

AERIAL SURVEY OF EMPEROR GEESE AND OTHER WATERBIRDS
IN
SOUTHWESTERN ALASKA,
FALL 2009

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Key Words: aerial survey, emperor geese, waterbirds, southwest Alaska.

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Abstract: This report presents results of the 31th consecutive, annual fall emperor goose population survey in southwest Alaska. This aerial survey was flown between 29 September and 4 October 2009 from Chagvan Bay to Bechevin Bay, including the entire north side of the Alaska Peninsula and the south side of the Alaska Peninsula, east to Wide Bay. The USFWS Turbine-Beaver (N754) was used and a left seat pilot/observer and right seat observer made observations along coastlines and over estuaries at an altitude of 45m (150 feet) ASL and airspeed of 200km/hr (110 kts). All species of waterbirds and marine mammals were counted with emphasis on emperor geese, Pacific brant, Canada geese, and Steller's eiders. Population estimates for emperor geese, Canada geese, and Steller's eiders within the entire survey area were 79,647, 46,954 and 57,320, respectively. Two additional replicate surveys of the Izembek NWR area were flown on 4 and 5 October to estimate sizes of the Pacific brant and Canada goose populations. Averages counts for the Izembek area were 144,594 Pacific brant (n=2 surveys) and 45,975 Canada geese (n=3 surveys).

Key words: aerial survey, emperor geese, waterbirds, southwest Alaska. December 2009

INTRODUCTION

Fall distribution, abundance, and population trends of emperor geese and other waterbirds at migratory staging areas throughout southwest Alaska have been annually monitored since 1979. Data from this survey are used to expand photographic estimates of emperor goose productivity (i.e. percent juveniles) based on the proportional distribution of the population at various fall staging locations. Important data necessary for management of waterbird populations and their habitats are provided by this survey. The survey includes coastline and estuarine habitats from Kuskokwim Bay south and west along the north side of the Alaska Peninsula to Unimak Island, and the south side of the Alaska Peninsula east to Wide Bay.

METHODS

The survey was flown using the USFWS Turbine-Beaver (N754) at a ground speed of approximately 200 km/hr (110 kts) and an altitude of 45m (150 feet) ASL. The 2009 survey route was from Chagvan Bay to the Naknek River, the north side of the Alaska Peninsula south to Bechevin Bay, and the south side of the peninsula east to Wide Bay. Observations were made from both sides of the aircraft and voice recorded into two panel-mounted computers using remote microphones. Computers received input from the aircraft Global Positioning System (GPS) saving coordinates for each observation. Computer programs developed by Jack Hodges (USFWS-MBM, Juneau) were used to collect and transcribe these data.

Coast line segments were usually flown 100 meters offshore with deviations to confirm species identification and numbers seaward within 1.6 km (1 mile) of shorelines. In estuaries, a systematic but meandering flight path was followed. Aircraft track was monitored on a computer moving map program to avoid duplication and obtain complete coverage of near shore and estuarine habitats. Whenever possible, flights over estuaries were conducted with <20 knots of wind and at or near high

tide.

The greater survey area includes 143 shoreline/estuarine segments (Figures 1-2) which were previously described by Mallek and Dau (2000). In 2009, segments 20 and 22, 29 and 32-34 were flown on 29 September; segments 35-85 on 1 October; and segments 86-137 on 4 October. Two additional surveys of Izembek Lagoon and other estuaries adjacent to Izembek NWR were flown on 4 October (Larned/Bollinger) 5 October (Mallek/Dau). General observations of habitat and survey conditions including wind speed and direction, temperature, sky condition, visibility, and tide stage were recorded en route during all surveys.

SURVEY CONDITIONS

29 September: From Chagvan (Seg. 20) and Nanvak (Seg. 22) bays and the Nushagak Peninsula south to Naknek (Segments 29 and 32-34) winds were southwesterly at 10-20 knots. Sky cover was 600 to 1,000 feet overcast to broken north of Cape Pierce, 1,000 overcast near Nushagak Bay and 10,000 feet scattered along the upper Alaska Peninsula. Visibility was good with only light drizzle at Chagvan Bay and along the Nushagak Peninsula, tides were low and air temperatures were 38-42°F.

1 October: Segments 35 (Egegik Bay) to 85 (Kinzarof Lagoon) were surveyed with winds northwesterly at 5-10 knots north of Izembek Lagoon and southwesterly at 23-30 knots from Izembek south. Tides were high at Naknek becoming mid at Cinder River and low from Seal Islands Lagoon through Izembek Lagoon. Tides along the Pacific side of the peninsula south of Cold Bay were high. Visibility was good and air temperatures increased from 33-40° F throughout the day. Overcast to scattered skies of 2,000 feet or higher persisted throughout the day.

4 October: Segments 86 (Cold Bay) to 137 (Wide Bay) were surveyed with westerly to southwesterly winds of 5-10 knots. Sky conditions were 1,000 to 5,000 feet overcast with good visibility except from Beaver Bay (Seg. 97) to Stepovak Bay (Seg. 107) where ceilings lowered to 400-800 feet overcast and visibility was significantly reduced. Temperature was approximately 40°F throughout the day.

5 October: Segments 60 (Moffet Bay) to 85 (Kinzarof Lagoon) were surveyed with northwesterly winds of 15-20 knots and good visibility. Sky conditions were 1,500 feet scattered lowering to 500 feet overcast and temperature held at 45 ° F. Visibility was good with slightly deteriorating conditions and mist along the Bering Sea coast (Seg. 66). Tides were high on the Bering side of the Alaska Peninsula and low on the Pacific side.

RESULTS/DISCUSSION

The totals for all species observed during the survey are summarized in Table 1. Estimates of emperor goose population sizes (1979-2009) and corresponding 3-year averages are summarized in Table 2. Figure 3 depicts the 31-year population trend for fall staging emperor geese.

Emperor Goose

The 2009 fall population of emperor geese was estimated at 79,647. Northern Alaska Peninsula estuarine staging sites contained 71,367 (89.6%) of the emperor geese observed (segments 35-59). From Chagvan Bay to Naknek 15 emperor geese (0.1%) were observed (segments 14-34) and 5,402 (6.8%) were observed along the south side of the Alaska Peninsula (segments 86-137). The remainder of emperor geese observations, from the vicinity of Izembek Lagoon and adjacent estuaries, totaled 2,863 (3.6%) (segments 60-85). The 2009 population estimate is 1.9% above the 78,201 observed in 2008 and the current 3-year population average of 77,127 is 0.6% below the previous 3-year average of 77,604 (Table 2). The fall emperor goose population trend continued to indicate an increase of 0.4%/year (Figure 3).

Numbers and proportions of emperor geese at primary staging sites along the Alaska Peninsula in 2009 were as follows: Egegik Bay 2,292 (2.9%, segments 36-37); Ugashik Bay 428 (0.5%, segment 38); Cinder River Estuary 13,130 (16.5%, segments 40-42); Port Heiden 12,090 (15.2%, segments 44-45); Seal Islands 25,237 (31.7%, segment 47); Nelson Lagoon and adjacent estuaries 17,889 (22.8%, segments 50-57, 551-552); Izembek Lagoon and adjacent estuaries 2,863 (3.6%, segments 60-68 and 80-85); Pavlof Bay 2,207 (2.8%, segments 91-93); Chignik Lagoon 430 (0.5% , segment 125) and Wide Bay 1,205 (1.5%, segments 136-137).

Pacific Brant

A total of 120,695 Pacific brant was observed during the emperor goose survey of which >99% (120,592) were in Izembek Lagoon and adjacent estuaries. A replicate count of Izembek Lagoon and adjacent estuaries on 5 October was 168,596. The average fall brant population size in the Izembek area was 144,594 based on these two surveys. The 2009 average count was 11.0% above the 2008 estimate of 130,294 (n=4 surveys) and 8.1% above the 34-year average fall count of 133,704 (1975-2008, Izembek NWR files).

Canada Goose

We observed 46,954 Canada geese during the emperor goose survey with Izembek Lagoon and adjacent estuaries accounting for 90.4% (42,462) of the total birds observed. Replicate counts of Izembek Lagoon and adjacent estuaries (4 and 5 October) provided counts of 49,652 and 45,812. The average Canada goose count estimated from these three surveys (including the Izembek area of the emperor goose survey) was 45,975. The 2009 average count was more than twofold the 2008 estimate of 22,148 (n=4 surveys) and 8.4% above the 34-year average fall count of 42,422 (1975-2008, Izembek NWR files).

Steller's Eider

We observed a total of 57,320 Steller's eiders during the emperor goose survey, a greater than twofold increase over the 2008 count of 28,637 and 10.0% below the 1979-2008 average of 63,661. The population trend of Steller's eiders indicates a 1.6%/year increase based on counts during the fall emperor goose survey (1979-2009).

Numbers and proportions of Steller's eiders at primary southwest Alaska estuarine staging sites were as follows: Chagvan Bay 1,425 (2.5%, segment 20); Egegik Bay 950 (1.7%, segments 36-37);

Cinder River Estuary 575 (1.0%, segments 40-42); Port Heiden 4800 (8.4%, segments 44-46); Seal Islands 8,170 (14.3%, segment 47); Nelson Lagoon and adjacent estuaries 35,650 (62.2%, segments 50-57, 551-552); and Izembek Lagoon and adjacent estuaries 5,750 (10.0%, segments 60-68 and 80-85).

Replicate counts of Izembek Lagoon and adjacent estuaries (4 and 5 October) provided counts of 4,479 and 13,940, respectively. The average Steller's eider count in the Izembek area, estimated from these three surveys (including the Izembek area of the emperor goose survey), was 8,056. This estimate is 17.2% above the 2008 estimate of 6,875 (n=4 surveys) and 64.1% below the 34-year average fall count of 22,470 (1975-2008, Izembek NWR files).

ACKNOWLEDGMENTS

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Figure 1. Map of emperor goose aerial survey segments 1-36 in southwest Alaska, 1992-2009.

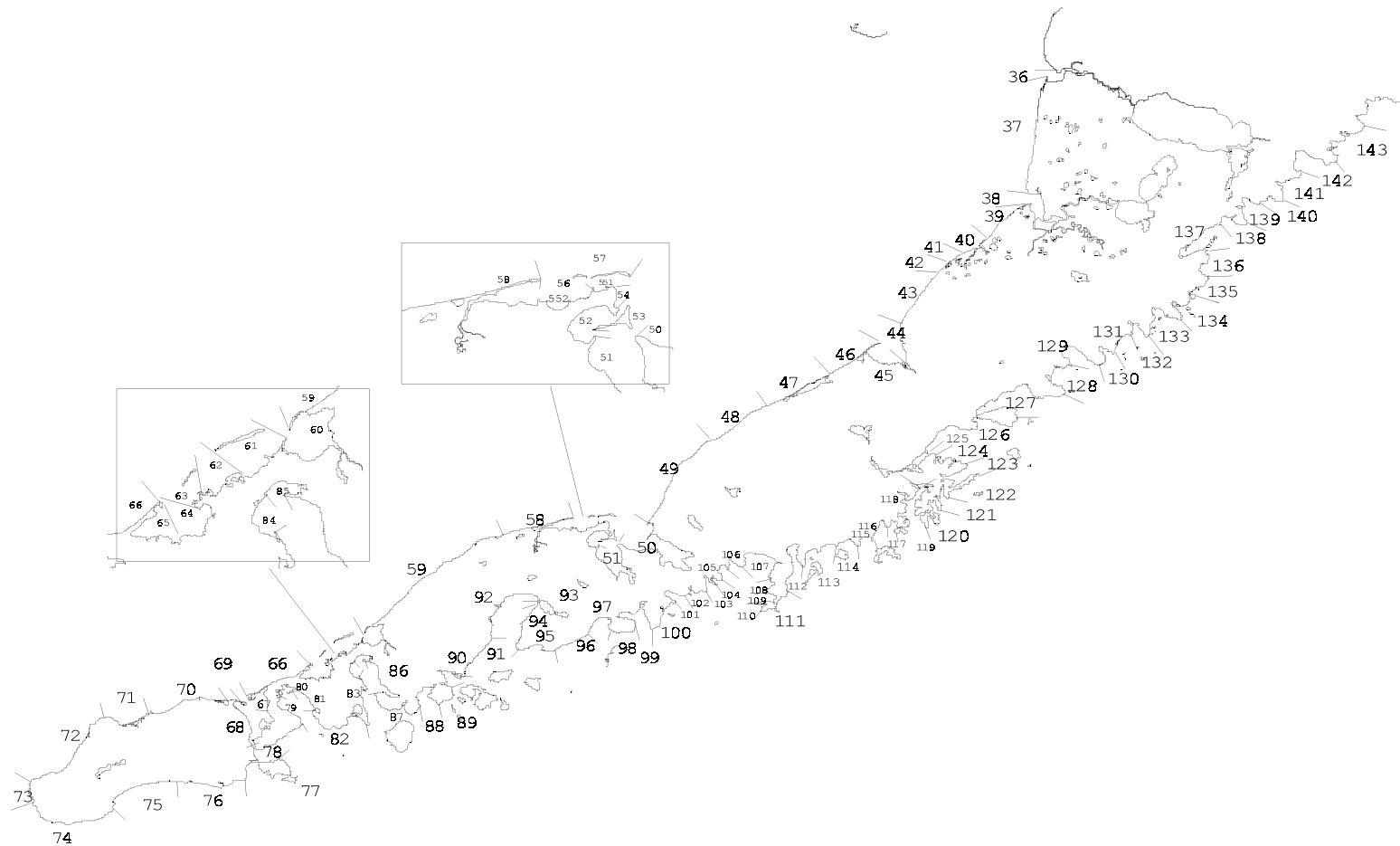


Figure 2. Map of emperor goose aerial survey segments 36-143 in southwest Alaska, 1992-2000.

Table 1. Waterbird and mammal observations by segment, southwest Alaska 29 September - 4 October 2009.

SPECIES	20	22	29	32	33	34	35	36	37	38	39	40	41	42	43
Amer. Green-winged Teal						140		550		40					
Amer. Wigeon		100													
Arctic Tern		1200		5			1								
Bald Eagle adult		1		1		1		1	1						
Bald Eagle juvenile									3			1		1	
Pacific Brant	26	70													
Black-legged Kittiwake		550	200												
Black Oystercatcher															
Black Scoter	11	15	6831	1367			10	54	507		2000				297
Brown Bear			4												
Canada Goose	190	3419						273				2			
Common Eider	55	16													
Common Loon															
Common Murre															
Common Raven									4	1					
Double-crested Cormorant															
Emperor Goose		15						2174	118	428		11139		1991	10
Gadwall		10										20			
Greater Scaup	2165	375		1291										75	
Harlequin Duck															
Harbon Seal	275	60								185					
King Eider															
Large Gull	138	94	433	539	32	104	1122	2657	8	1146	34	1507	10	100	160
Large Shorebird															
Long-tailed Duck										50					
Mallard	515	110			3	493	141	2850		507		290		70	
Mew Gull		40	150	25		127	1	330	1	50	6				
Medium Shorebird															
Moose						2									
Northern Pintail	1114	638	6	330	15	315	285	5970	25	2631		5990		450	30
Northern Shoveler										10					
Orca															
Pacific Loon															
Pelagic Cormorant	17	2							86						
Red-breasted Merganser	92	20				16		20		10		45		13	
Red-necked Grebe			1	4											
Red-throated Loon			1												
Sea Otter															
Small Gull	1	25	24	198	10	27	143	250				50			
Small Shorebird					515		380			2832		20			
Snow Goose									15						
Steller's Eider	1425							950				575			
Steller's Sealion															
Surf Scoter	2													15	
Tundra Swan						30									
Walrus															
White-winged Scoter	261		3385	6			11		13		134	2		5	257

Table 1(cont). Waterbird and mammal observations by segment, southwest Alaska 29 September - 4 October 2009.

SPECIES	44	45	46	47	48	49	50	51	52	53	54	551	552	56
Amer. Green-winged Teal													150	
Amer. Wigeon														
Arctic Tern														
Bald Eagle adult			1			3	3		1	1				
Bald Eagle juvenile						1								1
Pacific Brant														
Black-legged Kittiwake					1517	2670								
Black Oystercatcher														
Black Scoter	65		2100		2500	9	3	700	3300					
Brown Bear				2	1	4								
Canada Goose		115	125	148										
Common Eider				100										1300
Common Loon														
Common Murre														
Common Raven							2							
Double-crested Cormorant														
Emperor Goose	2900	9190	3	25237			1477	1974	125	120	178	7578	1203	3779
Gadwall														
Greater Scaup	250	125		125										
Harlequin Duck														
Harbon Seal		1010		500										550
King Eider		200												
Large Gull	942	5674	362	2642	273	334	903	410	560	125	1402	2170	1210	5670
Large Shorebird		1400												
Long-tailed Duck														
Mallard		1150		1033			5				52	310		
Mew Gull	175	1053	1	740	4		753	225	850			600		400
Medium Shorebird		850							600					
Moose														
Northern Pintail	40	13380		3825			285					2103	4610	
Northern Shoveler		150												
Orca						3								
Pacific Loon														
Pelagic Cormorant						2								
Red-breasted Merganser		8							40					
Red-necked Grebe														
Red-throated Loon														
Sea Otter		284					55	38						123
Small Gull		3050		120		75	100		75		20			139
Small Shorebird		5710		6420			20		1875			200	13450	125
Snow Goose														
Steller's Eider		4800		8170							400	3000	4900	27350
Steller's Sealion														
Surf Scoter								40						
Tundra Swan														
Walrus						550								
White-winged Scoter	250		410		1	2	25	40						

Table 1(cont). Waterbird and mammal observations by segment, southwest Alaska 29 September - 4 October 2009.

SPECIES	57	58	59	60	61	62	63	64	65	66	67	68	80	81
Amer. Green-winged Teal														
Amer. Wigeon														
Arctic Tern														
Bald Eagle adult		1		3			2				1		1	
Bald Eagle juvenile				1										
Pacific Brant				7120	47415	10617	3710	12975	27218		1429	3340	3695	
Black-legged Kittiwake	1301	1	725								102			
Black Oystercatcher														
Black Scoter		1810	1470							2041				
Brown Bear														
Canada Goose				12102	6650	2875		7220	10150			1450	740	
Common Eider	275													
Common Loon														
Common Murre														
Common Raven														
Double-crested Cormorant		1												
Emperor Goose	1455	288		434	200	10	8				23	819	808	6
Gadwall														
Greater Scaup														
Harlequin Duck										77				
Harbon Seal	800		305					50	60					
King Eider														
Large Gull	222	44	347	2293	1908	275	1825	577	1820	174	104	532	406	
Large Shorebird														
Long-tailed Duck														
Mallard				575					1150					
Mew Gull		3	4	350										
Medium Shorebird														
Moose														
Northern Pintail				95	1452			200	1200		20	250		
Northern Shoveler														
Orca														
Pacific Loon														
Pelagic Cormorant			1							1				
Red-breasted Merganser														
Red-necked Grebe			2											
Red-throated Loon														
Sea Otter	220		73	41	110	9	15	34	27	1	11			
Small Gull			73	100					20	2				
Small Shorebird				2225		940								
Snow Goose														
Steller's Eider				1855	195	150		50	3500					
Steller's Sealion														
Surf Scoter										62				
Tundra Swan													35	
Walrus														
White-winged Scoter			116							916				

Table 1(cont). Waterbird and mammal observations by segment, southwest Alaska 29 September - 4 October 2009.

SPECIES	82	83	84	85	86	88	90	91	92	93	97	99	101	102	104	107	112	113
Amer. Green-winged Teal																		
Amer. Wigeon																		
Arctic Tern																		
Bald Eagle adult	2					6	2	2	3		3		3	1		7	5	3
Bald Eagle juvenile			1			3		2	1			1				1	1	
Pacific Brant				3073														
Black-legged Kittiwake	250					100	30	20	1	20	25	62	161	37		26	407	147
Black Oystercatcher																		
Black Scoter	20		8		3	130	24	100	663	26		20	40			170		25
Brown Bear							8	4	1								1	
Canada Goose	285			990					220									
Common Eider																		
Common Loon			2		1	5	5	3	3			4	1	1		4		2
Common Murre													10			1		2
Common Raven	1		1					1				1						
Double-crested Cormorant																		
Emperor Goose	139	58		358	55		330		717	1490	40					75	100	
Gadwall																		
Greater Scaup																		
Harlequin Duck	50	25	4	3	151	3	312	41	69	276	25	128	10	15		14	25	
Harbon Seal							48	7		27			20			1		
King Eider																		
Large Gull	555	152	19	251	437	425	1464	34	377	477	96	343	351	187	2	158	288	177
Large Shorebird																		
Long-tailed Duck									5			2						
Mallard							8			254		46					230	
Mew Gull						10		20	20	220		170	10				601	
Medium Shorebird																		
Moose																		
Northern Pintail	30			60						320		75					300	
Northern Shoveler																		
Orca																		
Pacific Loon							2	7	2				4			3		4
Pelagic Cormorant							14	18	39	4			2	5	2	165	85	100
Red-breasted Merganser	400			30		100	431		275	442		266				204	40	
Red-necked Grebe								50	98	31		36	8			7		18
Red-throated Loon																		
Sea Otter	10			1	3		8		104	3								
Small Gull				100		72	25	20	180	20	70	176	80			84	43	90
Small Shorebird	110																	
Snow Goose																		
Steller's Eider																		
Steller's Sealion																		
Surf Scoter						30	5		15	10		8				45		
Tundra Swan												3						
Walrus																		
White-winged Scoter	1		3			90	103	140	46	60		2				103		16

Table 1(cont). Waterbird and mammal observations by segment, southwest Alaska 29 September - 4 October 2009.

SPECIES	114	115	116	117	118	125	126	127	128	129	130	131	132	133	134	135	136	137
Amer. Green-winged Teal																		
Amer. Wigeon						100												
Arctic Tern																		
Bald Eagle adult	1	2	1		2	5	7	3		5	2		1	2				3
Bald Eagle juvenile										2		2						
Pacific Brant									7									
Black-legged Kittiwake		7	157			1	178	15	152	1		1	77	11	10	11	50	63
Black Oystercatcher									3									
Black Scoter						1	785	255	94							15		359
Brown Bear								4	2	4				1			4	8
Canada Goose																		
Common Eider																		
Common Loon							4	2	3						2			1
Common Murre														1				4
Common Raven								1										6
Double-crested Cormorant							3		1									
Emperor Goose						430	87	120	210	238	75				35	195	220	985
Gadwall																		
Greater Scaup						750												
Harlequin Duck						10	303	94	25	7			7	20	10	30	2	84
Harbon Seal														10				
King Eider																		
Large Gull	23	252	75	23	6	591	1095	736	302	383	77	100	167		98	123	87	193
Large Shorebird																		
Long-tailed Duck																		
Mallard						315		300	1									
Mew Gull						299										1		291
Medium Shorebird																		
Moose								1										
Northern Pintail						500	150	110										
Northern Shoveler																		
Orca																		
Pacific Loon							1		1									
Pelagic Cormorant	30	14	110	62	1	4	10	195	207	36	92	3	16	14	51	1	17	47
Red-breasted Merganser							10	200		50								770
Red-necked Grebe	3		7				7	95	109				35					47
Red-throated Loon																		
Sea Otter						1	10	2	3	10	5						3	3
Small Gull	187	100	190	40	230	75	310	70	360	105		50	35			25	50	138
Small Shorebird																		
Snow Goose																		
Steller's Eider																		
Steller's Sealion										1								
Surf Scoter		5					216	300	100			12	90					65
Tundra Swan			2															
Walrus																		
White-winged Scoter		10	10				178	100	456	2	5	290	77			1		1476

Table 1(cont). Waterbird and mammal observations by segment, southwest Alaska 29 September - 4 October 2009.

SPECIES	Grand Total
Amer. Green-winged Teal	880
Amer. Wigeon	200
Arctic Tern	1206
Bald Eagle adult	93
Bald Eagle juvenile	22
Pacific Brant	120695
Black-legged Kittiwake	9086
Black Oystercatcher	3
Black Scoter	27828
Brown Bear	48
Canada Goose	46954
Common Eider	1746
Common Loon	43
Common Murre	18
Common Raven	18
Double-crested Cormorant	5
Emperor Goose	79647
Gadwall	30
Greater Scaup	5156
Harlequin Duck	1820
Harbon Seal	3908
King Eider	200
Large Gull	51412
Large Shorebird	1400
Long-tailed Duck	57
Mallard	10408
Mew Gull	7530
Medium Shorebird	1450
Moose	3
Northern Pintail	46804
Northern Shoveler	160
Orca	3
Pacific Loon	24
Pelagic Cormorant	1453
Red-breasted Merganser	3482
Red-necked Grebe	558
Red-throated Loon	1
Sea Otter	1207
Small Gull	7427
Small Shorebird	34822
Snow Goose	15
Steller's Eider	57320
Steller's Sealion	1
Surf Scoter	1020
Tundra Swan	70
Walrus	550
White-winged Scoter	9003

Table 2. Emperor goose fall survey data, southwest Alaska, 1979-2009.

YEAR	TOTAL	3YR. AVG.	DATES	OBSERVERS	SURVEY AREA
1979	59,808	NA	10/1-10/4	B.Conant/R.E.Gill, Jr.	North Alaska Peninsula only
1980	65,971	NA	10/4-10/8	R.J. King/R.E. Gill, Jr.	North Alaska Peninsula only
1981	63,156	62,978	10/3-10/8	R.J. King/R.E. Gill, Jr./D.V. Derksen	Kuskokwim Bay south
1982	80,608	69,912	10/6-10/10	R.J. King/K.S. Bollinger	Kuskokwim Bay south
1983	72,551	72,105	10/10-10/16	R.J. King/D.V. Derksen	Kuskokwim Bay south
1984	82,842	78,667	10/3-10/8	"	Kuskokwim Bay south
1985	59,790	71,728	10/10-10/14	R.J.King/W.D. Eldridge	Kuskokwim Bay south
1986	68,051	70,228	10/5-10/11	"	Kuskokwim Bay south
1987	65,663	64,501	10/2-10/5	"	Kuskokwim Bay south
1988	76,165	69,960	10/7-10/12	"	Kuskokwim Bay south
1989	70,729	70,852	10/7-10/12	R.J. King/L. Denlinger	Kuskokwim Bay south
1990	109,531	85,475	10/17-10/19	R.J. King/A.W. Brackney	Kuskokwim Bay south
1991	75,295	85,185	10/3-10/8	"	Kuskokwim Bay south
1992	82,295	89,040	10/10-10/17	"	Kuskokwim Bay south
1993	71,051	76,214	10/23-10/26	R.J. King/D.A. Dewhurst	Alaska Peninsula only
1994	87,086	80,144	10/8-10/14	R.J. King/K. Laing	Kuskokwim Bay south
1995	91,009	83,049	10/14-10/20	R.J. King/K.S. Bollinger	Kuskokwim Bay south
1996	87,018	88,371	9/28-9/29	R.J. King/W.D. Eldridge	North Alaska Peninsula only ¹
1997	86,669	88,232	10/3-10/5	R.J. King/C.P. Dau	North Alaska Peninsula only ¹
1998	67,744	80,477	10/7-10/9	R.J. King/E.J. Mallek	Alaska Peninsula only
1999	60,226	71,546	10/1-10/5	E.J. Mallek/C.P. Dau	North Alaska Peninsula only ¹
2000	61,626	63,199	9/26-28,10/2	"	Kuskokwim Bay south
2001	59,987	60,613	9/26-28,10/1	"	Kuskokwim Bay south
2002	78,692	66,768	9/29-10/2	"	Kuskokwim Bay south
2003	77,290	71,990	9/27-10/2	"	Kuskokwim Bay south
2004	93,544	83,175	9/30-10/3	"	Kuskokwim Bay south
2005	73,212	81,349	10/4-10/8	"	Alaska Peninsula only
2006	81,078	82,611	9/26-9/28	"	Alaska Peninsula only
2007	73,531	75,940	9/26-10/3	"	North Alaska Peninsula only ¹
2008	78,201	77,604	9/26-9/28	"	Kuskokwim Bay south
2009	79,647	77,127	9/29-10/5	"	Kuskokwim Bay south

¹ Average count of south side of the Alaska Peninsula used in estimate.

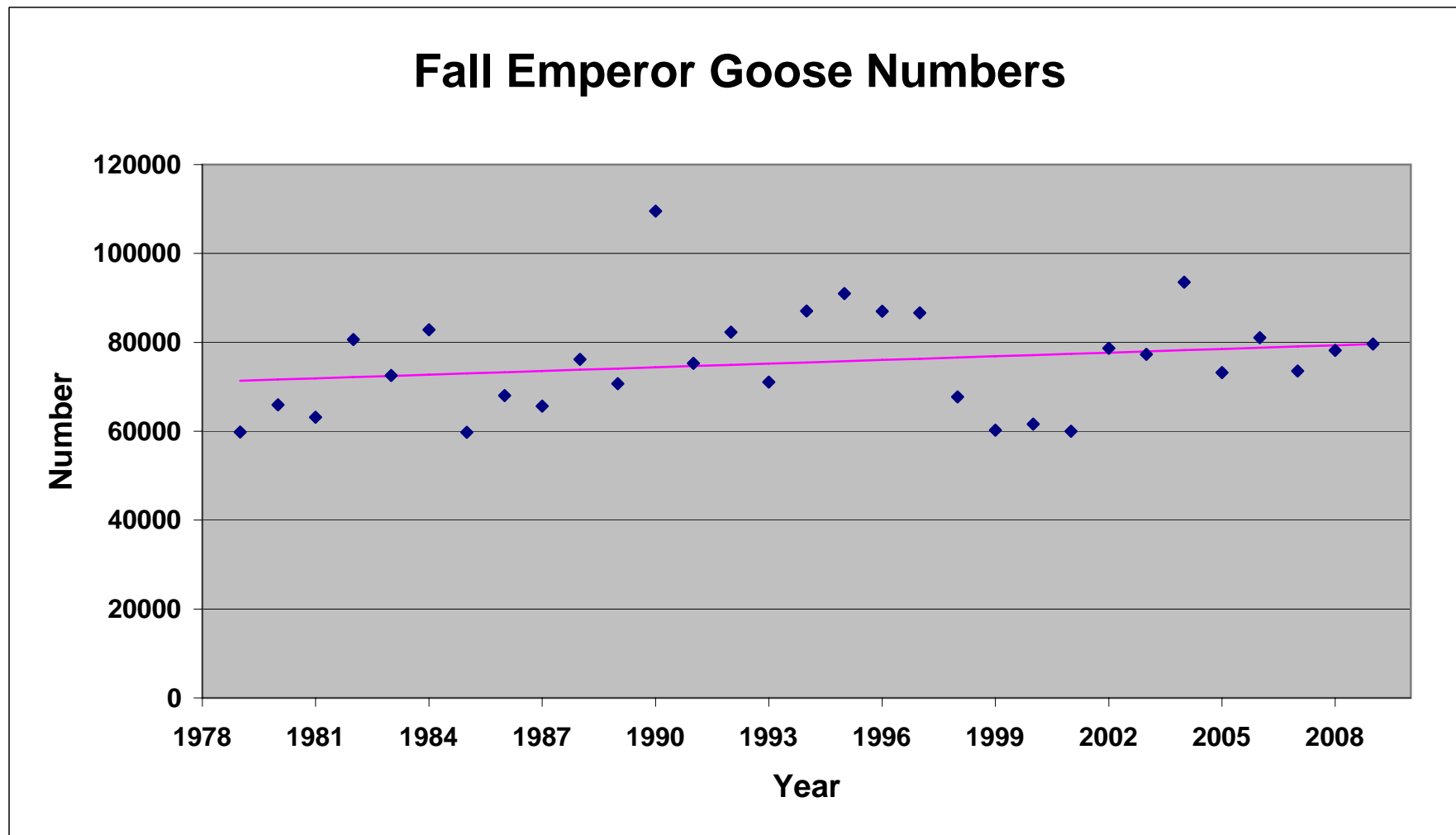


Figure 3. Thirty-one year trend of fall staging emperor geese in southwest Alaska: mean = 75,486, slope = 275, $p = 0.24$, R square = 0.05, mean annual growth rate = 0.36%.