

MARINE BIRD SURVEYS AT BOGOSLOF ISLAND, ALASKA, IN 2005



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Bogoslof Island is an important breeding site for seabirds and marine mammals in the southeastern Bering Sea. It was designated as a National Wildlife Refuge in 1909 (administered by the U.S. Fish and Wildlife Service) and as a National Natural Landmark in 1967 (administered by the National Park Service). The National Marine Fisheries Service has primary responsibility for Steller sea lions and Northern fur seals, the two main species of marine mammals using the island. Furthermore, Bogoslof has been a site for ecological research and geological study. As a result of the multi-agency interests in the area, periodic surveys of the status of wildlife at Bogoslof have been conducted (e.g., Byrd et al. 1980, Loughlin and Miller 1989, Byrd and Williams 1993, Byrd and Williams 1994, Byrd and Williams 1997, Ream et al. 2000, Robson 1999, Byrd and Williams 1999, Byrd et al. 2001, Byrd and Williams 2004). Typically visits to Bogoslof have been of only 1 or 2 days duration, because ship support is needed and there has seldom been adequate funding to remain in the area longer. Nevertheless, these short surveys provide a basis for assessing change in some of the primary species breeding on the island.

In mid-July 2005 refuge biologists conducted surveys of cormorants, kittiwakes, and murre. This report summarizes the results as well as historical results from tufted puffin transects, which were not surveyed this year. The information provides a comparison with earlier years and with other sites in the Bering Sea and is the basis for partially assessing the status of the National Natural Landmark as well.

METHODS

On July 12-13, 2005, the authors assisted by Martin Renner, Judy Alderson and Ron Keefer conducted a boat and shore-based census of ledge-nesting seabirds on previously established plots on Bogoslof. Habitat for ledge-nesting seabirds was divided into recognizable geographic segments in 1973 during initial surveys of seabirds, and these same designations were used for subsequent comparison (Fig. 1). Some of the areas may be viewed from land, but others must be viewed from the water. We used binoculars and tally counters to record the number of cormorants, kittiwakes, and murre on each of the segments.

In addition, we gathered information on productivity of kittiwakes by viewing the contents of a sample of nests to determine breeding status. Contents of nests provide a basis to calculate a productivity index (chick or eggs present per nest start) which we use for comparisons among years.

Fire Island

New Mountain (1992)

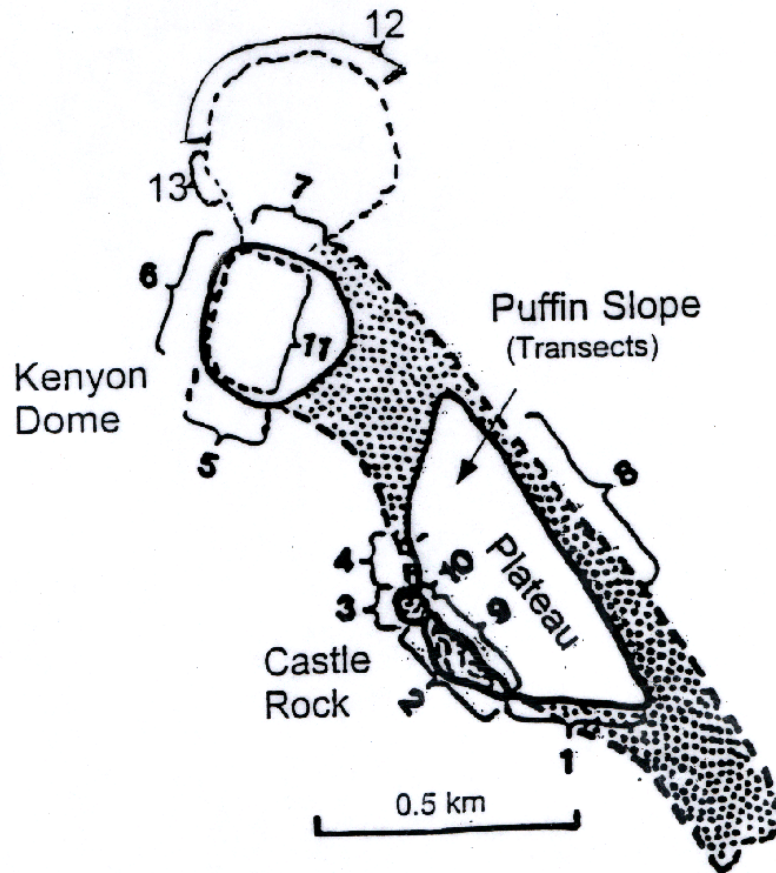


Figure 1. Map of Bogoslof and Fire Islands showing place names and segments for counting ledge-nesting seabirds (modified from Byrd et al. 1980). Stippling indicates beach.

RESULTS AND DISCUSSION

Ledgenester Populations

We had perfect weather for counting birds from land. However, counts from the sea were difficult and highly variable because of high densities of birds (particularly murre) and a slight swell (Table 1). We identified kittiwakes to species when possible, but combine them here for comparison with previous years. Counts of seabirds have varied dramatically in the four years for which we have complete island censuses (Table 2). Because of the active geology on the island, comparing specific count segments across decades has been problematic.

Table 1. Counts of ledge-nesting seabirds at Bogoslof and Fire Islands, 12 July 2005.

Section	Murres	Kittiwakes	Nests	RFCO	Nests	Comments
1	1105	65	25	1	1	
2	1834	321		0	0	317 BLKI, 4 RLKI
3	4705	3650	1810	20	17	
4	1328	93	51	0	0	all BLKI
5	2375	1805	885	9	7	
6	1185	2580	585	15	10	
7	1335	2019	847	5	4	included \geq 54 RLKI & 32 nests
8	1220					
10	6936					
11	150					
12	3627	2295		7	3	
13	4419	1134	160	26	15	included >29 RLKI & 12 nests
Bogoslof total	30219	13962	4363	83	57	
Fire	3166	1448	254	24	13	comprised: 1384 BLKI (214 nests) & 64 RLKI (40 nests)
Grand total	33385	15410	4617	107	70	additionally 9 PECO (0 nests)

Table 2. Counts of ledge-nesting seabirds at Bogoslof and Fire Islands, 1973-2005.

Species	Location	1973	1994	2000	2005
Murre	Bogoslof	42223	26406	35897	30219
	Fire	39300	10891	13358	3166
	Water				5000
	Total	81523	37297	49255	38385
Kittiwakes (nests)	Bogoslof	(830)	9314 (4764)	6591 (4721)	13962
	Fire	(1150)	1290 (773)	1891 (1024)	1448
	Total	(1980)	10604 (5537)	8482 (5745)	15410
RFCO	Bogoslof	>123 ^a	41	80	83
	Fire	> 20 ^a	0	0	24
	Total	>143 ^a		80	107
PECO	Bogoslof	>72 ^a	20	31	1
	Fire	0	0	0	8
	Total	0	20	31	9
GWGU	Bogoslof	1698	872	776	1600

^a Numbers refer to nests counted in 1973 so at least this many birds likely were present.

Cormorant Productivity

All but one of the red-faced cormorant nests we observed at the time of our survey were still active (Table 3). From ground level it was difficult to determine exactly how many chicks were present in nests, but 1 nest had at least one chick. We observed no pelagic cormorant nests on Bogoslof or Fire Islands in 2005, although we did see 9 adult birds.

Table 3. Red-faced cormorant productivity at Bogoslof Island in 2005.

Status	No. of nests
Empty	10
Present*	162
1 chick	10
1+chick	2
2 chicks	0
2+chicks	1
3 chicks	2
Total	177

Kittiwake Productivity

Productivity of red- and black-legged kittiwakes in 2005 was one of the highest levels we have recorded since 1991 (Fig. 2, Table 4), although our visit was a little earlier than ideal because most eggs had not hatched. In 2005 we were able to check more than 350 black-legged kittiwake nests. Over 85% were still active at the time of our survey (Table 4). We could not always be sure exactly how many chicks

were in nests so 4% were classified as having at least one chick. Of 38 red-legged kittiwake nests we could observe, 82% were still active (Fig. 2, Table 5). No chicks were observed.

Table 4. Reproductive success of black-legged kittiwakes at Bogoslof Island, July 12-13, 2005.

Status	Segment 6	Segment 7	Segment 13	Total
Empty	15	33	1	49 (14%)
Present*	38	207	23	268 (75%)
1 Egg	3	3		6 (<1%)
2 Eggs	2	1		3 (<1%)
1 chick		1		1 (<1%)
1+chick	1	11	1	13 (4%)
2 chicks		20		20 (6%)
Total	59	274	25	358

*Incubating or brooding, could not see nest contents

Table 5. Reproductive success of red-legged kittiwakes at Bogoslof Island, July 12-13, 2005.

Status	Segment 6	Segment 7	Segment 13	Total
Empty	3	4	0	7 (18%)
Present*	11	15	4	30 (82%)
1 Egg	1			
1 Chick				
Total	15	19	4	38

*Incubating or brooding, could not see nest contents

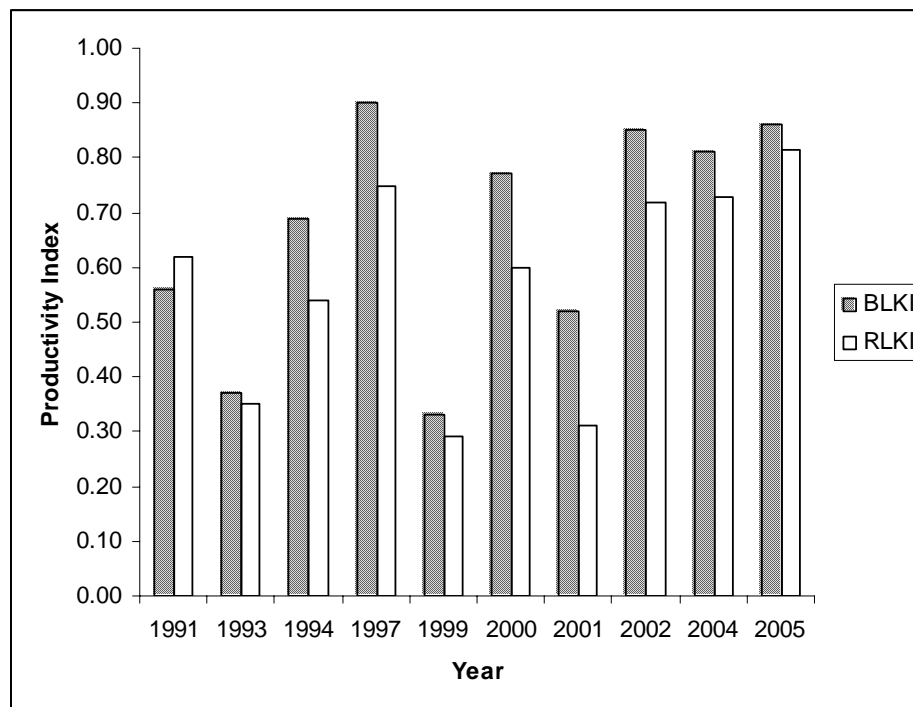


Figure 2. Indices to productivity of kittiwakes at Bogoslof Island (the index is the proportion of nests still active at the time of the survey (usually early to late chick-rearing)).

Tufted Puffin Burrow Density and Occupancy

Although we did not survey tufted puffins in 2005, we present historical data here (copied from Byrd and Williams 2004) so that this report can stand alone as a record of seabird work done on Bogoslof.

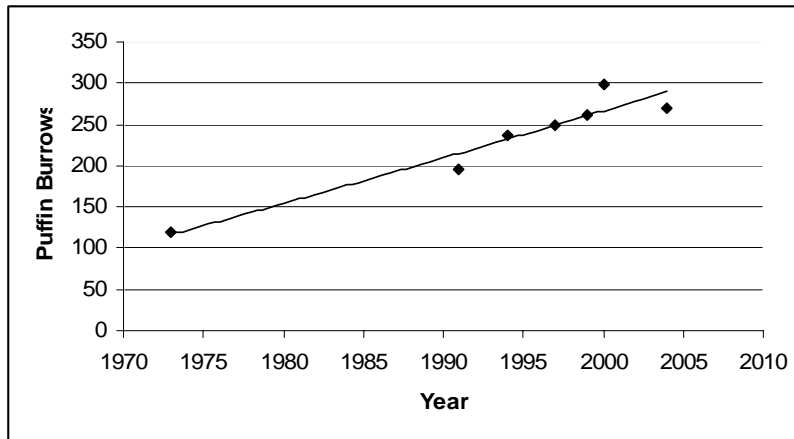


Figure 3. Number of tufted puffin burrows in transects on Puffin Slope, Bogoslof Island.

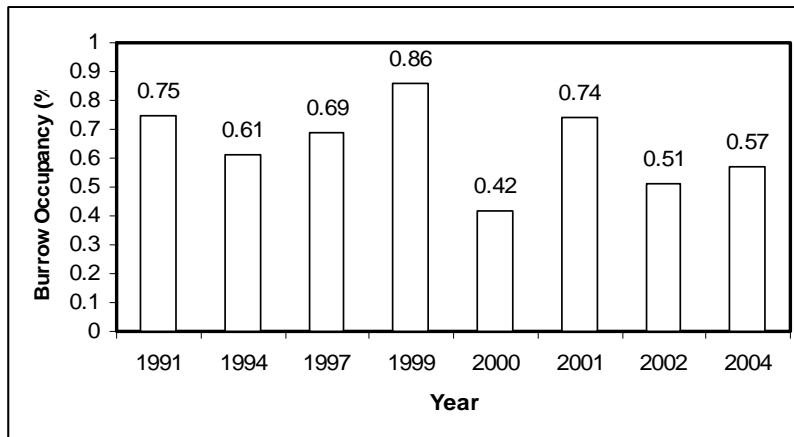


Figure 4. Occupancy rate of tufted puffin burrows at Bogoslof Island (average = 0.64, sd = 0.14, n = 8).

Table 6. Numbers of tufted puffin burrows in strip transects at Bogoslof Island, Alaska, 1973-2004.

Transect	1973	1991	1994	1997	1999	2000	2001	2002	2004
0	23	32	43	42	42	48	--	--	37
1	32	30	30	40	39	48	--	51	57
2	19	42	48	56	62	70	--	72	51
3	34	46	53	60	62	69	--	78	69
4	11	46	62	51	57	64	--	60	55
Total	119	196	236	249	262	299	--	--	269
% Occupied ^a	--	75	61	69	86	42	74 ^b	51	57

^a Droppings, egg fragments, or feathers were found near the burrow entrance.

^b Transects not surveyed but a sample of 294 burrows was checked on Aug. 30.

Glaucous-winged gull

We estimated a total of about 1600 individuals distributed around the island. Many nests were observed on the spit between the plateau and Kenyon's Dome and also on the plateau. Most nests were found near the vegetation edge or clearings and not in dense vegetation. Nearly all eggs had hatched and chicks were abundant.

Parakeet auklet

In contrast to previous visits, we were surprised at the number of parakeet auklets observed in the shallow area between Bogoslof and Fire islands. We estimated there were several hundred individuals foraging near the thick kelp mats. We did not survey in a manner that allowed us to count with any more precision. In the past parakeet auklets have seldom been sighted on land just in low numbers.

Northern fur seals

A special North Pacific Research Board project to investigate the costs associated with foraging for fur seals was conducted in 2005 jointly by NMFS and University of Alaska.

Table 7. Counts of northern fur seal pups at Bogoslof Island, Alaska. Fur seals were counted on land or were estimated from mark-recapture (shear sampling in 1997-2005). Data provided by National Marine Mammal Laboratory, Seattle, WA

Year	No. of pups
1976	0
1979	0
1980	2
1982	3
1983	13
1984	14
1985	9
1988	80
1989	99
1990	183
1991	413
1993	898
1994	1472
1995	1272
1997	5096
2005	12,631

Steller sea lions

Table 8. Counts of adult and sub-adult (non-pup) Steller sea lions at Bogoslof Island, Alaska. Steller sea lion pups were counted on land except for 2005 which was a medium format photographic aerial survey. Steller sea lion non-pups were counted from aerial survey 35 mm photographs or medium format (2004). Data provided by National Marine Mammal Laboratory, Seattle, WA

Date	No. of nonpups	Pups
1973	-	2328
1976	3308	-
1977	2328	-
1978	1000	-
1979	1468	914
1984	1379	-
1985	1287	1109
1989	682	358
1990	713	461
1991	558	501
1992	540	-
1993	-	322
1994	413	-
1996	382	-
1997	-	281
1998	274	220
2000	347	249
2002	356	180
2004	380	278
2005	-	225

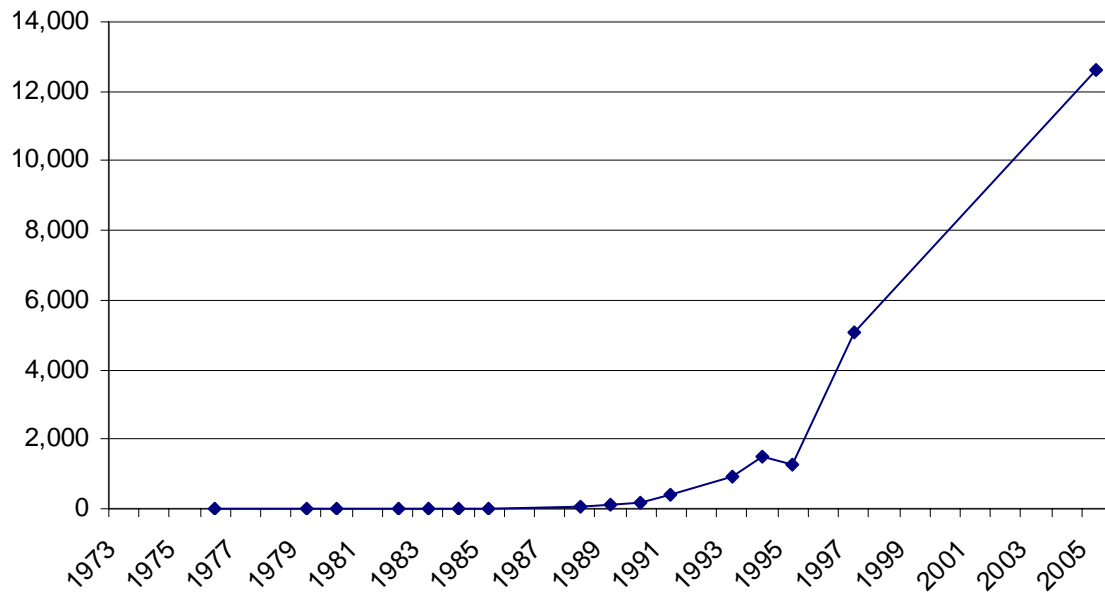


Figure 5. Counts of northern fur seal pups at Bogoslof Island, Alaska. Fur seals were counted on land or were estimated from mark-recapture (shear sampling in 1997-2005). Data provided by National Marine Mammal Laboratory, Seattle, WA

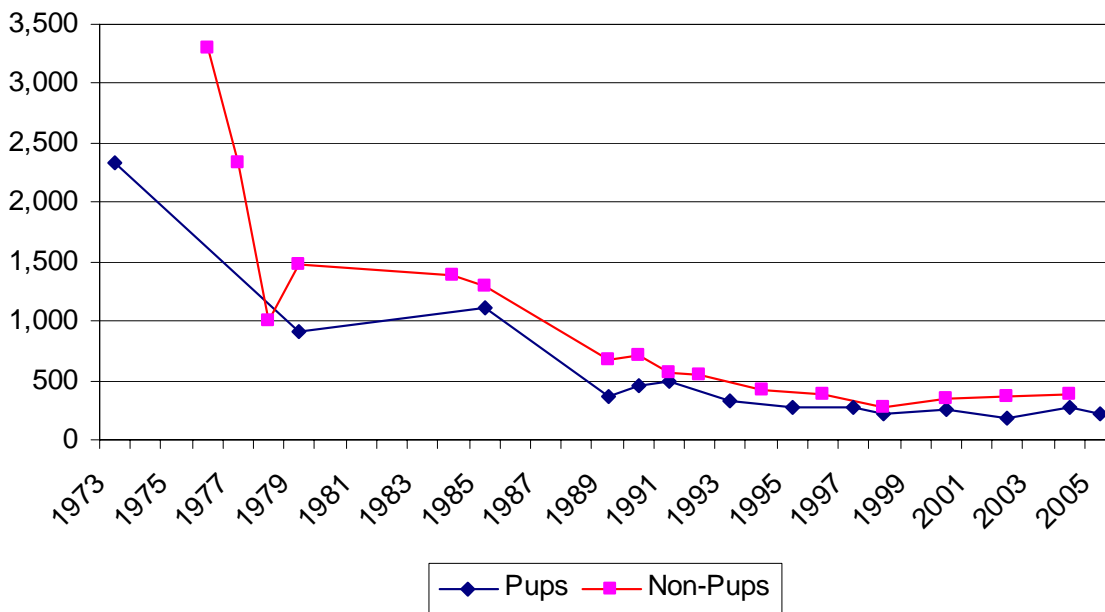


Figure 6. Counts of Steller sea lions (pups and non-pups) at Bogoslof Island, Alaska. Steller sea lion pups were counted on land except for 2005 which was a medium format photographic aerial survey. Steller sea lion non-pups were counted from aerial survey 35 mm photographs or medium format (2004). Data provided by National Marine Mammal Laboratory, Seattle, WA

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Appendix A. Productivity indices for black-legged (BLKI) and red-legged kittiwakes (RLKI) at Bogoslof Island.

Species	Status ^a	1991 ^b	% total	1993	% total	1994	% total	1997	% total	1999	% total	2000	% total	2001	% total	2002	% total	2004	% total	2005	% total	
BLKI	Empty	169	0.44	210	0.63	92	0.32	8	0.10	171	0.67	82	0.23	117	0.48	63	0.15	85	0.19	49	0.14	
	1 e							15								1	<0.01	4	0.01	6	0.02	
	2 e							7								0	0	2	<0.01	3	0.01	
	1e, 1c							13								4	0.01	2	<0.01			
	1c	191	0.50	120	0.36	198	0.67	16	0.20	12	0.05	119	0.33	108	0.44	185	0.43	147	0.32	1	0.00	
	1+ c							6	0.08							45	0.1	84	0.18	11	0.03	
	2 c	21	0.06	3	0.01	4	0.01	15	0.19	2	0.01	158	0.54	19	0.08	96	0.22	99	0.22	20	0.06	
	3 c																		1	<0.01		
	Present										72	0.28					37	0.09	32	0.07	268	0.75
	Total		381		333		294		80		257		359		244		431		456		358	
Index ^c			0.56		0.37		0.69		0.90		0.33		0.77		0.52		0.85		0.81		0.86	
Prod. ^d			0.61		0.38		0.70				0.09		1.21		0.60		1.08		1.04		too early	
RLKI	Empty	30	0.38	47	0.65	23	0.46	2	0.25	20	0.71	72	0.4	33	0.69	14	0.28	14	0.27	7	0.18	
	1 e							1								0	0	1	0.02	1	0.03	
	1 c	48	0.62	25	0.35	27	0.54	5	0.75	2	0.08	106	0.6	15	0.31	10	0.2	19	0.37			
	Present									6	0.21					26	0.52	18	0.35	30	0.79	
	Total		78		72		50		8		28		178		48		50		52		38	
	Index ^c			0.62		0.35		0.54		0.75		0.29		0.6		0.31		0.72		0.73		0.82
Prod. ^d			0.62		0.35		0.54		0.75		0.09		0.6		0.31		0.42		0.59		too early	

^aStatus of nests during our checks: e = egg, c = chick, present = bird incubating or brooding on nest and contents could not be determined

^bDates of data collection: 21 Aug. 1991 (J.C. Williams); 9 Aug. 1993 (G.V. Byrd); 5 Aug. 1994 (Byrd & Williams 1994); 14 July 1997 (Byrd & Williams 1997); 1 Aug. 1999 (Byrd & Williams 1999); full season, 2000 (Byrd et al. 2001); 31 Aug. 2001; 18-19 July 2002, 19-20 July 2004, 12-13 July 2005.

^cProportion of nests that still had a chick or an egg when the island was visited each year

^dEstimated chicks per nest (1+chicks were considered 1 chick). Birds "present" were excluded from calculations