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MEMORANDUM FOR: The Record

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

SUBJECT: 2018 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 2018. We estimated 75,719 (SE = 1,008) pups were born on St. Paul Island and 21,625 (SE = 345) 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 3.0% on St. Paul Island and 1.6% on St. George Island. Pup production was not estimated on Sea Lion Rock, a small island approximately 500 m from St. Paul Island in 2018. The 2018 pup production estimate for St. Paul Island is 6.1% less than the estimate in 2016 (Figure 1). The 2018 pup production estimate for St. George Island is 5.5% greater than the estimate in 2016. Overall pup production for the Pribilof Islands decreased approximately 3.7% from 2016 to 2018. Since 1998 pup production on St. Paul Island declined 57.7%, or at an annual rate of 4.04% (SE = 0.34), while pup production on the Pribilof Islands (St. Paul and St. George Islands combined) declined 51.6%, or at an annual rate of 3.4% (SE = 0.36). Pup production on St. George shows no significant trend in production since 1998 but the last three estimates have all shown an increase in pup production.

Adult male northern fur seals on St. Paul and St. George Islands were counted over the period July 8 to 14, 2018 (Table 2). Counts of territorial males with females (class 3; "harem" males) on St. George Island increased by 9.0% compared to 2016; no data were available for St. George in 2017. Idle males (classes 2 and 5,) on St. George Island increased in comparison to 2016 by 41.0%. On St. Paul Island the "harem" males decreased by 3.2% and the idle males decreased by 11.5% compared to 2017 (Figure 2). Overall, the total number of all classes of adult males counted on the Pribilof Islands in 2018 increased by 1.2% from 2016 to 7,608. The total number of "harem" males counted in 2018 decreased by 8.0% compared to 2016 on the Pribilof Islands. Due to weather, personnel did not make it to St. George Island in 2017 for the adult male counts.

Table 1. Numbers of northern fur seal, *Callorhinus ursinus*, pups born on the Pribilof Islands, Alaska in 2018 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	2,376	2,449
Kitovi	3,380	3,484
Reef	9,402	9,690
Gorbatch	6,778	6,986
Ardiguen	558	575
Morjovi	7,788	8,027
Vostochni	13,464	13,877
Polovina	2,562	2,641
Little Polovina ²		
Polovina Cliffs	6,160	6,349
Tolstoi	6,398	6,594
Zapadni Reef	2,629	2,710
Little Zapadni	4,788	4,935
Zapadni	7,182	7,402
Total	73,465	75,719
<u>St. George Island</u>		
South	3,754	3,815
North	6,576	6,683
East Reef	2,910	2,958
East Cliffs	4,497	4,570
Staraya Artil	907	922
Zapadni	2,634	2,677
Total	21,278	21,625

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 One harem male controlling one female was counted on Little Polovina in 2018, in a transitory area.

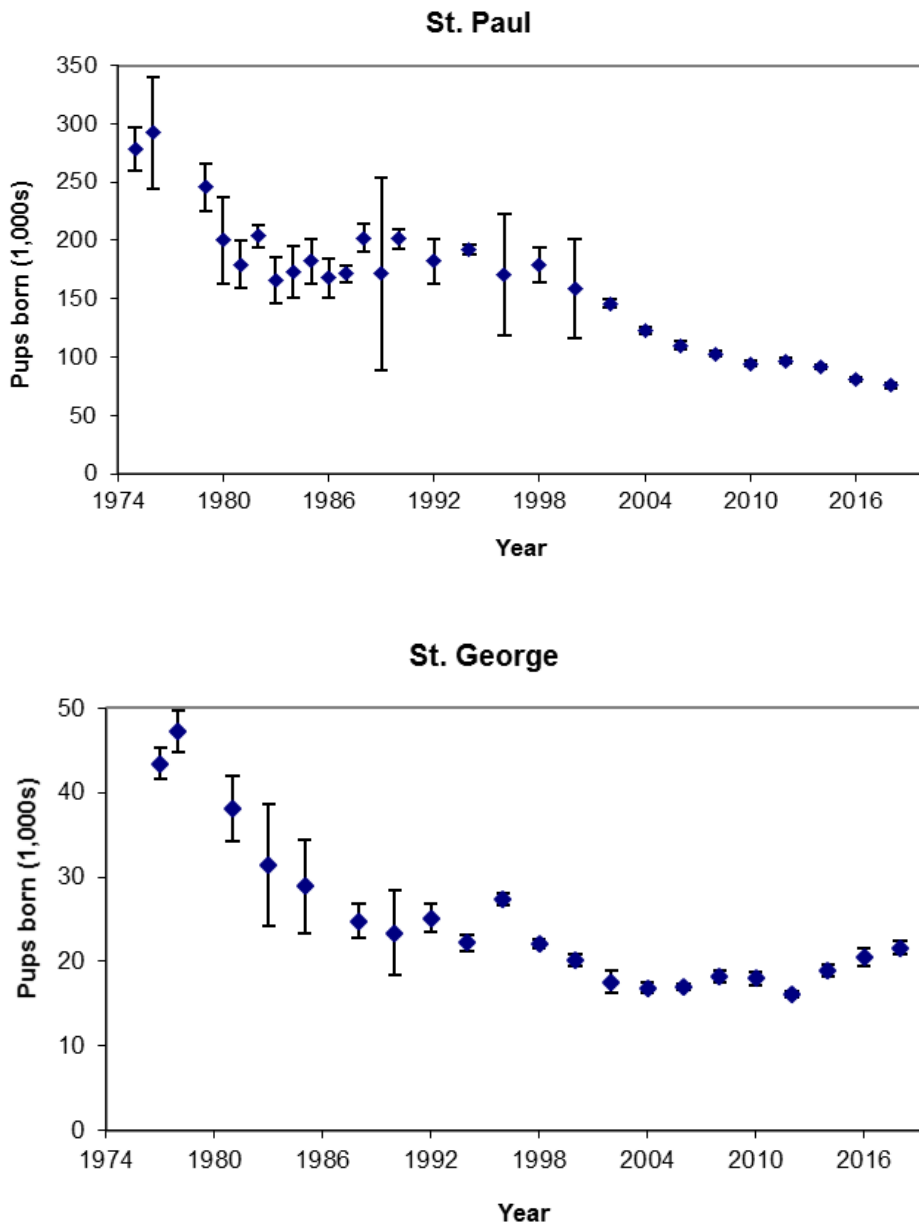


Figure 1. Estimated number of northern fur seal pups born on the Pribilof Islands 1975-2018. Error bars are approximate 95% confidence intervals. Note that St. Paul Island estimates do not include pups born on Sea Lion Rock.

Table 2. Number of adult male northern fur seals counted, by rookery, Pribilof Islands, Alaska, July 2018.

Rookery	Date (July)	Class of adult male*			Total
		2	3	5	
<u>St. Paul Island</u>					
Lukanin	8	28	76	78	182
Kitovi	8	64	109	118	291
Reef	11	100	359	237	696
Gorbach **	11	93	243	178	514
Ardiguen	11	5	43	6	54
Morjovi	12	76	292	181	549
Vostochni	13	128	641	261	1,030
Polovina	10	29	83	167	279
Little Polovina	10	0	1	91	92
Polovina Cliffs	10	81	227	28	336
Tolstoi	9	90	225	156	471
Zapadni Reef	14	32	125	111	268
Little Zapadni	14	62	193	94	349
Zapadni	14	90	345	254	689
Island total		878	2,962	1,960	5,800
<u>St. George Island</u>					
South	11	34	174	53	261
North	13	67	266	189	522
East Reef	14	37	123	106	266
East Cliffs	14	52	272	147	471
Staraya Artil	13	8	50	41	99
Zapadni	14	29	94	66	189
Island total		227	979	602	1,808

* 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.

** Zoltoi Sands haulout (adjacent to the rookery) was counted on a different day than the rookery area.

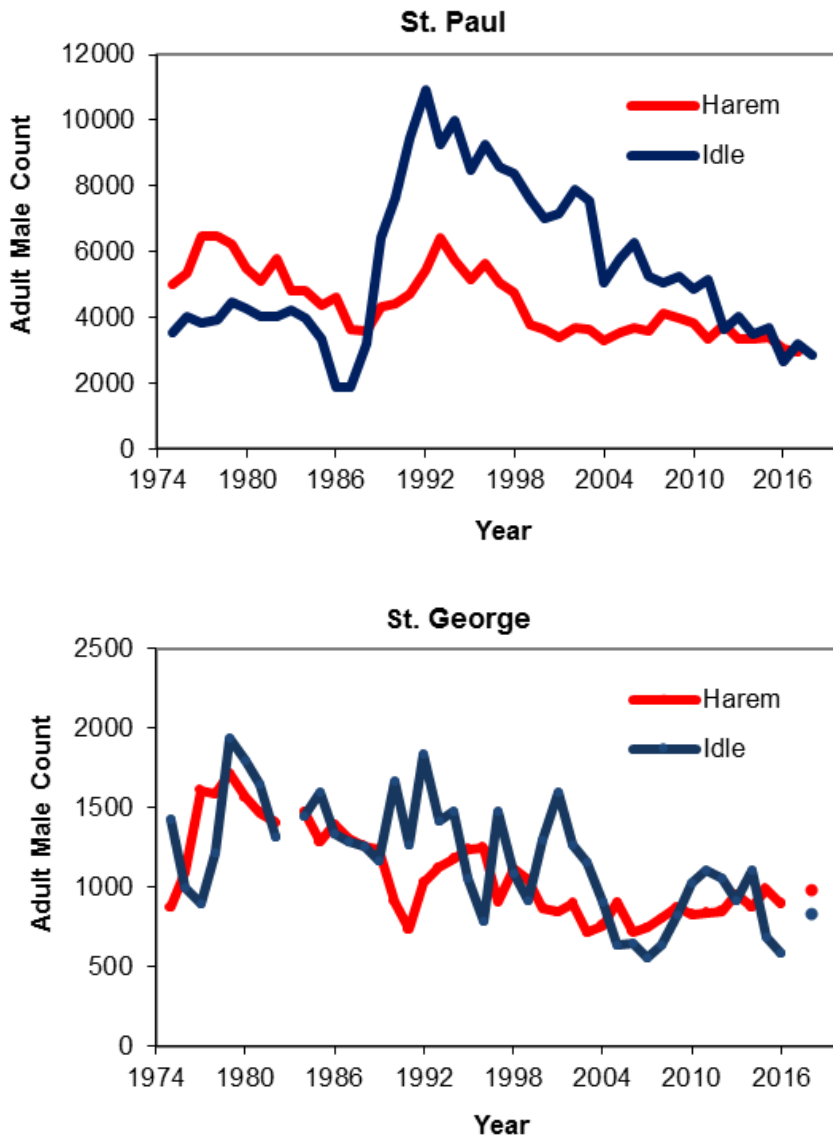


Figure 2. Northern fur seal adult males (harem, class 3 – red line; idle, classes 2 and 5 – blue line) counted on the Pribilof Islands 1975-2018. 2018 St. George Island data is represented by points since no counts were conducted on St. George in 2017.