

**AERIAL SURVEY OF EMPEROR GEESE AND OTHER WATERBIRDS**  
**IN**  
**SOUTHWESTERN ALASKA,**  
**FALL 2002**

Edward J. Mallek<sup>1</sup>

Christian P. Dau<sup>2</sup>

J. S. Fish and Wildlife Service  
Waterfowl Management  
412 Airport Way  
airbanks, Alaska 99701

<sup>2</sup>U. S. Fish and Wildlife Service  
Waterfowl Management  
1011 E. Tudor Road  
Anchorage, Alaska 99503

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

Christian P. Dau, *U.S. Fish and Wildlife Service, Waterfowl Management, 1011 E. Tudor Road, Anchorage, AK, 99503.*

**Abstract:** A fall aerial emperor goose survey was conducted in southwestern Alaska for the 24<sup>th</sup> consecutive year in 2002. The survey was flown from 29 September to 2 October 2002. Additional replicate surveys of the Izembek NWR area were flown on 2, 5, and 8 October. An amphibious Cessna 206 (N234JB), with a left seat pilot/observer and right seat observer, was flown at 150 feet ASL and 110 knots along the coastline and over estuaries to determine species composition and numbers of birds. Emphases were on emperor geese, Pacific brant, Canada geese and Steller's eiders with estimated populations of 78,692, 101,510, 60,845, and 120,411, respectively.

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Key words: aerial survey, emperor geese, southwest Alaska, waterbirds, waterfowl

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## INTRODUCTION

This annual survey is designed to provide data on the distribution and abundance of emperor geese and other waterbirds during fall migratory staging in southwestern Alaska. These data are used to expand photographic estimates of emperor goose productivity (i.e. percent juveniles) at various fall staging locations based on the proportional distribution of the population. The survey includes coastline and estuarine habitats from the Yukon-Kuskokwim Delta 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 an amphibious Cessna 206 (N234JB) at a ground speed of approximately 110 knots and an altitude of 150 feet ASL along coastline and estuarine survey segments from Jacksmith Bay to False Pass along the north side of the Alaska Peninsula and east to Wide Bay along the south side of the Alaska Peninsula. Observations were made from both sides of the aircraft (left-pilot/observer; right-observer). Observations were voice recorded into two laptop computers, one for each observer, using remote microphones. The computers received input from the aircraft Global Positioning System (GPS) which saved coordinates for each observation using a program designed by John Hodges (USFWS-Waterfowl Management-Juneau).

The coastal flight path was usually 100 meters offshore with deviations to confirm species identification and numbers, normally within 1 mile of exposed shorelines. In estuaries, a systematic but meandering flight path was followed to ensure complete coverage. Surveys were conducted with ambient surface winds less than 20 knots and when possible, primary staging areas were flown at

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or near high tide when geese are more concentrated along shorelines.

The survey area includes 143 shoreline/estuarine segments (Figures 1-2) described by Mallek and Dau (2000). Segments 14-34 were flown on 29 September, segments 35-59 on 30 September, segments 60-85 on 1 October, and segments 86-137 on 2 October. Additional surveys of Izembek Lagoon and estuaries adjacent to the Izembek NWR were flown on 2 October (1 survey, Larned and Anderson), 5 October (1 survey, Mallek and Dau), and 8 October (2 surveys, Mallek and Dau) to estimate Pacific brant and Canada goose populations which concentrate there. General observations of habitat and survey conditions including wind speed and direction, temperature, sky condition and visibility, as well as start and stop times and tide stage were recorded by segment.

## **SURVEY CONDITIONS**

**29 September:** Southwest winds of approximately 10 knots, sky conditions of 5,000 feet broken, and good visibility persisted throughout the day. Light mist occurred near Jacksmith Bay and Carter Bay. Temperatures ranged from 42 to 45°F.

**30 September:** Initial calm winds gradually increased to 10 knots from the southwest during the day. Sky conditions were 5,000 feet scattered to broken with good visibility. Temperatures were 40 to 43°F. Light precipitation occurred from Port Heiden to Port Moller. Low to mid tides occurred from Egegik Bay to Seal Islands Lagoon. Tides were high in Port Moller and Nelson Lagoon.

**1 October:** Winds were 15 knots from the west with sky conditions of 1,000 feet scattered during the day. Visibility was good and temperature was 35°F. Tides were low in Izembek Lagoon and high in Kinzarof Lagoon and Bechevin Bay. Morzhovoi Bay was at mid tide.

**2 October:** Winds were easterly at 5 knots or less during the day. Sky conditions were 2,500 feet overcast in the morning and scattered to clear in the afternoon. Visibility was good and temperatures ranged from 35 to 43°F.

## **RESULTS/DISCUSSION**

The totals for all species observed during the survey are summarized by segment in Table 1. Previous estimates of emperor geese (1979-2001) and corresponding 3-year averages are summarized in Appendix 1.

### **Emperor Goose**

We estimated the fall emperor goose population at 78,692 birds. The 2002 population estimate is 31% above the 2001 estimate of 59,987 and 18% above the 3-year average (2000-2002) of 66,768. Average numbers and proportions of emperor geese at primary staging sites were as follows: Egegik Bay 1,214 (2%, segments 36-37); Ugashik Bay 700 (1%, segment 38); Cinder River Estuary 23,483 (30%, segments 40-42); Port Heiden 4,178 (5%, segments 44-46); Seal Islands 15,300 (19%,

segment 47); Nelson Lagoon 14,103 (18%, segments 551-552 and 56); and Izembek Lagoon 1,237 (2%, segments 60-65).

### **Pacific Brant**

A total of 101,510 Pacific brant were observed during the 29 September to 2 October emperor goose survey of which 97% (98,268, segments 60-68 and 78-85) were in Izembek Lagoon and adjacent estuaries. Replicate survey counts of Izembek Lagoon and adjacent estuaries obtained on 2, 5 and 8 (2 surveys) October, were 102,171, 121,720, 120,027, and 137,009, respectively, providing an average of 115,839 for the five surveys of the area. The 2002 average for the Izembek area (115,839) is 3% above the 2001 fall average for the Izembek area (112,554, n=2 surveys) and 9% below the 27 year average of 127,888 (1975-01) for the Izembek area (Dau, USFWS, unpubl. data).

### **Canada Goose**

We observed a total of 60,845 Canada geese during the 29 September to 2 October emperor goose survey. Izembek Lagoon and adjacent estuaries accounted for approximately 83% (50,425) of the Canada goose total. Replicate survey counts of Canada geese in Izembek Lagoon and adjacent estuaries on 2, 5 and 8 (2 surveys) October were 33,339, 54,570, 36,033, and 52,602, respectively. The population average for the five surveys of the Izembek Lagoon area was 45,394 Canada geese which is 17% above the 2001 average (38,739, n=2 surveys) and is 4% above the 27 year average of 43,690 (1975-01) for the Izembek area (Dau, USFWS, unpubl. data).

### **Steller's Eider**

We observed a total of 120,411 Steller's eiders during the 29 to 2 October survey with 16,933 of these in Izembek Lagoon and adjacent estuaries. Replicate survey counts for Izembek Lagoon and adjacent estuaries on 2, 5 and 8 (2 surveys) October were 8,191, 14,085, 4,515, and 12,370, respectively, providing an average of 11,219 for the five surveys. The average fall (September/October) population size for the Izembek Lagoon area is 23,437 (range 4,500-78,645, n=90 surveys) from 1975-01 (Dau, USFWS, unpubl. data).

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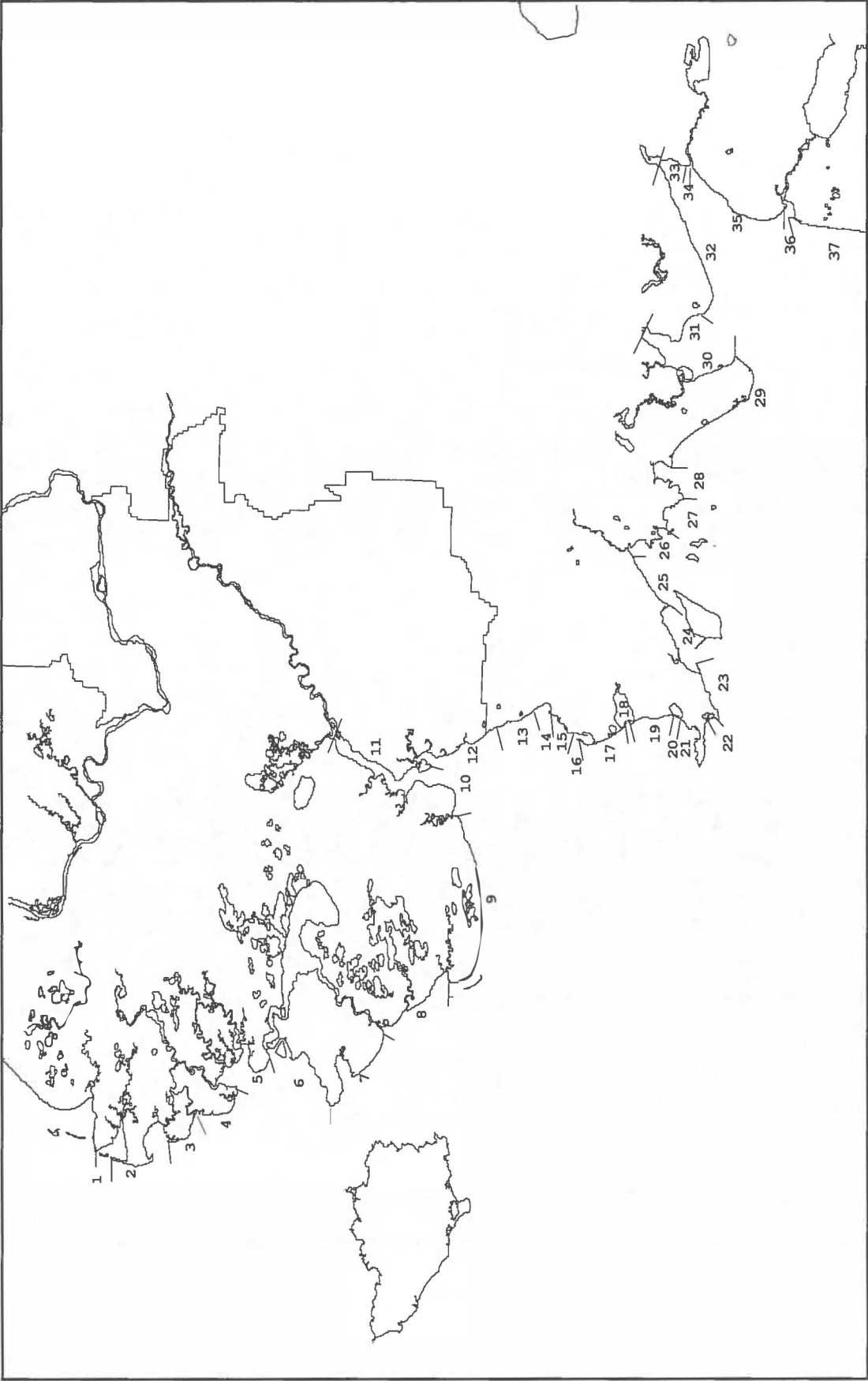


Figure 1. Map of emperor goose aerial survey segments 1 - 36 in southwest Alaska, 1992-2002.

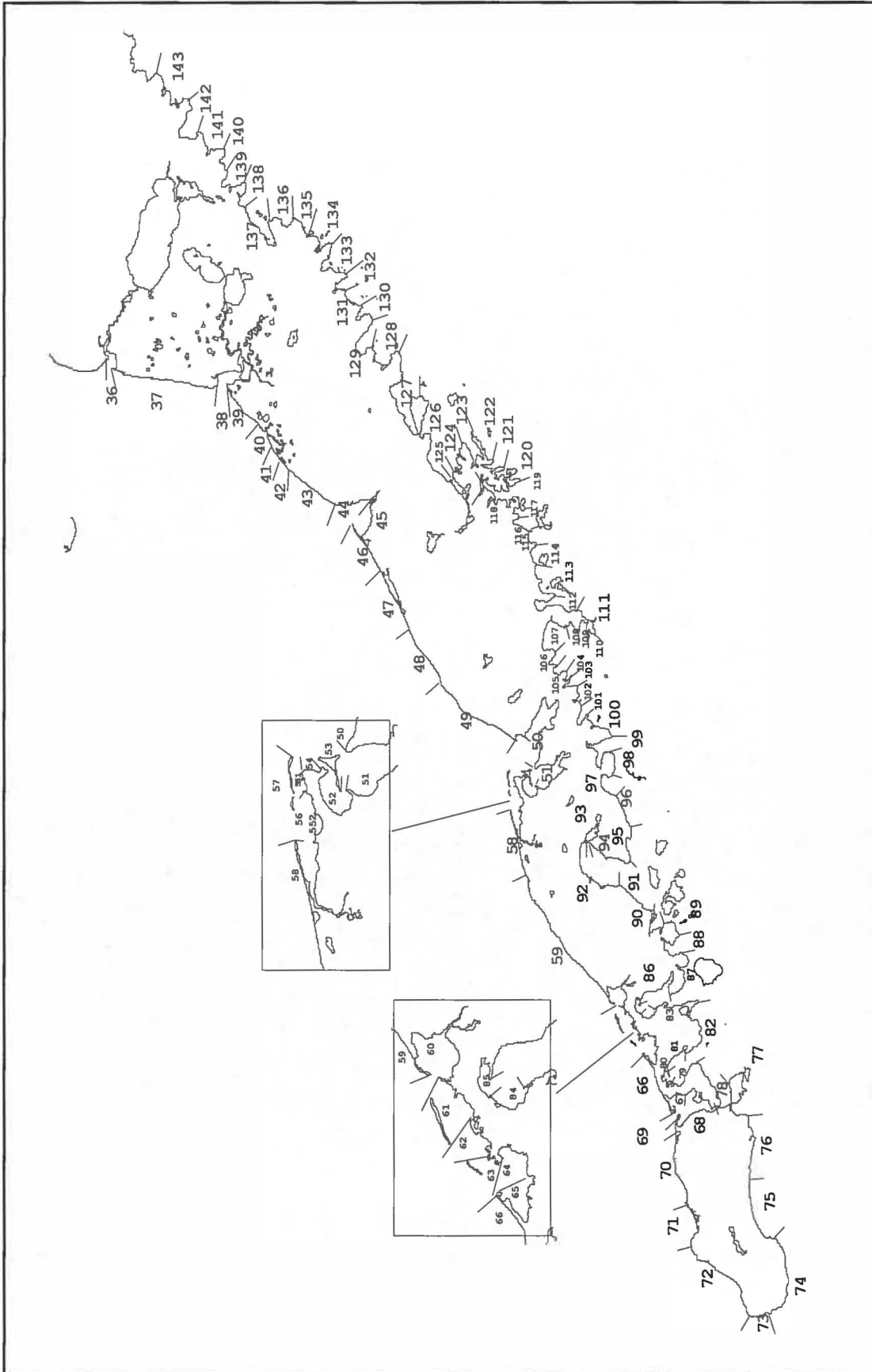


Figure 2. Map of emperor goose aerial survey segments 36-143 in southwest Alaska, 1992-2002.

Table 1. Waterbird and mammal observations by segment from southwest Alaska, 29-30 September and 1-2 October 2002.

SPECIES	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Am. Green-winged Teal													180	
American Wigeon							150							
Arctic Tern														
Bald Eagle				1							1			
Black-bellied Plover														
Brown Bear														
Beluga Whale														
Pacific Brant	1				65	12	2054		1015		14			
Black-legged Kittiwake						15				235	110	1	50	51
Black Oystercatcher														
Black Scoter		312	85		75	109	655	15	12	15	245	10	260	2
Bonaparte's Gull														
Canada Goose			125				2100		5350		209			
Caribou														
Common Eider						10		5		2		3		
Common Loon														
Common Murre														
Common Raven														
Cormorant					4		8	110		2	14	3	3	2
Emperor Goose			4		9		8		46					
Gadwall														
Glaucous-winged Gull	67	130	21	756	138	1044	229	17	7	9	285	170	278	435
Harlequin Duck					3								38	
Harbor Seal						35	15		300		1			
Horned Grebe														
King Eider						10			5					
Mallard	12		8				60						10	
Mew Gull	400	45	5	411							1			
Medium Shorebird														
Northern Pintail	783		972		565		2083		204		100		80	
Long-tailed Duck					220					20		2		
Pacific Loon					2									
Red-breasted Merganser				2			200		10		9			
Red Fox														
Ring-necked Duck			8								2	1		
Red-throated Loon		2			15						1	2		2
Scaup			325		770		4157		485		18		95	
Sea Otter											1			
Steller's Eider					670		1808		40		76			450
Steller's Sealion														
Surf Scoter			245			1								
Tundra Swan				8										6
Large Shorebird														
Small Shorebird	885		66	15	100						250			20
Walrus														
White-winged Scoter			48	8		26	35	2	47	10	353	5	27	40
Yellow-billed Loon														



Table 1. Waterbird and mammal observations by segment from southwest Alaska, 29-30 September and 1-2 October 2002.

SPECIES	28	29	30	31	32	33	34	35	36	37	38	39	40	41
Am. Green-winged Teal	350								610		450		700	
American Wigeon									10					
Arctic Tern											6			
Bald Eagle	1			1	3	1					1		1	1
Black-bellied Plover		50							10					
Brown Bear		1												
Beluga Whale														
Pacific Brant														
Black-legged Kittiwake	585	181	55	1							1	2	1500	
Black Oystercatcher														
Black Scoter	968	643	4		4922			2395	1865	5792	362	1169	4	
Bonaparte's Gull					7									
Canada Goose		75			35				5		20			235
Caribou		50												
Common Eider	12													
Common Loon														
Common Murre														
Common Raven										1				
Cormorant					6						2	15		
Emperor Goose									1209	5	700		19100	
Gadwall											2			
Glaucous-winged Gull	4275	693	430	503	1961	27	96	1314	841	242	891	24	511	1
Harlequin Duck										50		75		
Harbor Seal								701	490	735	50			
Horned Grebe														
King Eider		1												
Mallard	100		40	25		25	120	30	2250		2201		2715	
Mew Gull		1	93	591	830	23		296		110	10		2	
Medium Shorebird									250					
Northern Pintail	410	30		252	547	30	190		8195		4870		8673	
Long-tailed Duck														
Pacific Loon												2		
Red-breasted Merganser	125			3			31		5	10				
Red Fox														
Ring-necked Duck												1		
Red-throated Loon	6													
Scaup	20				5			1060	1545		125			
Sea Otter														
Steller's Eider										35			775	
Steller's Sealion														
Surf Scoter	2		5										50	
Tundra Swan	2						261							
Large Shorebird											520			
Small Shorebird	350		270	610	50	100		2710	190		5900		2600	
Walrus														
White-winged Scoter	195	579	35					1472	125	3328	12	23	500	
Yellow-billed Loon														

Table 1. Waterbird and mammal observations by segment from southwest Alaska, 29-30 September and 1-2 October 2002.

SPECIES	42	43	44	45	46	47	48	49	50	51	52	53	54	551
Am. Green-winged Teal				150										
American Wigeon				60										
Arctic Tern														
Bald Eagle				1	1		1		2	1				
Black-bellied Plover														
Brown Bear						1	4			3				
Beluga Whale														
Pacific Brant														25
Black-legged Kittiwake			1		2		122	1570	181	2	110	22		
Black Oystercatcher														
Black Scoter		1119	105	7417	3005	10	1738	378	10	5758	1215	250	2850	560
Bonaparte's Gull									1					
Canada Goose			15	808	50	225								
Caribou														
Common Eider				157		2	1							
Common Loon														
Common Murre														
Common Raven														
Cormorant		1						86		4	2	4		
Emperor Goose	4383		563	3610	5	15300		2	1687	122	2313	35		472
Gadwall														
Glaucous-winged Gull	35	39	507	3706	18	4916	118	170	3824	827	69	275		10
Harlequin Duck														
Harbor Seal			750		400	2		75						
Horned Grebe														
King Eider				60								1		
Mallard			40	550		240			5	125				300
Mew Gull		506	170	220		3			100		276	250		
Medium Shorebird														
Northern Pintail	2610		522	25710	250	1610	3				176			100
Long-tailed Duck														
Pacific Loon		1	1					1						3
Red-breasted Merganser										8				40
Red Fox						1								
Ring-necked Duck														
Red-throated Loon								4	2					
Scaup			35	360						175	750			
Sea Otter			1	5					32	25	63	49	14	
Steller's Eider			75	19220		10460			1000	400	10	350	3350	5324
Steller's Sealion														
Surf Scoter				50			10			530		70		
Tundra Swan						5								
Large Shorebird														
Small Shorebird	4050		100	2535		15000			20		73600			
Walrus								1201						
White-winged Scoter		44	1	1475	47	2	211	27	3	1000	308	1920	175	
Yellow-billed Loon														

Table 1. Waterbird and mammal observations by segment from southwest Alaska, 29-30 September and 1-2 October 2002.

SPECIES	552	56	57	58	59	60	61	62	63	64	65	66	67	68
Am. Green-winged Teal														
American Wigeon							20							
Arctic Tern														
Bald Eagle			2			1		1	1	1				2
Black-bellied Plover														
Brown Bear					1									
Beluga Whale														
Pacific Brant					56	1290	32127	650	4800	15660	30450		2885	715
Black-legged Kittiwake		600			1				250					181
Black Oystercatcher														
Black Scoter	5	200			51							145		10
Bonaparte's Gull														
Canada Goose						19975	6092	3290		7563	12065			820
Caribou														
Common Eider		170												
Common Loon														
Common Murre														
Common Raven														
Cormorant	93		1		1				2			24	70	
Emperor Goose	9616	4015	6325	920		642	5	90	500				16	768
Gadwall														
Glaucous-winged Gull	3528	4661	96	56	2257	2073	3163	2371	1105	1096	443	385	367	1824
Harlequin Duck												5		3
Harbor Seal					300	300		50	1	151	200			
Horned Grebe														
King Eider		20	450											
Mallard	150						50			150	525			40
Mew Gull	75		50		100				50	3		50	1	160
Medium Shorebird														
Northern Pintail	770					1815	1525			100	640			400
Long-tailed Duck														
Pacific Loon		1		2	2									
Red-breasted Merganser														
Red Fox														
Ring-necked Duck												115		70
Red-throated Loon														
Scaup		3												
Sea Otter	1	6			6	174	30	34	2	3	15	19	15	
Steller's Eider	24950	34240				4155	7510	2380			2243			2
Steller's Sealion								20						
Surf Scoter														
Tundra Swan														
Large Shorebird														
Small Shorebird	78150					9095	2250	3250			600	10	20	
Walrus														
White-winged Scoter												14		
Yellow-billed Loon														

Table 1. Waterbird and mammal observations by segment from southwest Alaska, 29-30 September and 1-2 October 2002.

SPECIES	78	79	80	81	82	83	84	85	86	88	90	91	92	93	97	99
Am. Green-winged Teal			40													
American Wigeon																
Arctic Tern																
Bald Eagle		1			3	1		1		1	1	2		4		1
Black-bellied Plover																
Brown Bear																2
Beluga Whale													5			
Pacific Brant			5531					4160								
Black-legged Kittiwake	10	2		340	74	8	20			210	573	154	758	476	550	775
Black Oystercatcher																
Black Scoter	35			95	55	40	30		78	63	96		424	23	8	50
Bonaparte's Gull																
Canada Goose			170		720	438		450						10		
Caribou																
Common Eider																
Common Loon	2	1			2				3		1	2	5			1
Common Murre												5				
Common Raven								1						2		
Cormorant	79	133		76	31	16			8	13	82	55	525	162		1
Emperor Goose			145	615	187	251	452	928	250		130		639	564	46	
Gadwall																
Glaucous-winged Gull	325	280	880	496	1190	25	120	1137	164	161	961	297	1112	635	456	828
Harlequin Duck	121	8			49	62			182	48	227	16	107	194	75	124
Harbor Seal		20		4	1			20	1		37			1		
Horned Grebe													15			
King Eider																
Mallard			50	30				10					250	620		
Mew Gull					1											
Medium Shorebird																
Northern Pintail			135					40						390		
Long-tailed Duck																
Pacific Loon									4		3	18	2	2		
Red-breasted Merganser		562	45	254	25	40	6	30	83	50	143		337	655		84
Red Fox																
Ring-necked Duck	13	2			1				70	36	27	166	279	410		120
Red-throated Loon																
Scaup																
Sea Otter	6	3			2				48				195	11		
Steller's Eider			635	50				8	20							
Steller's Sealion																
Surf Scoter	15											10	25			
Tundra Swan																
Large Shorebird																
Small Shorebird						10								50		
Walrus																
White-winged Scoter					15	28			38	10	35	77	1207	104		15
Yellow-billed Loon											2					1

Table 1. Waterbird and mammal observations by segment from southwest Alaska, 29-30 September and 1-2 October 2002.

SPECIES	101	102	103	104	105	106	107	112	113	114	115	116	117	118	124	125
Am. Green-winged Teal																
American Wigeon																1060
Arctic Tern																
Bald Eagle	3	2				1									3	1
Black-bellied Plover																
Brown Bear		1			1											
Beluga Whale																
Pacific Brant																
Black-legged Kittiwake	543	110		260	80	110	200	100	25	50	270	195	30	415	355	10
Black Oystercatcher																
Black Scoter		2				10	85	300	30		20		4	5		
Bonaparte's Gull																
Canada Goose																
Caribou																
Common Eider																
Common Loon					3	3	3		4							
Common Murre										3	10	20	20	65		
Common Raven							2			1						
Cormorant	4	53		58	12	53	123	311	16	67	20	64	54	61	120	2
Emperor Goose								51								529
Gadwall																
Glaucous-winged Gull	461	529	401	1039	82	113	77	430	88	65	355	166	243	60	98	1106
Harlequin Duck	32	14		26	23	75	6	20			5				5	97
Harbor Seal					5		30								2	
Horned Grebe																
King Eider																
Mallard																220
Mew Gull																404
Medium Shorebird																
Northern Pintail																480
Long-tailed Duck						2	3	22				10				
Pacific Loon	5						8	7	3	1		2				
Red-breasted Merganser				20		20	375	20				30				30
Red Fox																
Ring-necked Duck	25	20			52	19	328	63	40	25	210	75				
Red-throated Loon							2									
Scaup																1275
Sea Otter												1				17
Steller's Eider																
Steller's Sealion									1							
Surf Scoter	8				30		50	35			2		70			
Tundra Swan																
Large Shorebird																
Small Shorebird																
Walrus																
White-winged Scoter	55	10		30	105	44	180	30	80		64	65				20
Yellow-billed Loon																

Table 1. Waterbird and mammal observations by segment from southwest Alaska, 29-30 September and 1-2 October 2002.

SPECIES	126	127	128	129	130	131	132	133	134	135	136	137	Grand Total
Am. Green-winged Teal													2480
American Wigeon													1300
Arctic Tern													6
Bald Eagle	1	2	1	1	2	1		4				2	64
Black-bellied Plover													60
Brown Bear				7								6	27
Beluga Whale													5
Pacific Brant													101510
Black-legged Kittiwake	570	642	348	213	15	315	45	405	20	700	10	109	15924
Black Oystercatcher				10									10
Black Scoter	15	42	30	10		8					25	321	46649
Bonaparte's Gull													8
Canada Goose													60845
Caribou													50
Common Eider													362
Common Loon	3	1	1			1		2					38
Common Murre	25												148
Common Raven	1												8
Cormorant	13	251	306	34	72	2	23	336	33	27	33	49	3835
Emperor Goose	192	109	150	185	53	40	6		35	130	378	157	78692
Gadwall													2
Glaucous-winged Gull	512	1641	517	460	48	244	45	735	52	182	213	1068	73431
Harlequin Duck	73	64	8	22	2		20	15			60	100	2054
Harbor Seal				2				8				30	4717
Horned Grebe													15
King Eider													547
Mallard				10								40	11001
Mew Gull	10		150									90	5487
Medium Shorebird													250
Northern Pintail													65260
Long-tailed Duck													279
Pacific Loon													70
Red-breasted Merganser	25	15	78	15	10		2			50	10	1203	4660
Red Fox													1
Ring-necked Duck	11	78	4	3			11					18	2303
Red-throated Loon						1							37
Scaup													11203
Sea Otter	76	16		1		1					6	10	888
Steller's Eider												175	120411
Steller's Sealion		2											23
Surf Scoter	31	263	30		20		23	50				277	1902
Tundra Swan				2							2		286
Large Shorebird													520
Small Shorebird		400											203256
Walrus													1201
White-winged Scoter	87	150				65	8	10			20	39	14688
Yellow-billed Loon													3

Appendix 1. Emperor goose fall survey data, southwest Alaska, 1979-2002.

<b>YEAR</b>	<b>TOTAL</b>	<b>3YR. MEAN</b>	<b>DATES</b>	<b>OBSERVERS</b>	<b>REMARKS</b>
1979	59,808	NA	10/1-4	B. Conant/R.E. Gill, Jr.	South Alaska Peninsula missing
1980	65,971	NA	10/4-8	R.J. King/R.E. Gill, Jr.	North Alaska Peninsula only
1981	63,156	62,978	10/3-8	R.J. King/R.E. Gill, Jr./D.V. Derksen	All
1982	80,608	69,912	10/6-10	R.J. King/K.S. Bollinger	All
1983	72,551	72,105	10/10-16	R.J. King/D.V. Derksen	All
1984	82,842	78,667	10/3-8	R.J. King/D.V. Derksen	All
1985	59,790	71,728	10/10-14	R.J. King/W.D. Eldridge	All
1986	68,051	70,228	10/5-11	R.J. King/W.D. Eldridge	All
1987	65,663	64,501	10/2-5	R.J. King/W.D. Eldridge	All
1988	76,165	69,960	10/7-12	R.J. King/W.D. Eldridge	All
1989	70,729	70,852	10/7-12	R.J. King/L. Denlinger	All
1990	109,531	85,475	10/17-19	R.J. King/A.W. Brackney	All
1991	75,295	85,185	10/3-8	R.J. King/A.W. Brackney	All
1992	82,295	89,040	10/10-17	R.J. King/A.W. Brackney	All
1993	71,051	76,214	10/23-26	R.J. King/D.A. Dewhurst	Alaska Peninsula only
1994	87,086	80,144	10/8-14	R.J. King/K. Laing	All
1995	91,009	83,049	10/14-20	R.J. King/K.S. Bollinger	All
1996	87,018	88,371	9/28-29	R.J. King/W.D. Eldridge	North Alaska Peninsula only <sup>#</sup>
1997	86,669	88,232	10/3-5	R.J. King/C.P. Dau	North Alaska Peninsula only <sup>#</sup>
1998	67,744	80,477	10/7-9	R.J. King/E.J. Mallek	Alaska Peninsula only
1999	60,226	71,546	10/1-5	C.P. Dau/E.J. Mallek	North Alaska Peninsula only <sup>#</sup>
2000	61,626	63,199	10/1-5	C.P. Dau/E.J. Mallek	All
2001	59,987	60,613	9/26-10/1	C.P. Dau/E.J. Mallek	All
2002	78,692	66,768	9/29-10/2	C.P. Dau/E.J. Mallek	All

# Previous south side of the Alaska Peninsula used in estimate.