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MEMORANDUM FOR: The Record

FROM: Rod Towell, Rolf Ream, John Bengtson, and Michael Williams

SUBJECT: 2021 northern fur seal pup production and adult male counts on the Pribilof Islands, Alaska.

Numbers of northern fur seal, *Callorhinus ursinus*, pups were estimated using a mark-recapture method, shear-sampling, on St. Paul Island during August 2021. Due to restrictions during the Covid 19 pandemic, 5 sample rookeries were sheared and dead pups counted (Table 1). Adult male counts were counted on 14 sites, but pup production was only estimated on 13 sites since no pups were observed on Little Polovina in August, 2021. An estimate of the number of pups alive at the time of marking for St. Paul Island (excluding Sea Lion Rock) was obtained using a jackknife ratio estimate of pups to harem males on sampled rookeries. The jackknife ratio estimate was then multiplied by the total number of harem males counted (see below, excluding Little Polovina) to get the estimate of pups alive (69,696, SE = 10,902) for rookeries on St. Paul Island. Pup mortality was estimated for the whole island using the estimated mortality rate from sample rookeries. The observed pup mortality rate on sample rookeries was 4.27% (SE = 0.06%) on St. Paul Island. We estimated 72,806 (SE = 11,389) pups were born on St. Paul Island. The larger variance on the estimates was expected since a sample of rookeries, versus all rookeries, was used in the estimation process. The 2021 pup production estimate for St. Paul Island is 3.84% less than the estimate in 2018 (Figure 1). Since 1998 pup production on St. Paul Island declined 59.4%, or at an annual rate of 4.02% (SE = 0.33). No pup census work was undertaken in 2021 on St. George Island. Pup production on St. George shows no significant trend in production from 1998 to 2018.

Adult male northern fur seals on St. Paul and St. George Islands were counted over the period July 10 to 19, 2021 (Table 2). Due to the pandemic and other logistical concerns, bull counts on both islands have not been obtained consistently for the past 5 years. To provide similar assessments, 2021 counts have been compared to 2018, the last year of complete bull counts at both islands. Counts of territorial males with females (class 3; "harem" males) on St. George Island increased by 18.9% compared to 2018. Idle males (classes 2 and 5) on St. George Island decreased in comparison to 2018 by 21.1%. On St. Paul Island the "harem" males increased by 5.2% and the idle males decreased by 8.7% compared to 2018 (Figure 2). Overall, the total number of all classes of adult males counted on the Pribilof Islands in 2021 decreased by 1.1% from 2018 to 7,524.

Table 1. Numbers of northern fur seal, *Callorhinus ursinus*, pups born on sample rookeries of the Pribilof Islands, Alaska in 2021 by rookery. Estimates are shown for the numbers alive at the time of shearing and the estimated total number of pups born.

Rookery	Pups Alive at marking	SE	Dead pups	Total pups born	Mortality rate (%)	Harem males	Ratio live pups/males
<u>St. Paul Island</u>							
Reef	8,508	90.5	370	8,878	4.17	405	21.01
Morjovi	8,172	43.5	346	8,518	4.06	326	25.07
Polovina	2,557	158.0	114	2,671	4.27	91	28.10
Zapadni Reef	2,159	32.0	113	2,272	4.97	125	17.27
Zapadni	6,601	353.0	306	6,907	4.43	302	21.86
Total	27,997	400.85	1,249	29,246	4.27	1,249	22.42

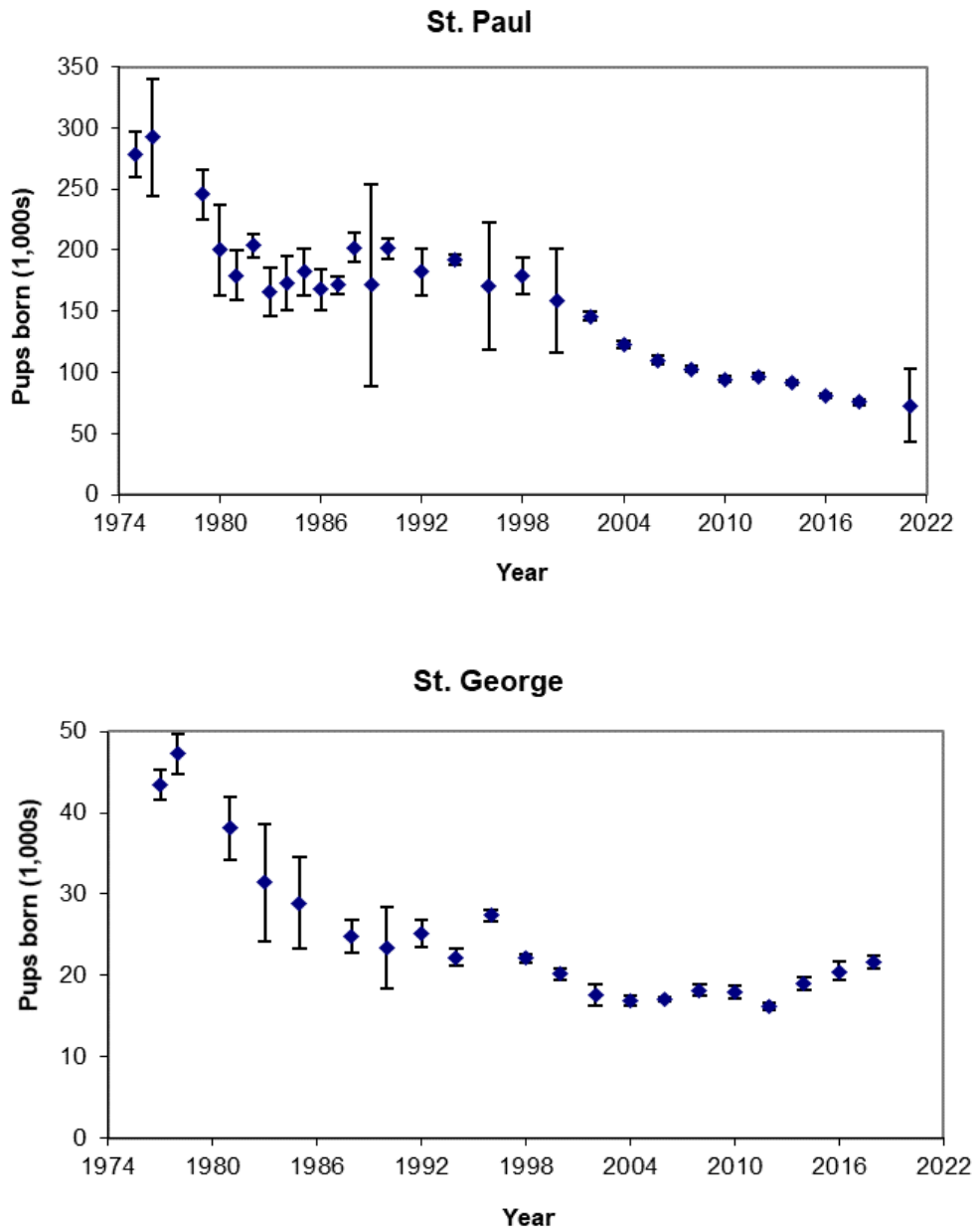


Figure 1. Estimated number of northern fur seal pups born on the Pribilof Islands 1975-2021. Error bars are approximate 95% confidence intervals. St. Paul Island estimates do not include pups born on Sea Lion Rock. No pup production estimate was obtained on St. George Island in 2021.

Table 2. Number of adult male northern fur seals counted, by rookery, Pribilof Islands, Alaska, July 2021.

Rookery	Date (July)	Class of adult male*			Total
		2	3	5	
<u>St. Paul Island</u>					
Lukanin	10	39	126	73	238
Kitovi	10	36	144	84	264
Reef	13	98	405	296	799
Gorbatch	13	78	245	203	526
Ardiguen	13	5	37	6	48
Morjovi	14	78	326	176	580
Vostochni	14	119	664	263	1,046
Polovina	15	24	91	164	279
Little Polovina	15	0	1	56	57
Polovina Cliffs	15	37	283	31	351
Tolstoi	12	70	201	94	365
Zapadni Reef	11	48	125	44	217
Little Zapadni	11	77	165	84	326
Zapadni	11	88	302	220	610
Island total		797	3,115	1,794	5,706
<u>St. George Island</u>					
South	18	39	185	50	274
North	19	75	334	112	521
East Reef	17	35	201	73	309
East Cliffs	17	48	259	102	409
Staraya Artil	19	16	66	19	101
Zapadni	18	30	119	55	204
Island total		243	1,164	411	1,818

* Adult males are assumed to be equal to or greater than 7 years of age. Class 2 – territorial without females; Class 3 – territorial with females; Class 5 – hauling ground males.

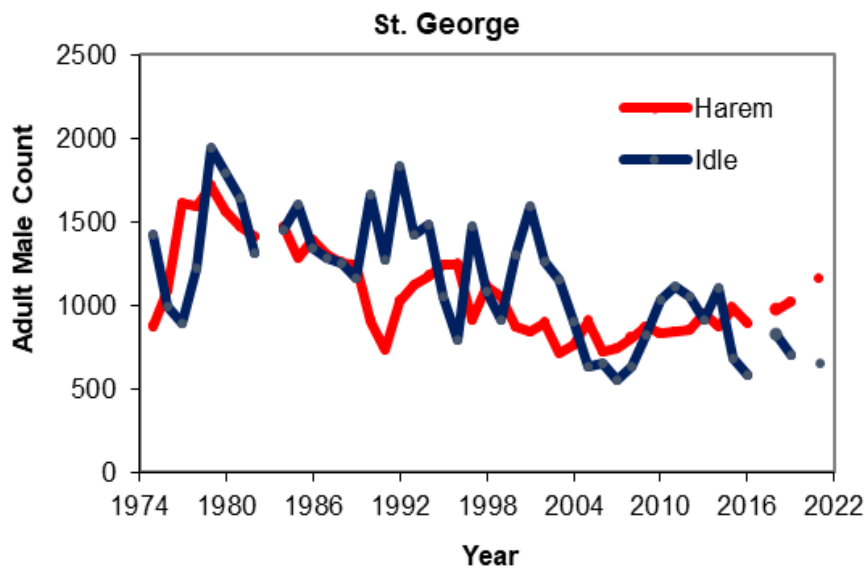
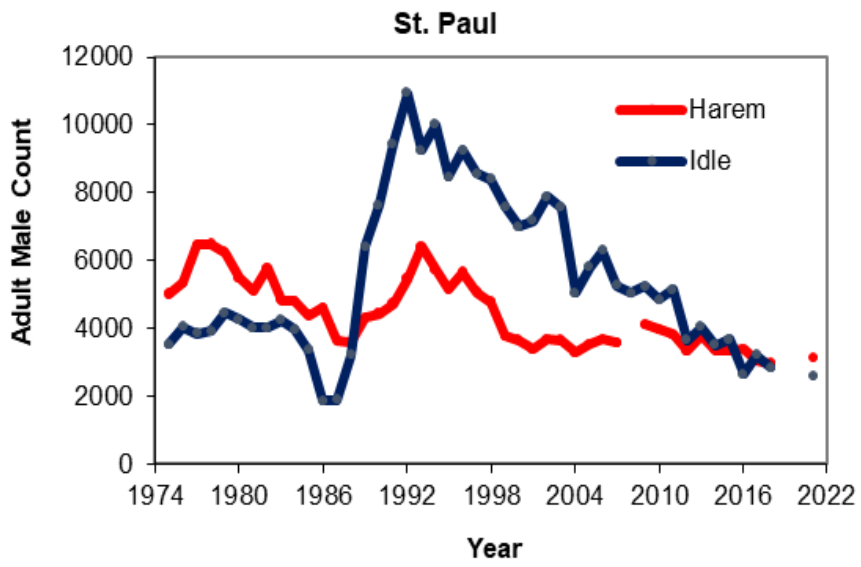


Figure 2. Northern fur seal adult males (harem, class 3 – red line; idle, classes 2 and 5 – blue line) counted on the Pribilof Islands 1975-2021.