

Alaska Fisheries Science Center
Marine Mammal Laboratory
7600 Sand Point Way NE, Bin C15700
Seattle, Washington 98115-0070

(206) 526-4313

FAX: 526-6615

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MEMORANDUM FOR: The Record

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

SUBJECT: 2016 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 2016. We estimated 80,641 (SE = 717) pups were born on St. Paul Island and 20,490 (SE = 460) 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 2.7% on St. Paul Island and 1.1% on St. George Island. Pup production was not estimated on Sea Lion Rock, a small island approximately 500 m from St. Paul Island in 2016. The 2016 pup production estimate for St. Paul Island is 12.1% less than the estimate in 2014 (Figure 1). The 2016 pup production estimate for St. George Island is 8.2% greater than the estimate in 2014. Overall pup production for the Pribilof Islands decreased approximately 8.6% from 2014 to 2016. Since 1998 pup production on St. Paul Island declined 55.0%, or at an annual rate of 4.12% (SE = 0.40), while pup production on the Pribilof Islands (St. Paul and St. George Islands combined) declined 49.7%, or at an annual rate of 3.5% (SE = 0.40). Estimated pup production on St. Paul has not been this low since before 1915 at which time the population was recovering from pelagic sealing at approximately 8% annually.

Adult male northern fur seals on St. Paul and St. George Islands were counted over the period July 10 to 19, 2016 (Table 2). Counts of territorial males with females (class 3; "harem" males) on St. George Island decreased by 9.2% compared to 2015. Idle males (classes 2 and 5,) on St. George Island decreased in comparison to 2015 by 14.5%. On St. Paul Island the "harem" males increased by less than 1.0% and the idle males decreased by 28.1% (Figure 2). Overall, the total number of adult males counted on the Pribilof Islands in 2016 decreased by 13.7% from 2015 to 7,515. The total number of "harem" males decreased by 1.4% on the Pribilof Islands.

Table 1. Numbers of northern fur seal, *Callorhinus ursinus*, pups born on the Pribilof Islands, Alaska in 2016 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	2,490	2,559
Kitovi	3,535	3,633
Reef	10,284	10,570
Gorbatch	7,079	7,276
Ardiguen	623	640
Morjovi	7,694	7,908
Vostochni	13,908	14,295
Polovina	3,145	3,232
Little Polovina ²		
Polovina Cliffs	6,487	6,667
Tolstoi	7,181	7,381
Zapadni Reef	3,164	3,252
Little Zapadni	5,280	5,427
Zapadni	7,590	7,801
Total	78,460	80,641
<u>St. George Island</u>		
South	3,848	3,891
North	6,205	6,275
East Reef	2,991	3,025
East Cliffs	4,573	4,625
Staraya Artil	783	792
Zapadni	1,861	1,882
Total	20,261	20,490

¹ 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 No harem males were counted on Little Polovina in 2016.

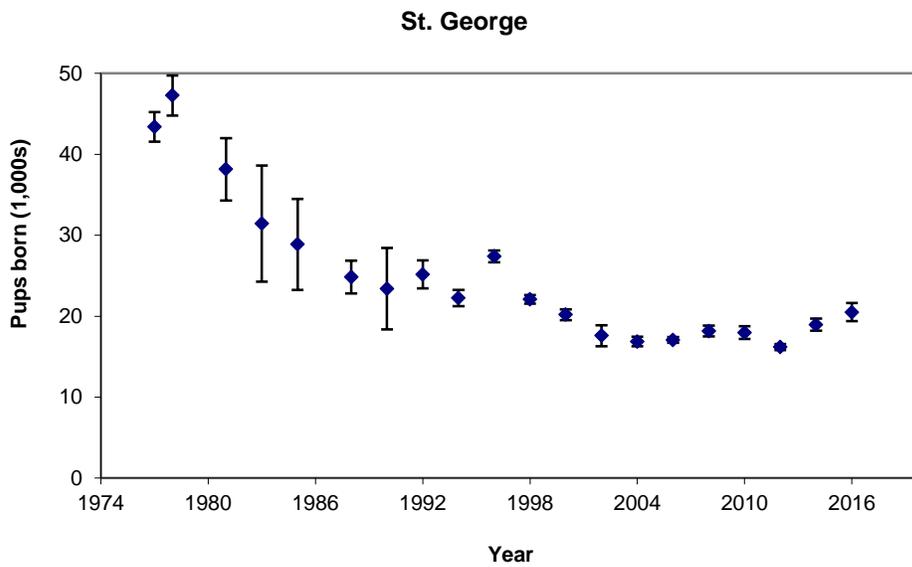
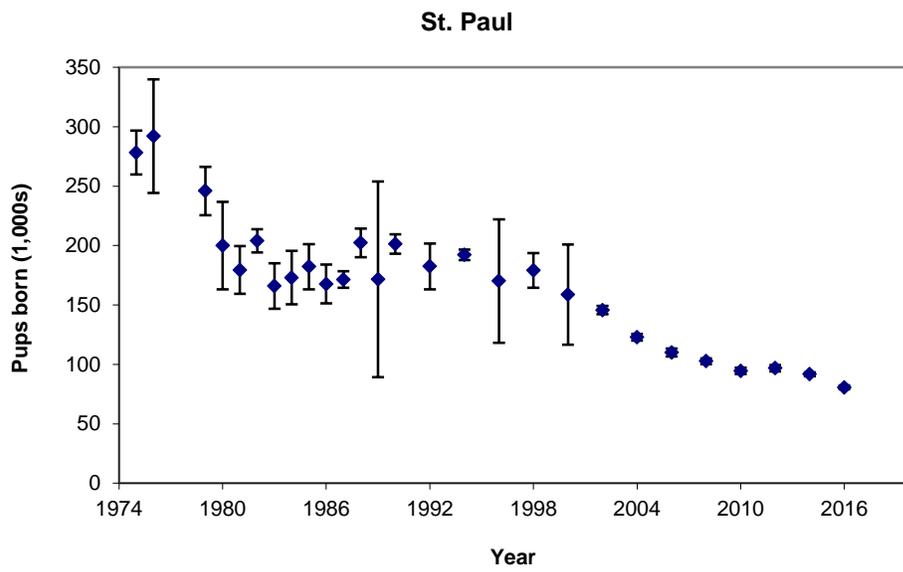


Figure 1. Estimated number of northern fur seal pups born on the Pribilof Islands 1975-2014. Error bars are approximate 95% confidence intervals. Note that St. Paul Island estimates do not include pups born on Sea Lion Rock.

Table 2. Number of adult male northern fur seals counted, by rookery, Pribilof Islands, Alaska, July 2014.

Rookery	Date (July)	Class of adult male*			Total
		2	3	5	
<u>St. Paul Island</u>					
Lukanin	12	26	105	47	178
Kitovi	12/19	48	136	95	279
Reef	18	126	464	212	802
Gorbatch **	18	65	299	213	577
Ardiguen	18	4	30	7	41
Morjovi	16	75	292	194	561
Vostochni	16	96	649	193	938
Polovina	14	27	100	150	277
Little Polovina	14	0	0	83	83
Polovina Cliffs	14	57	236	26	319
Tolstoi	19	78	321	128	527
Zapadni Reef **	10/19	49	143	122	314
Little Zapadni **	17	66	242	121	429
Zapadni	17/19	93	369	242	704
Island total		810	3,386	1,833	6,029
<u>St. George Island</u>					
South	11	61	158	37	256
North	10	73	254	121	448
East Reef	12	33	110	23	166
East Cliffs	12	54	250	77	381
Staraya Artil	10	19	35	22	76
Zapadni	12	22	91	46	159
Island total		262	898	326	1,486

* 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.

** Haulouts adjacent to the rookery were counted on a different day than the rookery area.

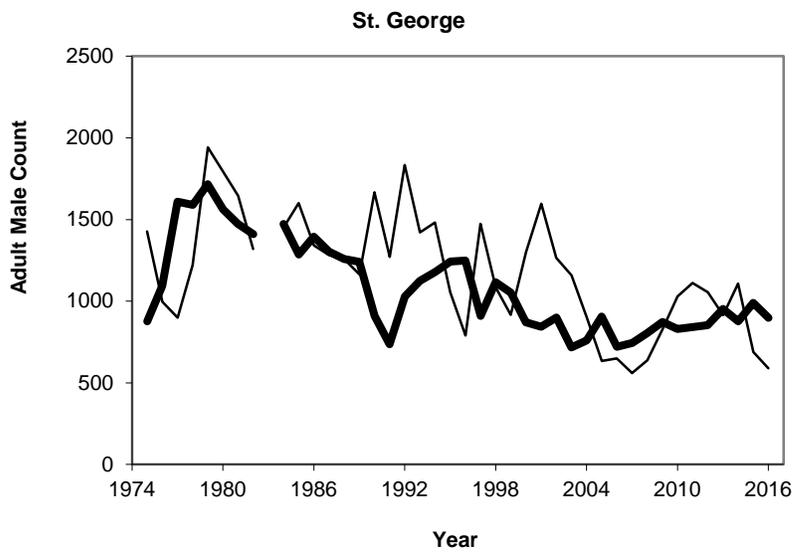
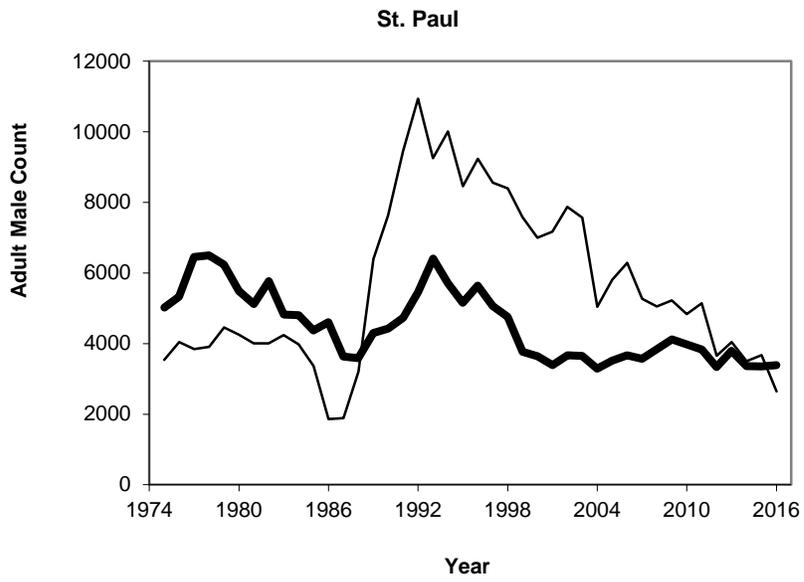


Figure 2. Northern fur seal adult males (harem, class 3 – thick line; idle, classes 2 and 5 – thin) counted on the Pribilof Islands 1975-2016.