

AERIAL SURVEY OF EMPEROR GEESE AND OTHER WATERBIRDS
IN SOUTHWESTERN ALASKA, SPRING 2015

By

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Abstract: We conducted the 33rd annual spring aerial emperor goose survey during 25–28 April 2015. This survey has been completed every year since 1981, except 2013. The survey includes coastline and estuarine habitats from the mouth of the Kuskokwim River to Wide Bay, including the north and south sides of the Alaska Peninsula. We counted a total of 98,155 emperor geese, which was 22.9% above the 2014 count of 79,883 geese, and 48.8% above the long-term average (65,923 geese, 1981–2014). The recent 3-year average (2012, 2014, and 2015) count was 81,875 geese (10.8% above the previous 3-year average of 73,879 geese). The recent 3-year average count is the highest on record since 1984 and is above the threshold for consideration of an open hunting season on emperor geese, as specified in the Yukon Delta Goose Management Plan and the Pacific Flyway Council Management Plan for Emperor Geese. Pacific brant and Steller's eider counts were 74,015 and 59,713, respectively.

INTRODUCTION

The distribution, abundance, and population trends of emperor geese and other waterbirds have been monitored since 1981 in spring at migratory staging areas throughout southwestern Alaska. The survey area includes the coastline and estuarine habitats from Kuskokwim Bay south and west along the north side of the Alaska Peninsula to Bechevin Bay, as well as the south side of the Alaska Peninsula east to Wide Bay. The survey focuses on a series of primary emperor goose use areas. A 3-year moving average of annual emperor geese counts is used as the population index for management purposes (Pacific Flyway Council Emperor Goose Management Plan 2006). The survey also provides data to calculate long-term population trends and variation in seasonal migratory phenology, distribution, and habitat use for emperor geese and associated species.

METHODS

We conducted the 2015 survey from 25–28 April within core use areas divided among 143 shoreline or estuarine segments (Mallek and Dau 2000; Figs. 1 and 2). We used electronic map displays along with 1:500,000 aeronautical and 1:63,360 topographical maps for navigation. We recorded habitat and survey conditions during the survey including wind, temperature, sky condition, visibility, sea and fresh-water ice conditions and tide stage.

We used an amphibious Cessna 206 (N9623R) as the survey platform. The aircraft was flown at a ground speed of approximately 175 km/hr (95 kts) and an altitude of 45 m (150 feet) above sea

level. Survey timing was determined based on reported and observed phenological indices of ice conditions and migration. Survey timing is intended to precede the arrival of emperor geese on the Yukon-Kuskokwim Delta and follows goose departures from the eastern Aleutian Islands and Kodiak Island (R. MacIntosh, S. Golodoff, S. Berns, B. Pyle, R. Corcoran and T. Lee, personal communications). We began the 2015 survey on 25 April at the mouth of the Kuskokwim River (Segment 12) and completed the survey on 28 April, ending at Segment 137 along the South side of the Alaska Peninsula. Daily itineraries and associated survey area conditions are presented below. We used laptop computers to receive input from the aircraft Global Positioning System (GPS), which saved coordinates for each input of voice recorded observations. Record and transcribe programs were used to process data (J. Hodges, USFWS R7 MBM).

SURVEY CONDITIONS

Climatic and habitat conditions (ice and snow on the landscape) were mild during the 2015. Ice break-up was very early in 2015 (Table 1). In southwest Alaska, sea and estuarine ice was absent and snow cover was light, only the largest lakes in northern Bristol and Kuskokwim bays (Segments 11–22) had remnant ice. Snow cover was absent below 300 feet above mean sea level from the Kuskokwim south to Nanvak Bay (Segment 22) and absent at ground level elsewhere in the survey area.

Survey Day 1 (April 25, Segments 12-36, Southwest Alaska and Bristol Bay, Mouth of Kuskokwim River to Egegik Bay): The Kuskokwim River was ice covered with melt water on top of the ice. There was no sea ice or estuarine ice in these segments and larger lakes near Cape Pierce had ≤ 40 percent ice cover. Larger lakes near Egegik Bay were ice free, as were smaller lakes between Bethel and Egegik Bay. Estuarine tides were low. Survey conditions were good except for moderate sun glare seaward of Segments 32 and 33. Winds were easterly at 5–15 knots and ceilings were scattered to overcast at 2,000–3,500 feet. Air temperatures were 35–50° F.

Survey Day 2 (April 26, Segments 35, 37-39, North side of the Alaska Peninsula, King Salmon to Cold Bay): Survey conditions were fair, but significant glare was encountered in Ugashik Bay, Herendeen Bay and the Nelson Lagoon complex. Winds were northerly at 15–20 knots turning northwesterly from Nelson Lagoon south. Mostly clear skies persisted until Cape Seniavin (Segment 49) and were 400–600 feet overcast from there south to Cold Bay. Estuarine tides were high throughout the survey. Air temperatures increased from 40 to 45°F during the day.

Survey Day 3 (April 27, Segments 60-68, 80-81, and 84–85, Izembek Lagoon Complex, including Bechevin and Morzhovoi Bays): Survey conditions were good with low tides along the Bering Sea side of the Alaska Peninsula and mid-high tides along the Pacific side. Ceiling was 2,000 feet scattered to overcast with calm to variable wind < 5 knots. Air temperature was near 40°F.

Survey Day 4 (April 28, Segments 86-137, South side of the Alaska Peninsula, Cold Bay to Wide Bay): Survey conditions were initially characterized by ceilings of 1,000 feet overcast with light rain and visibility of 5 miles. Precipitation stopped near Canoe Bay (Segment 93) and winds increased to 10–15 knots southeast to Aniakchak Bay (Segment 128). Winds became 15–

20 knots southeast eastward to Wide Bay (Segment 137). Air temperatures increased from 40 to 50°F during the day.

RESULTS

Historical emperor goose totals and details of annual surveys are provided in Table 2. Counts for all species by survey segment are provided in Appendix A.

Emperor Goose

The 2015 spring emperor goose count was 98,155; 22.9% above the 2014 count of 79,883 geese (Table 2) and 48.8% above the long-term average (1981–2014) of 65,923 geese. The recent 3-yr (2012, 2014, 2015, no data are available for 2013) average of emperor geese is 81,875, 10.8% above the previous 3-year (2011, 2012, 2014) average count of 73,879 geese (;Table 3).

Emperor geese were most concentrated at staging sites on the north side of the Alaska Peninsula (Segments 26-65) from Egegik Bay to Izembek Lagoon (94.2% of birds observed in 2015), versus the long-term (1981–2014) average of 89.8%. The largest aggregations of emperor geese were observed from Ugashik Bay to Port Moller-Nelson Lagoon (Segments 38–57). Fewer emperor geese were counted in 2015 compared to the long-term (1981–2014) average north of the Alaska Peninsula (545 versus the average of 3,629) and west of Izembek Lagoon (0 versus the average of 459), but more than average were observed along the south side of the Alaska Peninsula. In 2015, a total of 5,254 geese (5.4% of the total) were observed along the south side of the Alaska Peninsula (Segments 88–137) versus the historical (1981–2014) average of 3,306 (4.1% of the total).

Elevated numbers of emperor geese along the south side of the Alaska Peninsula in 2015 may have been the result of a slightly delayed migration relative to other years. However, overall observations of departures of emperor geese from Unalaska and Kodiak Island suggested that most geese were likely in the survey area during the survey. Observers at Unalaska, in the eastern Aleutian Islands, reported that most emperor geese departed over a week early in 2015 (1 April) with a flock of ten remaining until about 8 April (S. Golodoff, personal communication). At Womens Bay on Kodiak Island, half the wintering population of about 655 departed on 24 April (R. MacIntosh and S. Berns, personal communications) and all were gone before 27 April (T. Lee, Kodiak NWR, personal communication).

Pacific Brant

We observed a total of 74,015 brant during the 2015 survey (Appendix A), which is 3.8% above the long-term (1981–2014) average (mean = 71,275 brant). We counted 53,408 brant (72.2% of the 2015 brant total) in Izembek Lagoon and adjacent areas (Segments 60–68, 80–85). The long-term (1981–2014) average brant count in Izembek Lagoon and adjacent areas was 78.1% of the total (mean = 54,112 brant, Segments 60–68, 80–85). Also, we observed 15,635 brant in Chagvan and Nanvak bays (Segments 20, 22) which was 23.4% above the long-term average of 12,667 brant for those segments.

Steller's Eider

We counted 59,713 Steller's eiders during the 2015 survey (Appendix A). The 2015 count was 23.7% above the long-term average (1981–2014) of 48,283. A total of 6,227 Steller's eiders were counted from Kuskokwim Bay south to Cape Pierce (Segments 12–22). As in previous years, most Steller's eiders (53,428 birds, 89.5%) were observed from Port Heiden to Izembek Lagoon (Segments 44–68, 80–85). Steller's eider flock composition, recorded by the right seat observer, showed that all 74 flock (i.e., ≥ 5 birds) observations were of equal apparent sex ratios (i.e., adult males versus brown-plumaged birds).

DISCUSSION AND MANAGEMENT IMPLICATIONS

The spring emperor goose population indices (annual and 3-year averages) have remained essentially flat since surveys began in 1981 (<1% growth rate; Figure 3, Table 2), but more recent surveys (2007–2015) indicate an increasing population growth rate. The recent 3-year average count is the highest reported since 1984 and is above the threshold (80,000) for consideration of an open hunting season on emperor geese, as specified in the Yukon Delta Goose Management Plan and the Pacific Flyway Council's Management Plan for Emperor Geese (Pacific Flyway Council 2006).

While the population appears to be recovering, reasons for the historically slow growth of emperor geese are still not fully understood. However, additional mortality associated with increased harvest (especially if additive), could undermine population gains that may have led to recovery. Better harvest data and continued long-term aerial surveys will be required to quantify the effects of harvest on the population.

We believe careful consideration of harvest management is required for emperor geese, including a greater commitment to comprehensive harvest surveys in Alaska (and Russia) and expanded logistical and analytical support for such surveys. In addition to measuring take, harvest surveys should provide data to assess temporal and spatial distribution, and age composition within the harvest. A better understanding of additive losses from harvest is critical (Wolfe and Paige 2002, Naves 2015). Finally, we suggest that increased compliance with regulations should also be sought, through improved outreach, co-management, and cooperative enforcement.

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

On 24 April 2015, the U. S. Fish and Wildlife Service, Migratory Bird Management Program, sent out a request for emperor geese observations to select rural residents located within and outside the spring staging survey area (E. Taylor, personal communications). Observations of emperor geese at Kodiak Island were provided by Richard MacIntosh, Shirley Berns, Bill Pyle, Pat Holmes, Robin Corcoran and Tonya Lee, and at Unalaska by Suzi Golodoff. We appreciate

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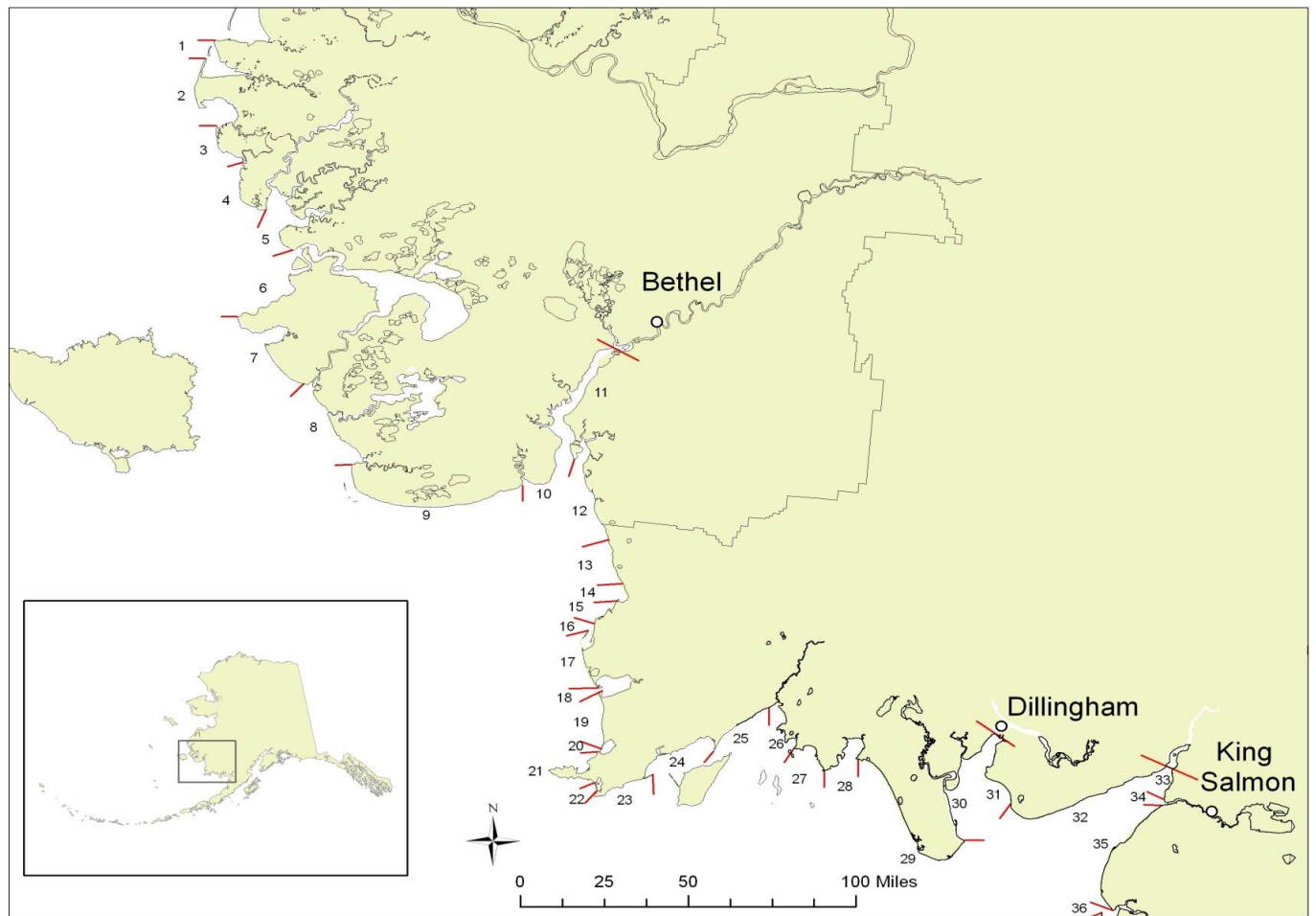


Figure 1. Emperor goose aerial survey segments 1–35, southwest Alaska.

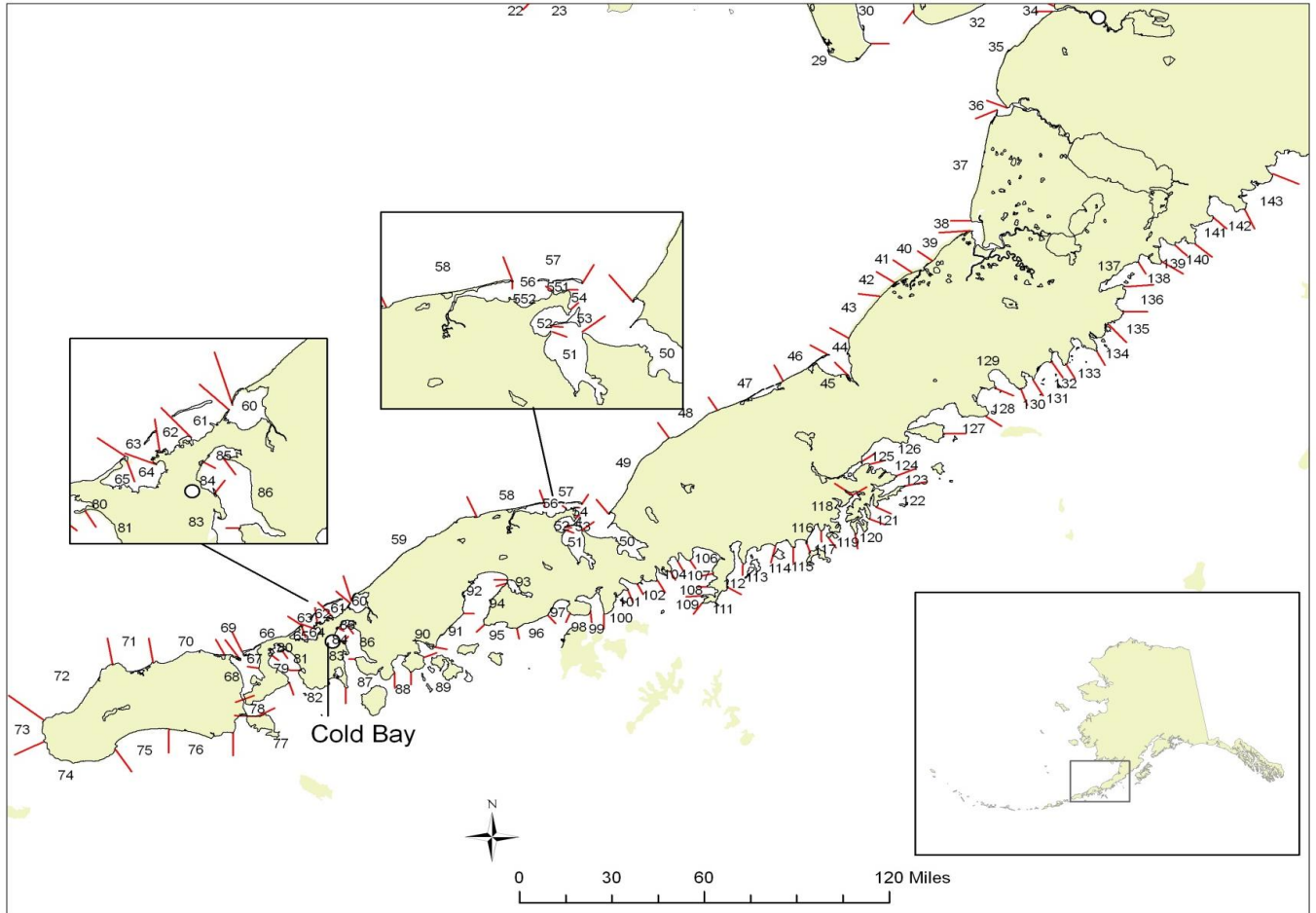


Figure 2. Emperor goose aerial survey segments 35–143, southwest Alaska.

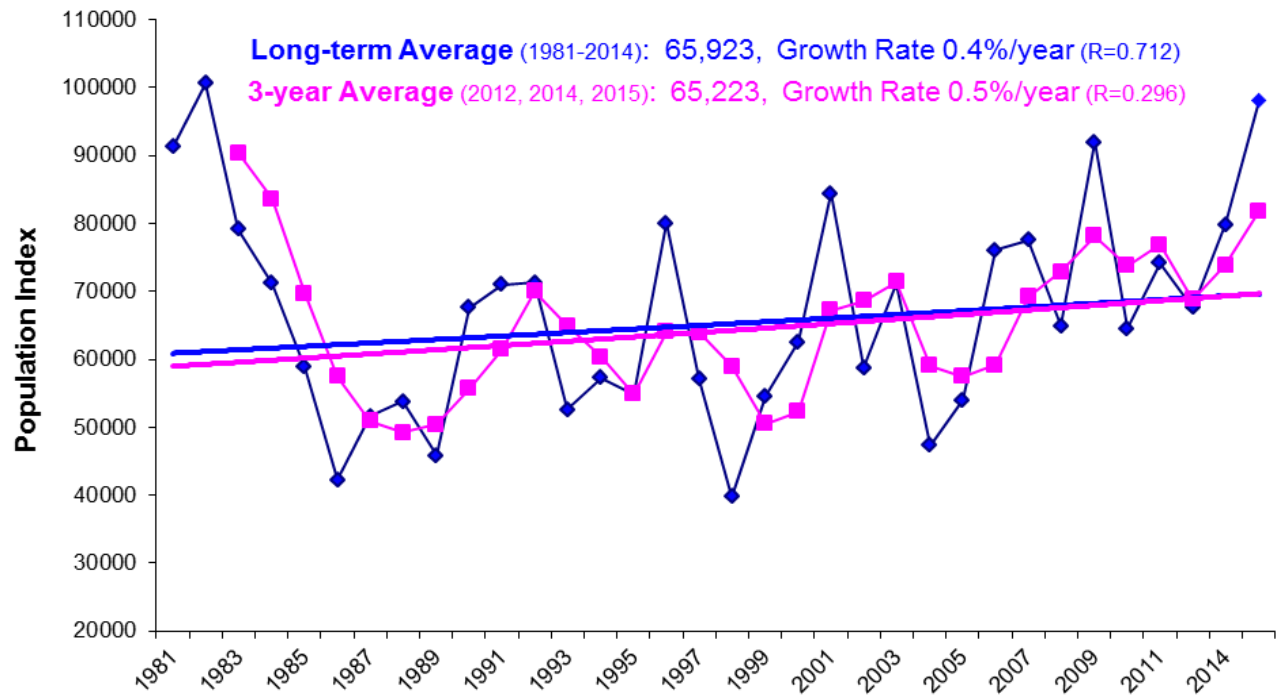


Figure 3. Spring emperor goose annual and 3-year average population indices, 1981-2015. No survey was conducted in 2013. Blue indicates data and trend for annual population counts. Pink indicates data and trend for 3-year averages.

Table 1. Snow and ice conditions during spring emperor goose survey in southwest Alaska, 25–28 April 2015. Overall relative phenology was very early based on ice and snow cover.

Area	Snow Cover¹	Marine Ice Cover²
Kokechik Bay	Not Surveyed	Not Surveyed
Hooper Bay	Not Surveyed	Not Surveyed
Hazen Bay	Not Surveyed	Not Surveyed
Carter Bay	Trace <300' AGL	0
Goodnews Bay	Trace <300' AGL	0
Chagvan Bay	Trace <300' AGL	0
Nanvak Bay	Trace <300' AGL	0

¹ Percent snow cover on near-shore freshwater marshes. NS = not surveyed.

² Percent of marine ice cover in estuary.

Table 2. Spring emperor goose survey results, southwest Alaska, 1981- 2015.

Year	Total	% Change Total	3-yr ave.	% Change 3-yr ave.	Dates	Observers	Survey Area
1981	91267				4/23-4/27	R.King/R.Gill/J.Sarvis/ C.Dau	Y-K Delta to Wide Bay
1982	100643	0.093			5/2-5/4	R.King/C.Dau/M.Reardon/ B. Reiswig	Kuskokwim Bay to Wide Bay
1983	79155	-0.271	90355		4/25-4/29	R.King/C.Dau/V.Berns/ J.Solberg	Kuskokwim Bay to Wide Bay
1984	71217	-0.111	83672	-0.074	4/26-5/4	R.King/C.Dau/V.Berns/ R.Arment	Kuskokwim Bay to Cape Douglas
1985	58833	-0.210	69735	-0.167	5/12-5/16	R.King/C.Dau	Kuskokwim Bay to Cape Chiniak
1986	42231	-0.393	57427	-0.176	5/4-5/7	"	Nelson Island to Cape Atushagvik
1987	51633	0.182	50899	-0.114	4/30-5/4	"	Hooper Bay to Puale Bay
1988	53784	0.040	49216	-0.033	5/2-5/6	"	Hooper Bay to Cape Chiniak
1989	45800	-0.174	50406	0.024	5/3-5/6	"	Hooper Bay to Portage Bay
1990	67581	0.322	55722	0.105	4/28-5/4	"	Hooper Bay to Portage Bay
1991	70972	0.048	61451	0.103	5/2-5/7	"	Hooper Bay to Puale Bay
1992	71319	0.005	69957	0.138	4/30-5/5	"	Hooper Bay to Cape Kubugakli
1993	52546	-0.357	64946	-0.072	4/30-5/5	"	Hooper Bay to Wide Bay
1994	57267	0.082	60377	-0.070	4/29, 5/2-6	"	Hooper Bay to Wide Bay
1995	54852	-0.044	54888	-0.091	5/3-5/6	"	Hooper Bay to Chignik Lagoon
1996	80034	0.315	64051	0.167	4/27-4/30	"	Hooper Bay to Puale Bay
1997	57059	-0.403	63982	-0.001	4/25-4/28	"	Hooper Bay to Wide Bay
1998	39749	-0.435	58947	-0.079	5/4-5/7	"	Hooper Bay to Wide Bay
1999	54600	0.272	50469	-0.144	4/27-5/1	"	Hooper Bay to Wide Bay
2000	62565	0.127	52305	0.036	4/28-5/3	E.Mallek/C.Dau	Hooper Bay to Chignik Lagoon
2001	84396	0.259	67187	0.285	4/29-5/4	"	Hooper Bay to Puale Bay
2002	58743	-0.437	68568	0.021	5/3-5/6	"	Kuskokwim Bay to Wide Bay
2003	71160	0.174	71433	0.042	4/29-5/3	"	Hooper Bay to Wide Bay
2004	47352	-0.503	59085	-0.173	4/30-5/3	"	Hooper Bay to Wide Bay
2005	53965	0.123	57492	-0.027	4/20-4/23	"	Kuskokwim Bay to Wide Bay
2006	76108	0.291	59142	0.029	4/27-5/2	"	Kuskokwim Bay to Wide Bay
2007	77541	0.018	69205	0.170	4/24-4/29	"	Kuskokwim Bay to Kuiukta Bay
2008	64944	-0.194	72864	0.053	4/29-4/30	"	Naknek to Bechevin Bay
2009	91948	0.294	78144	0.072	5/1-5/3	"	Kuskokwim Bay to Wide Bay
2010	64562	-0.424	73818	-0.055	4/27,5/1-5/2	"	Kuskokwim Bay to Canoe Bay
2011	74166	0.129	76892	0.042	4/27, 4/29-5/1	"	Kuskokwim Bay to Canoe Bay
2012	67588	-0.097	68772	-0.106	4/25-4/27	"	Kuskokwim Bay to Wide Bay
2013						No Survey	
2014	79883	0.182	73879	0.074	4/23-25,4/29	H.Wilson/C.Dau	Kuskokwim Bay to Wide Bay
2015	98155	0.186	81875	0.098	4/25-4/28	"	Kuskokwim Bay to Wide Bay

Appendix A. Waterbird and mammal observations by segment, southwest Alaska, 25–28 April 2015, continued.

Species	Segments																																			
	48	49	50	51	52	53	54	56	57	58	59	60	61	62	63	64	65	66	67	68	80	81	83	84	85	86	88	89	90	91	92	93	97			
American Wigeon																																				
Bald Eagle (Ad)		5	7	2					1	1		2	1		3	3		3		1	1				1	1			2	2	2	7				
Bald Eagle (Juv)	1	1										11	1		1									1		1					3	2				
Beluga																																				
Black Brant		1		4							75	8339	2403	215	1580	19585	15835	20	3742	2	114			1573				633	1919	85			4			
B-I Kittiwake	752	91																																		
Black Oystercatcher																																				
Balck Scoter	259	1090	176	119	1604	18	29	5526	211	226	1863	70	35	3	64	65	2	1050	264	33		126		45	15	9	23	1				10	10			
Brown Bear																	1																			
Bufflehead																														15						
Canada Goose																																				
Caribou												1																								
Common Eider								481	6																											
Common Loon			1																		1	1		1				1	1							
Common Merganser																																				
Common Murre																																				
Common Raven	1	1	13								1	1			1		1						1		2											
Double-crested cormorant															3				1																	
Emperor Goose			4	15	8			9178	10117			290											150										117			
Gadwall																																				
Goldeneye																																				
Greater Scaup	8			90	920		2					677												10										5		
Gray Whale		2									6							1														1				
Harlequin Duck		25	21								37		23		480	48		24	60		74	33		70	102	33			90		10	241	8			
Harbor Seal		1	130		1							260	50	435	100	130			62	1				30				1					5			
King Eider															70				14	4																
Large Gull	776	792	1067	521	160	94		1115	11163	10	157	722	3007	955	1345	625	810	728	135	810	1352	8	52	35	11	8	2	22	463		463	20				
Large Shorebird																																				
Long-tailed Duck		3	155									5	290		6				2																	
Mallard												23			20										50				1	2						
Mew Gull	452	2515	885	1210	1700	30	250	3200	50	30	758	183		180	300		50			2	208		8	111			2	14	1	119	84					
Nothern Pintail	1	5	5	6	294	1					80	80	375	570	75	350	400			50	1		1	12												
Parasitic Jaeger					1																															
Pacific Loon																									1											
Pelagic Cormorant		5									2								2			11				6	4	8	2	6	1	6				
Pigeon Guillemont																																				
Red-breasted Merganser	20	10										26	137	4	17	25				1	65	8	15	2	66	48	3		12	25	2	47				
Red-necked Grebe		7																		1						1										
Red-throated Loon																																				
Sandhill Crane																																				
Sabine's Gull																																				
Sea Otter			16	84	10	21	20	410		5	18	124	138	13	91		48		699	622	15		1	3	8	2							24			
Small Shorebird			300						4500	800		300										200												560		
Steller's Eider	250		20					14066	3200			7300	14035	800	117	1900	580																			
Steller's Sealion																																				
Surf Scoter																																				
Tundra Swan																										3										
Walrus	500																	1																		
Greater white-fronted goose																																				
Wolf																																				
White-winged Scoter		17		14			10	20		1	5	10			20																				50	

Appendix A. Waterbird and mammal observations by segment, southwest Alaska, 25–28 April 2015, continued.

Species	Segments																																		
	99	100	101	102	103	104	105	106	107	112	113	114	115	116	117	118	119	125	126	127	128	129	130	131	132	133	134	135	136	137	551	552			
American Wigeon																																			
Bald Eagle (Ad)	2	2	1	1				2	2	1		1	2	2	1	8		3	2	5	2	3	6		1	7	1	1		3		2			
Bald Eagle (Juv)										3	1	1	1			3							2									1			
Beluga																																			
Black Brant		25	15	8							4						1197				25	23						3	50		750	50			
B-1 Kittiwake	65						2		50					50																					
Black Oystercatcher							1							2							4	12			6	1	1								
Balck Scoter		45		5			30		20	140	35			10	8	10		43	194	122	15		45	35		13				8	51	30			
Brown Bear																1						4				1					1				
Bufflehead																																			
Canada Goose																																			
Caribou																																			
Common Eider																																		8	
Common Loon	2	1				2	1			4	2			1					1	1		2		6											
Common Merganser																																			
Common Murre										6				4	3	6		30							1	11	61	17	27	9					
Common Raven																					1														
Double-crested cormorant																																			
Emperor Goose				1														34	150	45	557	537		249		544	55	70	497	2248		5807			
Gadwall																																			
Goldeneye											14																								
Greater Scaup											40												2		4										
Gray Whale												1		4						3															
Harlequin Duck	20		30	20			14	2	1	85	20			18	6			241			3	94	1	7	10	2	18			20	26				
Harbor Seal											10												30									10		1	
King Eider						10	10											2	40																
Large Gull	17			3	3	3	5		113	274	12	4		22	8	9	5	1597	42	521	76	463	24	16	5	137	269	60	183	572	74	6883			
Large Shorebird																																	40		
Long-tailed Duck																																			
Mallard							3		4	7													10												
Mew Gull	366	1		3	2	2			57	110		10	17	1056	2	546	72	1052	8	236	44	21	46	5	212	208	5	16	5	320	400	200			
Nothern Pintail									80	1			1																			170	80		
Parasitic Jaeger																																			
Pacific Loon																																		1	
Pelagic Cormorant		11	2	4	29		3	1	1	12	2	1	29	7	4	2				2	26	17		2	3	7		1							
Pigeon Guillemont														1																					
Red-breasted Merganser	2	10							16	251	9				8			50	4		29	12		9			60		2	30					
Red-necked Grebe										1			1																				1		
Red-throated Loon																																			
Sandhill Crane																																			
Sabine's Gull																																			
Sea Otter		2																	95	22	8	37	90		3										
Small Shorebird																																		50	
Steller's Eider																																20	4265		
Steller's Sealion													6																						
Surf Scoter											2		45														8								
Tundra Swan									2				4									2	2		2										
Walrus																																			
Greater white-fronted goose																																			
Wolf																										1									
White-winged Scoter																																			10