

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

By
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January 2017

U. S. Fish and Wildlife Service
Migratory Bird Management
1011 E. Tudor Road
Anchorage, Alaska 99503

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

Heather M. Wilson, U.S. Fish and Wildlife Service, Migratory Bird Management, 1011 E. Tudor Rd, Anchorage, AK, 99503

Abstract: This report presents results of the annual fall emperor goose population survey in southwest Alaska (1979-2015). The 2015 fall emperor goose population index was 85,050 birds, resulting in a new 3-year average of 84,701. The survey was flown on 1, 3, and 4 October along the north side of the Alaska Peninsula (Naknek River to Bechevin Bay), with replicate surveys of the Izembek area flown on 4-6 October. All species of waterbirds and marine mammals were counted, but emphasis was placed on emperor geese, Pacific brant, Canada geese, and Steller's eiders. Consistent with previous reporting, the most recent 3-year average of emperor geese on the south side of the Alaska Peninsula (4,221) was included in our current index. Total population indices for Pacific brant, Canada geese, and Steller's eiders were 160,984, 48,366, and 61,221, respectively. Average counts for emperor geese, Pacific brant, Canada geese, and Steller's eiders in the Izembek Complex ($n = 4$ surveys) were 2,347, 160,984, 33,170, and 4,519, respectively.

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INTRODUCTION

The primary objective of the emperor goose fall survey is to provide annual population indices and proportional distributions of emperor geese (*Chen canagica*) at primary fall staging locations in southwest Alaska. The main uses of this information are to provide weighting factors for photographic estimates of emperor goose productivity (i.e., percent juveniles; Stehn and Wilson 2014) and a fall measure of emperor goose population trend relative to other emperor goose population indices (Dooley et al. 2016).

Secondarily, the survey provides annual fall population indices for Pacific brant (*Branta bernicla*), Canada geese (*Branta canadensis*), and Steller's eiders (*Polysticta stelleri*) along the entire Alaska Peninsula, as well as within Izembek Lagoon and surrounding estuaries (hereafter, Izembek Complex). Brant have been counted on the Alaska Peninsula during fall staging since 1975 (USFWS, unpubl. data), with more standardized surveying beginning in 1976. However, the majority of brant on the Alaska Peninsula (>99%) are found at the Izembek Complex. To help account for sampling variation in indices of dense aggregations of geese within the Izembek Complex, replicate surveys of the area are conducted each year.

Because the fall index of Pacific brant in the Izembek Complex encompasses nearly the entire world population of Pacific brant (Reed et al. 1998, Ward et al. 2005) and provides a comparative population measure to the Pacific Mid-Winter survey (Pacific Flyway Council 2002), it has been a consistent fall metric included the Pacific Flyway Databook (Olsen 2016). Together, the Fall Izembek Survey and Mid-Winter Survey are ranked as the highest priorities for population assessment of Pacific Black Brant by the Pacific Flyway Council (2002; see also Stehn et al. 2010).

METHODS

The 2015 Fall Emperor Goose Survey was flown using a USFWS Cessna 206 (N9623R) equipped with amphibious floats, at a ground speed of 167-200 km/hr (90-110 kts) and an

altitude of 45-77 m (150-250 feet) above sea level (ASL). The survey route included the north side of the Alaska Peninsula from Naknek to Bechevin Bay (Segments 34-85, Figs. 1-2). The pilot-observer and right seat-observer recorded presence of birds from both sides of the aircraft and voice recorded species and flock sizes into two laptop computers. GPS coordinates were automatically recorded and linked to the position of the aircraft track and individual aerial observations using custom computer programs (Jack Hodges, USFWS-MBM, Juneau). Although emperor geese, Pacific brant, Canada geese, and Steller's eiders are the primary species of interest, other waterbirds species are also recorded during the survey (Appendices 1 and 2).

Coastline segments of the survey were flown ~200 meters offshore, with deviations only to confirm species identification and flock size. Estuaries were flown in their entirety by following historical survey tracks and monitoring real-time aircraft locations to ensure adequate coverage of the survey area. Flights were primarily conducted with <20 knots of wind.

Historically, the Fall Emperor Goose survey included 143 coastline and estuarine habitats from the Yukon Kuskokwim Delta, Bristol Bay, the north side of the Alaska Peninsula and Unimak Island, to the south side of the Alaska Peninsula northeast to Wide Bay (Figures 1-2, Mallek and Dau 2000-2013). However, over time, the north side of the Alaska Peninsula (Segments 34-65 from Naknek through Izembek, Fig. 2) was identified as the primary fall staging area used by emperor geese in southwest Alaska (96% [SE: 0.004] of total index 1981-2014), with a relatively small proportion occurring on the south side of the Alaska Peninsula (Segments 86-137, Fig. 2), and even fewer observations in the "far northern" segments (i.e., Yukon-Delta and northern Bristol Bay; Segments 1-35, Fig. 1).

To improve efficiency of data collection, segments along the Yukon-Delta/northern Bristol Bay were omitted from surveying and analysis beginning in 2005. Similarly, surveys of the south side of the Alaska Peninsula (an area with relatively low numbers of birds and consistently poor flight/weather conditions) were also flown less frequently beginning in 2005, and the last fall survey of that area was flown in 2009. Recent surveys, including 2015, have included only segments on the north side of the Alaska Peninsula (Segments 34-85, Naknek through Izembek; Fig. 2), corresponding to areas where photographs for emperor goose age ratios are collected (Shults and Larned 2016, Stehn and Wilson 2014), and where Pacific brant, Canada geese, and Steller's eiders are most abundant. To maintain consistency with historical emperor goose indices, we included the most recent 3-year average from the south side of the Alaska Peninsula (2004, 2008, 2009) in the 2015 fall emperor goose index.

In 2015, segments 34 to 59 (North side of the Alaska Peninsula: Naknek to the start of Izembek) were flown on 1, 3, and 4 October. In the Izembek Complex, four surveys of segments 60--85 were flown on 4-6 October. Thus, I calculated the 2015 emperor goose survey indices as the sum of three parts: 1) the sum of the northern Alaska Peninsula (Segments 34-59); 2) the average of the four Izembek Complex surveys; and, for emperor geese only, 3) the most recent 3-year average from the south side of the Alaska Peninsula (2004, 2008, 2009; Segments 86-139). I also present long-term logistic growth rates for each of the primary species, calculated as the slope of annual counts. Finally, survey conditions including wind speed and direction, sky cover, visibility, and tide stage, were recorded during surveys and are provided below, consistent with historical reporting.

SURVEY CONDITIONS

1 October: Survey conditions were good with east winds at 5 kts, overcast ceilings to 6,000 feet, and unlimited visibility. However, by the end of the survey day, winds increased to 12 kts, and then to 25-30+ kts at Cape Menshikof (just south of Ugashik Bay/Pilot Point, Seg. 38). With winds forecasted to continue to increase further south, we terminated the survey at Cape Menshikof and returned to King Salmon for the day.

3 October: Starting just south of Pilot Point (Cape Menshikof; Seg. 39), our initial survey conditions were good, with west winds at 12 kts and broken ceilings of 900-1000 feet. Conditions improved as we reached the Port Moller region (Segs. 50-51) with 5 kts of wind and scattered ceilings at 2000-8000 feet. However, due to impending darkness, we terminated the day's survey at Herendeen Bay (Seg. 51, Nelson Lagoon Area) and returned to Cold Bay for the evening.

4 October: We began surveying at Herendeen Bay (Seg. 51, Nelson Lagoon Area) and worked south (Segs. 52-59) towards Cold Bay. Initial survey conditions were excellent, with broken overcast skies at 8000 feet, light south winds at 5 kts, and low tides. After landing and refueling Cold Bay, we initiated an afternoon survey of the Izembek Complex. By that time, survey conditions in Cold Bay had deteriorated to fair, and sometimes poor, primarily due to increased wind (18-25+ kts out of the southeast) and glare. Cloud cover was good (broken ceilings at 4000 feet), but low sun angle resulted in intermittent glare. Tides were high throughout the Izembek Complex survey.

5 October: Survey conditions for a single replicate survey of the Izembek Complex were good, with broken ceilings at 8000 feet, and west winds at 12 kts, improving to scattered ceilings at 5000 feet later in the day. A high tide predominated throughout the survey.

6 October: We completed two more replicates surveys of the Izembek Complex; one each in morning and afternoon. Conditions on the morning survey were excellent, with broken ceilings at 6000 feet, west winds at 7 kts, and low tides. The afternoon survey conditions were also good, but with slightly higher winds (12 kts), high tides, and occasional glare as cloud conditions became scattered at 5000 feet.

RESULTS/DISCUSSION

Population indices for the four primary species of interest (emperor geese, Pacific brant, Canada geese, and Steller's eiders) are summarized in the text below, as well as in Tables 1 and 2. Historical estimates of emperor goose fall population indices (1979-2015) and corresponding 3-year averages are summarized in Table 1, while segment-specific totals for all species observed during the survey are summarized in Appendices 1 and 2.

Emperor Goose

The 2015 fall population index of emperor geese was 85,050, resulting in a new 3-yr running average (2013-2015) of 84,701. The 2015 index was calculated as the sum of birds observed on the northern Alaska Peninsula (Seg. 34-59; 78,482), the average of Izembek Complex replicates (2,347, CV: 46%, $n = 4$: 3,914, 1,559, 1,711, and 2,205; Table 2), and the most recent 3-yr average from the south side of the Alaska Peninsula (4,221).

The 2015 emperor goose population index represented a 14% increase from the long-term average (74,755, 1979-2014, Table 1), but the long-term (1979-2015; MBM R7 files) fall population trajectory of emperor geese indicated no significant growth (growth rate: 1.0, SE: <0.01 , R^2 : 0.01).

Numbers and proportions of emperor geese at primary staging sites along the Alaska Peninsula from this survey are used to weight lagoon-specific photographic estimates of emperor goose productivity (i.e., percent juveniles) via a count-weighted estimate (Stehn and Wilson 2014, Shults and Larned 2016). Herein, we report the distribution of emperor geese among major lagoons along the north side of the Alaska Peninsula in 2015: Egegik Bay 1,847 ($<2.2\%$ of total 2015 index, Segments 36-37); Ugashik Bay 775 (1%, Segment 38); Cinder River Estuary 17,463 (20.5%, Segments 39-43); Port Heiden 12,563 (15%, Segments 44-45); Seal Islands 17,290 (20.3%, Segment 46-47); Nelson Lagoon and adjacent estuaries 28,534 (20.3%, Segments 50-58, 551-552); and other segments outside of major lagoons 10 (0%, Segments 34-35, 59); average of Izembek Lagoon and adjacent estuaries (i.e., Izembek Complex) 2,347 (2.8%, Segments 60-68 and 80-85); and the south side of Alaska Peninsula, Cold Bay to Wide Bay most recent 3-year average, 4,221 (5%; Segments 86-139).

Pacific Brant

All Pacific brant observed during the emperor goose survey were in the Izembek Complex. No brant were observed on the northern Alaska Peninsula in 2015. Thus, the Izembek Complex average (160,984) was calculated from 4 surveys of the Izembek Complex (168,642, 155,544, 153,518, and 166,232, average: 160,984, CV: 5%, Table 2). Consistent with historic fall brant indices, no previous counts of brant on the south side of the Alaska Peninsula were included in the 2015 index.

The 2015 Izembek Complex index (160,984) represented little ($< 0.01\%$) change from the previous year (2014: 160,694; $n = 3$ surveys), but a 19% increase from the long-term average of Pacific Brant counted on the fall emperor goose survey (135,393, 1976-2014, MBM R7 files). The long-term (1976-2015; MBM R7 files) fall population trend of Pacific brant suggests a flat growth rate (growth rate: 1.0, SE: <0.01 , R^2 : <0.11).

Canada Goose

A total of 48,366 Canada geese were observed during the emperor goose survey, with most (69%; average: 33,170) occurring in the Izembek Complex. The 2015 emperor goose survey index of Canada geese included observations from the northern Alaska Peninsula (15,196), and Izembek Complex replicates (average: 33,170; CV: 42%, $n = 4$ surveys: 23,644, 21,965, 34,868, and 52,201; Table 2).

The 2015 Canada goose fall index represented a 3% increase from the previous year (2014: 47,040) index and a 17% increase from the previous 3-year average (31,976, 2012-2014). However, it marked only a 2% decrease from the historical long-term average (49,331, 1979-2014, MBM R7 files). The long-term (1979-2015; MBM R7 files) fall population trend of Canada geese indicated no significant growth (growth rate: 0.99, SE: <0.01, R^2 : 0.07).

Steller's Eider

Our 2015 fall population index of Steller's eiders was 61,221, with 92% (56,702) occurring on the Northern Alaska Peninsula (44,356 of which were in the Nelson Lagoon area), and an average of 4,519 birds observed at Izembek Lagoon (CV: 40%, $n = 4$: 2,143, 4,305, 6,457, and 5,170; Table 2).

In 2015, Steller's eiders increased 42% from the previous year (43,066), and by 27% from the most recent 3-year average (39,883). Overall, Steller's eiders were 4% above their long-term average (58,891, 1979-2014, MBM R7 files). However, the current long-term fall population trend of Steller's eiders (1979-2015; MBM R7 files) continued to indicate no significant growth (growth rate: 1.0, SE: <0.01, R^2 : <0.01).

Numbers and proportions of Steller's eiders at primary southwest Alaska estuarine staging sites in 2015 were as follows: Egegik Bay 0 (Segments 36-37); Ugashik Bay 0 (Segment 38); Cinder River Estuary 0 (Segments 40-42); Port Heiden 3,646 (6%, Segments 44-46); Seal Islands 8,700 (14.2%, Segment 46-47); Nelson Lagoon and adjacent estuaries 44,356 (72.5%, Segments 50-58, 551-552); and Izembek Lagoon and adjacent estuaries 4,519 (7.4%, Segments 60-69 and 80-85).

Steller's eiders have been monitored at Izembek National Wildlife Refuge since the refuge was established, with formal annual surveys beginning in 1979. The long-term trend at Izembek Complex (1979-2015) indicated a stable to slightly decreasing population (growth rate: 0.99, SE: <0.01, R^2 : 0.40) while fall survey data for the Nelson Lagoon region indicated no significant trend (growth rate: 1.0, SE: <0.01, R^2 : 0.05) over the same time period. The most recent 10 year logistic growth rates in both locations provided similar results.

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

ACKNOWLEDGMENTS

I thank Bill Larned for serving as right-front observer for the majority of the survey, and Chris Dau for serving as right-front observer on the afternoon of October 6 for our final Izembek replicate. Alison Williams assisted with selected data transcription and Julian Fischer provided a helpful review of the report. I also thank Alaska Peninsula/Becharof and Izembek NWR's for their continued support of the survey by providing lodging, vehicles, hangar space, occasional fuel, and other logistical assistance.

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Figure 1. Map of emperor goose fall aerial survey segments 1-36 in southwest Alaska.

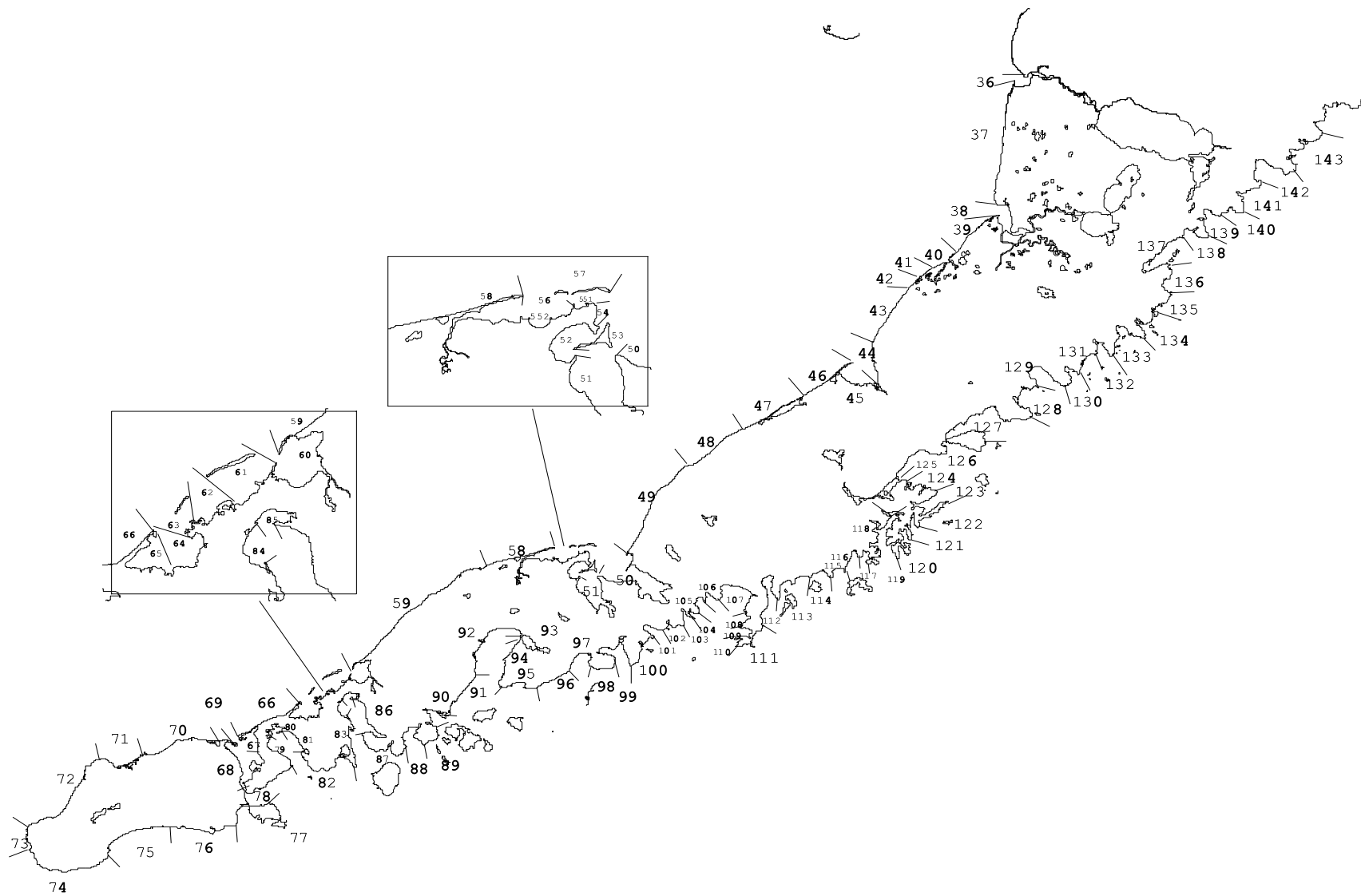


Figure 2. Map of emperor goose fall aerial survey segments 36-143 in southwest Alaska.

Table 1. Fall emperor goose survey data, southwest Alaska, 1979-2015.

YEAR	DATES	POPULATION INDEX	3YR. AVG.	PILOT/OBSERVER(S)	SURVEY AREA	SEGMENTS RANGE (TOTAL # SURVEYED)
1979	10/1-10/4	59,808	NA	Conant/Gill	North Alaska Peninsula only	11-79 (54)
1980	10/4-10/8	65,971	NA	King/Gill	North Alaska Peninsula only	11-79 (54)
1981	10/3-10/8	63,156	62,978	King/Gill/Derksen	Kuskokwim Bay south	11-90 (79)
1982	10/6-10/10	80,608	69,912	King/Bollinger	Kuskokwim Bay south	11-92 (81)
1983	10/10-10/16	72,551	72,105	King/Derksen	Kuskokwim Bay south	11-92 (81)
1984	10/3-10/8	82,842	78,667	"	Kuskokwim Bay south	11-92 (81)
1985	10/10-10/14	59,790	71,728	King/Eldridge	Kuskokwim Bay south	11-92 (81)
1986	10/5-10/11	68,051	70,228	"	Kuskokwim Bay south	11-92 (81)
1987	10/2-10/5	65,663	64,501	"	Kuskokwim Bay south	11-92 (81)
1988	10/7-10/12	76,165	69,960	"	Kuskokwim Bay south	11-92 (81)
1989	10/7-10/12	70,729	70,852	King/Denlinger	Kuskokwim Bay south	11-92 (81)
1990	10/17-10/19	109,531	85,475	King/Brackney	Kuskokwim Bay south	35-92 (81)
1991	10/3-10/8	75,295	85,185	"	Kuskokwim Bay south	11-92 (81)
1992	10/10-10/17	82,295	89,040	"	Kuskokwim Bay south	11-139 (105)
1993	10/23-10/26	71,051	76,214	King/Dewhurst	Alaska Peninsula only	35-137 (86)
1994	10/8-10/14	87,086	80,144	King/Laing	Kuskokwim Bay south	12-127 (83)
1995	10/14-10/20	91,009	83,049	King/Bollinger	Kuskokwim Bay south	20-139 (97)
1996	9/28-9/29	87,018	88,371	King/Eldridge	North Alaska Peninsula only ¹	35-65 (32)
1997	10/3-10/5	86,669	88,232	King/Dau	North Alaska Peninsula only ¹	35-85 (52)
1998	10/7-10/9	67,744	80,477	King/Mallek	Alaska Peninsula only	34-138 (85)
1999	10/1-10/5	60,226	71,546	Mallek/Dau	North Alaska Peninsula only ¹	35-85 (41)
2000	9/26-28,10/2	61,626	63,199	"	Kuskokwim Bay south	14-137 (96)
2001	9/26-28,10/1	59,987	60,613	"	Kuskokwim Bay south	14-137 (98)
2002	9/29-10/2	78,692	66,768	"	Kuskokwim Bay south	14-137 (100)
2003	9/27-10/2	77,290	71,990	"	Kuskokwim Bay south	14-137 (96)
2004	9/30-10/3	93,544	83,175	"	Kuskokwim Bay south	14-137 (88)
2005	10/4-10/8	73,212	81,349	"	Alaska Peninsula only	34-137 (58)
2006	9/26-9/28	81,078	82,611	"	Alaska Peninsula only	34-125 (48)
2007	9/26-10/3	73,531	75,940	"	North Alaska Peninsula only ¹	34-85 (42)
2008	9/26-9/28	78,201	77,604	"	Kuskokwim Bay south	14-137 (96)
2009	9/29-10/5	79,647	77,127	"	Kuskokwim Bay south	20-137 (76)
2010	9/30, 10/4	59,924	72,591	"	North Alaska Peninsula only ¹	34-85 (42)
2011	9/27-9/30	62,561	67,377	"	North Alaska Peninsula only ¹	34-85 (44)
2012	9/28-9/30	58,683	60,389	"	North Alaska Peninsula only ¹	35-85 (41)
2013	9/30, 10/19	78,100	66,448	Wilson/Dau	North Alaska Peninsula only ¹	35-85 (39)
2014	9/29-10/5	90,954	75,912	Wilson/Larned	North Alaska Peninsula only ¹	34-85 (43)
2015	10/1-10/6	85,050	84,701	Wilson/Larned/Dau	North Alaska Peninsula only ¹	34-85 (43)

¹ Most recent 3-yr average count of south side of the Alaska Peninsula used in estimate

Table 2. Summary of Fall 2015 counts used to calculate totals for the Izembek Complex and Emperor Goose Survey. The 2015 Fall Emperor Goose Survey totals were the sum of three parts, highlighted in grey below: 1) the Northern Alaska Peninsula (Segments 34-59, flown on 1,3, and 4 Oct.); 2) the Izembek Complex Average (Segments 60-85, flown on 4-6 Oct.); and for emperor geese only, 3) the most recent 3-year average from the south side of the Alaska Peninsula (2004, 2008, 2009; Segments 86-139).

Area	Species			
	Emperor Goose	Pacific Brant	Canada Goose	Steller's Eider
Northern Alaska Peninsula	78,482	0	15,196	56,702
<i>Izembek Complex Replicates</i>				
<i>Rep 1: Oct 4</i>	3,914	168,642	23,644	2,143
<i>Rep 2: Oct 5</i>	1,559	155,544	21,965	4,305
<i>Rep 3: Oct 6 (Morning)</i>	1,711	153,518	34,868	6,457
<i>Rep 4: Oct 6 (Afternoon)</i>	2,205	166,232	52,201	5,170
Izembek Complex Average	2,347	160,984	33,170	4,519
Izembek Complex CV	46%	5%	42%	40%
South side Alaska Peninsula ¹	4,221			
TOTAL	85,050	160,984	48,366	61,221

²The most recent 3-year average of the South side of the Alaska Peninsula was included only for emperor geese, in an effort to maintain consistency with previous years' calculations. For the other primary species, South side averages were never included in report totals, as historically, < 20 birds of these species were observed on the South side in any given year.

Appendix 2. Replicate waterbird and mammal observations by segment in the Izembek Lagoon Area, Alaska, 4-6 October 2016. Primary species are highlighted in grey.

SPECIES	REP 1 - Izembek Complex Segments: 4 October														TOTAL
	60	61	62	63	64	65	67	68	80	81	83	84	85		
Am. Green-winged Teal															0
Am. Wigeon															0
Bald Eagle	1														1
Pacific Brant	6382	71711	13163	19777	25023	17700	189	12318	2032					347	168642
Black-legged Kittiwake															0
Black Scoter								10	8		5				23
Brown Bear															0
Canada Goose	11915	620	964	16	4044			5035	1050						23644
Common Eider		4													4
Common Loon											2				2
Common Raven															0
Double-crested Cormorant															0
Emperor Goose	1265	44	80	10	15		37	370	451	225	771	131	515		3914
Goldeneye spp.															0
Greater Scaup	585														585
Gyrfalcon															0
Harlequin Duck											5	5			10
Harbor Seal	13	1				85		2						2	104
Large gull	661	305	442	820	651	260	2	790	697	6	20	107	73		4834
Mallard	10										4				14
Mew Gull	413													55	468
Northern Pintail	1015	72	270			500		570	30						2457
Northern Shoveler															0
Pacific Loon														1	1
Pelagic Cormorant														4	4
Red-breasted Merganser			8					7	60						75
Red-necked Grebe														7	7
Sea Otter	151	83		30	1		1	67			5		1		339
Shorebird	8570	1200				25							390		10185
Steller's Eider	10	233													243
Surf Scoter															0
Tundra Swan															0
Walrus															0
White-fronted goose															0
White-winged Scoter															0
Yellow-billed Loon											2				2

SPECIES	REP 2 - Izembek Complex Segments: 5 October														TOTAL
	60	61	62	63	64	65	67	68	80	84	85				
Am. Green-winged Teal															0
Am. Wigeon															0
Bald Eagle	1														1
Pacific Brant	14931	40619	20552	11634	22380	41946	79	784	2277					342	155544
Black-legged Kittiwake		100	12	1	3	24	203	24							367
Black Scoter								4	8						12
Brown Bear															0
Canada Goose	11940		200	630	375	5290		1700	1830						21965
Common Eider															0
Common Loon															0
Common Raven															0
Double-crested Cormorant													41		41
Emperor Goose	334	50	200					123	303	112				437	1559
Goldeneye spp.															0
Greater Scaup	130														130
Gyrfalcon															0
Harlequin Duck												9		30	39
Harbor Seal												41		5	176
Large gull	627	340	354	30	108	1053	43	24	360	72	674				3685
Mallard															0
Mew Gull	85											30		610	725
Northern Pintail	750		400			850	3	360	246						2609
Northern Shoveler															0
Pacific Loon													1		1
Pelagic Cormorant													4		4
Red-breasted Merganser															0
Red-necked Grebe															0
Sea Otter	792	587	3	8	62	201	153	50	6	3	27				1892
Shorebird		1000	20				150						800		1970
Steller's Eider	2470	500	350	928	1		4	2				50			4305
Surf Scoter													8		8
Tundra Swan		5													7
Walrus															0
White-fronted goose															0
White-winged Scoter															0
Yellow-billed Loon												20	4		24

SPECIES	REP 3 - Izembek Complex: 6 October (Morning)														TOTAL
	60	61	62	63	64	65	67	68	80	81	83	84	85		
Am. Green-winged Teal															0
Am. Wigeon															0
Bald Eagle	7				1										8
Pacific Brant	6400	50087	9346	16829	19671	47994	444	300	2001					446	153518
Black-legged Kittiwake							1000					10			1010
Black Scoter								5	19				46		70
Brown Bear	4														4
Canada Goose	11591	4900	1310	1020	5080	6100		2979	1662					226	34868
Common Eider															0
Common Loon												2	3		5
Common Raven									2						2
Double-crested Cormorant					50								1		51
Emperor Goose	467	10	189	69	14		10	401	66				485		1711
Goldeneye spp.															0
Greater Scaup	350														350
Gyrfalcon															0
Harlequin Duck								7				32	4		43
Harbor Seal		175	250	20	115			2	2				50		614
Large gull	398	906	78	494	686	341	890	485	559			8	460		5305
Mallard	262	3			4								26		295
Mew Gull	148	60	0	0	860	60	165	0	0			10	5		1308
Northern Pintail	2714	50	700	120	48	240		5					115		3992
Northern Shoveler															0
Pacific Loon		3													3
Pelagic Cormorant															0
Red-breasted Merganser				10	6										16
Red-necked Grebe															0
Sea Otter	44	42	1		82	76	116	65					7		433
Shorebird	5060	2800		8000			60								15940
Steller's Eider	2160	3415	92		10	620			140					20	6457
Surf Scoter															0
Tundra Swan															0
Walrus															0
White-fronted goose															0
White-winged Scoter														2	2
Yellow-billed Loon															0

SPECIES	REP 4 - Izembek Complex: 6 October (Afternoon)														TOTAL
	60	61	62	63	64	65	67	68	80	84	85				
Am. Green-winged Teal															0
Am. Wigeon															0
Bald Eagle		400													400
Pacific Brant	16685	62589	8940	6790	32566	34186	300	561	3185				430		166232
Black-legged Kittiwake							270								270
Black Scoter													8		8
Brown Bear															0
Canada Goose	10006	3260	1625		270	35890			1150						52201
Common Eider															0
Common Loon															0
Common Raven													2		2
Double-crested Cormorant															0
Emperor Goose	390	660	100	11		310	9	653					72		2205
Goldeneye spp.															0
Greater Scaup							800	3							803
Gyrfalcon							1								1
Harlequin Duck													14	10	24
Harbor Seal												7	1	41	120
Large gull	1130	3736	1065	357	575	4501	212	630	1216	61	139				13622
Mallard	400									15	400			100	915
Mew Gull	3568						100	904	3	110	24				4709
Northern Pintail	5700			200	670	3600	26	20	453				40		10709
Northern Shoveler															0
Pacific Loon														1	1
Pelagic Cormorant															0
Red-breasted Merganser		1													