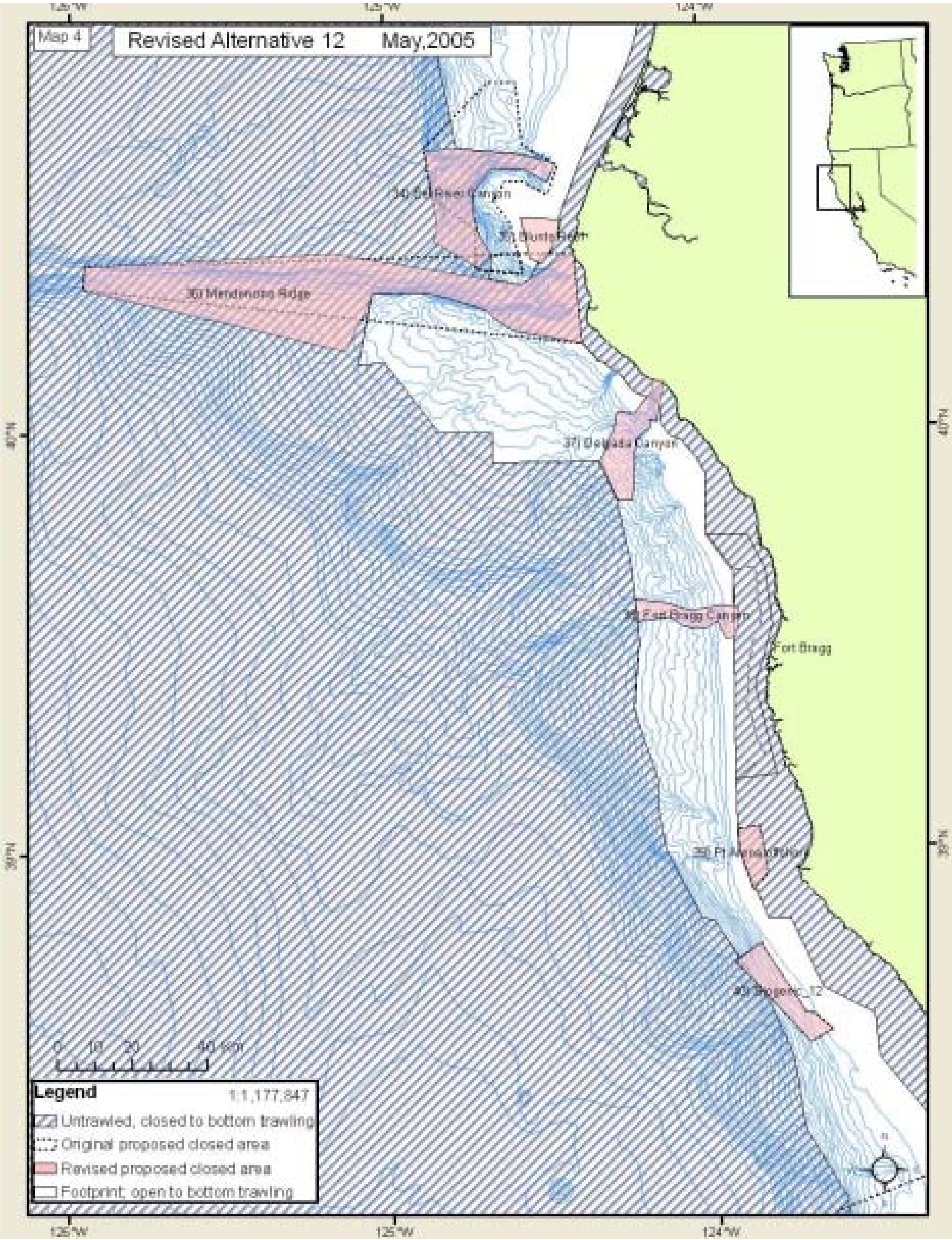

Figure 5: Revised Alternative C.12, Overview Map 4

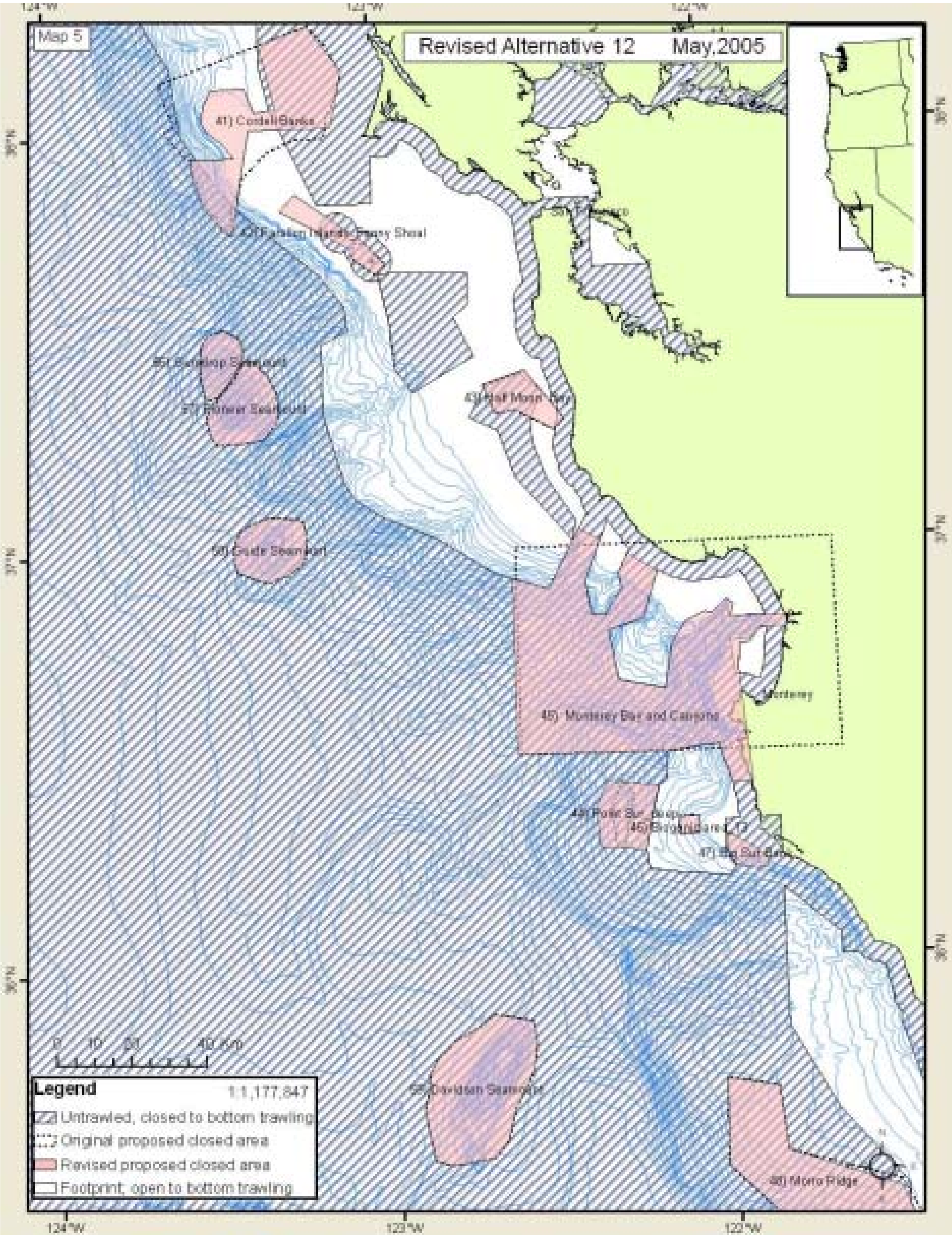

Figure 6: Revised Alternative C.12, Overview Map 5

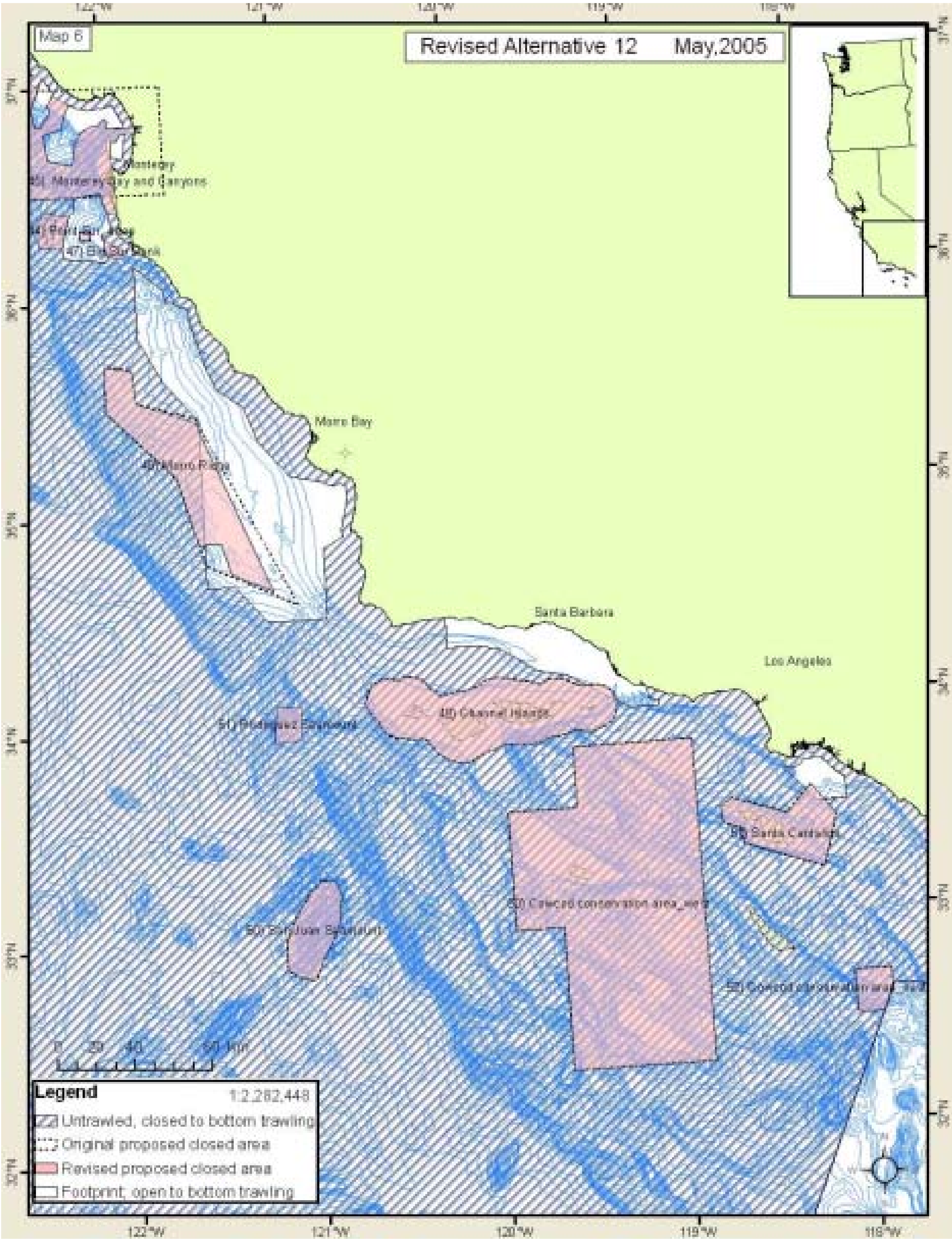

Figure 7: Revised Alternative C.12, Overview Map 6

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DETAILED SUPPORT AND JUSTIFICATON OF REVISED ALTERNATIVE C.12

While perfect information is not available for the designation of Essential Fish Habitat, or the determination of adverse impacts to that habitat, the potential for long-term and perhaps irreversible adverse impacts demands that precautionary action be taken immediately to reduce the impact of bottom trawling on the U.S. West Coast seafloor. The literature on environmental policy generally concludes that higher uncertainty justifies stronger policy intervention to avoid damages than certainty-equivalent cases (i.e. Nordhaus 1994). The reason for this result is that the amount of damage is non-linear. In other words, the increases in damages are greater in the worst case scenario than the decreases in the best-case scenario. This result is highly applicable to the analysis of EFH designation and mitigation measures because of the severity of economic damages in the worst case scenario. For example, if it turns out that commercial fish productivity is strongly tied to the presence of biogenic habitat structures (as suggested in the literature), the long-term effects of continued damage to these habitats would be extremely severe and irreversible from a fisheries perspective. Therefore, even if there is a low probability of this outcome, a comprehensive policy analysis should pay strong attention to this outcome in the evaluation of different policy interventions to minimize adverse impacts to EFH.

While there continue to be uncertainties, a substantial amount of scientific studies and data are available, both to designate Essential Fish Habitat and mitigate the adverse effects of fishing to the extent practicable. Based on the information currently available, it is clear that bottom trawling is causing adverse impacts to Essential Fish Habitat on the U.S. West Coast and that the revised Alternative C.12 (presented in this document) is the most practicable solution to minimize these adverse impacts.

Designation of Essential Fish Habitat

Given the available information concerning designation of Essential Fish Habitat, the alternative most consistent with a precautionary, ecosystem-based management approach to fisheries is Alternative A.2 with the addition of seamounts. This alternative is also consistent with the EFH Final Rule, which speaks directly to the various levels of information which may be available to determine EFH. Section 600.815(a)(1) recognizes four levels of EFH information for each life stage of each species:

(*1*) *Level 1: Distribution data are available for some or all portions of the geographic range of the species.*
(*2*) *Level 2: Habitat-related densities of the species are available.*
(*3*) *Level 3: Growth, reproduction, or survival rates within habitats are available.*
(*4*) *Level 4: Production rates by habitat are available.*

Based on the information presented in the EFH DEIS, it is clear that EFH information is currently at or below Level 1 for most groundfish in the Pacific Coast groundfish fishery. The EFH Final Rule describes how "habitat use" is to be inferred when information is Level 1:

In the event that distribution data are available only for portions of the geographic area occupied by a particular life stage of a species, habitat use can be inferred on the basis of distributions among habitats where the species has been found and on information about its habitat requirements and behavior. Habitat use may also be inferred, if appropriate, based on information on a similar species or another life stage.

This section also defines the burden of proof standard to be used by the Councils:

Councils should interpret this information in a risk averse fashion to ensure adequate areas are identified as EFH for managed species. Level 1 information, if available, should be used to identify the geographic range of the species at each life stage. If only Level 1 information is available, distribution data should be evaluated (e.g., using a frequency of occurrence or other appropriate analysis) to identify EFH as those habitat areas most commonly used by the species.

Use of the term "risk averse" in this context makes clear that the law and regulations do not require proof of causality before designating EFH, but rather use of whichever level of information is available. When information is at Level 1, any habitat that fish are associated with should be designated as EFH.

Observations of fish outside any given habitat type does not provide evidence that these habitats are not EFH. First, habitat use does not need to be obligate to affect the population of fish. For example, facultative and fortutious habitat use has been shown to enhance fish populations even if the habitat use is not obligate (Mumby et al. 2004). Second, there may be various forms of complex habitat in a given area, giving fish several options to use as shelter, for example. In this case, removal of some of the complex habitat (i.e. corals) decreases the availability of suitable habitats, even though other suitable habitats still remain. Basic ecological theory states that reduction in the availability of suitable habitat reduces the carrying capacity of the species that uses the habitat, even if other suitable habitat remains. This theory is supported by Rubec et al. (1999). Fishery management science in the U.S. is based on the premise that carrying capacity is proportional to maximum productivity (i.e. MSY). Therefore, even if corals are not the only type of complex habitat available to fish, their removal may reduce the productivity of fish. Furthermore, even if biogenic habitat is only utilized by fish at certain times of the year, it may have a strong influence on survivorship or reproductive success. For example, a fish may depend on the presence of biogenic habitat only at specific events such as spawning periods. Even though these events may be infrequent, they have a strong effect on population dynamic processes that determine productivity. Therefore, the absence of fish in biogenic habitat at one specific moment in time is not evidence that the habitat is not linked to the survivorship or fecundity of commercial fish and invertebrates.

Seamounts provide an area of vertical relief from the relatively flat and featureless abyssal plain. As such, seamounts are sites of enriched biological activity with enhanced biomass of pelagic and benthic organisms relative to the surrounding waters (Mullineaux and Mills 1997; Dower and Perry 2001; Haury et al. 2000). Studies indicate that seamounts function as deep-sea islands of localized species distributions, dominated by suspension feeders like corals and sponges which can be easily damaged by fishing gear that makes contact with the bottom (Monterey Bay National Marine Sanctuary, Sanctuary Integrated Monitoring Network, URL: www.mbnmssimon.org/sections/seamounts/overview.php). Recent studies conducted by the Monterey Bay Aquarium Research Institute on West Coast seamounts have documented unique and diverse biological communities. (http://www.mbari.org/volcanism/seamounts/seamountsresearchtop.htm).

Along the crests and slopes of several seamounts, MBARI scientists observed long-lived coral and sponge habitats. DeVogelaere et al. (2003) found 24 coral taxa on Davidson Seamount off California and described numerous species associations, particularly that *Paragorgia sp*. were found in areas with highest species diversity. Guyots are a type of volcanic seamount with a flat top or plateau. Because the tops are flat, they may be particularly vulnerable to trawling due to the relative ease of setting trawl gear. The rarity and uniqueness of seamount faunal communities provides strong scientific justification for a highly precautionary approach. Koslow et al. (2001) conducted a survey of Tasmanian seamounts where 30% of species identified were new to science and 30-60% were endemic to particular seamounts.

Accordingly, we support Alternative A.2 with the addition of seamounts as the EFH Description and Identification alternative.

Importance of Structure-forming Megafaunal Invertebrates as Key Components of the Ecosystem and Essential Fish Habitat

Corals, sponges, and other habitat-forming invertebrates provide three-dimensional structure on the seafloor that increases the complexity of benthic substrates. While corals and sponges are the most conspicuous and easily observable biogenic structures, they generally occur in diverse biological communities with other invertebrates such as crinoids, basket stars, ascidians, annelids, and bryozoans. Henry (2001) found thirteen hydroid species collected from only four coral specimens, suggesting that northern corals support highly diverse epifaunal communities. Beaulieu (2001) observed 139 taxa associated with deep-sea sponge communities in the northeast Pacific. Buhl-Mortensen and Mortensen (2004) found 17 species of Pandalus shrimp, isopods, amphipods, copepods, and decapods associated with *Paragorgia arborea* and *Primnoa resedaeformis* in Nova Scotia, including an obligate associated copepod. Removal of habitat structure in relatively low-structure soft-sediment systems significantly decreases biodiversity, and consequently that of the wider marine ecosystem (Thrush et al. 2001). Therefore, protecting known areas of coral and sponge habitat inherently protects areas of high benthic diversity and a host of benthic organisms that provide habitat for fish in the form of food and shelter.

Deep sea corals and sponges provide three dimensional structures that form habitat for commercial groundfish, shellfish, and other marine life (Husebo et al. 2002; Krieger and Wing 2002; Malecha et al. 2002; Heifetz 2002). Deep sea corals and sponges are found at depths from 30 meters to over 3,000 meters (Krieger and Wing 2002). Many cup corals, hydrocorals, and *Metridium* anemones are found at depths as shallow as 15 m. Some larger species of deep sea corals, such as *Paragorgia sp*. can grow over 3 m tall. Because these long-lived filter feeders are attached to the seafloor, they may be important indicators of areas in the ocean that have consistently favorable ecological conditions, such as areas of high upwelling that are worth protecting for other reasons as well.

Based on the best available science, cold water corals and sponges are important Essential Fish Habitat that are vulnerable to the impacts of bottom trawling. In February 2004, over 1,100 scientists signed a consensus statement declaring that "In short, based on current knowledge, deep-sea coral and sponge communities appear to be as important to the biodiversity of the oceans and the sustainability of fisheries as their analogues in shallow tropical seas." This statement is corroborated by numerous scientific studies documenting the importance of cold-water corals as habitat for fish and invertebrates. Here are 12 examples:

1. A recent study in the Olympic Coast National Marine Sanctuary (Hyland et al. 2004) corroborates the conclusion reached in other regions that coral and sponge ecosystems are valuable habitat for demersal fisheries on the U.S. West Coast and important "reservoirs of marine biodiversity" (Hyland et al. 2004). This study documented bottom trawl marks in the vicinity and a large proportion of dead or broken corals.
2. Krieger and Wing (2002) identified 10 megafaunal groups associated with *Primnoa sp*. deep sea corals, that use the corals for feeding, breeding, and protection from predators. Six rockfish species were either beneath, among, or above the coral colonies. Shrimp were among the coral polyps and a pair of mating king crabs was hiding beneath the coral. The authors conclude that removal of these slow-growing corals could cause long-term changes in associated megafauna.
3. Dr. Milton Love (pers. comm.) identified large schools of juvenile rockfish (including widow and squarespot rockfish) closely associated among the branches of the newly-discovered "Christmas tree coral", likely using the coral for protection. This deep sea coral species was named based on the numerous associated species that clung to the branches like Christmas ornaments (Opresko 2005).
4. Mortensen et al. (1995) identified megafauna associated with deep sea coral bioherms in Norway, including redfish, saithe, squat lobsters, sponges, and gorgonians (*Paragorgia arborea*, *Paramuricea placomus*, *Primnoa resedaeformis*).
5. Buhl-Mortensen and Mortensen (2004) documented 17 crustacean species associated with cold-water gorgonian corals off Canada, most of which were using the habitat as protection from predators and some were obligate to the corals. This suggests corals provide habitat for commercial fish prey.
6. Husebo et al. (2002) found that the largest catches of redfish (*Sebastes marinus*) were made with long-line fleets set in deep sea coral reef habitats. Ling and tusk were also most numerous in coral habitats, although not statistically significant. Fish caught in coral habitats tended to be larger in size than in non-coral habitats. Reasons for the associations were feeding and physical structure.
7. Christiansen and Lutter (2003) cite evidence that commercially caught demersal and pelagic fish species, mainly redfish, saithe, ling and tusk, have a higher abundance near deep sea coral reefs and patches.
8. Costello et al. (2003) found that fish species and abundance was greater on the deep sea coral habitat than surrounding seabed; 69% of species and 79% of abundance was associated with the reefs.
9. Koenig et al. (2003) state that important predatory fish species have been seen aggregating around the larger coral structures of *Oculina sp*. deep sea corals off Florida, and small fish have taken up residence inside the modules.
10. Scott and Risk (2003) found abundant fish associated with *Primnoa* which are not common in areas where coral is absent. The authors state that deep sea corals off Canada are being rapidly depleted by bottom trawling, which in turn appears to have an impact on fish stocks.
11. Sulak et al. (2003) listed economically important fish species observed in deep sea coral habitat, several of which were restricted to this habitat. The authors also found several poorly known fish species associated with deep sea corals.

12. Brodeur (2001) documented Pacific Ocean perch using sea whip forest habitat in the Pribilof Canyon in the Bering Sea on a diel cycle as resting areas.

Sponges represent a major component of biogenic fish habitat that has not received the level of attention as corals. However, sponges are a diverse group of large, slow-growing seafloor animals that provide habitat for fish and invertebrates on the U.S. West Coast. There are two major groups of sponges on the U.S. West Coast: hexactinellid (glass) sponges and demosponges. Sponges can reach sizes of 3 meters high and provide complex three dimensional structure on the seafloor. Large glass sponges found off the coast of British Columbia have been age dated to be 220 years old, and the average size based on current knowledge of growth rates is 35 years (Leys and Lauzon 1998). Several studies worldwide have documented the importance of sponges as fish habitat:

1. Freese and Wing (2003) documented that Aphrocallistes sponges provide habitat for juvenile red rockfish in the Gulf of Alaska. The authors state that the fish observed in the study benefited from the sponges through predator avoidance and that bottom trawl damage to sponge communities would be expected to have a negative impact on juvenile red rockfish survival rates.
2. Eastman and Eakin (1999) documented fishes of the genus Artedidraco are associated with sponge beds in the Ross Sea of Antarctica.
3. Tokranov (1998) described the association of the sponge sculpin (*Thyriscus anoplus*) with sponge beds in the northern Kuril Islands.
4. Konecki and Targett (1989) found that cod icefish (*Lepidonotothen larseni*) lay their eggs on the biogenic substrate provided by the spongocoel of the hexactinellid sponge *Rossella nuda* off Antarctica. The authors state that glass sponges serve as important nesting and refuge sites for Antarctic fishes and that destruction of sponge communities by bottom trawling could have an adverse impact of the fish ecology of the region.
5. Moreno (1980) and Daniels (1978) documented several species of fishes known to utilize sponges as spawning and nesting sites and for predator avoidance.
6. Munehara (1991) established that the silverspotted sculpin (*Blepsias cirrhosus*) uses the sponge *Mycale adhaerens* as a spawning bed and that the eggs benefit from the association through predator avoidance, oxygen supply, and the antibacterial and antifungal properties of the sponges.
7. Herrnkind and Butler (1994 identified sponges as “benthic juvenile shelter” for spiny lobster in Florida Bay that were found to be one of the most productive sites for survival of postlarvae.
8. Rocha et al. (2000) found that sponges are habitat 'oases' in a desert of rubble and flat rocky bottoms in Brazil. The study identified fish associations with shallow and deepwater sponges, including several obligate associations and and four endemic species of fishes associated with deepwater sponges.

The following species are known to associate with corals and sponges: rougheye rockfish, redbanded rockfish, shortraker rockfish, sharpchin rockfish, Pacific Ocean perch, dusky rockfish, yelloweye rockfish, northern rockfish, shortspine thornyhead, several species of flatfish, Atka mackerel, golden king crab, shrimp, Pacific cod, walleye pollock, greenling, Greenland turbot, sablefish, and various non-commercial marine species (Freese 2000; Krieger and Wing 2002;

Heifetz 1999; Else et al. 2002; Heifetz 2002). Red tree corals (*Primnoa sp.*) are known to provide protection from predators, shelter, feeding areas, spawning habitat, and breeding areas for fish and shellfish and are found throughout the U.S. West Coast (Krieger and Wing 2002). Stone (preliminary data, 2004) found an 87% rate of association between adult Alaskan FMP species and biogenic habitat and a 100% association rate for juveniles. Kaiser et al. (1999) found that biogenic habitat structure is an important component of demersal fish habitat, and observed higher densities of gadoid fish species associated with structural fauna such as soft corals, hydroids, bryozoans, and sponges in the southern North Sea and eastern English Channel. Husebo et al. (2002) found that the largest catches of redfish (*Sebastes marinus*) were made with long-line fleets set in deep sea coral reef habitats. Rocha et al. (2000) found that sponges are habitat 'oases' in a desert of rubble and flat rocky bottoms in Brazil. Reed (2002) in a study of deep water *Oculina* reefs along eastern Florida, noted extensive areas of *Oculina* rubble in part as the result of bottom fishing and major declines in commercial fish populations in the reefs from 1970-1990. Prevention of damage by bottom trawls to corals and other “living substrates” may increase the amount of protective cover available to slope rockfish to escape predation, increase survival of juvenile fish and thus have a positive impact on the stocks (Alaska Region EFH EIS).

Managed fish species in the PFMC management region using structure-forming invertebrates (such as corals, basketstars, brittlestars, demosponges, gooseneck barnacles, sea anemones, sea lilies, sea urchins, sea whips, tube worms, and vase sponges) as biogenic habitat include: Arrowtooth flounder, big skate, bocaccio, California skate, cowcod, Dover sole, flag rockfish, greenspotted rockfish, lingcod, longspine thornyhead, Pacific ocean perch, quillback rockfish, rosethorn rockfish, sablefish, sharpchin rockfish, shortspine thornyhead, spotted ratfish, starry rockfish, tiger rockfish, vermilion rockfish, yelloweye rockfish, and yellowtail rockfish (Pacific EFH DEIS).

Bottom Trawling Causes Adverse Impacts to Essential Fish Habitat

Adverse impacts to essential fish habitat from fishing that are more than minimal and not temporary is the legal trigger requiring mitigation measures. Based on the information included in the EFH DEIS and additional studies not considered in the document, it is clear despite the present uncertainties that bottom trawling taking place under the current Groundfish Fishery Management Plan is having adverse impacts on Essential Fish Habitat that are more than minimal and not temporary.

There is general scientific consensus that bottom trawling has wide ranging effects on habitats and ecosystems. According to the National Research Council (2002) Report on the Effects of Trawling and Dredging on Seafloor Habitat, these adverse impacts include:

- changes in physical habitat of ecosystems
- changes in biologic structure of ecosystems
- reductions in benthic habitat complexity
- changes in availability of organic matter for microbial food webs
- changes in species composition

• reductions in biodiversity.

These statements are corroborated by numerous scientific studies from around the world corroborate the conclusion that bottom trawling causes adverse impacts to biogenic habitat. Here are 31 examples of these studies:

1. Hyland et al. (2004) documented bottom trawl marks in the vicinity of coral and sponge beds in the Olympic Coast National Marine Sanctuary and observed a large proportion of dead or broken corals.
2. Engel and Kvitek (1998) compared heavily trawled and lightly trawled areas in otherwise similar regions off Big Sur, CA, finding lower epifaunal invertebrate densities at the more heavily trawled site. The authors conclude that intensive trawling significantly decreased physical habitat heterogeneity and biodiversity.
3. Grehan et al. (2003) found evidence that deep sea corals are being destroyed by trawling, as evidenced by trawl scars, flattened coral rubble, barren sediment, and lost trawl gear. The authors state that this provides irrefutable proof of a serious threat to the marine ecosystem caused by fishing that warrants immediate emergency measures to protect the remaining corals.
4. Conway et al. (2003) studied the environmental conditions where sponge reefs are found and discovered that like deep-sea coral reefs, many of the hexactinosan sponge reefs in British Columbia have been damaged or destroyed by the groundfish trawl fishery.
5. Hall-Spencer et al. (2002) document widespread trawling damage to cold-water coral reefs at 840-1300 m depth along the West Ireland continental shelf break and at 200 m off West Norway. The trawled coral matrix was at least 4550 years old. The authors discuss the need for urgent conservation measures to protect these corals.
6. Lundalv and Jonsson (2003) found about 50% of investigated coral sites in the Kosterfjord area to be destroyed by recent bottom trawling, while the remaining areas exhibit major signs of trawl damage.
7. Mortensen et al. (2003) found signs of fishing impact such as broken live corals, tilted corals, and scattered skeletons. Broken or tilted corals were observed along 29% of the transects.A total of 4 % of the coral colonies observed were impacted.
8. Fossa et al. (2002) developed an estimate of 30-50% of the deep sea coral *Lophelia* reefs in Norway have been damaged by bottom trawling and that fishermen claim that catches are significantly lowered in areas where the reefs are damaged.
9. Koslow et al. (2001) sampled the benthic fauna of Tasmanian seamounts finding high abundance and diversity of hard and soft corals, hydroids, sponges, ophiuroids, and sea stars, a large fraction of which were new to science. This study also found that heavy trawling has completely removed the reef aggregations.
10. Wassenberg et al. (2002) documented direct removal of sponges caused by trawling, accompanied by long-term changes in species composition over time.
11. Ardizzone and Pelusi (1983) and Ardizzone et al. (2000) found bottom trawling to reduce the quality and quantity of Posidonia oceania beds, a biogenic habitat in the Mediterranean Sea.
12. Hall-Spencer and Moore (2000) found a 70% reduction in maerl thalli habitats, which have important ecological functions, with no recovery after four years.
13. Kaiser et al. (1996) conducted a multivariate analysis showing that both beam trawling and dredging reduce the abundance of most epifaunal species in the Irish Sea.

14. Kaiser et al. (2000a) found that chronic fishing has caused a shift from communities dominated by relatively sessile, emergent, high biomass species to communities dominated by infaunal, smaller-bodied fauna. Removal of emergent fauna has thus degraded the topographic complexity of seabed habitats in areas of high fishing effort. The authors note that communities within these areas currently may be in an alternative stable state.
15. Ault et al. (1997) found conspicuous long-term damage to sponges and soft corals after one pass of a trawl and that the sponge *Ircina felix* and corals of the genus *Pseudoplexaura* appeared to be the taxa most vulnerable to breakage or dislodgement by trawling.
16. Collie et al. (1996), Collie et al. (1997), and Collie et al. (2000) found conspicuously and significantly reduced abundance of colonial epifaunal species that provide complex habitat for shrimp, polychaetes, brittle stars, and small fish at sites disturbed by bottom fishing in Georges Bank, and found that many species whose abundances were reduced were also prey for commercial fish.
17. DeAlteris et al. (2000) discuss physical impacts and biological alterations in community structure caused by trawling in New England and recommended closure areas to reduce the impact of mobile fishing gear on habitat and biodiversity.
18. Magorrian (1995) found otter trawling to remove emergent epifauna and reduce the structural complexity of mussel beds in Strangford Lough, and recommended marine reserves as a management tool.
19. McAllister and Spiller (1994) found that trawling and dredging have major impacts on marine habitats by removing protruding invertebrate animal life including sea anemones, sponges, sea squirts, crinoids and many others which provide shelter and food sources for juvenile fish and shellfish. Specific trawling effects in the study included shearing off higher hummocks, filling in low spots, changing the configuration of the bottom, removing areas more exposed to or protected from the current, exposing shellfish, worms and other sediment dwelling species to predation, and stirring up clouds of mud and other sediment that plug gills and similar structures of filter feeders. The authors recommend closures, control areas, and conversions to less damaging gear types.
20. Norse and Watling (1999) state that trawling damages refuges from predation and feeding places for demersal fish, which are correlated with species diversity and post settlement survivorship of some commercial species.
21. Pitcher et al. (2000) found that total annual removal of benthic fauna ranged from very low to over 80% in areas of highest trawl intensity in Australia's Great Barrier Reef. They found that highly vulnerable populations of epifaunal species may be depleted by about 55% overall and there will be a substantial alteration in most trawled grids with a shift to less vulnerable species.
22. Reed (2002) in a study of deep water Oculina reefs along eastern Florida, noted extensive areas of Oculina rubble in part as the result of bottom fishing and major declines in commercial fish populations in the reefs from 1970-1990.
23. Rumohr et al. (1994) found reductions in abundance of epifauna and absence of inner structures (feeding burrows, living chambers, tubes) in areas impacted by trawling in the German Bight.
24. Bavestrello et al. (1997) found fishing damage to gorgonian corals in the Ligurian Sea, found slow recolonization and recovery rates for these corals, and recommended special protection for these corals as a Natural Marine Park.

25. Stone and Malecha (2003) state that "gardens of corals, sponges, and other sessile invertebrates" were similar in structural complexity to tropical coral reefs with which they shared several important characteristics including complex vertical relief and high taxonomic diversity. The authors note the particular sensitivity of these habitats to disturbance and observed anthropogenic disturbance to corals.
26. Wheeler et al. (2003) found broken coral rubble and dead coral in areas of higher trawl intensity, whereas untrawled areas had a much higher abundance of undisturbed upright coral colonies.
27. Van Santbrink and Bergman (1994) documented 70% mortality to anthozoans after two passes of a beam trawl in the southern North Sea.
28. The NMFS Alaska Fisheries Science Center website (NMFS 2004) shows several underwater video clips taken with a Remotely Operated Vehicle. Clip 9 shows heavily trawled coral habitat containing "broken-up coral debris in this area -- heavily damaged". (http://www.afsc.noaa.gov/race/media/videos/vids_habitat.htm)
29. Anderson et al. (2003) documented high levels of coral and sponge bycatch in the New Zealand orange roughy trawl fishery.
30. MacDonald et al. (1996) made several estimates of habitat sensitivities to physical disturbance, concluding that fragile, slow recruiting animals are the most susceptible to disturbance.
31. Van Santbrink and Bergman (1994) documented mortality rates of several benthic species as a result of two passes of a trawl.

Bottom trawling is the leading, most widespread cause of reduced habitat complexity that is taking place among major fishing grounds along the North American continental shelf. As trawl gear can crush, displace, expose and bury marine life on the sea floor, habitats that are trawled are far more likely to have reduced overall species diversity. Those organisms remaining after extensive periods of trawling tend to be "comprised of large numbers of a few opportunistic species" (Norse and Watling 1999). The study found that the extent of the disruption of a habitat's complexity is dependent upon how long the area has to recover between trawls, how extensive the damage is from the trawling gear, and whether the habitat is constituted primarily of quick-recovering short-lived species or of slow growing, long-lived species.

The National Research Council (2002) Report concludes that the impacts of trawling can lead to measurable changes in benthic habitats over time, with the greatest impact on those communities which are ecologically most complex. Extended trawling over the same habitat can lead to "a shift from communities dominated by species with relatively large adult body size towards dominance by high abundances of small-bodied organisms." More significantly, areas of intense trawling activities have the potential to be permanently affected and will lead to the emergence of short-lived organisms which are "readapted to conditions of frequent physical disturbance." (NRC 2002).

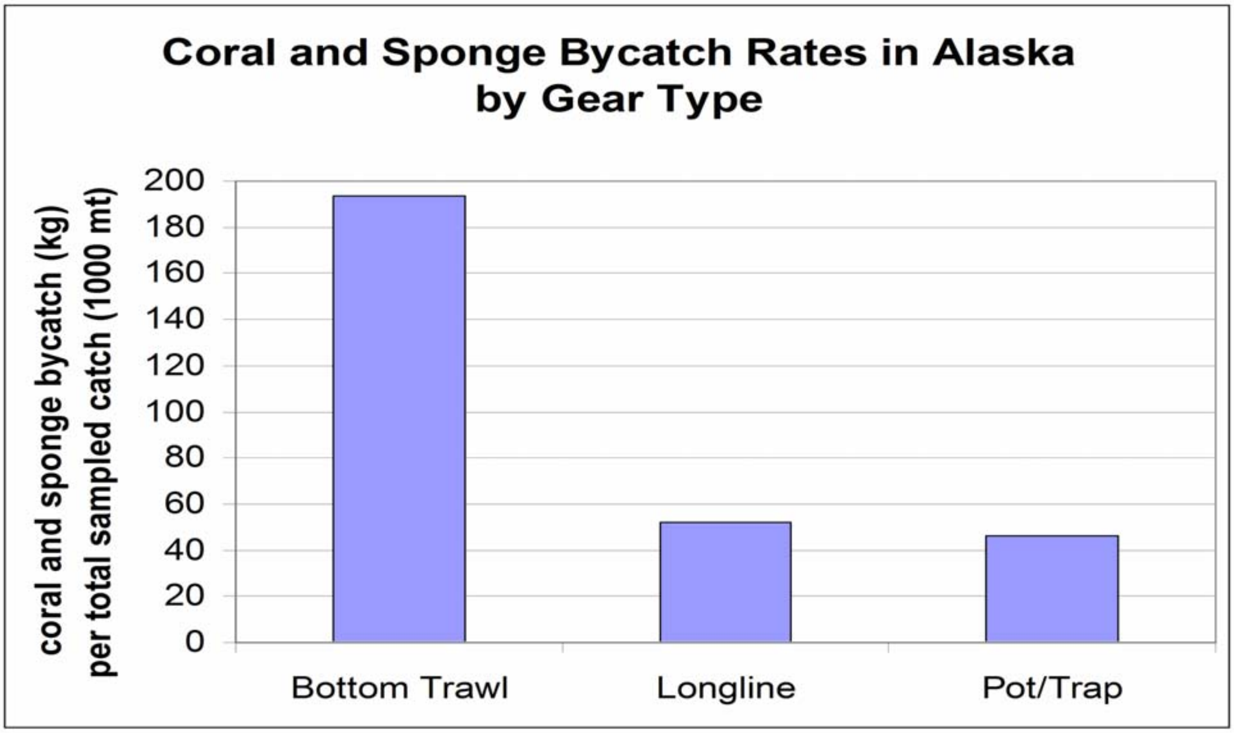

Figure 1: Bycatch rates for groundfish fishing gears in Alaska, based on data from 1990-2002. Bycatch rates are defined as the weight of reported bycatch divided by the weight of total sampled catch. These rates may not reflect actual damage to seafloor since fishing gears may not retain all corals and sponges that are impacted. However, they are useful for looking at relative impacts of different gears in a Benefit-Cost Analysis. Data source: NMFS (from Shester and Ayers 2005)

Bycatch of habitat-forming invertebrates constitutes direct evidence of adverse impacts of fishing to biogenic habitat (i.e. reduction in quality and quantity). The West Coast groundfish observer program (WCGOP) was established to obtain more precise estimates of fishery discards and total catch (NMFS 2003). For the same reasons that the data from the WCGOP improves the accuracy of catch estimates for overfished groundfish, observer data can and should be used to both evaluate the impacts of fishing on EFH and develop mitigation measures in the EFH EIS. In fact, a repeated criticism of the Alaska Region EFH DEIS by the Center for Independent Experts was that coral, sponge, and bryozoan bycatch from observer records were not analyzed, utilized, or incorporated (Drinkwater 2004).

Trawling will have the greatest impact upon marine flora and fauna that has adapted to exist in areas of low natural disturbance. Ecological disturbance theory suggests that the extent to which an organism within a habitat can recover from an anthropogenic disturbance (i.e. bottom trawling) is dependent upon the overall stability of the habitat prior to that disruption taking place. Organisms living in habitats that consist of easily dispersed sediments are far more likely to adapt more quickly to the new conditions following a trawl than would those organisms that normally do not experience extensive disruptions. Conversely, a habitat that consists of deep-water boulders or corals is far less likely to have extensive natural disruptions. Such “epifaunal communities that stabilize sediments, reef-forming species, or fauna in habitats that experience low rates of natural disturbance have been observed to be particularly vulnerable” to disruptive activities such as commercial bottom trawling (NRC 2002). This is especially important given that confluence of various advances in fishing technology – such as larger boats with more powerful engines, more robust mobile fishing gear and fish-finding technologies – has allowed fishers to seek out groundfish in areas, such as the deepwater slopes of the continental shelf, that just decades ago would have been impossible to reach.

These findings, taken together, indicate that the effects of highly-destructive fishing gears such as trawls will have a disproportionate impact upon structurally complex, interconnected ecosystems as found in shallow and deep-water coral habitats. These habitats which have grown over the period of several hundred years or more and exhibit a low capability to adapt to increased levels of disruption. That is, as trawling tends "to eliminate competitively dominant, long-lived but disturbance-sensitive structure-forming benthic species" and frees "up food and space for shorter-lived, disturbance-insensitive opportunistic (weedy) species" it represents a critical threat to corals, sponges, and other biogenic seafloor habitats that are clearly Essential Fish Habitat within the Pacific Fishery Management Region based on the best available science. (quotations from Watling and Norse 1999).

Adverse Fishing Impacts on the U.S. West Coast

This section outlines the rational basis for the determination that the adverse impacts of bottom trawling on U.S. West Coast Essential Fish Habitat are "more than minimal and not temporary".

The EFH Final Rule includes "site-specific or habitat-wide impacts" in its definition of adverse impacts on EFH. (50 CFR 600.810(1)). The Risk Assessment conducted in Appendix A of the EFH DEIS contains an analysis of the effects of fishing on Essential Fish Habitat. The main document includes the various data sources that were used in the analysis (p. 73-74). The strength of the model in its current form is that it provides generalized comparisons of different habitat types and fishing gears. Page 77 of the Appendix A main document states that

In terms of major habitats, biogenic habitats are more sensitive than hard bottoms (although we note that the former may occur on the latter) and these are much more sensitive than soft bottoms.

In terms of the major gear types, dredges are most impacting, followed by bottom trawls, and these are much more impacting than nets which are more impacting than pots & traps and hook & line (including longlines).

Therefore, consistent with the global literature, the model successfully identifies biogenic habitats and hard substrates as focus areas for mitigation measures and bottom trawls and dredges as the gear types with the greatest effect. Where the model stops short is in its estimation of actual impacts caused by the current groundfish management regime.

While the analysis overall has some merits, Appendix A of the EFH DEIS claims that there are two main limitations to current understanding of the impacts of fishing on habitat: 1) the relationship between fishing effort and habitat modification, and 2) the relationship between habitat modification and ecosystem productivity (including fish productivity). (Appendix A Risk

Assessment Main Document p.74). The document claims that "[p]resently there are very little data to fill either of these gaps". These "gaps" are used to justify the used of relative indices rather than actual numbers. These statements are simply unreasonable in a document that is intended to provide the public with a detailed understanding of the environmental impacts of federally authorized actions. Further, the reference to fish productivity unlawfully limits the inquiry and analyses:

"It is not appropriate to require definitive proof of a link between fishing impacts to EFH and reduced stock productivity before Councils can take action to minimize adverse fishing impacts to the extent practicable. Such a requirement would raise the threshold for action above that set by the Magnuson-Stevens Act."
67 Fed. Reg. 2343, 2345 (Jan. 17, 2002).

The EFH DEIS provides no justification that the two main limitations described in the Risk Assessment are valid nor does it provide a rationale for using relative indices rather than best estimates from the literature. On the contrary, there have been numerous studies providing direct quantifications of the relationship between trawl effort and habitat modification. Further, even were productivity an appropriate measure, there are also many methodologies in the literature that can be used to estimate the relationship between productivity and habitat features even in cases of high uncertainty.

Swallow (1990) presented a dynamic model for assessing the impacts of a renewable resource, fish, as a result of reductions in a non-renewable resource, habitat. The model result is that if habitat impacts are not considered in the coupled resource management system, the adverse impacts to habitat are systematically higher than the economic "optimal". This confirms the theoretical result that fish habitat damage externalities systematically increase the habitat damage above the optimal outcome, reducing the productivity of the renewable resource. Thus the failure to account for the externality causes a market failure. Due to the long recovery times of corals and sponges (approaching consideration as a "non-renewable resource", this model is appropriate and applicable to answer the question about fisheries productivity. Another example is provided in Mangel (2000), which developed a model based on Beverton-Holt and Ricker-like recruitment functions showing that loss of spawning habitat is equivalent to additional fishing mortality of the adult stock; or in other words, productivity loss.

Mangel's (2000) model indicates that there may be a lag time in habitat-mediated changes in fish productivity between when habitat damage occurs and fish productivity declines. This may occur based on demographic features of fish stocks, such as long life spans and/or lag times in the effects of density dependence on mortality. Mangel (2000: p 672) states that "…neither catch nor stock is a good indicator of what is happening to the habitat: the decline lags behind habitat destruction and the recovery lags behind habitat restoration. Habitat itself must be monitored." Mangel (2000) backs this statement through a mathematical model based on modern fishery models used in fishery management.

The use of indices rather than expected values is the fundamental flaw in the impacts model. When indices are used, impacts can only be determined relative to each other. While this may be a useful way to identify the most harmful activities, relative indices eliminate the ability to assess or evaluate the absolute impacts. While it is clear that there may be uncertainty with expected values, the data exists to provide numerical best estimates and standard deviations from available literature. In fact, the Alaska Region EFH DEIS contained an impacts model that compiled available information into "best estimates" of actual numerical figures based on literature on the impacts of trawling. While the ultimate conclusion in the Alaska EFH EIS was based on an unlawful definition and interpretation of the mitigation threshold, the model remains instructive. For example, Table B.2-4 in the Alaska EFH DEIS contains estimates of habitat sensitivity to each gear type as a percentage of the habitat in the affected area that is damaged with each unit of fishing effort. This clearly shows that it is not necessary to convert to an arbitrary relative scale of 0-3, as was done in the Pacific Region EFH DEIS. In particular, the use of a percentage in the Alaska model specifically allowed the analysts to develop absolute quantitative estimates of the loss of each habitat type as a result of current patterns of fishing effort, and eliminated the need to introduce an arbitrarily-defined "k-value" to estimate absolute impacts. This was precisely the problem pointed out by the PFMC Scientific and Statistical Committee which prevented the Pacific Region EFH DEIS impacts model. It is unclear why best estimates of percentages were not used in the Pacific Region model, when they were used successfully in the Alaska model based on the same literature.

In addition, another example of a quantitative model for incorporating sensitivity and recovery times is presented in DeAlteris et al. (1999). This study was aimed specifically at developing a methodology to identifying adverse impacts to EFH that are more than minimal and temporary and was not considered in the EFH DEIS. MacDonald et al. (1996) developed sensitivity indices for different benthic habitat types, and found that fragile, slow recruiting animals are most susceptible to fishing disturbance. Another study to add to the information on sponge sensitivity is Heifetz et al. (2003), which documented 50% damage to sponges in Eastern GOA one year after a trawl pass.

Furthermore, the EFH DEIS Risk Assessment (Appendix A) identifies category 3 Sensitivity Index score to be:

Major changes in bottom structure, such as re-arranged boulders; large losses of many organisms with differences between impact and control sites greater than 50% in most measured metrics.

Based on this statement alone, it would be unreasonable to claim that the "major changes" caused by gears that have a Sensitivity Score of 3 could be considered minimal.

Recovery rates for habitat types are the most important parameters to consider when determining whether known losses of habitats are "minimal and temporary". The Recovery Index used in the EFH DEIS omits several key studies and published information on the recovery of corals and sponges. The table on Page 16 in Appendix A-10 indicates the estimated recovery time for slope corals is "7.0+" years based on a study that showed no evidence of recovery for corals damaged by trawling in the Gulf of Alaska. However, it is clear that corals and sponges have growth rates on the order of millimeters per year, living to be hundreds of years old. In its Effects of Fishing model, the Alaska EFH DEIS used 100 years as its central estimate of the recovery time of hard corals (low estimate = 50 yrs; high estimate = 200 yrs) (Alaska Region EFH DEIS, 2004, Appendix B, Table B.2-5). In addition, the following studies justify a much higher estimate of coral and sponge recovery times (hence slower growth rates) than was presented in the Recovery Index, both on the continental slope and shelf.

1. Andrews et al. (2003) found growth rates of 1.74 cm/yr for Primnoa, 1 cm/yr for Corallium, and ages of 30 to over 200 years for deep-sea coral species of Davidson Seamount.
2. Cordes et al. (2001) found ages of 25-30 years for the deep sea coral *Anthomastus ritteri* in California's Monterey Bay, noting that the results agree with the general notion that growth rates are reduced and longevity increased in deep-sea species.
3. Roark et al. (2003) sampled corals from Hawaii and the Gulf of Alaska and dated a living *Gerardia* sp. to be 2700 years old and a black coral to be 2200 yrs old, using radiocarbon dating techniques.
4. Leys and Lauzon (1998) found large deep water Hexactinellid sponges to be 220 years old with average growth rates of 1.98 cm/year.
5. Probert et al. (1997) found recovery times greater than 100 years for deep sea corals.
6. Jones (1992) review of trawl impact literature revealed that recovery time for deep sea benthos with little natural disturbance is on the scale of decades.
7. Koslow et al. (2000) discusses the higher longevity and vulnerability of deepwater ecosystems to trawling, particularly on seamounts, which are known to have benthic fauna (i.e. corals) with high levels of endemism.
8. Risk et al. (2002) found ages of over 300 years for *Primnoa resedaeformis.*
9. Heikoop et al. (2002) found deep sea corals (*Primnoa*) in Alaska and elsewhere have lifespans of several centuries. The authors describe the potential of these corals to contain extended records of surface productivity, deep ocean temperature and chemistry of value to climatologists and fisheries managers.
10. Reed (2002) in a study of deep water Oculina reefs along eastern Florida, noted extensive areas of Oculina rubble in part as the result of bottom fishing and major declines in commercial fish populations in the reefs from 1970-1990. Coral growth rates averaged 16.1 mm/yr.

In addition, use of estimated ages of biogenic habitats as their recovery time is likely to be a significant underestimate of actual recovery because it omits the time necessary for recolonization. Specifically, if corals and sponges take a long time to settle and begin growth in damaged areas, overall recovery is much longer. Evidence for long recolonization times is presented in Koenig et al. (2003), which found no evidence of recolonization of Oculina deep sea corals into denuded areas and offered two explanations: continued trawling and the rubble areas do not provide suitable substrate for planular settlement of coral larvae. Additionally, the Krieger (2002) study cited in the EFH DEIS found no evidence for recolonization of corals seven years after trawling.

It is unclear why the recovery index distinguishes between gear types in its estimates of habitat recovery. Recovery should be based on the estimated time it takes for a fully damaged habitat to return to a pre-impacted state, independent from the source of damage. The differences between gears should be limited to the sensitivity of each habitat type to each unit of effort with different gear types. For example, whether a deep sea coral was removed by a bottom trawl or a researcher, the growth rate of each corals is the same. Furthermore, since age does not include recolonization time between impact and settlement of new biogenic structures, all recovery times used in the EFH DEIS that were derived from literature on ages are systematically underestimated.

It is also unfortunate that the Risk Assessment was not able to utilize the extensive trawl logbook data for the U.S. West Coast showing thousands of start and end points for recent years of trawl effort.

However, a simple calculation of habitat sensitivity and trawl effort illustrates that by any measure in the Pacific groundfish fishery, the more than minimal and not temporary threshold has been crossed. The following example represents a thought experiment to demonstrate the severity of habitat impacts using parameters from the Risk Assessment and scientific literature. The Risk Assessment states that the sensitivity of corals and sponges to one unit of bottom trawl effort is Sensitivity Level 3.0, which is defined on p. 75 to be a 50-100% loss of habitat-forming organisms. If we use the low value of 50%, this means that each area loses half of its habitat features every time it is trawled. Let's say an area containing corals is trawled once per year. This means in five years, the amount of available habitat will be reduced by $(0.50)^5$, which equals 3.1% of the original habitat. Even if we add in a rate of 1% recovery each year (which is equal to saying the recovery time for corals is 100 years), there is still only 5.1%. An optimistic (best case scenario), dynamic equation for this would be:

$$H_{t+1} = 0.5H_t + 0.01H_0, \qquad (1)$$

where H_0 is the initial amount of habitat and H_t is the amount of habitat after t years.

Note that this model contains a highly optimistic assumption that habitat recovers at a fixed rate regardless of how much is remaining. This ignores any potential delays in habitat recovery from recolonization, Allee effects, or ecological succession.

The following graph (Figure 2) shows 5 example trajectories of available habitat remaining in an area subject to one pass of a trawl per year and assuming a Sensitivity Rate of 50%. The first case, shown in pink is the trajectory for a habitat that does not recover from damage. The second case is shown in red (triangles) is the trajectory for a habitat with a recovery time of 100 years (1% recovery per year). If trawling stops at the end of year 4 due to a trawl closure, the habitat ceases to decrease and begins a slow trajectory toward total recovery (shown in green circles). For a case where habitat recovers in 10 years, the habitat is lost at a slower rate because it is compensated by recovery (shown in orange diamonds). If trawling continues, the habitat remaining at equilibrium is 20%. However, with a trawl closure enacted at the end of year 4, the habitat with a 10 year recovery time nears full recovery at year 14 (shown in blue squares).

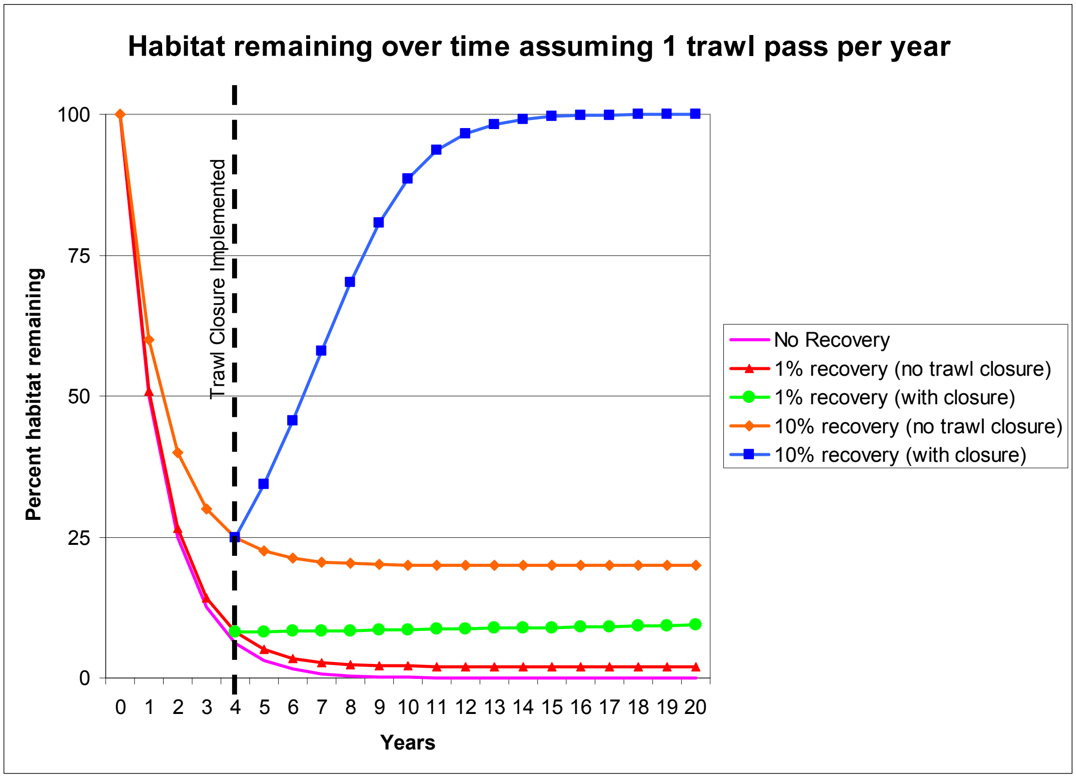

Figure 2: Results of hypothetical habitat damage model using actual parameters from the EFH DEIS and scientific literature on recovery rates. (Refer to text for further discussion).

For the case of many deep sea corals found off the U.S. West Coast, the recovery time is at least 100 years (see citations earlier in this Section). This recovery time (100 years) was used in the Alaska Region EFH DEIS "Effects of Fishing" habitat loss model. Using this estimate, all coral and sponge habitats where trawling occurs at least once per year with a 50% impact per pass, there will be less than 5% of this habitat type remaining after 5 years. (This is precisely the reason why the Alaska Region EFH DEIS showed long-term losses of corals on the order of 50-100% in all areas containing trawl effort. There is no reasonable way to justify that a 95% loss of corals and sponges at any specific biogenic habitat site is minimal (recall the EFH Final Rule's reference to "site-specific" adverse impacts and the CIE Report (Drinkwater 2004) reference to "localized impacts to corals and sponges"). Nor could any reasonable person justify that a 100 year recovery time is temporary from the standpoint of a fishery. Since there are many known areas of corals and sponges that are repeatedly trawled (i.e. observer bycatch data from WCGOP and overlay of trawl tracks on known records of corals and sponges documented in trawl surveys), these habitat features have been substantially reduced in both quantity and quality for the long-term. Therefore, it is clear based on the Sensitivity Level of >50% presented in the EFH DEIS for bottom trawling on corals and sponge and based on the published recovery times over 100 years that adverse impacts to biogenic coral and sponge habitats by bottom trawling authorized under the current Fishery Management Plan are occurring in a manner that is more than minimal and not temporary. This conclusion triggers the legal requirement to minimize adverse impacts of bottom trawling to the extent practicable.

The results of this simple thought experiment indicate that the first few passes of a trawl account for the biggest fraction of the total damage to habitats with long recovery times. The EFH DEIS (Ch.3, p. 3-16) confirms this result in its statement that:

Corals, anemones, sponges, sea pens, and sea whips are a highly sensitive habitat that may be substantially modified with relatively little fishing effort (NRC 2002). It may be that initial contact (i.e., the first time gear is deployed) is the most important due to the high sensitivity of the habitat to impact.

Therefore, even a single pass of a bottom trawl in sensitive habitat areas constitutes adverse habitat impacts that are more than minimal. This suggests that the most effective trawl closures are located in areas that are lightly-trawled or have not yet been trawled. Therefore, the best available scientific understanding of biogenic habitat sensitivity and recovery provides strong justification for closing all areas outside the trawl footprint.

Additional considerations beyond the EFH legal mandate

This section discusses the current state of scientific theories regarding the linkage between marine habitat and fisheries productivity and is simply designed to illustrate the potential effects of the adverse impacts described in the previous section. It is not intended to imply that productivity should be a consideration in the determination of adverse impacts. In fact, the linkage between EFH and commercial fish productivity is irrelevant from the standpoint of the law (see 67 Fed. Reg. at 2354), and from a factual standpoint, since corals and sponges constitute a component of EFH and we are nowhere near EFH Information Level 4 for these habitats and most others. However, the potential effects of habitat loss on fish productivity may be useful to consider.

Several ways to conceptualize this linkage are presented in the scientific literature. Many studies assume a one-to-one linear relationship between habitat availability and fish production (i.e. Naylor and Drew 1998; Costanza et al. 1997). Under this logic, a loss of 95% of habitat would result in a 95% loss in production. Another way to consider the issue is to assume that the habitat type only accounts for a certain proportion of the productivity of a fishery, say 20% as an arbitrary example. Under this logic, the damage to habitat would result in a loss of 19% of the landings produced in the trawled area (assuming all other habitat features are not impacted by trawling). Whether this would be considered "minimal" is an open question, but it suggests that management measures to mitigate the loss of coral and sponge habitat would pass a simple Benefit-Cost test from the fishermen's point of view as long as they represent less than a 19% economic loss to the trawl fleet due to increased fishing cost. While this is a simplified example, it represents the basic logic justifying habitat protection measures in a fisheries management regime that aims to maximize the value of the fisheries harvest.

The basic theory underlying the need to protect habitat from the perspective of the fishermen is that habitat damage may reduce the productivity of fish that are associated with the habitat. One way to illustrate this effect is to consider a basic Schaefer logistic growth equation:

dN/dt = rN(1-N/K) (2)

where dN/dt is the production, r is the intrinsic rate of increase, N is the stock size, and K is the carrying capacity. Most fishery models view the r and K parameters as exogenous, determined by environmental factors. However, if habitat damage caused by fishing reduces r or K, the overall production decreases for any given stock size. Figure 3 shows potential effects of harvest with a destructive gear on the logistic production of a fishery, where the the amount of fishing effort (or harvest) reduces K by (represented by different production functions at equilibrium). The basic effect is that fishing effort increases (destroying more habitat) the entire productivity curve becomes smaller, particularly the apex of the curve, which is the maximum sustainable yield (MSY). Depending on the degree to which the fishing gear destroys habitat (determined by Sensitivity and Recovery Rates), this framework suggests that there can be quite significant reductions in MSY as the result of destructive fishing. This demonstrates the general result that reducing habitat impacts of fishing leads to an increased fishery yields and/or prevents further decreases in productivity.

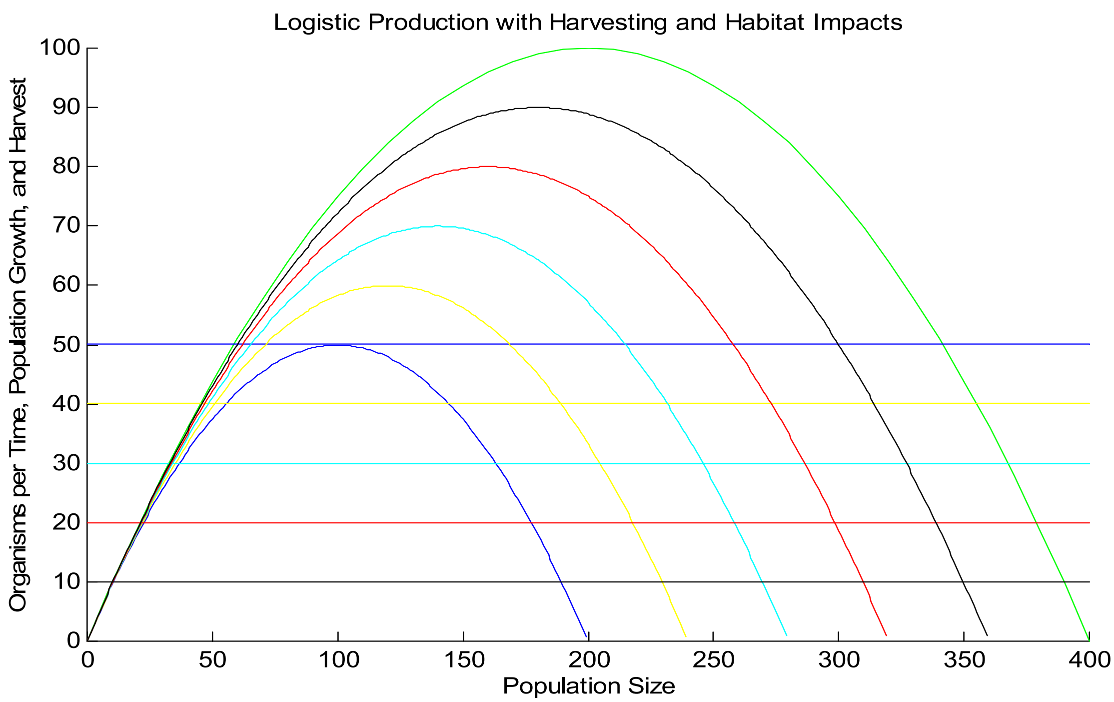

Figure 3. Effect of harvest on the logistic production function for the case where carrying capacity, K, is reduced by 4 times the level of harvest. Harvest rates (horizontal) correspond to production functions of the same color. The unfished carrying capacity is 400 with an potential MSY of 100 (green), while a harvest rate of 50 decreases the carrying capacity to 200 with an actual MSY of 50 (blue).

The time of managing fish stocks on a single-species basis without regard to their habitat is over. The inclusion of Essential Fish Habitat measures of the Sustainable Fisheries Act are a major step toward ecosystem-based fishery management. We now know that fish habitat is an essential driving force behind the production of commercial fish and maintenance of healthy ecosystems.

The "natural capital stock" of biogenic habitat must be managed explicitly. The Pacific Fishery Management Council has jurisdiction over which habitat areas are subjected to trawl impacts. From the standpoint of the Magnuson-Stevens Act and common sense, the Pacific Fishery Management Council must implement regulations that mitigate the adverse impacts of bottom trawling on Essential Fish Habitat in its final decision on this Environmental Impact Statement.

Mitigation Measures to Minimize Adverse Impacts to the Extent Practicable

The Sustainable Fisheries Act requires that if fishing activities are causing adverse impacts to EFH, Councils and NMFS must enact mitigation measures to minimize those adverse impacts to the extent practicable. It is clear from the above discussion that the adverse impacts of fishing on U.S. West Coast EFH are more than minimal and not temporary. Therefore, mitigation measures are required by law.

The US Commission on Ocean Policy, the PEW Oceans Commission, and many other scientists and administrative bodies have recognized the need to protect both the fish and the ecosystem in which the fish thrive. Current fishery management tools have largely focused on fishery conservation in its narrowest sense: avoid overfishing a species or a group of species. Gradually, the need to protect the fish *and* their associated habitat is being recognized. This need is imperative in Pacific Coast Groundfish management, given the legal mandate to minimize adverse impacts to the extent practicable.

As discussed in the Pew Oceans Commission Final Report, the goods and services from coastal and marine ecosystems, especially corals, sponges, and other biogenic habitats that are commonly damaged by benthic fishing gears are difficult, if not impossible, to replace. This suggests that if we destroy our nation's healthy ecosystems, we may well risk economic and social stability. In other words, there are costs associated with habitat destruction that go beyond the financial displacement of bottom trawlers, and eco-values beyond single species money fish. The value of a healthy ecosystem far outweighs the short-term economic gains of destructive bottom trawling.

Externalities in the Pacific Groundfish Trawl Fishery

An "externality" is generally defined as:

"An effect of one economic agent's actions on another, such that one agent's decisions make another better or worse off by changing their utility or cost. Beneficial effects are positive externalities; harmful ones are negative externalities."

(www-personal.umich.edu/~alandear/glossary/e.html)

Externalities are important in natural resource policy analysis because they cause market failures, justify policy intervention into markets, and suggest appropriate types of policy tools to correct market failures. Fish stocks and ocean habitats are subject to four distinct externalities from Pacific coast groundfish bottom trawl fisheries, largely as a result of their status as public goods. The first type is the ***stock externality***, which is the effect of an individual vessel's fish removals on the catch per unit effort of the rest of the fleet. This negative externality arises because the lower the stock size, the more effort is required to obtain a specific amount of catch. If this externality is not regulated, overfishing will occur in any circumstance where the cost of fishing is low enough. The market failure caused by this externality can be corrected with policy instruments that limit catch, including trip limits and total allowable catch quotas, many of which are already in place as a result of PFMC management. However, due to the uncertainty of fisheries stock assessments and enforcement capabilities, the effectiveness of these limits on target species catch depends on the degree to which fishery managers are precautionary in their quota decisions. The current Pacific groundfish fishery management plan uses catch limits and quotas to limit this catch. However, overfishing has occurred for nine Pacific groundfish species and current plans for stock rebuilding are on the order of several decades, so it is doubtful that the stock externality has been fully corrected.

The second type of externality is the ***habitat externality***. This negative externality occurs when the habitat impacts of harvesting fish affect the intrinsic growth rate and/or the carrying capacity of a fish stock. In the case of trawling, this may occur in several ways. Trawling is known to reduce the structural complexity of seafloor habitats, which in turn reduces the shelters from predation for juvenile groundfish. Less shelter from predation leads to higher mortality rates for young life stages with the overall effect of reducing the intrinsic rate of growth. Furthermore, if vulnerable habitats such as sponges, kelp, deep sea corals, or other biogenic substrates support higher densities of adult fish then if they are damaged or removed, the carrying capacity of the fish stock will be reduced by the act of harvesting fish with destructive gear. Decreases in the carrying capacity and growth rate reduce both the maximum sustainable yield and the maximum economic yield proportionally. In a legal context, this externality reflects the reduction in fish habitat that is “necessary” or “essential” to “support a population adequate to maintain a sustainable fishery” (EFH Final Rule (50 CFR Part 600)).

Since the costs of such destructive activity are dispersed throughout the entire fleet, this externality prevents an incentive to reduce the damage. Conversely, if one fisherman reduced his rate of habitat damage, the benefit would be distributed throughout the entire fishery. This externality is inherently a “collective action problem” as described in Hardin’s *Tragedy of the Commons* (1968), which to be corrected requires all vessels to collectively reduce their habitat damage rates. The most effective policy instruments available to reduce the habitat damage rates for the Pacific groundfish trawl fishery include permanent area closures and gear conversions which are the cornerstone mitigation measures of Alternative C.12.

The third externality in a destructive fishery is the ***ecosystem externality***, which results from reductions in the quality and/or quantity of habitat sufficient to support a healthy ecosystem. The consideration of this effect is mandated by the EFH Final Rule. This negative externality encompasses the various social and non-use costs of habitat damage. In practice, social costs may be expensive to quantify, but include reductions in existence value, biodiversity value, passive use value, option value, bequest value, scientific value, historical value, intrinsic value, or the value of the ecological services provided (other than the production of the target fishery). Brief descriptions and definitions of some of costs are provided in the EFH DEIS (Section 3.10.2 entitled “Non-Consumptive Non-Use Values”). Unfortunately, however, the EFH DEIS made no attempt to quantify these costs. However, these costs of habitat damage are real and evidenced in part by the tens of thousands of public comments that NMFS and the PFMC have received on this EFH DEIS.

The fourth externality in a destructive fishery is the ***technology externality***. This is a positive externality associated with the appropriability of innovations or technological improvements that reduce the damage rate of a fishery. The fact that this is a positive externality means that the a market failure is occurring because the current system does not sufficiently encourage technological improvements to reduce the impacts of bottom trawling. These technological innovations include developing new low cost gear types that catch fish without destroying habitat. The externality arises because the costs of technological innovation are born by an individual fisherman, but the benefits of the innovation are enjoyed by the entire fishing fleet. Therefore, the market failure is that there will be less technological innovation to reduce habitat impacts than there would be at the optimum for the fleet as a whole. Since this is a distinct externality from the habitat damage (negative) externality described above, the technology externality requires a distinct set of policy instruments to increase expenditures on technological innovation to economically efficient levels. The bottom line is that we need the motivation and incentive to develop ways to catch fish without destroying the habitat the fish depend on for survival.

These four externalities each lead to systematic biases preventing fishing activity from reaching its privately and socially optimal outcomes. Correcting these market failures in the Pacific groundfish fishery requires policy intervention to address each externality (see Table 1).

Table 1: Externalities addressed by the management tools proposed in Alternative C.12.

Management Measures	Externalities			
	Stock	Habitat	Ecosystem	Technology
Catch limits	X			
Area closures (incl. freezing trawl footprint)		X	X	
Gear conversions and restrictions		X	X	X
Research and Monitoring				X

As the table indicates, no single management tool can address all four externalities, suggesting the need for a combination of management tools. While the table shows which externalities can be addressed with each tool, the extent to which each tool fully corrects each externality depends on its specific application. The purpose of the table is to show how the proposed mitigation measures address the externalities that create a market failure of excessive habitat destruction.

One general rule in environmental policy development is that when designed properly, a combination of multiple policy instruments is a more cost-effective way to address the market failures associated with multiple externalities than any one management measure alone. On the U.S. West Coast, there are four distinct externalities with regard to EFH. By addressing these externalities on multiple fronts, the Comprehensive Alternative is the most cost-effective, precautionary, and practicable alternative that sufficiently mitigates the adverse impacts of fishing on EFH as required by the Sustainable Fisheries Act.

The Economic and Ecological Benefits of Bottom Trawl Closures

There has been substantially more effort focused on the potential costs of the trawl closures proposed in Alternative C.12 (and in fact all mitigation alternatives) than on its potential benefits. However, when making important decisions affecting the future of U.S. West Coast fisheries, it is essential that attention be focused on using the best available information to understand not only the short and long term fisheries benefits of protecting habitat, but also the long-term ecological costs of failing to do so. With regard to the former, several major scientific efforts have quantified the benefits of previous area closures. The EFH EIS should include a review of these studies to provide the public with a more complete understanding of the current state of knowledge on expected benefits of bottom trawl closures. With regard to the latter, any analysis of practicability must include a discussion of the long-term ecological costs and benefits of habitat protection.

The EFH EIS should include a discussion and estimation of avoided costs. Several studies found reductions in commercial fish populations as a result of habitat damage caused by trawling and/or increased landings in areas with un-impacted coral and sponge habitats (i.e. Reed 2002; Rellini et al. 2000; Rothchild 1994; Sainsbury et al. 1993; Thrush and Dayton 2002; Vassilopoulou and Papaconstantinou 2000; Husebo et al. 2002; Bradstock & Gordon 1983). These studies corroborate the hypothesis that biogenic habitats act as a component of "natural capital" that produces fish. The economic loss of a capital stock of habitat is calculated using the discounted present value of all future fish production that will no longer occur when the habitat is not available. Since the recovery rates of biogenic habitats in particular are so slow, the present value of all future losses can be quite significant. Therefore, the benefits of avoiding the loss of the habitat stock are the exact converse of the costs of the lost productivity if the habitat is lost. As such, benefits of habitat protection can be calculated by the avoided cost of habitat damage. Rudd et al. (2003) states that "Fully accounting for the value of ecological services flowing from marine reserves requires consideration of increased size and abundance of focal species within reserve boundaries, emigration of target species from reserves to adjacent fishing grounds, changes in ecological resilience, and behavioral responses of fishers to spatially explicit closures."

Second, there are several models available to estimate these avoided costs in the scientific literature. Specifically, Rodwell et al. (2003) developed a model whose results indicate that habitat protection in reserves can underpin fish productivity and, depending on its effects on fish movements, augment catches. The authors state that "Marine reserves increase total fish biomass directly by providing refuge from exploitation and indirectly by improving fish habitat in the reserve". Although Revised Alternative C.12 does not propose marine reserves, this type of model could and should be used to evaluate the effects of management measures. Conover et al. (2000) discusses the potential benefits of marine reserves including protecting critical habitats that have been depleted, conserving marine biodiversity, and enhancing the harvest of stocks outside the reserve. Soh et al. (2001) used GIS analysis and found that marine reserves can greatly protect shortraker and rougheye rockfish populations from habitat impacts, discards, and serial overfishing of substocks without reducing catch levels. White et al. (2000) showed that the costs of a marine reserve for tropical coral protection were greatly outweighed by the benefits from higher catches. Koslow et al. (2001) found that heavy trawling has completely removed the deep sea coral and sponge aggregations and that benthic biomass was 106% greater and species richness was 46% greater on unfished seamounts than fished seamounts. Wheeler et al. (2003) found broken coral rubble and dead coral in areas of higher trawl intensity, whereas untrawled areas had a much higher abundance of undisturbed upright coral colonies. The authors state that even small coral thickets provide "cover" for fish and that destructive removal of this cover may have major implications for local fish stocks and coral associated biodiversity. The authors recommend using the precautionary principle by implementing fisheries technical measures to prevent further damage to coral until more is known about the relationship between fish and corals.

In particular, a great deal of literature has attempted to quantify the economic value of the fishery production services provided by tropical mangrove habitats. While this specific habitat type does not occur on the U.S. West Coast, the valuation techniques provided by these studies are directly relevant to the valuation of all fish habitat types. The most common technique found in this literature is to identify all fisheries directly or indirectly associated with mangrove habitat and attribute the entire ex-vessel values of each fishery to the associated habitat (Naylor and Drew 1998, Ruitebeck 1988, Christensen 1982, Hamilton & Snedaker 1984, Gren & Soderqvist 1994, Ronnback 1999, Sathirathai & Barbier 2001, Ruitenbeck 1988; Costanza et al. 1997; Swallow 1990). For example, Naylor and Drew (1998) assumed one-to-one habitat fishery linkages for surgeonfish, rudderfish, jacks, parrotfish, grouper, squirrelfish, snapper, rabbitfish, mullet, emperorfish, goatfish, and octopus, based identifying either direct reliance of these fish species on mangroves for food, reproduction, or protection or indirect reliance on mangroves for nutrient supplies that flow into the near-shore zone. These studies establish the precedent that until higher levels of habitat-fishery linkages are known (i.e. EFH Level 4), the EFH EIS should assume a one-to-one relationship between fish productivity and associated habitats.

Adaptive Management and the Future of Pacific Coast EFH Protections

The Revised Alternative C.12 lays the groundwork for future improvements to the management of Essential Fish Habitat off the U.S. West Coast for generations to come. The following section discusses potential options and policy directions that NMFS and the PFMC will have the opportunity to take in the future as a result of implementing Alternative C.12 through the current EFH EIS process. The statements made in this section are not to be interpreted as additional components of Alternative C.12 for consideration in the current EFH EIS process, but rather as a long-term vision of the possibilities for future ecosystem-based fishery management actions that may be taken subsequent to the implementation of Alternative C.12.

Incentives to Minimize Trawl Impacts in Remaining Open Areas

With the proper incentives, fishermen can control many factors that determine the degree to which their activities impact the seafloor. The additional monitoring required as part of Alternative C.12 will provide baseline data with a tremendous potential to evaluate individual performance and enact performance standards to achieve additional conservation incentives in the Groundfish Fishery Management Plan. The placement (physical location) of trawl set locations and the degree of impact on the seafloor are largely at the discretion of individual vessel captains. The various factors that play into this decision may include the likelihood of catching valuable target species and the likelihood that they will damage fishing gear. While some seafloor types cause major damage to trawl nets, such as large, sharp boulders, there is little evidence that biogenic habitat types such as living substrates damage trawl gear. Therefore, there exists no immediate incentive to avoid such habitats in the pursuit of fish, particularly if there are higher abundances of fish in these areas.

In addition to technology-based standards, such as gear restrictions, there are ways to create disincentives to fish in ways that cause damage to ocean habitats. By establishing performance standards that either mandate or reward more desirable fishing behavior, fishery managers can leave it to the experts, the fishermen, to determine the locations and gear types with which they fish. The benefit of such performance standards are that they give fishermen more flexibility in terms of the manner through which they meet a given conservation objective, and therefore, fishermen can determine for themselves the most cost-effective way of doing so. The disadvantage, conversely, is that performance standards generally cost more to monitor and enforce than command and control regulations such as gear restrictions.

One example of a performance standard that would create a disincentive to destroy vulnerable habitat features is a hard limit on habitat bycatch. Since trawl nets will retain a portion of structural living habitats, such as sponges, bryozoans, anemones, corals, and tunicates, the bycatch of these invertebrates can be used as an indicator of damage to vulnerable seafloor habitat. The limitation of these indicators is that they represent a limited set of habitat types and may not reflect structural damage to physical substrates such as rocks, boulders, sand, and the many small invertebrates that are too small to be retained in the net. Moreover, there have been few studies examining how much actual damage to seafloor invertebrates by bottom trawling is reflected in bycatch samples. However, structural invertebrate bycatch has the benefit of showing actual damage to the seafloor and may be a more direct indicator of damage than other approaches, such as effects of fishing models that assume homogenous distribution of habitat types.

Such bycatch limits should provide opportunities for fishermen, scientists and stakeholders to provide their input concerning setting appropriate bycatch limits, altering bycatch limits over time, whether to apply bycatch caps by fleet, sector, or individual vessel, the appropriate spatial scale at which to apply bycatch caps, consequences of exceeding bycatch caps, and rewards for avoiding bycatch. Table 2 (below at the end of this section) provides an example framework of decision points that could be considered in a future process to establish and implement habitat bycatch limits.

Conversely, rewarding "clean" fishing can provide a positive, and potentially profitable, incentive for habitat conservation. Such rewards must be based on accurate information about the performance of fishing vessels, which is precisely the rationale for enacting the monitoring regime described as part of Revised Alternative C.12.

Another idea for the future that may be considered after the implementation of the current EFH EIS is the concept of Spatially-Explicit Dedicated Access Privileges (SEDAPs). SEDAPs could be tradeable ***area-specific*** permits allocated to specific permit holders granting an exclusive privilege of a specified amount of annual trawl effort in a specified area. This SEDAP approach would be combined with effort reduction (buyout) and could include gear transfer considerations.

Potential Future Uses of VMS Data to Protect Essential Fish Habitat

In addition to providing monitoring of compliance, VMS data will also provide significant data to develop adaptive management measures in the future. VMS is a powerful tool that provides many additional management options to reduce habitat impacts. Once they are in place, fishery managers can better understand how fish habitats are being affected and can develop performance standards that create incentives to reduce the overall footprint of each trawl vessel. Habitat impact monitoring can be used to identify areas where bycatch rates are highest within areas that remain open. Additionally, they may also reveal more spatially explicit information on which areas have higher and lower relative effort. These data may be used to develop additional closed areas based on areas of higher bycatch rates and/or areas that are outside the future footprint of the bottom trawl fishery. As enforcement and monitoring capabilities improve with technological innovations, the scale of management, or the size of the grid blocks, should decrease so that management can take place at a resolution that better fits the patchiness of the seafloor habitat types and the spatial resolution of fishing effort.

Conclusion

In summary, these comments have outlined the clear evidence that Essential Fish Habitat on the U.S. West Coast is being adversely impacted by bottom trawling in a manner that is more than minimal and not temporary. Ecosystem-based fishery management and the Sustainable Fisheries Act demand that Essential Fish Habitat be explicitly managed and protected. The Revised Alternative C.12 is a compilation of over three years of an iterative, constructive process to develop a practicable and precautionary habitat management regime that meets the standards of the law. Oceana has gone to great lengths to conduct extensive literature reviews and obtain the highest quality data to develop a comprehensive policy solution. Revised Alternative C.12 is explicit regarding its use of the best available data given the uncertainties and most up-to-date understanding of this complex interdisciplinary challenge. Ideally, the selection and implementation of Revised Alternative C.12 will broaden the management scope of the Pacific Fishery Management Council to explicitly include considerations of Essential Fish Habitat in the overall ecosystem-based management of U.S. West Coast Groundfish Fisheries.

Oceana's Comprehensive Alternative has survived the scrutiny of the Council's Scientific and Statistical Committee, rigorous analysis by the state fishery management agencies, and has continually been improved as the direct result of constructive feedback from fishermen, fishery managers, scientists, and conservation interests. In implementing the Comprehensive Alternative, NMFS and the Council can rest assured that the Alternative offers substantial protection to known seafloor habitats that are vulnerable to bottom trawl fishing gear. In fact, based on the strong scientific evidence presented in these comments, protecting these areas will maintain and enhance the productivity of U.S. West Coast fisheries and the health of our ocean ecosystems. At the same time, Revised Alternative C.12 legitimates the economic needs of coastal communities and has been significantly refined based on comments from the SSC and trawl fishermen to improve its practicability. Revised Alternative C.12 shows that we can indeed conduct healthy, sustainable fisheries while adequately protecting the very habitats and ecosystems that are responsible for the high productivity and biodiversity of U.S. West Coast marine environments. Please adopt the Revised Alternative C.12 presented in these comments as the Preferred EFH Mitigation Alternative in the EFH Final EIS.

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Scientists' Statement on Protecting the World's Deep-sea Coral and Sponge Ecosystems

As marine scientists and conservation biologists, we are profoundly concerned that human activities, particularly bottom trawling, are causing unprecedented damage to the deep-sea coral and sponge communities on continental plateaus and slopes, and on seamounts and mid-ocean ridges.

Shallow-water coral reefs are sometimes called "the rainforests of the sea" for their extraordinary biological diversity, perhaps the highest anywhere on Earth. However, until quite recently, few people - even marine scientists - knew that the majority of coral species live in colder, darker depths, or that some of these form coral reefs and forests similar to those of shallow waters in appearance, species richness and importance to fisheries. Lophelia coral reefs in cold waters of the Northeast Atlantic have over 1,300 species of invertebrates, and over 850 species of macro- and megafauna were recently found on seamounts in the Tasman and Coral Seas, as many as in a shallow-water coral reef. Because seamounts are essentially undersea islands, many seamount species are endemics - species that occur nowhere else - and are therefore exceptionally vulnerable to extinction. Moreover, marine scientists have observed large numbers of commercially important but increasingly uncommon groupers and redfish among the sheltering structures of deep-sea coral reefs. Finally, because of their longevity, some deep-sea corals can serve as archives of past climate conditions that are important to understanding global climate change. In short, based on current knowledge, deep-sea coral and sponge communities appear to be as important to the biodiversity of the oceans and the sustainability of fisheries as their analogues in shallow tropical seas.

In recent years scientists have discovered deep-sea corals and/or coral reefs in Japan, Tasmania, New Zealand, Alaska, California, Nova Scotia, Maine, North Carolina, Florida, Colombia, Brazil, Norway, Sweden, UK, Ireland and Mauritania. Because research submarines and remotely operated vehicles suitable for studying the deep sea are few and expensive to operate, scientific investigation of these remarkable communities is in its very early stages. But it is increasingly clear that deep-sea corals usually inhabit places where natural disturbance is rare, and where growth and reproduction appear to be exceedingly slow. Deep-sea corals and sponges may live for centuries, making them and the myriad species that depend on them extremely slow to recover from disturbance.

Unfortunately, just as scientists have begun to understand the diversity, importance and vulnerability of deep-sea coral forests and reefs, humans have developed technologies that profoundly disturb them. There is reason for concern about deep-sea oil and gas development, deep-sea mining and global warming, but, at present, the greatest human threat to coral and sponge communities is commercial fishing, especially bottom trawling. Trawlers are vessels that drag large, heavily weighted nets across the seafloor to catch fishes and shrimps. Scientific studies around the world have shown that trawling is devastating to corals and sponges. As trawlers become more technologically sophisticated, and as fishes disappear from shallower areas, trawling is increasingly occurring at depths exceeding 1,000 meters.

It is not too late to save most of the world's deep-sea coral and sponge ecosystems. We commend nations including Australia, New Zealand, Canada and Norway, which have already taken initial steps towards protecting some coral and sponge ecosystems under their jurisdiction. We urge the United Nations and appropriate international bodies to establish a moratorium on bottom trawling on the High Seas. Similarly, we urge individual nations and states to ban bottom trawling to protect deep-sea ecosystems wherever coral forests and reefs are known to occur within their Exclusive Economic Zones. We urge them to prohibit roller and rockhopper trawls and any similar technologies that allow fishermen to trawl on the rough bottoms where deep-sea coral and sponge communities are most likely to occur. We urge them to support research and mapping of vulnerable deep-sea coral and sponge communities. And we urge them to establish effective, representative networks of marine protected areas that include deep-sea coral and sponge communities.

The following 1,136 scientists have signed the *Scientists' Statement on Protecting the World's Deep-Sea Coral and Sponge Ecosystems*. Affiliations are for identification only, and do not imply endorsement by the signers' institutions.

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April 15, 2004

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Ms. Stephanie Madsen, Chair
North Pacific Fishery Management Council
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Dear Dr. Balsiger and Ms. Madsen:

Corals, sponges, and other living seafloor communities are important to the health of our oceans. The current Essential Fish Habitat Environmental Impact Statement process for the North Pacific provides the opportunity for the National Marine Fisheries Service (NMFS) and the North Pacific Fishery Management Council (NPFMC) to conserve corals, sponges, and other living seafloor communities that provide habitat for fishes from destructive fishing practices. We, the undersigned marine scientists and marine conservation biologists are concerned by the actions and rationale of the NMFS and NPFMC that fail to protect deep sea corals and sponges in North Pacific waters.

Presence of living benthic structure increases habitat complexity and sustains patterns of biodiversity in our ocean ecosystems. Cold water corals are among the most vulnerable and oldest seafloor habitats in Alaska. Many marine species, including commercially important species, utilize the vertical and three-dimensional structure provided by corals and sponges. Widely distributed in the Aleutians, Bering Sea, and Gulf of Alaska, these long-lived animals can protect fishes from strong currents and predators, as well as serve as nurseries for juveniles, and focal sites for feeding and reproduction.

Gorgonian corals, such as the red tree coral *Primnoa* spp. and the bubblegum coral *Paragorgia arborea,* are one of the most prominent groups of corals in Alaska. Both grow slowly, but can reach large sizes (3 m tall) and great ages (200+ years) if left undisturbed. Rockfish, Atka mackerel, walleye pollock, Pacific cod, sablefish, flatfish, crabs, and other economically important species in the North Pacific are found around red tree coral in the Gulf of Alaska (Krieger and Wing 2002). Among fish caught around corals during trawl surveys from 1975-1998, rockfish and Atka mackerel were most commonly caught around gorgonian, cup, and hydro- corals (Heifetz 2000). Eighty three percent of the rockfish observed during one study were associated with red tree coral (Krieger and Wing 2002). The removal or damage of red tree corals in Alaskan waters could have long term effects on associated faunal communities (Krieger and Wing 2002).

Video observation indicates that some managed fish species in the Aleutian Islands are highly associated with corals, sponges and other structure-forming invertebrates. One hundred percent of juvenile rockfish and eighty seven percent of all managed species counted in video from dives around the Aleutian Islands in 2002 were found within or very near these organisms (Stone, unpublished data). In recognition of their ecological importance and vulnerability to the adverse effects of fishing, coral, sponges, and other structure-forming seafloor communities have been identified as habitat areas of particular concern in Alaskan waters (Amendment 55/55/8/5/5 to the Fishery Management Plans for

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BSAI Groundfish, GOA Groundfish, BSAI Crab, Alaska Scallop, and Salmon in the EEZ, pg 362-364, Jan.1999).

Bottom trawling destroys far more ocean habitat than any other fishing practice on the West Coast. The NMFS estimates about one million pounds of corals and sponges were removed from the seafloor of the Aleutian Islands and the Bering Sea annually between 1997 and 1999 by commercial fishing – over 90% by bottom trawlers (NMFS 2003). The impacts of this kind of destruction are neither minimal nor temporary. Both hard corals and soft corals can be extremely slow growing and sensitive to disturbance (*eg* Krieger 2001, Witherell and Coon 2000). For some species, it could take hundreds of years, if ever, for these animals to recover from the destruction of bottom trawling (*eg* Witherell and Coon 2000, Risk *et al.* 1998, Andrews *et al.* 2002). Vase sponges, morel sponges, and seawhips in deep, cold water habitats such as those in the Gulf of Alaska are also very vulnerable and slow to recover from bottom trawling (Freese *et al.* 1999, Freese 2001).

As documented in the National Academy of Sciences, National Research Council report of 2002, "Effects of Trawling & Dredging on Seafloor Habitat," bottom trawling reduces the complexity and biological diversity of seafloor habitats. The Academy recommends closures, gear modifications, and fishing effort reductions to mitigate the detrimental impacts of bottom trawling. Further, in February 2004, more than 1,100 of the world's foremost biologists signed a consensus statement calling for governments and the United Nations to protect imperiled deep sea coral and sponge ecosystems.

Currently in the North Pacific, NMFS is using the argument that bottom trawling in Alaska has no more than a "minimal" impact on habitat. The agency is using the rationale that in order to be more than minimal, habitat degradation must be so severe as to cause commercial fish stocks to collapse below sustainable levels. NMFS is measuring habitat effects by gauging the stock status of commercial fish, an inappropriate proxy as fisheries scientists cannot separate the effects of overfishing from those of habitat destruction on the status of fish populations. Rather, the effects on habitat should be directly measured, using observation and experiment.

NOAA scientists have said that the deep-sea corals in the Aleutians in particular are likely unparalleled in the world and that they have observed areas of damaged corals and associated organisms. Further, NMFS' own analysis shows that habitat-structuring organisms like corals, sponges, bryozoans, tunicates, crinoids, and anemones will be reduced 70-90% in thousands of square kilometers of habitat if current fishing practices continue. These losses are not inconsequential. Ecosystems are naturally resilient, but only to a point. Waiting to cross that threshold is dangerous. If the resiliency of a system is exceeded, the change can be irrevocable.

The time is now to protect Alaska's corals. We strongly urge the Council and NMFS to protect sensitive benthic habitat from destructive fishing practices.

Sincerely,

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CARE
California Artificial Reef Enhancement PROGRAM

May 11, 2005

Mr. D. Robert Lohn, Regional Administrator
c/o Maryann Nickerson
National Oceanic and Atmospheric Administration
7600 Sand Point Way, NE, Building 1
Seattle WA 98115-0700

Re: Comments on 2005 Draft EIS for Pacific Coast Groundfish Essential Fish Habitat

Dear Mr. Lohn:

Thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for Essential Fish Habitat Designation for the Pacific Coast Groundfish Fishery Management Plan. This letter contains comments on the DEIS from the California Artificial Reef Enhancement Program (CARE). CARE is a nonprofit organization which, through public education and scientific research, promotes awareness and understanding of the potential value to be derived from artificial reef ecosystems in offshore California, and supports the preservation and enhancement of artificial reefs when recognized as beneficial to the marine environment.

As stated in our comments submitted on October 5, 2004, CARE supports the designation of the oil and gas platforms offshore of southern California as “Habitat Areas of Particular Concern” (HAPC) under the Magnuson-Stevens Fishery Conservation and Management Act. For the reasons stated in our previous comments and in these comments, we believe that Alternative B.8 in the DEIS, which would designate the oil and gas platforms off of the California coast as Habitat Areas of Particular Concern (HAPC), should be adopted as part of the comprehensive strategy to conserve and enhance essential fish habitat for fish species managed under the Pacific Coast Groundfish Fishery Management Plan. With these comments, we are providing additional scientific information that should be included and evaluated in the Final EIS for the purpose of selecting the final preferred alternative. Please contact me at (805) 320-8456 if you have any questions or would like any further information that CARE may be able to provide.

Sincerely,

George Steinbach
Executive Director

May 11, 2005

<u>Comments of CARE on the February 2005</u>
<u>Draft EIS for Pacific Coast Groundfish EFH</u>

General Comments:

General Comment 1:

CARE supports Alternative B.8 in the Draft Environmental Impact Statement ("DEIS"), the designation of oil and gas platforms offshore of southern California as "Habitat Areas of Particular Concern" ("HAPC") under the Magnuson-Stevens Fishery Conservation and Management Act ("Magnuson-Stevens Act"). The information submitted with these comments and with our comments dated October 5, 2004 strongly supports this designation.

General Comment 2:

In these comments, we use the term "platform reefs" to refer to the valuable groundfish habitat that oil and gas platforms provide. This term is meant to emphasize that scientific research demonstrates that the underwater portions of oil and gas platforms serve as de facto reef habitat. In addition, the term emphasizes that only the underwater portion of the platform is relevant to the discussion of groundfish Essential Fish Habitat ("EFH") and HAPC. We use "platform reefs" to emphasize the need for decision-makers to consider the habitat value of the underwater portion of the platform structure, and that both future groundfish fishery management and platform decommissioning decisions should consider their potential impact on the habitat that the platform reefs provide.

General Comment 3:

As the DEIS notes (p. 4-12), designation of HAPC "may result in indirect effects greater than those associated with EFH because resource managers and regulators are likely to place a high priority on protecting areas that have been designated as HAPCs." With respect to Alternative B.8, the DEIS (p. 4-13) acknowledges that: "Designation of the areas surrounding oil platforms would enhance NMFS' opportunity to fully consider their potential contribution to rebuilding overfished species before they are removed" on decommissioning. For these reasons, a careful, thorough and balanced analysis of potential positive and negative consequences associated with this alternative is essential to enable decision-makers to make informed decisions among the alternatives. However, the DEIS does not contain such an analysis. The Final EIS should acknowledge and evaluate the environmental consequences of the decision whether or not to adopt Alternative B.8 based on the information discussed in these comments.

General Comment 4:

The discussion of environmental consequences for the proposed preferred alternative and other alternatives addresses the protection of habitat for groundfish species and includes conservative assumptions that habitat used by groundfish has positive value.[1] By contrast, the analysis of Alternative B.8 on p. 4-13 states only that: "One view holds that scientific research indicating an abundance of fish species located near oil rig platforms is a benefit to the ecosystem." No citations are given and the unidentified "scientific research" is not described at all beyond that single summary sentence. The remainder of the discussion consists of arguments against the designation of platform reefs as HAPC, based on one outdated citation and unsupported speculation cited as "personal communications" (as discussed in specific comments below). We are very disappointed with the lack of attention in the "Environmental Consequences" analysis to the scientific evidence supporting the important ecological role of platform reefs and the need for their protection. This one-sided presentation does not provide decision-makers or the public with the information necessary to make an informed comparison among alternatives. The Final EIS must be revised to take into account the information presented in our prior comments and in these comments in order to present an unbiased basis for decision-making.

General Comment 5:

Some information on groundfish populations at platform reefs is described under the heading of "Alternatives" (DEIS, p. 2-10) and "Affected Environment" (DEIS, pp. 3-8 – 3-10). However, this information is disregarded — and is not even cross-referenced — in the "Environmental Consequences" analysis (DEIS, p. 4-13). With all respect to those who read this large document and attempt to digest and utilize the massive amount of information it contains, inclusion of this material in the "Alternatives" and "Affected Environment" sections is not an adequate substitute for full and fair consideration of this information in the evaluation of environmental consequences as required by the National Environmental Policy Act ("NEPA").

General Comment 6:

EFH decisions must be based on "the best available scientific information" (50 CFR § 600.815(a)(1)(ii)), and this information must be interpreted "in a risk-averse fashion" (*id.* at § 600.815(a)(1)(iv)). On that point, it is critical to note that ***the designation of platform reefs as HAPC will not have any adverse environmental consequences***. Rather, as the DEIS itself acknowledges, this designation would "enhance NMFS' opportunity to fully consider their potential contribution to rebuilding overfished species before they are removed." (DEIS, p. 4-13) Whatever scientific uncertainties may yet remain can be considered when NMFS consults regarding decommissioning plans for particular platforms. CARE believes that the increasing accumulation of evidence clearly supports the benefits of platform reefs. Nevertheless, should substantive scientific evidence be presented to document the speculative suggestions raised in the DEIS (*id.*), that evidence can be taken into account in the EFH consultation process. The HAPC designation itself would not prevent NMFS from conducting a thorough evaluation of each decommissioning proposal in order to minimize any adverse consequences. On the other hand, once the structures are removed, NMFS will have no opportunity for further evaluation because the platform reef habitat and thriving ecological communities will be destroyed. Moreover, since the removal of oil and gas platforms is typically

[1] For example, see DEIS pp 4-3 ("Each alternative is analyzed for the extent to which it protects habitat for individual species/life stages of groundfish") and 4-4 ("in the absence of definitive research, the analysis concludes that it is beneficial to protect some portion of each habitat type. . .") .

carried out by using explosives to sever the jacket, removing the platform reefs will kill the marine animals and fishes in the vicinity when the explosives are detonated. (Gitschlag et al., 2000.) As a result, large numbers of juvenile and adult individuals from slow-growing, slow-reproducing and long-lived species will be killed. This is a serious adverse consequence for the program of rebuilding these overfished stocks, especially since some of the highest observed populations of some rockfish species are associated with platform reefs. (Love 2003.) Yet the DEIS entirely ignores this issue. The cursory analysis presented of environmental consequences on p. 4-13 is wholly inadequate in failing to take into account the "one-way" nature of those consequences: If HAPC designation indirectly leads to any adverse consequences from the presence of the platform reefs, those consequences can be addressed in future decisions. If lack of HAPC designation indirectly leads to adverse consequences from elimination of the platform reefs, they and their existing groundfish populations cannot be restored.

General Comment 7:

In addition, the information submitted with our prior comments and these comments supports the decision not to select Alternative A.6, the most geographically restricted EFH designation, as the final preferred alternative. Were Alternative A.6 to be adopted, some platform reefs would be excluded from the area designated as EFH. In that event, the substantial existing groundfish populations at those platform reefs would be deprived of the benefits of the overall EFH conservation strategy, as well as the protection of the EFH consultation process in future decisions regarding the decommissioning of the platforms. In addition, such exclusion would necessarily preclude designating excluded platform reefs as HAPC. The Final EIS should acknowledge and evaluate these environmental consequences of Alternative A.6. Should the Council wish to narrow the designation of EFH as proposed in this alternative, it should be modified to retain EFH status for platform reefs that are outside the current range of Alternative A.6.

Specific Comments

1. DEIS, pp. i, 1-3

The DEIS states that: "*The purpose of the proposed action* is: first, to provide the Council and NMFS with the information they need to better account for the function of Pacific Coast groundfish EFH when making fishery management decisions; …" In order to fulfill this purpose, the DEIS must provide the Pacific Fisheries Management Council ("Council") and National Marine Fisheries Service ("NMFS") with all of the available scientific information regarding the habitat value of platform reefs. The duty to consider all available scientific information is enshrined in NEPA and in the Magnuson-Stevens Act. An EIS must "provide full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment." 40 CFR § 1502.1. Fishery Management Plans ("FMPs") must demonstrate that "the best available scientific information was used in the description and identification of EFH." 50 CFR § 600.815(a)(1)(ii). In addition, Fishery Management Councils are directed to "interpret this information in a risk-averse fashion to ensure adequate areas are identified as EFH for managed species." *Id.* at § 600.815(a)(1)(iv). The one-sided discussion on DEIS p. 4-13 fails to achieve this purpose.

2. DEIS, pp. i to ii, 1-3

The DEIS states that "the Council and NMFS have not had the tools to consider habitat and ecosystem function, and their relation to other biological and socioeconomic conditions affecting the groundfish fishery, in management decisionmaking. . . . *An overriding problem has been the challenge of managing fisheries with limited scientific data.* This increases the risk that decisions exacerbate the kinds of fishery- and stock-related problems just identified" (emphasis added). Thus, the DEIS recognizes the risk inherent in managing the Pacific groundfish fishery with limited data, and relies on conservative assumptions throughout the document to address this uncertainty. This approach is consistent with the requirement that identification of EFH must be based on "the best available scientific information" (50 CFR § 600.815(a)(1)(ii)), and that this information must be interpreted "in a risk-averse fashion" (*id.* at § 600.815(a)(1)(iv)). The document fails to take this approach in only one case – the analysis of alternative B.8. In that case alone, the "lack of conclusive research" is cited as an objection to HAPC designation (DEIS, p. 4-13). On the contrary, under the risk-averse analytical approach used in the rest of the document and required by EFH regulations, any scientific uncertainties should be a basis for conservative assumptions in favor of protecting platform reefs that provide existing habitat utilized by groundfish species.

3. DEIS, p. 2-1

The DEIS states that:

> In order to satisfy this requirement [to identify a preferred alternative or alternatives] in a way that fosters public input and informed decisionmaking, the Council chose preliminary preferred alternatives for EFH identification and description, HAPCs, and fishing impact minimization measures at their November 2004 meeting. They explicitly construed this choice as preliminary—they intend to revisit their decision at the June 2005 meeting, after the public comment on the DEIS has been received, to further refine their choice of a comprehensive preferred alternative. After the June 2005 Council meeting, NMFS will publish a final EIS (FEIS), which will identify these final preferred alternatives.

The DEIS does not explain why certain alternatives were designated as preferred. The Final EIS must describe the criteria used to identify preferred alternatives and must explain how the final preferred alternatives meet the criteria, as well as why rejected alternatives are rejected As noted above, one criterion that should be used to identify preferred alternatives is to interpret the best scientific available information "in a risk-averse fashion to ensure adequate areas are identified as EFH for managed species." 50 CFR § 600.815(a)(1)(iv).

4. DEIS, p. 2-1

During the November 2004 Council meeting, Council members raised some concerns which appeared to bear on the decision whether to designate Alternative B.8 as a preferred alternative. To the extent that those concerns may be considered in evaluating the alternative, they should be disclosed to the public readers of the EIS and addressed in its analysis. First, a concern was raised by one Council member about the "questionable motives" of those who advocate designating platform reefs as HAPC. It is unclear what motives the Council member was referring to. As a general matter, however, the Magnuson-Stevens Act balances a variety of interests, including commercial, recreational and environmental interests, in the management of U.S. fisheries. Commenters are entitled to present their views in order to inform fisheries management decisions and the analysis of environmental consequences. Moreover, under NEPA, the "motives" of any commenter on an EIS are irrelevant. The only relevant issue is whether a suggested course of action conserves and enhances EFH and assists in the recovery of fish populations.

5. DEIS, p. 2-1

Second, concerns were raised during the Council meeting that designating platform reefs as HAPC would set a precedent that would allow discarded articles, such as furniture, oil cans and sunken boats to be left in the ocean as artificial reefs. This is not the case. In the past, some artificial reef projects may have been used to justify solid waste disposal with harmful environmental consequences. However, such actions would not be permissible today under the extensive laws and regulations that govern the construction, siting and placement of artificial reefs. Congress passed the National Fishing Enhancement Act ("NFEA") (33 U.S.C. §§ 2101 *et seq.*) in 1984. The NFEA established national standards for artificial reef development, one of which is to "minimize environmental risks and risks to personal health and property." *Id.* at § 2102(4). The NFEA directed NOAA to create a National Artificial Reef Plan ("NARP") (*id.* at § 2103) and authorized the U.S. Army Corps of Engineers ("Corps") to issue permits for artificial reefs (*id.* at § 2104; *see also* 33 CFR § 322.5(b)). The NARP and the Corps' regulations establish guidelines for siting, materials, design, construction, management and liability, among others. In particular, the NARP provides that materials proposed for artificial reefs must be of proven stable design. Furthermore, the proposed revision of the NARP (Feb. 2002) states that secondary use materials that have generally been found to be unsuitable artificial reef materials include light vehicle bodies, fiberglass boats and boat molds and light gauge metal items such as refrigerators, washing machines, and clothes dryers. Both of these guidelines would prohibit designating discarded junk as artificial reefs. Moreover, state and federal natural resource agencies, the Council, NMFS, and the public all participate in the artificial reef permitting process, which ensures that only appropriate materials will be utilized. Finally, artificial reef permits issued by the Corps are subject to environmental review under NEPA, which further ensures that the concerns about the suitability of a particular material will be addressed.[2]

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[2] California also has an artificial reef program. Cal. Fish & Game Code §§ 6420-6425. Under California's program, the Department of Fish and Game has authority over the design, placement and monitoring of artificial reefs within state waters. Approximately 34 artificial reefs have been constructed along the California coast under

6. DEIS, p. 2-1

A third concern raised during the Council's consideration of Alternative B.8 was whether "man-made" habitat should be preferred over "natural" habitat in EFH and HAPC designations. The EFH regulations do not draw this distinction. EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." 50 CFR § 600.10. Substrate "includes sediment, hard bottom, **structures underlying the waters**, and associated biological communities." *Id.* (emphasis added). "Structures underlying the waters" means artificial (i.e., man-made) structures. NMFS added artificial structures to the definition of substrate in 1997. *See* Magnuson-Stevens Act Provisions: Essential Fish Habitat (EFH), 62 Fed. Reg. 66531 (Dec. 19, 1997) (interim final rule). In response to commenters that objected to the inclusion of artificial structures in the definition of substrate, NMFS stated that it:

> included "structures underlying the waters" in its interpretation of substrate to clarify that structures such as artificial reefs, jetties and shipwrecks may be considered EFH if they provide essential habitat for a managed species.

Id. at 66534. In 2002, when NMFS revised the EFH regulations, similar objections regarding the inclusion of artificial structures in the definition of EFH were raised, to which NMFS responded that it was "not modifying the interpretation of 'substrate' to exclude human made structures, because in some cases such structures can provide valuable habitat for managed species." Magnuson-Stevens Act Provisions: Essential Fish Habitat (EFH), 67 Fed. Reg. 2343, 2347 (Jan. 17, 2002) (preamble to final rule). Accordingly, NMFS has made it clear that artificial structures qualify as EFH. Nothing in the definition of HAPC is to the contrary. To the extent that the habitat characteristics of platform reefs qualify them as HAPC, the fact that they are artificial in origin must be considered irrelevant. Conversely, to reject platform reefs as HAPC for the reason that they are artificial would be inconsistent with the EFH regulations and the purposes of the Magnuson-Stevens Act. If the Council finds it necessary to prioritize, it should place the highest priority on those alternatives with the highest probability of achieving the fisheries management goals of the Act.

7. DEIS, p. iv, 2-6

It appears, based on Figure 2-6, that Alternative A.6, which would identify EFH as the upper 30 percent of the area where the Habitat Suitability Probability ("HSP") is greater than zero for all species, would exclude some of the 27 platform reefs off the California coast from the EFH area. However, there is not enough information in the text of the DEIS or in Figure 2-6 to determine whether or which platform reefs may be excluded from the area identified as EFH under Alternative A.6. In order to fully inform the decisionmakers and the public of the alternatives being considered, the DEIS should clearly state which platform reefs would be included in and excluded from the area identified as EFH under Alternative A.6. If the result of Alternative A.6 would be to eliminate some platform reefs from the EFH category – some of which support dense populations of groundfish as even the DEIS acknowledges (pp. 2-10, 3-8 to 3-10) – this

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the state program. Some of these artificial reefs were built before the NARP was adopted, however the recently constructed artificial reefs were built in accordance with NARP guidelines.

consequence should be recognized in the DEIS analysis as an adverse environmental consequence of Alternative A.6.

For this reason, as noted above, CARE urges that Alternative A.6 should not be adopted in its present form. Should the Council wish to narrow the designation of EFH as proposed in this alternative, it should be modified to retain platform reefs as EFH that are outside the current range of Alternative A.6.

8. DEIS, p. 2-10.

In the description of Alternative B.8, the DEIS notes that: "High concentrations of groundfish have been observed in association with many of the platforms off the California coast, including overfished species such as bocaccio and cowcod." For this reason, and as discussed below, identifying platform reefs as EFH and designating them as HAPC should be part of the comprehensive strategy to conserve and enhance EFH.

9. DEIS, p. 2-10

In the description of Alternative B.8, the DEIS states that: "In addition to providing suitable habitat, most of these structures are not fished and act as de facto reserves." The scientific literature cited in Chapter 3 of the DEIS that supports this statement has been confirmed by more recent research. Love et al. (2003) (Exhibit 1) found that fishing pressure around most platforms has been minimal, in part due to U.S. Coast Guard regulations that restrict access of large fishing boats to the waters near platforms. The same fact is documented by the U.S. Environmental Protection Agency ("USEPA") Essential Fish Habitat Assessment for NPDES Permit No. CA 2800000 (2000, pp. 5-2 to 5-3) (Exhibit 2). Further, the physical structure of oil platforms significantly restricts the use of both commercial and recreational gear to fish the resident fish populations.

10. DEIS, p. 2-10

In the description of Alternative B.8, the DEIS briefly acknowledges that: "The platforms rise steeply from the bottom and provide unique high relief habitat." The "uniqueness" of the platform reef habitat should be emphasized, given that "rarity of the habitat type" is one of the factors to be considered in designating HAPC. 50 CFR § 600.815(a)(8)(iv). As the DEIS acknowledges, the latticework of footers and crossbars that comprise the underwater features of platform reefs provide unique high relief habitat. Pinnacle reefs are the only natural formations that provide a similar type of high relief habitat. However, natural pinnacle reefs are very rare off of the California coast, with only one such reef located in the Santa Barbara Channel (Love, personal communication). The DEIS (p. 3-9) also notes that pinnacles are only found on the outer continental shelf, well away from the mainland. Consequently, the majority of this rare type of habitat is provided by platform reefs. In addition, as discussed in these comments, platform reefs provide hard bottom habitat that is rare in the areas in which the platform reefs are located. These facts must be considered in evaluating the environmental consequences of designating platform reefs as HAPC and provide support for the environmental benefits of Alternative B.8.

11. DEIS, p. 2-10

The DEIS states that Alternative B.8 was developed to be consistent with 50 CFR § 600.815(a)(8)(i), but does not explain the reasoning behind this statement. Section 600.815(a)(8)(i) provides that one criterion for designating HAPC is the importance of the ecological function provided by the habitat. The DEIS correctly notes on page 2-10 that high concentrations of groundfish species, including overfished bocaccio and cowcod, have been observed associated with many platform reefs. However, this brief statement fails to adequately address and inform the reader of the variety and importance of the ecological functions that platform reefs provide. As discussed in section 3.2.2.2.4 of the DEIS (pp. 3-8 to 3-10) and in the additional scientific information discussed and cited in these comments:

(i) platform reefs provide habitat for different life stages of rockfish (i.e., larvae, juveniles, adults) (Love 2000) (Exhibit 3), (Love 2001) (Exhibit 4), (Love 2003), (Love 2005) (Exhibit 5);
(ii) different life stages of the same species inhabit different depths along the platform reef (i.e., adults inhabit the deep waters and juveniles inhabit the midwaters), thereby reducing predation by adults on juveniles (Love 2003);
(iii) platform reefs create hard bottom habitat (via the lattice-work of legs and cross members) in areas that are primarily soft bottom habitat (Love 2003);
(iv) each platform reef creates a variety of habitat (again, via the lattice-work of legs and cross members) (Love 2003);
(v) because platform reefs have more adults in higher densities than natural reefs, they produce a disproportionate share of larvae in the region (Love 2003; Love 2005);
(vi) platform reefs recruit larval fish, which grow into juveniles that live in the midwaters and are found in greater densities than at natural reefs (Love 2003; Love 2005);
(vii) platform reefs recruit larval fish that would otherwise have perished in the absence of the platform reef (Love 2005);
(viii) juveniles living at platform reefs may grow to adulthood and remain there throughout their lives (Love 2003); and
(ix) a survey of six platform reefs revealed that approximately 20 percent of all bocaccio young-of-the-year in the Pacific Coast Groundfish fishery are found there (Love 2005).

Clearly, the platform reefs provide important ecological functions that must be addressed in the environmental consequences analysis of the Final EIS, and provide support for the environmental benefits of Alternative B.8.

12. DEIS, p. 2-10.

The DEIS states that Alternative B.8 was developed to be consistent with 50 CFR § 600.815(a)(8)(iii), but does not explain the reasoning behind this statement. Section 600.815(a)(8)(iii) provides that another criterion for designating HAPC is whether and to what extent development activities are, or will be, stressing the habitat type. The brief discussion on page 2-10 of the DEIS does not mention the fact that the current platform decommissioning regulations require complete removal of the platforms. However, as the DEIS correctly notes in section 4.3.3 (p. 4-13), "Oil platforms are subject to removal from the ocean as they are decommissioned." In fact, Gebauer et al. (2004) (Exhibit 6) estimates that removal of the oil platforms located in federal waters along the California coast will begin in 2010 and be completed by 2025. Complete removal of the oil and gas platforms will eliminate the groundfish habitat that the underwater platform reef portions provide. The Final EIS should consider the environmental consequences of this fact, which provides support for the environmental benefits of Alternative B.8, consistent with the HAPC criteria in section 600.815(a)(8)(iii).

13. DEIS, p. 2-10

The Final EIS should also explain that Alternative B.8 is consistent with the HAPC criterion in 50 CFR § 600.815(a)(8)(ii) ("The extent to which the habitat is sensitive to human-induced environmental degradation"). The habitat created by the platform reefs off of the coast of California is dependent on the platforms' presence and subject to elimination if they are removed under platform decommissioning regulations. As such, the platform reefs are sensitive to human-induced environmental degradation by removal of the structures. The Final EIS should consider the environmental consequences of this fact, which provides support for the environmental benefits of Alternative B.8, consistent with the HAPC criteria in section 600.815(a)(8)(ii).

14. DEIS, p. 3-8

The DEIS states that: "Managed species known to use offshore artificial structures include black rockfish, black-and-yellow rockfish, blue rockfish, bocaccio, brown rockfish, cabezon, calico rockfish, California scorpionfish, canary rockfish, copper rockfish, cowcod, darkblotched rockfish, flag rockfish, gopher rockfish, grass rockfish, greenblotched rockfish, greenspotted rockfish, greenstriped rockfish, kelp rockfish, leopard shark, Mexican rockfish, olive rockfish, quillback rockfish, rosy rockfish, sharpchin rockfish, starry rockfish, stripetail rockfish, treefish, vermilion rockfish, yelloweye rockfish, and yellowtail rockfish."

This list of 31 managed species understates the number of rockfish that use platform reefs as habitat. Based on annual surveys dating back to 1995, 42 species of rockfish have been identified as living around platform reefs. (Love et al. 2003; M. Love, personal communication.) The DEIS's understatement of the number of managed species that utilize platform reefs as habitat reflects the failure to rely on the best available scientific information on the habitat value of platform reefs.

15. DEIS, p. 3-8

The DEIS's discussion of the habitat value of platform reefs is based exclusively on *The Ecological Role of Natural Reefs and Oil and Gas Production Platforms on Rocky Reef Fishes in Southern California* (OCS Study MMS 99-0015) ("1999 MMS Report").[3] Several important scientific studies of the habitat value provided by platform reefs located off of California have

[3] The 1999 MMS Report is not listed as a reference in Chapter 10, "Literature Cited." It should be added.

been published since the 1999 MMS Report, including: Love et al. (1999) (Exhibit 7); Love et al. (2000); Love et al. (2001); Love et al. (2003). In addition, Love (2005) summarizes several articles that are based on his latest research, which have been submitted for publication in scientific journals.

In particular, in September 2004, Love (2005) surveyed the largest number of platform reefs since 1999. Love conducted complete surveys of platforms Irene, Hidalgo, Harvest, Hermosa, Hondo (first time), Heritage (first time), Holly, Gail, Grace, and Gilda. In addition, Love conducted midwater surveys at platforms C, B, A, Hillhouse, Henry, and Habitat (complete surveys were hindered due to poor water visibility). Love also surveyed a number of natural reefs (some first mapped in spring 2004) in the Santa Barbara Channel and around the northern Channel Islands. Love's research confirms that many platform reefs harbor higher densities of both juvenile and adult fishes than do most natural reefs. Moreover, new seafloor maps produced in 2004 by the U.S. Geological Survey demonstrate that the seafloor of much of the Santa Barbara Channel is composed of mud and sand. These studies corroborate the 1999 MMS Study and provide important additional evidence that platform reefs provide EFH for rockfish, and that platform reefs should be designated as HAPC. Love's research continues to demonstrate the importance of the Santa Barbara Channel platform reefs as providers of habitat for reef fishes. The DEIS again fails to present the best available scientific information on pp. 3-8 to 3-10, and disregards the breadth and depth of this research in concluding that there is a "lack of conclusive research regarding these issues specifically for the West Coast. . ." (p. 4-13).

16. DEIS, p. 4-13

The DEIS states that:

> One view holds that scientific research indicating an abundance of fish species located at oil rig platforms is a benefit to the ecosystem. Others refer to Holbrook et al. (2000) to stress that this research is inconclusive with regard to whether the observed fish abundance and densities indicate increased fish productivity or attraction of fish populations away from natural reef systems (Chabot, personal communication: Charter, personal communications).

The citation of Holbrook et al. (2000) is out of date. More recent research has addressed a number of the uncertainties that existed at the time that the Holbrook paper was written. The Final EIS must present a more up-to-date and accurate picture of the available scientific evidence. Moreover, the manner in which the DEIS frames the issue — i.e., platform reefs either increase fish productivity **or** attract fish populations away from natural reef systems — misleads the public and decisionmakers. Current research (summarized in the following comment) demonstrates that platform reefs have both effects — i.e., that platform reefs are important habitat for rockfish and function just as natural reefs do, in that they both produce and attract fish depending on species, site, season and ocean conditions. The DEIS, relying on the outdated reference to Holbrook et al., wholly fails to take into account these crucial findings in discussing the environmental consequences of Alternative B.8.

17. DEIS, p. 4-13

The Final EIS must consider the following current research results:

17(a). Love et al. (2003) found young-of-the-year rockfishes around platform reefs and around natural outcrops. His research indicated that the recruitment of juvenile fishes to platform reefs that are far from shore or in deep waters, such as Platforms Gail and Grace, is from maternal sources rather than attraction from natural outcrops. Platform reefs located nearer to shore or in shallow waters may attract juveniles from natural habitats because these platform reefs are located in areas in which it is relatively easier for juveniles to move between habitats. However, the converse is also true: juveniles may be attracted from platform reefs to natural habitats. One important difference, however, is the higher densities of young-of-the-year rockfishes found at platform reefs. Love et al. (2003) concluded that platform reefs provide a more optimal habitat than found on natural outcrops, making platform reefs functionally more important as nurseries.

17(b). Love et al. (2003) also found adult rockfishes around platform reefs and around natural outcrops. As with juveniles, adult rockfish found at platform reefs located far offshore or in deep waters likely arrived through recruitment rather than attraction. This research suggests that rockfishes may live their entire benthic lives around a single platform reef. Thus, the adult rockfishes at platform reefs result from maturation of resident fish rather than through the attraction of adults from natural outcrops. One important difference, however, is the higher densities of adult rockfishes found at platform reefs. The difference is so pronounced that, in some locations, platform reefs provide much or all of the adult fishes of some heavily fished species and thus contribute disproportionately to those species' larval production. (Love et al., 2003).

17(c). More recent research on the growth rate of young blue rockfish living around platform reefs demonstrates that they grow faster than fishes living around natural reefs in the same area (Love, 2005). Related research by Love (2005) indicates that platform reefs are more important producers of bocaccio and cowcod larva than natural habitat. Love's research demonstrates that mean densities for both species are higher at platform reefs than at natural reefs, and in some cases, the adult fishes at platform reefs are larger than those found at natural reefs. In particular, Platform Gail had the highest densities of mature bocaccio and cowcod of any natural or man-made habitat surveyed. Thus, the potential larval production at Platform Gail was much higher than any other site surveyed. Love estimated that for bocaccio one hectare of sea floor at that platform reef was equivalent to 68 hectares at an average natural reef, and for cowcod one platform reef hectare was equivalent to 26 hectares at an average natural reef.

17(d). Love (2005) also found that the number of juvenile bocaccio found around six platforms in the Santa Barbara Channel constituted 20 percent of the average number of juvenile bocaccio that survive in a year for the species' entire range. He determined that, when adults, these bocaccio will contribute about one percent of the additional amount of fish needed to rebuild the Pacific Coast population. His research demonstrates that, although platform reefs provide a relatively small amount of habitat area, this habitat can be crucial for rebuilding an overfished species.

17(e). Furthermore, recent research by Love (2005) indicates that platform reefs recruit larva that would not have survived were the platform reefs not there. By simulating surface currents in 1999 and 2002 originating at Platform Irene to model juvenile bocaccio distribution patterns, Love estimated the proportion of fish recruited to a platform reef that would have arrived at natural juvenile fish habitat in the absence of the platform. Love's results indicated that that seven percent and 23 percent, respectively, of young bocaccio would have survived to reach natural nursery habitat. In other words, the vast majority of young bocaccio would not have survived if they had been unable to settle on the platform reef during the recruitment season.

17(f). The research discussed above demonstrates that platform reefs perform much like natural outcrops, in that both produce and attract rockfishes. However, there is a difference in scale favoring platform reefs, which indicates that some platform reefs are important to regional rockfish production. (Love et al., 2003; Love, 2005.) This ecological role is of significant value especially to the recovery of the many overfished rockfish species that populate the platform reefs, such as bocaccio and cowcod.

17(g) Removal of oil and gas platforms is typically carried out by using explosives to sever the jacket, removing the platform reefs will kill the marine animals and fishes in the vicinity when the explosives are detonated. (Gitschlag et al., 2000) (Exhibit 8). As a result, large numbers of juvenile and adult individuals from slow-growing, slow-reproducing and long-lived species will be killed. This is a serious adverse consequence for the program of rebuilding these overfished stocks, especially since some of the highest observed populations of some rockfish species are associated with platform reefs. (Love 2003; Love 2005.)

In sum, the uncertainty as to the habitat value of platform reefs discussed in Holbrook (2000) has been rebutted by more recent research. Given the directive by the EFH regulations to interpret the best available scientific information in a risk-averse manner (50 CFR § 600.815(a)(1)(i) & (iv)), the Final EIS should rely on the most up-to-date research in order to evaluate environmental consequences, and should consider each of the above findings.

18. DEIS, p. 4-13

The DEIS states that: "Others refer to Holbrook et al. (2000) to stress that this research is inconclusive with regard to whether the observed fish abundance and densities indicate increased fish productivity or attraction of fish populations away from natural reef systems (Chabot, personal communication: Charter, personal communications)." The sources of these personal communications are identified in the "Literature Cited" section (DEIS p. 10-3) as Warner Chabot, affiliated with the Ocean Conservancy, and Richard Charter, affiliated with Environmental Defense. It appears that these personal communications relied solely on Holbrook (2000) which, as explained above, is out of date, to support their assertions. To the extent that the Final EIS relies on these personal communications, it should explain the qualifications of the persons cited and identify any supporting evidence for their statements.

19. DEIS, p. 4-13

The DEIS states that: "Other noted drawbacks to oil platforms HAPC designation include avoidance of returning the area under and around the platform to natural habitat that provide hiding places for rockfish, the potential for these sites to attract increased effort by fishermen and increased predators resulting in increased net mortality, and the potential for the oil platforms to be a hazard to navigation (Charter 2004, personal communication). No scientific evidence is cited as a basis for these assertions, which appear to be unsupported speculations. To the extent that the Final EIS relies on his assertions, it should explain Mr. Charter's qualifications and any supporting evidence for his statement.

20. DEIS, p. 4-13

The speculation that HAPC designation would prevent the restoration of soft-bottom hiding places for rockfish is contradicted by the best available scientific evidence. The soft-bottom habitat under and around the platform reefs is virtually devoid of hiding places. (Love 2005.) The only hiding places that exist are provided by the latticework of beams and cross members that make up the platform reef structure. Moreover, returning the area under and around platform reefs to soft-bottom habitat will require the destruction of existing hiding places and thriving habitat and kill large numbers of the resident fish. (Gitschlag et al., 2000.) The alternative that would enhance hiding places for rockfish is designating platform reefs as HAPC.

21. DEIS, p. 4-13

Regarding the claim that platform reefs could "attract increased effort by fishermen. . . resulting in increased net mortality (DEIS, p. 4-13): As the DEIS acknowledges, and as corroborated by Love (2003) and USEPA (2000), platform reefs are not currently heavily fished and, in fact, act as de facto marine refuges. This is due in part to U.S. Coast Guard regulations that restrict access of large fishing boats to the waters near platforms. In addition, the physical structure significantly restricts the use of both commercial and recreational fishing gear to fish the resident species. Designation of platform reefs as HAPC will not change the Coast Guard's regulation of navigation near the platform reefs nor will the designation alter the physical structure of platform reefs (i.e., large fishing boats will still find it difficult to navigate near them). Accordingly, designation of platform reefs as HAPC will not result in increased effort by fishermen.

22. DEIS, p. 4-13

Regarding the claim that platform reefs could attract "increased predators resulting in increased net mortality" (DEIS, p. 4-13), available scientific evidence suggests that the predation of young fishes on platform reefs is probably lower than that on natural outcrops. This is due to the fact that platform reefs occupy the entire water column and that the fish assemblages are distributed differently than on most natural outcrops. Natural outcrops in the area of platform reefs are typically 5 to 15 feet in height, putting all fish, both young and adults in close proximity. Adults prey on young fish. On platform reefs, the adult fishes are found near the bottom while young fishes occupy the midwaters. This separation implies lower mortality rates for young fishes residing at platform reefs. (Love 2003.) Further, other natural predators, such as pinnipeds, do not appear to be attracted to platform reefs. (Love 2005, personal communication.) The DEIS identifies no evidence to the contradict these observations.

23. DEIS, p. 4-13

Finally, regarding the claim that platform reefs have "the potential to be a hazard to navigation" (DEIS, p. 4-13), the U.S. Coast Guard is responsible for maritime safety in the navigable waters of the U.S. where the platform reefs are located. It has established requirements for all oil and gas platforms regarding the operation and maintenance of aids to navigation and other measures to insure marine safety. No vessel operator has lodged a formal complaint that any oil and gas platforms off of California created a navigation hazard (Boyes, personal communication). Similarly, no hazard complaints have been lodged by vessel operators regarding oil and gas platforms or artificial reefs in the Gulf of Mexico, where many platforms have been turned into artificial reefs. (Kasprzak 2005, personal communication; Boyes 2005, personal communication.) Mr. Kasprzak (Artificial Reef Coordinator, Louisiana Department of Fish and Wildlife, Baton Rouge, Louisiana) and Mr. Boyes (Waterways Management Officer, U.S. Coast Guard, District Eleven) are well-qualified to attest to these facts. The U.S. Coast Guard's regulatory oversight will not be affected by the designation of these platform reefs as HAPC. Thus, there is no basis to the claim that HAPC designation will cause the platform reefs to become a hazard to navigation or adversely affect marine safety.

24. DEIS, p. 4-13

The DEIS states that:

> Another potential drawback that has been of particular concern in the Gulf of Mexico is the relatively high levels of mercury contamination around oil platforms. The disposal of drilling fluids containing mercury from operational oil rigs has resulted in concerns that mercury levels in fish caught near oil platforms, even years after the oil rig is no longer operational, are substantially higher than those caught elsewhere and could be a hazard to humans (Charter 2004, personal communication).

No scientific evidence is cited as a basis for these assertions. To the extent that the Final EIS relies on his assertions, it should explain Mr. Charter's qualifications and any supporting evidence for his statement. The Department of the Interior, Minerals Management Service ("MMS"), has studied the issue of mercury contamination from drilling muds in the Gulf of Mexico and reached the opposite conclusion. As the MMS states on its website: "While the issue of mercury in seafood in the Gulf of Mexico is the subject of an increasing amount of research particularly because of global and regional inputs, the results of research to date generally supports the conclusion that oil and gas platforms do not play a significant role in elevating levels of mercury in fish and other seafood." (See:

http://www.gomr.mms.gov/homepg/regulate/environ/mercury.html). The MMS bases its conclusion, in part, on the following studies:

> 24(a). In 1995, a study of three OCS oil and gas platforms included the analyses of over 700 sediment samples and over 800 tissue samples from shrimp, crabs, marine worms, clams, fish livers, and fish stomach contents. Results of the analyses documented that total mercury is not concentrated to any greater extent in organisms living near the oil and gas platforms (less than 100 meters away) when compared to those living far away from the oil and gas platforms (over 3000 meters). From these results the scientists concluded that oil and gas platforms do not contribute to higher mercury levels in marine organisms. (Kennicutt, 1996) (Exhibit 9).
>
> 24(b). In 2002, a total of 196 sediment samples were taken from six drilling sites in the Gulf of Mexico and analyzed to determine if methyl mercury (MeHg) was being produced in the sediment around drilling platforms. The results showed that concentrations of MeHg in sediments around drilling platforms do not vary significantly with concentrations found at sites that were far from drilling. The report concluded that elevated levels of MeHg around oil and gas platforms are not a widespread phenomenon in the Gulf of Mexico. (Trefry, 2002) (Exhibit 10).
>
> 24(c). The MMS Subcommittee on Mercury in the Gulf of Mexico ("MMS Subcommittee") corroborated these findings. (Creselius et al., 2002) (Exhibit 11). The MMS Subcommittee was established to independently evaluate existing scientific literature on whether OCS oil and gas activities were causing mercury pollution in the Gulf, and provide guidance as to what actions MMS should take. The MMS Subcommittee determined that high levels of total mercury around oil and gas drilling sites was directly correlated with the drilling mud weighting agent barite. However, the increase in sediment concentrations of MeHg at or adjacent to OCS oil and gas drilling sites is not directly attributable to mercury introduced with barite. Further, the MMS Subcommittee determined that the discharges at OCS oil and gas drilling sites do not create conditions that enhance the conversion of mercury to MeHg.
>
> 24(d). An additional study is currently being conducted by the Battelle Marine Sciences Laboratory to determine if barite (the source of mercury in drilling muds) is soluble in the stomach of marine animals and if trace metals are released. Preliminary results indicate that barite is only minimally soluble and that mercury is not bioavailable to marine animals. (Cimato 2005, personal communication.)

Accordingly, the available scientific evidence does not support a high level of concern regarding mercury levels. In order to provide complete and accurate information to the public and decision-makers, each of these studies should be considered in the discussion of mercury issue in the Final EIS.

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U.S. Environmental Protection Agency. 2000. Essential fish habitat assessment for NPDES Permit No. CA 2800000. (Prepared by Science Applications International Corporation).

Exhibit 1

Love, M. S., D. Schroeder and M. Nishimoto. 2003. The ecological role of oil and gas platforms and natural outcrops on fishes in southern and central California: a synthesis of information. U. S. Department of the Interior, U. S. Geological Survey, Biological Resources Division, Seattle, Washington. OCS Study MMS 2003-032.

Exhibit 2

U.S. Environmental Protection Agency. 2000. Essential fish habitat assessment for NPDES Permit No. CA 2800000. (Prepared by Science Applications International Corporation).

Exhibit 3

Love, M. S., J. Caselle and L. Snook. 2000. Fish assemblages around seven oil platforms in the Santa Barbara Channel area. Fish Bull. 98:96-117.

Exhibit 4

Love, M. S., M. Nishimoto, and D. Schroeder. 2001. The ecological role of natural reefs and oil and gas production platforms on rocky reef fishes in southern California: 1998-1999 Survey Report. OCS Study MMS 2001-028.

Exhibit 5

Love, M.S. 2005. The ecological role of natural reefs and oil and gas production platforms on rocky reef fishes in southern California. Summary of research and project proposal. Santa Barbara, California.

Exhibit 6

Gebauer, D., et. al. 2004. Offshore Facility Decommissioning Costs, Pacific OCS Region. Department of Interior, Minerals Management Service, Pacific OCS Region.

Exhibit 7

Love, M. S., J. Caselle and L. Snook. 1999. Fish assemblages on mussel mounds surrounding seven oil platforms in the Santa Barbara Channel and Santa Maria Basin. Bull. Mar. Sci. 65:497-513.

Exhibit 8

Gitschlag, G. R., M.J. Schirripa, and J. E. Powers. 2000. Estimation of fisheries impacts due to underwater explosives used to sever and salvage oil and gas platforms in the U.S. Gulf of Mexico: Final report. OCS Study MMS 2000-087. Prepared by the National Marine Fisheries Service. Department of the Interior, Minerals Management Service, Gulf of Mexico Region.

Exhibit 9

Kennicutt II, M. C., R. H. Green, P. Montagna, and P.F. Roscigno. 1996. Gulf of Mexico Offshore Operations Monitoring Experiment (GOOMEX), Phase I: Sublethal responses to contaminant exposure-introduction and overview. Can. J. Fish. Aquat. Sci./J. Can. Sci. Halieut. Aquat. 53(11): 2540-2553.

Exhibit 10

Trefry, J. H., R. Trocine, M. McElvaine, R. Rember. 2002. Concentrations of total mercury and methylmercury in sediment adjacent to offshore drilling sites in the Gulf of Mexico. Final Report to the Synthetic Based Muds (SBM) Research Group. Florida Institute of Technology.

Exhibit 11

Creselius, E., L. Marshall Jr., W. Schroeder, D. Stephenson-Hawk. 2002. Mercury in the Gulf of Mexico: The Role of Outer Continental Shelf Oil and Gas Activities. Department of Interior, Minerals Management Service, Outer Continental Shelf Scientific Committee, Subcommittee on Mercury in the Gulf of Mexico.

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(805) 969-3594 cjmiller7@cox.net

May 9, 2005

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service
C/o Maryann Nickerson
7600 Sand Point Way, NE, Bin C15700
Seattle, WA 98115-0070

RE: Comments on Pacific Coast Essential Fish Habitat Draft EIS

Dear Mr. Lohn,

Our Association represents a small boat fleet of trap fishermen in the California Bight that fish for Spiny Lobster, Crab, Spot Prawn and Nearshore Rock fish with traps. The area of the Santa Barbara Channel and Channel Islands are the focus of my comments.

California Bight Shellfish trap fisheries.
There are several factors that characterize our fisheries in general as being conducted with no detectable impact to the seabed.

1. We fish the perimeters of essential fishery habitat due too the crustaceans we targets foraging behavior we are fishing in sand gravel or mud bottom.
2. Our fisheries have limited entry programs and are conducted seasonally or in very discreet areas they are temporal or spatially limited
3. The traps themselves have evolved to be highly selective by design and placement. The majority of the trapping takes place within state waters with minimum bycatch. A high percentage of that incidental bycatch is released alive. It is composed of nearshore rockfish.
4. The exception is Spot prawn trapping which does take place in federal waters and has had an observer program for the last three years.
5. Our fish-trapping fishery has been restricted by the state based on a data low stock assessment to the point that it is not an economically viable fishery any more.
6. In the Northern Channel Islands where we have the highest diversity of groundfish. This is due to the transition of California and Oregonian biological provinces and the extensive reef systems. In this area we have an extensive MPA system designed as a precautionary buffer that covers well over 30% of the high quality reef inside 25 fathoms. This is really a small-scale EFH no-take MPA system complemented by the existing federal stock rebuilding programs.
7. In reality the extreme weather combined with the extreme and rapid harvest controls have made a large portion of the traditional groundfish fisheries economically unviable for the dominant sport charter fleet and small scale fixed gear rockfish fleet.
8. There has been a natural oceanographic regime shift that has triggered a trend in overall kelp canopy regrowth and successful rockfish recruitment as this is documented by our MPA monitoring

program. These favorable conditions for recruitment are now supported by very strict harvest control in both catch limits and spatial management that restricts gear and harvest by area.

General Comments on Draft EIS.

We believe that the document needs to provide a better framework for regional assessment of fishery habitats in connection to the fishing ports as economic units that are characterized by diversity of fishing enterprise. The most significant omission is that there does not seem to be a human dimension to what is essential fishery habitat.
That would be the area that is essential to maintaining harvest and the working fishing port as a Cultural Resource for the Coastal Communities. There should be a defined alternative for insuring the fishing heritage of each port by adaptively managing the fisheries with experimental zonal harvest policies conducted with no-take representative habitat heritage reserves as monitoring control sites.

The key elements of this would be

1. Creating a policy for expanding the federal observer programs into fishing for data programs that develop a scientific protocol for incorporating research into traditional fishing practice.
2. Developing regional GIS support by expanding the NMFS port liaison program to directed fishery and habitat mapping
3. Regional development of joint fishery and scientists survey design forum supported by NOAA fisheries labs and the above geo-referenced mapping project.
4. Social and economic profiles of the ports and the spatial documentation of harvest control as baseline for EFH assessment.
5. A variety of monitoring programs by scale and region to calibrate monitoring of stock rebuilding objectives by area. Focusing the development of a representative sample of habitat and fishing as a bio-economic model for the various bioregions habitat types.
6. Achievable monitoring that has realistic goals so we will not be subject to more lawsuits.
7. Modeling of EFH experimental harvest policies with real stock data to quantify scenarios that would mitigate mandatory stock rebuilding timelines with an exponential level of precaution Harvest and habitat control.

Comments on California Bight Spatial Management.

As a commercial fisherman fishing in the California Bight we have witnessed the ad-hoc nature of spatial closures initiated in the California Bight. We recommend building adaptive management of the California Bight as a management unit for planning habitat quality based MPA systems. Restricting harvest by habitat is essentially creating a MPA.

We recommend an alternative reconfiguring the CINMS reserves taking into account the cumulative harvest control and fleet reduction in our region. That creates a monitoring reserve as a federal addition to CINMS through the council process adding slope fisheries.

This would be followed by adjusting the Existing Cow Cod Closure to open area for slope fisheries and creating a more scientifically based MPA network spatially designed by habitats that are high quality diversity areas.

This process would form the analytic basis for coordinating the federal and state MPA design to provide as a framework for adaptive harvest policy based in regulatory flexibility spatially utilizing the

California Bight as an experimental regional management unit on a scale for habitat based community based spatial management systems.

We still do not have a definitive spatial baseline of cumulative spatial harvest control to address a monitoring plan design. The DEIS alternatives for monitoring cannot be adequately analyzed with out the definition of a baseline in habitat protection.

We provide attachments design examples in GIS image files.

1. Joint Scientist Fishery Straw-man designs for CINMS reconfiguration
2. Industry supported reconfigurations with state zoning changes for specific reserves from no-take to MPA status.
3. Ground fish Habitat maps and value distribution surveys from CINMS process

Habitats of particular concern.

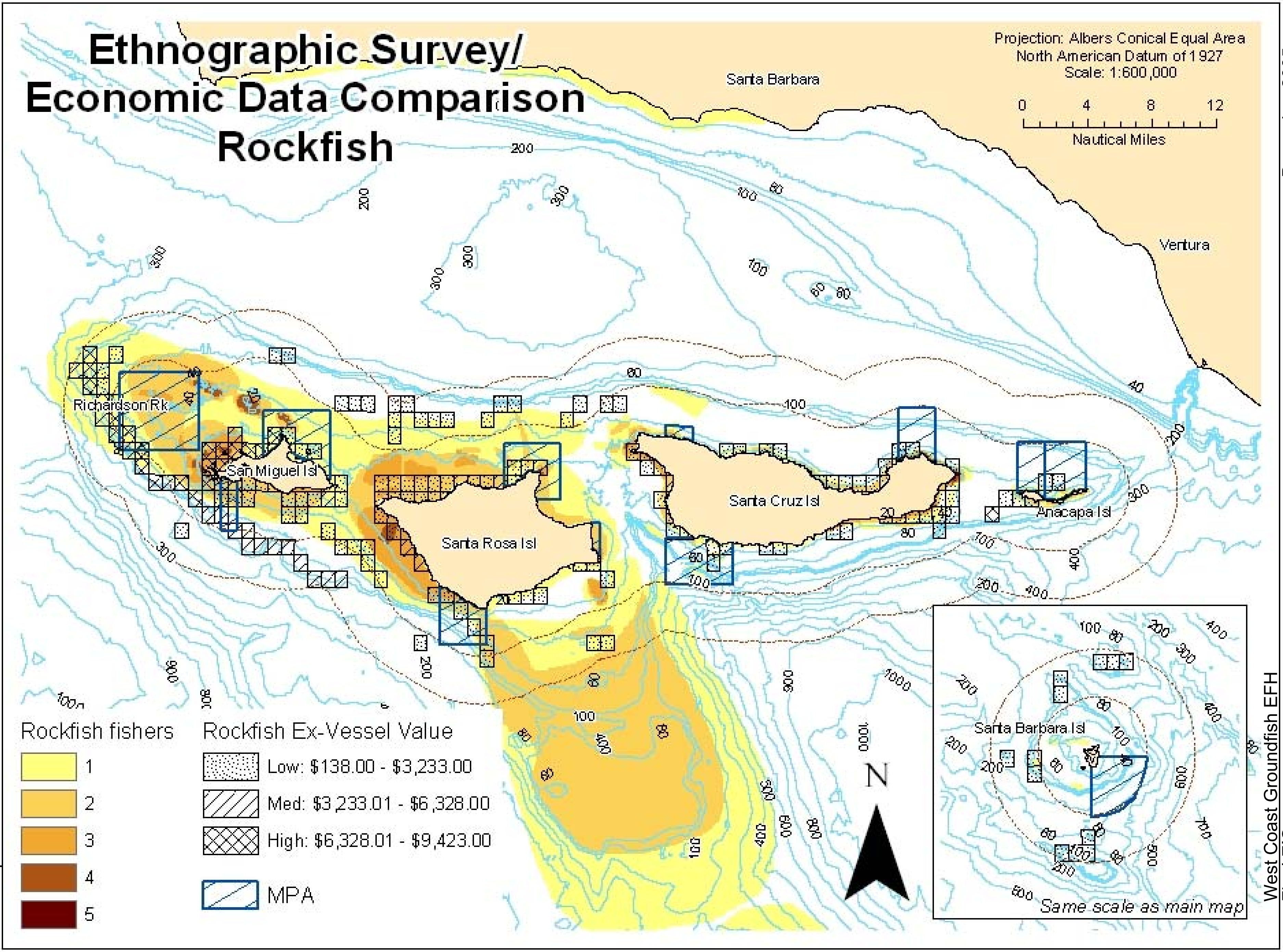
The DEIS supports an alternative of Surf Grass habitat as essential fishery habitat. This habitat is protected by the California State Water Quality Control board under the Coastal management act. The primary threat to this habitat is from sedimentation of nearshore low relief reefs associated with dredging and the developing reliance of coastal property owners on opportunistic beech replenishment programs. We support the need for comprehensive mapping of surf grass habitats in regions where beech replenishment programs are being initiated by coastal city governments. It is critical to be able to assess cumulative impacts from coastal beech replenishment permits and a monitoring program to insure minimum impacts of these programs to surf grass.

Our organization is very willing to work with NMFS in the development of proposals to assist in funding habitat analysis and the development of infrastructure for a collaborative process with NMFS and the Pacific Fisheries Management Council. We recommend initiating a pilot regional strategic plan for habitat mapping in the California bight under a partnership with NMFS and Sea Grant Fisheries extension. This should be conducted in collaboration with support from local academic institutions such as the Bren School of Ecology and Management at UCSB Santa Barbara, the Channel Islands State College at Camarillo and the NOAA fisheries labs.

We request that the Northwest region designate a point person to serve as liaison to our organization and the NMFS Southwest region to insure we have the best level of communication possible on developing the EFH analysis for our area over the next year. We would like to maximize our ability to assist in this process

Sincerely

Chris Miller VP CLTFA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Rockfish fishers
1
2
3
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5
Rockfish Ex-Vessel Value
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MPA
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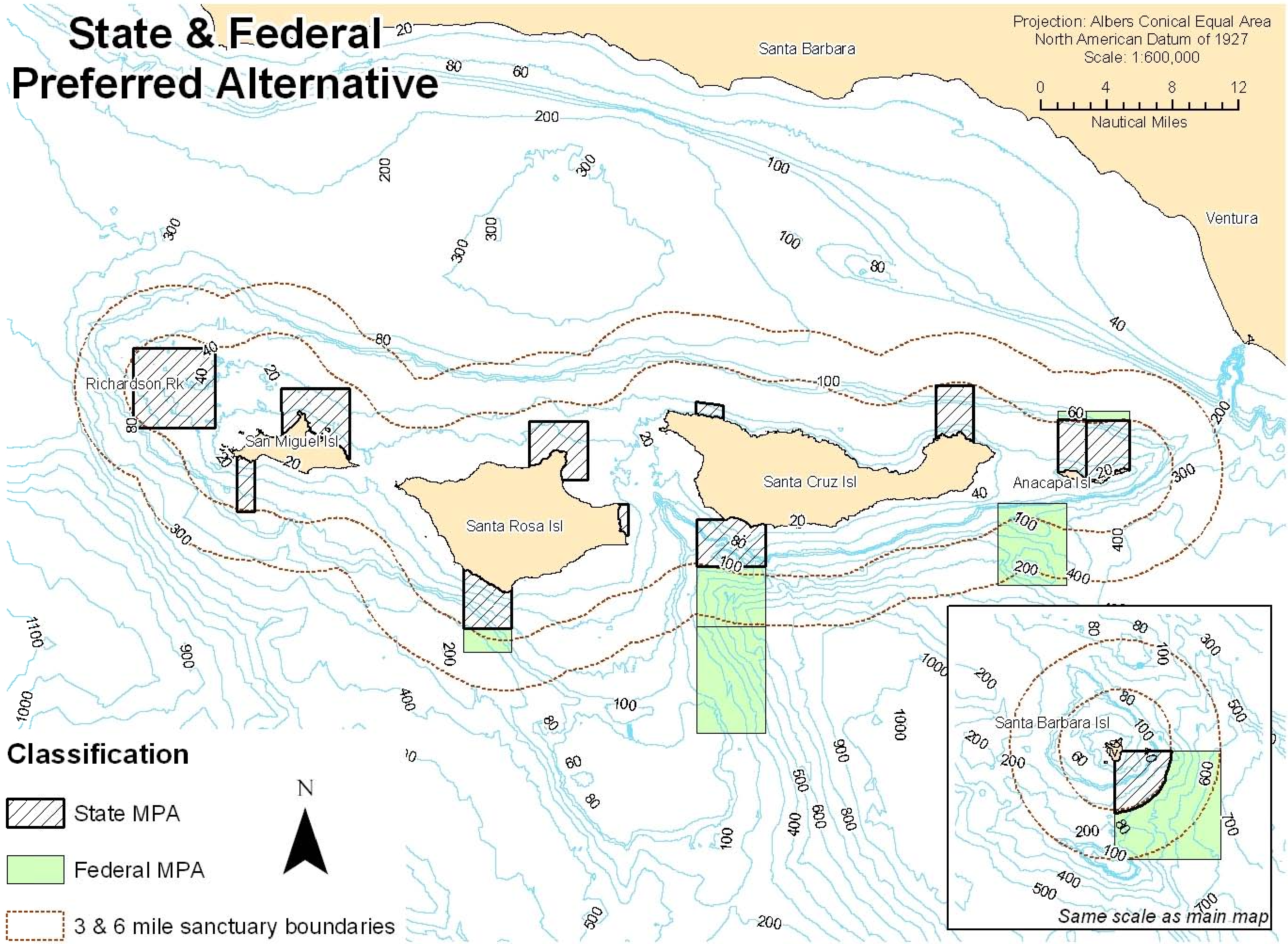
State & Federal
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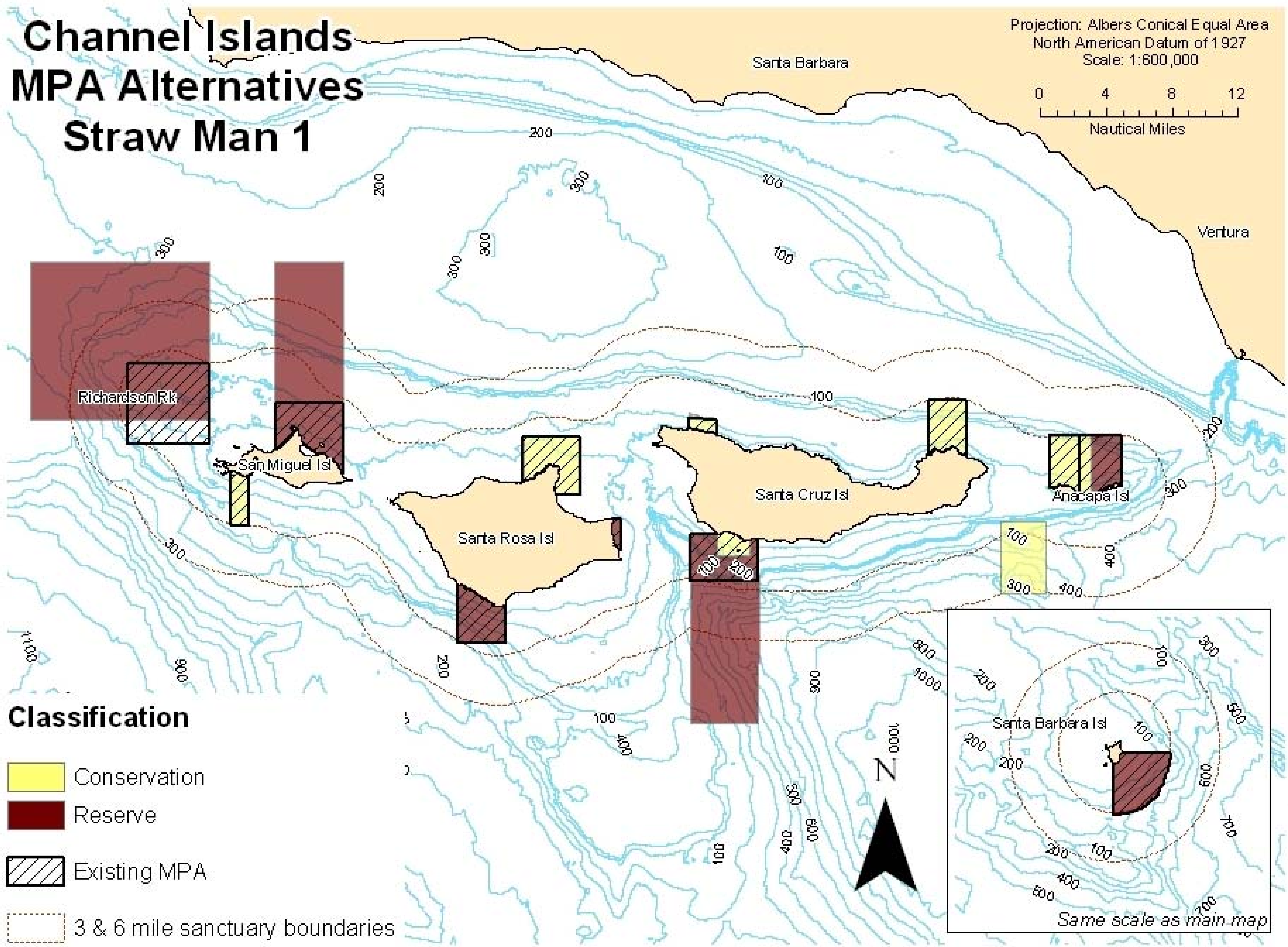
3 & 6 mile sanctuary boundaries
N


Channel Islands
MPA Alternatives
Straw Man 1
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Nautical Miles
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Ventura
Richardson Rk
San Miguel Isl
Santa Rosa Isl
Santa Cruz Isl
Anacapa Isl
Santa Barbara Isl
Same scale as main map
N
Classification
Conservation
Reserve
Existing MPA
3 & 6 mile sanctuary boundaries

Natural Resources Defense Council
Oceana
The Ocean Conservancy

May 11, 2005

VIA FACSIMILE: (206) 526-6426
VIA EMAIL: GroundfishEFHDEIS.nwr@noaa.gov

Mr. D. Robert Lohn, Regional Administrator
c/o Maryann Nickerson
National Marine Fisheries Service
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BIN C15700, Bldg. 1
Seattle, WA 98115-0070

Re: Comments on Pacific Coast Groundfish Fishery Management Plan Essential Fish Habitat Designation and Minimization of Adverse Impacts Draft Environmental Impact Statement

Dear Mr. Lohn:

The undersigned organizations submit these comments concerning the Draft Environmental Impact Statement for Pacific Coast groundfish ("DEIS") for consideration by the National Marine Fisheries Service.[1] While flawed, the analyses provided in the DEIS establish that current fishing practices and patterns cause significant long-term damage to essential fish habitat ("EFH"). Accordingly, the Fisheries Service and Pacific Fishery Management Council ("Council") are required to minimize these effects. Status quo measures are neither sufficient to meet the mandates of the Magnuson-Stevens Act nor responsive to the best available information.

These comments focus on some of the legal and analytical deficiencies of the DEIS. We believe that these deficiencies can be remedied between the draft and final Environmental Impact Statements, and most importantly that selection of a broad designation alternative and comprehensive minimization alternative is warranted by the facts, science, and the law.

The DEIS Does Not Satisfy the Requirements of the National Environmental Policy Act

I. The Statement of Purpose and Need is Impermissibly Narrow.

The Fisheries Service's statement of purpose and need in this DEIS is improperly narrow and vague. See City of Carmel-By-The-Sea v. U.S. Dep't. of Transp., 123 F.3d 1142, 1155 (9th Cir. 1997) (" . . an agency cannot define its objectives in unreasonably narrow terms."). The Fisheries Service states that the objectives for the Environmental Impact Statement ("EIS" or

[1] Some of the undersigned organizations have submitted additional independent comments, to be considered in conjunction with these comments.

"DEIS") are to consider alternatives for the designation of EFH and Habitat Areas of Particular Concern ("HAPCs"), to consider alternatives for the minimization of adverse effects of fishing on EFH, and to address gaps in the available data. DEIS at 1-4. The Magnuson-Stevens Fishery Conservation and Management Act ("MSA"), Fisheries Service's regulations, and the joint stipulation from AOC v. Daley require the Fisheries Service to do more than merely propose alternatives and identify gaps in the data. The Fisheries Service must implement all practicable measures to minimize adverse effects on EFH and must fully explore and evaluate those options in its EIS. Failure to include this fundamental objective within the purview of the DEIS violates NEPA, the MSA, and the agency's regulations and obligations under AOC v. Daley.

The MSA requires that the Fisheries Service minimize the adverse effects of fishing on EFH to the extent practicable. 16 U.S.C. § 1853(a)(7). The DEIS falls far short of analyzing the relative efficacy of the alternatives on minimizing adverse effects to EFH, not to mention recommending to the Council which measures the agency believes would be most practicable in achieving those goals. Instead, the reader is left with nothing more than a vague suggestion that the analysis contained within the DEIS might, someday, be incorporated into a decision that results in "on the water" EFH protections.

Additionally, the Joint Stipulation and Order from AOC v. Evans require that "NMFS will determine either that action is necessary or that action is not necessary to comply with the requirements of Section 303(a)(7) of the Magnuson-Stevens Act [16 U.S.C. § 1853(a)(7)]." AOC v. Daley, Joint Stipulation and Order at 5. This determination is one of the primary purposes of the DEIS and must be included in the statement of purpose and need, yet the DEIS is devoid of such a determination. The Fisheries Service must do more than merely consider and rate the alternatives under consideration and point out gaps in the available data; it must also decide which alternatives best satisfy its mandate to minimize adverse effects on EFH. The DEIS utterly fails to do so. The closest the agency gets to committing to whether it will take action (or require the Pacific Council to do so) is when it states that it will identify final preferred alternatives following the June 2005 Council meeting. DEIS at 2-1. By failing to include a determination of whether the findings contained within the DEIS merit action by the Pacific Council, NMFS has violated its obligations under AOC v. Daley to conduct full NEPA review of its efforts to minimize adverse effects to EFH. Joint Stipulation at 3-5. NMFS may not delay consideration of this decision until it issues its Record of Decision because the analysis that leads to the determination must be incorporated into the NEPA process. Failure to evaluate the environmental effects of the decision of whether or not NMFS will require action to be taken "would frustrate the fundamental purpose of NEPA, which is to ensure that federal agencies take a hard look at the environmental consequences of their actions early enough so that it can serve as an important contribution to the decision making process." California v. Norton, 311 F.3d 1162, 1175 (9th Cir. 2002) (internal citations and quotation marks omitted). We believe that conservation action is appropriate and required for the reasons stated below.

II. The Range and Quality of Alternatives Considered is Inadequate.

NEPA requires the Fisheries Service to consider "alternatives to the proposed action." 42 U.S.C. § 4332(2)(C)(iii). The alternatives analysis is the "heart" of the environmental review process. 40 C.F.R. § 1502.14. As such, agencies must "rigorously explore and objectively evaluate all reasonable alternatives." Id. As explained above, "an agency cannot define its objectives in unreasonably narrow terms," City of Carmel-By-The-Sea v. United States Dep't. of Transp., 123 F.3d 1142, 1155 (9th Cir. 1997), in order to limit the range of alternatives that it must consider. Alaska Wilderness Recreation & Tourism Ass'n v. Morrison, 67 F.3d 723, 729 (9th Cir. 1995) (quoting Idaho Conservation League v. Mumma, 956 F.2d 1508, 1520 (9th Cir. 1992)). The Fisheries Service is obligated to consider all reasonable alternatives that fit squarely within the scope of identifying and describing EFH and HAPC, as well as identifying and recommending which minimization measures the Pacific Council should implement and when they will be implemented. While the agency and Council clearly may consider alternatives refined in response to public comment, and refine or combine alternatives in response to public comments, the Fisheries Service may not consider or adopt any alternate proposals not included within the range of alternatives presented within the DEIS absent full NEPA review. Doing so would violate NEPA's express purpose of informed decision making and public participation. Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 349 (1989); Metcalf v. Daley, 214 F.3d 1135, 1141 (9th Cir. 2000).

Before commenting on the issues raised by the EFH, HAPC, and minimization alternatives, we would like to voice a universal critique of the methodological approach taken by the Fisheries Service. By considering alternatives for EFH, HAPC, and minimization separately, the agency has greatly limited the number of alternatives available for consideration and adoption. This leads to arbitrary and illogical results. As the agency readily acknowledges in the section entitled "The Implications of the EFH Identification and Description Alternatives on HAPC and Affects Minimization," the choice of EFH alternative limits which HAPC and minimization alternatives remain available for implementation. DEIS at 4-11 – 4.12. Thus, the Fisheries Service could choose EFH, HAPC, and minimization alternatives that do not work together. As a result, the number and range of HAPC and minimization alternatives considered in this DEIS are far fewer and less broad than the agency would like the reader to believe. This approach violates NEPA's express requirement that the Fisheries Service consider a reasonable range of alternatives. To correct this methodological problem, the agency should either consider a range of HAPC and minimization alternatives within each EFH alternative so that the steps ultimately taken to minimize adverse impacts correspond to the EFH identified, or permit selection and implementation of any combination of alternatives.

A. The Fisheries Service Relies Too Heavily on HSP to Define EFH and Fails to Identify a Threshold for Determining Whether Habitat is Essential Under its HSP Alternatives.

The Fisheries Service relies exclusively on the Habitat Suitability Probability ("HSP") model in all but two of the alternatives considered for EFH identification and designation. DEIS at 2.3. As described further below, this raises great concerns about the adequacy of the range of EFH designation and identification alternatives. In addition, the HSP model does not include all relevant information, such as data layers concerning coral and sponge. The range of data used to select EFH also is truncated impermissibly by the overly-quantitative nature of the analysis and the focus on the abundance of managed species to the exclusion of other necessary components of EFH, such as prey species and their habitats. The Fisheries Service should include more information in its analysis in order to improve the precision of its EFH model.

Additionally, the agency explains that the HSP scores are used as a proxy for determining whether habitat is "essential," but fails to define the threshold level for making such a determination. DEIS at 2-3. Instead, the Fisheries Service asserts that "the higher the HSP, the more likely the habitat area should be identified as EFH." DEIS at 2-3. Applying this logic to the alternatives presented leaves the Council and the general public to guess whether essential habitat equates to 100% of the area with HSP above zero (Alternatives A.2 and A.3), the top 70% (Alternative A.5), or the top 30% (Alternative A.6), and whether distinctions should be made for overfished and precautionary zone species. The Fisheries Service's approach here is inadequate. See Morongo Band of Mission Indians v. F.A.A., 161 F.3d 569, 575 (9th Cir. 1998) ("The touchstone for our inquiry is whether an EIS's selection and discussion of alternatives fosters informed decision-making and informed public participation.") (citation and internal quotations omitted).

The very purpose of the DEIS – to provide a management tool for developing conservation efforts and stewardship of EFH – is rendered meaningless if the tool relied upon fails to identify the point at which habitat should be considered "essential" within the meaning of the law. The Fisheries Service must provide more reasoning in its analysis and guidance to the Council than it has chosen to provide in the DEIS. Additionally, the nearly exclusive reliance on HSP as a means of describing and identifying EFH greatly limits the quality and range of EFH alternatives considered.

B. Considering HAPC as a Subset of EFH Leads to Illogical and Arbitrary Results.

Designation of HAPC should identify areas based on one or more of the following criteria: (i) the importance of the habitat's ecological function provided by the habitat; (ii) the extent to which the habitat is sensitive to environmental degradation; and (iii) whether development activities are, or will be, stressing the habitat type. 60 C.F.R. § 600.815(a)(8). The Fisheries Service's decision to consider HAPC as a subset of EFH could lead to illogical and arbitrary results. The Council's designation of HAPC could be circumscribed by its contemporaneous designation of EFH if the HAPC alternative selected does not fit within the chosen EFH. Alternatively, the Council could choose to avoid this inconsistency by only considering HAPC alternatives that fit within certain EFH alternatives, or vice versa. Either way, the number of HAPC alternatives that can be considered fully is limited by the agency's insistence that HAPC be a subset of EFH.

III. The Fisheries Service's Environmental Effects Analysis is Inadequate.

NEPA requires that agencies discuss "the environmental impacts of the proposed action and alternatives." 40 C.F.R. § 1508.9(b). Environmental impacts are defined to include "both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial." 40 C.F.R. § 1508.8(b). The fundamental purpose of the DEIS is the detailed consideration of the environmental effects of implementing all practicable minimization measures. The DEIS fails to accomplish this. Indeed, the Fisheries Service admits that "[i]t is not possible to analyze the degree to which the function of habitat within the ecosystem or for groundfish will be affected by the alternatives." DEIS at 4-1. Although NEPA does not require agencies to "foresee the unforeseeable," it does require agencies to predict potential consequences of their actions before those consequences are fully known. Methow Valley

Citizens Council v. Regional Forester, 833 F.2d 810, 816-817 (9th Cir. 1987), rev'd on other grounds, Robertson v. Methow Valley Citizens Council, 490 U.S. 332 (1989) (quoting City of Davis v. Coleman, 521 F.2d 661, 676 (9th Cir. 1975). The Fisheries Service may not shirk its responsibilities to consider environmental effects merely due to limitations in the available data. "Reasonable forecasting and speculation is . . . implicit in NEPA, and we must reject any attempt by agencies to shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as crystal ball inquiry." Kern v. U.S. Bureau of Land Management**,** 284 F.3d 1062, 1073 (9th Cir. 2002) (internal quotations and citations omitted).

NEPA also requires that the Fisheries Service fully consider the cumulative impacts of its decisions together with "other past, present and reasonably foreseeable future actions." 40 C.F.R. § 1508.7; see Klamath-Siskiyou Wildlands Center v. Bureau of Land Management, 387 F.3d 989, 993-94 (9th Cir. 2004) ("Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."). Accordingly, the agency is required to analyze all past, present, and reasonably foreseeable fishing efforts in terms of their cumulative impact to EFH. The Fisheries Service does not appear to have done so, especially with regard to a cumulative analysis of all past fishing activities within EFH.

The DEIS Does Not Satisfy the Requirements of the Magnuson-Stevens Act

One of the primary purposes of the 1996 Sustainable Fisheries Act amendments to the Magnuson-Stevens Act is to protect habitat. Accordingly, Congress imposes on the Fisheries Service the duties to describe and identify Essential Fish Habitat, and to minimize the adverse effects of fishing on EFH to the extent practicable.

The statute makes clear that the duty to minimize adverse effects focuses on the effects of fishing on habitat. See 16 U.S.C. § 1853(a)(7) (duty to "minimize…adverse effects on such habitat caused by fishing). The regulations similarly make clear that the inquiry regarding whether there are adverse effects to EFH focuses on whether a fishing activity has any affect on the quality or quantity of EFH:

> Adverse effect means any impact that reduces quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

50 C.F.R. § 600.810(a). Thus, in order to determine the universe of adverse effects that may require measures to minimize, the Fisheries Service must examine any and all impacts that reduce the quality or quantity of the habitat itself. These impacts include considerations of benthic organisms, prey species and their habitat, and other ecosystem components. In other words, the adverse effects inquiry is a broad one, focused on the effects of fishing on habitat and elements of the ecosystem, and not limited to the effects of fishing on fish stocks themselves.

In addition, the agency must perform a cumulative impacts analysis, which is to consider impacts on the environment. 50 C.F.R. § 600.815(a)(5).

Based on the adverse effects evaluation and the cumulative impacts analysis, the "Council must prevent, mitigate, or minimize any adverse effects from fishing, to the extent practicable, if there is evidence that a fishing activity adversely affects EFH in a manner that is more than minimal and not temporary in nature… ." 50 C.F.R. § 600.815(a)(2)(ii).

I. NMFS Cannot Limit Its Analysis of Adverse Impacts to Managed Species Alone and Fails to Evaluate Properly MMNT.

The MSA requires that the Fisheries Service and the Fishery Management Councils "minimize to the extent practicable adverse effects on [EFH] caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat." 16 U.S.C. § 1853(a)(7). The EFH rule requires that the Fisheries Service and the Councils "must act to prevent, mitigate, or minimize any adverse effects from fishing, to the extent practicable, if there is evidence that a fishing activity adversely affects EFH in a manner that is more than minimal and not temporary ["MMNT"]." 50 C.F.R. § 600.815(a)(2)(ii). The agency acknowledges that "[p]racticable Council action is triggered by adverse effects that are more than minimal and not temporary in nature." DEIS at 2-15. The agency goes to great lengths in both the DEIS and the appended Risk Assessment to create a sensitivity and recovery index ("SRI") to value the impact to habitat by gear type. While this helpful first step provides ample justification for implementing a minimization alternative, the SRI model itself does not consider all relevant factors.

First, the SRI that forms the basis of all but three of the minimization alternatives limits its consideration of habitat primarily to benthic habitat. The EFH rule requires consideration of a much broader definition of habitat when considering adverse effects. 50 C.F.R. § 600.810(a) ("Adverse effects may include direct or indirect physical, chemical, or biological alternations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH."). The agency must include qualitative analysis in addition to its SRI index that considers all of the best available science pertaining to prey species and their habitat and other important ecosystem components not captured by the SRI model.

Second, the DEIS provides no guidance to the public, the Council, or the decision maker about which adverse effects of fishing on EFH must be minimized. The Fisheries Service asserts that the Risk Assessment was intended to define when impacts from fishing exceed the MMNT threshold, but "due to data and time constraints it was not possible . . . to create an analytical tool capable of identifying areas of impacted habitat and demonstrating the effects of minimization alternatives." DEIS at 2-12 – 2-13. In other words, the main tool relied upon to create the minimization alternatives is incapable of accomplishing the very thing it was designed to do. Nevertheless, it is clear from the analyses currently described in the EIS that there are effects of fishing that reduce the quality and quantity of EFH in a manner that is both more than minimal and not temporary and therefore, that minimization is required.

In addition, the Fisheries Service regulations recognize three categories of tools to address adverse effects on fishing: fishing equipment; time/area closures; and harvest limits. 50 C.F.R. § 600.815(a)(2)(iii)(A)-(B). None of the alternatives considered in the DEIS even considers the use of reduced harvest limits as a way of minimizing adverse effects to EFH. The DEIS also fails to explain the basis of the decision to omit this tool from consideration under any of the alternatives. This decision not only contravenes the agency's regulations, but also ignores the conclusion of the National Research Council that "[e]ffort reduction is the cornerstone of managing the effects of fishing, including, but not limited to, the effects on habitat." NRC, 2002. In addition to being contrary to law, the decision violates NEPA for failing to consider a reasonable range of minimization alternatives and violates the APA for failing to articulate a reasoned basis for its decisions. Effort reduction is a reasonable management tool that NMFS must add to its suite of minimization measures under consideration.

II. The DEIS Fails to Consider the Best Scientific Information Available.

As described further below, the DEIS fails to consider the best scientific information available. This failure violates not only NEPA's mandates, but also the MSA and National Standard 2. 16 U.S.C. § 1851(a)(2); 50 C.F.R. § 600.315.

The DEIS Analysis is Deficient

In addition to the legal failures outlined above, the DEIS's analyses and conclusions are substantively and analytically flawed. While the DEIS contains valuable information that provides ample basis for a broad EFH designation and demonstrates clearly that minimization measures are necessary, the analyses should be improved to meet relevant legal and scientific standards.

I. EFH Identification: Description of the Alternatives

The rationale for Alternative A.1 should be revised to include more than simply a description of the status quo EFH identification alternative to describe fully why this alternative was chosen in the initial EFH identification decision. The discussion should pay special attention to depths greater than 3400 meters which are part of the status quo but not included in Alternatives A.2-A.6. Furthermore, as Alternative A.1 is the only alternative not based on the HSP model, it must be fully compared and contrasted with the HSP model-based alternatives, including the number of uncertainties in the HSP model output and how this alternative addresses these uncertainties.

Similarly, the description of Alternative A.2 should be enhanced to include a more explicit description of how this alternative provides better assurance that groundfish essential fish habitat is properly identified. The description of this alternative in its current form notes only that the addition of 100 meter depth provides a precautionary adjustment in case of non-observed species. This description should also clearly convey that the extra 100 meter depth helps buffer the uncertainties surrounding the HSP modeling effort and major prey species habitat requirements that are noted below.

A. <u>The Shortcomings of the HSP Models Should be Clearly Stated in the Description of Alternatives and Environmental Analysis.</u>

Only two of the six EFH identification alternatives are not solely based on the Habitat Suitability Probability (HSP) model. It is therefore imperative that the description of the alternatives and the environmental analysis provide the public with a clear understanding of the limitations and uncertainties involved in this modeling effort.[2] The following major uncertainties should be clearly defined in an accessible format to aid the decision maker and public in understanding the differences between alternatives:

1. The HSP modeling effort only includes depths out to 3000 meters. The discussion in Alternative A.2 and information from the groundfish life history appendix clearly illustrate that groundfish have been observed at depths up to 3400 meters;
2. Of the possible 328 maps of groundfish species and their life stages, only 160 HSP maps can be produced resulting in roughly half of the maps needed to adequately identify EFH by life stage for each of the eighty-two groundfish species.[3] The primary life stage where little information is available is larvae and eggs. This is particularly important for overfished species;
3. The trawl surveys utilized in the HSP model provide limited information concerning the function of habitat for a species for the following reasons. First, temporal aspects of the survey data may omit important habitats (for example, winter breeding grounds for lingcod using summer trawl surveys). Second, trawl surveys are of limited value for identifying EFH for juvenile stages (evident by a review of the HSP model outputs). Third, there is a strong bias towards habitats that can be trawled which can result in under representation of species that associate with untrawlable substrates for purposes of modeling the effects of depth and latitude[4]; and
4. The limited mapping of organisms that form biogenic habitats, which are particularly vulnerable to impacts and may have long recovery times, may result in these areas not being identified as EFH.

B. <u>The Treatment of Groundfish Prey Species is Improperly Limited.</u>

The EFH final rule states that:

> Loss of prey species may be an adverse effect on EFH and managed species because the presence of prey makes waters and substrate function as feeding habitat, and the definition of EFH includes waters and substrate necessary to fish for feeding. Therefore, actions that reduce the availability of major prey species, either through direct harm or capture, or through adverse impacts to the prey species' habitat that are known to cause a reduction in the population of the prey species, may be considered adverse effects on EFH if such actions reduce the quality of EFH. FMPs should list the major prey species for the species in the

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[2] We note that Appendix A, the Risk Assessment provides a fuller discussion of the HSP modeling process and applicable limitations and uncertainties. However, this information should be stated clearly in the main body of the EIS to help ensure the public and decision makers can make an informed decision.

[3] 50 CFR 600.815(a)(1)(iv).

[4] Appendix A at 91.

> fishery management unit and discuss the location of prey species' habitat. Adverse effects on prey species and their habitats may result from fishing and non-fishing activities.

50 C.F.R. 600.815 (a)(7). Accordingly, the groundfish FMP must include a list of major prey species for groundfish and discuss the location of prey species' habitat. The discussion of prey species in the main text of the EIS is currently limited to one section[5] describing primary prey species and a general statement that prey species utilize the same habitats as groundfish. The EIS currently includes only one alternative focused on protection of a prey species. The EIS should be revised to include a better discussion of the habitat requirements of major prey species to be included in the range of alternatives to aid the public in fully analyzing these alternatives. If information does not exist, this must be stated clearly in the EIS.

C. Habitat Areas of Particular Concern Should not be Limited to Essential Fish Habitat Alternatives.

The EIS should make clear that the identification of HAPCs for groundfish should not be limited by alternatives for identifying and describing EFH. If an area is identified as a HAPC but is located outside of an area included in a EFH identification alternative, this area can be identified as both EFH and a HAPC. For example, if the PFMC or public identifies an area that meets the requirements for designation of a HAPC but this area is located deeper than preliminary preferred Alternative A.2 (3400 meter depth designation for EFH), this area can still be designated as both a HAPC and EFH.

II. Effects of Fishing on Essential Fish Habitat: Description of Alternatives

The description of the development of alternatives to minimize adverse impacts of fishing on essential fish habitat gives the public a misguided understanding of the proper management standard of the MSA and EFH regulations.[6] While the EIS provides the definition of adverse impacts from the final rule, it then goes on to provide a different standard for assessing adverse effects centered around the link between EFH and groundfish production, resulting in a "precautionary" label being applied to development of the alternatives.

The EIS bases this on the following rationale. First, the EIS discusses the purpose of the impacts model and its inability to model the relationship between the intensity of fishing effort and effects on habitat due to a lack of data. Next it states that the current state of habitats effects research only makes it possible to construct alternatives that are targeted at physical alteration of habitat and changes in biodiversity from the impact. It therefore concludes that alternatives cannot be quantitatively constructed to increase production of groundfish or enhance ecosystem function, leading to a precautionary approach being taken by NMFS and the Council in developing the alternatives. The EIS further elaborates on this point by stating:

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[5] EIS at 3-30.
[6] EIS at 2-15; this same rationale is also presented in a summarized form at 4-1.

> [A]lthough the alternatives cannot be specifically targeted to promote sustainable fisheries with predictable population level results, the alternatives were developed to reduce adverse impacts in terms of physical modification to habitat and biodiversity. The paucity of quantified, spatially explicit data on adverse impacts, and the extent which adverse impacts have reduced the ability of groundfish to sustain themselves, functioned as the problem statement around which the alternatives were constructed. The alternatives were deliberately developed to reflect the broad range of available data and present the full spectrum of precautionary choices for decision makers to meet the purpose and need of action to minimize the adverse effects of fishing.[7]

The MSA obligation to minimize the adverse impacts of fishing on EFH is not based on a production standard. Rather, it is based on the definition of adverse impact or effect:

> Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences or actions.[8]

The EIS seems to put too much emphasis on the failure of the EFH impacts model to model the relationship between the intensity of fishing effort and effects on habitat. The model is not the only way (and not even the proper way considering available data) to assess adverse effects as defined by the MSA and EFH regulations. Studies analyzing the impacts of fishing gears on EFH can provide information to show an adverse effect necessary for developing a range of mitigation alternatives. Furthermore, the current state of the art habitat research, as defined by the EIS, provides the appropriate type of information to assess adverse effects. Quantitative studies linking gear impacts to production are not needed to meet MSA requirements.

Therefore, the proper standard and the one that guided development of these alternatives by the PFMC's EFH EIS Committee, is based on minimizing adverse impacts as defined in the EFH regulations using the best scientific information available. In this case, a review of the literature, the development of a sensitivity and recovery index (SRI) and guidance provided by the National Research Council ("NRC") are utilized to identify fishing operations that have adverse effects on habitat. Therefore, the description of the development of the alternatives should be revised to clearly state the definition of adverse impacts and that the tools necessary to identify and minimize the adverse effects of fishing gears on EFH are contained within the EIS as opposed to couching the alternatives as "precautionary" by using a groundfish production and quantifiable impacts standard.

The presentation of the sensitivity and recovery indices in the EIS discusses the decision to interpret global literature to help understand the effects of fishing on habitat. The EIS should cite the NRC report to support this choice and better inform the public on the basis of this

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[7] Id.

[8] 50 C.F.R. 600.810.

recommendation.[9] To do this the EIS should include a general discussion on the NRC report, as well as the Auster and Langton paper and others, by incorporating the discussion in Appendix A to help better inform the decision maker as to how the adverse impacts were identified and a range of alternatives for minimizing them was developed.

The description of Alternative C.1 includes the potential mitigative effect of the rockfish conservation area ("RCA"). The description must also include the fact that the RCA is in place as a bycatch reduction management tool to help maximize fishing opportunities and that the RCA changes in size and shape frequently. This section of the EIS should make this clear by incorporating discussion of the use of the RCA contained in section 4[10] to help better inform the public about this alternative.

Finally, the EIS incorrectly states that Alternatives C.12-C.14 are mutually exclusive and that only one could be contained in a final preferred alternative.[11] This statement is misleading. While the areas identified in C.12, C.13, and C.14 are identical, the levels of protection afforded these areas could range from no bottom trawling to no fishing. Therefore, the mitigation strategies identified in the different alternatives can be mixed and matched for the specific areas contained in alternatives C.12-14.

III. Effects of Fishing on Essential Fish Habitat: Analysis of Adverse Impacts

The alternatives for minimizing the adverse impacts of fishing gear on EFH rely almost exclusively on a the SRI that displays in a numerical fashion the impact of a gear on a specific habitat in terms of how sensitive the habitat is to a particular gear type and the expected time needed for the habitat to recover from an impact. The main body of the EIS must include a discussion of the methodology utilized to develop this index in order to inform the public of key information that was not included. For example, it is our understanding that only literature that included quantifiable before and after differences of gear effects was included. There is ample literature on growth, age, biology, re-settlement and other relevant factors that should have been included. It is important that all available studies and sources of information are included in the EIS, regardless of whether or not they are considered useful for the SRI, to provide the public and the decision maker with the information necessary to make an informed choice.

The information presented in the SRI is treated as a range with standard errors based on the number of studies for each category. This methodology may result in certain values having a greater range of impact based on the number of applicable studies, not necessarily on the basis of the certainty provided in the original study. For example, only one study on the effects of bottom trawling on hard slope biogenic habitat showing major changes in bottom structure was considered. The sensitivity value for this category is given as 1.5-3 solely for the reason that it is one study as opposed to the impacts found.

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[9] We recognize that the NRC report is cited in various places in the document and should also be cited here for the reasons discussed.

[10] EIS at 4-14.

[11] EIS at 2-12.

The sensitivity index provides a relative measure of the likely changes to habitat caused by interactions with various fishing gears and therefore provides little information on subsequent impacts.[12] This makes the cumulative impacts analysis (see below) critical in determining adverse impacts. Furthermore, the sensitivity values do not incorporate the relationship between fishing impacts and depth. The gear impacts analysis notes that benthic communities in deeper waters are probably less adapted to resisting and recovering from physical disturbances generally.[13] Considering that over the last few years fishing effort has been redirected into deeper waters, this factor is a significant one and must be stated clearly in the environmental analysis discussion to ensure the public makes an informed decision. Finally, the SRI does not consider the issue of fishing intensity or frequency of disturbance of the bottom by fishing gear.

IV. Effects of Fishing on Essential Fish Habitat: Prey Species

The EFH final rule states that:

> Loss of prey species may be an adverse effect on EFH and managed species because the presence of prey makes waters and substrate function as feeding habitat, and the definition of EFH includes waters and substrate necessary to fish for feeding. Therefore, actions that reduce the availability of major prey species, either through direct harm or capture, or through adverse impacts to the prey species' habitat that are known to cause a reduction in the population of the prey species, may be considered adverse effects on EFH if such actions reduce the quality of EFH. FMPs should list the major prey species for the species in the fishery management unit and discuss the location of prey species' habitat. Adverse effects on prey species and their habitats may result from fishing and non-fishing activities.

50 C.F.R. 600.815 (a)(7). While the EIS describes major prey species and identifies their habitat requirements generally, it provides no information on direct harm or capture with the exception of krill. The EIS should utilize information in the Bycatch EIS and groundfish observer data to identify direct removal of prey species by fishing and incorporate discussion of adverse impacts to prey species and their habitats into the description and environmental consequences of alternatives to minimize adverse impacts of fishing on EFH.

V. Effects of Fishing on Essential Fish Habitat: More than Minimal and Not Temporary Threshold

The EFH Rule states that:

> Councils must act to prevent, mitigate, or minimize any adverse effects from fishing, to the extent practicable, if there is evidence that a fishing activity adversely affects EFH in a manner that is more than minimal and not temporary in nature, based on the evaluation conducted pursuant to paragraph (a)(5) of this section.

[12] Appendix A Risk assessment at 124.
[13] Appendix A, Gear impacts analysis at 27.

50 CFR 600.815 (a)(2)(ii). In Section 2 of the EIS there is a discussion of the "minimal and temporary threshold" and how the risk assessment process sought to delineate where impacts exceeded this threshold.[14] At the conclusion of the discussion, the EIS does not define the "minimal and temporary threshold". Yet in Section 4 of the EIS a de facto "minimal and temporary threshold" is established for gear types with no rationale other than to "simplify the large amount of information for the analyses of individual alternatives".[15] These minimal and temporary thresholds are arbitrary. In the absence of evidence that can demonstrate that these values do in fact equate to minimal and temporary, the proper standard should be values of 0 for sensitivity and recovery in the SRI. In addition to being precautionary, an approach the EIS touts often to describe the range of alternatives to minimize adverse impacts of fishing on EFH, there is precedence for this approach in another region. In the EIS for EFH in the Gulf of Mexico NMFS and the Council utilized a similar metrics tool for assessing impacts of fishing gears on different habitat types based on a global literature search. In that EIS, anything above a value of 0 (no impacts) was considered to have crossed the minimal and temporary threshold unless proven otherwise. Furthermore, it is abundantly clear from the data presented in the EIS that by any rational measure, the more than minimal and not temporary threshold has been crossed, and that measures must be taken to minimize the adverse effects of fishing on essential fish habitat.

VII. Cumulative Effects Analysis

The EFH final rule states that:

> Cumulative impacts are impacts on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. To the extent feasible and practicable, FMPs should analyze how the cumulative impacts of fishing and non-fishing activities influence the function of EFH on an ecosystem or watershed scale. An assessment of the cumulative and synergistic effects of multiple threats, including the effects of multiple threats, including the effects of natural stresses (such as storm damage or climate-based environmental shifts) and an assessment of the ecological risks resulting from the impact of those threats on EFH, also should be included.

50 CFR 600.815 (a)(5). To analyze cumulative impacts the EIS provides a brief discussion for each of the alternatives and a methodology to rank the cumulative impacts of the specific alternative. Section 3 of the EIS should provide an analysis of the past, present and reasonable foreseeable future actions on EFH and discuss the ecological risks posed by the cumulative impacts of these actions. Relevant discussions would include past, present and reasonably foreseeable future temporal and spatial patterns and trends of fishing in conjunction with the same considerations for spatial and temporal trends of non-fishing activities contained in the section 3.10. This analysis will better inform the decision maker as to the true status of groundfish EFH and the implications of impacts minimization alternatives in section 4.

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[14] EIS at 2-13.
[15] EIS at 4-2.

VIII. Economic Analysis

Any viable economic analysis of minimization measures should include not only the short-term direct costs of management measures, but also the long-term costs of continued habitat damage, as well as the long-term benefits of habitat protection. In addition, the economic impact analysis of section 4 must be revised to include the expected future economic gains by groundfish trawl vessels due to the buyback program. This program was established based on the premise that by reducing the number of fishing vessels in the trawl fishery, the remaining vessels would become more profitable. The EIS should consult the appropriate analysis from the groundfish trawl vessel buyback program to include in the EIS.

Conclusion

Industrial fishing off the West Coast causes serious impacts to habitat. Adverse effects to habitat are occurring in West Coast waters that are long-term and substantial. The Fisheries Service is legally required to minimize these effects. A comprehensive regulatory system specifically designed to protect habitat is necessary for the agency to live up to its legal mandates and its responsibility as steward of our public resources.

Sincerely,

David Newman
Attorney
Natural Resources Defense Council

Chris Dorsett
Director, Regional Fish Conservation
The Ocean Conservancy

Jim Ayers
Pacific Regional Director
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May 11, 2005

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Re: Comment on 2005 Pacific Coast Groundfish EFH DEIS

Dear Adminstrator Lohn:

This letter submits comments of the Natural Resources Defense Council and The Ocean Conservancy on the above referenced topic, supplementing the comments we sent jointly with Oceana under separate cover analyzing the legal and technical adequacy of the Essential Fish Habitat Draft Environmental Impact Statement (DEIS). The purpose of this letter is to express the support of our organizations and our more than 2 million members, volunteers and activists for specific alternatives analyzed in the DEIS. In summary, we support EFH Identification Alternative A.2 (depths less than 3,500m) plus seamounts and Impact Miminization Alternatives C.5 (prohibit a krill fishery) and C.12, revised version (close ecologically important areas to bottom trawl), combined with closures to bottom-contacting gear, per Alternative C. 13, at Cordell and Daisy Banks and seamounts. We also support Research and Monitoring Alternatives D.2.1, D.3 and D.4, combined with a systematic research and monitoring program aimed at providing relevant information on habitat quality and impacts to decision makers and the public, and fostering adaptive management of habitat measures (an alternative omitted from the DEIS). We urge you to remedy the deficiencies in the document, described in our joint comments with Oceana, and to take action as quickly as possible to implement the alternatives described herein.

Background and Principles

Fishery managers and scientists have called habitat damage the most significant long term threat to the health of fisheries. Extensive research, including a National Academy of Sciences (NAS) report,[1] documents the adverse impacts of bottom trawling on a variety of habitats. A number of studies identify bottom trawling as one of the most disruptive disturbances to seabed communities, decreasing habitat complexity and potentially altering productivity. The NAS study emphasizes that lack of area-specific

[1] National Research Council, 2002. Effects of Trawling and Dredging on Seafloor Habitat, National Academy of Sciences.

studies on trawling effects does not justify postponing action to address fishing effects on seafloor habitat.

Over the last two years, two national blue ribbon ocean commissions have made recommendations for improving fishery management and the health of the oceans. Those reports embrace a number of principles that are consistent with the NAS approach and that we believe should underlie the National Marine Fisheries Service's (NMFS's) decisions regarding protection of groundfish essential fish habitat (EFH). They include the precautionary approach, which errs on the side of conservation in the face of uncertainty and limited information; ecosystem-based management, which reflects the relationships between ecosystem components, including humans; adaptive management, in which management measures are designed to continually provide new information and improve the basis for future management decisions. The alternatives we support incorporate these principles. They take important steps to reduce the adverse effects of fishing on Pacific groundfish habitat, provide protection to diverse and vulnerable habitats, and proactively prevent new potential impacts in the future.

Rationale

Alternative A2: Depths less than 3,500 meters plus seamounts. Alternative A.2, selected by the Pacific Fishery Management Council (PFMC) as a preliminary preferred alternative, is the only EFH-identification alternative that utilizes both the habitat suitability probability (HSP) modeling outputs and other data sources, yet is not so broad as to be meaningless. This alternative addresses the uncertainties involved with the HSP modeling outputs by including other data sources plus a 100 meter-depth buffer. Alternatives A.3 through A.6 rely exclusively on the HSP model outputs and therefore fail in several ways to utilize the best scientific information available. First, the HSP modeling outputs are limited to depths less than 3000 meters. That limitation results in identification of EFH out to a maximum of 3000 meters despite information that groundfish occur at depths of 3400 meters. Second, the HSP modeling effort only produced EFH requirements for about half of the species by life stage. Thus, that modeling effort did not identify EFH for a number of life stages for key groundfish species. Alternative A.2 takes these uncertainties into account by incorporating other data sources and adding a 100-meter buffer to acknowledge our information is likely to be incomplete. Finally, the HSP modeling process excluded major prey species. Considering that the EFH rule requires that councils interpret information for designating EFH in a "risk averse fashion to ensure adequate areas are identified as EFH for managed species," Alternative A.2 is also the best choice because it provides a greater degree of certainty that the habitat needs of prey species are incorporated into EFH designation.

We support inclusion of seamounts for the following reasons. First, though seamounts may rise to a depth level above 3500 meters, the EFH identification methodology in the EIS utilizes the 3500-meter depth line on the continental slope to exclude areas beyond that line, including seamounts occurring outside it. Second, given what is known about the potential biological productivity, degree of endemism, occurrence of fragile habitats including coral and sponge, and other ecological functions of seamounts, the most prudent course of action would be to include seamounts in Alternative A.2 for EFH designation.

Alternative C.5: Prohibit a Krill Fishery. We support Alternative C.5 as a proactive measure to protect a crucial part of groundfish habitat: an abundant prey species at the base of the food web, nourishing groundfish directly and indirectly as food for other prey species. Food availability is a critical prerequisite for groundfish growth and recruitment. Protecting krill, currently an unfished species, as habitat is consistent with the EFH rule[2] and provides a zero-cost way to ensure that a major prey species remains available. Adopting Alternative C.5 is a smart step in a complex multi-species fishery with many uncertainties about how fishing is currently altering food-web relationships, productivity and rebuilding potential.

Revised Alternative C.12: Close Ecologically Important Areas to Bottom Trawl, combined with specified features of C. 13. The Council adopted the suite of C.12 through C.14 as preliminary preferred alternatives, and we support a combination of these options that provides higher levels of protection for habitats that are unique, particularly vulnerable, and/or important sources of productivity. Specifically we propose C.12 plus the greater protection level provided by C.13 (Close Bottom-Contacting Gear) for at least Cordell Bank, Daisy Bank (based on a proposal for a habitat area of particular concern submitted by Dr. Mark Hixon for consideration of the Pacific Fishery Management Council's EFH EIS Committee) and to all seamounts, as unique habitats with a high degree of endemism and vulnerability. We believe greater protection is warranted for these habitats because they are rich in fragile structure-forming invertebrates and likely to be slow to recover.

C.12 combines closure of identified areas to bottom trawling, freezing the trawl footprint, restricting catch, restricting gear, monitoring via observer data and expanded use of VMS, and benthic research and mapping. It thus incorporates the key measures recommended by the National Academy of Sciences to address the long-term adverse impacts of bottom trawling on fish habitat. The selection of these areas is based on the overlap of three or more habitat-related data sets, including the results of the risk assessment conducted by NMFS consultants to evaluate the sensitivity and recovery time of various habitats. This use of multiple data sets makes it the spatial alternative that most systematically uses available scientific information. As noted by the PFMC's Scientific and Statistical Committee, it is the only set of alternatives that deals explicitly with protection of habitat-forming invertebrates such as deep-water corals and sponges, in addition to encompassing a broad range of other groundfish habitat types.

Alternative C.12 has been revised recently, based on trawl track data, to reduce its potential economic displacement and increase protection in areas where displacement is unlikely to be a factor. The SSC found economic assessment methodology used by its proponents likely to be more accurate than that used in the DEIS.[3]

[2] 50 C.F.R. 600.815 (a)(7).
[3] SSC Notes Nov. 1, 2, 2004

Alternatives D.2.1: Expanded Logbook; D.3: Expanded Vessel Monitoring System; and D.4: Research Reserve System. The DEIS identified a number of data needs that, if satisfied, can improve our knowledge about gear impacts (particularly those of the non-trawl groundfish fleet), assess habitat quality, minimize adverse impacts on groundfish habitat, mitigate economic displacement, and adaptively manage this fishery. We therefore support collection of data through expanded logbooks and VMS, the creation of research reserves that will facilitate studies of habitat impacts and better protection for essential groundfish habitat, and a research and monitoring program that utilizes this data to inform decision makers and the public and improve management.

Trawl logbook information has repeatedly proved useful for management purposes, from its supporting role in developing the first depth-based bycatch model to its use in revising the C.12-C.14 suite of alternatives to reduce economic displacement while maintaining protection for habitat. It makes sense to expand logbooks to other vessels in the groundfish fleet. Likewise, the kind of spatially specific information VMS provides is vital to improving habitat protection over time, managing adaptively, and mitigating economic impacts of management measures to fishing communities. Finally, we support creation of a research reserve system designed to improve our understanding of the impacts of fishing gear and for other management purposes. The DEIS finds that such a system may increase knowledge relating habitat to living marine resources, thereby resulting in improved stock status, higher fishery yields and improved education resources. To minimize economic displacement of such a system, we expect it could be designed within a subset of the areas identified in Alternatives C.12-C.14.

Summary

We believe NMFS and the Pacific Council have a historic opportunity to take a more ecosystem-based approach to managing the groundfish fishery by moving forward with a combination of Alternative C.12 and C.13, alternatives already designated as preliminary preferred by the Council. We appreciate the opportunity to comment, and urge you to take action now to address the flaws in the DEIS and provide the long-term habitat protection needed to sustain Pacific groundfish.

Sincerely,

Karen Garrison
NRDC

Chris Dorsett
The Ocean Conservancy

Cc: Don Hansen, Chair, PFMC
Dr. Don McIsaac, Executive Director, PFMC
Susan A. Kennedy, NOAA Strategic Planning Office nepa.comments@noaa.gov.

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May 11, 2005

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service
c/o Maryann Nickerson
7600 Sand Point Way, NE
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Seattle, WA 98115-0070

Dear Mr. Lohn:

The Oregon Department of Fish and Wildlife has reviewed the draft Groundfish Essential Fish Habitat (EFH) Environmental Impact Statement (EIS) for the Pacific Coast Groundfish Fishery Management Plan. We are supportive of habitat protection as a complementary and necessary component of management measures to ensure the continued productivity of marine fishery stocks managed by the Pacific Fishery Management Council. Increasing attention to habitat values in the management and conservation of marine fishes moves fishery management into a broader ecological context, and well beyond the traditional demographic and population approaches that have been employed historically.

We also appreciate the opportunity to provide information included in the document and to participate in the process of reviewing the document in its developmental stages. We have a number of general comments to offer.

- The preparation of the draft Environmental Impact Statement to support the Pacific Fishery Management Council's upcoming decisions on Essential Fish Habitat has focused a great deal of effort and has brought information together that would not otherwise have been available to managers in a usable format. There are significant gaps and uncertainties in the EIS data and there is also a focus on trawl impacts due to gaps in our understanding of marine fisheries, particularly non-trawl fisheries. In particular, more research and monitoring is needed to understand the specific linkages between marine habitat condition and fishery resource productivity.

- Because of the limitations to our understanding of habitat, fisheries, and fishery impacts, the Council will be forced to make significant decisions in June 2005 between various alternatives which have been analyzed with the best available but still significantly limited databases. It will not be possible for the Council to address the tradeoffs between the benefits of habitat protection, and the impacts of restricting fisheries on other than the most general and qualitative basis.

- A significant shortcoming of the analyses to date is the limited amount of economic impact analysis for most of the alternatives under consideration. The Council will be considering alternatives, in many cases, without specific or adequate understanding of the economic impacts to the fisheries or communities subject to various management alternatives. There is essentially no data on alternatives related to non-trawl fishery economic impacts.

- There is an unfortunate mismatch of scale and detail between the analyses of bottom-trawl fishing activity in potentially closed areas (based on 10 minute x 10 minute blocks) and the geographic scale of habitat features and potential closures. While the analyses are based on the best information available, and in some cases are constrained by confidentiality requirements, it is unfortunate that we are unable to more closely match the scales of habitat feature distribution and fishery activity.

- There is a comparable mismatch between the general text description of areas potentially closed to fishing by one or more gear types, the depiction of these areas in the figures of EIS Chapter 2, and the very detailed estimates of proportion of substrate type or habitat area protected in the habitat tables of Chapter 4. The document would have been more helpful to the affected public if approximate coordinate points for the potential closed areas had been provided, especially for the highly complex impacts minimization alternatives C.12, C.13 and C.14.

- The absence of spatial data on fisheries other than bottom-trawl puts the Council in a very difficult position of deciding on areas to protect without adequately understanding the potential impacts to non-trawl fisheries. The best information available cannot provide the Council or the public with the necessary understanding of the need for protection, nor the distribution of likely economic impacts on non-trawl fishing (an estimate of practicability).

- There are three prominent, high-priority areas for improved information to support future decision-making by the Council in this arena. One is spatial data on effort and harvest in commercial fixed gear, hook-and-line and recreational fisheries. The second is ecological research to better understand the location of critical habitats, in particular biogenic habitat features (e.g. corals, sponges, sea pens) and other dynamic habitats such as kelp and seagrass beds. More research is necessary on the impacts of fishing activities to benthic habitat features, and the recovery of these habitats when fishery impacts are reduced or removed. A third is a retrospective evaluation of the efficacy of measures to protect EFH adopted by the PFMC at its upcoming meeting in June 2005. The National Marine Fisheries Service and the state agencies that participate in the Pacific Fishery Management Council process will be charged with providing these additional data and analyses when the EFH process undergoes its mandated five year review. It is essential that NMFS support funding requests that will make provision of this information possible.

- A significant deficiency in this process has been the lack of federally sponsored public education on these alternatives. The states tried to address this priority need by redirecting limited resources from other priority program areas to attempt to address this gap. Federal outreach and communication on this process continues as a paramount need.

- The preparers of the EIS have done a remarkable job assembling and depicting alternatives and supporting information with very limited time and resources. It is through their efforts that the uncertainties and data gaps that we discuss above have come to light. We believe that the EIS represents a comprehensive compilation of the best information currently available.

Thank you for the opportunity to comment on the draft EIS.

Sincerely,

Patricia M. Burke

Patricia M. Burke, Manager
Marine Resources Program

Northwest Indian Fish Commission Comments on the Draft EIS

Chapter 2

Section 2.5.2, Alternative C.12, “Tribal Fisheries” (p.2-27). Language should be made consistent with Section 2.2 or removed altogether as section 2.2. would provide the necessary exemption.

Chapter 3

Section 3.7.2, “Tribal Fisheries” (p.3-164 to 168):

Paragraph 2, 2nd sentence reads, “ . . .the tribes annually . . .”. For groundfish this is now biennially.

Paragraph 2, 3rd sentence reads, “ . . .occurs primarily with hook and line and pots. . .”. This should be changed to, “ . . .hook and line and trawl . . .”. Pots are for crab only (see tables 3-55 and 3-56).

Paragraph 3, 1st sentence begins, “Twelve western Washington. . .”. This should be changed to “Thirteen”.

Paragraph 11, 2nd sentence reads, “In developing these trawl fisheries, the tribes . . .”. It should read, “In developing these trawl fisheries, the Makah . . .” as they are the only tribe with trawl fisheries.

Paragraph 14, change “Tribe’s” or “the Tribe” to tribes as this philosophy of sustainability is shared by all coastal tribes.

Oregon Anglers

Mr. D. Robert Lohn
Regional Administrator, National Marine Fisheries Service
c/o Maryann Nickerson
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Re: Comment on 2005 Pacific Coast Groundfish DEIS

Dear Mr. Lohn,

These comments are submitted on behalf of Oregon Anglers and the Recreational Fishing Alliance (Oregon Group). We represent recreational fisherman in Oregon (Oregon Anglers) as well as at the national level (RFA). We appreciate the opportunity to present our views and concerns relating to Groundfish EFH

In the Magnuson-Stevens Fishery Conservation and Management Act we find a guideline for analyzing, and then choosing or suggesting alternatives relating to EFH. We are referring to the national standards, (Sec.301.)(a)(2) [*Conservation and management measures shall be based on the best scientific information available.*] (Sec.301)(a)(8) [*Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.*]

We find that many of the alternatives in the EFH DEIS do not comply with the standards mentioned above. Many are based on assumptions rather than applicable scientific information. Many have large economic impacts to the downside on fishing sectors and communities. The prevalent data sets come from one fishing sector while several alternatives affect all fishing sectors. All habitat interactions due to fishing are assumed to be detrimental to the marine ecosystem in this DEIS. While we support a precautionary approach to fishery management, we cannot support a zero human impact one.

Upon reviewing the EFH DEIS we find existing or modified alternatives that we do support. Our listing with modifications and explanations are as follows:

<u>Essential Fish Habitat Identification and Description</u>

Alternative A.2: Depths less than 3500m

We choose this alternative because it includes all habitat where groundfish have been observed. It would be, by default, the most accurate description of EFH based on current data.

<u>Habitat Areas of Particular Concern Designation</u>

Alternatives B.2 through B.8

Many of these alternatives have enough data to support designation. The rest relate to structural features which we can support on a precautionary management basis.

Alternative B.9 (modified) Process for new HAPC designation

It is our recommendation that this alternative be modified to include a process to remove a HAPC designation from an area. If the science used to support the original designation is no longer valid, then there should be an equivalent process to remove designation.

<u>Minimize Adverse Fishing Impacts to EFH</u>

Alternative C.8.1 (modified) Zoning Fishing Activities

Our support would be for this alternative with some changes. We believe that this alternative would be most in compliance with national standard; M-S Act(301)(a)(8). This alternative allows outcome-based management involving area closures. It allows fishers and management a process and some time to develop alternative gear to lessen EFH impacts. An incentive is offered to develop “clean” gear. Our suggested change concerns funding of gear development. *We recommend that funding for implementation of this alternative not be taken from that which is dedicated to any other fishing sector, nor cause a lowering of the percentage normally allocated to another sector.*

<u>Research and Monitoring Activities</u>

Alternative D.4 (modified) Research Reserve System

In our assessment of this alternative we believe that there is great value in a system of research reserves. They should encompass all habitat types designated as HAPC. All three zones of the EEZ should be included, nearshore, slope, and shelf. Reserves would need to be no larger in area than necessary to study the representative HAPC areas contained within. An allowance on shape would need to be made to comply with enforcement issues. Our addition to this alternative would be in the area of reserve management. *Management of research reserves shall be done only by NOAA Fisheries. All funding of reserve activities must be through federal tax revenues and/or fees. No private funding, as for instance grants from resource user organizations or from environmental organizations, may be used. Reserves must be reauthorized every 5 years through the Council process. No extractive activities will be allowed in a reserve except those necessary to conduct fisheries research.*

This alternative would allow for baseline and experimental data to be obtained in a controlled environment. Studies over time could help determine which habitat features are most important to a productive environment.

<u>Summary:</u>

Oregon Anglers and RFA believe that common sense can be used on this issue of EFH. We support an approach which relies on objective science and compliance with MSA national standards.

Thank you for considering these comments.

Regards,

John Holloway
Oregon Anglers
Recreational Fishing Alliance

Cc: PFMC
ODFW Marine Program

Coastside Fishing Club
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28 March 2005

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Portland, OR 97220-1384

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS

Recreational fishermen have long been the stewards of ocean and fishery conservation. We support a healthy ocean environment, since without it we would not enjoy a meaningful recreational experience, either now or in the future.

The Coastside Fishing Club supports measures that will protect our Essential Fish Habitat (EFH). Our priorities are 1) public access and utilization of this public resource for recreational purposes before any commercial extraction. 2) That any fishing gear and techniques allowed in such an area must pose no threat to the environment. 3) That recreational fishing, and in particular mid-water and surface trolling for game species (e.g. salmon, tuna, etc), not be impacted by EFH restrictions except where there is strong scientific evidence that it would be harmful. We have consistently advocated that vertical hook and line fishing methods pose no threat to EFH. However, we acknowledge that essential bottom habitat is directly threatened by the commercial groundfish trawl industry, and that EFH protection must address the impacts caused by such destructive fishing practices.

The Coastside Fishing Club has reviewed the Essential Fish Habitat (EFH) DRAFT Environmental Impact Statement, and evaluated the various alternatives adopted by the PFMC. Of all the alternatives considered, only Alternative 12 represents a comprehensive approach towards protecting EFH, while preserving the publics right to access and utilize this public resource. Developed by Oceana and others, this alternative addresses all three objectives of the Sustainable Fisheries Act, is easy to comprehend, and is an effective response to the federally mandated protection of essential fish habitat. Our assessment of the alternative finds that the Oceana plan accurately identifies habitat areas sensitive to fishing impacts, and that the included maps and descriptions are complete. The Oceana plan, in accordance with findings from the NRC (National Academy of Sciences, National Research Council 2002: *The Effects of Trawling and Dredging on*

Seafloor Habitat) correctly identifies that ground trawl gear, practices, and operations are the primary threat to essential fish habitat; and proposes to mitigate those effects through closures, gear modification, and effort reduction. Finally, Alternative 12 proposes other reasonable and effective actions to encourage the conservation and enhancement of essential habitat areas.

The two variations to Alternative 12, Alternatives 13 and 14, unnecessarily restrict recreational fishing, without demonstrating a need for such restrictions or indicating how such restrictions would actually enhance EFH protection. While Alternative 13 does not specifically address recreational fishing, the language might be construed as doing so. Because of these restrictions we do not support either Alternative 13 or 14. The other 11 alternatives are not comprehensive and are therefore difficult to evaluate without knowing how they might be combined into an overall EFH protection package. Additionally, instead of doing a scientific analysis of biogenic habitat these other alternatives rely too heavily on identification of sites where fish are currently found, rather than embracing a broader ecosystem management approach. The Oceana analysis is habitat-based: they looked for places were corals, sponges, or other animal life exist and then drew lines around those areas – a more comprehensive ecosystem approach than found in the other 11 original alternatives.

The Coastside Fishing Club endorses the findings and proposed actions contained in Alternative 12. We encourage its adoption by the Council and by NMFS; either as the single preferred alternative, or fully incorporated into a new alternative that eliminates bottom trawling in EFH designated areas. Bottom trawling is the primary threat to essential fish habitat, and Alternative 12 specifically mitigates this threat while preserving recreational mid water, surface, and bottom fishing utilizing vertical hook and line gear.

Dan Wolford, Science Director

orig /s/ D L Wolford

Coastside Fishing Club

Copies to
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Pacific Marine Conservation Council

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May 10, 2005

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Re: Comment on 2005 Pacific Coast Groundfish DEIS for Essential Fish Habitat

Dear Mr. Lohn,

Pacific Marine Conservation Council (PMCC) is pleased to take this opportunity to offer comments on the Draft Environmental Impact Statement (DEIS) on Essential Fish Habitat for Pacific Coast Groundfish. PMCC is a west coast regional non-profit organization that works with commercial and sport fishermen, marine scientists, environmentalists and others. We operate with a mission dedicated to sustaining healthy and diverse marine ecosystems and fishing communities. It is from this perspective that we offer these comments.

The Northwest Region of NOAA Fisheries and the Pacific Fishery Management Council (Council) are to be congratulated for the work that has been accomplished on the DEIS, given the limited resources available. While we will offer constructive criticism of aspects of this document and associated processes, we do so with accompanying respect for the efforts of your staff.

PMCC has long engaged in habitat issues regarding Pacific groundfish, including several years' service by Science Director Jennifer Bloeser on the Council's Habitat Advisory Committee. We have carefully monitored the development of the DEIS, and Senior Policy Director Peter Huhtala helped development draft alternatives on the Council's EIS Oversight Committee.

During this comment period PMCC has conducted extensive outreach to attempt to engage more members of the fishing industry and residents of coastal communities in this important process. We will describe some of this outreach in this comment letter, partly because we feel compelled to let you know that we believe that the limited outreach conducted by the federal government was inadequate. The decisions that will emerge from this DEIS will likely have significant short and long-term impacts on fisheries and coastal communities, and extraordinary efforts should have been

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made to communicate with this portion of the public as well as with all citizens interested in the future of marine habitat.

PMCC also facilitated the work of an Independent Scientific Review Panel. This group conducted their own examination of the DEIS and their conclusions and recommendations are submitted separately from these comments. Neither PMCC staff nor board members participated in the Panel's deliberations. PMCC was solely interested in bringing the additional, independent insight of well-respected scientists to this process.

PMCC Outreach: Essential Fish Habitat Draft Environmental Impact Statement

On February 23, 2005, PMCC distributed a letter stating the need for public comment on the DEIS to Pacific groundfish permit holders, fishing groups and associations, and others who we identified as being involved or interested in the fishery. We also contacted senior personnel with natural resource agencies, including Sea Grant, in Washington, Oregon and California; and all members of the Pacific Fishery Management Council and groundfish-related advisory bodies.

The response was significant. We received inquiries almost daily in the following weeks, and during March and April met with more than 40 sport and commercial fishermen in 24 Washington, Oregon and California coastal communities. Over 100 copies of the DEIS on CD, provided to PMCC by NOAA Fisheries, were handed out with written background materials on the DEIS process and how to comment. We also distributed these materials to interested National Marine Sanctuary managers and staff, and instructors and graduate students at the University of Washington and Oregon State University.

Many fishermen with whom we spoke did not know about or understand the DEIS nor know how to comment. Several raised concern over whether regulations that affect nearshore fishing efforts, particularly sport fisheries for salmon, rockfish and halibut, will result. PMCC's outreach efforts in Washington and California fueled those in Oregon, where town meetings were held by OSU Sea Grant Extension and the Oregon Department of Fish and Wildlife.

PMCC believes that NOAA Fisheries' outreach in coastal communities with regard to the DEIS should have been more extensive. Additional constructive input from people who make their living on and near the water would have resulted in a more comprehensive EFH EIS, and in superior protection of sensitive marine habitats with minimal impact on fishing communities.

PMCC Recommendations on the DEIS Alternatives:

EFH Designation

PMCC recommends adopting *Alternative A.3, Depths less than 3,500 m* as Essential Fish Habitat (EFH) for Pacific groundfish. This alternative encompasses all of the known Habitat Suitability Probability (HSP) information and adds a precautionary spatial extent by depth. This allows for species for which HSP is not known for all life stages and provides a buffer for uncertainty. A reasonably broad designation of EFH, but short of the entire EEZ, reduces potential conflicts with HAPC designation as well as defining an adequate area where actions by other federal agencies should be subject to EFH consultation with NOAA Fisheries.

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HAPC Designation

PMCC encourages the Council and NOAA Fisheries to designate Habitat Areas of Particular Concern (HAPC). The designation would, we believe, add a layer of focus that may inspire more attention to be paid to Conservation Recommendations made to other federal agencies during EFH consultation. This could have a positive impact on fisheries and coastal communities.

We understand the challenges in defining specific areas as HAPCs, but attention should be paid to the Areas of Interest in *Alternative B.7*. One challenge we foresee in geographically-defined HAPC designation based on "ecological function" is the lack of robust data regarding specific functions throughout the areas. This might be overcome by defining a process to modify the boundaries of the HAPCs as new data becomes available. PMCC supports *Alternative B.9 Process for New HAPC Designations*, and we suggest that procedures for modifying or removing HAPC designation might be implemented within a refined version of this alternative.

The Council's preliminary preferred alternatives, *B.2: Estuaries, B.3: Canopy Kelp, B.4: Seagrass,* and*, B.6: Rocky Reefs* all describe habitat types observed to serve important ecological functions. PMCC supports final adoption of these alternatives.

Minimize Adverse Fishing Impacts to EFH

This is the most challenging and controversial of the suites of alternatives. It is also where decisions can be made that result in real protection of the most sensitive or slow to recover marine habitats within EFH.

In general, PMCC supports use of fishing gear and techniques that are appropriate to the environment being fished. Incentives should be offered to encourage use of gear that least damages habitat. Considerable investment should be made in cooperative research that offers opportunity for fishermen to design and participate in studies to demonstrate the effective use of gear that minimizes damage to sensitive habitat.

PMCC acknowledges the limited amount of research that has been conducted on the West Coast to demonstrate specific impacts of a variety of gear on habitat. In addition, reliable fishing effort information relative to location is minimal, except in the case of the groundfish trawl fishery.

There has been a great deal of research conducted worldwide that documents the negative habitat impacts of mobile, bottom-contact gear. *Alternative C.12: Close Ecologically Important Areas to Bottom Trawl* focuses on this gear. PMCC generally supports the approach used in this alternative. The concept of using multiple data sources to define sensitive and slow to recover habitat in a precautionary manner, and then to close these areas to bottom trawling, while minimizing the economic impact makes a lot of sense. This should be the starting point in crafting a comprehensive alternative that works for both the marine environment and the fishery.

Alternative C.12 freezes the trawl footprint based on areas trawled 2000-2003, providing a reasonable basis for protecting potentially pristine habitat without affecting economic activity. *Alternative C.4: Prohibit the Geographic Expansion of Fishing* utilizes a similar approach with 2000-2002 as the qualifying years. This provides a measure of precaution but is not adequate in itself for minimizing adverse impacts of fishing gear on habitat.

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Alternative C.12 also identifies areas where trawling has occurred in recent years that would be off limits to the gears. The basis for closing these areas to trawling needs to be based on the best scientific information available, with a reasonable measure of precaution. In defining these areas, including buffers around the most sensitive habitat, consideration should be given to where any displaced fishing effort may move. Increased effort in nearby areas that remain open may have unintended consequences.

While the intent of *Alternative C.12* is to minimize gear impacts to the extent *practicable*, this requires some ground-truthing. PMCC has consistently testified to the Council that we believe that it is important to assess whether disparate adverse economic impacts may accrue to individual communities if important opportunities are lost due to restricted access. NOAA Fisheries can determine this to some degree using economic and spatial effort data regarding the trawl fishery, but it remains essential to engage fishermen in this process.

It is encouraging to hear that members of the trawl fishery have been working with *Alternative C.12* to reconfigure some of the closed areas so that the impact on the industry would be minimal even as important habitat is protected. There will probably be some give and take, but if NOAA Fisheries and the Council work closely with the fishermen and states to verify to the extent possible both biological and economic data, the outcome seems promising. Using trawl track data, logbooks and landings reports should help to refine the maps in order to minimize displacement of effort while still achieving significant habitat protection.

PMCC is supportive of *Alternative C.9: Gear Restrictions,* but only including those restrictions that very likely will protect habitat, such as *C.9.5: Prohibit dredge gear* and *C.9.6: Prohibit beam-trawl gear*. *C.9.1: Prohibit roller gear larger than 15 inches on bottom trawls* might be considered if, in the total package of alternatives, roller gear larger than 8 inches is only prohibited on the shelf.

PMCC is also supportive of a modification of *Alternative C.11: Relax Gear Endorsement Requirements,* if trawl-endorsed permit holders are allowed to switch to longline or pot gear, but not vice versa.

Research and Monitoring

PMCC strongly recommends that the final Research and Monitoring EFH EIS Alternative combine elements of *Alternatives D.2, D.3, and D.4*. The management tools outlined in the Alternatives are complimentary to each other and would provide information critical to improving our understanding on the location and impacts on EFH. Selected individually, none of the proposed Alternatives is extensive enough to gather the information needed for adequate protection of EFH. An Alternative developed from elements of all of the proposed Alternatives would provide the balance of fishery dependent and fishery independent information sources we require in other areas of fishery management.

We recommend that the Council and NOAA Fisheries develop a research plan specific to the EFH research needs identified through the process of developing this EIS. While we recognize the need for improved information around groundfish habitat and strongly support the development of a research plan for this purpose, inaction (Alternative D.1) is not an acceptable response to lack of information. We recommend that the Council move forward with the identification and designation of sensitive habitat areas for protection and research purposes using the best available science.

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The National Research Council report on Improving the Use of the "Best Scientific Information Available" Standard in Fisheries Management makes the following recommendation in terms of developing plans to improve available science.

> *"NOAA Fisheries should develop and implement a plan to systematically improve the quality of the "best scientific information available" that includes regular assessments of the outcomes of management actions and evaluation of the predictive quality of the scientific information supporting those actions."*

To accomplish this we strongly recommend and support the development of a research program that uses local area knowledge and collaborative research with members of the fishing industry as information gathering mechanisms.

Our specific recommendations on the proposed Alternatives are outlined below.

Alternative D.2: Expanded Logbook Program
PMCC strongly supports the use of an expanded logbook program designed to gather information on habitat. In recognition of the cost of such a program we would support Option D.2.2, where a random sample of fishing vessels is required to maintain logbooks as long as there is explicit buy-in at the onset of the program for adequate design, allowing for extrapolation of the information to the nonparticipating portion of the fleet.

Alternative D.3: Expanded Vessel Monitoring Program
PMCC supports the use of vessel monitoring programs for the purposes of increased safety and application of spatial management that allows for continued fishing opportunities while rebuilding overfished stocks. We encourage and support the use of technology in VMS systems that allows for the distinction between a vessel fishing and a vessel transiting. This would allow vessels to transit through closed areas for safety purposes. To the extent possible the cost of VMS units and associated transmission costs should be paid by the federal government.

Alternative D.4: Research Reserve System
PMCC strongly supports an Alternative that includes the development and use of a research reserve system. The EFH DEIS explicitly acknowledges the constraint placed on our knowledge of the effects of fishing on habitat resulting from the lack of unaffected control sites. The information gathered from control sites is a critical piece of the information puzzle and will not be accomplished through Alternatives D.2 or D.3. We recommend a collaborative process be developed with the fishing industry for the purposes of identification and design of this system.

Thank you for this opportunity to comment on the DEIS. We will be happy to discuss our recommendations

Sincerely

Jennifer Bloeser
Science Director

Peter Huhtala
Senior Policy Director

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Pacific Marine Conservation Council

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May 11, 2005

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service
c/o Maryann Nickerson
7600 Sand Point Way, NE
Bin C15700
Seattle, WA 98115-007

Re: Comment on 2005 Pacific Coast Groundfish DEIS for Essential Fish Habitat
Independent Scientific Review Panel

Dear Mr. Lohn,

Pacific Marine Conservation Council (PMCC) has facilitated the work of an Independent Scientific Review Panel (Panel) to review the Pacific Coast Groundfish DEIS for Essential Fish Habitat during the public comment period. We are pleased to provide you the report from this Panel.

It is PMCC's belief that the thorough, scientific assessment of the DEIS "Purpose and Need" and proposed alternatives is a valuable contribution to this important process, and we encourage you to give the report careful consideration. We want to be clear that these comments are independent from PMCC, and wholly separate from the comments submitted by PMCC staff.

No staff or board members of PMCC served on the Panel. The Panel members were not offered or provided financial compensation.

Sincerely,

Peter Huhtala
Senior Policy Director

Pacific Marine Conservation Council

Independent Scientific Review Panel Evaluation of

Draft Environmental Impact Statement on Essential Fish Habitat for the U.S. West Coast

Dr. Selina Heppell, Chair

Dr. Peter Auster

Dr. Don Gunderson

Dr. Ralph Larson

Dr. Les Watling

Consensus Statement

The Draft Environmental Impact Statement (DEIS) on Essential Fish Habitat (EFH) for the U.S. West Coast represents an important opportunity for the Pacific Fisheries Management Council (PFMC) to take a major step toward ecosystem-based management. The document has a number of shortcomings, principally, a) lack of data on habitat impacts of various gear types, b) lack of ground-truthing for the GIS-based model that forms the foundation of several of the recommended management actions, c) lack of data to determine the functional relationship between habitat condition and fish population or community response, and d) repeated failure to identify appropriate response variables to assess the likely success or failure of a proposed action. Nevertheless, the DEIS does a reasonable job of acknowledging these shortcomings (many of which will require years of research to rectify) and providing alternatives with a wide range of precaution. The authors of the DEIS are to be congratulated on production of a comprehensive document in a very short time frame that provides paths for habitat definition and protection, while highlighting the paucity of information available on fish habitat off the west coast of the United States.

This review Panel's preferred alternatives for each DEIS objective reflect a general consensus of precaution, based on our understanding of the alternatives presented, data gaps (particularly on the distribution and intensity of non-trawl fisheries) and the our collective experience in marine ecology and fishery impacts. Because data on gear impacts, habitat sensitivity and recovery are not available for the West Coast, the data layers used to generate EFH and mitigation alternatives are not functionally connected. This is a major drawback, although the GIS-based model is an excellent tool for visualizing and evaluating the spatial extent of each alternative. We urge the PFMC to utilize this tool carefully and to acknowledge the uncertainty that accumulates with each data layer by avoiding decisions that require a high level of precision.

The impact of fishing on habitat can be reduced through one or more of the following actions:

a) gear modification,
b) gear restrictions in space – permanent (including closure to all gear types),
c) gear restrictions in space – rotating, and
d) effort reduction.

We anticipate that the PFMC will settle on a “package” of EFH protection that utilizes most or all of these actions. However, as marine ecologists, we are not well-qualified to judge the likely effectiveness of gear modifications and effort reduction. We also cannot evaluate the potential socioeconomic impacts of the alternatives, but support additional research to choose alternatives that minimize hardship while assuring adequate habitat protection. Progressive alternatives that include relief for fishermen, such as the Central California license buy-out, may be a viable solution for some areas. However, we have concerns about the potential redistribution of fishing effort if closures are enacted, and we urge the PFMC and its Habitat Committee to consider this possibility carefully for any management scenarios that involve closures.

We strongly recommend that the EIS be reviewed 5 years after implementation, to update the models with new information, ground-truthing, and assessment of the effects of the chosen alternatives. The research and monitoring necessary to improve the EIS will require a substantial commitment of funds from NMFS and state agencies. In order to estimate recovery times for damaged habitats, controlled experiments must be carried out over extensive time periods (decades in many cases). This research will be money well spent, however, if it is targeted at the major uncertainties of the model and effects of the mitigation actions. We anticipate that well-planned, cooperative research will decrease the amount of area designated as "essential" or "critical," and permit a much more focused conservation effort that has less impact on fisheries and greater benefits to fish populations.

Preferred Alternatives – Summary

A. EFH designation

Alternative A.3, with some support for A.4.

B. HAPC designation

Alternative B.7 was strongly supported, along with designation for estuaries (B.2), kelp canopy (B.3), seagrass beds (B.4) and rocky shelf areas (B.6) that serve as juvenile rearing habitat.

Alternative B.5 is supported as a goal but some Panel members felt that Core Area designation is premature given the limited data available.

Alternative B.9 is supported with an emphasis on external review.

C. Alternatives to Minimize Impacts to EFH

Alternatives 3 or 12/13.

General goal: Reduce effort of most damaging gear on most sensitive habitat.

There is additional support for Alternatives 7 and 10.

D. Research recommendations

Alternatives D.2 and D.4 .

Preferred Alternatives – Justification and Discussion

EFH designation

All life stages and life processes require habitat, and these are not the same within a species. Identification of habitat necessary for growth, reproduction, and other life processes for all 80+ groundfish species and their life stages is an enormous undertaking, as evidenced by the large appendix listing these factors. It is not surprising that when presence/absence is used as a response variable to assess EFH, the entire EEZ becomes designated. No amount of probabilistic modeling is likely to change that conclusion, but placing EFH designation into a probability framework (Habitat Suitability Probability, or HSP) is a step in the right direction because it at least acknowledges uncertainty.

Able (1999, American Fisheries Society Symposium 22, *Fish Habitat: Essential Fish Habitat and Rehabilitation*) described a hierarchical scheme for EFH designation that could be integrated into PFMC's research and management goals:

- Tier 1: Presence/absence. This approach requires comprehensive sampling of all potential habitat with multiple gears, not just NMFS trawl survey data.
- Tier 2: Relative abundance. Better quality habitats should be able to sustain larger population sizes than lower quality habitats. This approach requires a repeated measures sampling scheme because population sizes fluctuate from year to year.
- Tier 3: Vital rates. Growth, frequency of reproduction, and other demographic rates should be greater in high quality habitat. This approach requires physiological sampling of multiple individuals from a variety of sites over time.
- Tier 4: Productivity. "Source" habitats contain healthy populations that consistently provide a net export of individuals through recruitment and spillover. The identification of "sources" is difficult and requires detailed sampling of many sites over long time periods.

The advantage of this hierarchical approach is that is can help us hone our designations substantially, from the entire EEZ to areas that truly are "essential" because they provide the food and shelter required to sustain healthy fish populations.

We are particularly concerned about the paucity of information on juvenile groundfish habitat because it is precisely those individuals that are most likely to be strongly tied to structure that may be damaged by fishing gear. Only the designation of estuaries, seagrass beds, kelp canopy areas and some "Areas of Interest" specifically address juvenile habitat. We believe that the PFMC should be most precautionary about potential impacts to juvenile habitat and be extremely wary of habitat status assessment that is based solely on the catch of adults.

Alternatives A.3 and A.4

Alternative A.1 (No action) keeps many options open, with less potential conflict when combined with HAPC designation and mitigation actions. It also identifies categories of habitat, although these should be expanded. However, designating the entire EEZ as EFH does not focus attention on any particular habitats, and shifts the entire direction of the exercise to designation of HAPC.

Alternative A.3 (100% HSP area) received the most support within the Panel, with additional consideration of alternatives that designate unknown deep water areas. However, this alternative is primarily based on HSP calculations from trawl survey records, which are insufficient measures of habitat use by all life stages. This option also makes everything "essential," hence nothing is essential, and makes actions targeted to conserve particular species difficult or impossible to implement using the EFH boundaries

We like the flexibility and added precaution of EFH based on management status (Alternative A.4), and 2 Panel members supported this option as preferred. Designation is weighted by management status of the exploited populations and protects “essential” habitats based on frequency-dependent distributions (Tier 2, above). Further, this alternative designates seamounts as EFH in a precautionary manner appropriate for the management regime and sensitivity of such habitats. However, this alternative is problematic because a) a population at low abundance may not occur regularly in areas that could be “essential”, and b) habitat needs of individuals do not change just because their management status changes.

The alternatives with lower HSP thresholds lack data to support the assumption that such designations truly contain essential habitats of managed species and that other areas do not have habitats that play an important role in mediating demographic processes.

Recommendations:

1) Retain the seven composite areas identified in the 1998 EFH designation, but consider other habitat designations based on structure, function and impacts. For example, splitting nearshore rocky shelf habitat (<100m depth) into a separate category is supported because of the importance of these shallow reef areas as juvenile fish habitat and increased impacts of recreational fishing gear.
2) Final designation of EFH should be based on maps that include the most recent information from multiple sampling sources. A research plan for ground-truthing those maps should be a top priority for the first 5 years. Refinements to the HSP model using a tiered assessment approach are encouraged.

HAPC designation

We strongly support the effort to designate Habitat Areas of Particular Concern, and the list of considerations is a good start. The use of habitat-specific knowledge regarding sensitivity to impacts and recovery times to designate specific sites as HAPCs allows implementation of precautionary approaches to mitigate the effects of fisheries activities in the context of ecosystem-based management. Unfortunately, the first consideration for HAPC designation, “the importance of the ecological function provided by the habitat”, is far too broad and vague, and “ecological function” has not really been measured for any of the habitats listed. Nevertheless, the areas listed in Alternatives B.2 – B.7 are based on ecological principles and observations of fishes and particular life stages in those habitats. Core areas for managed species as well as areas of interest, with area-specific knowledge of function or sensitivity, should be included in HAPC designation.

The Areas of Interest listed for Alternative B.7 include various canyons and banks that have unique combinations of structure and oceanographic characteristics that seem to correspond with high productivity, biodiversity, or both. Many of these areas also include biogenic structure, likely because of particular combinations of depth and current. The danger of a somewhat vague "Areas of Interest" HAPC designation is that decisions to include or not include an area will be highly subjective, at least until further study can identify features that make these areas unique or areas of high groundfish productivity. There may be more specific combinations of structure, depth, and currents that would be better to use for HAPC designation and identification of Areas of Interest.

Three Panel members strongly support designation of Core Areas (B.5). Use of core areas based on frequency-dependent distributions are supported by theoretical and empirical studies of demersal fishes. Core Habitat designation is a good goal, but may be premature without more "higher level" data (Tiers 2-3) than are currently available.

Specific HAPCs for areas known to serve important ecological functions are supported. Alternatives B.2 (Estuaries), B.3 (Kelp canopy), and B.4 (Sea grass) make sense, although the potential effects of non-fishing human activities on these habitats may exceed the effects of fishing activities, and there seems to be little power to limit these activities (such as development and filling of estuarine areas, or dredging and disposition of spoils). The kelp canopy designated for California (based on 1989) probably underestimates potential kelp coverage, although the map of kelp canopy in California looks reasonably complete at the scale shown. The area of kelp canopy habitat that does not coincide with area designated as essential under EFH alternative A.3 (Habitat Table 4-4) must be on sand bottom. If the inconsistency of the EFH alternative A.3 and the HAPC alternative B.3 is a problem, HAPC alternative B.6 would cover most of the important habitat included in alternative B.3.

Alternative B.6 (Rocky reefs) makes sense to the Panel, as the physical structure of the reef is essential for a number of species of fish, and can be subject to modification by some fishing activities. This alternative would include most kelp forests, so if alternative B.3 was not chosen, most of the same habitat would still be recognized as HAPC.

The Panel generally did not support the designation of oil platforms as HAPCs (Alternative B.8), despite the fact that they do serve as habitat.

All of these designations lack specific consideration of biogenic habitat other then kelp and sea grass, and all soft-bottom habitat. Much of biogenic habitat associated with hard substrates would be covered under Alternative B.6, and some in B.7, but none associated with soft bottom habitat would be included. Hard-substrate habitats are probably more sensitive to some effects of fishing, but focus on these areas may be at the expense of soft-bottom habitat.

The process for designating new HAPC areas (Alternative B.9) is supported, as it allows flexibility and response to new findings. Recommendations from the PFMC Habitat Committee should be reviewed by experts on benthic habitats, fish ecology and fish distribution. There should also be a mechanism for "delisting" HAPCs, as new information may actually reduce the perceived importance of specific areas.

Recommendations:

1) Combine Alternatives B.7, 2, 3, 4, and 6, with effort to identify quantifiable

characteristics for designation.

2) Strongly consider Alternative B.5, Core Area designation, if species-specific relative abundance data are available.
3) Support Alternative B.9, with emphasis on external review.

Alternatives to Minimize Impacts to EFH

General goal: reduce effort of most damaging gear on most sensitive habitat

We would encourage the use of more habitat-friendly gear, and the participation of the fishing community in the development of effective fisheries management systems. Therefore, to the extent that it is possible, we would like to see the use of the most destructive gear in the most sensitive habitats be restricted the most, and other gears restricted less (or encouraged). Given a wealth of experimental and observation data on the negative impacts of mobile, bottom-contacting gear in multiple habitats, we favor restrictions on dredging and trawling (especially on hard bottom). Restrictions on fixed gear are more problematic, because the effects of pots, nets and lines on habitat are poorly documented and probably less than mobile gear. Thus, precautionary restrictions on these gear types, in addition to trawl restrictions, may stifle a move toward more sustainable fishing practices. At present, we can only guess at habitat sensitivity to different gears, and it may be a long time before this lack of knowledge changes. Certainly, gear design and fishing tactics can minimize damage, so that this problem will be a constantly moving target.

Alternatives 3 and 12/13

The Panel favors impact reduction through protection of sensitive habitat. We favor options within Alternatives C.3 and C.12/13, although both of these approaches have flaws. These options provide a choice between a subjective set of “Ecologically Important Areas” identified by Oceana (C.12 and C.13) or, or an alternative set of areas chosen more objectively by the National Ocean Service (C.3) but using crude data inputs (trawl survey data) and admittedly questionable analytical techniques. Only option C.13 addresses invertebrate megafauna explicitly. Neither option seems to identify what will happen to the HAPC areas identified in Alternatives B.1 to B.8. Redistribution of fishing activities must be carefully considered, as “unsensitive habitat” may become heavily impacted, and more explicit justification for restricting the designation based on trawl effort is needed under Option C.3. However, either alternative offers a place to start, providing the areas involved can be added to or deleted as further information on HSP or sensitivity becomes available. Present information is crude at best, making it imperative that some flexibility be built into the selected alternative.

The amount of area closed to fishing under alternatives C.3.1 and C.3.3 is extensive, and would certainly play a role in limiting the effects of fishing on habitat. C.3.2 and C.3.4 apply more limited restrictions, focusing on the most highly-rated sensitive habitats, and might be more palatable from a socioeconomic perspective. The PFMC should consider the addition of Alternative C.7 (close Areas of Interest) if this alternative is adopted. Alternatives under C.3 may be particularly useful on an experimental basis as part of an adaptive management plan that includes intensive monitoring.

Alternatives C.12-14 are specific to habitat and the footprint of fishing and are most tightly linked to the distribution of managed species based on habitat selection theory, where areas of highest density, at particular life history stages, are generally an organism's preferred habitat. The description of these Alternatives is comprehensive and rather complex, requiring a) identification of ecologically important areas and b) an assumption that bottom trawling is the major impact on those areas. The latter is likely, but impact from other fisheries should not be ignored. The former requires a complex assessment and a number of assumptions, given the lack of data on relative abundance for many species and life stages. The Panel liked these alternatives from a biological standpoint, but data are lacking to provide a strong *empirical* justification for the large areas affected. From a precautionary standpoint, restriction of gear that is known to damage structure forming invertebrates in areas where those invertebrates are likely to occur is reasonable, but should be verified. This Alternative is strongly driven by protection of deep sea corals, which are poorly mapped on the west coast slope and may or may not provide critical habitat for groundfish.

Specific regulations that result from the adoption of this Alternative will require much discussion, compromise, and assessment monitoring. Efforts to "appease" fisheries by allowances for certain important fishing areas may be a successful compromising measure. Redistribution of effort must be modeled, at least qualitatively, and may be anticipated through analysis of logbook data following trawl footrope restrictions that occurred in 2000.

Alternatives C.13 and C.14 are more restrictive variations on C.12, and were generally viewed by Panel members as overly precautious. The exception to this is a recommendation for restriction of fixed gear in deepwater areas that are likely to house structure-forming invertebrates. There is a great advantage to having some areas closed to all fishing activities, but the large areas covered by these alternatives are likely excessive. Selective closures of Areas of Interest may be more palatable and avoid massive effort redistribution. One Panel member argued that the provision on footropes (none greater than eight inches in diameter) allowed in the open area should be removed from C.13 if this Alternative is adopted.

Alternative C.1 was deemed unacceptable because current regulations and closures are not based on habitat, which is the mandate of this EIS.

Alternative C.2, depth-based gear restrictions, could serve as a default option in light of poor information on impacts and recovery, but may be overly cautious. Restrictions on large-footrope trawl gear would seem to have positive effects, constraining trawling largely to non-rocky areas without having to specifically identify the rocky areas. Information on habitat recovery in areas currently closed or no longer trawled would be helpful to determine recovery times and relative impact functions. Without field data, it was difficult for the Panel to evaluate which depth zones would be best for this under the alternatives in C.2. However, we do not favor the restrictions on fixed gear in shallow water. Two important and well-managed fisheries, the Dungeness crab and California spiny lobster fisheries, would be particularly affected by the restrictions posed here, and it seems excessively punitive to destroy these fisheries after the members have helped to create reasonable systems of management.

Alternative C.4, prohibit geographic expansion of fishing, has some serious methodological flaws. Why would anyone assume that areas not fished between 2000 and 2002 are “potentially pristine”, given the long history of fishing on our coast? Nevertheless, the Panel agrees that preserving the current fingerprint of fishing seems like a good idea with few economic impacts right now. Alternative C.4.2 (all gear) would be preferable, as a way to encourage gear with smaller impacts (as covered under C.11). Fixed gear has a limited but measurable impact footprint, especially in deep waters during deployment and recovery. On hard substrates, gillnets and other fixed gear have been shown to impact emergent fauna like corals as well as fragile geologic structures. However, we note that these alternatives are not consistent with most of the EFH designation alternatives.

Alternative C.5. prohibit a krill fishery, is an interesting idea from an ecosystem-based management standpoint. It may also “set the stage” for setting limits to the expansion of fisheries for other low-trophic level species, such as northern anchovy, shortbelly rockfish, sardine and squid. However, this alternative seems outside of the scope of EFH, and it does not make sense from an ecological standpoint to equate prey availability with habitat.

Alternative C.6, close hotspots. This alternative focuses on biodiversity and needs further development. Hotspots do not directly address the sensitivity of habitats. For fisheries enhancement or biodiversity protection, hotspots can be stratified by depth, latitude and habitat type. They should also be based on data collected over a number of years. Identification and protection of hotspots of productivity or juvenile recruitment may meet sustainable fisheries goals more than biodiversity criteria.

Alternative C.7, close Areas of Interest. This may be a reasonable, precautionary alternative until data show “minimal impact” of each gear type on the Area of Interest identified in the HAPC Alternative B.7. However, as with Alternative C.3, redistribution of effort will be important to consider, and closing these areas is probably insufficient for EFH protection. This alternative could be added to Alternative C 3, and overlaps with areas identified in our current preferred alternative, C12.

Alternative C.8. Ocean zoning is a hotly debated option that we feel is politically unfeasible at this time. While the idea of zoning fishing activities and doing further research on ways to fish while reducing impact on the habitat may be useful, these concepts are better addressed in other alternatives. Also, zoning quickly turns the scientifically-based issue of habitat protection into a pure allocation issue.

Alternative C.9 covers a series of gear restrictions. Alternatives that involve the development of less harmful gear types, rather than fishing restrictions, are an effective management approach when there are data available to show that the gear modifications actually work (i.e., maintain catch and substantially reduce impact). This approach leads to cooperative research, which further enhances the relationship between fishermen, researchers and managers. Also, this alternative codifies many current practices. Gear restrictions are likely to be useful in some areas but are not precautionary by themselves. Some on the Panel felt that we should avoid support for gear-specific options, given our mandate and expertise. The measures described in this option are aimed only at a subset of the bottom-tending gears and are thus more allocative than biologically based, and may be more difficult to enforce than some other Alternatives.

Alternative C.10, no-trawl zones plus license buy-out in Central California, is the most progressive alternative and is likely to be useful in some areas, but may not be feasible where multiple gear impacts are common. It would also be important to know what the trawlers will do in response to the buy-out. C10 requires actions of private organizations after passage and is outside the purview of the Council and NMFS to require implementation of all of the provisions. In general, the Panel felt it was beyond our abilities to evaluate the socioeconomic trade-offs of acceptance or rejection of this alternative.

Alternative C.11 relaxes gear endorsement requirements. Adding flexibility to fishing strategies can ease the negative effects that area closures or gear restrictions may have on fishermen, promotes the use of more habitat-friendly gear, and may also help spread effort of individual fishermen across space, time and species. However, the biological impacts of this Alternative are unclear.

Recommendations:

1) Alternatives that consider the spatial distribution of habitat, impacts on habitat (fishing effort) and its sensitivity to those impacts should be adopted. Of the alternatives provided, C.3.4 and C.13 best meet those goals, and could be modified to reduce socioeconomic impacts.
2) Impacts of all gear types should be included in the assessment, and ground-truthing is needed.
3) Areas of Interest identified in the HAPC designation should also be protected (Alternative C.7).
4) Solutions that reduce economic hardship and encourage partnerships between conservation groups and industry should be supported (Alternative C.10).
5) Gear modifications to reduce impacts on habitat should be encouraged but require field testing (Alternative C.9).
6) Adoption of any Alternatives that include area closures should include an assessment of likely effort redistribution.

Research Recommendations

The Panel developed and ranked a series of general research needs that included our own judgments as well as specific alternatives from the DEIS:

1) Ground-truthing habitat suitability probability
2) Habitat recovery monitoring
3) Research reserves
4) Expanded logbook to include data from other fisheries
5) Gear impact experiments
6) Vessel Monitoring System effort distribution analysis
7) Alternative sampling methodologies

Recommendations 5, 6, and 7 received equivalent mean ranks from Panel members. Note that all of these research needs are important, but restricted funding will likely require some prioritization. We strongly recommend intensive pre- and post-closure monitoring of any closed areas that may result from adoption of the alternatives outlined in this DEIS.

Research reserves that are closed to all fishing activities are highly controversial, but provide the only tool to separate fisheries impacts from changes in habitats or fish abundance that are due to environmental change. Research reserves could also serve as locations for habitat sensitivity and recovery assessment. Two Panel members ranked establishment of reserves as their top research priority. We support cooperative efforts by coastal communities and scientists to design these reserves, as recommended by Oregon’s Ocean Policy Advisory Council.

We also make the following general recommendations for improvements to the HSP designations:

1) Trawl survey data needs to be supplemented with ROV or submersible observations.

2) The correct spatial scale (based on home range) for habitat analysis needs to be determined for each life stage of each species.

3) The analysis of habitat suitability currently should incorporate additional parameters and interactions of those parameters with the current ones (depth, latitude, and “substrate”).

4) Relative abundance (Tier 2 response) should be used instead of presence/absence whenever possible.

5) More habitat categories should be considered. Ten is overly crude, and misses important detail on features such as rugosity, biogenic cover, etc.

Comments on the DEIS process and document

The idea of "Essential Fish Habitat," as outlined in the SFA in 1996, was flawed at the outset, in that no guidance was provided to distinguish mere "habitat" from "essential habitat." The idea of habitat bottlenecks (habitats of limited size through which the population passes at some time in its life cycle, which are also vulnerable to the effects of fishing gear and other factors) is ecologically sound. However, the language of the law makes it difficult to account for the effects of density-dependent habitat selection (and therefore to distinguish the core areas of habitat that are most suitable for a population), the rarity of a habitat that might be used by a particular life stage, and the vulnerability of that habitat to human and natural disturbances. Thus, NMFS was probably correct in its first assessment, designating everything within the EEZ as "Essential Fish Habitat," even though that designation in the end meant nothing because it failed to allow focus on any particular portion of the habitat. As a result, the HAPC designation became the means of identifying "really, really Essential Fish Habitat."

Use of the HSP models for identifying habitat is a reasonable approach, but subject to limitations of the data used in the analysis. Because of the inherent problems in identifying "essential fish habitat" as it has been defined, perhaps the highest purpose of this section (EFH designation) should be to recognize the diversity of species and the habitats utilized, and allow for the broadest context for the identification of really, really essential (and vulnerable) habitat in the designation of HAPC and of measures to minimize adverse impacts to EFH.

It is critical, for the logic of this EIS, that any HAPC and actions for remediation are areas that have been designated as EFH. All of the alternatives to reduce impacts must interact with the designation of EFH that is ultimately chosen, and with the alternatives for HAPC. Ideally, mitigation efforts should be nested within EFH and HAPC designations to drive the alternatives to limit impacts, with explicit language linking mitigation issues to the attributes of concern. We recommend that the PFMC Habitat Committee develop a comprehensive framework for action that more logically follows the hierarchy necessary for non-conflicting action: a fairly broad EFH designation based on ground-truthed information on relative abundance of all life stages (which may not need to be species specific), HAPC designation for areas with unique functions, such as nursery grounds, areas with high biogenic habitat, high productivity, and/or high biodiversity, and impact reduction actions that target critical areas within these designations. The alternatives presented in the DEIS are disjoint, requiring an overwhelming appendix of tables and maps to show conflicts that will arise. This approach is inefficient and makes it extremely difficult to do more than simply choose a preferred action (or combination of actions) for each of the 3 sets of alternatives, based on ecological principles, conservation concerns, socioeconomic concerns, etc.

The apparent conflicts between EFH and HAPC designation shown in Appendix 4 are of particular concern and difficult to understand. For example, Habitat Table 4-4 shows that only EFH alternative A.6 would not include the areas identified in HAPC alternative B.6, but Figure 4-3 shows some areas (which seem mostly like deep-water areas) included in HAPC alternative B.6 are excluded in several of the EFH alternatives. Likewise, some of the areas included in HAPC alternative B.7 (Areas of Interest) are not included in some of the EFH alternatives because of a disconnect between methods to identify HSP (catch records) and in-water observations of these areas that identify them as Areas of Interest.

The “Purpose and Need” section does a good job describing the management framework for west coast groundfish but does a poor job linking the management framework to EFH designations, thus making it impossible to evaluate EFH alternatives against a set of explicit goals (e.g., minimally capture the top 50% of the population distribution of each managed species, capture 80% of spawning habitat, etc.). While there are targets set within alternatives (e.g., 70% HSP), these are thresholds for specific alternatives and not an overall goal for which various alternatives were proposed and can be compared. The four goals stated in section 1.4 are strawmen and the existing preferred alternatives discussed in chapter 2 clearly “consider” these in aggregate. Without explicit threshold values for particular metrics (e.g., what are thresholds for “practicable” alternatives?), it is impossible to develop a review criteria that does not explicitly include personal viewpoints related to balancing industry needs with conservation goals. This is not an unusual situation (in fact, a similar process and framework were recently evaluated for groundfish EFH in the New England Region) and is why reviews of the EFH and HAPC alternatives from other Councils preclude rigorous scientific review. While the underlying theory and methods used to develop alternatives is certainly open to scientific debate, the value-laden alternatives are really not. Thus, we believe that the approach used by the PFMC is generally robust and defensible, but science-driven vs. value-driven decisions should be distinguished whenever possible.

The Purpose and Need section is supposed to “set the stage” for what the EIS is and why it is important. Overall, the description of the EIS process is reasonable, but there are a few elements missing, such as the definition of EFH and habitat-related mandates of the Sustainable Fisheries Act. Some Panel members also found it confusing to have the EIS presented as a document describing “the effects of conservation actions [on habitat]” when the mandate is to determine the effects of fishing on habitat. This may be more than a simple semantics issue, as the “burden of proof” may rely on proper definition of the problem. Because the “action” in this case is implementation of conservation measures, rather than introduction of a new stressor, this apparent switch of focus may be intentional and necessary – but it should be better explained.

This section of the DEIS also includes a description of the current management framework for west coast groundfish, but does not really provide information about how habitat management would fit into that framework. Most importantly, state vs. federal regulations and their interactions should be addressed. Also, there is no description of the current regulations that are designed to reduce impacts on overfished stocks (these closures are described in the Alternatives chapter).

The current methods for determining HSP and habitat sensitivity are not up to the task at hand, primarily due to a lack of data. The Risk Assessment group developed a model that relies on a complex matrix of these interacting factors, which in turn is based on published studies that are mostly from other areas. The functional relationship between habitat sensitivity and impact is based on a sound premise, but one without any empirical support. There are no data on effort and local impacts of non-trawl fisheries. There is also a problem of spatial scale that was noted by the SSC - fishing effort blocks (large scale) vs. habitat patch (EFH polygons – small scale). The SSC’s conclusion was that fishing impacts model is inadequate and should not be used in its present form for risk assessment. Some Panel members were less certain of this conclusion, as long as the results of the model are used in a qualitative, rather than quantitative way. The level of apparent precision given by the models can be misleading, but only if you let it be. The DEIS authors acknowledge the uncertainty in the model and argue that the array of alternatives provides a range from extremely precautionary to risk-prone approaches. As a result of current uncertainty in key parameters, the PMCC Independent Scientific Review Panel believes that an adaptive approach is required whereby the EFH process allows for both closing and re-opening areas to fishing activity.

Pacific Marine Conservation Council
Independent Scientific Review Panel

DR. SELINA HEPPELL is an Assistant Professor in the Department of Fisheries and Wildlife at Oregon State University (OSU). She is also Adjunct Faculty in the OSU Marine Resource Management Program at the College of Oceanic and Atmospheric Science, as well as the Nicholas School of the Environment at Duke University. Selina is a member of the IUCN Marine Turtle Specialist Group (sea turtle conservation), the Willamette-Lower Columbia Technical Recovery Team (listed salmonid recovery planning), and the Environmental Quality Committee of the American Society of Ichthyologists and Herpetologists (fish conservation). Her expertise is population ecology, marine fisheries ecology, conservation biology, and life history evolution, and her research generally focuses on how populations respond to perturbations. Some current research projects include: comparative life-history analysis of Oregon groundfish, changes in habitat structure and fish communities in de facto marine reserves off the Oregon coast, grouper population dynamics and marine protected area design in Florida, maternal effects on offspring quality and changes in recruitment variability with age of maternal stock, and sea turtle population dynamics in response to management and longline bycatch.

DR. RALPH J. LARSON was born in 1946, and from the age of 4 grew up in southern California. He attended Occidental College, where he met Dr. John S. Stephens, Jr., and was introduced to marine ecology and the biology of fishes. He graduated with departmental honors in 1968. He then attended graduate school at the University of California, Santa Barbara, under the tutelage of Dr. Alfred W. Ebeling, earning his M.A. degree in Biology in 1972, and his Ph.D. degree in 1977. At UCSB, he studied the ecology of kelp-forest fishes, and interspecific competition between two species of kelp-forest rockfishes. He then taught for a year in the Department of Zoology, U. C. Berkeley, was a research Biologist for a year at the New York Ocean Sciences Laboratory, studying larval fish ecology, and then spent a year assessing the effects of the San Onofre nuclear power plant on fishes. He was appointed an Assistant Professor of Biology at San Francisco State University in 1980, and has spent the remainder of his career at that institution. He has taught courses in ecology, biology of fishes, fisheries biology, biological oceanography, biogeography, general zoology, and general biology, and has supervised the Master’s thesis research of nearly 40 students. He also spent 2 ½ years working on leave with the National Marine Fisheries Service, studying the ecology of pelagic juvenile rockfishes. He and his students have studied life history of rockfishes, the ecology of juvenile rockfishes and other species, the genetics of the larval and juvenile stage of fishes, and the effects of climate change on fish communities. He is a Fellow of the California Academy of Sciences, was Chair of the Board of Governors for the Moss Landing Marine Laboratories, was a member of the Master Plan Team for the Marine Life Protection Act in California, and is the President-elect for the Western Society of Naturalists.

DR. LES WATLING received his Ph.D. in Marine Science from the University of Delaware in 1974. He is currently Professor of Oceanography at the University of Maine. He served on the U.S. National Research Council's Committee on Marine Biodiversity and he is a Past President of the Crustacean Society. He also serves on the International Council for the Exploration of the

Sea's Working Group on Benthic Ecology. His research interests have spanned two disparate topics, crustacean taxonomy and phylogeny on the one hand and benthic oceanography on the other. Watling's benthic interests are focused on impacts of humans on benthic environments, with an emphasis on organic enrichment and habitat disruption. Topics investigated in the last few years include the impact of salmon net-pen aquaculture on benthic environments, and the effects of fishing activities on benthic habitats and its consequences for benthic community structure. Most recently he has been the co-sponsor of two symposia dealing with impacts of mobile fishing gear on benthic communities and his research projects have focused on the potential loss of marine biodiversity associated with fishing activities. Much of the current work has been conducted using research submersibles as well as samples taken from surface ships.

DR. DONALD R. GUNDERSON is a Professor in the School of Aquatic and Fishery Science, University of Washington. His research has focused on the biology, population dynamics, and management of groundfish, with nearly 40 years of experience at the University of Washington, the Washington Dept. of Fish and Wildlife, and the National Marine Fisheries Service. Most of his current research is on spatial processes in population dynamics, and habitat utilization by groundfish.

DR. PETER J. AUSTER is the Science Director for the National Undersea Research Center and an Assistant Professor-in-Residence in the Department of Marine Sciences at the University of Connecticut. His research focuses on the ecology and conservation of fishes. He has participated as scientist or chief-scientist on 40 major research cruises and countless day trips in the northwest Atlantic, Gulf of Alaska, Bering Sea, Caribbean Sea, South China Sea, and equatorial Pacific. He also participated in research expeditions to Lake Baikal in Russia and Lakes Victoria and Malawi in the Rift Lake Valley of East Africa.

For the past 20 years, he has conducted studies to define how seafloor landscapes effect the distribution and abundance of fishes, understand the linkages between habitat level processes and population-community dynamics, and develop methods for monitoring habitat integrity. From an applied science perspective, he has focused his attention on the impacts of fishing gear on the environment and developing the scientific basis for using marine protected areas as a conservation tool in outer continental shelf regions.

His basic approach to fieldwork has been to use the same types of techniques underwater that wildlife biologists use on land. That is, making direct underwater observations to study how individual animals react to variations in nature. He has conducted over 1,400 scuba dives, 59 submersible dives (using the Johnson Sea-Link I and II, Delta, Mermaid IV, NR-l, Alvin, and Deepworker 2000), and 360 remotely operated vehicle dives (using Minirover, SeaRover, MaxRover, Phantom, Recon, and Ventana ROVs).

Peter serves on a number of panels and committees that are focused on marine resource management and conservation. He is involved in several outreach initiatives that are targeted at informing the public about marine conservation issues. Most recently, he was awarded a Pew Marine Conservation Fellowship in 1999, the NOAA Environmental Hero Award in 2000, and was named an Ocean Hero by the American Oceans Campaign in 2001.

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May 10, 2005

Mr. D. Robert Lohn, Regional Administrator
c/o Maryann Nickerson
National Marine Fisheries Service
7600 Sand Point Way NE - BIN C15700 - Bldg. 1
Seattle, WA 98115-0070

Subject: Comments on the "Pacific Coast Groundfish Fishery Management Plan - Essential Fish Habitat Designation and Minimization of Adverse Impacts" Draft EIS
Support of Modified Alternatives of Collaborative Efforts between Environmental Non-Governmental Organizations and Fishermen and
Protection and Consideration of Impacts to Coastal Communities

Dear Mr. Robert Lohn:

We appreciate this opportunity to comment on the "Groundfish Essential Fish Habitat Designation and Minimization of Adverse Impacts Draft Environmental Impact Statement (DEIS)." We support the Pacific Fisheries Management Council and National Marine Fisheries Service's efforts to assess the environmental and socioeconomic effects of the alternatives presented in the Draft EIS. Our review of the Draft EIS document and discussions we have had with NMFS staff, including Dr. Rebecca Lent and Mr. Steve Copps, provided us with a good understanding of the intent and variables of the Essential Fish Habitat program. Our comments are broad with respect to the fisheries issues but are focused on the effects of the Essential Fish Habitat program on local coastal communities and fishing dependent harbors.

The Magnuson-Stevens Act and a 2000 court order require the preparation of this DEIS. The purpose of this DEIS is to evaluate the effects of fishing on essential fish habitat and to identify measures that will minimize those impacts to the extent practical. The project will also designate "Habitat Areas of Particular Concern" and identify other actions that encourage the conservation and enhancement of Essential Fish Habitat (source: DEIS). The Pacific Coast Groundfish Management Plan (FMP) will ultimately be amended to incorporate the alternatives selected by the Pacific Fisheries Management Council (PFMC) and as may be approved by the National Marine Fisheries Service (NMFS).

Fisheries and Non-Governmental Organizations

There are an estimated 4-6 permit holders that we believe regularly bottom trawl in the San Luis Obispo central California region. These commercial fishermen have historically moored and offloaded seafood product at Avila Beach/Port San Luis Harbor. We strongly support the environmental non-governmental organizations (NGO's) and these 4-6 commercial fishermen's (and their associated representatives) efforts to agree on designating zones in the study area (such as Alternative C.12 as may be modified) as no-bottom trawl zones. Of course, other areas would remain available for trawling and other types of fishing, both sport and commercial use. As we understand it, the NGO's, individuals and Fishing Associations (local Fishermen's Associations, FMA, PCFFA and others) are working to identify areas they think should be kept open to bottom trawl fishing and those remaining areas that should be closed to bottom trawlers. Again, we strongly support these efforts and recommend that whatever collaborative proposals are eventually submitted to the Pacific Fisheries Management Council be taken seriously and adopted by NMFS and the Commerce Department. We believe that the collaborative efforts of the NGO's and the commercial fishermen will result in the best alternative for the central California coast area regarding designations of the Essential Fish Habitat, while also meeting the requirements of the court order and the Magnuson-Stevens Act, et seq.

Port San Luis Harbor staff is working with the NGO's and some of the fishermen to educate and encourage the development of information for the GIS mapping of the Alternatives in the draft EFH EIS. The outcome, which is subject to modification, may also include some of the local trawl permits and vessels being purchased with private funds.

We respectfully request both the PFMC and NMFS allow the NGO's to continue working with the trawl fishermen, the group most greatly impacted by this process, in order to prepare recommendations on open trawl areas and trawl closed zones within the central California coast study region. We expect these groups to present a preliminary zoning plan at the PFMC meeting in June 2005. We support any alternative submitted by a collaborative effort of NGO's and commercial fishermen.

In addition, we respectfully request that both the Pacific Fisheries Marine Council and the National Fisheries Marine Service accept and support any Alternative submitted by these groups in a joint effort as one of the preferred alternatives in the EFH EIS. We believe that the fishermen and NGO's should be allowed, if not encouraged, to continue their collaborative work to identify essential fish habitat, to designate habitat areas of particular concern, to minimize, to the extent practical, the adverse effects of fishing on the essential fish habitat, and to identify other actions that will encourage the conservation and enhancement of the essential fish habitats within any modified Alternative for the central California coastal region.

Ports, Harbors and Coastal Communities

There are many small ports and harbors that have a symbiotic relationship with the fisheries industries, both sport and commercial, within the EIS study region. These small craft harbors rely on the fisheries to provide steady jobs and act as an economic engine, keeping the community vibrant. In the case of central California harbors, the past few years of increased regulatory actions have had a drastic effect on the ability of the fishing fleets to continue making a profit. This decline, in turn, has a direct effect on the coastal host community (harbors and marinas). The implementation of regulatory closures or restrictions will have a deleterious economic effect on these local coastal communities. We ask that both the PFMC and the NMFS carefully consider the socioeconomic effects of any designation of essential fish habitat in the central California region.

We understand that it is very difficult to quantify the exact social and economic effects of the proposed closures and cannot offer, at this time, solid evidence of those effects, other than our past experience and day-to-day observation of the fishing industry and the benefits it provides to our communities. There is a synergy that occurs which is un-measurable in terms of cash value that also needs to be considered in the development of fishing regulations, including the designation of essential fish habitats on the west coast. The public visits the ports and harbors and loves to get their fresh seafood while watching the boats offload their catch. Without community interest, these small craft harbors become stagnant and turn into yacht harbors for the wealthy, or marine malls selling plastic sharks and T-shirts. The small independent business persons (fishermen) are forced out and the working harbors cease to exist. We have seen this in southern California harbors and hope that that does not happen here. With this in mind, please use care in implementing the EFH's and HACP's and take our comments into consideration.

We have attached our specific comments to this letter for your consideration in preparing the final "Environmental Impact Statement for the Essential Fish Habitat Plan on the West Coast for the Pacific Fisheries Management Council." In advance, we appreciate your consideration of these comments and observations.

Again, we thank the Council and Fisheries Service for your attention to this alternative. We are available for future discussions on this issue. Should you require additional information please contact me by phone at (805) 595-5409, ext. 14, or by email at jaye@portsanluis.com.

Sincerely,

Jay K. Elder
Harbor Manager
Port San Luis Harbor District

Encl.: Attachment A – Detailed Comments

cc: Harbor Commission
Dr. Rebecca Lent, Dept. Asst. Administrator – Regulatory Programs, NMFS
Mr. Steve Copps, Sr. Policy Analyst, NMFS
Mr. Don Hansen, Chair, PFMC
Port San Luis Commercial Fishermen's Association

Attachment A

Memorandum

To: Mr. D. Robert Lohn, Regional Administrator
c/o Maryann Nickerson
National Marine Fisheries Service
7600 Sand Point Way NE - BIN C15700 - Bldg. 1
Seattle, WA 98115-0070

From: Port San Luis Harbor District
Avila Beach, CA

Date: May 10, 2005

Re: Comments on the "Pacific Coast Groundfish Fisheries Management Plan - Essential Fish Habitat Designation and Minimization of Adverse Impacts" Draft EIS

The following are comments offered for consideration with regard to the "Draft Environmental Impact Statement on Pacific Coast Groundfish Fisheries Management Plan Essential Fish Habitat Designation and Minimization of Adverse Impacts." The Proposed Action is to amend the "Pacific Coast Groundfish Fishery Management Plan ("FMP") pursuant to section 303(a)(7) of the Magnuson-Stevens Act, to (1) describe and identify essential fish habitat (EFH) for the fishery, (2) designate Habitat Areas of Particular Concern, (3) minimize to the extent practicable the adverse effects of fishing on EFH, and (4) identify other actions to encourage the conservation and enhancement of EFH. The project area for this action extends from the seaward boundary of the Pacific Coast Exclusive Economic Zone shoreward to the inland extent of estuaries.

We appreciate the opportunity to offer these comments, which focus on the possible effects of the proposed action on coastal fishing communities in the central California coast study area (Port San Luis/Avila Beach to Pillar Point - Princeton).

There are numerous alternatives offered and considered in the Draft EIS that would have distinct effects on the coastal fishing communities. We are also aware that the socioeconomic effects of the proposed action are difficult to calculate due to the lack of available hard data for both the fisheries biomass and onshore activities related to the fishing industry. The fisheries models and economic models are models and, as such, are subject to a margin of error. We appreciate the efforts of the NMFS staff economists who have worked hard to develop these economic models and are not being critical of the work presented here. However, we believe there is much to be learned about the socioeconomics of any essential fish habitat designation that may be adopted. We urge the Council and NMFS to proceed with caution as we are dealing with a very tender social community which is on the verge of collapse. As we all agree, the estimates of the rockfish biomass is still uncertain and we support the continued funding of monitoring and research to improve the science of rockfish biomass determination to continue the sustainability of these important fisheries.

In general, the calculations that use the "Habitat Suitability Probability" ("HSP") are acceptable and raise the question of "What is the definition of Essential Fish Habitat?" We believe that the entire ocean is an essential fish habitat and, therefore, any human use would have an impact to its protection designation. We also understand that essential fish habitat is defined in the statutes, but in reality, we must make a reasonable determination that allows human interaction with the habitat as long as the final effect of the human factor does not reduce the species (in this case, rockfish) below the sustainability levels set by the NMFS and PFMC. We request that you continue to allow human use of the resources to the greatest extent feasible for the benefit of both fishing and harbors. We believe that we can co-exist in the environment by properly designating some areas for the protection of the essential fish habitat and other areas for resource harvest and harbor functions.

Alternatives to Designate and Describe Essential Fish Habitat ("EFH")

This Draft EIS states that the "Actions taken by a Council to minimize adverse effects of fishing on EFH may include fishing equipment restrictions, time or area closures, harvest limits, or other measures. Any such measures would be designed to reduce ongoing effects to fish habitats and/or promote recovery of disturbed habitats. These measures may result in socioeconomic effects for the affected sectors of the fishing industry, but would be designed to promote sustainable fisheries and long-term socioeconomic benefits. The environmental consequences of proposed actions would be evaluated in applicable NEPA documents before they are implemented." The designation of EFH's is a good idea but should only be adopted if the socioeconomics and historic uses (specifically fisheries and harbors) of those areas are seriously considered, understood and protected in the final EIS. We do not believe that the long-term cumulative socioeconomic effects on harbors in the designation of EFH's were fully explored, identified or mitigated in this draft EIS. More work is required to identify and mitigate the long-term socioeconomic impacts of any designation of EFH's on coastal harbors and the fishing industry.

A.1: The no action plan or status quo encompasses 317,690 sq. miles. We do not support this alternative for obvious reasons.

A.2: Designate the entire region west of the 3,500 meter as EFH (100% of HSP is greater than zero); encompasses 187,741 sq. miles. We do not support this alternative as it could have severe effects on the existing fishing and harbor industries that rely on the resources in that designated area.

A.3: Designate the region as EFH (100% of HSP is greater than zero); encompasses 87,160 sq. miles. Same comment as A.2 above.

A.4: Designate the region as EFH (60-90% of HSP overfished areas, precautionary areas, all other ground fish and all seamounts); encompasses 79,481 sq. miles. May support if some areas were opened to all gear types for continued fishing.

A.5: Designate the region as EFH (70% of HSP is greater than zero); encompasses 78,569 sq. miles. May support if adequate areas were opened to all gear types for continued fishing and limited effects to coastal communities.

A.6: Designate the region as EFH (30% of HSP is greater than zero); encompasses 66,589 sq. miles. May support if adequate areas were opened to all gear types for continued fishing and limited effects to coastal communities.

With regard to the matter of the errors on some of the essential fish habitat maps generated from information collected on the managed species, we wish to reserve the right to comment further if there are substantial differences in those maps from what is represented in the Draft EIS.

Alternatives to Designate Habitat Areas of Particular Concern ("HAPC")

This Draft EIS states that the "Designation of HAPC's, like designation of EFH generally, does not have any direct environmental or socioeconomic affect, but may result in indirect effects greater than those associated with EFH because resource managers and regulators are likely to place a high priority on protecting areas that have been designated as HAPC's." The designation of HAPC's is a good idea but should be adopted only if the socioeconomics and historic uses of those areas are seriously considered by the PFMC and NMFS in the final EIS. The long-term effects of designation of HAPC's must be further considered in the final EIS with a focus on the probability of further regulation restricting the fisheries and possibly the functions of ports and harbors in these designated zones. We do not believe that the long term cumulative effects of the designation of HAPC's were fully explored and identified in this draft EIS. More work is required to establish the long-term impacts of any designation of HAPC's.

B.1: The no action plan or status quo. We do not support this alternative as we understand that HAPC's must be identified and designated.

B.2: Estuaries designation: This alternative is understandably an important one and is supported. However, many estuaries also include harbors and marinas and the effects of a HAPC on any of these coastal dependent harbors could have an effect on the basic functions of harbors and marinas and should be seriously considered in the process. We do not believe that this Draft EIS fully explores the possible effects of such a designation on ports, harbors and marinas located in or near estuaries. More work needs to be done with regard to the continued ability of harbors to perform basic maintenance functions such as dredging and repairs to facilities.

B.3: <u>Canopy Kelp:</u> This alternative is also an important one and is supported. Again, however, we urge the consideration that a 100% designation of all kelp forest (current and historic) could have an effect on some commercial harvest operations and, of course, some harbors and marinas. Excluding some areas should be considered, which might have a negative effect on the harvesters and or coastal communities with facilities in or near kelp forest.

B.4: <u>Sea Grass</u>: See our comments on B.3. Clearly an important species, but must consider the impacts to ports, harbors and marinas and their continued ability to continue in maintaining their facilities and providing services.

B.5: <u>Core Habitat (upper 10% of overfished and precautionary species)</u>: Clearly an important alternative and is supported. However, there may be some areas which should be excluded to allow continued fishing and harbor functions, as may be historic and established by past or current use. Additional consideration on the effect to historic and existing use by fishermen and harbors is required.

B.6: <u>Rocky Reefs</u>: Again, this is an important alternative and is supported. However, there may be some areas that should be excluded to allow continued fishing and harbor functions, as may be historic and established by past or current use. Additional consideration on the effect to historic and existing use by fishermen and harbors is required.

B.7: <u>Areas of Interest</u>: This is an important alternative and is supported. However, there may be some areas that should be excluded to allow continued fishing and harbor functions, as may be historic and established by past or current use. Additional consideration on the effect to historic and existing use by fishermen and harbors is required.

B.8: <u>Oil Production Platforms</u>: The artificial reef alternative is not supported. Also consideration of existing lease sales, (Mineral Management Service) especially in the Santa Maria Basin should be discussed. Designation of EFH and HAPC's of those existing Outer Continental Shelf (OCS) lease sites should be done to protect the habitat from future oil exploration and production on the central coast.

B.9: <u>Process for New HAPC Designations</u>: Great idea, but another process also needs to be developed. The "Process to Un-Designate HAPC's" should be designed for the possibility of future re-designation or changes to this HAPC program. Please add the decommissioning of HAPC process to this alternative.

<u>Alternatives to Minimize Adverse Impacts to EFH</u>

This Draft EIS states that the "Federal and state agency actions that may adversely affect EFH trigger consultation and/or recommendations under sections 305(b)(2)-(4) of the Act. Under section 305(b)(4)(A) of the Act, NMFS must provide EFH Conservation Recommendations to federal and state agencies regarding any action that would adversely affect EFH."

"EFH recommendations from NMFS or a Council to federal or state agencies are non-binding. Nevertheless, <u>as a result of EFH coordination, consultations, and recommendations, Federal or state</u>

agencies may decide to restrict various activities to avoid or minimize adverse effects to EFH. Such restrictions could result in project modifications that lead to higher costs for the applicants for federal or state permits, licenses, or funding."

"Costs associated with consultations will likely vary depending on the number of species associated with an EFH designation, and the amount of habitat designated as EFH. If an entity chooses not to participate in consultations, then the EFH designation will ultimately have no effect on that entity. If consultations result in conservation recommendations, then there are likely to be increased costs in the short-term and possibly in the long-term depending on the amount of offsetting benefits realized from enhanced habitat productivity resulting from EFH designation."

This Draft EIS fails to fully consider the probable effects of the EFH designation on coastal communities, especially ports, harbors and marinas. The final EIS should detail what the effects might be to these coastal facilities if designation of EFH's are adopted and include the community's facilities. The increase in costs to mitigate an EFH in a harbor location may have an adverse socioeconomic effect and/or close down existing facilities which support coastal access, commerce, recreational uses and marine transportation corridors.

C.1: No Action: No comment.

C.2: Depth-based Gear –specific Restriction:

C.2.1: For the central California region, we believe that this action is already in place and, if so, would support the status quo, with some exceptions that might open up some historic trawl zones to allow some take with bottom gear.

C.2.2: For the central California region, we believe that this action is already in place and, if so, would support the status quo. We would object to the prohibition of all fixed gear shoreward of 150 fathoms and request that some fixed gear be allowed in the region, specifically in areas of historic take.

C.2.3: We would not support this alternative option as it would have a significant impact on the historic fisheries and harbor functions.

Consideration of the effects of all the C.2 options should be analyzed for the economic and social impacts to the coastal communities.

C.3: Close Sensitive Habitat:

C.3.1: "Greater than or equal to the recovery index where the value is greater than one. Closed to all gear types."(?) We would support this option if the pelagic fisheries and other less invasive bottom gear fisheries would still be allowed in the EFH zones.

C.3.2: "Greater than or equal to the recovery index where the value is greater than one. Closed to all gear types."(?) We would support this option if the pelagic fisheries and other less invasive bottom gear fisheries would still be allowed in the EFH zones.

C.3.3: Same comment as above.

C.3.4: Same comment as above.

Consideration of the effects of all the C.3 options should be analyzed for the economic and social impacts to the coastal communities. The use of the 100 hours rule and the limited time period (i.e., 2000-2002) is not reasonable. We strongly suggest that the period be expanded to include at least the past ten - if not the past twenty - years of trawling. The one hundred hour rule may be sufficient, but we would request that the NMFS and PFMC take into consideration the trawl fleet reply for this central coast area on this matter. There is a limited fleet here and the time periods (hours and years) used may not be applicable for our small fleet.

C.4: <u>Prohibit the Geographic Expansion of Fishing</u>: Areas that have not been fished recently (2000-2002) would be closed to fishing to protect areas that are potentially pristine.

<u>C.4.1</u>: Trawl fisheries would be prohibited from fishing in areas that were untrawled during 2000-2002.

<u>C.4.2</u>: Apply the expansion limit to all bottom-tending gear types. The closure would extend west from a line approximating the 2,000 m (1,094 fm) depth contour to the seaward margin of the EEZ.

Consideration of the effects of all the C.3 options should be analyzed for the economic and social impacts to the coastal communities. The use of the 100 hours rule and the limited time period (i.e., 2000-2002) is not reasonable. We strongly suggest that the period be expanded to include at least the past ten - if not the past twenty - years of trawling. The one hundred hour rule may be sufficient, but we would request that the NMFS and PFMC take into consideration the trawl fleet reply for this central coast area on this matter. There is a limited fleet here and the time periods (hours and years) used may not be applicable for our small fleet.

C.5: <u>Prohibit a Krill Fishery</u>: We support as long as other fisheries and the harbor functions are not impacted and continue to be allowed.

C.6: <u>Close Hotspots:</u> Prohibits trawling in hotspot areas, where – in this case – hotspots are defined as habitat that has high probability of being EFH for a large number of groundfish. Areas that are associated with 50 or more species/lifestage combinations would be closed to bottom trawling.

We support this as long as other types of non-trawling fisheries are allowed in the "Hotspot" areas.

C.7: <u>Close Areas of Interest</u>: Closes any combination of the areas of interest HAPC's designated under Alternative B.7 to fishing by specified gear types. (The 21 areas of interest listed under Alternative B.7 are underwater features, such as seamounts and submarine areas, or are currently under some form of protection.) Closures affect the following activities:

<u>Option C.7.1</u>: Close areas of interest to bottom trawling.

<u>Option C.7.2</u>: Close areas of interest to all bottom-contacting fishing activities.

This is an important alternative and is supported. However, there may be some areas that should be excluded to allow continued fishing and harbor functions, as may be historic and established by past or current use. Additional consideration on effect to historic and existing use by fishermen and harbors is required.

C.8: Zoning Fishing Activities: Limits the use of bottom-tending fishing gear to specified zones.

First, all areas deeper than the 2,000 m (1,094 fm) contour along the continental slope extending to the maximum westward range of groundfish EFH are closed to certain bottom-tending fishing gear types, according to the options described below.

Second, a five-year transition period to gear specific zones is established for the remaining area inside the 2,000 m contour, which remains open to these activities, subject to any other restrictions, for the five years from implementation (e.g., 2007-2011). Third, during this five-year period, NMFS conducts the research necessary to delineate zones where specified fishing activities would be permitted. At the end of the five-year transition period, the gear-specific zones come into effect and any remaining unzoned area is closed to affected gear types, according to the options described below. (Restrictions applied outside 2,000 m remain in effect.)

In identifying fishing zones, NMFS must demonstrate that any unavoidable adverse impacts would be minimal and temporary, based on the best scientific information available.

Option C.8.1: Fishing zones are established for bottom-contact trawls, dredges, and similar bottom-tending mobile fishing gear. Other bottom-contacting gear types are unaffected by the zoning system, including the prohibition outside 2,000 m.

We support as long as some bottom trawl and bottom-contact fishing is allowed and that all other types of fisheries are not impacted (i.e., pelagic and mid-water trawl/net).

Option C.8.2: Fishing zones are established for all bottom-contacting gear types, including bottom longlines, traps, and pots. The immediate closure outside of 2,000 m applies to all bottom-contacting gear types. In addition to establishing the zoning system, NMFS will conduct a gear substitution and modification research program, intended to redesign bottom fishing gear to reduce damage to habitat. This program will have a significant cooperative research element by employing fishermen in the design and testing of new gear.

We support as long as some bottom trawl and bottom-contact fishing is allowed and that all other types of fisheries are not impacted (i.e. pelagic and mid-water trawl/net).

The zoning system will be regularly modified to incorporate new information about habitat sensitivity and recovery factors, gear impacts on habitat, and to accommodate use of newly developed or modified gear.

This is an important statement that requires a follow up mitigation measure and policy to insure it is implemented.

C.9: Gear Restrictions: Specific gear modifications and prohibitions that are based on that interaction. The following gear restrictions would be implemented in areas identified as EFH for groundfish:

C.9.1: Prohibit roller gear larger than 15 inches on bottom trawls.
C.9.2: Prohibit the use of flat trawl doors (i.e., require cambered doors).
C.9.3: Limit the length of a single longline groundline to 3 nm.
C.9.4: Employ Habitat-Friendly Anchoring System.
C.9.5: Prohibit dredge gear.
C.9.6: Prohibit beam-trawl gear.
C.9.7: Prohibit set-gillnets in waters deeper than 60 fm.
C.9.8: Prohibit dingle bar gear (troll groundfish gear).

We support these mitigation measures and policies.

C.10: Central California No-trawl Zones: Based on a project being undertaken by two environmental advocacy organizations, The Nature Conservancy (TNC) and Environmental Defense Fund (EDF). Involves private funds used to purchase groundfish limited entry trawl licenses and vessels in concert with the designation of no-trawl zones off the central California coast. The project area extends from Point Conception to Davenport, California, and includes adjacent offshore seamounts (Gumdrop, Guide, Pioneer, Davidson, and Rodriguez).

TNC/ED have identified 23 permit holders they believe regularly trawl inside the project area. Most home port in Morro Bay, Moss Landing, Monterey, or Half Moon Bay. TNC/EDF intend to purchase a significant majority of the bottom trawling permits and vessels in this region if the Council/NMFS designates a significant portion of the project area as no-bottom-trawl zones.

TNC/ED will identify areas they think should be designated no-trawl zones using the GIS data developed as part of this EIS in combination with a participatory process involving trawl fishermen in the project area. If this alternative is adopted as an FMP and regulatory amendment, these areas will be closed to bottom trawling by NMFS once TNC/EDF have negotiated purchase contracts or options for at least half of the limited trawl permit holders they have identified as operating in the project area.

We generally support this Alternative only if a majority of the limited entry permit holders of local bottom trawl fishermen and other impacted fishermen cooperate with the NGO's in establishing the open trawl areas and agree with the closed areas. We suggest that a modified alternative be considered which allows for the collaboration of the NGO's and the bottom trawl fishermen to present a pilot project in the southern area of this Alternative study area (Pt. Conception to Pt. Sur) and then expand to the northern boundary of this Alternative study area in the nine months allocated for final action by the Pacific Fisheries Management Council. Consideration of the buy out program and unintended effects to the local harbors should be considered and offset with mitigation measures to insure the continued infrastructure is in place, new markets are explored, funding for new shore side fisheries support facilities are provided and the economic synergy is maintained for the shore side businesses in the local coastal communities. The Final EIS should also implement mitigation measures to prevent the buy back program from becoming a burden to the local coastal communities and harbors if the subject vessels are abandoned and fall into disrepair, creating a nuisance.

> C.11: Relax Gear Endorsement Requirements: Vessels holding a groundfish limited entry permit account for a large portion of groundfish landings. Currently, limited entry permits include a gear endorsement specifying the type of gear the permit holder may use. These endorsements identify three gear categories: trawl, longline, and pot. In addition, longline and pot gear permit holders may also have a sablefish endorsement. Permit holders with this species-specific endorsement may participate in the high-value primary sablefish fishery and are allocated vessel-specific catch quotas, known as tier limits because the endorsements fall into one of several categories, or tiers, with different catch quotas. Under this alternative, gear endorsements are relaxed but the sablefish endorsement is not. This would allow permit holders to switch gear types, providing fishermen greater flexibility in changing strategies based on prevailing conditions in the fishery.

We support this Alternative.

> C.12: Close Ecologically Important Areas to Bottom Trawl: This alternative was proposed by the environmental group Oceana. The alternative would close a network of areas to bottom trawling; set a maximum footrope size of eight inches on bottom trawl gear within open area; require Vessel Monitoring Systems on all bottom trawl vessels with positions recorded every 5 minutes; increase onboard observer coverage on bottom trawl vessels to a level determined to be necessary by NOAA to estimate annual bycatch of habitat-forming invertebrates; establish a process for setting a limit on the bycatch of habitat-forming invertebrates; require ongoing research including comprehensive benthic mapping.

We would support this Alternative only if a majority of regional limited entry bottom trawl fishermen cooperate with this NGO in establishing the open trawl areas and agree with the closed areas and if all other fishing gear types would continue to be allowed in the EFH designated in the Alternative.

C.13: Close Ecologically Important Areas to Bottom-contacting Gear: The areas identified in Alternative C.12 would be closed to all bottom-contacting gear types, defined as both fixed gear (longlines, pots, and traps) and bottom trawl.

We oppose this alternative.

C.14: Close Ecologically Important Areas to Fishing: The areas identified in Alternative C.12 (see Figure 2-28) are closed to all fishing.

We oppose this alternative.

The Draft EIS fails to take into consideration or explain the current regulations and restrictions that are in place and should prepare a map with overlays in the Final EIS. The PFMC and NMFS should seriously consider these existing and possible future (such as the California State Blue Ribbon committee studying MPA's) actions that may overlap any designations being considered in this EIS.

This EIS includes the following statement: ***6.1.7*** *EO 12866 (Regulatory Impact Review)* EO 12866, Regulatory Planning and Review was signed on September 30, 1993, and established guidelines for promulgating new regulations and reviewing existing regulations. The EO covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. Section 1 of the EO deals with the regulatory philosophy and principles that are to guide agency development of regulations. It stresses that in deciding whether and how to regulate, agencies should assess all of the costs and benefits across all regulatory alternatives. Based on this analysis, NMFS should choose those approaches that maximize net benefits to society, unless a statute requires another regulatory approach. The information and analyses in Chapter 4 of this EIS would be relevant to a Regulatory Impact Review (RIR) analysis of future regulations developed from this process. If proposed regulations are promulgated, an RIR would be prepared as part of a proposed regulatory package.

The question here is whether the Draft EIS sufficiently meets this requirement of an analysis of the benefits and costs of regulatory actions with regard to the designation of EFH and or HAPC. We would request that the NMFS expand the discussion on this EO and provide additional analysis of the proposed regulations on both the fishing fleets and the harbors and marinas within the study area.

We appreciate your consideration on this very important matter and look forward to the Final EIS including a response to our questions. Overall, we believe that the contents meet the minimum requirements of NEPA but the document must be expanded in the areas identified in our comments. We are available for consultation on our comments if you wish to discuss them further. Again, thank you for the opportunity to comment on this EIS.

May 11, 2005

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service
C/o Maryann Nickerson
7600 Sand Point Way, NE
Bin C15700
Seattle, WA 98115-0070

RE: Comment on 2005 Pacific Coast Groundfish Essential Fish Habitat Draft Environmental Impact Statement dated February 11, 2005.

Dear Mr. Robert Lohn,

Thank you for this opportunity to submit comments on the 2005 Pacific Coast Groundfish Essential Fish Habitat Draft Environmental Impact Statement dated February 11, 2005. The Audubon Society of Portland has 10,000 members throughout the state of Oregon who care deeply about the protection of coastal wildlife and habitat off of our coast. We applaud your efforts to compile the best available science, identify and designate essential fish habitat (EFH) and Habitat Areas of Particular Concern (HAPC), minimize adverse impacts that may result to EFH due to fishing, and identify further actions to encourage the conservation and enhancement of EFH. In the spirit of the PEW Ocean Commission Report of 2003 and the U.S. Commission on Ocean Policy Report of 2004, we believe this document seeks to incorporate the vital principles of ecosystem-based management into Pacific fishery management.

ALTERNATIVES TO IDENTIFY AND DESCRIBE EFH: ADOPT A.2

The Audubon Society of Portland recommends adoption of Alternative A.2, where EFH is identified as 100% of the area where the habitat suitability probability (HSP) is greater than zero for all species and any additional area in depths less than or equal to 3500 m (1914 fm).

We feel Alternative A.2 should be chosen as the Preferred Alternative because it is inclusive enough to cover all habitats where groundfish have been observed, with the addition of 100 m depth as a precaution for non-observed species and scientific uncertainty, but it is not so over-inclusive as to render the designation of EFH meaningless. Additionally, it will minimize restrictions to subsequent selections of HAPCs, which are to be subsets of designated EFH.

ALTERNATIVES TO DESIGNATE HAPC: ADOPT B.2, B.3, B.4, B.6, B.7, B.9

The Audubon Society of Portland recommends adoption of Alternatives B.2, B.3, B.4, B.6, B.7 and B.9. Although not required by the Magnuson-Stevens Act (MSA), Councils are encouraged to designate HAPCs, based upon the importance of the ecological function provided by the habitat, the extent to which the habitat is sensitive to human-induced environmental degradation, whether development activities are or will be stressing the habitat type and the rarity of the habitat type. These considerations are particularly germane in the context of the more than 80 species managed by the Pacific Fishery Management Council (PFMC). At a time when eight of the assessed 19 species of groundfish are declared overfished and offshore aquaculture and exploration activities are being hotly pursued on the federal level, the moment is ripe to move forward with designation of HAPCs in an effort to conserve and restore the most crucial habitat types, to be determined by the best available science.

In light of the importance of such designation, we recommend including Alternatives B.2, B.3, B.4 and B.6, which encompass essential estuaries, canopy kelp, seagrass and rocky reefs. These biologically productive areas have been shown to provide important habitat for many marine species, including groundfish, at various stages of life history, for reproduction, feeding and refuge. Although these habitat types are among the areas of highest productivity in the world, they can be particularly sensitive areas, due to proximity to the shoreline, inadequate mapping and vulnerability to certain gear types. Thus, designation as HAPCs would serve to concentrate attention on potential threats to these habitat types and would enable the PFMC to make informed future decisions regarding the management of Pacific groundfish.

Additionally, we recommend including Alternative B.7, a “catchall” designation for special interest areas that possess unique geological and ecological characteristics that may be critical for rockfish management. Seamounts and canyons supply a variety of unique ecological functions, perhaps the most important being the provision of high concentrations zooplankton, which is a principal food source for both juvenile and adult rockfish.

Finally, we recommend adopting Alternative B.9, which establishes a streamlined process for designating new HAPCs, based on proposals submitted to the PFMC. Based on the principles of adaptive management, this alternative recognizes that new future scientific information could call for inclusion of other critical habitat areas as HAPCs. It establishes a process for petition and PFMC consideration. This streamlined process will provide assurances that proposals submitted by organizations and individuals will be fully and fairly considered.

ALTERNATIVES TO MINIMIZE ADVERSE IMPACTS TO EFH: ADOPT C.4.2, C.6, C.7.2, C.9.5, C.9.6, C.10 AND A COMBINATION OF C.12, C.13 AND C14.

The Audubon Society of Portland recommends adoption of C.4.2, C.5, C6, C.7.2, C.9.5, C.9.6, C.10 and a combination of C.12, C.13 and C.14. Because Amendment 11 to the Fishery Management Plan did not include measures to minimize fishing impacts on EFH, it is essential to take steps to do so today. Although restrictions on the use of large footrope gear and Rockfish Conservation Areas have some mitigating benefits on the effects of fishing gear, these restrictions may only affect a small portion of habitat and are not necessarily determined by specific habitat type.

Under Alternative C.4.2, geographic expansion of fishing for all bottom-tending gear types would be prohibited, to protect areas that are potentially pristine. Because there is little data for areas in which there have historically been no fisheries, a precautionary approach should guide management in these unexploited areas, so as to truly adhere to the principles of sound science and provide valuable environmental baseline data for the future. As acknowledged by the DEIS itself, relatively little is known about organisms such as deep-sea corals that may occur in these areas and be particularly vulnerable to impacts associated with even a single fishing event. Recent discoveries such as new black coral species in close proximity to Los Angeles, multispecies aggregations of reproducing psychrolutid sculpins and deep-sea octopod, brooding eggs on the Gorda Escarpment off of California and methane seeps with associated carbonate rock structures and chemosynthetic communities along the shelf-break off of Oregon's coast support this precautionary approach, suggesting there are diverse, yet scattered areas that warrant protection by limiting the expansion of existing fisheries. Thus, protecting presently undisturbed areas until better mapping information is available is critical. Additionally, applying the expansion limit to all bottom-tending gear types, not just trawl fisheries, is essential.

The PFMC should adopt Alternative C.5, which prohibits a krill fishery. Euphausiid shrimp are important prey for a wide range of species along the West coast and are inextricably linked to groundfish, both as primary prey for groundfish and in secondary ways through the food web. In the spirit of ecosystem-based management, we are supportive of preserving a healthy forage base for groundfish and their prey, and we encourage future actions by the PFMC to protect the full spectrum of currently non-managed forage species.

We recommend inclusion of Alternative C.6, which calls for closure of "hotspots," as a Preferred Alternative for minimization of adverse impact on EFH. Used in conjunction with other alternatives, prohibiting trawling for the top 20% HSP areas associated with 50 or more species/lifestage combinations will ensure protection of the greatest possible number of groundfish populations.

Alternative C.7.2 closes off those special interest areas included under B.7 to all bottom-contacting activities, rather than just to the specific method of bottom trawling, thereby affording increased precautionary protection to these geographically unique and biologically productive areas.

Alternatives C.9.5 and C.9.6 prohibit the use of destructive dredge and beam trawl gear, which are being phased out anyway. Thus, these limitations will have little economic impact on fishing interests, but will seek to afford maximum protection to bottom habitat. That being said, we acknowledge that fishing gear is constantly evolving and that habitat protections envisioned may not be maintained through time as gear configurations change. We therefore support using gear restrictions in conjunction with the other protective measures to minimize adverse impact to EFH, as outlined above and below.

Alternative C.10 utilizes existing closed or unfished areas to eliminate bottom trawl gear. Through the use of public-private partnerships, private funds are used to buyout 50% of groundfish trawl permits, in concert with designation of no-trawl zones off the Central California coast. Progressive cooperative partnerships such as these are an essential and forward-thinking means of protecting habitat and fisheries for future generations, distributing the economic hardship of marine conservation more evenly onto a more diverse spectrum of interested stakeholders. Although geographically limited in scope, this alternative may have merit if the interested private parties (the Nature Conservancy and fishing interests) agree this is a productive proposal.

Alternatives C.12, C.13 and C.14 represent a broad spectrum of closures to ecologically important areas, either to just bottom trawl gear, all bottom-contacting gear or all fishing, respectively. We believe a combination of these alternatives should be utilized to achieve the PFMC's goals of protection and research. Integration of these approaches will also give the PFMC the opportunity to develop a network of research reserves, which can serve as a means to compare fishery management techniques and effects against benchmark data.

The Audubon Society of Portland recommends adoption of C.12, the "Oceana" alternative, in an effort to freeze the existing bottom trawl footprint. As stated by Oceana, the best science available from the National Academy of Sciences has found that bottom trawling reduces habitat complexity, causes shifts in benthic communities and reduces productivity of benthic habitats. By utilizing existing closed areas, denying expansion of trawling areas, closing sensitive areas within those currently being trawled, limiting roller gear size and engaging in ongoing research and monitoring, the PFMC can maintain healthy fisheries while protecting habitat and marine biodiversity. The Audubon Society of Portland also supports adoption of C.13, which limits use of bottom-contacting gear in ecologically important areas. Finally, we also recommend closure of specific ecologically important areas to all fishing. There is sound science to suggest that creating a network of discrete marine areas of biological significance that is off-limits to all fishing can allow adult fish to grow and reproduce in abundance, while their offspring help replenish populations outside closed boundaries where fishing is allowed. This alternative is supported by the principles of ecosystem-based management and moves fishery management into a broader ecological context.

RESEARCH AND MONITORING ALTERNATIVES: ADOPT A COMBINATION OF D.2.1 AND D.4

The Audubon Society of Portland recommends adoption of D.2.1. As stated above, one of the biggest challenges the PFMC faces today in the context of Pacific groundfish management is the relative lack of data, analysis and understanding of the species, their habitats and the effects of human disturbance. Data collected by fishing vessels can prove invaluable for gaining a future understanding of these complex interactions and gathering spatial data for future mapping. Thus, under this alternative, all fishing vessels will be required to maintain a logbook, recording information on fishing time, location and catch composition, similar to the current trawl logbook program. In addition, however, it is imperative that this data is not only collected, but also error-checked, entered into a database and analyzed in a meaningful way; one of the biggest complaints we have heard from fishing interests at public meetings related to this and other documents is that logbook data is gathered by individuals, but is not compiled and analyzed in a meaningful or timely manner.

We also strongly support Alternative D.4, which would restrict fishing in specific areas. These research reserves areas would not only minimize fishing impacts on habitat and marine wildlife, but would provide controlled benchmark data for determining extent of fishing impacts, differentiating natural versus human impacts and measuring the length of time necessary for habitat features and function to recover. By establishing a network of research reserves, the PFMC can engage in a comparative study of 1) areas open to and impacted by commercial and recreational fishing, 2) areas subject to only limited and controlled fishing disturbance and 3) areas not open to or impacted by any fishing. These areas should broadly represent all habitat types in which PFMC-managed groundfish occur, to allow comparison of the effects of fishing across these different types.

GUIDING PRINCIPLES

In general, we feel it is imperative for the PFMC to take a precautionary approach to management of Pacific groundfish, while we improve our limited understanding of the impacts of fishing on diverse habitats and the ability of habitats to recover from fishing impacts. In fact, the Oregon State of the Environment Report 2000 states, "the most significant risk to marine fisheries … is our insufficient understanding of the complex interactions of natural and human caused changes in stock health."[1] It is crucial, therefore, that the PFMC err on the side of caution in protecting and restoring Pacific groundfish and habitat.

We strongly encourage the PFMC to include a network of research reserves in its effort to designate, protect and understand present and future EFH. By monitoring and analyzing impacts and effectiveness in these reference sites, the PFMC can glean new

[1] **Oregon Progress Board.** 2000. Oregon State of the Environment Report, Statewide Summary, Salem, Oregon.

knowledge, engage in adaptive management and move forward more confidently with fishery management, basing its decisions on sound science.

Utilizing the principles of ecosystem-based management, the PFMC should develop an ecologically based management plan that considers the entire ecosystem, including humans, and protects the long-term health of the marine environment**.** This plan should think beyond protection of single species and should consider the inherently interrelated nature of all marine species and habitat types, as well as potential past, present, future and cumulative human impacts on these environments.

Finally, we feel it is important that all possible EFH protection measures be adopted in the near-term, rather than deferring measures for future understanding. This precautionary implementation should then be modified accordingly, based on the principles of adaptive management, as new information is gathered during the mandatory five-year review process.

CONCLUSION

In conclusion, we would again like to thank you for this opportunity to comment. As stated above, we applaud your efforts in creating this Draft Environmental Impact Statement and strongly support the designation and protection of EFH for Pacific groundfish. Specifically, we support the respective alternatives and general principles outlined above.

Thank you for considering these comments.

Sincerely,

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cc: Pacific Fisheries Management Council
Oregon Department of Fish and Wildlife

Southern California Trawlers Association

May 4, 2005

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service
c/o Maryann Nickerson
7600 Sand Point Way, NE, Bin C15700
Seattle, WA 98115-0070

RE: GROUNDFISH MANAGEMENT PLAN ESSENTIAL FISH HABITAT (EFH) DRAFT EIS

Dear. Mr. Lohn:

Our Association is composed of small trawl vessels in the 32 to 60 foot range, most being less than 45 feet long, who trawl for California halibut, ridgeback prawns and sea cucumbers, and formerly for spot prawns. We fish along the coastline from San Pedro, sometimes as far south as San Diego, up to Point Conception, from Point Arguello up to Pt. Buchon, and a few of our boats fish in Monterey Bay for halibut seasonally. Our boats are home-ported in Morro Bay, Port San Luis, Santa Barbara, Ventura, Channel Islands and San Pedro Harbors.

The purposes of this letter are 1) to fill in some serious information gaps in the DEIS regarding small-boat artisanal trawling that is done by our Association members in this region, and 2) comment on the various alternatives offered in the DEIS to mitigate impacts of fishing on EFH. Since most, if not all, of the information regarding trawling and its impacts in the DEIS relate to Groundfish Management Plan A-Permit trawl vessels, only one of which, home-ported in Morro Bay, is in our Association, we believe it is in the best interest of all for us to provide you with information about our fisheries.

In the Santa Barbara Channel area, particularly, there is no groundfish fishery to speak of, as described in the DEIS. This was not always the case: in the 1940s until about 1980 or so, groundfish were trawled in this region. Due to market and infrastructure changes, ***not*** stock decline problems, this fishery gradually moved out of the Southern California Bight (SCB). However, many, if not most, of the alternative proposals for management actions under the groundfish plan that address mitigation of impacts to EFH will certainly affect our small-boat artisanal fisheries for the remaining species we fish for, as well. So far, however, this is without including relevant information about our fisheries, to any appreciable extent, upon which the Pacific Fisheries Management Council (Council) can make an informed decision on EFH mitigation measures that accounts for our fisheries.

6 Harbor Way, Box 101 Santa Barbara, California 93109

Habitat Mapping Discrepancies

The DEIS map scales are nearly useless for us to have any accuracy regarding exactly where EFH, HAPC or mitigation closure areas are. Larger scale maps need to be created in order for us to effectively understand and comment on the accuracy (or lack thereof) of habitat type information in the SCB.

Partly due to scale, partly due to very inappropriate assumptions on limited data, areas noted in DEIS maps as rocky or gravelly bottom are grossly inaccurate for the SCB. Our Association members have a combined, cumulative fishing experience history approaching a few hundred years of time on these seafloors, and pretty much know where the hard bottom habitat is. Unfortunately, we have not been consulted regarding these details of habitat type distribution. This information disconnect should be corrected prior to making decisions about closing areas of presumed habitat in the SCB based on mostly inaccurate habitat type geographic data.

As an example, and as far as we can determine given the small-scale of maps presented in the DEIS, Oceana's Alternative 12 mapping misses significant detail for water depths that we trawl, particularly with respect to mapping of bottom types (*see* DEIS Appendix C, Figure 42). It is clear that Alternative 12 wishes to place the entire Channel Islands National Marine Sanctuary in marine no-take reserve status, despite the extremely detailed habitat analysis undertaken by the CINMS Marine Reserve Working Group (MRWG) that resulted in the nearly-consensus array of no-take zones implemented by the California Fish and Game Commission. Much of the discussion in Alternative 12 lacks any of the habitat typing specificity that was readily available online from the CINMS web site, and makes erroneous assumptions about habitat types in those federally managed waters as a result.

What is unclear, however, is the status of the western Santa Barbara Channel. A green-blocked area is marked "open to bottom trawling" in the eastern half of the Channel, and a pink zone "Areas closed to bottom trawling" extends 6 miles around the Sanctuary, but the map is white (is that open?, closed? both?) in the western half of the southern part of the Channel, and western quarter of the coastal, northern part of the Channel. This area is currently open to trawling. This ambiguity must be resolved prior to making any meaningful comment on the proposal for the SCB, particularly the Channel.

Other conservation efforts have similarly mischaracterized large swaths of habitat type, and we are concerned that this misinformation made its way, by reference or by inappropriate use of this misinformation by the DEIS writing team: an area from Santa Barbara Point to Pitas Point from 1-2 miles offshore was mischaracterized as gravel bottom. This area is predominantly soft mud bottom, as any trawler would have been able describe. There is one reef structure, Carpinteria Reef, that everyone knows about and avoids, and there are a couple of hard bottom area outside of Carp Reef towards the oil platforms that we also know about and avoid to prevent damage to our nets. However, to characterize the entire area as gravel bottom is to ignore well-marked bottom type notations on the NOS charts, as well as failing to incorporate readily-available local fishing knowledge of the region.

Cumulative area closures in the SCB

This consideration of EFH is not happening in a vacuum, and should not be approached as if it were the only management measure that will reduce risk for groundfish EFH. A number of other actions have been taken by both State and Federal ocean regulatory agencies that bear directly on risk-averse, precautionary protection of groundfish EFH in the SCB. Some examples of these (See Figures 1 & 2):

▪ <u>State Waters Inside One Nautical Mile</u>. This area is closed to trawling at all times throughout California. The bulk of nearshore rocky reefs occur in this zone, and this is some of the best essential fish habitat (EFH) along the coastline. It is completely protected from any impacts of trawl fishing.

▪ <u>Channel Islands National Marine Sanctuary (CINMS) Marine Protected Areas (MPAs)</u>. This effort culminated in 2003 with a number of complete no-take marine protected areas (called marine reserves) around the northern Channel Islands. These areas were carefully selected to represent an array of habitat types, but the driving factor in discussions about these reserves was clearly the perceived status of groundfish stocks in the area. We say "perceived status" because at a time when conservation groups and state and federal marine resource regulators were saying that the SCB was devoid of bocaccio, our Association members were seeing startlingly large numbers of bocaccio in the region. Likewise with cowcod, hook and line fishermen repeatedly reported that there were many areas that were abundant in cowcod that were not being reported by scientists studying the area.

▪ <u>Proposition 132 (Gillnet Ban) State Waters Marine no-take zones</u>. Two of the four no-take zones in this regulation protect dozens of square miles of EFH in the SCB.

▪ <u>CINMS Federal-waters MPAs</u>. Currently, the Sanctuary Program (NMSP) is circulating a Sanctuary Designation Authority amendment document that proposes to give authority for the Sanctuaries Program to regulate commercial and sport fishing in ocean waters, traditionally the role of its sister agency, National Marine Fisheries Service (NMFS) or NOAA Fisheries. The purpose of this attempt to power-shift from NMFS to NMSP is to facilitate the implementation of "Phase 2" of the CINMS MPA plan in federal waters of the Sanctuary from 3 miles to 6 miles offshore of the four northern Channel Islands. Many of these areas are in places where our Association fishermen have traditionally fished for ridgeback or spot prawn, and this effort will, once again, further reduce the perceived risk to groundfish EFH in federal waters.

▪ <u>Federal-State designated Cowcod Conservation Area</u>. This area, some 5,200 square miles of ocean area is designated to, again, reduce risk to groundfish stocks (cowcod) and to protect EFH under the groundfish management plan (and California management consistency therewith) is closed to all trawling, and most other types of fishing as well.

▪ <u>Federally-designated Rockfish Conservation Area (RCA) (Shelf Closure)</u>. In the SCB, the area has been somewhat of a "moving target," but currently is believed to be closed to fishing of all types for groundfish between shore and 150 fathoms, but changes seasonally to 60 or 75 fathoms and outward.

▪ <u>California Halibut Trawl Bill</u>. Enacted in 2004, these new regulations and management measures provide yet another risk-averse layer of gear, permitting and area closures that further protects groundfish EFH of concern to the Council. Some of the additionally precautionary measures include observers for California Halibut Trawl Grounds (CHTG) bycatch and habitat issues, excision of potential coral and sponge habitat from CHTG (all deepwater canyons in the CHTG), a permit system that declines or defers transferability until capacity goals/fleet reduction issues are considered, and a complete closure of the CHTG during the halibut spawning period (mid-March to mid-June, which no other halibut gear type observes), and others.

This accumulated suite of risk-averse, precautionary management actions taken together serve as a suitable array of areas that provide more-than-adequate protection for rebuilding groundfish stocks and the EFH upon which they depend. It should be considered as an offset for both the small-boat trawl fishery in the SCB, and as sufficient buffer for protection from impacts of fishing on groundfish EFH.

1. This array (See Figures 1 and 2) is hereby formally proposed as another alternative to be comprehensively and cumulatively analyzed in the EFH DEIS for the SCB region to protect groundfish EFH.

Monterey Bay

At a recent meeting in Morro Bay to discuss various alternatives, we learned that the Oceana Alternative 12 and the Nature Conservancy Alternative both have the entire Monterey Bay closed to trawling to protect hard bottom habitat, especially corals and sponges. However, this ignores the fact that in certain areas (see Attachment A and Figure 3), our Association members fish in highly storm-disturbed sandy bottom area (Terrace Point to the Pajaro River) for California halibut seasonally, and no deepwater coral or sponge habitat exists in the relatively shallow 25 to 60 fathom halibut flats used by our members. In order to achieve the stated goal of maximizing protection of EFH while minimizing socioeconomic impacts to fishing, further information sharing and a finer-scale closure proposal should be examined in the Monterey Bay. The areas currently used by halibut trawlers in our Association do not impact biogenic organisms or hard bottom substrate in Monterey Bay. Those areas should not be closed to trawling. The approximate bounds of this very small portion of the Monterey bay are as follows: outside the 3-mile line to the 60 fathom contour, from a point where these two lines intersect off Terrace Point (approximately 36° 53.61' x 122° 4.13') to a point where these two lines intersect again off the Pajaro River (approximately 36° 50.26' x 122° 52.37').

2. We respectfully request that this area be kept open to trawl fishing, as currently regulated, in any final proposal to protect groundfish EFH.

Avila Beach Area

Attachment A describes an area From Point Buchon to Point Arguello outside the 3-mile state waters limit line out to 60 fathoms. This area is historically fished for California halibut in muddy seafloor bottom habitat as the fish and weather allow.

3. We respectfully request that this area be kept open to trawl fishing, as currently regulated, in any final proposal to protect groundfish EFH.

Cumulative Socioeconomic Impacts

With the array of closures already implemented along the California coastline, a significant concern relates to the cumulative impacts of these closures on the essential infrastructure required to sustain viable commercial "working" fishing ports and harbors along the 1,100 mile coastline of California. At what point do we see the regulation that becomes "the straw that broke the camel's back?" That is, which additional layer of no-fishing regulation will cross the threshold of cutbacks to the number of boats required to harvest a sustainable yield from California's ocean resources, the number of buying stations still left in Morro Bay, San Pedro or Santa Barbara Harbors, the number of fish processors and/or retailers that can keep their doors open in order to serve the remaining few fishing boats that still go out? The cultural value of working ports and harbors is measured in both cultural heritage and tourism value: it is common knowledge that what attracts tourist dollars to the Morro Bay or Santa Barbara Harbor is "the quaint fishing boats" that still number in the tens, at least, in each Harbor (actually, there are only 5 A-permit boats left in the combined ports of Morro Bay and Port San Luis, we learned at the May 1 meeting in Morro Bay). At some point, an additional regulation will be the last one necessary to remove the infrastructure, more or less permanently (due to the failure of the commercial fishing industry to recruit young people among its numbers), that supports this cultural heritage in California ports and harbors. It behooves the Council to carefully consider whether or not further draconian measures are actually required to effectively protect groundfish EFH, or whether these further measures are, in fact, "the last straw" for fisheries culture and infrastructure in these ports and harbors. Another way to phrase this question is to turn it on its head: "how much fishing area, how many fishing boats, are necessary to maintain the year-round sustainable infrastructure of buying stations, ice houses, hoists, fish processing plants, wholesalers and retailers, that can provide fresh California seafood to seafood consumers?"

Fishing Grounds for Southern California Trawlers Association members

Attachment A lists the areas that our Association members use to harvest California halibut, ridgeback prawns, sea cucumbers and (formerly) spot prawns in the disjunct fishing grounds from Monterey Bay to San Diego. Figures 1 and 2 chart the areas closed to trawling due to a wide variety of management and regulatory actions. As you will see, due to recently implemented regulations, these areas are vanishingly small compared to "the Pacific Ocean," a common yardstick for conservationists to conclude "but we're only closing 1-4% of the ocean to trawling." They are vanishingly small compared to any EFH Alternative proposal currently in the DEIS. That 1-4% referenced, depending on how it overlaps with our trawl areas, might actually represent an additional erasure of 20, 30, 40, or even 50% of our remaining trawl grounds. Which percentage will be the final straw?

To conclude, we offer another alternative for the Southern California Bight that we respectfully request be analyzed concurrently with the other alternatives in the DEIS prior to the Council making a final decision regarding further protection for EFH from the impacts of trawling. We offer assistance to any proponent of any alternative in the form of consultation on detailed information regarding habitat types in our region. Please contact Mike McCorkle (805) 566-1400 to arrange such information sharing. Thank you for considering our request for analysis of our alternative to protect EFH while minimizing socioeconomic impacts to our Association members.

Sincerely,

Mike McCorkle

Mike McCorkle,
President

c: Mr. Don McIsaacs, PFMC
Ms. Rebecca Lent, NMFS
Mr. Steve Copps, NMFS
Mr. Steve Ralston, NMFS
Ms. Jan Mason, NMFS
Mr. Mark Helvey, NMFS
Mr. Lyle Enriquez, NMFS
Ms. Marija Vojkovich, CDFG
Ms. Susan Ashcroft, CDFG
Mr. Jim Ayers, Oceana
Mr. Chuck Cook, Nature Conservancy
Mr. Rod Fujita, Environmental Defense
Mr. Pete Leipzig, FMA
Mr. Zeke Grader, PCFFA
Congresswoman Lois Capps

Attachment A

Southern California Trawlers Association:
Southern California Trawl Grounds

The Southern California Trawlers Association is a group of small-boat artisanal trawl fishing vessels that use a small footrope (8" or less) to trawl sustainably for mainly fresh, local markets and buyer/processors. Our Association is composed of relatively few boats (variable from 13 to 20), but the age composition of our captains makes attrition a problem today that is accelerating (we held funeral services for Association Member, Captain Tony West, F/V Steel Fin II, in late April, 2005). Few younger fishermen are entering the trawl fishery due to the incessant clamor of some conservation organizations that "all trawling is bad," and due to the draconian measures taken by both State and Federal regulatory agencies in the last few years to rebuild several groundfish stocks. Due to horsepower and gear limitations, our boats do not fish on rocky substrate or in extremely deep water. Net damage from reefs has taught us the wisdom of avoiding these areas of rocks.

Our boats provide local live halibut, ridgeback prawns (and, formerly, spot prawns) and some sole to local markets. We also trawl for sea cucumbers, for human consumption, mostly in Asian ethnic markets in the San Francisco, Oakland, Los Angeles areas, and some dried sea cucumber is exported.

Areas our Association Members Fish

San Diego

From the 3 mile line out to about the 45 fathom depth. The seafloor from Pt. Loma down to the Mexican border is mostly relatively low gradient sand flats. We catch mainly halibut and sea cucumber in this area, but ridgeback shrimp are in the Navy dumping area but it is so full of debris we can't fish there.

Newport Beach

From the western edge of the Newport Canyon up to Pt. Fermin, off San Pedro, from the 3 mile line outward as far as (for ridgeback prawn) 100 fathom depth. We catch sea cucumbers, halibut and ridgeback prawns in this area, but the halibut are mainly closer to the 3-mile state waters limit line.

Santa Monica Bank and Bay

Along the eastern edge of the Santa Monica Bank we fish for halibut, ridgeback prawn and sea cucumber, all on soft mud bottom from the Santa Monica Bay fishing closure line and/or the 3-mile state waters limit out to 100 fathoms for ridgebacks. Along the western edge of the Santa Monica Bank up to Malibu we fish along the closure line & outside 3 miles also. We do not fish any part of Redondo Canyon.

Pt. Mugu to Arguello

Along the mainland side of the Santa Barbara Channel from Point Mugu to Point Arguello. During the California Halibut Trawl season (June 16 to March 15) we fish from 1 mile offshore to 3 miles out and beyond. During the closed (for spawning) season in this area, we fish outside of state waters 3-mile limit line. As a result of discussions with conservation groups regarding the recently enacted California

Halibut Trawl Permit legislation, we agreed not to fish in areas that may contain deepwater corals and/or sponges or other biogenic organisms such as sea fans. For this area specifically, we now do not fish in Mugu Canyon, Hueneme Canyon, or in the canyons off Point Arguello and Point Conception. We fish out to 150 fathoms from mainly Conception to Santa Barbara, and in the Ventura Flats from Hueneme Canyon west. We fish these areas for sea cucumbers, ridgeback prawn, and California halibut. We used to fish for spot prawns, but due to concerns over bycatch of bocaccio (principally in the area north of Point Arguello), we no longer are able to fish for spot prawns at this time. The bottom types we fish in this area are mostly mud and some sandy mud. There are a few well-known rock reef areas we all avoid so as not to damage our small trawl nets. Historically we also fished for ridgeback and spot prawns in China Bay, Santa Cruz Island, and in the Channel inside of the gap between Anacapa and Santa Cruz Islands, also over mud bottom. In 100-130 fathoms we also historically fished for Dover and English sole on soft bottom in that area, and along "the Finger" (100-fathom west-pointing bathymetric feature in mid-Channel) for rockfish. Sole were also caught along the lower (northeastern) edge of the Finger as it merges with the Ventura Flats (the "Dunes" area where Platform Gail is now located).

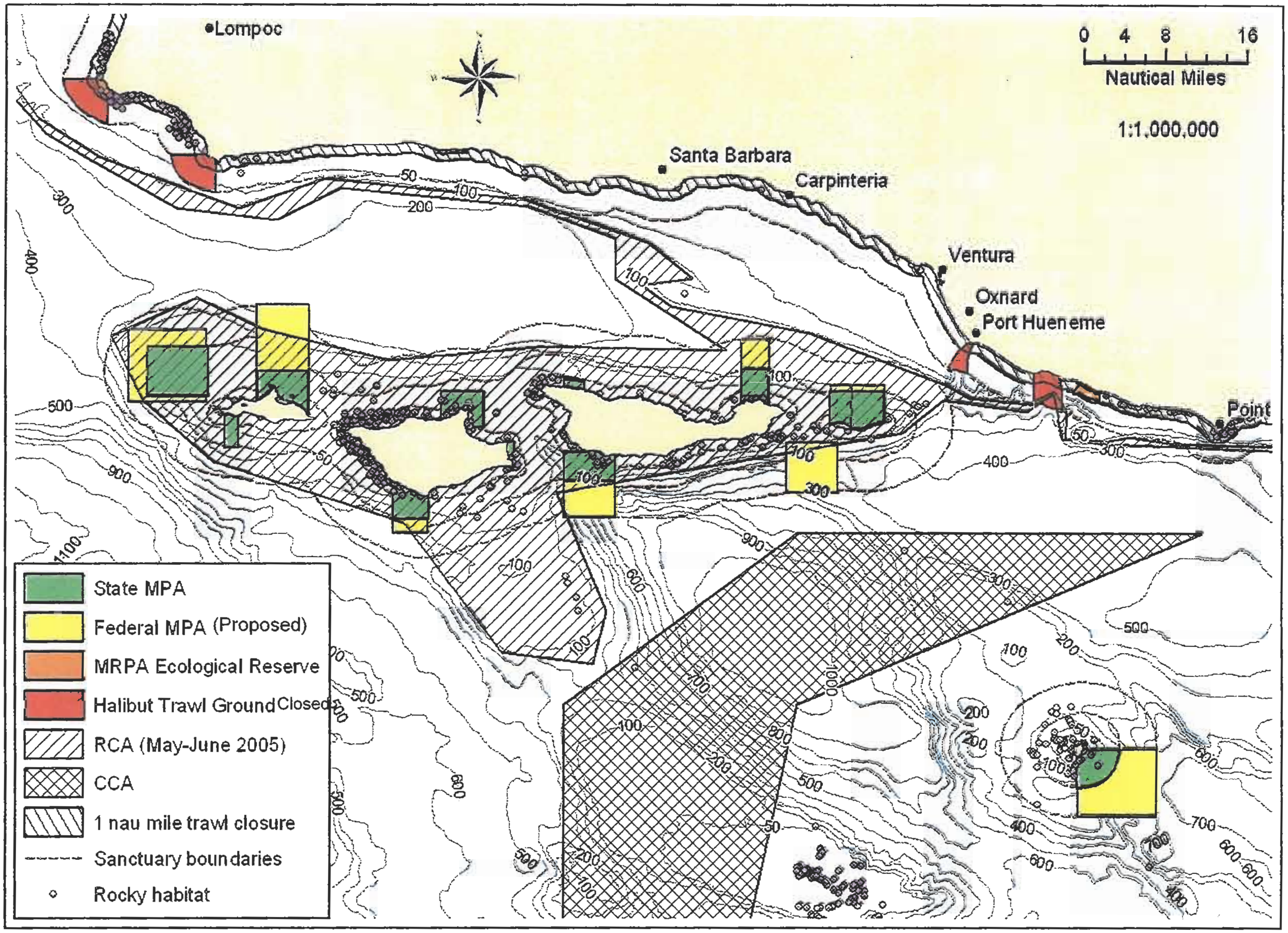
Avila Beach

From Point Buchon to Point Arguello outside the 3-mile state waters limit line. We catch principally California halibut, but also catch some sole in quantities allowed by the Groundfish Management Plan.

Monterey

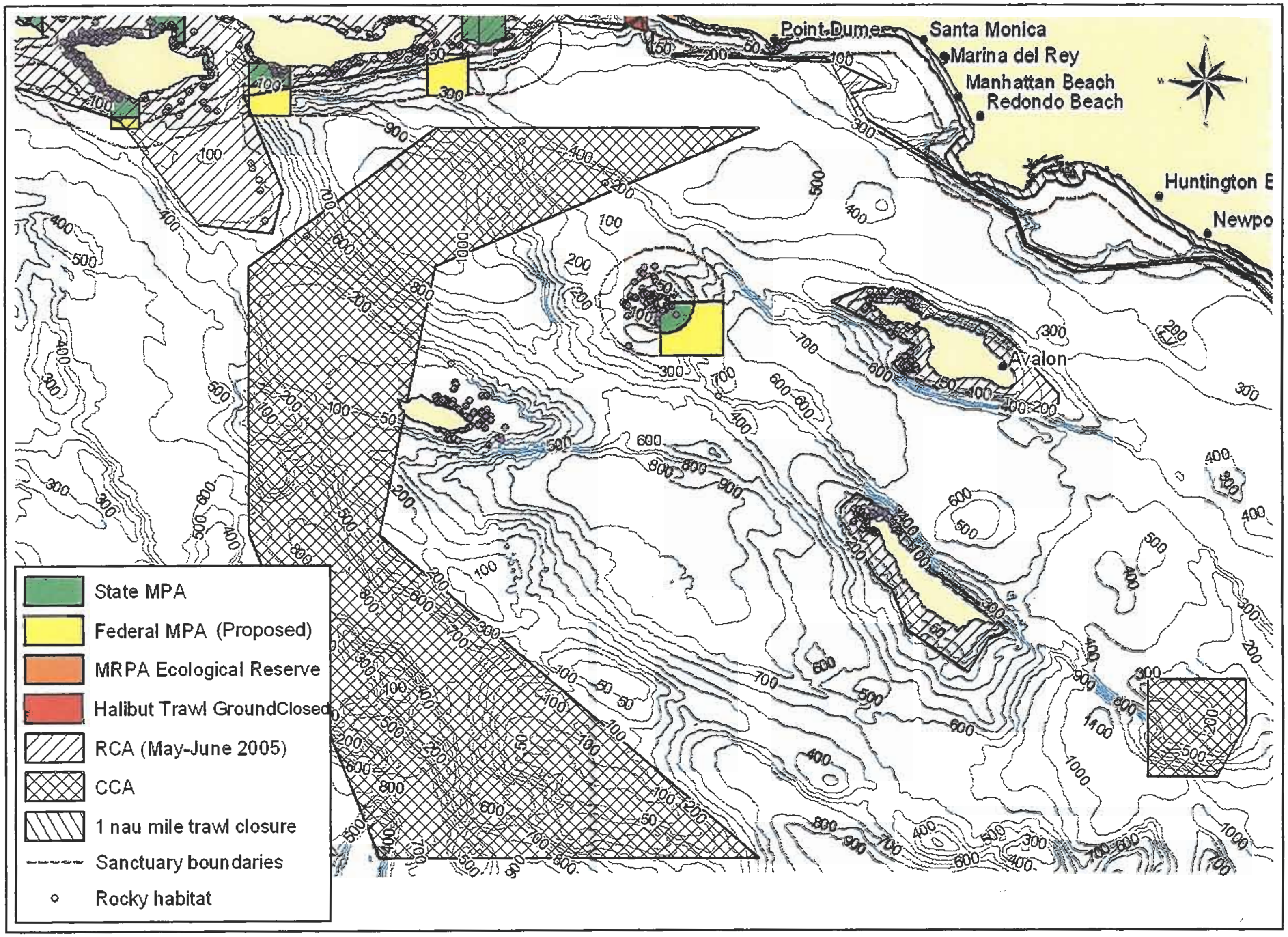
Outside the 3-mile line to the 60 fathom contour, from a point where these two lines intersect off Terrace Point (approximately 36° 53.61' x 122° 4.13') to a point where these two lines intersect again off the Pajaro River (approximately 36° 50.26' x 122° 52.37'). We catch halibut and sole, and the bottom is mostly sandy. Association members do not fish in the Monterey Canyon.

Figure 1.
Southern California Trawlers Association
Proposed Alternative to Mitigate Effects of Fishing on EFH



Data: NOAA, CA DFG, CSDS (substrate). Design: M.Robinson, 2005.
Bathymetry in fathoms. Map colors: www.colorbrewer.com.

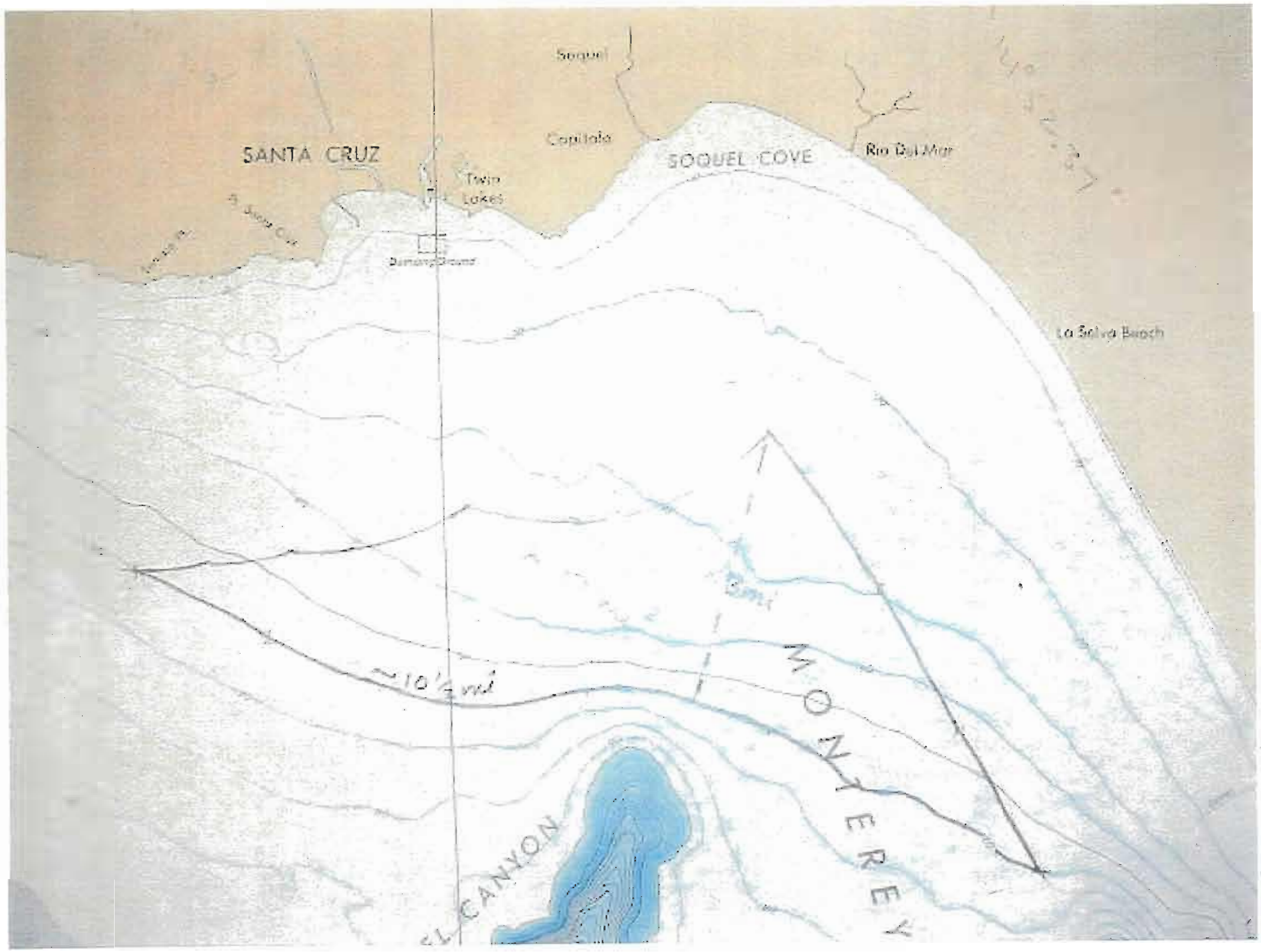
Figure 2.
Southern California Trawlers Association
Proposed Alternative to Mitigate Effects of Fishing on EFH



Data: NOAA, CA DFG, CSDS (substrate). Design: M.Robinson, 2005.
Bathymetry in fathoms. Map scale: 1:1,250,000. Map colors: www.colorbrewer.com.

0 5 10 20
Nautical Miles

Figure 3.
Southern California Trawlers Association
Monterey Bay Halibut Trawling Area (Outside 3 miles)



Southern California Trawlers Association

6 Harbor Way, Box 101, Santa Barbara, CA 93109

May 16, 2005

RE: ERROR CORRECTION, COMMENT LETTER ON EFH DEIS

To whom it may concern:

On May 4, 2005, our Association sent a letter to Dr. Robert Lohn regarding our comments on the Draft EIS on Essential Fish Habitat currently under review. Unfortunately, due to the large volume of information we had to review in a very short time frame, we inaccurately described one of the alternatives to minimize fishing impacts on EFH.

Alternative C.10, described in Chapter 2 of the DEIS, involves the Nature Conservancy's alternative to work with fishermen to come up with areas closed to trawling in the central coast. Figure 2-27 illustrates an area from above Monterey Bay to Pt. Conception and out to at least 200 meter depth. The figure was captioned "no-trawl zones" and the text was not specific in detail other than to say that the Conservancy would work with fishermen to come up with no-trawl zones.

We erroneously concluded that the entire area, including all of Monterey Bay, was proposed to be closed to trawling, due to our reading of the text and figure. We understand now that that is not the stated intent of the Nature Conservancy proposal represented by Alternative C.10.

Please strike the words "...and the Nature Conservancy Alternative both..." from line 2 of the paragraph on page 4 of our letter that is headed "Monterey Bay." Thank you for making this correction to our comments on the EFH DEIS.

Sincerely,

Mike McCorkle

Mike McCorkle,
President

Subject: Comment on 2005 Pacific Coast Groundfish DEIS
From: "Steve Bodnar, Coos Bay Trawlers Association" <c.trawl@verizon.net>
Date: Mon, 09 May 2005 10:14:58 -0700
To: "GroundfishEFHDEIS" <GroundfishEFHDEIS.nwr@noaa.gov>
CC: "Hal Weeks" <hal.weeks@state.or.us>, "Pacific Fishery Comment lin" <pfmc.comments@noaa.gov>

Coos Bay Trawlers' Association, Inc.

PO Box 5050

63422 Kingfisher Rd.

Coos Bay, OR 97420

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E-mail: c.trawl@verizon.net

A Non-Profit Organization Since 1997

May 9, 2005

Mr. D. Robert Lohn

Regional Administrator, National Marine Fishery Service

c/o Maryann Nickerson

7600 Sand Point Way, NE

Bin C15700

Seattle, WA 98115-0070 Comment on 2005 Pacific Coast Groundfish DEIS

Dear Mr. Lohn;

The lawsuit litigation that forced the Pacific Fishery Management Council to develop an Essential Fish Habitat Environmental Impact Statement did not challenge the content of the FMP but only the process used to develop the FMP. The judge ruled that the FMP fell short of following NEPA procedure and therefore the Council needed to revisit the development of the FMP using correct NEPA procedures. However, the Council, fearing further lawsuits or perhaps even a directive from NMFS or by NOAA Fisheries Office of General Council, made the decision that NEPA compliance, or over-burdening the management system, is now a priority. This became obvious when Alternative 1, status quo, was eliminated from the Council's preferred options. What we should be asking is whether NEPA, and how NOAA Fisheries has started implementing it, fosters or hinders timely, high quality federal fisheries management and whether it could disrupt the intent and goal of the best management decisions for fishermen and conservation.

To quote attorney David Frulla's recent testimony to the U.S. House of Representatives Committee on Resources, "NEPA is a procedural statute. It imposes no substantive conservation obligations. That said, the environmental community has often used NEPA as a litigation device to attempt to force a substantive reconsideration of an agency action with which it did not agree. Accordingly, there are two elements of NEPA that should concern the Subcommittee: (1) whether it serves as an effective independent mechanism to ensure quality agency decision-making; and (2) whether it actually also serves to improve the quality of NOAA Fisheries decision-making. Regarding the first point, the litigation record shows that NEPA is, quite simply, over-rated as an enforcement tool. As to the latter, I submit that a wide array of substantive statutes independently help to ensure environmentally-aware decision-making. In fact, NEPA obligations may actually inhibit timely, science-based management."

While status quo for many may mean no change, business as usual, that is certainly not at all the case with our Pacific Fishery Management Council or the west coast fishing fleet. Status quo here means a continuation of heavy management measures while the resources continue to rebuilding. For the trawl fleet, this has meant: Fleet reduction via the buy-back program; Prohibited large roller gear use; Restrictions of use of large footrope gear areas; Implementation of small footrope gear and areas of use; Development of the selective flat fish net and restriction on deployment; Introduction and mandatory use of excluders in all shrimp trawls; Forced to carry observers for data collection activities; Coerced to operate under "house arrest" with the unfunded mandatary VMS program; Forced to develop the RCA and boundary modifications; Engaged in collaborative research to help improve the science; Current development of ITQ program to reduce discards with industry funding; Reduced time on the water by 75 to 80 percent; Reduced our earnings by at least 75%.

THE FACT OF THE MATTER IS THAT NO MATTER WHAT THE TRAWL FLEET DOES TO IMPROVE THE SITUATION, OCEANA AND NATURAL RESOURCE DEFENSE COUNCIL WILL NEVER BE SATISFIED. Look at either groups' website and you will see that their goal is to eliminate all net fishing. This is unreasonable. So how can any appeasement be made? We believe that you and the Council should take a stand against eco-terrorists by just saying no. Remember the judge didn't have a problem with the plan, just the technical NEPA procedure.

We encourage NMFS and the Council to select the following:

A. IDENTIFY AND DESCRIBE ESSENTIAL FISH HABITAT

CBTA preferred Alternative A.1 status quo

Second choice Alternative A.2 Depths less than 3500 meters

B. Designate Habitat Areas of Particular Concern

CBTA preferred Alternative B.1 status quo

> Second choice Alternative B.2 Estuaries, 3 Canopy Kelp, 4 Seagrass, and 6 Rocky reefs combined

C. MINIMIZE ADVERSE IMPACTS ON EFH DUE TO FISHING

CBTA preferred Alternative C.1 status quo

> Second choice Alternative C.4.1 Prohibit the geographic expansion of fishing for all bottom-tending gear and if other alternatives are also going to be adopted then it has to be the "Trawl Industry's Proposal" developed through meetings on the west coast with Pete Leipzig.

D. RESEARCH AND MONITORING

CBTA preferred Alternative D.1 status quo

Second choice has not been developed by anyone. But we would prefer status quo with added collaborative research on fishing impacts.

The expanded logbook program really does not need to be an alternative. The current logbook law requires all commercial fishermen to keep logbooks but the government has chosen to enforce it with only one group, the trawlers. If logbooks are going to be used in the future, one type should be produced for the entire coast that emphasizes total catch for both commercial and sport fishing.

VMS alternative is already in motion. However, CBTA is still against this system, especially because the government refuses to pay for this mandated equipment.

Fishermen feel that the Council is operating in fear of environmental group lawsuits and are willing to sacrifice every coastal community to appease them, all over of a question of NEPA procedure. The Council and its family of support agencies and committees have worked hard to manage our fisheries. The fleet in particular has made the most extreme sacrifices to ensure a healthy sustainable resource and to ensure the Council met compliance requirements of the management laws. We are very frustrated to see that NOAA is willing to flush it all down the toilet. Its our communities jobs at stake, not NMFS', that these environmental groups are willing to sacrifice.

The nation needs to address the frustration level environmental groups are placing on our fishing communities. The nation needs to weigh the stress these groups are placing on our hard working families against the donations these groups receive from their appeals to the public that the oceans are in crisis. The nation needs to address the fact that they are being duped by the desire to fund environmental groups effort to free the waters of nature loving fishermen.

Sincerely,

Steve Bodnar, Executive Director

Subject: Does PFMC Understand California's Abalone Fishery?
From: Rob Cozens <rcozens@pon.net>
Date: Wed, 11 May 2005 09:38:17 -0700
To: GroundfishEFHDEIS.nwr@noaa.gov

Ladies & Gentlemen:

In my reading, the PFMC Groundfish EFH EDIS seems to give the impression that (a) there is a commercial abalone fishery in California and (b) dive equipment is used in harvesting abalone:

Chapt 3,

Pg. 107--

"In California, abalone and sea urchin are taken in dive fisheries, ...

Dive fisheries (using either a self contained air tank, or breathing off a hose "hooka" from a low pressure air compressor vessel) are used to pursue various fish and shellfish such as urchins, lobsters, and sea cucumbers..."

Pg. 137--

"Many commercial sea urchin and/or abalone divers also hold sea cucumber permits and began targeting
sea cucumbers more heavily beginning in 1997."

I would refer you to the Abalone Recovery Management Plan on California's Department of Fish & Game website, which states in part:

1.2 Purpose and Need for Action
...The only abalone fishery currently open in the state is the northern California red abalone sport fishery.

7.1.1.1 Species-specific Considerations for Management
Since 1997, northern California abalone management has been limited to red abalone, the only species with abundances that can support a fishery...

7.1.1.2 Gear Restrictions
The prohibition of the use of scuba and surface-supplied air while taking abalone in northern California established a depth refuge for a portion of the stock, because free

divers generally cannot dive deeper than 28 ft (8.5 m) (Karpov et al. 1998).
The mandatory use of a specialized abalone iron for take aids in protecting the soft and vulnerable abalone foot and thus reduces incidental mortality. This gear restriction has been used throughout California since 1975.

Rob Cozens, Staff Conservator
Mendonoma Marine Life Conservancy
P.O. Box 217
Manchester, CA 95459-0217
(707) 895-2584

"Promoting a healthy and bountiful offshore environment."

Subject: MMLC Comments Re: PFMC Groundfish EFH DEIS
From: Rob Cozens <rcozens@pon.net>
Date: Mon, 9 May 2005 11:58:18 -0700
To: GroundfishEFHDEIS.nwr@noaa.gov
CC: MMLC Conservators:;, MMLC +:;, MMLC General:;

May 9, 2005

Mr. D. Robert Lohn, NOAA Fisheries Regional Administrator
National Marine Fisheries Service, Northwest Region
7600 Sand Point Way NE, BIN C15700
Seattle, WA 98115-007

Dear Mr. Lohn,

I am writing on behalf of the Mendonoma Marine Life Conservancy to express our support for the effort to identify, restore, and protect ocean habitats that are essential to Pacific Coast groundfish.

We are a private group of sixteen educators, fishermen, environmentalists, divers, Native Americans, kelp harvesters, and other stakeholders focused on mapping offshore geography, ecology, fisheries, and recreational uses in California State waters from the Humboldt-Mendocino county line to the outflow of the Russian Gulch Watershed south of Fort Ross. MMLC's mailing list includes over 100 individuals and organizations, and our By-Laws authorize advocacy as an "interested party" as referenced in Section 2861(a) of the California Fish & Game Code.

Groundfish share a vulnerability to overfishing with open water, schooling fish. But because many groundfish species live in and around the same rocky reefs and other bottom features for most of their adult life, they are also vulnerable to destruction of their homes, feeding areas, and breeding grounds from certain kinds of fishing activity. These homes, feeding areas, and breeding grounds often include living seafloor animals as well as geologic terrain and vegetation.

MMLC supports efforts to (1) identify and protect habitat areas of concern essential to groundfish, and (2) protect some areas from further damage by prohibiting the use of fishing gear known to damage groundfish habitat and seafloor animals. We believe that the elimination of habitat-damaging fishing gear should be done in such a way as to minimize economic hardships on fishermen, as they are simply applying techniques and tools created before mankind realized their potential for damage.

MMLC would also like to point out that Figure 2-7 [B.2 HAPC Estuaries] omits the longest undeveloped estuary in California: Big River Estuary, where the upper extent of salt water intrusion can exceed eight miles. Bocaccio is among the species that were documented in the Big River Estuary and lower subbasin by Warrick & Wilcox in 1981, and several other groundfish species have been identified in the Estuary at some stage in their development. We feel Big River Estuary offers an excellent venue for estuarine research in general and studies of potential interaction between juvenile salmonids and juvenile rockfish in particular. Please include Big River Estuary in Alternative B.2.

Lastly, we would caution that precautionary management principles be used in all cases where information needed for decision making is unavailable. In the history of U.S. and Canadian management of North Atlantic fishing grounds many decisions placed socioeconomic interest over precautionary management principles, and eleven years after the fishery was finally closed Atlantic cod population levels were still among the lowest ever recorded.

We understand that application of precautionary management principles will skew decision making in favor of protecting essential habitat in those cases where definitive data is unavailable or inconclusive. Because of the degree of uncertainty surrounding much current data, precautionary management principles will need to be employed often early-on; thus we feel it is important that the final EIS include a definition of "precautionary management principles" in Chapter 9.

Thank you for the opportunity to comment.

Sincerely,

Rob Cozens, Staff Conservator
Mendonoma Marine Life Conservancy
P.O. Box 217
Manchester, CA 95459-0217
(707) 895-2584

"Promoting a healthy and bountiful offshore environment."

[Hard copy to follow via USPS]

Subject: Groundfish Essential Fish Habitat Draft Enviromental Impact Statement
From: "Robert Craven" <cravenr@charter.net>
Date: Thu, 28 Apr 2005 14:47:44 -0700
To: <GroundfishEFHDEIS.nwr@noaa.gov>
CC: <pfmc.comments@noaa.gov>

Gentlemen: I am a small charter operator in the central Oregon coast area (Newport). I am also Vice resident of the Oregon Coast Sportfishing Association. I hope my comments on the proposed changes comming in the coastal groundfish fishery will help you to do a better job of managing this difficult challange facing you now.

alternative A.4 is my Prefered option

No comment on section B

alternative C.3 It is not acceptable to close Habitat areas to all fishing because some types of fishing have little or no impact on the habitat. Option C.3.1 or C.3.2 is a much more rational approach to the problem, and would have the least economic impact on the coastal communities.

alternative C.14 NOT acceptable (see comments on alternative C.3 which apply to this alternative also.)

alternative D.2 Option D.2.1 One more Logbook! This will not set well with the smaller commercial, and charter vessel owners some operate only 4 months of the year, and have very little envirmental impact. Option D2.2 Better, but from my point of view, it is still not good.

alternative D.3 This could be the ecconomic straw that breaks the back of the small vessel operators. The impact of these vessels is minimal or none existant, but more people work on the small vessels than on the larger ones in this area. Do you really want to put all those people out of work? Do you really want to turn off the lights of the small coastal communities? I know the main thrust of this draft proposal is enviromental, but I would like to remind all of you that Homo Sapiens is also part of the enviroment, and to fail to consider them in your proposals or to give them a lesser status is to fall short of the job. Please consider us also. Thank you for your time and attention.

Robert E Craven managing owner
Sea Quell Charters LLC
Hustler Charters LLC
Newport Oregon

Subject: Comment on 2005 Pacific Coast GroundfishDEIS
From: "Janice and Harry Green" <hjgreen@jeffnet.org>
Date: Mon, 9 May 2005 22:09:17 -0700
To: <GroundfishEFHDEIS.nwr@noaa.gov>
CC: <pfmc.comments@noaa.gov>, <Hal.Weeks@state.or.us>

May 7, 2005

Mr. D. Robert Lohn
Regional Administrator, NOAA Fisheries
c/o Maryann Nickerson
7600 Sandy Point Way, NE
Bin C15700
Seattle, WA 98115-0070

Re: Comment on Groundfish EFH DEIS

Dear Mr. Lohn:

Your staff and the Pacific Council are to be congratulated for such an intelligent and comprehensive approach to providing a rational basis for analyzing fisheries conditions and their effects on essential habitat. If what I say indicates a limited comprehension of what exists in the DEIS, I will be happy to be corrected, and will make my excuses beforehand: It is an extensive document which I am not sure I comprehend.

My concern is an evident “pass” on analyzing the impacts of sportfisheries. I believe I saw references to Appendix A, which had an Appendix 13. But all I ever found was a perfunctory textual re-reading of MRFSS data graphs. There was no attempt to resolve any (startling) data inconsistencies. There was no attempt to use better state data. There seemed to be no attempt to sort salmon trolling and tuna fishing from bottom fishing, though I am not sure about this last from the text. There was no attempt to even discuss the abundance depressions where groundfish are accessible to small boats (increasing in severity as a point of access is approached). I am certain there is literature on this subject. There was so far as I know, no data search, or even discussion, of the effects of estuary fishing on stocks which use estuaries for reproduction. There is no discussion of the effects of the livefish fishery burgeoning in the past 10 years in traditional sport groundfish territory (also leading to depletion and most likely contributing to the “port effect”). Surely there are some measures somewhere of the likely impact of mooching, of jigging on the bottom with a weight, etc. Or at least we could look forward to some attempts to quantify those impacts.

In a time when some media report how sportfishing is more responsible for fisheries depletion than commercial fishing (!), and when many organizations concerned with sustainable fisheries seem to go out of their way to mention only sustainable commercial fishing, I believe that sportfishing needs to be brought up to the point of having an important place in every discussion. Since most sportfishing probably does have less impact than most commercial fishing, and in many cases an equal or greater community economic impact, it seems clear that one way to minimize the impact on EFH would be to allocate more fish to sportfishers. This would have the added benefit of extracting a greater economic benefit from the limited allowable catches of some of the more constraining species of groundfish. While I realize that such views might not meet with enthusiasm in some quarters, it seems to me that such ideas at least warrant some discussion in a comprehensive review.

Sportfishers do need to consider what impacts they are having, and perhaps how best to minimize them. While I might think to myself that the truth might be rather benign, right now we are left with no data with which to argue any point in any direction. Sportfishers and regulators need to get started somewhere.

Very truly yours,

Janice Green
Oregon Sport Advisory Committee

cc via e-mail
Marine Program, ODFW
Pacific Fishery Management Council

Subject: Comment on 2005 Pacific Coast Groundfish DEIS
From: "Fischer, Rhonda" <rhonda.fischer@oregonstate.edu>
Date: Mon, 9 May 2005 16:26:08 -0700
To: <GroundfishEFHDEIS.nwr@noaa.gov>, <pfmc.comments@noaa.gov>, <Hal.Weeks@state.or.us>

To: Maryann Nickerson

As a third generation commercial fisherman and long time Sea Grant Extension Educator, I have a number of comments on the Groundfish Essential Fish Habitat Draft Environmental Impact Statement (Groundfish EFH/EIS).

- I strongly support protecting fish habitat and using the tool of Habitat Areas of Particular Concern (HAPC) is important. I support the Council's preferred alternatives, B.2, B.3, B.4 and B.6.
- Under Alternative C.12, C.13 and C.14 there is only one near shore area listed for Oregon. That area runs from Coos Bay south to Bandon and out to approximately 80 fathoms. This area is rarely trawled because of rough bottom and communication cables, thus restricted bottom trawling (C.12) would have little affect. But this area is the only area available to recreational groundfish fleet and a small number of hook and line groundfish commercial vessels. Alternative C.13 would eliminate those fisheries, a real blow to Coos Bay and Bandon. Alternative C.14 would also cut out a large portion of very productive salmon trolling grounds out of Coos Bay and Bandon. A double blow to the communities.
- Alternative C.9 (option 9.8) would prohibit dingle-bar gear (troll groundfish gear). I have fished this gear for lingcod for over 20 years and prohibiting it would be a real mistake. Dingle-bar gear is very selective for lingcod. If setup right rockfish catch is nearly zero. The gear is primarily used by salmon trollers allowing an alternative fishery during salmon closures. Because the fish are handled carefully, one at a time, landed price is double trawl caught and is usually sold to niche markets. The bottom impact is minimal.

Maybe there is a misconception of what the gear is and how it is used. The dingle-bar is a 5 to 7 foot, 1½ inch diameter steel bar and replaces the lead cannonball weight. The trolling gear is a string of 5 or 6 weighted jig hooks spread six feet apart and floats are used to keep the gear off the bottom. The dingle-bar is lowered to the bottom with a salmon gurdie and then raised and lowered to meet bottom conditions. The dingle-bar is not drug along the bottom, but raised slightly off the bottom and only allowed to occasionally contact bottom. The jig line does not hit the bottom as it is set two to three feet above the bottom of the dingle-bar. The gear is towed at 2.0 to 2.5 knots with only occasional bottom contact (maybe every 100 feet) with a 1½ diameter footprint bottom impact is very minimal.

Instead of prohibiting this gear I think the Council and NMFS should be encouraging gear that is selective, has minimal impact, is available for small boats and produces a high value product.

Thank you

Paul Heikkila
F/V Andante
786 S. 1st Avenue
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(541) 396-3096

Monterey Fish Market

MFM Seafood Inc.

★ Wholesale
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★ Retail Market
1582 Hopkins St.
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Ph: 510-525-5600
★ Office
1620 Hopkins St.
Berkeley, CA 94707
Ph: 510-525-0999
Fax: 510-525-4109

D. Robert Lohn, Regional Administrator
C/o Maryann Nickerson
NMFS, 7600 Sand Point Way NE
Bin C15700, Bldg. 1
Seattle, WA. 98115-0070

Mr. Lohn;

i.e. 2005 Pacific Coast Ground fish EFH DEIS

I am a seafood wholesaler and retailer in San Francisco. A firm supporter of sustainable fisheries, and the need to protect essential fisheries habitat (EFH). I also support fishermen who attempt to fish for species which do not catch or impact other fish and who use non destructive fishing methods. There is a need to differentiate fishing gear which impacts EFH from fishing gear that dose not.

The Scottish Seine is a gear which will not impact an EFH. It is a very light and easily damaged encircling gear which can only be used over soft bottom. Even the presence of a small anomaly in the bottom damages and prevents the gear from fishing a hard bottom EFH. Unlike a bottom trawl that can fish and damage the hard bottom, Scottish Seines do not actively tow. Rather, the net is slowly gathered and reeled in hydraulically greatly reducing and often eliminating the possible impact to an EFH.

At this time I believe that Scottish Seine has been placed in the category of trawl gear in many of the proposed EFH's. This prohibits Scottish Seine fishing because of this improper inclusion in the trawl category.

When determining the final EFH please exclude Scottish seine from any fishing prohibition designed to protect fish from trawling. It is important to protect an EFH, but at the same time, I feel it is also important for NMFS to encourage methods of fishing, such as the Scottish Seine that dose not impact the bottom and the goals of the EFH.

Thank you for your consideration;

Paul Johnson

Tom Worthington

PORTS seafood
The Fresh Fish Company

D. Robert Lohn, Regional Administrator
C/O Maryann Nickerson
NMFS, 7600 Sand Point Way NE
Bin C15700, Bldg. 1
Seattle, WA 98115-0070

May 2, 2005

Dear Mr. Lohn,

I am a seafood wholesale/distributor located in San Francisco. I am and always have been a firm supporter of sustainable fisheries, and support and understand the need to protect essential fisheries habitat (EFH). However, I strongly believe that there is a need to differentiate fishing gear which impacts EFH from gear that does not. There are many fishermen who attempt to fish for species which do not catch or impact other fish and who use non-destructive fishing gear, and they are losing their livelihood as a result of being grouped with other more destructive fishing methods. These fishermen lack a cohesive voice.

The Scottish Seine is one such method that does not impact an EFH. It is a very light and easily damaged encircling gear, which can only be used over soft bottom. Even the presence of a small anomaly on the bottom damages and prevents the gear from fishing a hard bottom EFH. Unlike a bottom trawl that can fish and damage a hard bottom, Scottish Seines do not actively tow. Instead, the net is slowly gathered and reeled in hydraulically greatly reducing and often eliminating the possible impact to an EFH.

At this time, I believe that the Scottish Seine has been placed in the category of trawl gear in many of the proposed EFH's. This action would prohibit Scottish Seine fishing because of the improper inclusion in the trawl category.

When determining the final EFH please exclude the Scottish Seine from any fishing prohibition designed to protect fish from trawling. It is important to protect an EFH, but it is equally important for NMFS to encourage methods of fishing that do not impact the ocean bottom and the goals of EFH. I feel that a Scottish Seine exclusion is in the spirit of EFH.

Thank you for your consideration.

Sincerely,

Timothy Ports

1440 BANCROFT AVENUE SAN FRANCISCO, CA 94124-3603 (415) 593-8080 FAX (415) 593-9393

Subject: Comment on 2005 Pacific Coast GroundfishDEIS
From: "Rod Lee" <rod@staffjennings.com>
Date: Tue, 3 May 2005 09:41:15 -0700
To: <GroundfishEFHDEIS.nwr@noaa.gov>
CC: <pfmc.comments@noaa.gov>, <Hal.Weeks@state.or.us>

Dear Mr. Lohn,

I am writing you to express my opinions on the upcoming EIS groundfish proposal.

As a sportfisher and ex-commercial salmon troller, I have some experience with the fisheries off of the Oregon coast. I recently sold my boat and license after learning of the impending doom of the salmon fishery and I'm glad I did.

I understand the concern for wanting to protect our groundfish; however the problem I have is with the implementation of drastic methods without the convincing evidence to justify them. Based on my own observations it appears as though the stocks of Canary and Yelloweye rockfish are doing just fine, at least in the common "sportfishing" areas. Now I don't have "scientific" data to support that observation, but I don't think you or any of the government agencies have any "scientific" data to tell me I'm wrong either.

It is my understanding that Trawlers have created most of the concern for over harvesting of these protected groundfish? To my knowledge, the areas in which these trawlers fish is not the same as the areas the EIS is proposing to close to fishing? I'm curious as to how closing these areas are supposed to help and why it is necessary to penalize the sportfishermen for the trawler's over harvest?

I understand we are all in this together but if my neighbor kills off all the grass in his yard that doesn't give him the right to come over and use my yard to play in, right?

Here is the point of my email;

1. There are obviously areas that produce large amounts of these protected fish that are not commonly fished by sportfishermen. Why are you trying to isolate the areas that sportfishermen fish as opposed to closing areas Trawlers would use?
2. If you close an area, commercial or sport, use the correct and corresponding data for those areas. Do not base sport restrictions on Trawl data or vice versa.
3. The economic impact these closures would inflict to the coastal economies will be devastating. The demise of the commercial industries have already made a mark on the coastal community and caused them to focus more efforts on sport fishing. The closures proposed would kill not only the local fishers but also the thousands and thousands of tourists drawn to the area for that very reason.
4. There is a huge domino effect that happens when you close one area to sportfishers, as was witnessed last year after closing the >40 fathom area to bottomfishing, thus creating more pressure on the inshore reefs and the blue/black rockfish.
5. Rather than close existing habitat, why not make more habitat for them to thrive in? (i.e. artificial reefs) They are proven and would not only reverse the stock decline but create MORE fishing opportunities, thus creating a win-win situation for everyone.

Every time you hear a plane fly over I'm sure you don't run for cover for fear it's dropping a bomb in your area, and thus you shouldn't start closing the entire ocean because a few trawlers exceeded their catch limits, or because our neighbors (California) are having stock issues.

I appreciate you and your agencies trying to protect our fish, I just want to make sure we are using valid reasoning and not unnecessarily penalizing those who have done nothing wrong.

Thank you for your time and consideration,

Rod Lee
Concerned fisherman

6900 SW 130th Ave.
Beaverton, OR 97008

503-626-7264

Cc: Hal Weeks(ODFW) and the PFMC

4/28/05

To Dr. John Lohn:

I am writing you regarding the classification of Scottish Seine fishing as trawl gear. Osprey Seafood is celebrating 28 years of business in the Bay Area on May 1st. We are a seafood wholesale company located in San Francisco and a seafood retail outlet in Napa. In our years of doing business we have always supported the small fisherman, the fisherman that cares for their product as well as their enviornment. This concern for the integrity of the small guy has yielded a better product and a livelyhood for someone that knows the proper way to fish, that doesnt destroy their enviorn and shows a passion for the oceans that provide for their future. To be able to sell a top quality product that was caught with little or no by-catch and that didn't tear up the ocean floor is one of our goals. Imagine a targetted fishery where the fishermen only catches what they seek and doesn't leave a trail of destruction in their wake. We have that with Scottish Seine fishing. The delicate gear prohibits fishing the hard ocean bottom as well and active trawling. Thus the impact on habitat is minimal at best. Scottish Seine fishing has been placed in the trawl gear category in many of the essential fisheries habitat proposals. This categorization puts a halt to Scottish Seineing due to the impact caused by other types of trawl gear. We believe that all involved would be best served by excluding the Scottish Seine method, allowing a less invasive industry to grow and encouraging other fishermen to look at this method as a sustainable and profittable method of fishing. We hope that you will consider our input in this matter and look at this small fishery as one of the many steps needed to improve our oceans and preserving managable fishing techniques. Thank you for your time.

Best Fishes,

Michael Weinberg-Lynn
President, Osprey Seafood of CA, Inc.

Subject: Groundfish impact statement
From: "josestone" <josestone@actionnet.net>
Date: Wed, 27 Apr 2005 12:36:31 -0700
To: GroundfishEFHDEIS.NWR@noaa.gov

Dear Mr. D. Robert Lohn;

I am writing this letter because, again, I find the governing fishing bodies possibly considering some very disturbing fishing changes.

First of all, I would like to give you some background of my fishing expertise. I started fishing at the age of 13 and I am now 61 and am still fishing. I started in the troll fishery, as most fishermen did at that time, and then moved into bottom trawling where in 1962 I was running bottom trawlers at the age of 20. I have seen the Russians and Polish take "ocean run" on our grounds. I have survived hook changes, mesh size and season changes, mercury scares, Demoic acid and Listeria. Fish too white, fish too black, fish too old, fish too young and through all of this I have tried to apply common sense. It is too bad we can't teach common sense because it would be more valuable than today's gasoline.

I understand, that as biologists and council members, you are being forced down this path by litigation. I am convinced, that no matter how we proceed the environmental groups will not be placated and as I look at some of these alternatives, I cannot see the logic behind them.

Under alternative 6.9, option 9.2 would eliminate the pink shrimp fishery. We have spent 20 years changing and fine tuning this particular door arrangement. I actually believe, that this door with its 8" wide shoe probably rides lighter on the bottom than the cambered doors the option prefers. I do have some doubt that we are doing damage to the bottom when we will sometimes fish the same grounds for months with good catch rates.

Option 9.5 would completely curtail my scallop fishing.

Option 9.8 would raise havoc with the troll fishery. Troll fisherman fish from top to bottom of the water column and to eliminate the bottom would devastate that fishery.

The reason I have written about these options is because they were the PMFC preferred alternatives.

We have experienced some huge changes in the last few years and we have seen the bottom fish fleet reduced and their area reduced dratically. No fishing from 50-250 fathoms, which as I see it, solved the problem of bottom contact. This is a tremendous area that is not closed with no fishing. So this is now a reserve.

The pink shrimp fleet has implemented sorting grates that eliminate the groundfish catch.

The halibut fleet has been moved from inshore to outside of 100 fathoms. Just another example of our effort to help the council solve these problems. Isn't it time for the industry, the council and the environmentalists to stop making rules that will harm the fishing community? The council has repeatedly said that Rock fish recovery is a slow process so I think we need to give these lates changes (bottom fish 50-250 fathoms, halibut outside 100 fathoms, & shrimp boats with sorting grates) a chance to work.

This is why I would endorse the status quo option at this time. It makes sense which I think is something that we all could use a healthy dose of now.

Thank you for taking the time to read these comments.

Joseph Rock

Subject: EFH Comments
From: "KELLEY RETHERFORD" <excalibur@carrollsweb.com>
Date: Wed, 11 May 2005 13:50:24 -0500
To: <groundfishefhdeis.nwr@noaa.gov>
CC: <Pfmc.comments@noaa.gov>, <Hal.weeks@state.or.us>

Michael Retherford
880 NE Sturdevant Rd.
Toledo, OR 97391

May 10, 2005

Mr. Jim Lohn
National Marine Fisheries Service
7600 Sandpoint WY NE
Seattle, WA 98115.

Dear Mr. Lohn,

I am and owner/operator of a 65' trawler/crabber fishing out of Newport, Oregon. I have been in the west coast fisheries since the mid 1980s and have observed the increasing complexity of management regulations that have been imposed on the fishing industry by legislation and litigation. I hope NMFS and the PFMC continues to support the current efforts toward development of IQs, as this is likely the only way we will stabilize and improve the wealth of the resource and the health of the coastal fishing industry. I do not feel that the current "habitat" related amendments will do much enhance fisheries management. Nearly all of the proposed measures require greater amounts of funding and manpower than that which is currently available. The history of management has shown that there is little enthusiasm for funding initiatives such as those proposed by government, so the onus of funding falls to the user.

Essential fish habitat is a difficult subject to define precisely, but if the intent is to define an area that habitat alteration effects on fish be considered then the PFMC alternative A.3 would be the most logical alternative.

I concur with the PFMC's proposal B2 to establish estuary areas as HAPCs. Research has shown that these are the areas that are very productive for most of our fished species and critical for the early life of crab and shrimp. I am not in favor of additional closures on the continental shelf and slope. Many of these areas have already been closed to fishing, some for up to 6 years. During that time there have been no efforts to evaluate if these closures were beneficial, detrimental, or neutral for fish production. I would hope that NMFS and the PFMC refrain from sequestering additional grounds without adequate scientific study. Without any supporting evaluation of the effects of fishing on offshore rocky reefs there is no basis for this option. There are already tools in place to control fishing in these habitats and additional regulations will only be redundant and add additional unnecessary expenses to fishermen.

The alternatives presented for item C are all problematic in that it is not clear how these measures will mitigate fishing effects. The base years of 2000-2002 are questionable measures of fishing. One must remember that the fishery in those years was already significantly impacted by trip limits and area closures. In fact the entire west coast trawl fishery is much different today than in the past. Since 1994 75% of trawl effort has been removed by limited entry permit retirement, vessel buyback program and migration of part of the fleet to Alaska. This along with changes in fishing practices has significantly reduced fishing effects. An ODFW study of fishing effort showed less than 10% of the grounds are actively fished. This result is in line with other studies that show trawl fisheries in general only trawl 10-15% of available habitat.

I have also actively participated in NMFS West coast trawl surveys and habitat mapping projects. I can attest that observations of many untrawled areas show barren bottom strewn with bare cobbles and stones, while trawled areas have rich bottom fauna.

My concern for selection of any of the items in item C has impacts on all bottom gear including crab traps. Again, without research there is no data to evaluate the effects of these permanent changes. Given that there already have been major reductions in trawl impacts and that we lack objective data to base decisions on it would be prudent to take an incremental approach to develop meaningful regulatory measures. All of the needed action can be taken within the normal regulatory process and does not require a separate program.

Alternative D.1 is the appropriate alternative for research and monitoring. All of the proposed alternatives are added regulations on fishermen; however, it is not clear how these will further EFH objectives. Logbooks and VMS should be addressed in the normal regulatory process, since all of the alternatives, except research reserves, relate to management of catch and effort. In the case of research reserve,s it is premature for the Council to establish a “reserve system” without consideration of the effectiveness of this system and its affect on fishing. NMFS has a scientific study group working on developing an approach to studying reserves. The PFMC should wait until these studies are prepared before considering reserves. However, there is a pressing need to quantify fishing effects on habitat if, in fact, there are any significant fishing effects to habitats currently fished.

Sincerely yours,

Michael Retherford
Captain, F.V. Excalibur

Cc: PFMC
Hal Weeks, ODFW

Sent via the WebMail system at carrollsweb.com

OREGON STATE UNIVERSITY

Dr. Mark A. Hixon
Department of Zoology
Oregon State University
Corvallis, OR 97331-2914

phone: 541-737-5364 fax: 541-737-0501 e-mail: hixonm@science.oregonstate.edu http://www.onid.orst.edu/~hixonm/index.htm

10 May 2005

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service
7600 Sand Point Way
Seattle, WA 98115-0070

re: Comment on 2005 Pacific Coast Groundfish DEIS

Dear Mr. Lohn:

I wish to endorse the comprehensive review of the EFH-DEIS submitted by an independent panel of academic scientists appointed by the Pacific Marine Conservation Council: Dr. Selina Heppell of Oregon State University (Chair), Dr. Peter Auster of the University of Connecticut, Dr. Don Gunderson of the University of Washington, Dr. Ralph Larson of San Francisco State University, and Dr. Les Watling of the University of Maine.

All of these marine scientists are respected experts on EFH-related issues, both regionally and nationally, ranging from spatially explicit population dynamics (Heppell), to groundfish habitat assessment (Auster), to West Coast groundfisheries (Gunderson), to rockfish recruitment and population structure (Larson), to benthos and biogenic habitat (Watling).

As the sole West Coast academic fish biologist serving on the Marine Protected Areas Federal Advisory Committee (http://mpa.gov/), I find the report by this panel of experts to be objective, thoughtful, and reasonable. I fully endorse their recommendations regarding the EFH-EIS alternatives, and urge NMFS and PFMC to consider their assessment carefully.

Thank you for considering my suggestions.

Sincerely,

Mark A. Hixon
Professor

cc: Oregon Department of Fish and Wildlife
Pacific Fisheries Management Council
Pacific Marine Conservation Council

May 6, 2005

Robert Lohn
Regional Administrator
National Marine Fisheries Service
7600 Sand Point Way, NE
Bldg 1
Seattle, WA 98115

Dear Mr. Lohn:

The Fishermen's Marketing Association represents commercial groundfish and shrimp trawl fishermen in Washington, Oregon, and California.

We are pleased to have the opportunity to provide comments on the Draft EIS for Groundfish Essential Fish Habitat. We have followed this issued since the passage of the Sustainable Fisheries Act in 1996 and the effort made by the Pacific Fishery Management Council to comply with the mandate of Congress to address this issue at that time.

This recent effort by NOAA Fisheries in assisting the Pacific Council to comply with the Court Order to prepare a new EIS has been an enormous task, requiring much work on the part of the Agency as well as the Council staff. The product, while comprehensive and greatly detailed, provides the public little guidance on the practical need for many of the measures.

The alternatives presented to limit the impact of fishing gear on the habitat are very broad ranging from status quo to complete closures of a substantial amount of area. There seems to be no standards or criteria that must be met, which would help evaluate whether any of the alternative achieve a goal. Therefore, the document presents a full range of alternatives from which the Council has great discretion to select from.

We are familiar with the Council process and support this open and transparent forum to develop fishery management measures. However, in this situation, the far reaching implications of some of the alternative in the EIS has led us to develop our own trawl industry proposal that falls within the range of alternatives that have been analyses in the EIS. Our goal has been to make recommendations for areas that could be closed to groundfish trawling while minimizing the negative economic impacts upon the fishery and the coastal communities. We will be submitting our proposal to the PFMC by their briefing book deadline of May 25, 2005, so that our alternative may be given consideration at the Council's June meeting in Foster City.

It is our hope and wish that NOAA-Fisheries will work with the trawl industry to help identify the impacts of our proposal and provide the PFMC with an analysis by which a comparison with other alternatives may be made. We have been working with the three States on summarizing information about our proposal which will describe the economic impact of our proposed closure; however, the ability of the States to provide information about the bottom substrates found within our proposed areas is limited. Therefore, we would like the assistance of NOAA-Fisheries in compiling this information from the databases that the agency has used to characterize the bottom in some of the other alternatives.

Thank you for this opportunity to provide comments and we look forward to working with your staff on this new alternative.

Sincerely,

Peter Leipzig
Executive Director

cc: Don Hansen, Chair, PFMC
FMA Board of Directors

F/V Regina
Thomas J. Stickel
938 Pacific Street
Morro Bay, CA 93442

May 11, 2005

D. Robert Lohn, Regional Administrator
c/o Maryann Nickerson
National Marine Fisheries Service
7600 Sand Point Way NE
BIN C15700, Bldg. 1,
Seattle, WA 98115-0070

Via email: GroundfishEFHDEIS.nwr@noaa.gov;

Susan A. Kennedy
NOAA Strategic Planning Office (PPI/SP)
SSMC3, Room 15603
1315 East-West Highway
Silver Spring, MD 20910

Via email: nepa.comments@noaa.gov.

Re: Comments on 2005 Pacific Coast Groundfish EFH DEIS

To Whom It May Concern:

I am an open access fisherman who utilizes vertical hook-and-line gear. I have fished for a living all of my adult life, and I earn 100 percent of my income from fishing.

For many years, a large percentage of my income was derived from fishing vertical gear for chilipepper rockfish, working from about the Cordell Banks to the Channel Islands; that fishery is now virtually closed to me forever. In order to replace this lost income, in recent years I have fished the same type of vertical hook-and-line gear for blackgill rockfish, with some incidental blackcod. In 2004, I carried a federal observer on board my vessel on numerous occasions. It was observed that my fishery had no bycatch.

The only fishing grounds accessible for me to be able to participate in this fishery from my homeport of Morro Bay, California, is the Santa Lucia Banks. I have already been displaced from all closer grounds, where I traditionally fished for chilipeppers. Please do not close the last place I have left to fish this highly selective gear type.

Thank you for your consideration of my comments.

Sincerely,

/s/THOMAS J. STICKEL

Thomas J. Stickel

EXCLUSIVE FRESH, INC.
"Purveyors of Fine Seafood"
PRINCETON BY-THE-SEA

Exclusive Fresh, Inc.
P.O. Box 308
165 Airport St.
El Granada, CA 94018
(650) 728-7321 • (650) 728-7322
FAX (650) 728-7372

April 7, 2005

D. Robert Lohn, Regional Administrator
c/o Maryann Nickerson
National Marine Fisheries Service
BIN C15700, Bldg. 1
7600 Sand Point Way NE
Seattle, WA 98115-0070

Dear Mr. Lohn;

I am writing to comment on 2005 Pacific Coast Groundfish EFH DEIS.

I am a wholesaler and retailer of seafood based in the San Francisco Bay Area. As a firm supporter of sustainable fisheries, I believe in the need to protect essential fisheries habitat. But I also support fishermen who attempt to fish "clean" and believe in the need to differentiate between gear which adversely impacts EFH and gear that does not.

The Scottish Seine is very light and easily damaged encircling gear which can only be used over soft bottom. Since even the presence of a small anomaly on the seafloor bottom damages or prevents this gear from fishing, hard bottom EFH is avoided at all cost. Unlike a bottom trawler, the Scottish Seine fishing vessel uses only minimal power to maintain orientation; there is no active towing of the net. Rather, the net is slowly gathered and reeled in hydraulically, further reducing the possibility of impacting EFH.

When choosing the final EFH EIS please take under advisement the benign nature of the Scottish Seine and consider precluding it from any fishing prohibition. It is important to protect EFH but at the same time I feel it is important for NMFS to encourage low EFH impact methods of sustainable fishing such as the Scottish Seine.

Thank you for your consideration,

Phil Bruno
Owner
Exclusive Fresh, Inc.

cc: Susan Kennedy, NOAA

EXCLUSIVE FRESH, INC.
"Purveyors of Fine Seafood"
PRINCETON BY-THE-SEA

Exclusive Fresh, Inc.
P.O. Box 308
165 Airport St.
El Granada, CA 94018
(650) 728-7321 • (650) 728-7322
FAX (650) 728-7372

April 27, 2005

D. Robert Lohn, Regional Administrator
c/o Maryann Nickerson
National Marine Fisheries Service
7600 Sand Point Way NE
Bin C15700, Bldg. 1
Seattle, WA 98115-0070

Dear Mr. Lohn,

I am a seafood wholesaler in El Granada, a firm supporter of sustainable fisheries, and the need to protect essential fisheries habitat (EFH). I also support fisherman who attempt to fish using non-destructive methods which do not catch or impact other species of fish. There is a need to differentiate between destructive methods and those that are not.

The Scottish Seine is a gear which is non-destructive and will not impact an EFH. It is a very light and easily damaged encircling gear that can only be used over soft bottom. A presence of even the smallest anomaly on the bottom results in damage and prevents the gear from fishing a hard bottom EFH. Unlike a bottom trawl that is able to fish and damage the hard bottom, Scottish Seines do not actively tow. Instead the net is gathered slowly and reeled in hydraulically. This method greatly reduces and often eliminates any possible impact to an EFH.

Presently, I believe that Scottish Seine has been placed in the category of trawl gear in many of the proposed EFH's. Due to this improper inclusion in the trawl category, Scottish Seine fishing is prohibited.

When determining the final EFH, please exclude Scottish Seine from any fishing prohibitions designed to protect fish from trawling methods. While it is important to protect an EFH, it is also important for NMFS to encourage non-destructive fishing methods, such as the Scottish Seine, that do not impact the bottom and help reach the goals of the EFH.

Thank you for your consideration.

Sincerely,

Philip L. Bruno
President/Owner
Exclusive Fresh, Inc.

MOSS LANDING HARBOR DISTRICT

7881 SANDHOLDT ROAD
MOSS LANDING, CA 95039

TELEPHONE - 831.633.5417
FACSIMILE - 831.633.4537

GENERAL MANAGER
HARBORMASTER

Linda G. McIntyre, Esq.

May 5, 2005

Mr. D. Robert Lohn, Regional Administrator
c/o Maryann Nickerson
National Marine Fisheries Service
7600 Sand Point Way NE - BIN C15700 Bldg. 1
Seattle, WA 98115-0070

Subject: Comments on the "2005 Pacific Coast Groundfish Fishery Management Plan - Essential Fish Habitat Designation and Minimization of Adverse Impacts" DEIS - Support of Modified Alternatives of Collaborative Efforts between Environmental Non-Governmental Organizations and Fishermen and Protection and Consideration of Impacts to Coastal Communities

Dear Mr. Lohn:

Thank you for this opportunity to comment on the "Groundfish Essential Fish Habitat Designation and Minimization of Adverse Impacts Draft Environmental Impact Statement (DEIS)." We support the Pacific Fisheries Management Council (PFMC) and National Marine Fisheries Service (NMFS) efforts to assist the environmental and socioeconomic effects of the alternatives presented in the Draft EIS. Our comments are broad in scope on the fisheries issues but are focused on the effects of the Essential Fish Habitat program on local coastal communities and fishing dependent harbors.

The Magnuson-Stevens Act and a 2000 court order require the preparation of this DEIS. The purpose of this DEIS is to evaluate the effects of fishing on essential fish habitat and to identify measures that will minimize those impacts to the extent practical. The project will also designate "Habitat Areas of Particular Concern" and identify other actions that encourage the conservation and enhancement of Essential Fish Habitat (source: DEIS). The Pacific Coast Groundfish Management Plan (FMP) will ultimately be amended to incorporate the alternatives selected by the PFMC and as may be approved by the NMFS.

Current Joint Efforts

There are an estimated 23 permit holders that we believe regularly trawl in central California region, some of whom offload at the Moss Landing Harbor. We support the efforts of the environmental non-governmental organizations (NGO's) and these 23 commercial fishermen (and their associated representatives) to see if they can agree on designated zones in the study area (such as Alternatives C.10 and C.12 as may be modified) as no-bottom trawl zones. Of course, other areas would remain available for trawling and other types of fishing, for both sport and commercial take. It is my understanding that the NGO's, individuals and Fishing Associations (local Fishermen's Associations, FMA, PCFFA and others) are working to identify areas they think should be kept open to bottom trawl fishing and those remaining areas to be closed to bottom trawlers. We strongly support these efforts and recommend that whichever alternatives are eventually submitted to the PFMC be taken seriously and adopted by NMFS and the Commerce Department. We believe that the collaborative efforts of the NGO's and the Fishermen will ultimately result in the best alternative for the central California coast area for designation of the Essential Fish Habitat, meeting the requirements of the court order and the Magnuson-Stevens Act, et seq.

We request both the PFMC and NMFS allow the NGO's to continue working with the trawl fishermen (who will be most impacted) in order to prepare recommendations on open trawl areas and trawl closed zones within the central California coast study region. We expect these groups to provide a preliminary zoning plan for at the PFMC meeting in June 2005. We support any alternative submitted by a collaborative group effort of NGO's and commercial fishermen.

We respectfully request that both the PFMC and the NMFS accept and support any Alternative submitted by any joint effort of these groups as one of the preferred alternatives in the EFH EIS, and allow the fishermen and NGO's to continue their collaborative work with the commercial fishermen, that is, to identify essential fish habitat, to designate habitat areas of particular concern, to minimize, to the extent practical, the adverse effects of fishing on the essential fish habitat, and to identify other actions that will encourage the conservation and enhancement of the essential fish habitats within any modified Alternative for this region.

Potential Impacts on Ports, Harbors and Coastal Communities

There are many small ports and harbors that have mutually beneficial relationships with fisheries industries, both sport and commercial, within the study region. These small craft harbors rely on the fisheries to provide steady jobs and act as an economic engine to keep the community vibrant. In the case of central California harbors, the past few years of increased regulatory actions have had a drastic negative affect on the ability of the fishing fleets to continue making a profit, which has a direct effect on the coastal host community (harbors and marinas). The implementation of yet another regulatory action (closure) will have a great economically adverse effect on these local communities. Therefore, we ask that both the PFMC and the NMFS carefully consider the socioeconomic effects of any designation of essential fish habitat in the central California region.

We understand that it is very difficult to quantify the social and economic effects of such a project or plan and cannot offer specific verifiable evidence of those effects, other than our past experience and day-to-day observation of the fishing industry and the benefits it has on our communities. There is a synergy that occurs which is un-measurable in terms of cash value that needs to be considered in the development of fishing regulations, including the designation of essential fish habitats on the west coast. The public comes to the ports and harbors and enjoys getting their fresh seafood while watching the boats offload their catch. Without that, these small craft harbors become stagnant and turn into yacht harbors for the rich. The little guys are forced out and the working harbors cease to exist. We have seen this in southern California harbors and hope that that does not happen here. Please be careful in the implementation of the EFH and take these comments into consideration when doing so.

Again, we thank the Council and Fisheries Service for your consideration of this alternative. We are available for future discussions on this issue. Should you require additional information please contact me by email at mcintyre@mosslandingharbor.dst.ca.us or by telephone at (831) 633.5417.

Sincerely,
Moss Landing Harbor District

Linda G. McIntyre
General Manager/Harbormaster

LGM:mdm

C: MLHD Board of Harbor Commissioners
Dr. Rebecca Lent, Dept. Asst. Administrator – Regulatory Programs, NMFS
Mr. Steve Copps, Sr. Policy Analyst, NMFS
Mr. Don Hansen, Chair, PFMC
Moss Landing Harbor Commercial Fisherman's Association

Mr. D. Robert Lohn
NMFS
C/o Maryann Nickerson
7600 Sandy Point Way, NE
Bin C 15700
Seattle, WA 98115-0070
May 4, 2005

Dear Sir,

I am writing to express my concerns with several of the proposals being considered by the NFMS about closures to areas of the Oregon coast.

One proposal would ban all bottom-contact fishing. This would eliminate all bottom fishing including crabbing in those areas. That seems a very severe measure, especially based on the lack of good scientific evidence that sport fishing or crabbing has a big impact on the fishery.

Sport fishing has been the lifeblood of many small communities along the Oregon coast and represents a substantial infusion of money to local and the state economy.

Another proposal would close certain, "Ecologically Important Areas", to all fishing. Who decides what areas and what data supports that sport fishers have impacted the fishery. Sport fishermen have historically been very responsive in following guidelines for bag limits, size and gender identification. Little or no EIS data is based on sport fishing. It is based almost exclusively on Trawl Data.

Please take into account when you consider the current closure proposals that the sport fishing fleet does represent a major influence on the economy and does virtually no harm to the ecology or the fishery.

Sincerely Yours,

Edmund Keene

Edmund Keene
920 SW 13th Ave.
Portland, OR 97205

Email; ekeene@ecomphotos.com

Subject: Comments on 2005 Groundfish DEIS
From: "George Alderson" <george7096@comcast.net>
Date: Tue, 10 May 2005 13:59:21 -0400
To: <GroundfishEFHDEIS.nwr@noaa.gov>
CC: <pfmc.comments@noaa.gov>

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service, Northwest Region

Dear Mr. Lohn:

Please consider our comments which follow in reaching decisions on the 2005 groundfish DEIS. I (George) grew up in Oregon, and my sister's family still lives there. Here in Maryland we consume fish from the Northwest that arrive through commercial channels.

We ask NMFS to adopt a top priority of assuring a sustainable, natural fishery resource. We would like to see increased protection for sensitive habitat such as kelp, sponges and corals, essential factors to support groundfish populations. We ask NMFS to adopt policies that will encourage fishing operators to adopt fishing gear that is less destructive to the habitat and to non-target species of fish and invertebrates.

NMFS should identify examples of the main habitat types and protect reserved areas to serve as ecological benchmarks, somewhat like using exclosures and research natural areas in terrestrial habitat management. Reference reserves should be established to give researchers a basis for identifying the impacts of fisheries on all the habitat types in the region.

At any time when essential information for decisionmaking is lacking, "precautionary management principles" should be used.

NMFS should adopt a management plan based on the natural ecosystems. This is an essential foundation for managing fisheries over the long term, so we will have a productive marine fishery in the future.

Thank you for considering our views.

Sincerely,
George & Frances Alderson
112 Hilton Ave.
Baltimore, MD 21228-5727
Tel. 410-788-7096
Email: george7096@comcast.net

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: Tom Aldridge <thomasaldridge95112@yahoo.com>
Date: Fri, 6 May 2005 12:58:14 -0500
To: GroundfishEFHDEIS.nwr@noaa.gov

May 6, 2005

Regional Administrator D. Robert Lohn
7600 Sand Point Way NE
Seattle, WA 98115-0070

Dear Regional Administrator Lohn,

I kind of think it is almost hopeless to get our government to actually protect and save our marine life because it seems to me that the law of the day is to let business do anything to make a profit even if it causes the death of all kinds of species and even if it means mass extinction of all kinds of marine life.It seems to me that if our government continues to act with little care for the oceans and the fish and the marine life, this will truly become the century of mass extinction.Year after year we read of the crisis in the oceans and year after year business intersts seem to run amuk and kill all they can kill and the government simply does nothing to stop this slaughter.Remember how close we came to killing all the buffalo-and how about the number we did on the carrier pigeon!!Our government seems to be incapable of protecting the great works of God and only capable of protecting big business and their right to destroy the works of God and all life in the sea!!I urge you to protect ecologically important and sensitive ocean habitats, including deep water corals and sponges, from destructive fishing practices in the Pacific Ocean.

The waters off the West Coast of the United States contain a diversity and abundance of ocean life, including ecologically and economically important fish species. Sadly, years of unsustainable fishing practices have decimated many fish populations to dangerously low levels and damaged the habitat they need to flourish. Studies have shown that fishing gears such as bottom trawls, which are widely used on the West Coast, damage sensitive marine habitats. Right now you have the opportunity to protect and restore the ocean habitats necessary to sustain our marine life by protecting ecologically important and sensitive areas from destructive fishing practices such as bottom trawling.

I am particularly concerned about the protection of deep water coral and sponges that recent studies have shown occur off the West Coast. These organisms, which can live for centuries, are highly susceptible to damage from fishing. I urge you to protect these areas from further damage by prohibiting the expansion of bottom trawling and protecting known areas of coral and sponge.

Thank you for the opportunity to present these comments.

Sincerely,

Mr. Tom Aldridge
296 S 13th St
San Jose, CA 95112-2143

Subject: "Comments 2005 Groundfish DEIS"
From: Karen Meyer <karen@greenfireproductions.org>
Date: Tue, 10 May 2005 19:48:04 -0700
To: GroundfishEFHDEIS.nwr@noaa.gov
CC: pfmc.comments@noaa.gov, Hal.Weeks@state.or.us

May 11, 2005

Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service, Northwest
Region 7600 Sand
Point Way NE, BIN C15700
Seattle, WA 98115-007

Dear Mr. Lohn:

I attended the recent Essential Fish Habitat meeting in Newport, Oregon at the end of April and wanted to submit the following comments for your consideration for decisions that will be made on the Groundfish Essential Fish Habitat Draft Environmental Impact Statement (DEIS).

Because the DEIS is so complex, the alternatives quite numerous, and the fact that I do not feel qualified to comment on specific alternatives, I will make more general comments and suggestions to the Pacific Fishery Management Council.

Based on the meeting in Newport, I am concerned that the specific needs of fishermen will carry more weight than the scientific knowledge about the state of groundfish and their potential habitat protection needs. I encourage you to strongly consider the scientific recommendations.

In general, I feel it is imperative for the PFMC to take a precautionary approach to management of Pacific groundfish, while we improve our limited understanding of the impacts of fishing on diverse habitats and the ability of habitats to recover from fishing impacts. In fact, the Oregon State of the Environment Report 2000 states, "the most significant risk to marine fisheries Š is our insufficient understanding of the complex interactions of natural and human caused changes in stock health." It is crucial, therefore, that the PFMC err on the side of caution in protecting and restoring Pacific groundfish and habitat.

I strongly encourage the PFMC to consider the need for connectivity between habitats, so that these habitat reserves can provide the added benefit of enhancing groundfish populations. I encourage you to include a network of research reserves in PFMC's effort to designate, protect and understand present and future EFH. By monitoring and analyzing impacts and effectiveness in these reference sites, the PFMC can glean new knowledge, engage in adaptive management and move forward more confidently with fishery management, basing its decisions on sound science.

Utilizing the principles of ecosystem-based management, the PFMC should develop an ecologically based management plan that considers the entire ecosystem, including humans, and protects the long-term health of the marine environment**.** This plan should think beyond protection of single species, and consider the inherently interrelated nature of all marine species and habitat types, as well as potential past, present, future and cumulative human impacts on these environments.
I feel it is important that all possible EFH protection measures be adopted in the near-term, rather than deferring measures for future understanding. This precautionary implementation should then be modified accordingly, based on the principles of adaptive management, as new information is gathered, during the mandatory five-year review process.

Overall, I believe it is important to:
 * manage and make these decisions on a precautionary principle,
 *increase protection for sensitive habitat types such as kelp, corals and sponges that are essential to groundfish productivity,
 * protect a representative sample of unique habitat types from all types of fishing impacts,
 * include connectivity as a criteria for designating EFH - so that the habitat reserves have the potential to replenish groundfish stocks,
 * make it easier for fishermen to change to less destructive gear,
 * establish a network reference reserves in order to better understand fishery impacts on all habitat types.

Thank you for your efforts to protect essential fish habitat for Pacific groundfish.

Karen Anspacher-Meyer

--

Karen Anspacher-Meyer
Executive Director
Green Fire Productions
karen@greenfireproductions.org
www.greenfireproductions.org
541-486-4070 fax 541-486-4010
P.O. Box 14906, Portland, OR 97293

April 13, 2005

Dr. Robert Lohn
Administrator, Northwest Region
National Marine Fisheries Service
7600 Sand Point Way, NE
Seattle, WA 98115-0070

Dear Administrator Lohn:

Re: Comment on 2005 Pacific Coast Groundfish EFH DEIS
Please adopt Alternative 12

I am writing because a healthy Pacific Ocean is crucial for our way of life, which includes our economy and recreation.

For more than three years, Oceana has been bringing science and information to the Pacific Fishery Management Council and NOAA regarding the importance of protecting deep-sea corals and sponges from bottom trawling.

I support protecting ecologically sensitive areas of the Pacific seafloor such as corals and sponges, and special places such as seamounts, biogenic areas, and deep sea canyons from destructive commercial fishing.

Deep-sea corals are a true natural wonder. Deep-sea corals are perhaps the oldest living seafloor animals on the planet. Extremely sensitive to disturbance and slow growing, these ancient animals can live hundreds of years. Corals, sponges, and other living seafloor animals provide oases of life on the seafloor, supporting ecological diversity crucial for healthy sustainable oceans.

Bottom trawling destroys far more ocean habitat than any other fishing practice on the West Coast. Commercial fishing vessels drag large weighted nets across the ocean floor, clear cutting a swath of habitat in their wake. When disturbed by bottom trawling, as much as 90% of a coral colony may perish, and up to 67% of sponges may be damaged.

Corals, sponges, and other living seafloor animals are important for healthy sustainable oceans. These animals cannot withstand the destructive fishing practice of bottom trawling.

Because living seafloor is not found everywhere, it is possible to both protect this important ocean habitat while maintaining vibrant fisheries.

This can be accomplished by prohibiting bottom trawling in areas where corals, sponges, and other living seafloor animals or known or likely to exist.

As you consider the Essential Fish Habitat Draft Environmental Impact Statement, please adopt Alternative 12, which protects habitat and maintains vibrant fisheries.

Thank you for your consideration and help in this urgent matter.

Respectfully,

J. Capozzelli

J. Capozzelli
315 West 90th Street
New York, NY 10024

Subject: Comments 2005 Groundfish DEIS
From: "Frank Quinn" <marfran@harborside.com>
Date: Tue, 10 May 2005 17:37:43 -0700
To: <GroundfishEFHDEIS.nwr@noaa.gov>

Mr. Robert D. Lohn, Regional Administrator

National Marine Fisheries Service, Northwest Region

Dear Mr. Lohn:

In developing policy for protecting marine habitats and managing offshore fishing within federal waters, surely two of the primary concerns of the Pacific Fisheries Management Council will be how to promote sustainable fishing to meet the needs of our growing population, and how to advise and assist fishermen to develop practices that assure a viable future for the industry.

In our area, where groundfish are particularly important, the fishing industry is already hurting and has been in serious decline for years. Overfishing and the use of bottom trawl nets and other heavy fishing gear have depleted fish stocks and caused much damage to the marine habitats the fish depend on for sustenance. Effective measures to protect those critical habitats and to regenerate and restore fish populations are essential if commercial fishing is to have a future here along the Pacific Coast.

We urge strongly that the Council adopt policies that will increase protection of sensitive habitats needed for the replenishment of groundfish stocks, and that representative sample habitat areas be reserved and protected from all types of fishing impacts for future study and as a source for regenerating fish populations. We hope the Council will be able to assist fishermen to develop and employ fishing gear and techniques that are less destructive than those that have caused so much damage.

Lastly, we believe that an ecosystem-based management plan that truly protects the long-term health of the marine environment offers the only promise for the future of fishing here on the West Coast, both as an important local industry, and as an essential economic resource for the country as a whole.

Sincerely,

Francis E. Quinn and Marjorie Feldman

425 Bandon Ave., SW

Bandon, OR 97411

Subject: EFH Alternatives- Public Comments sought
From: "sheri hafer" <somethingsfishy@charter.net>
Date: Wed, 13 Apr 2005 10:03:18 -0700
To: <GroundfishEFHDEIS.nwr@noaa.gov>

Dear Mr. Robert Lohn,

Yet again a heavily financed enviromental group(Oceana) is pushing their agenda of removing fisherman from existance. Despite now 10 years of heavy regulatory action protecting the groundfish, they still aren't happy until we are all out of business.
In the middle of listening to all the rheotoric regarding the implementation of The MLPA on the central coast attempting to make essentially most of our fishing grounds no-take zones, we receive your notice of further attacks on the fishing community. Honestly, does anyone consider that if this continues we will be importing all our fish from disease ridden fish farms, or unregulated fisheries of foreign countries. California has vast resources that are being wasted. The fishery managers should use simple tools to regulate the groundfishery, ie seasonal closures, size limits on the nearshore, quotas, gear modifications, mammal population controls, etc but chooses to continue with complex models of unending restrictions as if the fishery is not protected enough only because of these pretensious enviromental idealist and their money.
I am a trap fisherman for nearshore live-fish and spot prawns. I have been dealing with the development of a Nearshore Fishery Management Plan for the last 8 years including a 80% reduction in TAC, restricted access from 1200 to 200 permits, gear limits and modifications including a 5"ring to prevent large fish into the traps, trip limits, state wide allocations etc. With the spot prawns, all trawling was stopped and a restricted access program is in place with less than 30 permits. I have carried a Federal Observer the last 5 years with results demonstrating less than a 2% bycatch rate. The California nearshore fisheries are catch and release selective harvesting. It is the cleanist fishing in the world. How can you justify eliminating it?
Many fisherman are going out of business, there was a 50% reduction in fisherman just in our local Morro Bay community. We lost our local weather bouye and weather station recently with no effort to replace them. I feel the state/feds are too biased towards the enviromental community and letting the fishing communities die on the vine. 10 years from now, after the currrent older fisherman retire, their will not be commercial fishing in California at the rate we are going because it will be economically impossibe to survive, but maybe that is what everyone seems to want. Tom Hafer

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS.
From: "Gayle Hansen" <gayle.hansen@oregonstate.edu>
Date: Tue, 10 May 2005 15:16:32 -0700
To: <GroundfishEFHDEIS.nwr@noaa.gov>
CC: <nepa.comments@noaa.gov>

Dear Dr. Robert Lohn and Susan Kennedy,

I briefly looked over the Draft EIS on essential fish habitat for groundfish. I was happy to see some mention of kelp beds as habitat structure for fish. But there are many things missing from the statement about seaweeds in general and their importance to ground fish.

In the Estuary chapter, you mention the importance of seagrasses to fish, but you overlook the tons of ephemeral green algae and diatoms that infest our bays also providing shelter and/or food (through the food chain) for fish and other animals. On the outer coast, multiple seaweed species provide shelter for fish -- and both seaweeds and phytoplanton provide essential food sources for fish through the food web. I recently asked Rick Brodeur, who works on food chain dynamics, how many pounds of algae (both phytoplanton and seaweeds) it takes to make 1 pound of salmon -- he said "about 1000 pounds". I had to determine how he calculated this 1000:1 ratio -- but you would have to go through at leasst 4 trophic levels, each with only 10% efficiency, to get to salmon -- so this does appear to be accurate -- and it is undoubtedly the same for groundfish. Also, in an early report by Leigh et al. (1986), kelps and rockweeds were determined to be more productive per unit area per year than plants in any other ecosystem on earth, exceeding even those in tropical rain forests -- and far exceeding the seagrasses.

If algae (both phytoplanton and seaweeds) are so essential to the habitat and diet of fish, including groundfish, I feel that it should receive more ephasis in your EIS. If seaweed beds (both kelp and other seaweeds) were destroyed, groundfish and many other fish would suffer tremendously and more than likely many would be wiped out.

Although I don't have the statistics on this, I find it astonishing that so few government agencies have marine botanists working for them on this very subject. As far as I can tell, NOAA doesn't have a single marine botanist in their Habitat division. The state of Oregon has put their Parks Department in charge of seaweeds, but they don't seem to have a clue about their importance.

In the terrestial environment, dominant tree types and other plants are well recognized for their importance to animals. It is such an undeniable fact that I cannot figure out why this hasn't happened in the marine environment. Without the shelter, food, and oxygen provided by these "plants" (both phytoplanton and seaweeds), there would be no fish out there. Many freshwater algae are considered to be indicator species of environmental change. Their tolerances to changes in temperature, water chemistry, and light are minimal, and when they die, it is obvious something is awry. This is also true of many marine algal species, but they have yet to be studied to recognize which ones are actually true indicator species. There has been little money available for this in the past -- explaining the lact of data.

I hope that you will rewrite this EIS to include more emphasis on these important organisms so that we can recognize their critical role in the marine environment and determine how to use them as indicator species in order to prevent future catastrophies like the depletion of our groudfish stocks.

Sincerely,

Gayle Hansen
Associate Professor, Oregon State University
Hatfield Marine Science Center
2030 SE Marine Science Drive
Newport, Oregon 97365

gayle.hansen@oregonstate.edu

541-867-0200

Subject: Restore Ocean Habitat
From: "Ben Kitchen" <bkitchen@hotmail.com>
Date: Tue, 10 May 2005 19:40:09 -0700
To: <GroundfishEFHDEIS.nwr@noaa.gov>

Dear Mr. D. Robert Lohn,

My Name is Benjamin Kitchen and I live in Lake Oswego, Oregon. The reason why I am writing you today is to let you and others know that I support sustainable fishing in the Pacific Ocean off of the Oregon coast. The Audubon Society of Portland and I feel it is important that the Pacific Fisheries Management Council take action to:

* **increase protection for sensitive habitat types such as kelp, corals and sponges that are essential to groundfish productivity,**
* **protect a representative sample of unique habitat types from all types of fishing impacts,**
* **make it easier for fishermen to change to less destructive gear,**
* **establish a network reference reserves in order to better understand fishery impacts on all habitat types,**
* **develop an ecosystem-based management plan that truly protects the long-term health of the marine environment.**

As an Oregonian I favor these goals, and that I strongly urge application of "precautionary management principles" in all cases where information needed for decision making is unavailable. Please listen to me, it is our duty as Americans to defend and protect our country. Thank you for your time.

Sincerely,

Ben Kitchen

Subject: Comment on Pacific coast groundfish EFH DEIS
From: Christopher Lish <lishchris@yahoo.com>
Date: Sun, 8 May 2005 18:03:53 -0700 (PDT)
To: GroundfishEFHDEIS.nwr@noaa.gov

D. Robert Lohn
NOAA Fisheries Regional Administrator
7600 Sand Point Way NE
BIN C15700, Bldg. 1
Seattle, WA 98115-0070

Dear Administrator Lohn,

As you consider alternatives to protect Pacific groundfish habitat, I urge you to close ecologically important areas to destructive gears, such as bottom trawls, and to create areas where all groundfish and their habitats are protected.

“A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.”
-- Aldo Leopold, The Conservation Ethic

Pacific groundfish are in trouble. Years of heavy fishing have taken their toll so that today both the fish and the fishermen are suffering. We must take steps today to restore our oceans so that our marine wildlife and our fisheries can thrive in the future. Protecting essential fish habitat is one of the most important steps on this path.

“An unwritten compact between the dead, the living and the unborn requires that we leave the unborn something more than…depleted natural resources.”
-- A Washington State Court decision

Deep-sea corals, sponges, and rocky reefs are part of the seascape that supports ocean life and must be preserved. I also support actions that would help fishermen move away from destructive gears to more sustainable fishing.

“The nation behaves well if it treats the natural resources as assets which it must turn over to the next generation increased, and not impaired, in value.”
-- Theodore Roosevelt

I value the oceans and I want to see them healthy and vibrant in the years to come. I ask you to take real action now to protect underwater habitats.

Thank you for your consideration of my comments. Please let me know how you intend to proceed on this issue. I look forward to your response. Please respond by e-mail to lishchris@yahoo.com if possible.

Sincerely,
Christopher Lish
PO Box 113
Olema, CA 94950
lishchris@yahoo.com

May 4, 2005
Mr. D. Lohn
Regional Administrator. NMFS
C/o Maryann Nickerson
7600 Sandy Point Way, NE
Bin C15700
Seattle, WA 98115-0070

Comment on 2005 Pacific Coast GroundfishDEIS

Dear Administrator,

I am a member of the Recreational Fishing Alliance and also an avid fisherman paying taxes in both Oregon and Washington and am opposed to regulators closing vast areas of the coastal zones to the new EIS regulations. I respectfully recommend that your office consider the economic disaster of imposing these new unproven regulations on the coastal communities that thrive on tourists visiting and recreating in these public areas. These is no justifiable rationale or studies that prove these area need to be closed to the public harvesting species within these areas. It is an unreasonable program developed without sufficient analysis and is not justifiable, regardless of any support the plan may have. I believe the National Marine Fisheries Service needs to better evaluate the impacts of these proposals and preserve fishing opportunities for future generations of anglers. I also believe that this plan is an economic disaster waiting to happen to the already economically depressed coastal communities.

The National Marine Fisheries Service has not fully analyzed the potential impacts on the anglers who harvest and recreate these areas. I for one will review my monies spent on the Oregon Coast and all the clients that I draw to the coast to fish the waters off Oregon and Washington. I will better manage my assets and tax dollars and reinvest in areas that Are not impacted by these inappropriate regulations.

Sincerely,
Tom Merriman

cc. PFMC, ODFW Marine Resources Program

City of Morro Bay

Morro Bay, CA 93442 • 805-772-6200
www.morro-bay.ca.us

May 10, 2005

Mr. D. Robert Lohn
Regional Administrator, National Marine Fisheries Service
c/o Maryann Nickerson
7600 Sand Point Way, NE
Bin C15700
Seattle WA 98115-0070

RE: COMMENT ON 2005 PACIFIC GROUNDFISH DRAFT ENVIRONMENTAL IMPACT STATEMENT

The City of Morro Bay treasures its fishing heritage and local commercial fishing fleet that provides fresh seafood for this country in a highly regulated and sustainable environment. Our harbor and its commercial fishing businesses depend on groundfish landings to support the harbor infrastructure, since many of our fishermen are mainly albacore, crab or salmon permittees with actual landings in the ports north of Morro Bay. Our City has suffered from the reductions in groundfish quotas, seasonal restrictions and area closures to the extent that the local groundfish market has almost collapsed and just a few of the traditional shore side support businesses are still hanging on.

Currently there are 5 Class A permittees who operate out of our port. That represents trawl fishing effort over two hundred miles of coastline between Santa Barbara Harbor and Monterey Harbor. Each Class A permittee generally fishes between 5-8 days to make their 60 day quota; so on most of the days of the year there IS NO LONGER EVEN ONE DEEP WATER COMPLEX TRAWLER OPERATING ON THIS TWO HUNDRED MILES OF COASTLINE. Yet, the port still does get groundfish, and these are the consistent landings that allow our one remaining full service fish buying dock to keep employees working and pay the bills. The City is dedicated to supporting this remaining fish buying dock and is currently in the process of installing a new $700,000 ice making machine for commercial fishing use at this location.

Clearly the policy of subsidizing more and bigger trawlers in the 1970s was a disaster, but just as clearly the resource for 15 years now has been very lightly harvested compared to historic levels. Many of our local restaurants no longer can get local fresh fish and have turned, like most of the country, to frozen fish which is oftentimes harvested in environmentally damaging ways in unregulated countries. In the last two years we have seen some hope as groundfish prices have gone up a little, quotas increased slightly, (but typically not what was promised) due to the federal buy-back program and Class A permittees have started to see a reasonable economic return for fishing again. We are hopeful that some uncertainty can be relieved for these local businesses and for the City. In this context, we learned about the groundfish essential fish habitat draft environmental impact statement (EFH DEIS).

FINANCE
595 Harbor Street

ADMINISTRATION
595 Harbor Street

FIRE DEPARTMENT
715 Harbor Street

PUBLIC SERVICES
955 Shasta Street

HARBOR DEPARTMENT
1275 Embarcadero Road

CITY ATTORNEY
955 Shasta Avenue

POLICE DEPARTMENT
850 Morro Bay Boulevard

RECREATION AND PARKS
1001 Kennedy Way

D. R. Lohn
May 10, 2002
Page 2 of 2

Many of the alternatives in the DEIS would appear to close fishing grounds to the extent that would eliminate consistent landings in Morro Bay and finally put an end to our commercial fishing harbor. We do not believe it is the intent of the National Marine Fisheries Service to eliminate fresh seafood landings in our area and decimate our City and we urge you to:

♦Work with the fishing industry on alternatives that will protect Essential Fish Habitat, especially those grounds with deep water corals and critical bottom habitat so that we can increase access to the abundant sustainable fishery resources in our area for our City and the seafood consumer.

♦Implement EFH designation for groundfish that have no strings attached or unforeseeable implications for low/no impact vertical gear or traps.

♦Extend the timelines for adoption of groundfish EFH so that the coastal communities/fishing industry can fully engage the discussion with NMFS and the environmental community.

♦Improve the outreach to community and fishing businesses by considering an ombudsman program, enhancing your sustainable fisheries outreach effort or some mechanism to empower local fishermen to give input and build trust with NMFS and the environmental community.

I would close by pointing out that virtually 100% of our commercial fishermen are owner operated small businesses. We don't have the corporate interests that can hire lobbyists that the large processors and factory producers of some other areas have or the money and influence of the environmental NGOs. It is tremendously difficult for a small business owner/operator or a small city for that matter to take the time to become informed on these issues, much less to attend the many meetings that are needed to have an impact. Thus our voices are often not heard or we find that decisions are made at meetings we are unable to attend. Even when we do comment (such as our support of the Federal Buyback Program, provided that the buy-back vessels would not become problems for harbors and the overall science based quotas would remain the same) we have come to have low expectations for results. Currently, two buy-back boats in this harbor are in arrears to the City approximately $4700 and the reallocation in groundfish quotas that were "bought back" has not happened as we felt was promised.

All of the above facts lead to a feeling of lack of empowerment and even distrust of the process that is not conducive to a positive collaborative process. Still, we remain convinced that almost all involved have the same goals of protecting our environment and maintaining sustainable fisheries; so we will continue to try to work with all parties for mutually beneficial solutions.

Please consider our recommendations and help us preserve the important economic and cultural values of allowing an environmentally sound and sustainable fishery to stay on the central coast of California.

Sincerely,

Janice Peters

Mayor Janice Peters

cc: Conresswoman Capps
PFMC

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: John Savlove <john@savlove.com>
Date: Fri, 6 May 2005 13:13:41 -0500
To: GroundfishEFHDEIS.nwr@noaa.gov

May 6, 2005

Regional Administrator D. Robert Lohn
7600 Sand Point Way NE
Seattle, WA 98115-0070

Dear Regional Administrator Lohn,

Ideas and projects constantly undergo revision. It is obvious that human endeavors - regardless of their value, which is of course in many cases very high - are tapping our resources at a pace that our minds refuse to comprehend. As the dominant force on this planet, we must take drastic measures now to make up for how successfully we've despoiled the ecology that sustains our lives.
The rest of this text is prepared, but I stand by every word for it because I understand the delicate yet powerful and altogether miraculously logical links between coral reefs, biodiversity, fish habitats, and the cycle of life that permits us to rule as we do. We have a moral AND economic imperative to get really smart and courageous NOW about how we treat our fellow life-forms. To ignore these messages - or even to blithely let them wait until tomorrow - is to betray our virtue and our future. I have seen environmental catastrophe. It is not pretty. In spite of their laziness, normal humans can be taught (or required) to respect our oceanic foundations in the face of greater and greater tragedies.

The waters off the West Coast of the United States contain a diversity and abundance of ocean life, including ecologically and economically important fish species. Sadly, years of unsustainable fishing practices have decimated many fish populations to dangerously low levels and damaged the habitat they need to flourish. Studies have shown that fishing gears such as bottom trawls, which are widely used on the West Coast, damage sensitive marine habitats. Right now you have the opportunity to protect and restore the ocean habitats necessary to sustain our marine life by protecting ecologically important and sensitive areas from destructive fishing practices such as bottom trawling.

I am particularly concerned about the protection of deep water coral and sponges that recent studies have shown occur off the West Coast. These organisms, which can live for centuries, are highly susceptible to damage from fishing. I urge you to protect these areas from further damage by prohibiting the expansion of bottom trawling and protecting known areas of coral and sponge.

Thank you for the opportunity to present these comments.

Sincerely,

Mr. John Savlove
PO Box 19
11 Water St
North Bennington, VT 05257-9516

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
500 NE Multnomah Street, Suite 356
Portland, Oregon 97232-2036

IN REPLY REFER TO
ER05/160

May 3, 2005

Mr. D. Robert Lohn
NMFS, Northwest Region
7600 Sand Point Way Northeast
Bin C15700
Seattle, WA 98115

Dear Mr. Lohn:

The Department of the Interior has reviewed the Draft Environmental Impact Statement for the Pacific Coast Groundfish Fishery Management Plan to Conserve and Enhance Essential Fish Habitat Designation and Minimization of Adverse Impacts, Pacific Coast Exclusive Economic Zone; Washington, Oregon, and California. The Department does not have any comments to offer.

We appreciate the opportunity to comment.

Sincerely,

Preston Sleeger

Preston A. Sleeger
Regional Environmental Officer

Subject: Comments 2005 Groundfish DEIS
From: "Pepper Trail" <ptrail@ashlandnet.net>
Date: Tue, 10 May 2005 20:41:59 -0700
To: GroundfishEFHDEIS.nwr@noaa.gov
CC: pfmc.comments@noaa.gov

To: Mr. D. Robert Lohn, Regional Administrator
National Marine Fisheries Service, Northwest Region
7600 Sand Point Way NE, BIN C15700
Seattle, WA 98115-007

From: Pepper Trail, Ph.D.
Conservation Chair
Rogue Valley Audubon Society
2011 Crestview Drive
Ashland, OR 97520

These comments on the Groundfish Essential Fish Habitat Draft Environmental Impact Statement (DEIS) are submitted on behalf of the Rogue Valley Audubon Society, a chapter of the National Audubon Society with over 500 members in southern Oregon. We are concerned about the declining health of Oregon's fishery resources, and urge that management of groundfish on the Pacific coast be governed by the "precautionary principle." In other words, when data needed for informed decision-making are lacking, the most conservative alternative must be followed; the alternative that is most protective of the fisheries resource. Since there are many critical gaps in our understanding of groundfish ecology, this approach will necessitate significant changes in current management practices.

Specifically, we urge the Pacific Fisheries Management Council to take action in five critical areas:

* establish a network of reserves in order to better understand fishery impacts on all habitat types, * increase protection for sensitive habitat types such as kelp, corals and sponges that are essential to groundfish productivity,
* protect a representative sample of unique habitat types from all types of fishing impacts,
* make it easier for fishermen to change to less destructive gear,
* develop an ecosystem-based management plan that truly protects the long-term health of the marine environment.

Thank you very much.

Respectfully submitted,

Pepper W. Trail, Ph.D.

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: "ANGELAD@HAWAII.RR.COM" <ANGELAD@HAWAII.RR.COM>
Date: Fri, 11 Mar 2005 20:28:34 -0500
To: GroundfishEFHDEIS.nwr@noaa.gov

Dear Pacific Fishery Management Council,

Bottom contact gear, such as trawls, longlines, pots and traps, are dangerously destructive to marine life and the habitat they depend on. In your plan to minimize the adverse effects of such gear to essential fish habitat, please close ecologically sensitive areas to bottom trawling and other bottom contact gear, establish a process for setting a limit on the bycatch of habitat-forming invertebrates, such as corals and sponges, and create other provisions agreed upon by conservationists and scientists to protect the health of our oceans for future generations.

Please consider this an official comment on the 2005 Pacific Coast Groundfish EFH DEIS.

ANGELA DECRESCENZI
P.O. BOX 143
KEALAKEKUA, HI 967500143

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: "brbptts@aol.com" <brbptts@aol.com>
Date: Mon, 21 Mar 2005 16:26:35 -0500
To: GroundfishEFHDEIS.nwr@noaa.gov

Dear Mr. Lohn, Regional Administrator, National Marine Fisheries Service:

A healthy Pacific Ocean is crucial for our way of life, including our economy and recreation.

A key to keeping the Pacific Ocean healthy is the protection of marine habitats necessary to support its diverse assemblage of ocean life, including economically valuable fish species. Sadly, many of these habitats have and continue to be impacted by destructive fishing practices. I support protecting ecologically sensitive areas of the Pacific seafloor such as corals and sponges; and special places such as seamounts, biogenic areas, and deep sea canyons from destructive fishing practices.

As you consider the Essential Fish Habitat Draft Environmental Impact Statement, please adopt a management alternative that protects these ecologically sensitive habitats necessary to maintain vibrant fisheries.

Barbara Potts
19078 Chaparral Dr
Penn Valley, CA 959469686

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: Andrew Ericskson <akerickson@earthlink.net>
Date: Thu, 21 Apr 2005 11:15:48 -0500 (CDT)
To: GroundfishEFHDEIS.nwr@noaa.gov, nepa.comments@noaa.gov

Dear Administrator Lohn,
A healthy Pacific Ocean is crucial for our way of life including our economy and recreation.

For more than three years, Oceana has been bringing science and information to the Pacific Fishery Management Council and NOAA regarding the importance of protecting deep sea corals and sponges from bottom trawling. I support protecting ecologically sensitive areas of the Pacific seafloor such as corals and sponges; and special places such as seamounts, biogenic areas, and deep sea canyons from destructive commercial fishing.

As you consider the Essential Fish Habitat Draft Environmental Impact Statement, please adopt Alternative 12, which protects habitat and maintains vibrant fisheries.
Andrew Ericskson
2209 Marian Pl.

Venice, CA 90291

Subject: Comment on Pacific coast groundfish EFH DEIS
From: "Miranda Vorhees" <DM110104@peoplepc.com>
Date: Fri, 22 Apr 2005 02:22:00 -0400
To: "GroundfishEFHDEIS.nwr@noaa.gov" <GroundfishEFHDEIS.nwr@noaa.gov>

April 22, 2005

D. Robert Lohn
NOAA Fisheries Regional Administrator
7600 Sand Point Way NE
BIN C15700, Bldg. 1
Seattle, WA 98115-0070

Dear Administrator Lohn,

As you consider alternatives to protect Pacific groundfish habitat, I urge you to close ecologically important areas to destructive gears, such as bottom trawls, and to create areas where all groundfish and their habitats are protected.

Pacific groundfish are in trouble. Years of heavy fishing have taken their toll so that today both the fish and the fishermen are suffering. We must take steps today to restore our oceans so that our marine wildlife and our fisheries can thrive in the future. Protecting essential fish habitat is one of the most important steps on this path.

Deep-sea corals, sponges, and rocky reefs are part of the seascape that supports ocean life and must be preserved. I also support actions that would help fishermen move away from destructive gears to more sustainable fishing.

I value the oceans and I want to see them healthy and vibrant in the years to come. I ask you to take real action now to protect underwater habitats.

Sincerely,

Miranda Vorhees
2609 W Oliver Dr
Muncie, IN 47302-2039
USA
DM110104@peoplepc.com

Subject: Comment on 2005 Pacific Coast Groundfish EFH DEIS
From: George Imrie <geodai@webtv.net>
Date: Fri, 6 May 2005 01:02:45 -0500
To: GroundfishEFHDEIS.nwr@noaa.gov

May 6, 2005

Regional Administrator D. Robert Lohn
7600 Sand Point Way NE
Seattle, WA 98115-0070

Dear Regional Administrator Lohn,

I urge you to protect ecologically important and sensitive ocean habitats, including deep water corals and sponges, from destructive fishing practices in the Pacific Ocean.

The waters off the West Coast of the United States contain a diversity and abundance of ocean life, including ecologically and economically important fish species. Sadly, years of unsustainable fishing practices have decimated many fish populations to dangerously low levels and damaged the habitat they need to flourish. Studies have shown that fishing gears such as bottom trawls, which are widely used on the West Coast, damage sensitive marine habitats. Right now you have the opportunity to protect and restore the ocean habitats necessary to sustain our marine life by protecting ecologically important and sensitive areas from destructive fishing practices such as bottom trawling.

I am particularly concerned about the protection of deep water coral and sponges that recent studies have shown occur off the West Coast. These organisms, which can live for centuries, are highly susceptible to damage from fishing. I urge you to protect these areas from further damage by prohibiting the expansion of bottom trawling and protecting known areas of coral and sponge.

Thank you for the opportunity to present these comments.

Sincerely,

Mr. George Imrie
PO Box 540433
Redondo, WA 98054-0043