

Aerial survey of wintering Pacific brant and other waterbirds at the Izembek NWR Complex and Sanak Islands, Alaska, January 2012.

Edward J. Mallek, U.S. Fish and Wildlife Service, Migratory Bird Management, 1412 Airport Way, Fairbanks, AK, 99701

Christian P. Dau, U.S. Fish and Wildlife Service, Migratory Bird Management, 1011 E. Tudor Rd, Anchorage, AK, 99503

ABSTRACT: This report presents results of the 14 January 2012 aerial survey of Pacific brant at the Izembek NWR Complex and Sanak Islands. The total of 44,252 brant observed included 32,256 in the the Izembek NWR Complex and 11,996 in the Sanak Islands. The Izembek NWR Complex includes shorelines and estuaries from Moffet Bay to Bechevin Bay, along the north side of the Alaska Peninsula and includes Kinzarof Lagoon and Morzhovoi Bay on the south side of the Alaska Peninsula. The Sanak Islands, including Sanak, Caton, and associated smaller islands, are located approximately 80 km south of the Izembek NWR Complex. Totals for other primary species (Izembek/Sanak) were 13,437 emperor geese (4,589/8,848), and 13,189 Steller's eiders (6,732/6,457). Ice cover in Bering Sea estuaries was $\geq 95\%$ and 60-85% in Pacific Ocean estuaries. Based on 2010-2012 surveys we suggest the Alaska Midwinter Index totals of Pacific brant inventories be amended to 31,746 in 2010, 48,900 in 2011, and 44,252 in 2012 to account for counts made at the Sanak Islands.

Key words: Winter survey, brant, waterbirds, Izembek NWR Complex, Sanak islands, Alaska.

INTRODUCTION

Aerial surveys of the wintering population of Pacific brant at the Izembek NWR Complex (hereafter Izembek) include refuge coastline and adjacent marine estuaries and have been performed annually since 1980. These surveys have also been performed annually at the Sanak Islands (hereafter Sanak) since 2010. Data from these surveys document distribution, abundance, population trends and habitat use in relation to varying ice conditions. Because of the increasing number of wintering brant at Izembek (Ward et al. 2009) this population has been included in the annual Pacific Flyway Mid-Winter index (PF-MWI) since winter 1985-86. Current 3-year running averages from the PF-MWI provide population management indices for Pacific brant (Pacific Flyway Council 2002). Alaska wintering brant are an increasingly important element in this index.

The Izembek area includes shorelines and estuaries from Moffet Bay to Bechevin Bay, along the north side of the Alaska Peninsula and includes Kinzarof Lagoon and Morzhovoi Bay along the south side of the peninsula (Fig. 1). Brant have long been reported to winter at Sanak, 80 km south of Izembek, with earliest reports being ground-based estimates of approximately 2,000 birds in the 1950's (Jones 1952, 1955). Sanak includes Sanak, Caton, Elma and Long islands and numerous smaller islands and rocks (Fig. 2).

METHODS

The 2012 winter survey of Izembek and Sanak was flown on 14 January by Migratory Bird Management (MBM) personnel in an amphibious configured Quest Kodiak aircraft (N736). The survey was flown at a ground speed of approximately 175 km/hr (95 kts) and an altitude of 45m (150 feet) above sea level. Observations made from both sides of the aircraft were voice recorded into panel-mounted computers and later transcribed using a programs developed by Jack Hodges (USFWS-MBM, Juneau, AK).

Systematic flight paths provided coverage of all nearshore and open water areas along shorelines and in estuaries within the survey areas. On-board panel-mounted computers provided map displays showing the aircrafts position and track which aided navigation and insured complete coverage. Observations of habitat and survey conditions including ice cover, wind speed and direction, temperature, sky condition, visibility, and tide stage were recorded in each segment.

SURVEY CONDITIONS

Visibility was good throughout the day with broken ceilings of 3,000 feet or greater and only minor glare. A southeast wind was 20 kts or less throughout the survey areas and the air temperature were near 32°F. Ice cover in Izembek Lagoon was $\geq 95\%$ and ranged from 60% to 85% in Pacific Ocean estuaries along the south side of the Alaska Peninsula and $< 5\%$ at Sanak. Tide levels were high in Bering Sea estuaries and low in estuaries along the Pacific Ocean side of the Alaska Peninsula and at Sanak.

RESULTS

Pacific Brant

We observed an overall total of 44,252 brant at Izembek (32,256) and Sanak (11,996; Tables 1 and 2, Appendix 1). At Izembek most brant were concentrated in Kinzarof Lagoon (Seg. 85), Big Lagoon (Seg. 80) and Hook Bay (Seg. 67; Table 1). Central Izembek Lagoon (Seg. 61) is an important, traditional wintering site for brant but ice-cover precluded use during the survey. The 2012 Izembek count was 30.5% below the 27 February 2011 historic high estimate of 46,383. Peak winter counts at Izembek have varied among years but the long-term trend (1980-2012) indicates a 7.5%/year increase (average $15,391 \pm 4,064$ [95% CI], $R^2=0.746$; Fig. 3; MBM/Izembek NWR files).

Comparable surveys of brant at Sanak have been conducted since 2010 (Dau and Bollinger 2011) and the 11,996 brant observed during the 2012 survey (Table 2) is the largest count to date. Survey estimates of brant during winter (1991 [3,052], 2010 [5,303], 2011 [2,517], 2012 [11,996]) show that numbers have been highly variable over the past two decades (Appendix 1).

Emperor Goose

We observed an overall total of 13,437 emperor geese at Izembek (4,589) and Sanak (8,848; Tables 1 and 2, Appendix 1). Emperor geese observed at Izembek were at Hook Bay (Seg. 67)

94, St. Catherine's Cove (Seg. 68) 1,254, Morzhovoi Bay (Seg. 80) 979, Kinzarof Lagoon (Seg. 85) 502 and Cold Bay (Segs. 83-84) 1,595. The 2012 Izembek count (4,589) is 66.9 % above the 1980-2011 average of 2,749 (MBM/Izembek NWR files). Izembek winter counts (1980-2012) have been highly variable without a significant trend (average $3,099 \pm 569$ [95% CI], 0.8%/year, $R^2=0.008$; MBM/Izembek NWR files). Emperor geese are often more abundant at Izembek in winter than during spring and fall migration periods (Dau and Mallek 2011, Mallek and Dau 2011, MBM/Izembek NWR files).

Steller's Eider

We observed an overall total of 13,189 Steller's eiders at Izembek (6,732) and Sanak (6,457; Tables 1 and 2, Appendix 1). At Izembek the highest concentrations occurred along the Bering Sea coast (Seg.66) between Izembek Lagoon and Bechevin Bay (1,765) and on the Pacific Ocean side (Seg. 80) in Big, Middle, and Little lagoons in Morzhovoi Bay (1,685). The 2012 Izembek count is 68.0% below the 1980-2012 average of $21,031 \pm 4,319$ (95% CI), and the long-term trend is -2.1%/year ($R^2=0.085$; MBM/Izembek NWR files).

DISCUSSION / RECOMMENDATIONS

The Izembek count of wintering brant has been used as part of the Pacific Flyway Midwinter Index (PF-MWI) since 1985-86. Currently, the Alaska MWI for brant does not include counts at Sanak (USFWS 2011, Pacific Flyway Data Book). Starting in 2010, brant at Sanak have been counted in conjunction with the standard Izembek survey. We recommend formal expansion of the survey area to include Sanak every year and that the combined totals for these areas become the Alaska MWI index. We recommend the 2010-2012 Alaska MWI totals of brant be amended to include Sanak data as follows: 2010 (31,746), 2011 (48,900), 2012 (44,252) and that these total appear in future publications of the Pacific Flyway Data Book.

At Izembek, ice conditions determine daily habitat availability and brant distribution. Brant exhibit strong site fidelity and move among favored sites when ice conditions are severe so it would be valuable to conduct surveys during varying ice regimes. Distributional data show the importance of Izembek areas such as Kinzarof Lagoon, where an average of 17% of wintering brant occur with up to 57% occurrence during severe ice conditions. In recent years, severe ice conditions have been of shorter duration due to moderating weather conditions and is one factor associated with increasing brant numbers (Ward et al. 2009).

Historical observations at Sanak (Jones 1952, 1955, McKnight 1971, Dau and Chase 1995, Izembek NWR files), suggest regular wintering by brant but their relationship to the Izembek population requires further study. Wintering numbers of brant are increasing at both Izembek and Sanak and coordinated aerial surveys during periods of variable ice conditions could help determine whether brant occurring at these two locations are discrete or if they move between sites in response to ice conditions. Of the four Sanak surveys, three were flown when Izembek Lagoon ice cover was 40-95%. Those three surveys resulted in 73% of brant occurring at Izembek versus 95% during the single survey when ice was absent. Additional surveys are required to better define the relationship of ice cover and brant distribution.

It is unknown to what extent eelgrass habitats are being impacted by increasing numbers of wintering brant and their concentrated foraging at sites that are also heavily utilized during fall staging. Continued research on stability and use of eelgrass habitats at Izembek will become increasingly important if milder weather conditions continue and brant grazing pressure increases. An additional concern is that south side Alaska Peninsula estuaries at Izembek are State of Alaska (State) tidelands and currently not protected by special habitat designation. Increased use of these estuaries by brant occurs when ice prevents access to Izembek Lagoon; thus brant would benefit if Kinzarof Lagoon; Big, Middle and Little lagoons in Morzhovoi Bay; and Hook Bay and St. Catherine's Cove in Bechevin Bay were designated State Critical Habitats or additions to the Izembek State Game Refuge.

The findings and conclusions in this article are those of the author(s) and do not necessarily represent the views of the U.S. Fish and Wildlife Service.

ACKNOWLEDGMENTS

We appreciate support of the staff of the Izembek NWR who provided access to data from previous surveys and for providing lodging and vehicle use. We appreciate assistance from Bob Platte (MBM-R7) for preparation of map presentations for Figures 1 and 2.

REFERENCES

- Dau, C.P. and M.A. Chase. 1995. Aerial survey of wintering birds and mammals in the Sanak Islands. Unpubl. Rept., USFWS, Izembek NWR, Cold Bay, AK. 7pp.
- _____ and E.J. Mallek. 2011. Aerial survey of emperor geese and other waterbirds in southwestern Alaska, spring 2010. Unpubl. Rept., USFWS, MBM, Anchorage, AK. 17pp.
- _____ and K.S. Bollinger. 2011. Aerial survey of wintering Pacific brant and other waterbirds on and adjacent to the Izembek NWR, Alaska, 2009-2010. Unpubl. Rept., USFWS, MBM, Anchorage, AK. 8pp.
- Jones, R.D., Jr. 1952. Quarterly refuge narrative report for the Aleutian Islands National Wildlife Refuge, 1 Sept. to 31 Dec. 1952. Unpubl. Rept., USFWS, Cold Bay, AK. 10pp.
- _____ 1955. Refuge narrative report for the Aleutian Islands National Wildlife Refuge and the Izembek Bay Area. Jan. to April 1955. Unpubl. Rept., USFWS, Cold Bay, AK. 10pp.
- Mallek, E. J. and C. P. Dau. 2011. Aerial survey of emperor geese and other waterbirds in southwestern Alaska, fall 2010. Unpubl. Rept., USFWS, Fairbanks, AK. 14p.
- MBM/Izembek NWR files. Multi species data base of waterbird and marine mammal surveys along the lower Alaska Peninsula. USFWS, Migratory Bird Management, Anchorage; Izembek NWR, Cold Bay, AK.

McKnight, D.E. (ed). 1971. Report of survey and inventory activities, Part III – Waterfowl and small game. Vol. II, Ann. Proj. Seg. Rept., Federal Aid in Wildlife Restoration, Proj. W-17-3, Jobs No. 10 & 11. 76p.

Pacific Flyway Council. 2002. Pacific Flyway management plan for Pacific brant. Pacific Flyway Study Comm. [c/o USFWS, DMBM] Portland, OR, Unpubl. Rept., 40pp. + appendices.

USFWS. 2011. Pacific Flyway Data Book: Waterfowl harvests and status, hunter participation and success in the Pacific Flyway and United States. Unpubl. Report, Division of Migratory Bird Management, Portland, OR. 104pp. Compiled by D.P. Collins, C.A. Palmer, and R.E. Trost.

Ward, D.H, C.P. Dau, T. Lee Tibbitts, J.S. Sedinger, B.A. Anderson and J.E. Hines. 2009. Change in abundance of Pacific brant wintering in Alaska: Evidence of a climate warming effect? *Arctic* 62(3): 301-311.

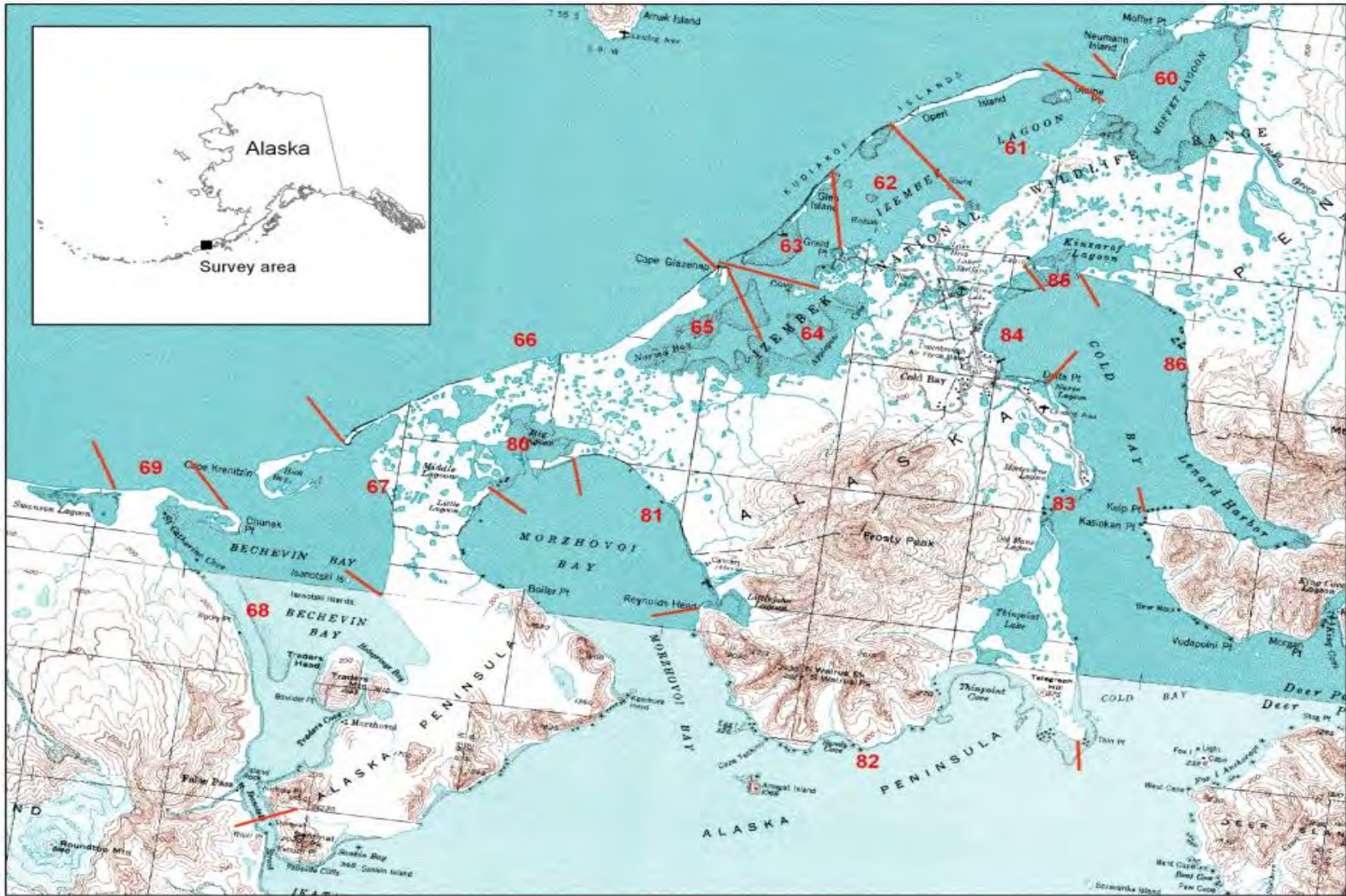


Figure 1. Map of Pacific brant survey area by segment in the Izembek NWR area.

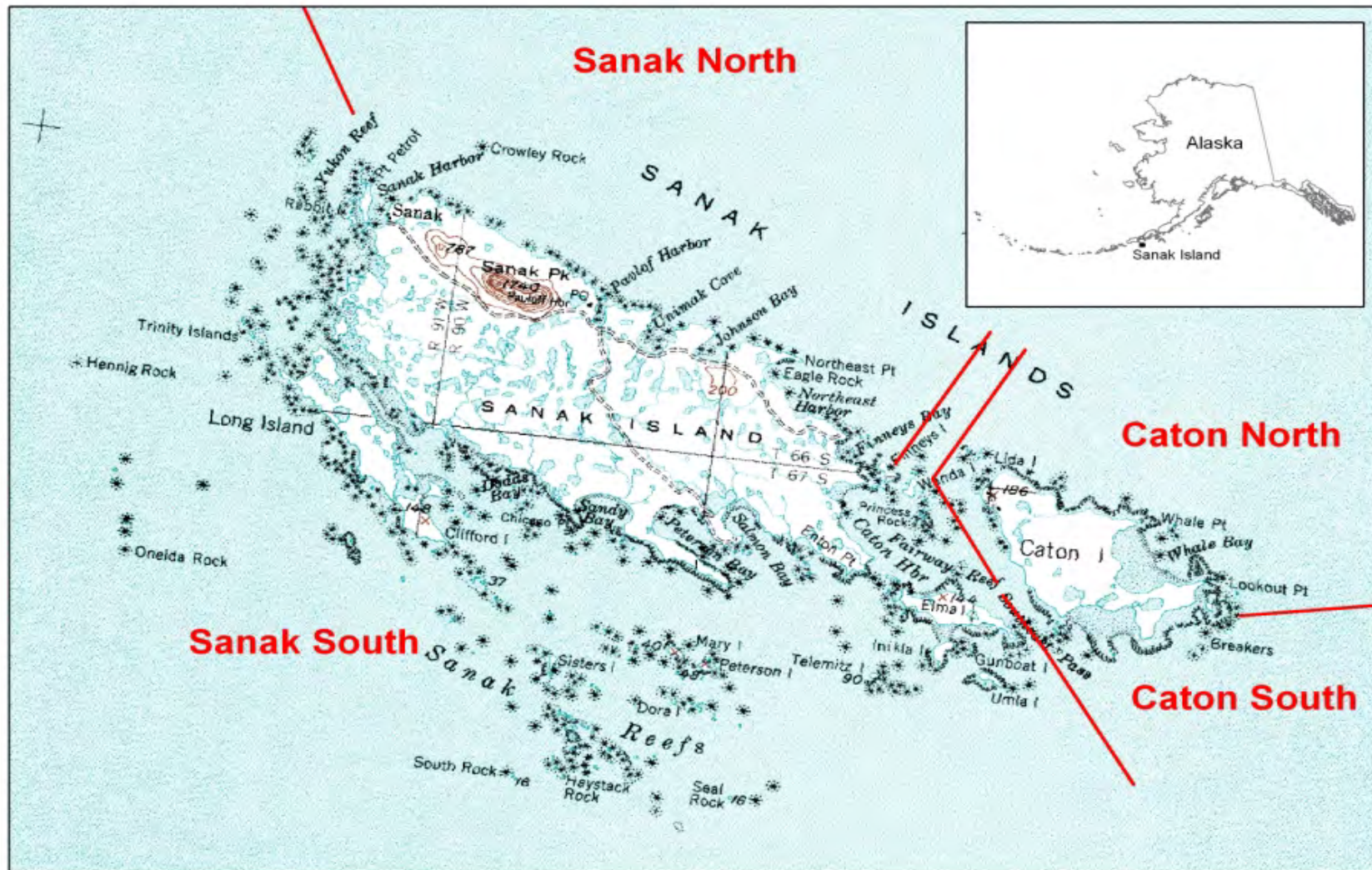


Figure 2. Map of Pacific brant survey areas, Sanak Islands.

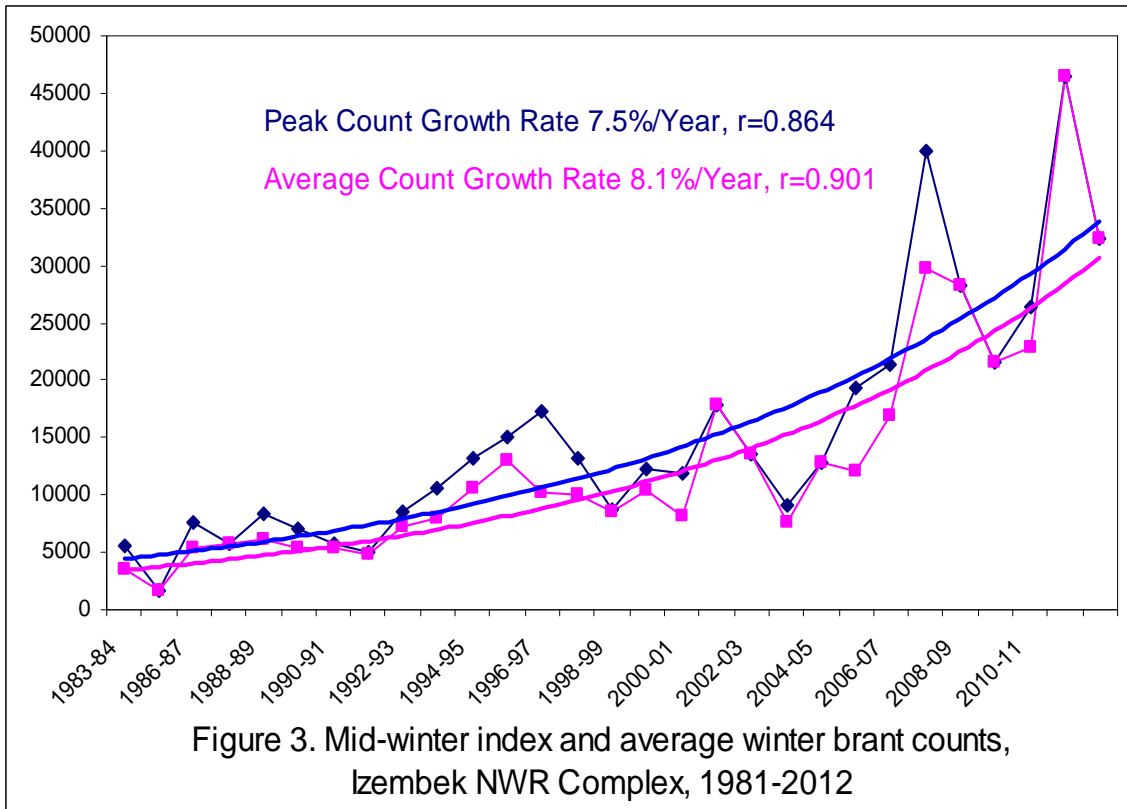


Table 1. Waterbird and mammal observations by segment, Izembek NWR Complex, 14 January 2012.

Species	60	61	62	63	64	65	66	67	68	80	81	82	83	85	TOTAL
Bald Eagle	0	0	0	0	0	2	3	0	0	2	1	0	1	0	9
Bald Eagle (juv)	0	3	0	0	0	0	1	0	1	0	0	0	0	0	5
Brant	85	0	0	0	0	0	0	12066	3850	8000	0	0	570	7685	32256
Black Scoter	2	0	0	0	50	0	671	17	60	0	19	0	20	20	859
Common Eider (hen)	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
Common Eider	0	0	0	0	0	0	5	0	5	0	0	0	0	0	10
Common Raven	0	10	0	0	0	0	0	0	0	0	10	0	0	0	20
Emperor Goose	0	0	0	0	0	0	80	94	1254	979	85	0	1595	502	4589
Eurasian Wigeon	0	0	0	0	0	0	0	0	0	200	0	0	0	0	200
Common Goldeneye	50	0	0	0	0	0	0	75	0	150	0	0	0	0	275
Greater Scaup	0	0	0	0	0	0	0	3120	0	0	0	0	0	40	3160
Harlequin Duck	0	0	0	0	0	0	11	4	0	0	0	0	41	170	226
Harbor Seal	0	0	0	30	0	0	24	2	0	50	0	0	2	8	116
King Eider	0	5	0	0	0	0	0	0	0	0	0	0	0	0	5
<i>Large gull ssp.</i>	1	0	0	1	0	0	27	42	29	22	1	1	68	3	195
Long-tailed Duck	70	62	0	0	0	0	90	70	8	0	0	1	6	0	307
Mew Gull	0	0	0	0	0	0	0	0	0	10	0	0	0	0	10
Northern Pintail	0	7	0	0	8	0	65	0	0	0	0	0	60	0	140
Pelagic Cormorant	0	0	0	0	0	0	0	0	0	0	7	4	3	0	14
R-b Merganser	0	0	0	0	15	0	12	0	0	175	0	0	0	100	304
Sea Otter	0	1	0	0	0	10	0	6	6	0	4	2	22	0	51
Steller's Eider	770	175	0	0	0	0	1765	160	487	1685	0	0	965	725	6732
Steller's Sealion	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Surf Scoter	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4
Wolf	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
White-winged Scoter	0	0	0	0	0	0	2	20	0	0	2	0	15	0	39

Table 2. Waterbird and mammal observations by segment, Sanak Islands, 14 January 2012.

Species	Caton North	Caton South	Sanak North	Sanak South	TOTAL
Bald Eagle	2	0	1	19	22
Bald Eagle (juv)	0	0	4	17	21
Brant	2915	2978	0	6103	11996
Black Oystercatcher	43	50	24	236	353
Black Scoter	0	17	0	396	413
Bufflehead	2	20	0	2	24
<i>Cattle</i>	0	0	37	605	642
Common Loon	0	0	1	0	1
Common Merganser	0	0	0	15	15
Common Goldeneye	0	0	0	1	1
Common Raven	1	0	0	13	14
Emperor Goose	761	1837	674	5576	8848
Greater Scaup	115	100	0	3	218
Harlequin Duck	565	60	1079	1005	2709
Harbor Seal	0	0	0	200	200
<i>Horse</i>	0	0	0	13	13
King Eider	0	0	0	10	10
<i>Large gull ssp.</i>	155	33	11	223	422
Long-tailed Duck	0	0	10	3	13
Mallard	40	270	0	57	367
Northern Pintail	375	100	0	2110	2585
Pelagic Cormorant	49	0	64	299	412
R-b Merganser	3	5	11	24	43
<i>Small shorebird</i>	4205	4800	0	940	9945
Steller's Eider	1604	790	1197	2866	6457
Tundra Swan	0	0	0	20	20
White-winged Scoter	0	0	10	0	10

Appendix 1. Summary of aerial survey data of the Sanak islands, Alaska.

Species	1970	1991	2010			2011			2012		
	Sanak	Sanak and Caton ²	Sanak	Caton	Total	Sanak	Caton	Total	Sanak	Caton	Total
Am.Wigeon	0	0	10	0	10	0	0	0	0	0	0
Bald Eagle	0	83	36	4	40	14	4	18	20	2	22
Bald Eagle (juv)	0	0	8	4	12	0	0	0	21	0	21
Brant	0	3052	3871	1432	5303	1237	1280	2517	6103	5893	11996
B-I Kittiwake	0	143	0	0	0	0	0	0	0	0	0
Black Oystercatcher	0	0	729	159	888	0	0	0	260	93	353
Black Scoter	0	560	1914	676	2590	164	328	492	396	17	413
Bufflehead	0	0	80	61	141	9	44	53	2	22	24
Canada Goose ¹	200	0	0	0	0	0	0	0	0	0	0
<i>Cattle</i>	0	414	914	0	914	413	0	413	642	0	642
Common Eider	0	128	0	0	0	82	164	246	0	0	0
Common Loon	0	0	12	2	14	3	1	4	1	0	1
Common Merganser	0	0	3	0	3	0	0	0	15	0	15
Common Murre	0	709	0	0	0	0	0	0	0	0	0
Common Raven	0	25	0	40	40	0	10	10	13	1	14
<i>Eider ssp.</i>	740	0	0	0	0	0	0	0	0	0	0
Emperor Goose	1030	3368	5737	1638	7375	1910	709	2619	6250	2598	8848
Gadwall	0	140	0	0	0	0	0	0	0	0	0
Goldeneye ssp.	0	0	11	45	56	25	50	75	1	0	1
Greater Scaup	0	0	301	65	366	140	64	204	3	215	218
Harlequin Duck	45	13	2778	1528	4306	131	104	235	2084	625	2709
Harbor Seal	0	14	197	76	273	0	30	30	200	0	200
Horned Puffin	0	7	0	0	0	0	0	0	0	0	0
<i>Horse</i>	0	15	53	0	53	15	0	15	13	0	13
King Eider	0	358	0	0	0	0	0	0	10	0	10
<i>Large gull ssp.</i>	0	1145	203	28	231	67	29	96	210	188	398
Long-tailed Duck	145	587	63	3	66	70	8	78	13	0	13
Mallard	45	312	633	33	666	96	84	180	57	310	367
Northern Pintail	0	6125	45	170	215	106	455	561	2110	475	2585
Northern Shoveler	0	0	0	60	60	0	0	0	0	0	0
Pacific Loon	0	0	1	0	1	0	0	0	0	0	0
Pelagic Cormorant	0	601	783	397	1180	62	35	97	363	49	412

Appendix 1 (continued). Summary of aerial survey data of the Sanak islands, Alaska.

Species	1970	1991	2010			2011			2012		
	Sanak	Sanak and Caton ²	Sanak	Caton	Total	Sanak	Caton	Total	Sanak	Caton	Total
<i>Puddle duck ssp.</i>	0	255	0	0	0	0	0	0	0	0	0
<i>Puffin ssp.</i>	0	50	0	0	0	0	0	0	0	0	0
R-b Merganser	0	231	558	187	745	32	38	70	35	8	43
Red-necked Grebe	0	0	2	0	2	0	0	0	0	0	0
<i>Scoter spp.</i>	555	0	0	0	0	0	0	0	0	0	0
Sea Otter	0	21	2	1	3	0	0	0	0	0	0
<i>Shorebird (ROSP)</i>	0	8598	1530	510	2040	110	650	760	940	9005	9945
Steller's Eider	0	16603	2054	3173	5227	345	742	1087	4063	2394	6457
Surf Scoter	0	0	0	0	0	16	0	16	0	0	0
Tufted Puffin	0	7	0	0	0	0	0	0	0	0	0
Tundra Swan	2	83	29	0	29	47	7	54	20	0	20
Steller's Sealion	0	0	0	48	48	0	0	0	0	0	0
Whimbrel	0	0	10	0	10	0	0	0	0	0	0
White-winged Scoter	0	64	164	4	168	0	6	6	10	0	10

¹ Possibly brant misidentified as Canada geese.

² Populations estimated from linear transect sampling including waters 15-30 km offshore.