

RESULTS OF SEABIRD MONITORING AT ST. PAUL ISLAND, ALASKA IN 2005



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Key words: *Aethia psittacula*, *Aethia pusilla*, Alaska, Bering Sea, black-legged kittiwake, common murre, food habits, least auklet, parakeet auklet, *Phalacrocorax urile*, Pribilof Islands, productivity, red-faced cormorant, red-legged kittiwake, *Rissa brevirostris*, *Rissa tridactyla*, St. Paul Island, thick-billed murre, *Uria aalge*, *Uria lomvia*.

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INTRODUCTION

St. Paul Island is one of the long-term seabird monitoring sites on the Alaska Maritime National Wildlife Refuge (AMNWR). The populations and productivity of selected seabirds at St. Paul have been studied since 1975. The goal of the monitoring program on St. Paul is to detect changes in populations, chronology, reproductive productivity, survival, and food habits of these species. Data from this and other monitoring sites around Alaska provide the information needed to detect long-term trends in marine birds, and help to direct management and research goals throughout the refuge.

The specific goals in 2005 were to 1) estimate hatching chronology for red-legged kittiwakes (*Rissa brevirostris*), black legged kittiwakes (*Rissa tridactyla*), common murres (*Uria aalge*), thick-billed murres (*Uria lomvia*), and red-faced cormorants (*Phalacrocorax urile*); 2) estimate reproductive success indices for the same five species; and 3) band, measure, and collect regurgitations from red-faced cormorant chicks.

METHODS

Three observers were present on St. Paul during the summer of 2005. Sadie Wright was present from 8 May to 5 September, and Debra Dykstra and Denny Wynn were present from 20 May to 29 August.

Red-faced cormorants, black-legged and red-legged kittiwakes, and common and thick-billed murres were monitored for breeding chronology and productivity estimates. Nests were monitored every 3-5 days from pre-laying until fledging. A subset of red-faced cormorant nests at the Tolstoi, Zapadni, and Ridgewall colonies were monitored daily to determine precise incubation periods.

We used an extension ladder to reach red-faced cormorant nests from the beach along a 1 mile stretch of coastline at Tasmana (the low point northeast of High Bluffs). We began banding and measuring chicks when they were 30+ days old from 23 July to 11 August, and opportunistically collected regurgitations during handling. These diet samples will be analyzed later and results presented in a future report.

We conducted population counts from 11 July to 31 July on plots established in 1976 and followed standardized methods (Byrd 1989) to count black-legged kittiwakes, red-legged kittiwakes, thick-billed murres, common murres, and northern fulmars (*Fulmarus glacialis*) for comparison to past years. Tables of population counts are presented in Appendix B.

We collected a few dead seabirds from the beaches of St. Paul, including murres, shearwaters, fulmars, and kittiwakes. We conducted necropsies on a few of the birds, but most were sent to the storage freezers at refuge headquarters in Homer, for further analysis.

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Table 1. Counts of northern fulmars at St. Paul Island, Alaska, 1976-2005. (Not all plots were counted in all years. Therefore, we summarize data in 3 comparable combinations of plots)

Plot	1976	1982	1984	1985	1985	1985	1985	1986	1986	1986	1986	1986	1987	1987	1987	1987	1987	1987	1988	1988	1988	1988	1988
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2sw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2ne	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2	-	-	1	1	0	0	0	0	2	0	1	1	0	2	1	1	0	0	0	0	0	0
5sw	0	0	1	0	0	0	0	0	0	1	0	1	2	0	2	1	0	0	0	0	0	0	0
5ne	0	0	0	0	0	1	0	1	0	2	1	1	0	0	0	1	0	0	0	0	0	0	0
6	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	3	3	1	6	6	12	0	1	3	9	4	6	9	2	3	4	1	2	4	6	2	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	1	1	0	0	2	2	0	0	0	0	0	0	1	0	0
14	2	6	3	8	8	10	4	4	6	7	7	6	9	4	5	2	2	4	13	13	4	6	4
15	4	4	2	6	6	12	3	3	8	18	5	8	16	6	6	1	2	2	12	16	0	13	9
16	1	1	3	2	2	4	2	1	2	3	0	0	1	0	0	0	0	0	0	1	0	0	0
17	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
19 top	2	1	1	2	2	5	4	0	0	0	0	0	4	1	0	1	0	0	0	3	0	3	0
19 btm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20 top	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
20 btm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	7	-	-	14	6	6	4	8	15	7	5	5	20	6	14	3	7	2	18	14	5	8	13
22	3	26	10	10	10	10	10	11	15	23	13	9	24	15	5	1	1	6	20	18	7	7	9
23	17	20	8	14	14	17	7	9	33	30	12	13	23	13	12	5	7	5	16	25	3	7	9
24	0	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	-	-	9	9	18	9	9	16	17	5	20	22	8	9	7	8	9	11	5	3	6	3
29 new	-	-	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	3	7	41	45	45	33	27	21	30	20	12	19	31	22	34	12	21	0	39	34	6	37	10
32	2	1	3	3	3	4	5	5	1	6	3	5	0	1	1	1	1	0	11	8	4	0	1
33	0	-	-	0	0	0	0	8	7	10	4	4	6	5	5	4	7	4	0	0	0	0	0
total 1 ^a	37	60	26	46	46	67	28	29	67	91	42	44	95	44	33	16	13	19	66	81	17	36	31
total 2 ^b	39	67	67	95	95	104	60	55	9	119	57	69	127	67	70	30	36	19	116	123	27	73	42
total 3 ^c	39	67	67	95	95	104	60	63	105	129	61	73	133	72	75	34	43	23	116	123	27	73	42

Table 1. Counts of northern fulmars at St. Paul Island, Alaska, 1976-2005, continued.

Plot	1988	1988	1989	1989	1989	1989	1989	1989	1989	1989	1992	1992	1992	1992	1992	1992	1995	1995	1995	1996	1996	1996	1996
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2sw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2ne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6	8	6
5sw	0	1	0	0	0	0	0	0	0	0	0	1	2	2	7	2	1	6	5	2	12	7	7
5ne	1	0	0	0	0	0	0	0	0	3	-	-	7	4	5	4	2	1	2	0	8	2	6
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	1	0	0	0	0	0	0	3	0	1	0	1	0	1	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	1	6	0	0	7	4	2	2	2	10	12	10	4	0	2	0	2	7	2	4	5	3	4
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	1	1	0	6	5	0	0	0	0	3	0	0
14	8	11	3	3	12	11	10	5	8	10	16	15	16	12	17	15	8	14	17	6	11	5	9
15	0	3	1	1	7	6	2	3	10	6	11	5	3	10	9	2	2	4	0	0	0	1	2
16	0	0	0	0	0	0	1	0	0	0	0	0	2	2	1	0	1	0	0	2	0	0	0
17	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-	-
18	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	0	0	0	0	0	0	0
19 top	1	0	0	0	2	4	4	0	2	1	3	1	1	3	3	2	3	3	3	1	2	2	2
19 btm	-	-	-	-	-	-	-	-	-	-	10	6	2	6	12	2	0	0	0	0	3	0	0
20 top	0	0	1	1	1	2	1	2	0	0	1	2	1	1	1	0	0	0	0	0	0	0	1
20 btm	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0
21	5	9	5	6	19	12	9	9	8	15	-	-	-	-	-	-	-	-	-	-	-	-	-
22	11	21	3	5	26	19	15	14	7	23	6	27	5	0	25	11	1	22	4	7	12	4	1
23	4	14	7	7	16	9	22	9	8	21	15	14	20	10	22	8	0	11	5	21	17	18	14
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	1	1
29	6	10	6	4	19	8	9	4	10	12	-	-	-	-	-	-	2	4	0	-	-	-	-
29 new	-	-	-	-	-	-	-	-	-	-	11	5	9	4	7	1	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	44	39	58	31	67	13	20	7	12	30	64	35	45
31	29	41	53	33	48	31	10	23	37	60	49	71	26	87	84	84	17	28	10	47	97	39	111
32	2	0	6	1	4	2	3	4	5	4	6	10	11	5	3	11	0	1	5	7	3	4	11
33	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
total 1 ^a	26	56	15	17	71	56	56	35	37	74	64	76	63	44	102	51	20	68	39	41	70	42	46
total 2 ^b	57	97	74	51	123	89	69	62	79	138	120	159	100	136	191	146	37	97	54	99	176	94	175
total 3 ^c	57	97	74	52	124	89	69	62	79	138	120	159	100	136	191	146	37	97	54	99	176	94	175

Table 1. Counts of northern fulmars at St. Paul Island, Alaska, 1976-2005, continued.

Plot	1996	1996	1999	1999	1999	1999	1999	1999	2002	2002	2002	2002	2002	2002	2002	2005	2005	2005	2005	2005	2005	2005	2005
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2sw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2ne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	9	7	4	2	4	5	4	6	0	0	0	0	0	1	1	3	1	0	13	21	19	13	
5sw	12	7	10	11	3	4	5	4	1	0	2	1	2	1	9	7	7	0	0	0	1	1	
5ne	2	3	1	3	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	
6	0	0	0	0	0	1	0	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	1	0	1	1	1	
8	0	0	1	0	0	0	0	0	8	2	5	2	2	0	0	2	0	0	0	0	1	0	
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
10	9	3	2	2	0	1	0	23	1	11	3	7	5	6	1	2	1	1	3	2	1	2	
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13	0	2	0	0	0	0	0	0	0	3	2	1	1	3	4	0	0	0	1	1	1	1	
14	15	8	0	0	3	4	5	0	5	13	7	4	12	6	5	8	2	1	4	4	2	5	
15	0	0	0	0	0	0	0	0	0	0	3	1	7	4	0	0	0	0	1	0	0	3	
16	0	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
18	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	0	1	
19 top	2	0	1	0	0	0	0	0	2	2	0	0	2	0	3	2	0	3	5	2	4	4	
19 btm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20 top	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
20 btm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
22	8	8	9	2	12	7	6	14	17	18	20	21	21	22	0	1	1	1	9	11	10	11	
23	20	22	11	8	13	10	7	13	15	18	14	18	32	15	7	12	10	11	15	12	12	9	
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
28	0	0	0	0	2	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
29	-	-	5	1	4	3	3	5	2	3	3	2	5	0	-	-	-	-	-	-	-	-	
29 new	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	2	4	6	2	1	
30	43	21	32	18	13	6	9	9	32	58	31	27	69	39	11	23	21	21	10	17	18	23	
31	48	60	37	39	21	21	24	19	15	54	21	56	118	71	55	15	30	50	26	52	76	27	
32	13	11	7	2	2	3	1	1	4	7	7	6	9	5	1	7	19	12	8	6	14	8	
33	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
total 1 ^a	68	53	36	26	34	29	25	55	49	67	56	55	84	57	29	38	21	19	41	35	34	39	
total 2 ^b	138	131	84	69	63	58	57	82	68	128	84	117	211	134	86	63	71	81	88	114	143	87	
total 3 ^c	138	131	84	69	63	58	57	82	68	129	84	117	211	134	86	63	71	81	88	114	143	87	

^atotal of plots 1, 2sw, 3, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 31, 32, 28, 31, 32.

^btotal of plots 1, 2sw, 3, 4, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 24, 25, 26, 27.

^ctotal of plots 1, 2sw, 3, 4, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 24, 25, 26, 27, 28, 31, 32, 33.

Table 2. Mean counts of northern fulmars at St. Paul Island, Alaska, 1976-2005.

Year	Total 1			Total 2			Total 3		
	Mean	SD	n	Mean	SD	n	Mean	SD	n
1976	37		1	39	-	1	39		1
1982	68		1		-	1			1
1984	70		1	70	-	1			1
1985	88	19.3	4	89	19.5	4	89	19.5	4
1986	79	27.3	5	80	27.9	5	86	29.7	5
1987	57	39.2	6	58	39.4	6	63	39.9	6
1988	76	36.9	7	76	36.9	7	76	39.9	7
1989	86	30.2	8	86	30.2	8	86	30.2	8
1992	141	30.9	6	142	31.6	6	142	31.6	6
1995	63	30.9	3	63	30.9	3	63	30.9	3
1996	129	35.5	6	136	35.4	6	136	35.4	6
1999	64	12.3	6	69	11.8	6	69	11.8	6
2002	124	49.9	6	124	49.9	6	124	50	6
2005	83	19.4	8	92	25.5	8	92	25.5	8

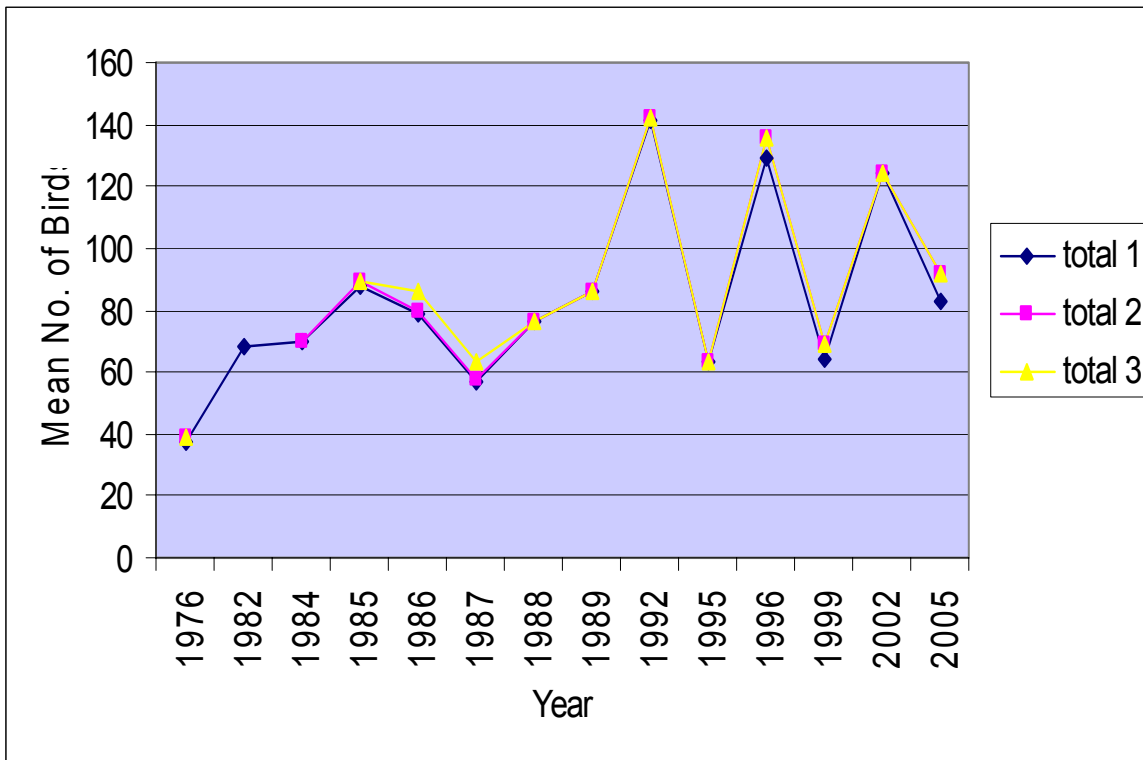


Figure 1. Mean counts of northern fulmars at St. Paul Island, Alaska 1976-2005.

Table 3. Counts of red-faced cormorants at St. Paul Island, Alaska, 1976-2005. (Not all plots were counted in all years. Therefore, we summarize data in 3 comparable combinations of plots).

Plot	1976	1982	1984	1985	1985	1985	1985	1986	1986	1986	1986	1986	1987	1987	1987	1987	1987	1987	1988	1988	1988
1	14	3	1	18	21	24	16		20	16	14	16	17	23	20	17	13	20	11	13	12
2sw	4	17	1	0	0	0	0	0	0	0	1	0	3	4	2	2	1	3	0	0	0
2ne	-	-	-	1	3	1	0	6	7	7	5	5	8	12	6	8	9	9	0	0	0
3	10	1	0	0	0	1	2	4	5	4	4	6	11	16	7	11	17	13	5	1	2
4	1	-	-	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0
5sw	15	13	6	0	3	3	5	0	0	0	0	0	0	4	2	0	2	1	3	0	4
5ne	3	0	0	0	1	2	7	1	0	0	0	0	1	0	5	0	0	0	3	0	0
6	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	2	4	1	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	4	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	4	1	2	6	4	6	4	8	5	5	5	5	5	6	3	5	3	4	9	6	6
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	23	8	15	16	14	14	17	18	16	15	12	14	21	15	21	17	17	18	16	17	16
13	2	0	3	3	3	7	5	2	1	1	1	1	1	1	1	1	1	1	1	1	3
14	3	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	1	0
15	7	0	3	0	1	0	3	0	0	0	0	0	1	2	2	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	6	7	4	4	4	7
17	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	8	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
19 top	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 btm	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20 top	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 btm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	0	-	-	2	4	4	7	4	4	5	4	4	2	0	0	0	0	4	0	0	0
22	1	6	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
23	2	0	0	0	1	3	1	0	2	0	1	0	0	0	0	0	0	0	0	0	0
24	9	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	5	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	2	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	-	-	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0
29 new	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	64	7	1	16	16	12	8	22	20	21	21	18	84	88	76	66	75	64	96	92	96
32	48	0	10	141	136	129	134	53	53	53	52	66	18	24	23	23	23	23	3	6	1
33	11	-	14	0	0	0	0	21	20	25	20	46	1	1	1	1	1	1	2	0	0
total 1 ^a	214	60	47	200	200	201	203	108	122	115	112	126	163	184	162	142	152	148	147	137	140
total 2 ^u	231	-	47	200	200	201	203	109	122	115	112	126	163	186	162	142	152	148	147	137	140
total 3 ^c	242	-	61	200	200	201	203	130	142	140	132	172	164	187	163	143	153	149	149	137	140

Table 3. Counts of red-faced cormorants at St. Paul Island, Alaska, 1976-2005, continued.

Plot	1988	1988	1988	1988	1989	1989	1989	1989	1989	1989	1989	1989	1989	1992	1992	1992	1992	1992	1992	1995	1995	1995	1995	1996
1	14	6	18	8	5	8	8	8	6	5	6	3	4	4	1	1	4	3	3	5	-			
2sw	0	0	0	0	1	2	5	5	2	1	2	3	0	1	0	3	0	0	1	0	-			
2ne	0	0	0	0	0	0	0	0	0	0	0	0	8	6	6	13	6	0	0	0	-			
3	4	7	10	8	0	3	5	4	2	0	1	3	7	5	4	3	3	0	0	0	-			
4	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2	0	-			
5sw	3	3	2	3	1	1	1	2	1	2	1	1	2	2	1	1	2	5	1	6	-			
5ne	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	8	5	1	0	0	-			
6	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-			
7	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	3	0	0	0	-			
8	0	0	0	1	0	0	0	0	0	0	0	0	2	1	0	1	1	0	0	0	-			
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
10	4	5	4	3	1	4	2	3	2	4	4	4	1	1	2	0	2	0	0	0	-			
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	-			
12	13	14	19	14	12	14	8	12	10	2	2	4	11	11	9	6	8	5	5	8	-			
13	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	-			
14	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	-			
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	9	8	8	-			
16	9	8	4	7	2	1	1	3	1	2	3	1	3	2	2	1	1	1	1	1	-			
17	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	0	0	0	-			
18	0	0	0	0	1	1	0	0	2	1	0	0	3	3	4	7	5	0	0	0	-			
19 top	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	-			
19 btm	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	-			
20 top	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-			
20 btm	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	-			
21	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-			
22	0	0	0	0	2	1	1	1	1	1	1	1	2	0	1	1	0	1	2	2	-			
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-			
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-			
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-			
26	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-			
27	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-			
28	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	-			
29	0	0	0	1	0	0	0	0	0	0	0	0	-	-	-	-	-	0	0	1	-			
29 new	-	-	-	-	-	-	-	-	-	-	-	-	0	3	0	2	0	-	-	-	-			
30	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	-			
31	98	99	102	79	98	116	118	97	70	57	80	85	139	121	122	79	110	3	0	3	-			
32	5	6	0	1	0	0	0	0	0	0	0	0	3	0	0	1	3	132	177	122	-			
33	0	0	0	0	0	0	3	2	0	0	1	0	193	203	274	153	150	0	1	0	-			
total 1 ^a	142	141	156	117	122	151	148	133	96	73	97	104	179	157	151	115	148	160	198	155	0			
total 2 ^b	142	141	156	117	123	151	148	133	97	74	97	105	179	158	151	115	148	160	200	155	0			
total 3 ^c	142	141	156	117	123	151	151	135	97	74	98	105	372	361	425	268	298	160	201	155	0			

Table 3. Counts of red-faced cormorants at St. Paul Island, Alaska, 1976-2005, coninued.

Plot	1999	1999	1999	1999	1999	1999	2002	2002	2002	2002	2002	2002	2005	2005	2005	2005	2005	2005	2005	2005	2005
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	-	-
2sw	2	1	0	1	1	2	0	0	0	0	1	0	18	21	18	13	4	8	19	-	-
2ne	3	6	4	5	3	7	0	3	2	1	1	1	0	0	0	0	0	0	0	-	-
3	3	2	0	2	2	1	1	1	1	1	1	1	10	8	5	2	6	24	6	-	-
4	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	-	-
5sw	2	0	1	0	0	0	1	9	1	0	0	2	0	0	0	0	0	0	0	-	-
5ne	0	0	0	0	0	0	0	2	0	5	3	0	0	0	0	0	1	0	2	-	-
6	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-
7	2	4	2	3	1	6	0	0	1	0	0	0	0	0	0	0	0	0	0	-	-
8	0	0	1	2	3	5	14	17	12	12	12	13	0	0	0	0	0	0	0	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	-	-
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	-	-
12	0	0	0	0	0	0	3	3	4	3	0	3	11	5	3	3	2	4	3	-	-
13	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	1	0	0	-	-
14	0	0	0	0	0	0	0	0	0	0	0	0	7	6	3	5	2	2	0	-	-
15	0	0	0	0	0	0	1	2	2	1	2	2	0	0	0	1	0	2	0	0	0
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	1	0	0	0	0	0	4	4	0	1	1	0	1	0	0	0	0	0	1	0	0
19 top	0	0	0	0	0	0	1	3	1	0	2	1	2	0	0	3	0	0	0	17	3
19 btm	0	0	0	1	0	0	0	0	0	0	0	0	17	26	16	4	16	15	17	3	3
20 top	0	0	0	0	0	0	0	1	1	1	3	0	0	0	0	0	0	0	0	0	0
20 btm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	2	2
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
23	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29 new	-	-	-	-	-	-	-	-	-	-	-	-	1	0	0	0	0	0	0	8	8
30	0	1	0	0	0	1	5	5	0	0	0	0	18	25	22	26	22	22	23	17	17
31	105	126	95	83	86	77	50	41	27	35	40	33	9	2	3	2	3	1	2	5	5
32	2	0	0	0	0	0	5	11	1	2	1	0	2	7	0	1	12	12	3	1	1
33	98	64	85	55	72	70	188	182	240	213	212	207	1	0	0	3	1	1	0	0	0
total 1 ^a	118	134	99	91	93	93	80	94	51	61	66	55	61	49	33	31	31	54	38	23	23
total 2 ^b	118	134	101	91	93	93	84	94	51	63	66	55	61	49	33	31	31	54	38	23	23
total 3 ^c	216	198	186	146	165	163	272	276	291	276	278	262	62	49	33	34	32	55	38	23	23

^atotal of plots 1, 2sw, 3, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 31, 32, 28, 31, 32.

^btotal of plots 1, 2sw, 3, 4, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 24, 25, 26, 27.

^ctotal of plots 1, 2sw, 3, 4, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 24, 25, 26, 27, 28, 31, 32, 33.

Table 4. Mean counts of red-faced cormorants at St. Paul Island, Alaska 1976-2005.

Year	Total 1			Total 2			Total 3		
	Mean	SD	n	Mean	SD	n	Mean	SD	n
1976	214		1	231		1	242		1
1982	60		1	60		1			1
1984	47		1	47		1	61		1
1985	201	1.4	4	201	1.4	4	201	1.4	4
1986	117	7.3	5	117	7	5	143	16.9	5
1987	159	14.9	6	159	15.6	6	159	15.6	6
1988	140	11.9	7	140	11.9	7	140	11.9	7
1989	116	27.8	8	116	27.2	8	117	27.8	8
1992	150	23	6	150	23	6	345	62.3	6
1995	171	23.5	3	172	24.7	3	172	25.2	3
1999	105	17.5	6	105	17.4	6	179	25.7	6
2002	68	16.3	6	69	16.8	6	276	9.4	6
2005	40	13.2	8	40	13.2	8	41	13.2	8

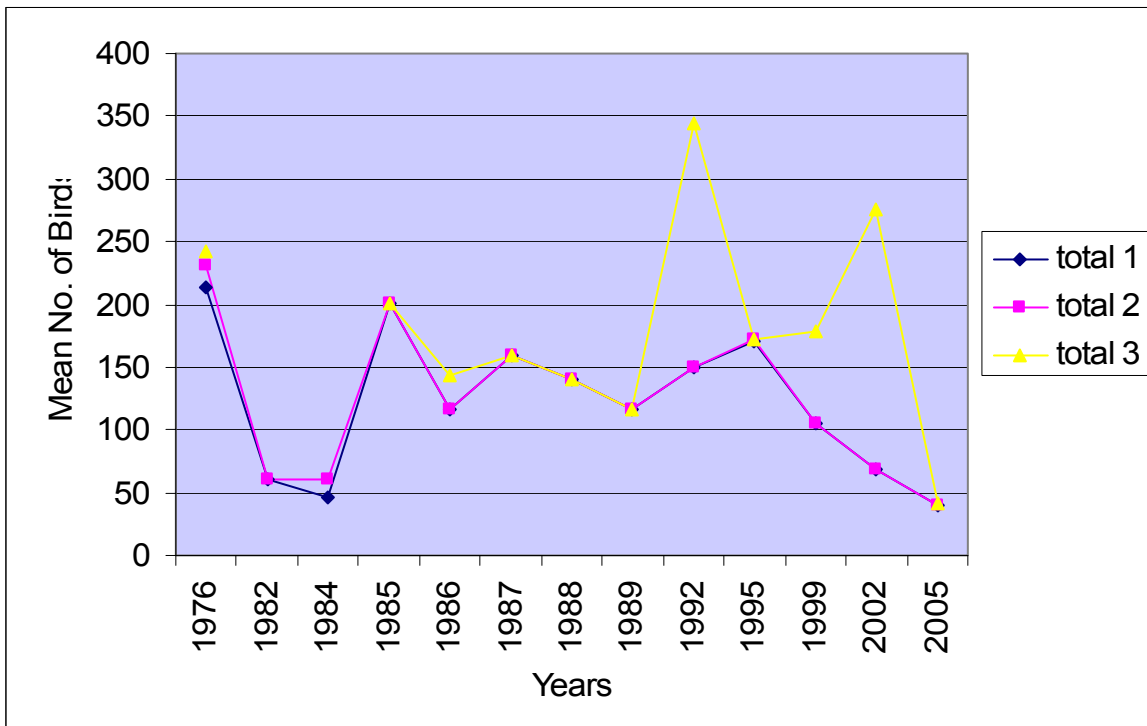


Figure 2. Mean counts of red-faced cormorants at St. Paul Island, Alaska, 1976-2005.

Table 5. Counts on plots of red-faced cormorant nests at St. Paul Island, Alaska, 1976-2005. (Not all plots were counted in all years. Therefore, we summarize data in 3 comparable combinations of plots).

Plot	1976	1982	1984	1985	1986	1987	1988	1989	1992	1995	1996	1999	2002	2005
1	12	3	1	14	14	15	7	5	4	3	-	0	0	0
2sw	-	0	1	0	0	1	0	2	0	1	-	1	0	3
2ne	-	-	0	1	4	5	0	0	5	0	-	3	1	0
3	7	0	0	0	5	8	0	0	3	0	-	3	1	3
4	-	-	0	0	0	0	0	-	0	2	-	0	0	0
5sw	5	1	0	1	0	1	2	1	1	1	-	1	1	0
5ne	2	0	0	0	0	0	2	-	3	0	-	0	1	0
6	-	-	0	0	0	0	0	-	0	0	-	0	-	-
7	1	2	0	0	0	0	0	-	0	0	-	6	0	0
8	3	0	0	0	0	0	0	-	0	0	-	0	7	0
9	1	1	1	0	0	0	-	-	-	0	-	0	0	-
10	2	0	0	5	7	5	4	1	1	1	-	0	0	0
11	-	0	0	0	0	0	0	-	0	0	-	0	0	0
12	10	3	7	17	16	16	14	-	8	5	-	0	3	4
13	2	0	0	3	1	1	1	1	0	0	-	0	0	0
14	1	0	0	0	0	0	0	-	0	0	-	0	0	2
15	2	0	0	2	2	2	0	0	0	5	-	0	1	0
16	-	0	0	0	0	3	3	0	2	0	-	0	-	0
17	-	0	0	0	0	0	0	0	-	0	-	0	-	-
18	5	0	1	0	0	0	0	2	2	0	-	1	0	-
19 top	-	0	0	0	0	0	0	0	3	0	-	0	1	0
19 btm	-	-	0	-	-	-	-	-	0	0	-	0	0	4
20 top	-	0	0	0	0	0	0	0	0	0	-	0	0	0
20 btm	-	-	0	-	-	-	-	-	0	0	-	0	0	0
21	-	-	0	5	4	0	0	0	-	0	-	0	0	-
22	1	4	0	0	0	0	0	1	1	2	-	0	0	0
23	2	0	0	1	1	0	0	0	0	0	-	0	0	0
24	0	-	0	0	0	0	0	0	0	0	-	0	0	0
25	0	-	0	0	0	0	0	0	0	1	-	0	0	0
26	1	-	0	0	0	0	0	0	0	0	-	0	0	0
27	-	-	0	0	0	0	0	0	0	0	-	0	0	0
28	1	-	0	1	0	0	0	0	0	0	-	0	0	0
29	-	-	0	0	0	0	0	0	-	0	-	0	0	-
29 new	-	-	0	-	-	-	-	-	0	0	-	-	0	0
30	-	-	0	-	-	-	-	-	0	0	-	0	0	0
RW	43	0	0	9	20	70	77	69	80	0	-	82	24	8
ZAP	19	0	5	89	46	18	0	0	0	100	-	2	0	9
TOL	1	-	7	0	20	1	0	0	208	1	-	60	155	0
total 1 ^e	110	13	15	141	107	129	107	82	103	115	-	93	38	26
total 2 ^u	119	-	15	142	112	137	107	82	106	116	-	96	39	29
total 3 ^c	120	-	22	142	132	138	107	82	314	117	-	156	194	29

^etotal of plots 1, 2sw, 3, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 31, 32, 28, 31, 32.

^utotal of plots 1, 2sw, 3, 4, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 24, 25, 26, 27.

^ctotal of plots 1, 2sw, 3, 4, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 24, 25, 26, 27, 28, 31, 32, 33.

Table 6. Maximum counts of red-faced cormorant nest at St. Paul, Island, Alaska, 1976-2005.

Year	Total 1	n	Total 2	n	Total 3	n
1976	110	1	119	1	120	1
1982	13	1	13	1	13	1
1984	15	1	15	1	22	1
1985	141	4	142	4	142	4
1986	107	5	112	5	132	5
1987	129	6	137	6	138	6
1988	107	7	107	7	107	7
1989	82	8	82	8	82	8
1992	103	6	106	6	314	6
1995	115	3	116	3	117	3
1999	93	6	96	6	156	6
2002	38	6	39	6	194	6
2005	26	8	29	8	29	8

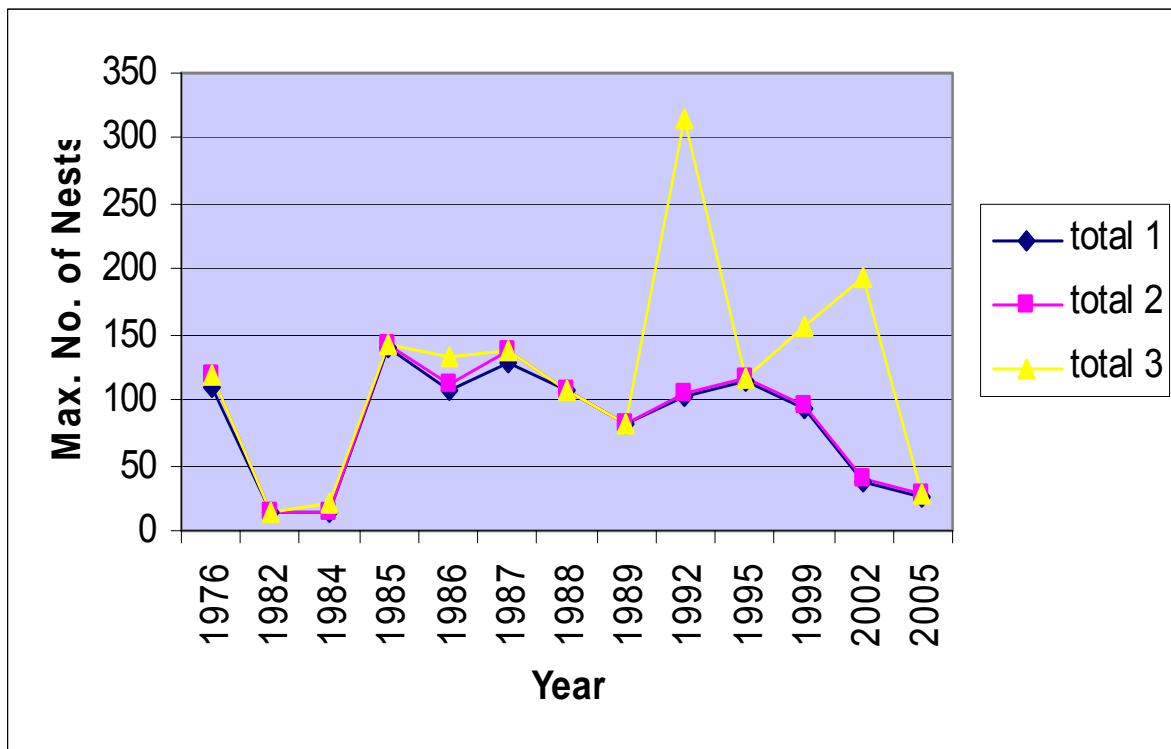


Figure 3. Maximum counts of red-faced cormorant nests at St. Paul Island, Alaska, 1976-2005.

Table 7. Counts of black-legged kittiwakes at St. Paul Island, Alaska, 1976-2005. (Not all plots were counted in all years. Therefore, we summarize data in 3 comparable combinations of plots)

Plot	1976	1982	1984	1985	1985	1985	1985	1986	1986	1986	1986	1986	1987	1987	1987	1987	1987	1987	1988	1988	1988	1988	1988
1	35	30	78	44	64	55	55	65	74	76	72	55	60	53	58	58	47	55	54	48	55	64	60
2sw	26	24	50	42	40	29	34	49	51	37	43	44	18	22	24	27	23	23	18	35	26	33	31
2ne	-	-	36	24	31	24	27	38	44	38	31	-	28	41	42	35	35	36	30	34	36	46	41
3	47	46	48	51	68	49	48	54	47	54	37	45	27	41	46	51	37	37	27	47	36	50	29
4	15	-	13	12	14	15	15	12	9	14	10	6	7	6	6	8	5	7	6	4	4	9	3
5sw	93	79	128	73	60	110	104	94	110	106	111	123	50	93	59	78	80	116	95	87	86	89	86
5ne	14	18	14	19	19	12	12	12	10	8	8	8	8	9	12	8	4	18	19	17	16	17	16
7	47	20	36	30	33	26	24	21	22	19	18	19	10	15	20	21	13	20	14	13	13	16	14
8	20	4	24	16	12	4	6	12	10	9	8	12	5	8	5	8	3	8	10	10	17	17	17
9	94	56	53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	44	60	62	57	63	47	43	53	44	48	35	45	35	33	49	48	38	49	39	42	39	46	29
11	21	10	5	10	12	7	15	13	9	11	8	11	8	13	10	8	6	12	12	13	14	16	10
12	78	68	64	94	98	68	83	96	77	71	81	79	51	67	76	82	57	66	67	66	89	64	64
13	40	34	32	39	40	37	37	41	42	41	42	47	33	29	33	38	28	33	34	34	37	39	34
14	20	23	13	20	31	18	31	27	22	23	29	25	26	28	22	23	24	20	24	21	21	21	22
15	50	62	84	50	51	48	64	54	53	48	35	40	31	50	43	40	45	39	46	41	47	47	36
16	60	24	24	30	32	27	27	31	30	38	26	19	11	27	23	26	19	34	41	36	30	30	30
17	24	4	5	5	6	1	6	5	3	4	4	4	2	2	4	6	3	2	3	4	6	4	4
18	40	23	14	38	27	27	41	19	19	21	20	10	18	25	16	19	14	26	19	17	19	20	22
19 top	45	26	27	18	18	12	16	15	16	16	16	16	14	11	9	13	8	8	12	11	12	11	9
19 btm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20 top	15	11	14	13	14	13	13	13	16	15	16	15	8	7	7	8	9	12	8	13	13	6	8
20 btm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	24	-	-	16	16	10	18	18	16	16	14	15	15	18	16	23	16	14	9	13	24	11	17
22	66	81	38	76	70	58	66	63	66	35	74	56	40	46	42	39	48	47	49	50	52	47	48
23	80	56	53	46	41	48	41	42	37	37	51	37	27	32	36	24	37	41	32	47	39	38	43
24	44	-	46	24	18	34	47	64	63	49	53	44	52	45	51	39	41	43	60	56	48	42	47
25	41	-	24	27	25	24	26	27	23	16	24	24	14	17	14	19	18	21	22	21	18	16	19
26	45	-	19	15	26	13	30	34	31	24	25	26	24	26	26	26	21	26	30	29	28	28	35
27	25	-	25	24	30	22	33	24	36	31	27	27	10	15	24	28	17	24	28	27	28	26	28
28	16	-	13	17	19	14	12	12	15	14	14	16	8	5	8	6	10	12	8	8	13	10	9
29	12	-	11	13	17	16	27	20	13	18	20	22	14	13	14	21	17	12	12	12	13	13	20
29 new	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	914	390	620	654	634	649	606	503	562	532	572	537	358	448	459	426	494	592	480	480	481	447	435
32	720	207	519	433	425	397	444	333	373	345	333	352	212	259	253	215	217	220	270	269	276	277	286
33	338	-	-	298	286	297	273	251	263	271	254	260	228	233	236	199	224	212	231	233	231	225	226
total 1 ^a	2415	1272	1923	1823	1820	1714	1783	1579	1660	1552	1609	1576	1039	1289	1279	1234	1232	1442	1329	1361	1388	1365	1299
total 2 ^b	2601	-	2063	1942	1952	1836	1946	1752	1837	1700	1762	1719	1154	1403	1408	1360	1344	1575	1483	1506	1527	1496	1440
total 3 ^c	2939	-	-	2240	2238	2133	2219	2003	2100	1971	2016	1979	1382	1636	1644	1559	1568	1787	1714	1739	1758	1721	1666

Table 7. Counts of black-legged kittiwakes at St. Paul Island, Alaska, 1976-2005, continued.

Plot	1988	1988	1989	1989	1989	1989	1989	1989	1989	1989	1992	1992	1992	1992	1992	1992	1995	1995	1995	1996	1996	1996	1996
1	61	61	68	57	67	51	43	56	60	53	60	62	53	70	28	38	18	27	19	20	34	54	41
2sw	36	31	26	32	37	28	24	26	32	34	25	23	18	24	3	14	11	14	14	14	21	21	15
2ne	55	50	28	35	35	17	16	18	21	29	26	21	27	34	18	19	4	6	18	6	22	17	12
3	41	40	29	47	31	26	14	28	32	32	56	48	45	48	36	39	34	26	53	29	51	46	43
4	5	5	2	5	5	1	3	3	1	5	8	5	6	6	4	5	7	7	17	9	22	26	16
5sw	108	113	89	84	74	59	60	65	60	67	40	83	84	80	60	61	77	74	94	77	125	120	69
5ne	29	16	6	14	20	8	9	9	13	10	11	7	13	17	5	5	10	5	6	3	22	15	8
7	16	15	10	20	15	7	12	9	7	10	13	9	10	11	10	10	7	8	8	5	3	4	4
8	18	19	6	17	9	4	5	5	3	7	6	6	9	6	8	10	5	2	4	1	1	3	0
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	42	50	33	44	40	34	32	28	31	40	35	33	29	31	23	24	24	27	27	23	36	40	25
11	13	13	13	13	10	11	9	12	8	8	9	10	15	10	10	11	7	6	9	5	14	14	7
12	81	79	75	85	61	57	53	53	49	79	74	64	70	77	46	57	47	60	64	47	63	59	57
13	37	37	40	40	33	29	19	20	33	37	42	57	43	45	46	44	34	30	45	38	43	47	43
14	21	29	6	11	17	11	7	3	14	18	15	15	19	23	15	13	14	15	17	15	17	24	8
15	54	44	38	33	36	27	29	24	30	36	35	39	38	57	24	40	14	33	17	24	38	37	31
16	49	33	43	32	31	34	21	26	32	33	37	50	59	36	34	47	13	16	25	27	30	28	29
17	8	7	3	3	4	1	4	2	1	4	-	-	-	-	-	-	3	2	5	-	-	-	-
18	19	23	23	16	19	18	15	20	18	26	13	25	20	26	17	19	6	9	14	13	14	16	12
19 top	12	14	3	7	7	6	4	2	5	11	7	5	9	8	6	8	1	2	1	2	3	6	4
19 btm	-	-	-	-	-	-	-	-	-	-	32	43	39	29	22	30	9	14	25	20	19	26	35
20 top	11	9	3	9	8	7	5	5	5	9	8	9	11	7	7	5	3	2	10	2	3	5	7
20 btm	-	-	-	-	-	-	-	-	-	-	30	31	35	32	28	28	18	23	33	-	33	28	28
21	25	23	12	9	11	9	11	8	9	14	-	-	-	-	-	-	-	-	-	-	-	-	-
22	44	55	34	33	37	28	29	35	24	44	39	41	47	45	33	41	24	28	34	36	44	43	28
23	41	40	34	42	42	25	23	19	30	43	31	30	33	26	27	24	16	22	24	24	21	39	26
24	59	52	46	50	45	37	44	44	28	49	39	49	45	47	40	44	46	50	50	56	67	69	57
25	22	19	23	24	17	13	13	18	14	27	15	13	22	14	12	16	16	16	18	28	34	16	25
26	37	33	24	28	27	26	23	18	14	28	30	28	33	33	22	26	17	19	20	23	17	23	24
27	29	26	20	17	18	23	19	21	11	34	20	27	26	24	20	23	7	18	16	9	9	11	15
28	13	9	8	6	8	10	7	5	6	8	15	10	15	13	17	9	13	13	13	14	17	27	16
29	25	16	14	11	11	6	9	9	13	5	-	-	-	-	-	-	-	-	-	-	-	-	-
29 new	-	-	-	-	-	-	-	-	-	-	5	8	8	8	8	8	5	29	15	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	28	33	35	37	30	29	13	12	11	12	11	13	8
31	486	536	499	486	481	322	356	380	406	408	488	490	462	452	471	551	297	292	447	342	402	395	421
32	294	321	237	242	234	183	188	147	179	228	182	185	124	188	122	176	127	114	196	123	159	171	156
33	251	228	201	246	204	193	175	171	216	210	314	314	222	321	202	308	250	223	222	213	196	261	224
total 1 ^a	1464	1545	1272	1332	1278	941	936	946	1039	1200	1189	1241	1152	1251	997	1190	776	796	1103	843	1114	1159	1005
total 2 ^u	1629	1689	1395	1462	1398	1051	1045	1055	1113	1351	1316	1373	1299	1388	1112	1313	882	919	1237	982	1280	1331	1158
total 3 ^c	1880	1917	1596	1708	1602	1244	1220	1226	1329	1561	1630	1687	1521	1709	1314	1621	1132	1142	1459	1195	1476	1592	1382

Table 7. Counts of black-legged kittiwakes at St. Paul Island, Alaska, 1976-2005, continued.

Plot	1996	1996	1999	1999	1999	1999	1999	1999	2002	2002	2002	2002	2002	2002	2002	2005	2005	2005	2005	2005	2005	2005	2005	2005
1	27	39	7	4	4	4	7	4	0	0	0	0	0	0	1	0	0	0	0	2	1	0		
2sw	15	20	14	12	1	9	16	21	12	14	13	10	15	10	12	11	11	12	11	10	11	10		
2ne	16	20	20	17	16	12	17	27	20	16	23	21	27	25	13	12	7	8	8	12	12	16		
3	41	46	47	56	40	42	48	52	33	47	43	45	44	44	58	51	48	48	55	78	67	61		
4	19	17	35	18	17	8	13	23	31	33	33	43	52	41	36	30	24	31	34	31	34	42		
5sw	70	104	43	43	27	42	42	20	10	9	15	7	17	12	83	57	51	45	17	47	53	28		
5ne	6	9	13	5	7	6	12	24	18	26	35	31	32	32	7	1	3	5	3	3	2	5		
7	2	2	1	1	0	0	1	3	0	4	3	3	3	6	26	20	16	16	19	29	28	24		
8	4	0	0	0	0	0	1	1	1	3	2	3	3	3	6	3	7	2	0	7	5	3		
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
10	32	35	14	13	15	11	15	21	20	25	18	19	15	24	14	14	15	10	14	17	15	19		
11	9	14	13	9	9	7	11	18	23	26	20	20	23	21	20	19	12	9	12	23	20	17		
12	48	52	43	14	50	37	54	62	48	50	48	49	51	48	35	39	28	32	31	37	39	36		
13	42	40	10	39	21	8	16	20	26	24	24	26	26	26	25	24	19	25	28	36	36	27		
14	6	18	16	6	10	3	3	13	8	9	10	10	6	7	19	4	7	9	11	10	10	6		
15	28	35	5	4	12	14	24	30	21	23	25	23	17	20	17	11	7	31	16	29	31	16		
16	22	37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
18	12	10	4	2	0	6	1	0	9	15	22	12	11	10	21	18	13	17	23	37	29	21		
19 top	2	5	3	2	0	16	5	12	4	8	9	4	9	7	7	3	2	2	0	15	11	2		
19 btm	23	31	4	5	0	0	7	10	9	20	20	9	22	15	49	35	21	28	63	69	61	31		
20 top	5	8	0	0	0	1	0	0	3	3	3	3	3	3	0	0	0	0	0	0	0	2		
20 btm	21	26	3	0	7	6	5	5	11	12	11	12	13	11	23	18	15	24	21	43	34	15		
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
22	30	43	15	16	14	15	19	19	17	14	16	17	15	14	1	15	6	5	35	28	27	22		
23	23	35	14	13	21	16	21	15	16	18	24	24	23	22	25	27	16	24	25	37	30	24		
24	55	70	30	33	47	28	28	49	35	40	45	39	43	39	34	39	31	33	37	47	39	36		
25	20	28	6	6	9	6	13	12	11	12	14	18	14	12	14	9	16	17	17	17	19	20		
26	16	17	7	3	8	6	9	15	16	15	17	16	15	32	11	17	13	19	13	16	15	13		
27	21	29	20	13	14	18	8	22	25	25	22	22	26	23	12	11	6	10	11	19	21	15		
28	12	18	8	3	5	8	2	16	11	14	9	12	10	14	7	2	3	6	8	6	7	3		
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
29 new	-	-	3	1	5	9	1	13	9	11	10	11	9	11	7	12	7	29	11	14	13	12		
30	6	19	11	7	13	5	12	16	27	30	26	32	23	19	24	26	22	26	23	24		22		
31	423	490	109	183	257	278	331	356	377	387	388	401	492	364	288	267	291	371	225	390	421	364		
32	137	194	51	65	99	94	169	104	128	123	132	152	130	156	153	159	129	168	173	185	199	176		
33	211	279	107	135	144	120	200	170	272	259	300	290	274	288	359	331	381	420	351	426	380	414		
total 1 ^a	962	1199	422	487	587	609	796	795	774	828	850	859	935	829	818	743	681	831	698	1020	1035	863		
total 2 ^b	1105	1378	528	563	687	683	869	932	903	967	990	1009	1095	990	932	851	774	947	818	1156	1170	992		
total 3 ^c	1316	1657	635	698	831	803	1069	1102	1175	1226	1290	1299	1369	1278	1291	1182	1155	1367	1169	1582	1550	1406		

^atotal of plots 1, 2sw, 3, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 31, 32, 28, 31, 32.

^btotal of plots 1, 2sw, 3, 4, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 24, 25, 26, 27.

^ctotal of plots 1, 2sw, 3, 4, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 24, 25, 26, 27, 28, 31, 32, 33.

Table 8. Mean counts of black-legged kittiwakes at St. Paul Island, Alaska 1976-2005.

Year	Total 1			Total 2			Total 3		
	Mean	SD	n	Mean	SD	n	Mean	SD	n
1976	2415		1	2601		1	2939		1
1982	1296		1			1			1
1984	1923		1	1948		1			1
1985	1785	50.7	4	1919	55.5	4	2208	50.6	4
1986	1595	41.5	5	1754	52.7	5	2014	51.5	5
1987	1253	129.8	6	1374	135.6	6	1956	132.9	6
1988	1393	84.6	7	1539	88.1	7	1771	92.3	7
1989	1118	169.9	8	1234	183	8	1436	200.6	8
1992	1170	92.3	6	1300	98.8	6	1580	146	6
1995	892	183.3	3	1013	195.1	3	1244	186	3
1996	1047	134.7	6	1206	150.6	6	1436	173.3	6
1999	616	154.7	6	710	161.6	6	856	191.4	6
2002	846	52.7	6	992	62.4	6	1273	66.4	6
2005	836	134.3	8	955	146.8	8	1338	168.4	8

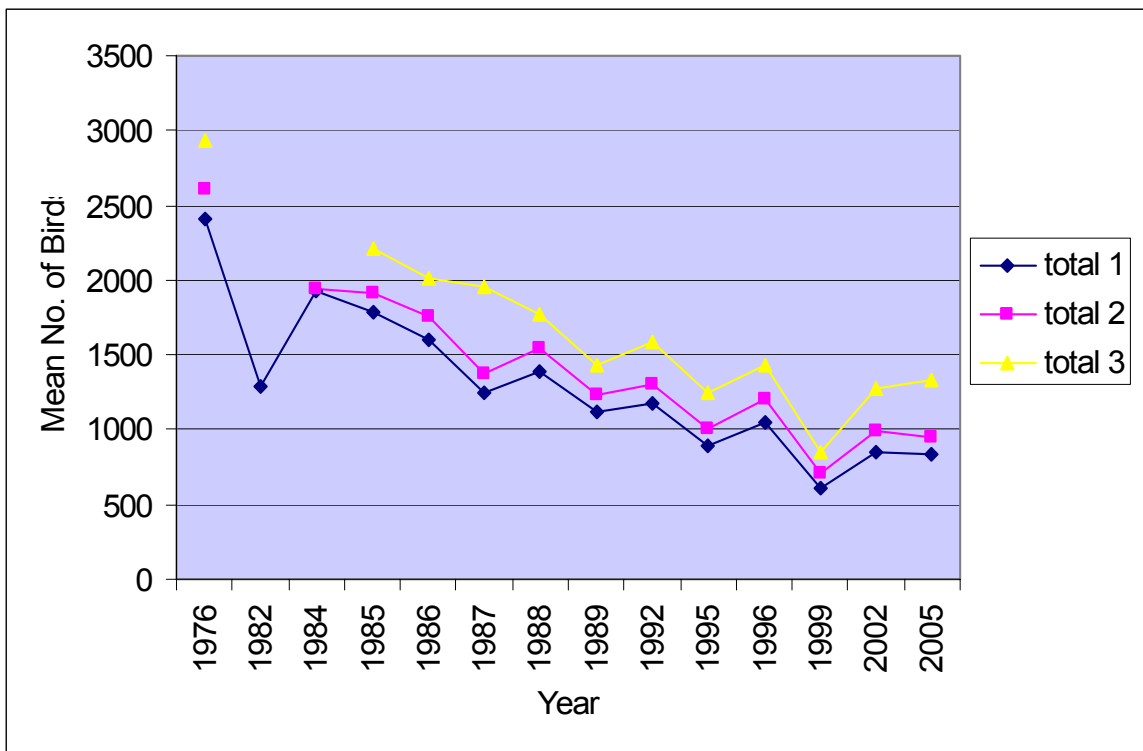


Figure 4. Mean counts of black-legged kittiwakes at St. Paul Island, Alaska, 1976-2005.

Table 9. Counts on plots of black-legged kittiwakes nests at St. Paul Island, Alaska, 1976-2005. (Not all plots were counted in all years. Therefore, we summarize data in 3 comparable combinations of plots).

Plot	1976	1982	1984	1985	1986	1987	1988	1989	1992	1995	1996	1999	2002	2005
1	32	4	-	38	65	49	50	48	50	-	28	4	0	0
2sw	12	3	-	26	40	25	16	6	13	-	16	8	10	2
2ne	-	-	-	21	34	36	26	13	23	-	9	13	15	3
3	30	5	-	23	39	30	25	17	35	-	34	36	39	15
4	7	-	-	9	12	5	3	2	4	-	10	43	22	8
5sw	56	15	-	36	107	71	67	37	59	-	50	56	3	18
5ne	3	4	-	10	9	6	8	3	8	-	4	4	21	0
7	34	3	-	19	17	15	12	9	10	-	1	1	0	3
8	9	0	-	11	10	4	11	2	7	-	1	1	1	1
9	72	6	-	-	-	-	-	-	-	-	-	-	-	-
10	27	6	-	38	44	26	27	20	30	-	17	10	15	8
11	18	2	-	8	11	7	9	5	9	-	7	8	15	3
12	46	8	-	54	68	65	52	37	49	-	31	38	38	16
13	26	6	-	27	35	33	30	23	44	-	28	38	21	2
14	11	4	-	12	23	13	13	4	10	-	8	5	6	3
15	36	7	-	35	42	30	31	19	23	-	24	20	15	9
16	39	2	-	19	34	21	24	14	30	-	15	-	-	-
17	19	1	-	4	5	2	3	0	-	-	-	-	-	-
18	22	6	-	17	18	14	17	9	20	-	8	3	12	8
19 top	30	10	-	12	16	11	10	2	7	-	2	10	5	1
19 btm	-	-	-	-	-	-	-	-	30	-	15	8	11	6
20 top	13	0	-	12	14	9	7	6	9	-	4	1	2	0
20 btm	-	-	-	-	-	-	-	-	24	-	19	4	9	2
21	14	-	-	10	14	17	15	5	-	-	-	-	-	-
22	55	16	-	44	59	44	36	18	32	-	18	17	15	0
23	72	6	-	30	45	29	27	19	25	-	13	22	18	6
24	31	-	-	31	48	49	42	23	37	-	39	47	33	12
25	27	-	-	14	18	16	14	13	9	-	10	10	9	6
26	24	-	-	13	22	24	17	12	23	-	14	9	12	3
27	13	-	-	16	27	21	20	12	20	-	12	21	17	6
28	11	-	-	13	11	7	7	3	11	-	8	5	11	1
29	6	-	-	8	21	18	9	4	-	-	-	-	-	-
29 new	-	-	-	-	-	-	-	-	7	-	-	7	8	3
30	-	-	-	-	-	-	-	-	29	-	8	12	23	4
31	608	86	-	435	529	444	380	309	375	-	292	231	321	0
32	539	63	-	348	370	253	254	129	160	-	118	83	103	96
33	206	-	-	238	260	221	214	137	224	-	143	120	223	219
total 1 ^a	1679	254	-	1235	1561	1178	1082	722	975	-	704	596	660	191
total 2 ^b	1792	-	-	1331	1699	1300	1185	787	1079	-	797	731	764	227
total 3 ^c	1998	-	-	1569	1959	1521	1399	924	1303	-	940	851	987	446

^atotal of plots 1, 2sw, 3, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 31, 32, 28, 31, 32.

^btotal of plots 1, 2sw, 3, 4, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 24, 25, 26, 27.

^ctotal of plots 1, 2sw, 3, 4, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 24, 25, 26, 27, 28, 31, 32, 33.

Table 10. Maximum counts of black-legged kittiwake nests at St. Paul Island, Alaska, 1976-2005.

Year	Total 1	n	Total 2	n	Total 3	n
1976	1679	1	1792	1	1998	1
1982	254	1	254	1	254	1
1985	1235	4	1331	4	1569	4
1986	1561	5	1699	5	1959	5
1987	1178	6	1300	6	1521	6
1988	1082	7	1185	7	1399	7
1989	722	8	787	8	924	8
1992	975	6	1079	6	1303	6
1996	704	6	797	6	940	6
1999	596	6	731	6	851	6
2002	660	6	764	6	987	6
2005	191	8	227	8	446	8

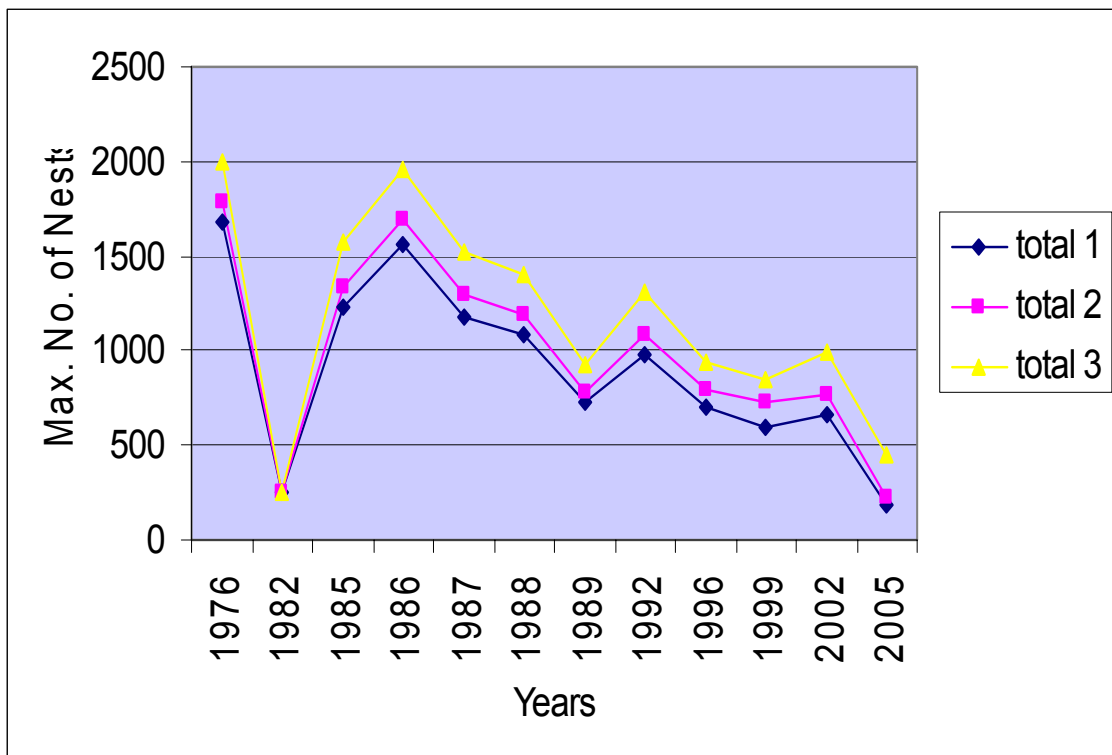


Figure 5. Maximum counts of black-legged kittiwake nests at St. Paul Island, Alaska, 1976-2005.

Table 11. Counts of red-legged kittiwakes at St. Paul Island, Alaska, 1976-2005. (Not all plots were counted in all years. Therefore, we summarize data in 3 comparable combinations of plots).

Plot	1976	1982	1984	1985	1985	1985	1985	1985	1986	1986	1986	1986	1986	1987	1987	1987	1987	1987	1987	1988	1988	1988	1988
1	9	3	4	3	6	7	4	9	3	3	2	3	2	1	1	1	2	2	2	1	1	1	1
2sw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2ne	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
3	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
4	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5sw	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5ne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	1	0	2	0	0	0	0	0	0	1	0	0	0	1	1	0	0	1	0	1	1	1	0
8	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	5	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	0	0	0	0	0	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	10	4	1	8	4	4	4	3	4	2	1	3	0	0	0	0	1	0	2	2	2	4
13	1	13	9	3	5	5	5	4	2	3	3	3	1	3	2	1	2	1	1	6	5	4	4
14	6	2	3	1	3	4	2	9	2	3	5	2	3	2	2	4	1	2	4	0	3	0	1
15	2	0	2	2	2	4	4	4	2	1	1	0	2	2	2	4	1	2	2	5	5	5	3
16	1	0	0	0	1	0	0	1	0	2	0	0	0	0	0	0	0	1	0	0	0	0	1
17	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
18	3	4	3	2	2	2	3	0	1	0	1	2	2	1	2	2	1	2	1	2	2	2	3
19 top	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
19 btm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20 top	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 btm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	1	-	0	1	1	1	2	1	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0
22	2	9	5	2	3	5	7	7	4	0	2	4	5	2	2	7	2	1	4	3	2	1	1
23	11	7	12	8	7	9	5	7	4	1	0	3	4	2	6	2	6	9	3	3	6	2	5
24	25	-	32	21	21	26	14	23	15	9	15	16	17	3	12	9	14	14	14	14	13	13	13
25	3	-	2	1	0	1	3	3	4	7	2	2	2	2	4	1	2	4	1	2	2	2	2
26	11	-	5	0	6	0	2	0	2	1	2	1	1	0	1	0	1	6	4	4	5	4	3
27	25	-	43	25	46	25	36	33	23	28	25	25	25	13	24	16	13	25	11	29	23	18	27
28	3	-	4	2	2	4	2	3	5	6	4	0	5	0	2	2	4	3	3	3	4	4	4
29	1	-	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
29 new	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	61	35	23	26	27	27	22	28	25	20	22	21	25	24	25	26	20	42	36	29	34	29	37
32	15	0	5	6	6	7	7	5	10	8	7	8	5	3	1	3	1	1	3	0	0	0	0
33	0	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
total 1 ^a	113	88	73	54	69	79	66	77	57	45	45	47	52	41	44	50	36	64	56	54	61	46	59
total 2 ^u	180	-	159	103	144	135	123	139	106	96	93	91	102	59	87	78	70	116	89	106	108	87	108
total 3 ^c	180	-	-	103	144	135	123	139	106	96	93	91	102	59	87	78	70	116	89	106	108	87	108

Table 11. Counts of red-legged kittiwakes at St. Paul Island, Alaska 1976-2005, continued.

Plot	1988	1988	1988	1989	1989	1989	1989	1989	1989	1989	1989	1992	1992	1992	1992	1992	1992	1995	1995	1995	1996	1996	1996
1	1	1	1	1	1	2	2	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0
2sw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2ne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
5sw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	3	3	1	3	2
5ne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	2	1	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	2	4	3	1	1	5	4	4	2	2	3	0	0	0	0	0	0	0	1	0	0	1	1
13	6	7	5	4	3	5	2	6	5	5	4	3	5	5	2	3	4	3	2	2	4	6	5
14	1	1	3	0	0	2	2	3	0	1	4	4	5	3	4	3	4	2	3	4	0	0	0
15	5	4	6	5	12	7	8	10	5	5	7	5	6	7	5	2	3	2	4	10	7	6	5
16	0	1	1	0	0	0	0	0	0	0	0	0	3	1	0	0	1	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-
18	2	2	1	2	2	1	3	3	2	2	3	0	0	1	0	0	0	0	0	0	0	0	0
19 top	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
19 btm	-	-	-	-	-	-	-	-	-	-	-	1	1	1	0	1	0	0	0	0	0	0	0
20 top	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 btm	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-
22	2	2	3	1	3	1	3	3	2	2	2	2	0	2	3	0	0	3	2	4	3	4	3
23	4	7	2	1	1	1	4	6	7	0	9	0	1	0	1	1	1	0	0	0	0	0	2
24	20	20	15	8	11	10	21	16	20	5	23	13	16	11	14	9	13	18	17	27	12	14	12
25	2	2	2	4	1	3	2	4	3	2	2	1	4	4	1	0	3	1	0	1	0	3	4
26	4	4	4	2	3	4	6	4	7	2	4	2	4	6	4	3	5	6	9	17	15	15	17
27	25	28	25	4	18	11	14	22	20	3	26	15	17	18	17	15	17	7	8	12	3	6	7
28	5	5	4	1	7	1	1	1	1	4	7	5	4	6	4	4	8	3	5	5	1	4	3
29	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-
29 new	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	6	5	5	9	6	6	0	0	0	1	0	2
31	42	39	41	46	52	66	49	28	48	51	52	37	39	40	35	36	36	17	15	13	14	7	14
32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
total 1 ^a	66	67	65	61	75	90	79	65	73	69	86	51	56	59	53	46	48	29	30	36	31	28	32
total 2 ^u	122	126	115	80	115	119	123	112	124	85	148	87	101	104	93	77	94	64	70	98	62	70	75
total 3 ^c	122	126	115	80	115	119	123	112	124	85	148	87	101	104	93	77	94	66	70	98	62	70	75

Table 11. Counts of red-legged kittiwakes at St. Paul Island, Alaska, 1976-2005, continued.

Plot	1996	1996	1996	1999	1999	1999	1999	1999	1999	2002	2002	2002	2002	2002	2002	2005	2005	2005	2005	2005	2005	2005	2005	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2sw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
2ne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	1	2	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
4	0	0	0	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5sw	3	2	1	3	0	4	5	5	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5ne	0	0	0	0	7	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	1	0	2	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	2	1	1	0	2	1	1	2	1	1	2	2	1	0	0	0	0	0	1	0	0
13	6	5	7	0	1	2	1	0	0	1	1	1	2	3	2	2	3	1	1	6	6	7	6	6
14	3	0	0	3	1	1	3	3	5	12	11	9	9	12	12	9	3	3	10	8	10	9	9	
15	3	8	5	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
19 top	0	0	0	0	0	0	2	0	0	0	4	4	1	4	6	0	0	0	0	0	0	0	0	0
19 btm	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	1	2	0	4	1	1
20 top	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 btm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	4	5	4	0	4	3	3	0	3	8	11	10	12	12	12	0	0	0	0	7	12	11	7	7
23	0	1	0	0	0	1	0	0	4	5	1	2	1	0	1	0	0	0	0	0	0	0	0	0
24	14	13	13	15	10	6	9	4	10	10	9	9	11	13	7	0	3	3	2	4	3	5	5	5
25	1	1	2	0	0	0	0	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
26	16	12	10	3	1	4	2	4	3	5	2	4	1	1	2	1	0	1	1	0	0	0	0	0
27	8	9	10	13	11	10	12	10	13	12	10	15	15	14	14	2	2	1	2	5	3	4	2	2
28	1	5	4	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29 new	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0
31	12	15	22	24	36	31	37	30	48	41	32	31	53	93	56	19	21	15	14	14	24	27	16	16
32	0	0	0	0	0	0	0	1	0	0	0	0	0	6	2	3	3	4	7	4	7	7	7	7
33	0	0	0	0	0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0	0	0	0	1
total 1 ^a	31	36	40	33	52	45	54	41	68	69	64	59	80	133	94	36	30	23	35	40	60	64	45	45
total 2 ^b	71	76	79	65	74	66	77	65	94	97	85	88	107	161	117	40	35	28	40	49	66	73	52	52
total 3 ^c	71	76	79	65	74	66	77	65	94	99	87	90	109	161	117	40	35	28	40	49	66	73	53	53

^atotal of plots 1, 2sw, 3, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 31, 32, 28, 31, 32.

^btotal of plots 1, 2sw, 3, 4, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 24, 25, 26, 27.

^ctotal of plots 1, 2sw, 3, 4, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 24, 25, 26, 27, 28, 31, 32, 33.

Table 12. Mean counts of red-legged kittiwakes at St. Paul Island, Alaska, 1976-2005

Year	Total 1			Total 2			Total 3		
	Mean	SD	n	Mean	SD	n	Mean	SD	n
1976	113	113	1	180	-	1	180	-	1
1982	88	-	1	159	-	1	-	-	1
1984	73	-	1	-	-	1	-	-	1
1985	69	10	5	69	10	5	129	16.4	5
1986	49	5.2	5	49	5.2	5	98	6.3	5
1987	49	10.6	6	83	19.5	6	83	19.5	6
1988	60	7.6	7	110	12.8	7	110	12.8	7
1989	75	10	8	113	21.9	8	113	21.9	8
1992	52	4.9	6	93	9.8	6	93	9.8	6
1995	32	3.8	3	77	18.1	3	78	17.4	3
1996	33	4.3	6	72	6	6	72	6	6
1999	49	12.1	6	74	11.3	6	74	11.3	6
2002	83	27.4	6	109	28	6	111	27.2	6
2005	42	14.2	8	48	15.4	8	48	15.5	8

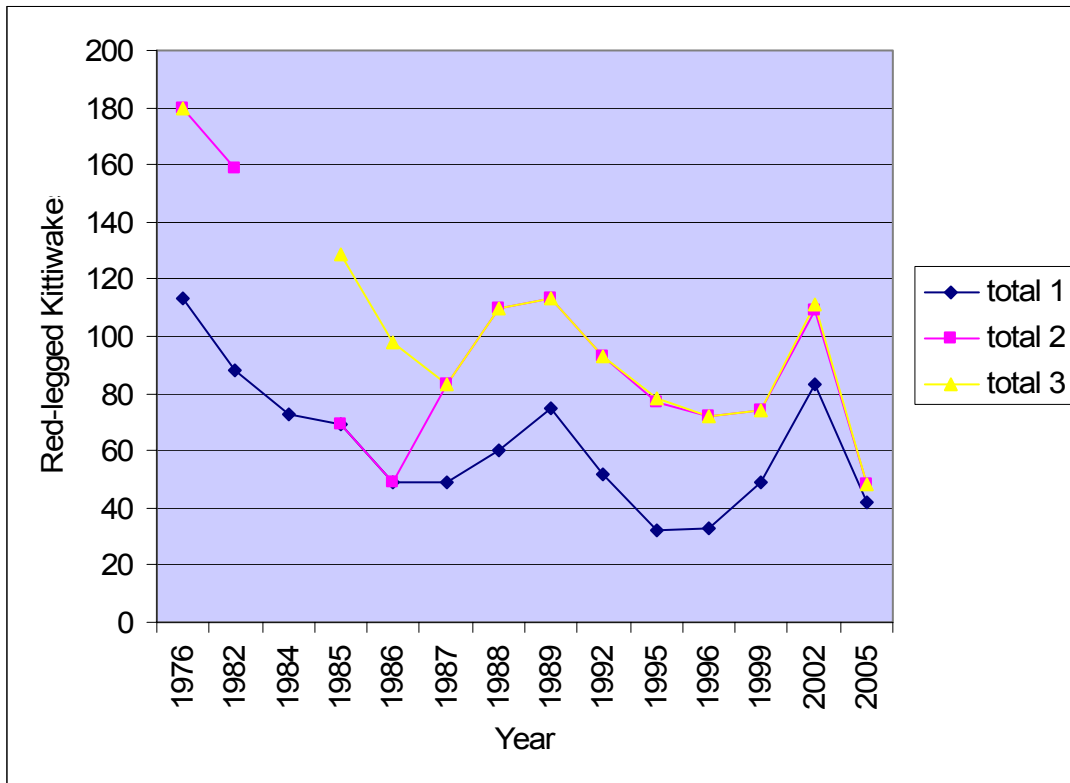


Figure 6. Mean counts of red-legged kittiwakes at St. Paul Island, Alaska, 1976-2005.

Table 13. Counts on plots of red-legged kittiwake nests at St. Paul Island, Alaska, 1976-2005. (Not all plots were counted in all years. Therefore, we summarize data in 3 comparable combinations of plots.)

Plot	1976	1982	1984	1985	1986	1987	1988	1989	1992	1995	1996	1999	2002	2005
1	5	0	-	5	3	3	1	1	0	-	0	0	0	0
2sw	0	0	-	0	0	0	0	0	0	-	0	0	0	0
2ne	-	-	-	1	0	0	0	0	0	-	0	0	0	0
3	1	0	-	0	0	0	2	0	0	-	0	1	1	0
4	0	-	-	0	0	0	0	0	0	-	0	0	0	0
5sw	0	0	-	0	1	1	0	0	0	-	2	7	0	0
5ne	0	0	-	0	0	0	0	0	0	-	0	7	0	0
7	0	0	-	1	1	1	1	0	0	-	0	0	0	0
8	0	0	-	0	0	0	0	0	0	-	0	0	0	0
9	3	0	-	-	-	-	-	-	-	-	-	-	-	-
10	0	0	-	2	0	0	0	0	1	-	0	0	0	0
11	0	0	-	0	0	0	0	0	0	-	0	0	0	0
12	0	0	-	4	2	0	0	0	0	-	0	2	1	0
13	0	0	-	3	2	1	5	2	3	-	3	2	1	0
14	2	0	-	2	3	3	1	-	4	-	0	2	8	0
15	0	0	-	3	2	2	4	4	6	-	6	1	0	0
16	1	0	-	1	2	1	0	0	3	-	0	-	-	-
17	1	0	-	0	0	0	0	0	-	-	-	-	-	-
18	1	0	-	2	1	1	2	1	1	-	0	0	1	0
19 top	0	0	-	0	1	0	0	0	0	-	0	1	2	0
19 btm	-	-	-	-	-	-	-	-	1	-	0	0	0	0
20 top	0	0	-	0	0	0	0	0	0	-	0	0	0	0
20 btm	-	-	-	-	-	-	-	-	0	-	0	0	0	0
21	1	-	-	1	1	0	0	0	-	-	-	-	-	0
22	1	0	-	4	4	4	2	1	2	-	4	4	9	0
23	5	0	-	7	4	5	2	-	0	-	0	0	5	0
24	18	-	-	21	15	11	11	4	8	-	7	9	7	0
25	1	-	-	1	3	2	2	1	0	-	0	5	0	0
26	8	-	-	1	2	3	2	0	4	-	8	5	5	0
27	20	-	-	26	25	22	18	3	16	-	6	14	6	0
28	3	-	-	2	5	2	3	-	5	-	3	0	0	0
29	1	-	-	0	0	0	0	-	-	-	-	-	-	-
29 new	-	-	-	-	-	-	-	-	0	-	-	0	0	0
30	-	-	-	-	-	-	-	-	4	-	0	0	0	6
31	30	0	-	17	22	22	23	20	25	-	12	41	26	1
32	9	0	-	3	5	-	0	0	0	-	0	2	0	2
33	0	-	-	0	0	0	0	0	0	-	0	0	2	0
total 1 ^a	54	0	-	53	51	43	43	29	42	-	27	70	54	3
total 2 ^b	104	-	-	104	101	83	79	37	75	-	51	103	72	3
total 3 ^c	104	-	-	104	101	83	79	37	75	-	51	103	74	3

^atotal of plots 1, 2sw, 3, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 31, 32, 28, 31, 32.

^btotal of plots 1, 2sw, 3, 4, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 24, 25, 26, 27.

^ctotal of plots 1, 2sw, 3, 4, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 24, 25, 26, 27, 28, 31, 32, 33.

Table 14. Maximum counts of red-legged kittiwake nests at St. Paul Island, Alaska, 1976-2005.

Year	Total 1	n	Total 2	n	Total 3	n
1976	54	1	104	1	104	1
1982	0	1	0	1	0	1
1985	53	4	104	4	104	4
1986	51	5	101	5	101	5
1987	43	6	83	6	83	6
1988	43	7	79	7	79	7
1989	29	8	37	8	37	8
1992	42	6	75	6	75	6
1996	27	6	51	6	51	6
1999	70	6	103	6	103	6
2002	54	6	72	6	74	6
2005	3	8	3	8	3	8

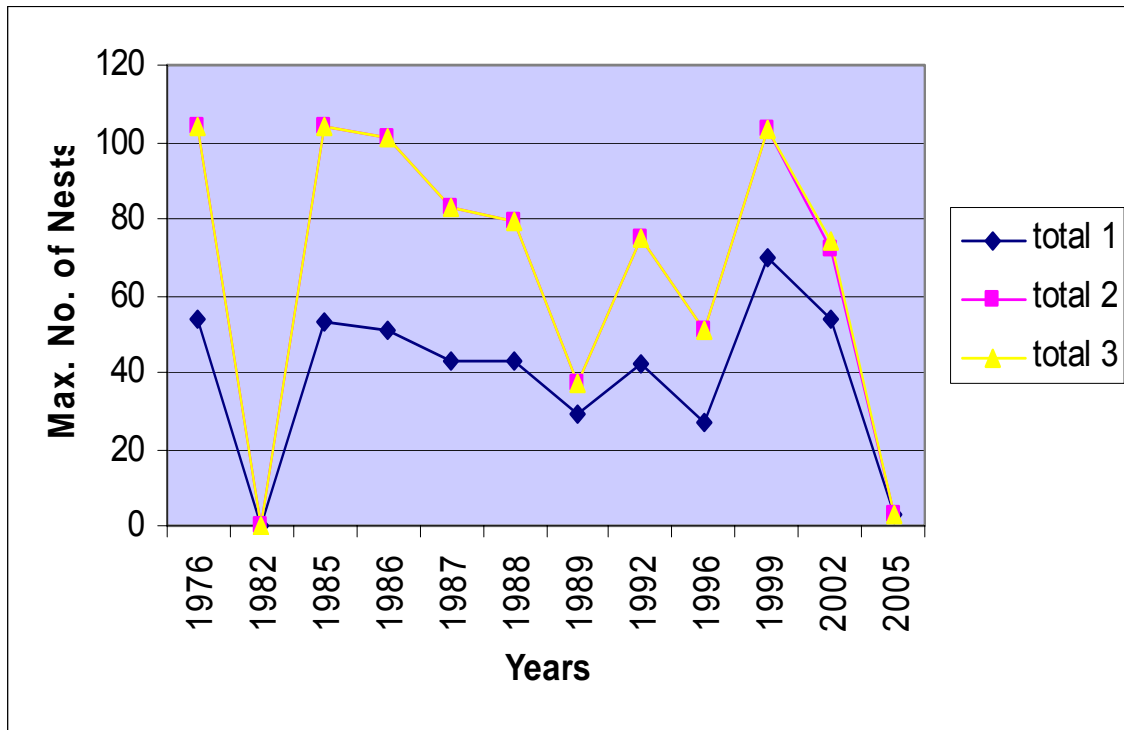


Figure 7. Maximum counts of red-legged kittiwakes nests at St. Paul Island, Alaska, 1976-2005.

Table 15. Counts of common murres at St. Paul Island, Alaska, 1976-2005. (Not all plots were counted in all years. Therefore, we summarize data in 3 comparable combinations of plots).

Plot	1976	1982	1984	1885	1885	1885	1885	1986	1986	1986	1986	1986	1987	1987	1987	1987	1987	1987	1988	1988	1988	1988	1988
1	15	0	23	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2sw	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2ne	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3	15	12	0	0	0	0	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5sw	0	81	8	0	0	2	0	5	7	11	14	14	7	7	3	5	8	11	7	4	10	9	8
5ne	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	6	0	0	0	0
7	256	2	1	0	1	0	3	0	2	1	0	1	0	0	1	0	1	2	2	1	0	0	0
8	20	109	2	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	2	2	1	0	1
9	104	75	76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	648	0	268	343	319	242	300	253	294	337	289	293	0	2	14	1	3	1	1	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	11	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	184	6	29	26	26	27	25	10	11	23	19	19	23	10	19	15	17	19	17	15	15	20	24
15	11	113	4	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0
16	106	0	20	17	6	25	17	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
17	21	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
18	192	0	18	21	15	22	15	9	14	10	11	10	11	8	13	15	15	20	13	17	18	17	8
19 top	133	118	92	79	99	58	70	44	74	115	73	90	0	6	2	0	1	15	0	0	0	4	0
19 btm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20 top	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 btm	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	-	-	-	-	-
21	2	-	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	6	11	0	0	0	0	0	10	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0
23	25	0	12	0	0	0	0	0	4	20	3	3	3	10	12	17	29	26	6	8	0	4	2
24	6	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	-	0	15	7	6	8	6	17	14	15	11	12	10	13	20	20	2	25	7	21	22	21
27	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	6	-	0	0	0	0	0	1	0	3	1	0	0	0	0	0	0	5	0	0	0	0	0
29	7	-	0	5	5	6	6	5	6	5	3	4	0	2	2	2	2	5	0	0	0	0	0
29 new	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	752	417	428	540	483	515	525	420	483	373	501	521	461	496	466	482	474	535	443	437	410	425	433
32	558	407	567	380	460	405	419	347	334	384	410	374	413	383	436	433	406	387	329	303	340	362	400
33	1085	-	-	667	703	685	620	698	713	886	836	950	867	916	874	883	898	988	837	978	927	912	941
total 1 ^a	2806	1290	1467	1389	1404	1271	1357	1103	1226	1275	1322	1328	919	924	966	968	955	1016	826	787	794	841	876
total 2 ^b	2818	-	1467	1404	1411	1277	1365	1110	1243	1292	1338	1339	931	934	979	988	975	1023	851	794	815	863	897
total 3 ^c	3903	-	-	2071	2114	1962	1985	1808	1956	2178	2174	2289	1798	1850	1853	1871	1873	2011	1688	1772	1742	1775	1838

Table 15. Counts of common murres at St. Paul Island, Alaska, 1976-2005, continued.

Plot	1988	1988	1989	1989	1989	1989	1989	1989	1989	1989	1992	1992	1992	1992	1992	1992	1995	1995	1995	1996	1996	1996	1996	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2sw	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	2	9	0	0	0	0	0
2ne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	8	9	13	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5sw	10	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	26	21	78	25	29	31	31
5ne	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	2	0	0	0	0
7	0	0	1	0	0	0	1	2	1	1	-	-	-	-	-	-	1	0	0	4	1	0	4	4
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	0	2	2
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	1	2	2
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	23	21	28	26	42	37	44	30	29	37	64	79	73	51	89	75	25	0	37	78	85	87	105	105
15	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	12	0	3	7	0	0	0	0	0
16	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	0	0	0	-	-	-	-	-
18	11	21	12	9	8	7	11	16	14	9	24	21	22	45	21	23	33	38	34	43	55	35	42	42
19 top	0	4	0	0	0	0	0	0	7	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
19 btm	-	-	-	-	-	-	-	-	-	-	13	21	14	20	17	13	5	0	4	4	14	1	1	1
20 top	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 btm	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	1	1
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-
22	0	0	7	14	15	12	16	12	12	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	2	6	1	0	2	2	4	0	1	1	0	0	0	0	0	0	5	0	0	4	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	25	22	18	25	23	36	27	30	28	30	31	24	39	26	35	26	25	28	40	30	38	38	35	35
27	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
29	0	0	4	0	1	1	0	2	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29 new	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	10	0	0	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0
31	479	471	437	615	477	432	381	432	483	396	362	341	315	353	361	367	465	448	535	533	451	556	418	418
32	430	457	444	421	414	447	388	453	545	508	422	448	448	476	458	508	344	368	428	421	387	314	457	457
33	933	816	898	708	707	800	704	741	866	877	955	1083	1193	758	1237	973	768	823	925	803	746	783	830	830
total 1 ^a	955	982	931	1086	958	940	845	945	1092	967	872	889	859	925	931	988	887	894	1090	1166	1006	1022	1061	1061
total 2 ^u	980	1004	949	1111	981	976	872	975	1120	997	903	913	899	951	966	1014	913	922	1130	1196	1044	1060	1096	1096
total 3 ^c	1913	1820	1847	1819	1688	1776	1576	1716	1986	1874	1858	1996	2092	1709	2203	1987	1681	1745	2055	1999	1790	1843	1926	1926

Table 15. Counts of common murres at St. Paul Island, Alaska, 1976-2005, continued.

Plot	1996	1996	1999	1999	1999	1999	1999	1999	2002	2002	2002	2002	2002	2002	2005	2005	2005	2005	2005	2005	2005	2005
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2sw	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2ne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	7	12	9	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
5sw	20	39	0	12	17	32	5	21	6	4	6	4	10	9	0	0	0	0	0	0	0	0
5ne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	14	13	8
7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	79	91	0	14	12	28	0	27	5	0	2	4	5	3	3	6	3	3	3	4	5	1
15	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1
16	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	38	48	37	44	0	39	0	0	60	42	70	82	72	68	0	0	0	0	0	0	0	0
19 top	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 btm	4	6	0	0	0	0	32	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 top	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 btm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	0	0	0	14	9	0	0	0	0	0	0	0	0	0	0	6	3	2	0	4	6	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	30	36	25	32	14	25	0	36	24	26	31	45	33	31	13	0	0	0	21	13	22	11
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29 new	-	-	8	3	8	11	0	3	4	3	5	3	3	5	0	0	0	0	0	0	0	0
30	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	511	618	299	371	306	357	373	869	301	312	362	325	292	305	166	144	135	374	265	283	331	278
32	456	475	233	272	161	319	264	334	290	330	304	385	336	332	177	251	292	373	454	377	357	379
33	799	821	254	388	353	554	702	402	566	591	549	505	520	526	480	661	761	932	904	778	759	850
total 1 ^a	1107	1272	576	741	517	779	645	1253	662	688	744	800	715	717	346	407	433	753	734	682	712	671
total 2 ^b	1137	1308	601	773	531	804	647	1289	686	714	775	845	748	748	359	407	433	755	755	695	734	682
total 3 ^c	1936	2129	855	1161	884	1358	1349	1691	1252	1305	1324	1350	1268	1274	839	1068	1194	1687	1659	1473	1493	1532

^atotal of plots 1, 2sw, 3, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 31, 32, 28, 31, 32.

^btotal of plots 1, 2sw, 3, 4, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 24, 25, 26, 27.

^ctotal of plots 1, 2sw, 3, 4, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 24, 25, 26, 27, 28, 31, 32, 33.

Table 16. Mean counts of common murrelets at St. Paul Island, Alaska, 1976-2005.

Year	Total 1			Total 2			Total 3		
	Mean	SD	n	Mean	SD	n	Mean	SD	n
1976	2806		1	2818		1	3903		1
1982	1290		1			1			1
1984	1467		1	1467		1			1
1985	1355	59.5	4	1364	61.6	4	2033	71.5	4
1986	1251	92.3	5	1264	94.9	5	2081	194.6	5
1987	958	35.3	6	972	31.9	6	1876	71.5	6
1988	866	76.5	7	886	79.7	7	1793	72.5	7
1989	971	82.1	8	998	82.1	8	1785	126.1	8
1992	911	47.4	6	941	44.8	6	1974	173.6	6
1995	957	115.2	3	988	122.8	3	1827	200	3
1996	1106	100.2	6	1140	98.9	6	1937	119.4	6
1999	752	264.4	6	774	272.5	6	1216	318.4	6
2002	721	47.7	6	752	54.8	6	1296	37.4	6
2005	592	166.8	8	603	171.1	8	1368	302.4	8

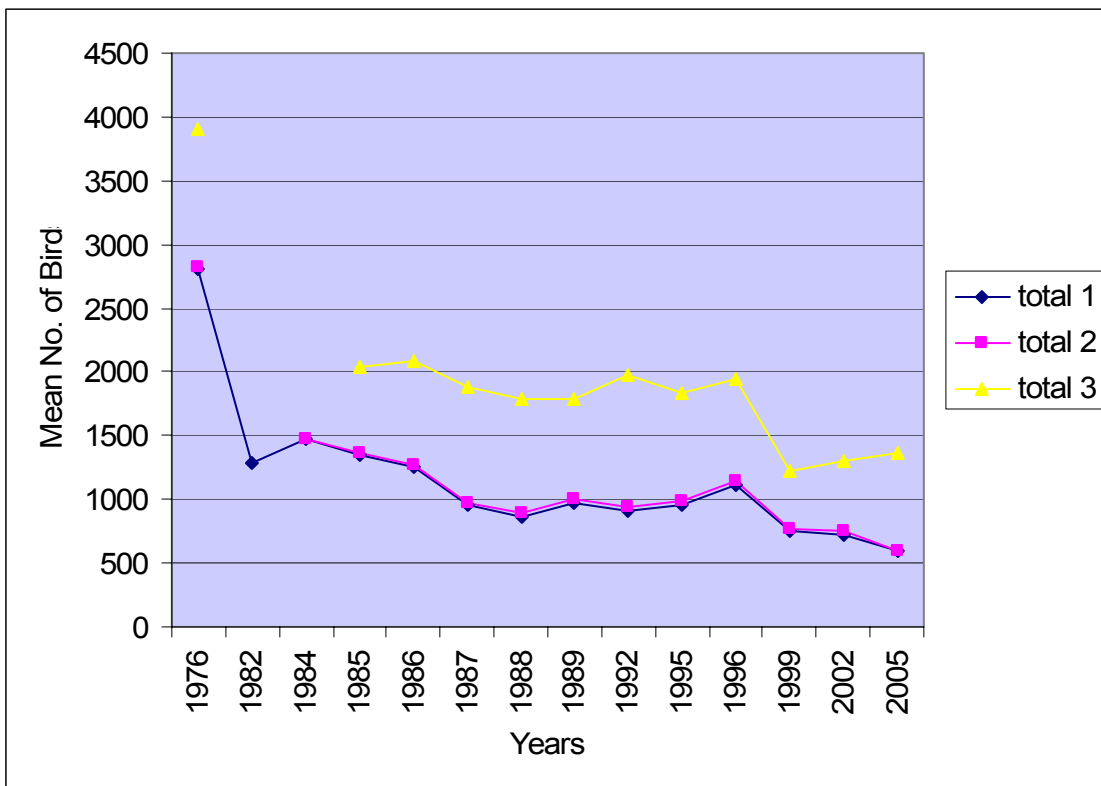


Figure 16. Mean counts of common murrelets at St. Paul Island, Alaska, 1976-2005.

Table 17. Counts of thick-billed murre at St. Paul Island, Alaska, 1976-2005. (Not all plots were counted in all years. Therefore, we summarize data in 3 comparable combinations of plots)

Plot	1976	1982	1984	1985	1985	1985	1985	1986	1986	1986	1986	1986	1986	1987	1987	1987	1987	1987	1987	1988	1988	1988	1988	1988
1	72	9	35	8	8	3	2	9	15	2	3	18	7	4	6	6	7	5	8	5	9	2	1	
2sw	26	26	31	12	14	19	16	26	21	14	19	20	13	17	14	16	20	16	12	12	16	15	10	
2ne	-	-	-	14	14	14	11	16	14	13	15	16	15	16	17	19	24	17	0	0	0	6	0	
3	79	57	88	55	58	58	39	81	78	63	73	99	63	85	80	90	127	82	58	66	71	54	56	
4	100	-	59	23	26	24	18	34	43	36	48	30	38	38	19	43	51	44	27	29	31	41	37	
5sw	266	179	215	149	149	149	101	190	220	275	236	239	175	254	170	268	291	231	125	163	212	222	200	
5ne	120	27	37	43	45	49	43	48	48	51	48	54	72	81	73	81	100	90	59	67	67	59	65	
7	142	117	77	36	34	38	59	50	48	38	46	48	38	50	36	38	50	36	41	44	52	39	45	
8	253	122	130	54	60	44	93	99	69	63	64	77	81	77	84	79	83	90	141	108	142	112	118	
9	133	191	137	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
10	284	157	231	204	187	195	215	313	280	310	223	286	206	238	272	222	294	303	95	120	168	162	225	
11	40	38	38	34	28	42	34	26	33	30	29	28	27	19	25	25	31	30	20	20	31	36	26	
12	193	49	97	78	93	91	73	92	86	76	73	88	70	83	91	86	102	69	55	52	72	70	55	
13	110	186	157	91	84	97	115	96	111	112	110	108	82	100	103	113	108	78	51	73	102	102	71	
14	369	244	289	179	208	184	341	310	334	348	248	325	220	330	323	283	342	393	326	330	347	335	313	
15	206	107	196	136	123	128	146	142	113	139	154	149	66	147	116	115	95	110	91	65	109	88	78	
16	187	26	123	75	50	71	71	75	78	86	68	74	56	100	90	86	93	88	117	82	119	103	86	
17	88	59	72	54	60	54	66	51	55	67	67	55	36	60	58	54	53	63	43	19	60	61	45	
18	254	72	159	109	96	110	110	144	144	163	148	147	158	172	162	151	146	145	166	122	191	143	126	
19 top	179	48	91	72	58	59	77	88	71	83	96	93	81	77	85	77	75	69	60	23	79	63	45	
19 btm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
20 top	37	82	68	58	82	65	78	71	77	83	81	81	65	85	83	79	84	86	64	56	83	75	60	
20 btm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
21	137	-	81	102	82	65	66	112	125.32	156	139	159	143	185	186	214	183	198	72	60	134	145	97	
22	563	308	347	274	259	303	378	345	463	367	360	330	335	354	371	370	407	473	276	328	392	344	359	
23	1073	259	511	357	273	262	489	369	454	514	553	405	468	446	465	436	471	552	304	429	380	314	439	
24	65	-	94	47	58	51	97	92	97	120	111	89	76	78	87	99	80	83	60	74	100	74	80	
25	87	-	74	52	98	56	62	47	59	67	61	58	36	45	55	47	56	52	38	48	52	39	35	
26	250	-	232	120	100	105	151	117	149	165	160	162	155	165	141	167	160	166	114	76	147	148	153	
27	13	-	1	0	3	4	4	2	2	2	3	2	2	1	1	1	1	1	1	1	1	1	1	
28	224	-	151	94	117	122	135	181	138	181	175	160	120	155	133	162	176	150	125	126	150	127	150	
29	329	-	247	150	153	134	151	152	270	233	225	229	91	124	130	137	151	139	77	74	100	142	137	
29 new	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
31	2179	1383	2040	1910	1960	1817	1965	1716	2001	1815	1942	1947	1788	1958	1968	1797	2014	1981	1822	1627	1645	1545	1812	
32	1952	598	1891	1460	1340	1325	1368	1592	1924	1927	1680	1723	1589	1754	1632	1633	1768	1720	1548	1641	1883	1582	1923	
33	1087	-	-	805	917	958	925	1193	1217	1455	1527	1023	1304	1339	1270	1279	1537	1470	1190	1261	1281	1288	1272	
total ^a	8397	4068	6728	5319	5159	5038	5742	5807	6590	6473	6186	6265	5604	6331	6159	5965	6615	6559	5322	5351	6051	5362	6027	
total ^b	9136	-	7339	5655	5561	5400	6209	6280	7078	7044	6744	6766	6031	6813	6595	6484	7139	7055	5687	5705	6532	5792	6483	
total ^c	10223	-	-	6460	6478	6358	7134	7473	8295	8499	8271	7789	7335	8152	7865	7763	8676	8525	6877	6966	7813	7080	7755	

Table 17. Counts of thick-billed murres on St. Paul Island, Alaska, 1976-2005, continued.

Plot	1988	1988	1989	1989	1989	1989	1989	1989	1989	1989	1992	1992	1992	1992	1992	1992	1995	1995	1995	1996	1996	1996	1996
1	7	7	3	17	10	22	18	9	14	12	23	19	15	12	20	2	0	5	21	23	21	26	
2sw	18	20	6	20	30	41	31	38	28	46	35	31	30	30	21	33	18	28	37	39	39	32	31
2ne	17	15	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0
3	92	94	47	84	70	97	62	71	64	73	68	62	72	51	43	77	48	37	80	61	74	72	79
4	52	35	44	58	54	66	63	54	69	72	34	38	54	40	50	39	25	21	48	50	58	51	54
5sw	240	225	55	62	61	65	46	48	62	69	118	142	186	211	225	225	148	155	266	246	218	198	242
5ne	66	56	194	253	213	216	215	218	209	221	50	44	46	33	40	42	9	13	32	53	23	47	47
7	61	48	16	32	28	34	33	24	35	28	27	34	35	33	35	45	26	23	45	49	48	31	39
8	149	116	39	73	38	55	49	54	76	43	64	68	80	82	72	91	51	42	115	140	94	129	133
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	214	217	182	178	200	218	196	239	207	190	149	141	168	137	148	158	110	113	159	211	177	196	202
11	32	30	19	24	25	27	24	24	25	25	15	11	11	16	22	22	6	6	23	26	22	24	22
12	79	67	74	96	77	91	101	105	84	100	60	55	37	67	60	70	40	52	47	64	92	55	85
13	107	101	48	76	85	87	83	80	97	81	80	94	71	82	92	95	52	69	86	103	96	116	95
14	391	384	250	266	339	427	382	349	379	401	346	360	362	361	434	425	148	186	266	237	231	343	250
15	103	94	86	48	96	94	105	92	107	86	57	71	57	72	73	63	120	108	140	173	181	180	199
16	127	107	85	83	113	98	78	100	107	77	65	92	63	86	80	70	63	84	54	60	60	58	61
17	60	65	54	37	38	48	47	54	45	47	-	-	-	-	-	-	27	34	32	-	-	-	-
18	183	143	122	92	118	129	147	130	154	170	160	180	155	188	186	174	118	99	163	97	115	116	131
19 top	72	56	40	25	43	50	44	51	51	66	51	50	30	44	44	30	27	27	26	1	21	22	27
19 btm	-	-	-	-	-	-	-	-	-	-	109	120	107	108	102	111	92	103	99	106	115	108	101
20 top	69	85	58	52	78	79	74	86	74	79	78	78	46	80	93	76	54	58	54	47	61	56	61
20 btm	-	-	-	-	-	-	-	-	-	-	46	43	46	48	53	45	38	41	51	47	50	48	49
21	187	167	55	21	65	76	87	82	86	97	-	-	-	-	-	-	-	-	-	-	-	-	-
22	350	424	368	355	402	447	408	296	434	405	264	199	250	234	241	251	92	92	177	280	272	353	284
23	365	435	246	278	375	429	392	277	361	431	319	262	353	299	276	330	84	135	309	233	246	344	247
24	83	80	77	95	91	88	71	77	77	83	-	91	88	92	83	80	63	55	60	76	71	89	72
25	49	45	31	45	40	37	47	33	43	44	50	43	49	52	45	51	27	19	22	39	38	37	32
26	162	138	121	125	149	155	126	89	107	137	125	139	142	175	141	161	102	96	140	146	135	145	143
27	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	154	155	120	125	117	132	119	106	96	117	96	98	114	121	119	101	39	53	87	85	83	68	68
29	189	162	90	77	116	119	120	96	108	127	-	-	-	-	-	-	-	-	-	-	-	-	-
29 new	-	-	-	-	-	-	-	-	-	-	337	331	325	386	408	378	262	304	318	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	274	272	251	286	272	224	102	111	161	103	140	94	160
31	1747	1945	2189	1889	1558	1805	1838	1740		1628	1747	1629	1835	1967	1975	1868	1492	1759	2031	1850	1715	2047	2056
32	1735	1624	1633	1522	1586	1571	1463	1644	1707	1755	1849	2048	1659	2129	1667	1969	1114	1489	1785	1507	1368	1683	1745
33	1465	1323	853	1014	1070	944	1135	1068	1002	1182	1264	1524	1436	1162	1657	1270	1236	1231	1389	1287	1012	1106	1182
total ^a	6080	6171	5675	5442	5432	5984	5711	5575	4168	5909	5560	5578	5498	6116	5759	6064	3759	4491	5846	5438	5116	6065	6001
total ^b	6581	6625	6068	5890	5883	6462	6137	5934	4560	6362	5865	5987	5945	6596	6197	6496	4015	4735	6203	5834	5501	6455	6370
total ^c	8046	7948	6921	6904	6953	7406	7272	7002	5562	7544	7129	7511	7381	7758	7854	7766	5251	5966	7592	7121	6513	7561	7552

Table 17. Counts of thick-billed murrens on St. Paul Island, Alaska, 1976-2005, continued.

Plot	1996	1996	1999	1999	1999	1999	1999	1999	2002	2002	2002	2002	2002	2002	2002	2005	2005	2005	2005	2005	2005	2005	2005
1	24	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	
2sw	37	36	8	5	13	14	20	26	1	0	2	5	4	6	9	0	0	0	0	0	0	0	5
2ne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3	74	92	53	47	106	81	113	103	14	11	32	20	22	25	24	26	6	3	17	36	29	21	
4	50	61	36	17	59	54	63	61	28	38	67	93	73	63	1	20	8	13	116	186	173	133	
5sw	230	268	136	110	136	218	161	202	22	23	34	45	39	50	47	64	43	9	115	102	100	100	
5ne	62	54	11	15	37	35	42	31	17	43	61	127	101	114	41	51	45	11	71	116	109	92	
7	40	45	30	40	54	74	65	57	7	0	3	12	30	49	26	37	18	12	31	38	29	34	
8	115	125	52	43	71	92	86	91	129	113	176	192	169	179	7	147	46	32	280	293	282	219	
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
10	197	213	97	78	181	193	185	216	103	106	123	139	132	135	16	72	52	32	114	146	127	123	
11	25	23	10	10	24	25	23	24	2	25	39	43	40	37	0	1	4	7	20	35	30	27	
12	54	45	18	53	34	37	43	42	66	57	46	40	37	44	40	48	27	17	55	68	51	42	
13	105	100	51	20	86	94	108	112	64	73	77	85	73	76	6	26	20	17	124	125	121	110	
14	281	323	136	180	193	235	229	331	155	128	207	255	189	221	54	133	13	59	125	132	127	125	
15	206	169	15	66	169	132	123	133	25	59	72	76	54	55	41	52	46	32	73	79	49	51	
16	56	59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
18	135	88	158	83	44	77	43	48	71	100	131	157	123	129	83	59	47	6	51	97	77	37	
19 top	28	21	36	38	78	126	89	102	16	43	83	80	73	58	53	92	77	44	97	78	170	71	
19 btm	70	116	79	54	115	48	186	207	7	18	35	34	31	25	97	126	93	40	234	261	140	75	
20 top	60	74	38	30	44	48	47	55	30	38	57	94	72	72	15	25	21	26	57	60	71	60	
20 btm	51	47	28	22	35	34	34	40	16	24	35	58	44	44	7	11	10	4	38	43	12	14	
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
22	285	287	138	308	273	192	295	330	137	133	155	189	146	164	1	107	53	33	228	199	169	163	
23	241	227	95	137	186	99	78	224	96	146	155	203	139	161	3	148	99	34	198	249	210	202	
24	71	86	48	59	54	74	49	88	33	45	44	46	45	43	39	43	41	23	45	37	42	43	
25	27	35	0	31	18	28	41	31	37	31	37	36	29	30	37	40	29	19	51	52	61	48	
26	134	132	87	96	135	127	67	156	71	88	85	80	76	82	71	121	101	31	135	103	101	89	
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
28	75	59	47	32	63	76	48	97	36	57	65	74	58	54	12	37	26	19	61	66	76	71	
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
29 new	-	-	170	175	239	308	154	213	144	176	227	237	201	193	19	110	79	11	139	209	192	142	
30	165	149	58	72	146	125	148	168	82	137	183	204	151	175	113	166	121	25	97	165	136	166	
31	1952	2352	1038	1463	1416	1873	1996	1293	1747	1645	1704	1774	1906	1715	1208	1117	1309	1909	1217	1783	1546	1520	
32	1641	1997	794	1139	1245	1454	1882	1691	1084	1656	1440	1762	1356	1582	302	943	512	612	1486	1247	1622	1090	
33	1239	1210	1015	1039	1097	1626	1854	1242	1174	1451	1214	1423	1296	1099	831	761	1351	1716	1481	1609	727	1184	
total ^a	5792	6566	2914	3865	4390	5099	5628	5111	3786	4399	4597	5298	4705	4872	3738	4032	3858	4195	4603	5462	4940	4752	
total ^b	6149	6939	3132	4100	4719	5458	5896	5544	3991	4658	4895	5627	4986	5144	3912	4410	4134	4305	5049	5939	5383	5155	
total ^c	7388	8149	4147	5139	5816	7084	7750	6786	5165	6109	6109	7050	6282	6243	4214	5353	4646	4917	6535	7186	7005	6245	

^atotal of plots 1, 2sw, 3, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 31, 32, 28, 31, 32.

^btotal of plots 1, 2sw, 3, 4, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 24, 25, 26, 27.

^ctotal of plots 1, 2sw, 3, 4, 5sw, 5ne, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19 top, 20 top, 22, 23, 24, 25, 26, 27, 28, 31, 32, 33.

Table 18. Mean counts of thick-billed murrens at St. Paul Island, Alaska, 1976-2005.

Year	Total 1			Total 2			Total 3		
	Mean	SD	n	Mean	SD	n	Mean	SD	n
1976	8397		1	9136		1	10223		1
1982	4068		1			1			1
1984	6728		1	7339		1			1
1985	5315	307.3	4	5706	351.3	4	6608	355	4
1986	6264	302	5	6782	320.1	5	8065	421.4	5
1987	6206	382	6	6686	408.8	6	8053	501	6
1988	5766	397	7	6200	445.5	7	7498	502	7
1989	5737	273	8	6162	267.3	8	7195	283	8
1992	5763	269	6	6181	304.9	6	7567	279	6
1995	4699	1059	3	4984	1115.3	3	6270	1200	3
1996	5830	508	6	6208	503	6	7381	543	6
1999	4501	994	6	4808	1045.6	6	6120	1340	6
2002	4610	505	6	4884	543.8	6	6160	602	6
2005	3589	1127.7	8	3892	1255.9	8	5099	1352.3	8

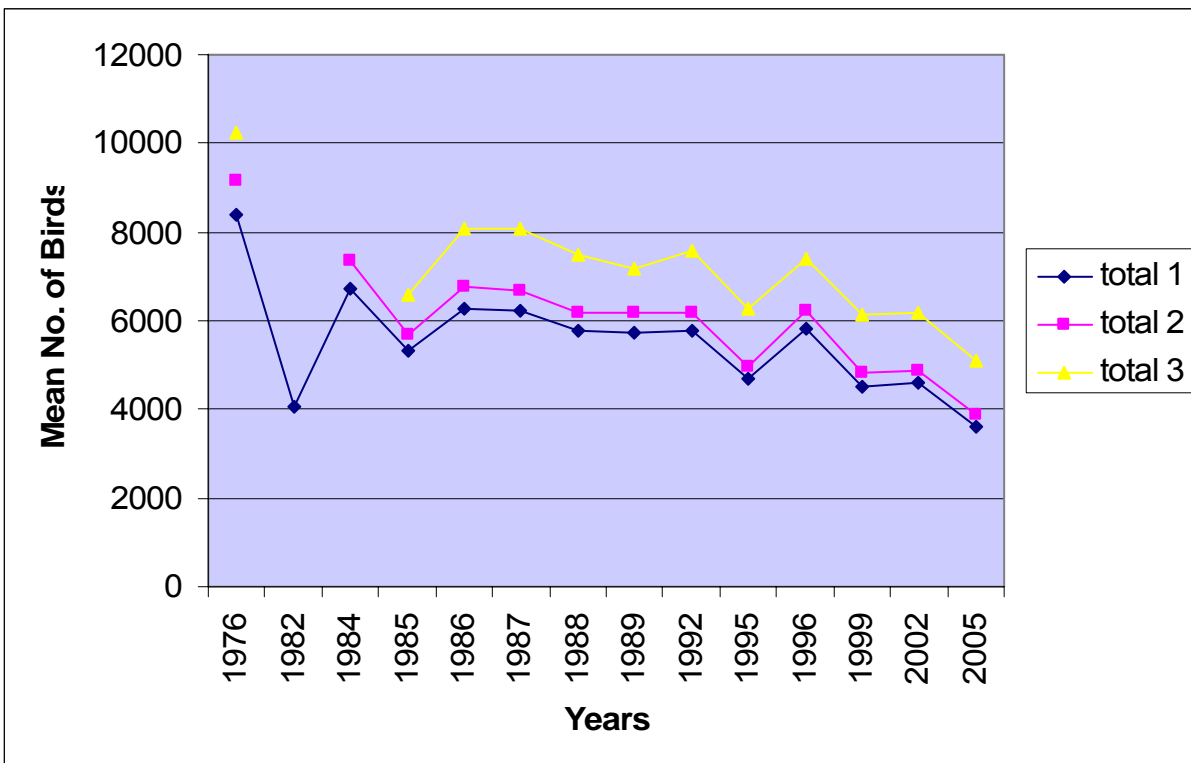


Figure 9. Mean counts of thick-billed murrens at St. Paul Island, Alaska, 1976-2005.

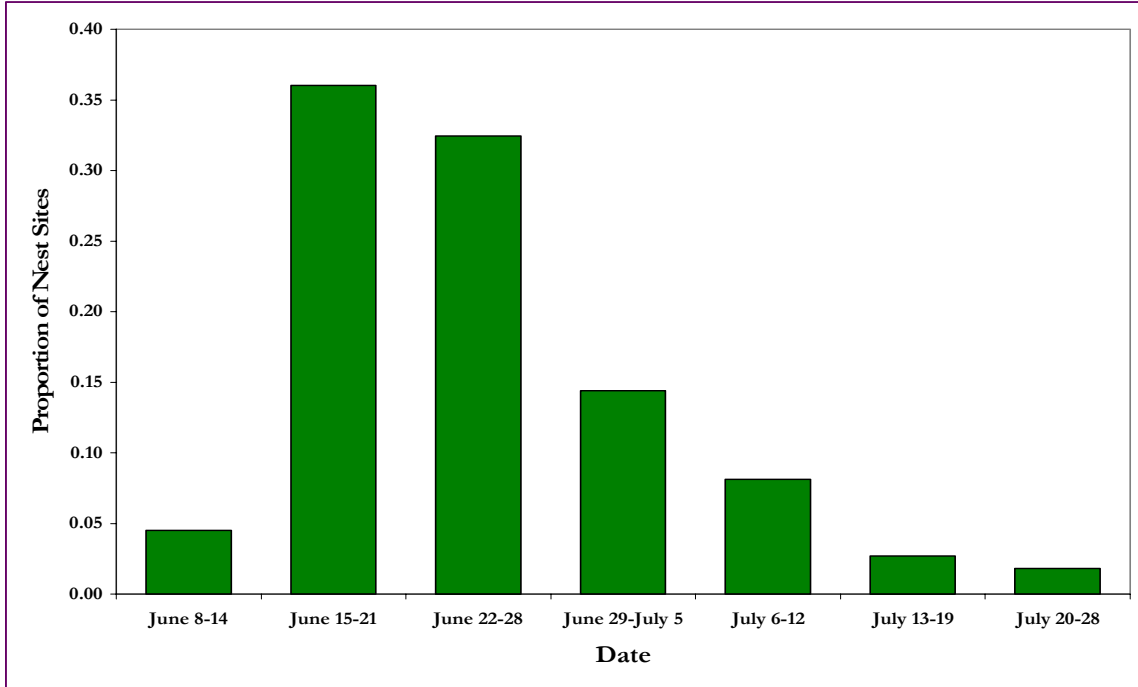


Figure 10. Hatch date frequency distribution as proportion per week of red-faced cormorants at St. Paul Island, Alaska, in 2005.

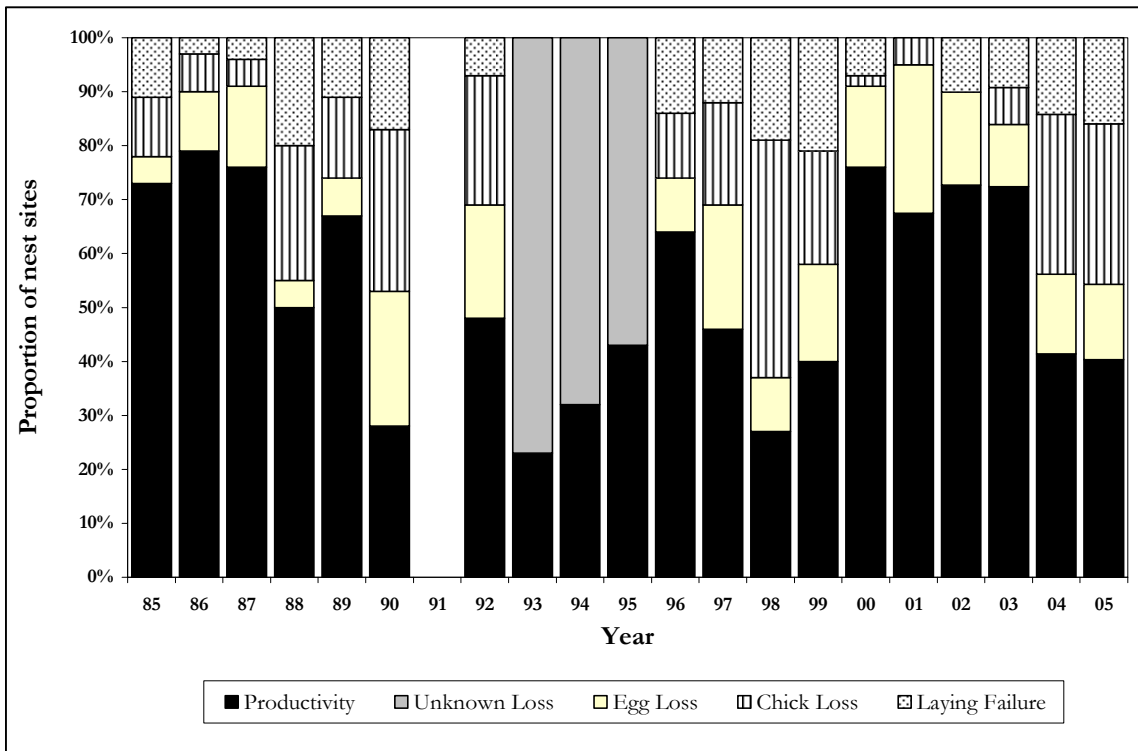


Figure 11. Reproductive performance of red-faced cormorants at St. Paul Island, Alaska, 1985 – 2005 (not monitored in 1991).

Table 19. Reproductive performance of red-faced cormorants on plots (n = 9)^a at St. Paul Island, Alaska in 2005.

Parameter	Productivity Plots ^a										Mean	sd
	90 +90W	Reef+Fox Pt. Tour Pt	66	64	88W +88E	89	89E	89B +tunnel	44S+47 51+53	Total		
Total nests (A)	31	27	23	27	31	52	28	23	16	258		
No. nests ≥ 1 egg (B)	29	21	17	12	26	49	26	22	15	217		
Minimum no. eggs (C)	100	61	53	23	90	159	80	70	43	679		
No. nests ≥ 1 chick (D)	24	11	8	0	15	44	14	14	10	140		
Minimum no. chicks (E)	65	21	23	0	41	125	42	39	25	381		
No. nests ≥ 1 chick fledged (F)	23	10	1	0	14	27	13	10	6	104		
Total chicks fledged (G)	48	19	1	0	29	68	34	26	14	239		
Laying success (B/A)	0.94	0.78	0.74	0.44	0.84	0.94	0.93	0.96	0.94	0.84	0.05	
Clutch size (C/B)	3.45	2.90	3.12	1.92	3.46	3.24	3.08	3.18	2.87	3.13	0.10	
Nesting success (D/B)	0.83	0.52	0.47	0.00	0.58	0.90	0.54	0.64	0.67	0.65	0.08	
Hatching success (E/C)	0.65	0.34	0.43	0.00	0.46	0.79	0.53	0.56	0.58	0.56	0.07	
Chick success (G/E)	0.74	0.90	0.04	0.00	0.71	0.54	0.81	0.67	0.56	0.63	0.06	
Egg success (G/C)	0.48	0.31	0.02	0.00	0.32	0.43	0.43	0.37	0.33	0.35	0.04	
Fledging success (F/D)	0.96	0.91	0.13	0.00	0.93	0.61	0.93	0.71	0.60	0.74	0.08	
Reproductive success (F/B)	0.79	0.48	0.06	0.00	0.54	0.55	0.50	0.45	0.40	0.48	0.08	
Fledglings/nest initiation (G/A)	1.55	0.70	0.04	0.00	0.94	1.31	1.21	1.13	0.88	0.93	0.18	
Overall productivity (F/A)	0.74	0.37	0.04	0.00	0.45	0.52	0.46	0.43	0.38	0.40	0.08	
Fledgling brood size (G/D)	2.00	1.73	0.13	0.00	1.93	1.55	2.43	1.86	1.40	1.71	0.15	

^aPlots were combined for statistical analyses.

sd = standard deviation - derived from ratio estimator worksheets with plots as the sample unit.

Table 20. Red-faced cormorant chicks banded at St. Paul Island, Alaska in 2005.

Date 2005	USFWS Band (Rt)	Color Band (L)	Weight (Kg)	Wing Ch. Rt. (mm)	Head/Bill (mm)	Culmen (mm)	R. Tarsus (mm)	Tail (mm)	Bill Depth (mm)	Bill Width (mm)	Regurge? Y/N
7/23	1018-01201	1	1.59	245	119.4	54.0	54.0	113	12.7	12.0	Y
7/23	1018-01202	2	1.83	196	119.8	53.7	61.0	63	16.2	13.2	N
7/23	1018-01203	3	1.62	211	114.6	51.3	56.4	80	14.6	13.3	Y
7/23	1018-01204	4	1.72	183	111.5	47.5	59.9	60	14.8	13.3	Y?
7/23	1018-01205	5	1.47	174	104.9	47.0	56.2	57	14.4	12.3	Y?
7/23	1018-01206	7	1.56	183	110.5	50.8	58.2	54	15.9	12.4	Y
7/23	1018-01207	8	1.33	169	107.3	49.0	58.1	47	13.5	11.2	N
8/3	1018-01208	9	2.12	234	125.3	57.7	60.8	104	14.6	14.3	N
8/3	1018-01209	10	2.02	236	123.5	55.3	59.1	97	14.3	12.4	Y
8/3	1018-01210	11	1.55	213	112.7	49.5	54.2	83	11.7	10.6	Y
8/3	1018-01211	12	1.84	205	119.2	52.3	58.9	52	13.9	12.5	Y
8/3	1018-01212	13	1.71	183	114.9	48.4	60.0	48	13.7	12.2	N
8/3	1018-01213	14	2.02	231	125.9	54.2	61.7	88	15.1	13.9	N
8/3	1018-01214	15	1.57	222	114.3	50.2	55.0	91	12.3	12.3	N
8/3	1018-01215	17	2.06	269	127.8	58.8	63.1	127	14.0	12.9	N
8/3	1018-01216	18	1.72	232	120.5	55.7	56.6	107	13.7	13.2	N
8/3	1018-01217	19	2.05	231	125.4	56.4	61.3	94	14.5	14.2	N
8/5	1018-01218	20	1.74	236	117.6	57.8	57.8	115	13.3	12.1	N
8/5	1018-01219	21	1.68	233	117.3	52.3	55.5	109	11.6	11.6	N
8/5	1018-01220	22	1.97	200	120.3	53.2	62.4	68	17.0	13.8	Y
8/5	1018-01221	23	1.98	225	121.4	55.2	59.7	87	16.4	14.4	Y
8/5	1018-01222	24	1.68	211	115.2	52.6	56.1	85	13.2	12.9	Y
8/5	1018-01223	25	1.42	190	111.7	54.4	55.5	68	13.8	11.2	N
8/5	1018-01224	27	1.64	213	113.8	52.4	56.6	88	13.7	11.7	N
8/5	1018-01225	28	1.53	209	115.9	54.1	56.7	77	13.5	12.6	N
8/5	1018-01226	29	2.05	214	126.1	56.9	63.3	74	14.9	14.2	N
8/5	1018-01227	30	2.03	221	124.6	56.1	61.6	79	15.9	13.8	N
8/5	1018-01228	31	1.36	161	108.7	49.1	53.3	50	15.3	11.6	N
8/5	1018-01229	32	2.04	244	125.1	56.0	61.1	110	16.1	14.3	N
8/5	1018-01230	33	1.73	233	120.2	54.7	56.2	109	13.0	11.5	N
8/5	1018-01231	34	1.83	231	121.2	54.8	57.7	106	13.1	13.0	N
8/5	1018-01232	35	2.04	235	127.4	56.1	60.7	96	15.7	13.8	N
8/10	1018-01233	37	1.72	186	117.4	50.7	59.1	52	14.4	14.2	Y
8/10	1018-01234	38	1.39	168	107.3	49.6	56.4	55	12.9	12.7	Y
8/10	1018-01235	39	1.49	151	102.1	48.3	62.5	44	15.9	13.2	Y
8/10	1018-01236	40	1.61	189	112.0	54.0	58.2	65	14.0	13.0	Y?
8/10	1018-01237	41	1.64	192	113.0	54.5	58.5	65	13.8	13.4	Y
8/10	1018-01238	42	1.55	262	127.0	53.2	50.4	127	15.1	15.3	Y
8/10	1018-01239	43	2.10	244	127.4	56.7	62.0	111	16.0	13.6	N
8/10	1018-01240	44	2.29	259	133.8	56.4	63.1	122	16.4	15.1	N
8/10	1018-01241	45	2.20	252	126.6	55.8	62.5	112	16.1	15.1	N
8/11	1018-01242	47	2.11	286	126.8	56.5	63.3	147	16.9	13.4	Y
8/11	1018-01243	48	2.05	283	128.6	57.5	62.9	150	16.0	14.5	Y
8/11	1018-01244	49	2.03	286	132.6	57.3	60.4	159	14.1	14.7	Y
8/11	1018-01245	50	1.57	231	114.4	56.0	54.8	109	13.1	12.4	N
8/11	1018-01246	51	1.60	244	119.0	56.2	56.0	117	12.9	11.8	Y
8/11	1018-01247	52	1.73	246	120.8	55.6	57.3	122	14.5	12.8	N
8/11	1018-01248	53	2.09	251	126.7	59.4	62.9	NA	16.2	14.0	N
8/11	1018-01249	54	1.44	222	114.6	54.2	54.1	96	13.3	12.6	N
8/11	1018-01250	55	1.66	196	112.3	53.5	57.2	68	13.3	12.5	N
8/11	1018-01251	57	1.51	188	110.5	51.4	53.9	58	14.5	12.6	N
8/11	1018-01252	58	1.62	183	109.7	50.3	57.3	64	14.5	13.7	N
8/11	1018-01253	59	2.21	275	124.6	57.3	62.3	133	15.6	13.9	N
8/11	1018-01254	70	2.14	281	129.2	60.3	60.7	145	15.4	13.8	N
8/11	1018-01255	71	1.24	262	117.6	54.4	57.3	132	11.6	13.2	Y

Table 21. Hatching chronology of black-legged kittiwakes at St. Paul Island, Alaska, 1976-2005^a

Year	Mean hatch date	Sample Size	Standard Deviation
1975	2 August	33	4.7
1976 ^b	29 July	23	2.8
1977	28 July	60	4.9
1978	28 July	39	5.0
1979	29 July	19	4.3
1985	5 August	62	5.5
1986	19 July	229	6.1
1987	16 July	148	6.5
1988	17 July	113	6.3
1989	29 July	30	6.1
1990	8 July	189	5.6
1992	8 July	333	6.1
1996	28 July	not reported	not reported
1997	19 July	133	not reported
1998	21 July	199	not reported
1999	27 July	31	not reported
2000	6 July	236	not reported
2001	11 July	not reported	not reported
2002	4 July	210	5.4
2003	12 July	201	5.7
2004	5 July	273	5.6
2005	20 July	52	8.5

^aNot monitored in 1980–1983, 1991. Phenology not recorded in 1984, 1993–1995.

^bOnly used nest observations in which an egg and then a chick were seen less than 7 days apart.

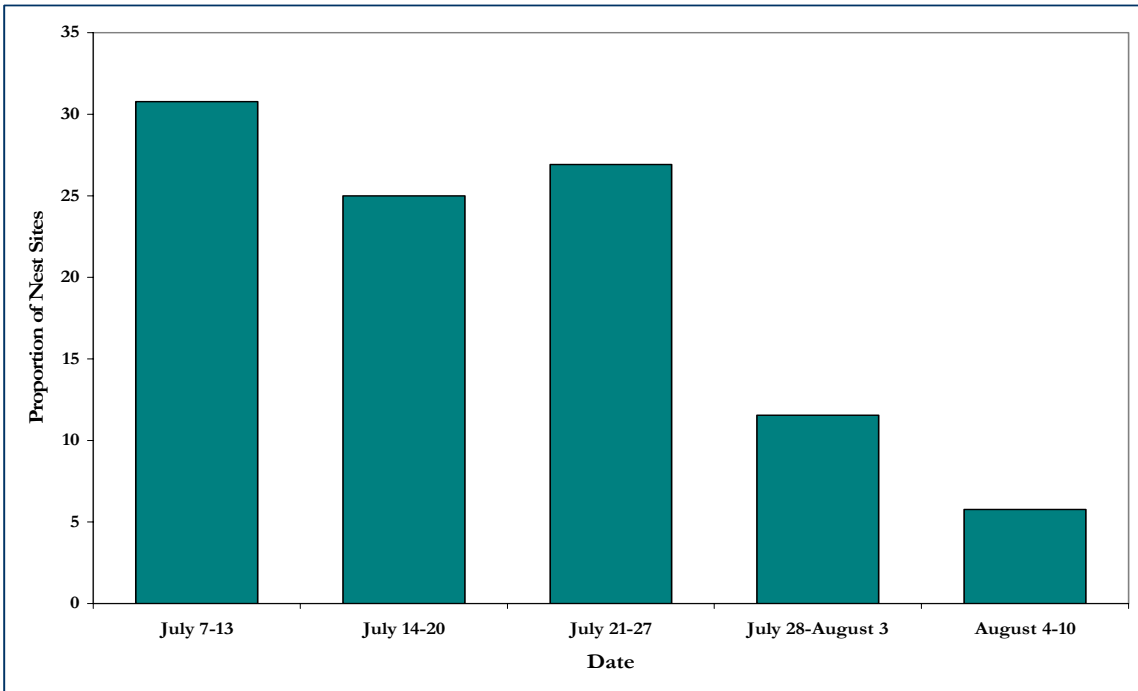


Figure 12. Hatch date frequency distribution as percent per date interval for black-legged kittiwakes at St. Paul Island, Alaska in 2005.

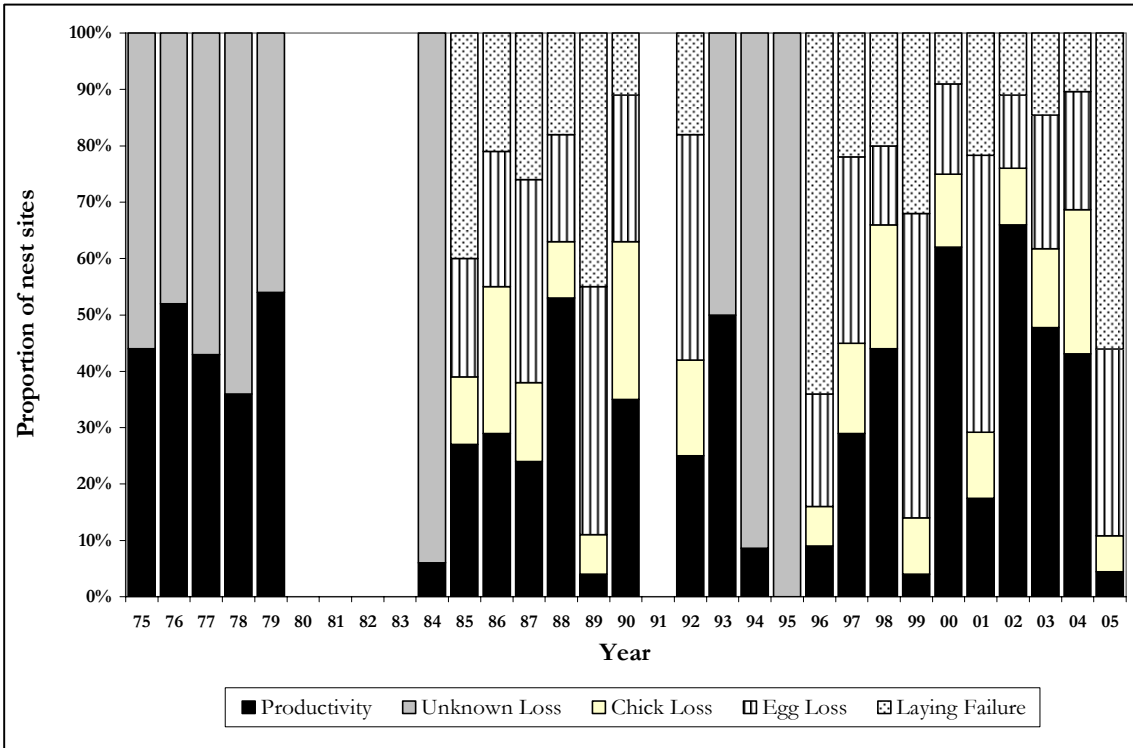


Figure 13. Reproductive performance of black-legged kittiwakes at St. Paul Island, Alaska 1975-2005. (Not monitored in 1980 – 1983, 1991).

Table 22. Reproductive performance of black-legged kittiwakes on index plots (n=18) at St. Paul Island , Alaska, in 2005.

Parameter	Productivity Plots ^a																		Total	Mean	sd								
	90+	64.5+	65	68	70	89	88E+W	44+48	50	55	56	52	110	91	64+66	+67	+69	+71				87	104	+89E	89.5+109	44S	47	49	+51
Total nests (A)	32	40	29	23	33	18	26	32	28	21	39	42	29	36	29	27	31	28	543										
No. nests ≥ 1 egg (B)	21	31	9	7	9	3	13	26	21	13	13	19	5	11	14	4	9	11	239										
Minimum no. eggs (C)	33	50	11	8	9	4	17	38	23	15	15	23	6	15	17	4	11	11	310										
No. nests ≥ 1 chick (D)	6	11	1	0	0	0	0	1	15	4	2	7	0	2	4	0	6	0	59										
Minimum no. chicks (E)	7	14	1	0	0	0	0	1	17	4	2	7	0	2	5	0	6	0	66										
No. nests ≥ 1 chick fledged (F)	0	4	1	0	0	0	0	0	11	4	0	3	0	0	1	0	0	0	24										
Total chicks fledged (G)	0	4	1	0	0	0	0	0	13	4	0	3	0	0	2	0	0	0	27										
Laying success (B/A)	0.66	0.78	0.31	0.30	0.27	0.17	0.50	0.81	0.75	0.62	0.33	0.45	0.17	0.31	0.48	0.15	0.29	0.39	0.44	0.05									
Clutch size (C/B)	1.57	1.61	1.22	1.14	1.00	1.33	1.31	1.46	1.10	1.15	1.15	1.21	1.20	1.36	1.21	1.00	1.22	1.00	1.30	0.06									
Nesting success (D/B)	0.29	0.35	0.11	0.00	0.00	0.00	0.00	0.04	0.71	0.31	0.15	0.37	0.00	0.18	0.29	0.00	0.67	0.00	0.25	0.06									
Hatching success (E/C)	0.21	0.28	0.09	0.00	0.00	0.00	0.00	0.03	0.74	0.27	0.13	0.30	0.00	0.13	0.29	0.00	0.55	0.00	0.21	0.06									
Chick success (G/E)	0.00	0.29	1.00	0.00	0.00	0.00	0.00	0.00	0.76	1.00	0.00	0.43	0.00	0.00	0.40	0.00	0.00	0.00	0.41	0.14									
Egg success (G/C)	0.00	0.08	0.09	0.00	0.00	0.00	0.00	0.00	0.57	0.27	0.00	0.13	0.00	0.00	0.12	0.00	0.00	0.00	0.09	0.05									
Fledging success (F/D)	0.00	0.36	1.00	0.00	0.00	0.00	0.00	0.00	0.73	1.00	0.00	0.43	0.00	0.00	0.25	0.00	0.00	0.00	0.41	0.12									
Reproductive success (F/B)	0.00	0.13	0.11	0.00	0.00	0.00	0.00	0.00	0.52	0.31	0.00	0.16	0.00	0.00	0.07	0.00	0.00	0.00	0.10	0.04									
Fledglings/nest initiation (G/A)	0.00	0.10	0.03	0.00	0.00	0.00	0.00	0.00	0.46	0.19	0.00	0.07	0.00	0.00	0.07	0.00	0.00	0.00	0.05	0.03									
Overall productivity (F/A)	0.00	0.10	0.03	0.00	0.00	0.00	0.00	0.00	0.39	0.19	0.00	0.07	0.00	0.00	0.03	0.00	0.00	0.00	0.04	0.02									

^aPlots were combined for statistical analyses.

sd = standard deviation - derived from ratio estimator worksheets with plots as the sample unit.

Table 23. Hatching Chronology of red-legged kittiwakes at St. Paul Island, Alaska, 1976-2005.

Year	Mean hatch date	Sample size	Standard deviation
1975	31 July	3	0
1976	31 July	41	4.7
1977	27 July	10	6.7
1978	13 August	7	11.9
1979	11 August	12	3.8
1985	5 August	6	5.1
1986	20 July	19	10.1
1987	23 July	2	2.1
1988	19 July	17	11
1990	12 July	11	5.3
1992	8 July	21	4.4
1996	3 August	only 1 hatched	--
1997	19 July	11	not reported
1998	23 July	22	not reported
1999	17 July	18	not reported
2000	8 July	23	not reported
2001	13 July	not reported	not reported
2002	9 July	16	6.6
2003	27 July	5	7.2
2004	10 July	20	6.7
2005	N/A ^a	5	N/A

^aFor red-legged kittiwakes, zero eggs hatched in 2005

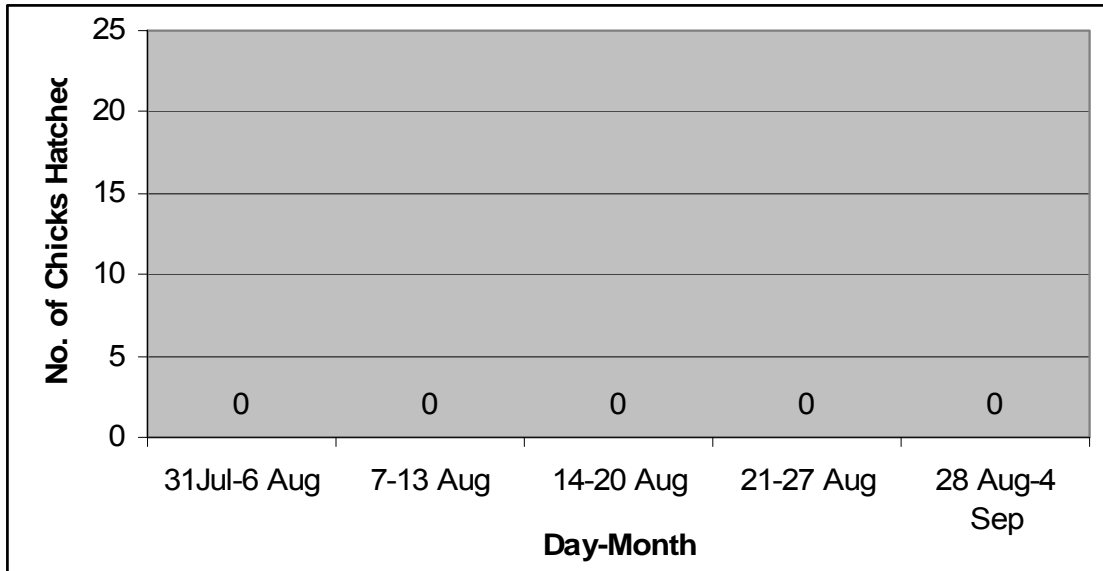


Figure 14. Breeding chronology of red-legged kittiwakes at St. Paul Island, Alaska, 2005.

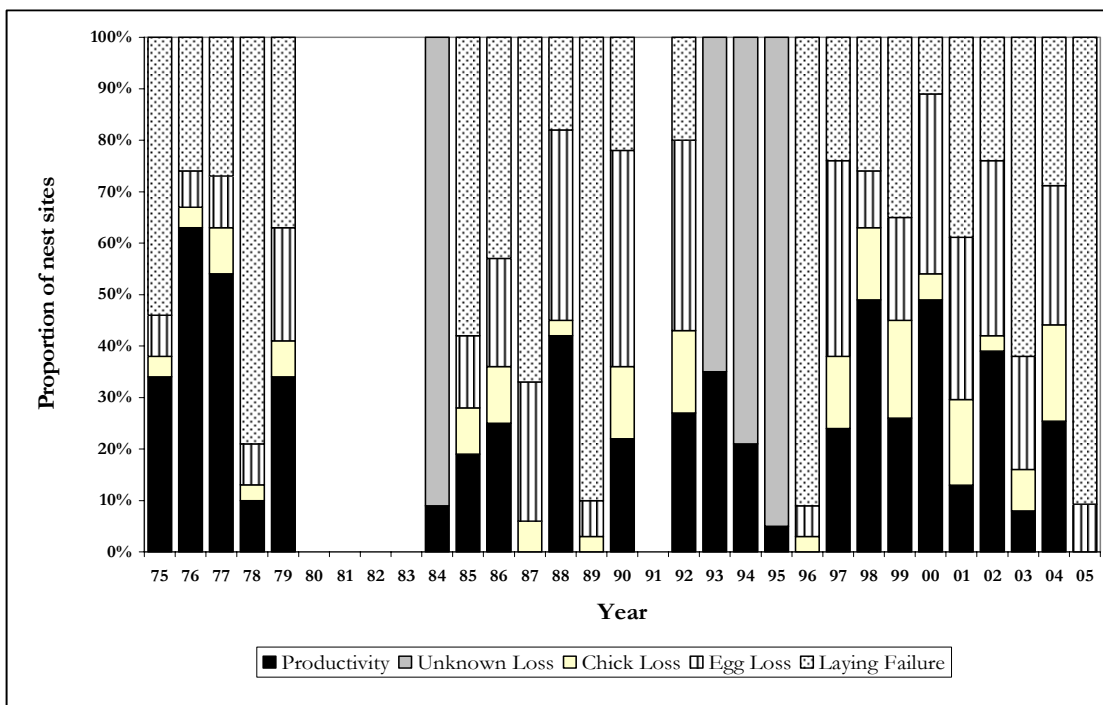


Figure 15. Reproductive performance of red-legged kittiwakes at St. Paul Island, Alaska, 1975-2005 (Not monitored in 1980-1983 and 1991).

Table 24. Reproductive performance of red-legged kittiwakes on index plots (n = 4)^a at St. Paul Island, Alaska in 2005.

Parameter	Productivity Plots ^a				Total	Mean	Sd
	56+56A +56B	53 +54	44+47+48 49+50+51	65+66+85 +87+104			
Total nests (A)	15	13	12	14	54		
No. nests ≥ 1 egg (B)	0	0	5	0	5		
Minimum no. eggs (C)	0	0	5	0	5		
No. nests ≥ 1 chick (D)	0	0	0	0	0		
Minimum no. chicks (E)	0	0	0	0	0		
No. nests ≥ 1 chick fledged (F)	0	0	0	0	0		
Total chicks fledged (G)	0	0	0	0	0		
Laying success (B/A)	0.00	0.00	0.42	0.00	0.09	0.10	
Clutch size (C/B)	0.00	0.00	1.00	0.00	1.00	0.00	
Nesting success (D/B)	0.00	0.00	0.00	0.00	0.00	0.00	
Hatching success (E/C)	0.00	0.00	0.00	0.00	0.00	0.00	
Chick success (G/E)	0.00	0.00	0.00	0.00	0.00	0.00	
Egg success (G/C)	0.00	0.00	0.00	0.00	0.00	0.00	
Fledging success (F/D)	0.00	0.00	0.00	0.00	0.00	0.00	
Reproductive success (F/B)	0.00	0.00	0.00	0.00	0.00	0.00	
Fledglings/nest initiation (G/A)	0.00	0.00	0.00	0.00	0.00	0.00	
Overall productivity (F/A)	0.00	0.00	0.00	0.00	0.00	0.00	

^aPlots were combined for statistical analyses.

sd = standard deviation - derived from ratio estimator worksheets with plots as the sample unit.

Table 25. Hatching chronology dates of common murrelets at St. Paul Island, Alaska, 1976-2005

Year	Mean hatch date	Sample size	Standard deviation
1975	17 August	3	1.2
1976	2 August	3	6.9
1977	14 August	14	6.0
1978	25 July	7	4.7
1985	2 August	5	5.4
1986	2 August	33	6.5
1987	28 July	39	5.3
1988	31 July	116	7.2
1989	9 August	165	7.2
1990	29 July	not reported	not reported
1992	29 July	74	5.8
1996	10 August	not reported	not reported
1997	10 August	30	not reported
1998	15 August	10	not reported
1999	8 August	97	not reported
2000	1 August	107	not reported
2001	1 August	not reported	not reported
2002	6 August	82	4.9
2003	29 July	51	7.7
2004	10 August	40	11.1
2005	18 August	10	6.4

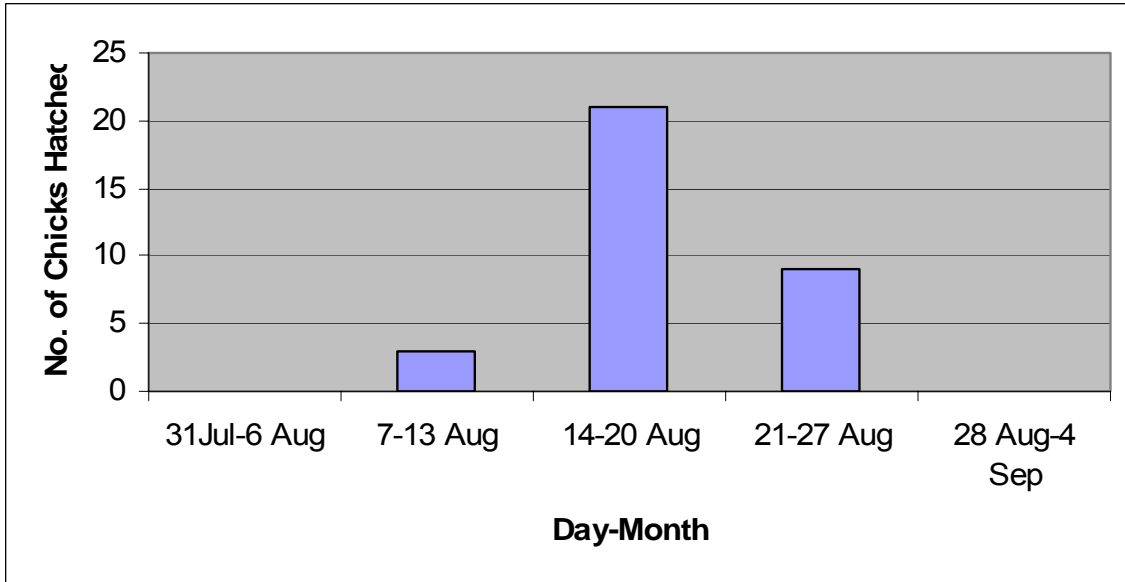


Figure 16. Breeding chronology of common murrelets at St. Paul Island, Alaska, in 2005

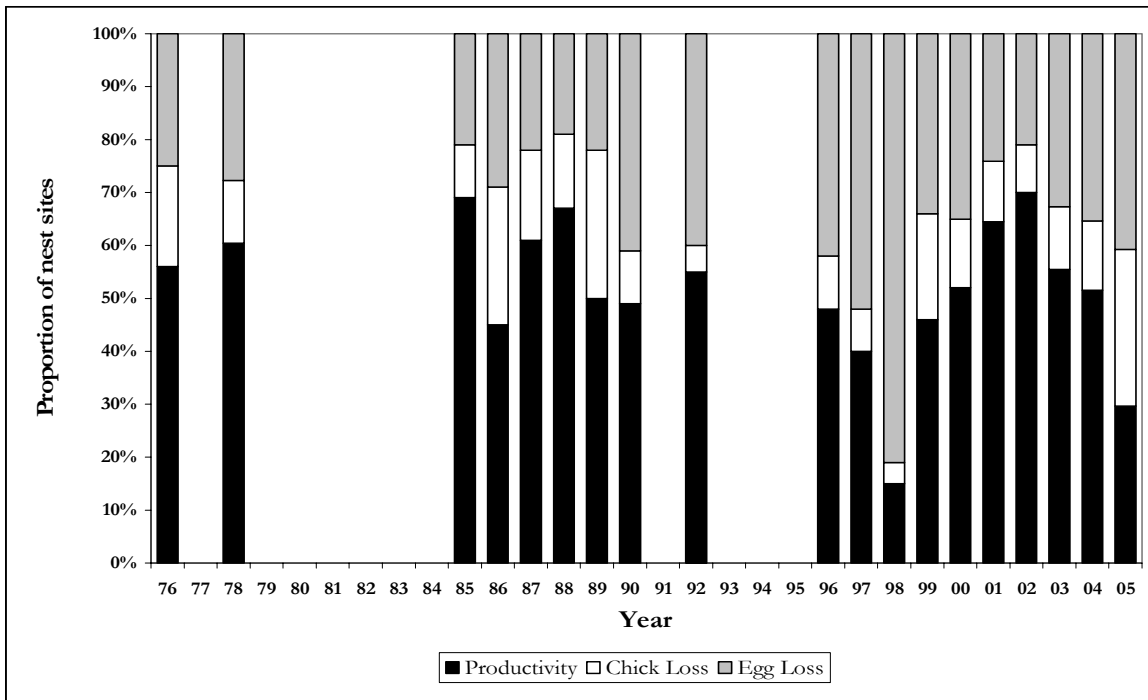


Figure 17. Reproductive performance of common murrelets at St. Paul Island, Alaska, 1976-2005 (not monitored in 1977, 1979 – 1984, 1991, 1993 – 1995).

Table 26. Reproductive performance of common murrens on index plots (n=4)^a at St. Paul Island, Alaska in 2005.

Parameter	Productivity Plots ^a				Total	Mean	Sd
	48+64	80	86+89	90+91			
	66+67+68	81+84	104+109	110			
No. sites with egg (A)	8	18	16	12	54		
No. sites with chick (B)	6	11	9	6	32		
No. sites where chick fledged (C)	6	3	5	2	16		
Hatching success (B/A)	0.75	0.61	0.56	0.50	0.59	0.04	
Fledging success (C/B)	1.00	0.27	0.56	0.33	0.50	0.15	
Reproductive success (C/A)	0.75	0.17	0.31	0.17	0.30	0.10	

^aPlots were combined for statistical analyses.

sd = standard deviation - derived from ratio estimator worksheets with plots as the sample unit.

Table 27. Hatching chronology dates of thick-billed murres at St. Paul Island, Alaska, 1976-2005.

Year	Mean hatch date	Sample size	Standard deviation
1975	29 July	23	6.6
1976	31 July	83	6.4
1977	30 July	34	5.7
1978	26 July	50	4.8
1985	5 August	16	4.0
1986	2 August	72	7.1
1987	1 August	260	5.7
1988	6 August	45	6.6
1989	11 August	205	4.5
1990	2 August	not reported	not reported
1992	1 August	220	6.0
1996	12 August	not reported	not reported
1997	13 August	133	not reported
1998	14 August	66	not reported
1999	5 August	241	not reported
2000	3 August	321	not reported
2001	7 August	not reported	not reported
2002	7 August	153	5.2
2003	7 August	145	6.9
2004	17 August	192	7.1
2005	17 August	16	7.3

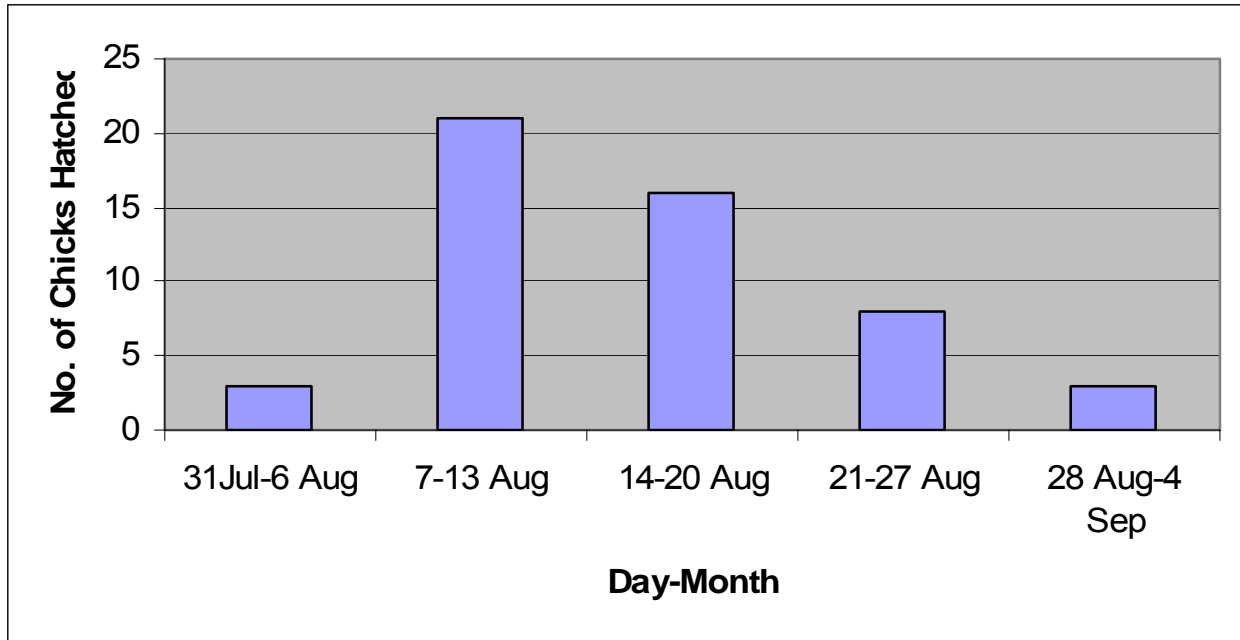


Figure 18. Breeding chronology of thick-billed murres at St. Paul Island, Alaska, in 2005

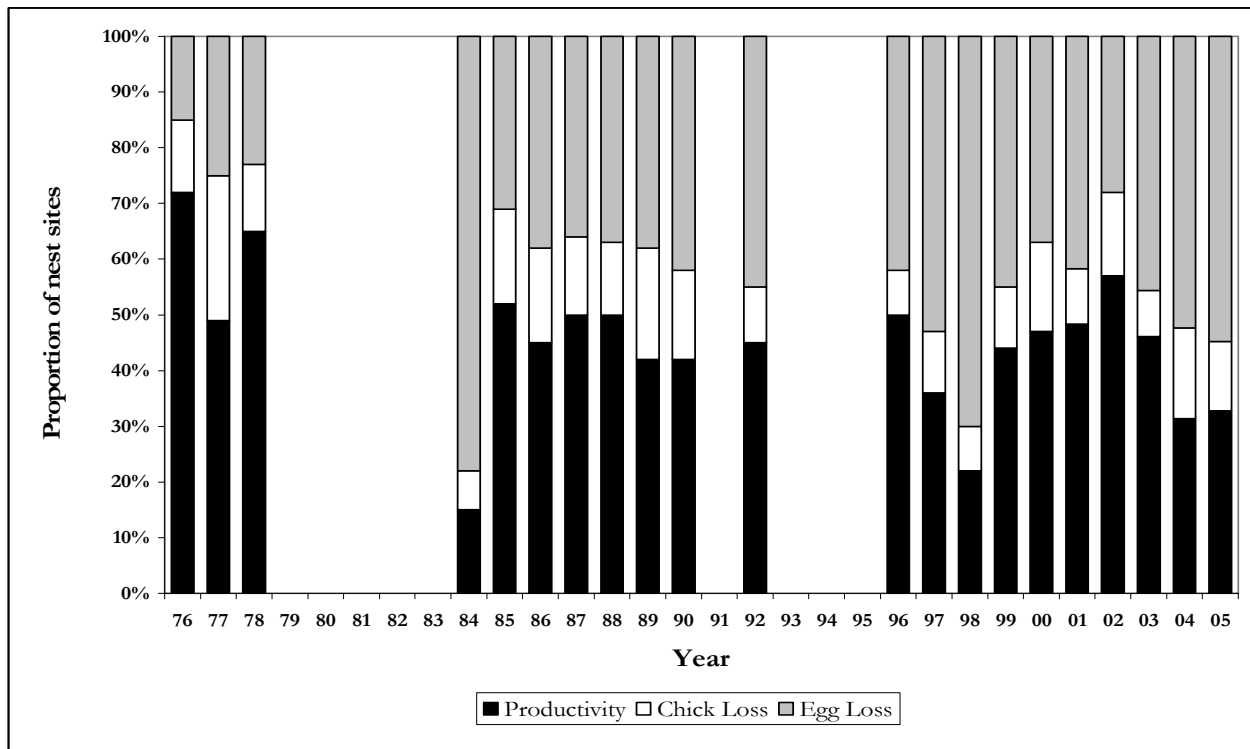


Figure 19. Reproductive performance of thick-billed murres at St. Paul Island, Alaska, 1976-2005 (not monitored 1979 – 1983, 1991, 1993 – 1995).

Table 28. Reproductive performance of thick-billed murre on index plots (n=16)^a at St. Paul Island, Alaska in 2005.

Parameter	Productivity Plots ^a							Total	Mean	sd
	47+50+52	48	80+81	85+86	88+89	64+66+67	90+91			
	53+54+55+56A	+49	83+84	87+109	104	68+69	110			
No. sites with egg (A)	20	18	28	32	27	23	29	177		
No. sites with chick (B)	5	0	5	24	17	21	8	80		
No. sites where chick fledged (C)	5	0	1	17	14	18	3	58		
Hatching success (B/A)	0.25	0.00	0.18	0.75	0.63	0.91	0.28	0.45	0.12	
Fledging success (C/B)	1.00	0.00	0.20	0.71	0.82	0.86	0.38	0.73	0.07	
Reproductive success (C/A)	0.25	0.00	0.04	0.53	0.52	0.78	0.10	0.33	0.11	

^aPlots were combined for statistical analyses.

sd = standard deviation - derived from ratio estimator worksheets with plots as the sample unit.

ANNOTATED LIST OF BIRDS

* Breeding bird

Common loon (*Gavia immer*). We saw 1 bird on 29 June. Sightings typically several years apart.

***Northern fulmar** (*Fulmarus glacialis*). Birds bred on cliff faces all around the island. Present throughout the field season, with partially feathered chicks on the cliffs when we departed on 5 September.

Pelagic cormorant (*Phalarocorax pelagicus*). Significantly more numerous than last year. Ninety three were counted in the cormorant census around St. Paul on 26 – 31 July. Several birds were observed in breeding plumage, but no nests observed.

***Red-faced cormorant** (*Phalarocorax urile*). This species is the only cormorant known to breed on St. Paul Island. The first nest with eggs was observed at High Bluffs on 8 May, although the first egg was probably laid May 3. The first chick was observed June 8. Chicks appear to fledge at approximately 45 days of age.

Snow goose (*Chen caerulescens*). Two individuals were observed near Polovina Lake from 17 May to 9 June.

Emperor goose (*Chen canagica*). At least 2 individuals remained on the island from 27 May to 4 May. One individual was observed feeding on marine algae at SW Point.

Cackling goose (*Branta hutchinsii*). Several small flocks (6-13 individuals) were observed in June.

Gadwall (*Anas strepera*). There were up to 3 individuals observed at Tonki Point from 9 May to 25 June. This is the 6th record for the island.

***Green-winged teal** (*Anas crecca*). Pairs were observed throughout the summer at Polovina, Webster, Sheep, and Rocky lakes, as well as in several smaller bodies of water.

***Northern pintail** (*Anas acuta*). Pintails were observed daily throughout the season at most lakes and ponds around the island.

Canvasback (*Aythya valisineria*). A female was observed on Rocky Lake from 12 May to 18 May. This is the 3rd record for the island.

Ring-necked duck (*Aythya collaris*). A male was observed at Webster Lake from 22 May to 24 May. This is the 4th record for the island.

King eider (*Somateria spectabilis*). This species was observed every day this summer. Two injured females roosted in the harbor and salt lagoon.

Harlequin duck (*Histrionicus histrionicus*). Several hundred harlequins were present from 8 May to 5 September with a noticeable decline in numbers by mid-summer.

***Long-tailed duck** (*Clangula hyemalis*). Observed daily, long-tailed ducks are a common breeder on larger and deeper lakes, primarily Sheep Lake, Big Lake, Polovina Lake and Webster Lake.

Bald eagle (*Haliaeetus leucocephalus*). An adult and juvenile bald eagle was observed periodically throughout the summer. The juvenile was observed stooping on an injured gull at Salt Lagoon and catching murrelets off the Zapadni cliffs.

Lesser sandplover (*Charadrius mongolus*). We saw this species in late August at Pumphouse Lake and in the harbor.

Gray-tailed tattler (*Heteroscelus brevipes*). A high count of at least 3 individuals observed in Salt Lagoon in July and August.

Whimbrel (*Numenius phaeopus*). *Hudsonicus* and *variegatus* subspecies both were seen this season.

Bristle-thighed curlew (*Numenius tahitiensis*). At least 3 separate individuals were observed this summer. The first was on Zapadni in mid-May.

***Rock sandpiper** (*Calidris ptilocnemis*). The dominant breeding shorebird at the Pribilof Islands. Rock sandpipers were present upon our arrival (May 3) and were observed daily. In late July they began to stage on the salt lagoon mudflats and along beaches, forming large flocks of over 1,000 birds.

Sanderling (*Calidris alba*). One adult was observed on Salt Lagoon mudflats from 3 August to 13 August.

Semipalmated sandpiper (*Calidris pusilla*). An adult was observed at Salt Lagoon in a flock of rock sandpipers on 18 July.

Buff-breasted sandpiper (*Tryngites subruficollis*). One observed on 22 August.

Ruff (*Philomachus pugnax*). At least 2 males and 1 female were observed in August.

***Red-necked phalarope** (*Phalaropus lobatus*). Observed nesting around most of the island's lakes and ponds.

Herring gull (*Larus argentatus*). Both *smithsonianus* and *vagae* were observed this summer.

***Black-legged kittiwake** (*Rissa tridactyla*). The most numerous breeding kittiwake, nested on cliffs all around the island. Present on St. Paul throughout our field season (8 May to 5 September). Nest building commenced in mid-May. The first egg was observed on 7 June at Zapadni. The first hatchling of the season was observed on 7 July. Fledgling black-legged kittiwakes were first seen in mid-August.

***Red-legged kittiwake** (*Rissa brevirostris*). The less numerous of the two kittiwake species breeding on St. Paul, they were present on St. Paul throughout our field season (8 May to 5 September). Red-legged kittiwakes nested primarily on High Bluff cliffs, with a few nesting on the Ridgewall and Zapadni cliffs. The first eggs were observed 9 June on High Bluffs (plot 49). No chicks hatched on our plots.

***Common murre** (*Uria aalge*). The less abundant of the two nesting species of murre and was seen throughout our field season. The first egg was observed at Tolstoi on 22 June. The first chick of the season was observed on 11 August on High Bluffs.

***Thick-billed murre** (*Uria lomvia*). The most numerous breeding murre. The first egg of the season was sighted on 25 June at Tolstoi and Zapadni. The first chick was observed on 7 August at Zapadni.

Pigeon guillemot (*Cephus columba*). Several observed daily in May.

Ancient murrelet (*Synthliboramphus antiquus*). This species was observed almost daily near SW Point and Reef Point from mid-May through the end of July. A high count of 28 birds occurred on 4 June.

***Parakeet auklet** (*Aethia psittacula*). We found numerous birds along most cliffs around the island from our arrival on 8 May to the second week of August.

***Crested auklet** (*Aethia cristatella*). The crested auklet is the least common of the three breeding auklet species on St. Paul. They were sighted offshore from Ridgewall on 8 May and observed daily in the hundreds from mid-May through late July. In early August numbers began to drop rapidly.

***Least auklet** (*Aethia pusilla*). This species is the most common breeding auklet on St. Paul. We saw them on the cliffs when we arrived on 8 May. Thereafter we observed them daily in the thousands from mid-May through mid-July. Unlike last year, there were no flocks of least auklets on the breakwater spit across the slough from Staff Quarters. Numbers began to drop rapidly following mid-July. One or 2 least auklets were observed daily the first two weeks of August.

Rhinoceros auklet (*Cerorhinca monocerata*). Frequently observed throughout the summer below Ridgewall and SW Point, as many as 3 individuals were sighted at one time.

***Horned puffin** (*Fratercula corniculata*). First observed on 19 May and sighted daily through our departure on 5 September. Numbers dropped in mid-August.

***Tufted puffin** (*Fratercula cirrhata*). We first observed this species on the Ridgewall cliffs on 10 May. They were seen daily throughout the summer, forming large rafts (up to 70 puffins) in the spring and fall.

Common cuckoo (*Cuculus canorus*). Three individuals were sighted this season. The first was observed on 11 June on Reef Point, and 2 others were observed on 19 June (one at the rock quarry and one at the scoria quarry on Polovina Lake). One was re-sighted on 20 June.

Say's phoebe (*Sayornis saya*). Sighted on 19 August in the scoria quarry on Polovina this was the first record for the Pribilofs, and only the second offshore Bering Sea record.

Common raven (*Corvus corax*). Three individuals were present on the island throughout the field season (8 May to 5 September). We observed ravens stealing murre and cormorant eggs from the cliffs and their calls would cause all the seabirds on the cliffs to flush.

Barn swallow (*Hirundo rustica*). Both subspecies *rustica* and *erythrogaster* were observed on the island this summer.

***Winter wren** (*Troglodytes troglodytes*). We saw one bird carrying insects to nests on 16 June at Tolstoi.

Arctic warbler (*Phylloscopus borealis*). One individual observed at Hutchinson Hill on 20 June.

Dark-sided flycatcher (*Muscicapa sibirica*). One individual was sighted at Hutchinson Hill on 20 June.

Gray-streaked flycatcher (*Muscicapa griseisticta*). Although undetected on the Pribilofs prior to 2002, we continue to see increasing numbers of this species on St. Paul. A high count of 6 individuals was observed on 20 June in the scoria quarry on Polovina Lake. Several individuals remained for several days.

Northern wheatear (*Oenanthe oenanthe*). Individuals were observed during the spring and fall migrations. A high count of 7 (6 juveniles and 1 adult) were observed 1 September at the scoria quarry on Polovina.

Olive-backed pipit (*Anthus hodgsoni*). One individual was observed at Kaminista on 21 May.

***Lapland longspur** (*Calcarius lapponicus*). This species is very common breeder at St. Paul. There were males displaying upon our arrival on 8 May. In late August there were flocks of juveniles on the roadsides.

***Snow bunting** (*Plectrophenax nivalis*). Observed daily throughout the season (8 May – 5 September), they nested primarily in rocky sections of the island's interior. Adults were uncommon in August.

***McKay's bunting** (*Plectrophenax hyperboreus*). At least 2 males observed on St. Paul this summer. One individual spotted once on Zapadni, the second set up a territory on the lava flow NE of Crater Hill. It was observed from 22 May to 22 July.

***Gray-crowned rosy finch** (*Leucosticta tephrocotis*). This species was observed daily across the island. Pairs built nests in building eaves, lava flows, in the quarry, and in scoria scrapes. The ravens raided many of the rosy finch nests.

Seabird Carcasses

Few seabird carcasses were found on St. Paul this summer (Figure 20). There were two significant groups found in 2005. Approximately 25 unidentified murre carcasses were found on North Beach on 18 May. The carcasses appeared to be at least a week old. In addition, 19 Short-tailed shearwater carcasses were found on Lukanin Beach in August. All birds appeared emaciated.

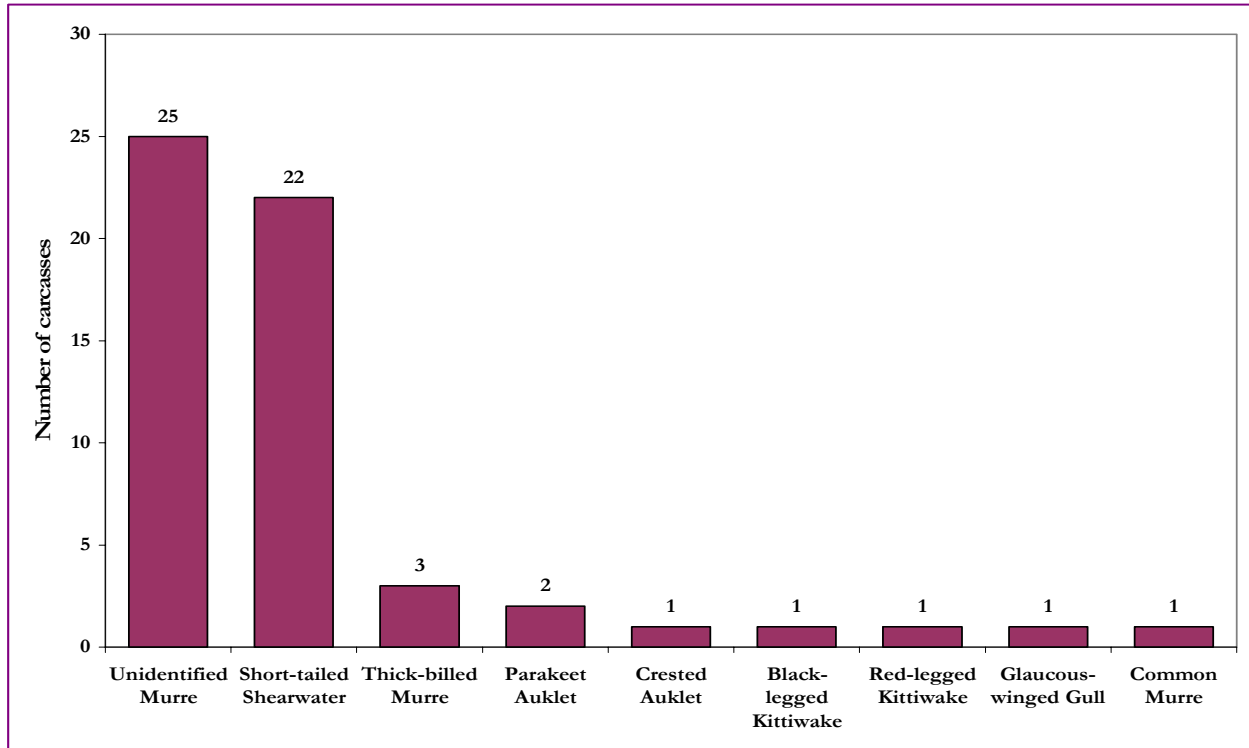


Figure 20. Number of seabird carcasses found washed up on beaches from May 18 to August 20, on St. Paul Island, in Alaska, 2005.

