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MEMORANDUM FOR: The Record

FROM: Rod Towell, Rolf Ream, and Michael Williams

SUBJECT: 2022 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 the Pribilof Islands during August 2022. We estimated 66,774 (SE = 1,038) pups were born on St. Paul Island and 26,481 (SE = 266) pups were born on St. George Island (Table 1). To minimize disturbance, dead pup counts were conducted at 4 sample rookeries on St. Paul Island and 3 sample rookeries on St. George Island. Since 2006 this dead pup counting procedure resulted in a ratio estimation protocol for the calculation of the estimate of the total number of pups born. The observed pup mortality rates were 4.0% on St. Paul Island and 2.1% on St. George Island. Pup production was not estimated on Sea Lion Rock, a small island approximately 500 m from St. Paul Island in 2022. The 2022 pup production estimate for St. Paul Island is 8.3% less than the estimate in 2021 and 11.8% less than the estimate in 2018 (Figure 1). The 2022 pup production estimate for St. George Island is 22.5% greater than the estimate in 2018. Overall pup production for the Pribilof Islands decreased approximately 4.2% from 2018 to 2022. Since 1998 pup production on St. Paul Island declined 62.7%, or at an annual rate of 3.95% (SE = 0.28), while pup production on the Pribilof Islands (St. Paul and St. George Islands combined) declined 53.7%, or at an annual rate of 3.2% (SE = 0.29). Pup production on St. George shows no significant trend in production since 1998. However, since reaching a low in 2012, pup production on St. George has increased at an annual rate of 4.7% (SE = 0.52). As in 2021, all rookeries of St. Paul Island, including Sea Lion Rock, were flown with a small UAS system. All St. George island rookeries were flown during 2022. We are in the process of determining the efficacy of using the UAS survey data for estimating pup production.

Adult male northern fur seals on St. George Islands were counted over the period July 10 to 15, 2022 (Table 2). Counts of territorial males with females (class 3; "harem" males) on St. George Island decreased by 10.6% compared to 2021. Idle males (classes 2 and 5,) on St. George Island increased in comparison to 2021 by 6.4%. Due to a Covid-19 incident, no adult male counts were performed on St. Paul Island in 2022.

Table 1. Numbers of northern fur seal, *Callorhinus ursinus*, pups born on the Pribilof Islands, Alaska in 2022 by rookery. Estimates are shown for the numbers alive at the time of shearing and the estimated total number of pups born.

Rookery	Live	Born ¹
<u>St. Paul Island</u>		
Lukanin	2,158	2,248
Kitovi	2,284	2,380
Reef	8,522	8,879
Gorbatch	5,159	5,375
Ardiguen	660	688
Morjovi	7,528	7,843
Vostochni	11,958	12,458
Polovina	2,496	2,600
Little Polovina ²	--	--
Polovina Cliffs	5,728	5,968
Tolstoi	5,196	5,413
Zapadni Reef	2,434	2,536
Little Zapadni	3,956	4,122
Zapadni	6,012	6,264
Total	64,091	66,774
<u>St. George Island</u>		
South	4,161	4,250
North	7,473	7,633
East Reef	3,800	3,882
East Cliffs	6,244	6,378
Staraya Artil	986	1,007
Zapadni	3,261	3,331
Total	25,925	26,481

¹ The number of pups born is calculated for each rookery using the live pup estimates and a ratio estimator for mortality and the total pups born estimates.

² Rookery is currently considered extinct, was not observed in 2022 to confirm.

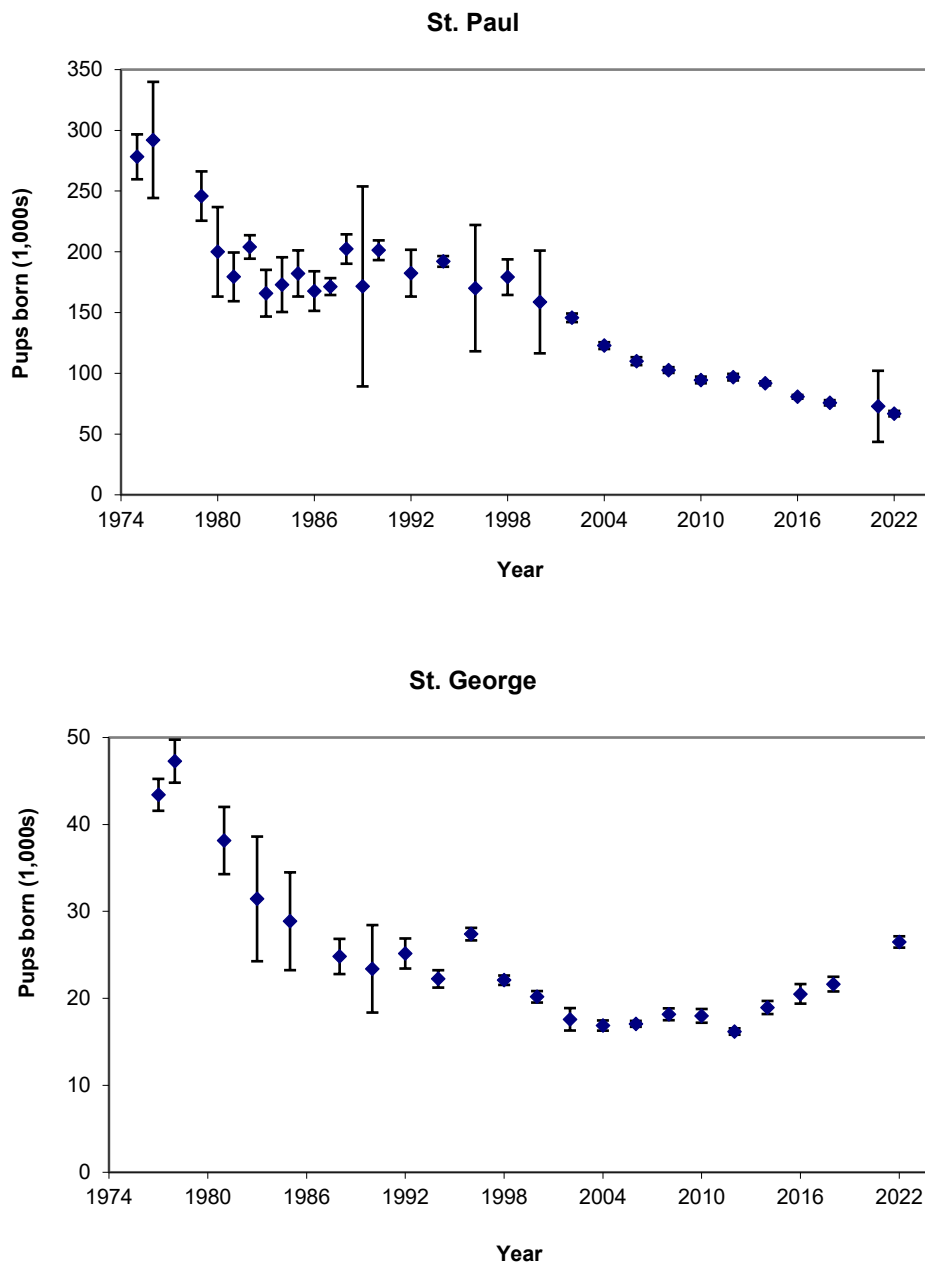


Figure 1. Estimated number of northern fur seal pups born on the Pribilof Islands 1975-2022. Error bars are approximate 95% confidence intervals. Note that St. Paul Island estimates do not include pups born on Sea Lion Rock. Large error bars are indicative of years in which not all rookeries were sheared and the estimate was produced from a sample of rookeries, i.e. 2021 St. Paul.

Table 2. Number of adult male northern fur seals counted, by rookery, St. George Island, Alaska, July 2022.

Rookery	Date (July)	Class of adult male*			Total
		2	3	5	
<u>St. George Island</u>					
South	12	26	163	67	256
North	14	83	333	187	603
East Reef	10	69	128	119	316
East Cliffs	10	87	266	147	500
Staraya Artil	13	16	49	45	110
Zapadni	15	37	102	86	225
Island total		318	1,041	651	2,010

* 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.

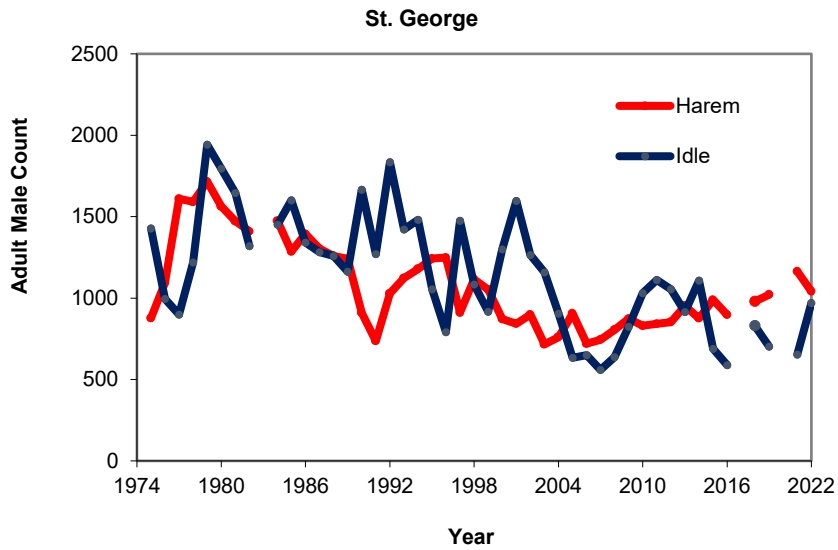
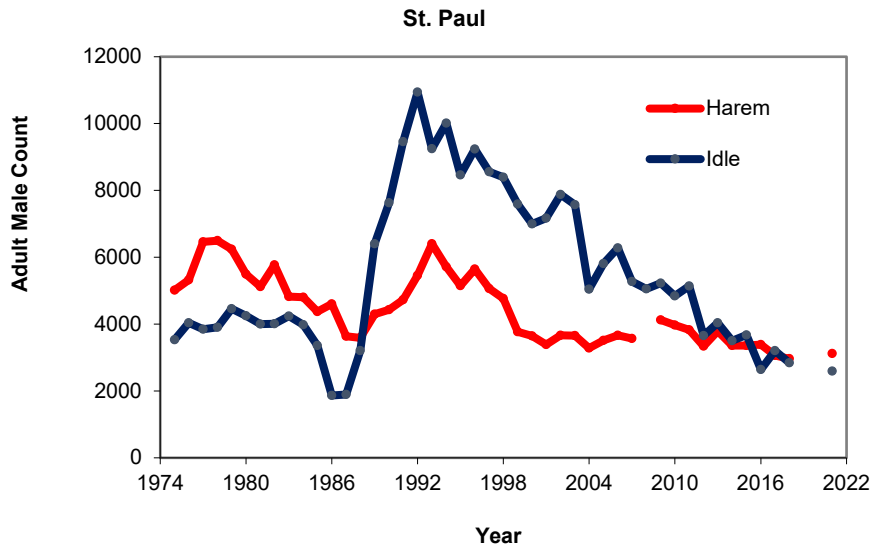


Figure 2. Northern fur seal adult males (harem, class 3 – red line; idle, classes 2 and 5 – blue line) counted on the Pribilof Islands 1975-2022.