

Aerial population survey of common eiders and other waterbirds in near shore waters and along barrier islands of the Arctic Coastal Plain of Alaska, 27-30 June 2003

By

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SUMMARY

An aerial survey of common eiders and other waterbirds in coastal habitats along the Arctic Coastal Plain of Alaska, including barrier islands, was conducted for the fifth consecutive year from 27 to 30 June 2003. Observations were made from a de Havilland Beaver (N754) by Hodges as pilot/observer and Dau as observer. The study area established when the survey was initiated in 1999 encompasses approximately 1,050 km of the Chukchi and Beaufort sea coastlines from Omalik Lagoon north and east to the Canadian border and an additional 190 and 325 km, respectively, of barrier island habitats off Kasegaluk Lagoon and from Point Barrow to Demarcation Bay. Phenologically the first four survey years (1999-2002) increased in progressive lateness relative to habitat availability and sea ice conditions. In 2003, ice conditions along the Beaufort Sea coast were comparable to 2002 while less ice was present along the Chukchi Sea coast. Preliminary observations suggest the phenology of common eider nesting was advanced about five days from 2002 (J. Reed. USGS-BRD).

A total of 2,123 common eiders, including 874 indicated breeding pairs, was observed in 2003. Total common eiders observed was down 52.3 percent while indicated pairs (pairs+single drakes) was up 3.9 percent from the 2002 observations of 4,449 birds and 841 indicated pairs. The large decrease in total common eiders observed may be attributable to Canadian breeding birds not being short-stopped in the survey area as was suspected due to ice conditions in 2002. There was a slight increase in the number of indicated pairs in 2003 and their distribution was consistent with previous years data (Dau and Taylor 2000a, 2000b, Dau and Anderson 2001, 2002). Other waterbird species observed and their change in numbers from 2002 included long-tailed ducks 9,724 (+90%), glaucous gull 7,031 (+160%), Pacific brant 2,656 (+101%), surf scoter 5,764 (+284%), northern pintail 879 (+70%), greater scaup 495 (+500%) and king eider 5,369 (-50%). The large decrease in king eiders, paralleling that of common eiders, is of note as the Alaska arctic coast migration of both species is largely enroute to the Canadian Arctic and hence affected by similar climatic/oceanographic factors.

INTRODUCTION

This report summarizes the fifth consecutive year of aerial survey efforts to estimate common eider population size and trend, demography, distribution and habitat use along the Arctic Coastal Plain north and east from Omalik Lagoon on the Chukchi Sea to the Canadian border on the Beaufort Sea. The primary goal is to estimate the size and trend of Alaskan breeding common eiders along the Chukchi and Beaufort sea coastline. These data will be useful for management of the species and for evaluating the potential impacts of on and offshore petroleum development and other activities along the Arctic Coastal Plain of Alaska. The data can also be compared to long-term migration counts of the combined Alaska and Canadian populations at Barrow (Suydam et al. 1997, 2000).

METHODS

The survey is timed to coincide with nest initiation to early incubation while pairs are intact and males remain in the vicinity of breeding sites. When available, ground surveys have been used

to determine breeding phenology and appropriate survey timing. A de Havilland Turbine Beaver amphibian flown at approximately 110 knots and an altitude of 45 meters ASL/AGL was used. We feel aircraft change did not alter consistency with observations collected during previous years. Observations, made out both sides of the aircraft by the pilot/observer (left) and observer (right), were entered directly into onboard computers using remote microphones. Computers were interfaced with the aircraft Global Positioning System (GPS) and observations were collected using record and transcribe programs designed by the pilot as in previous years. Meandering flight routes followed mainland and barrier island shorelines and adjacent near shore waters providing complete coverage from the shore to approximately 1.6 km offshore. Deviations were made to include flocks seen up to 3 km offshore. Moving map programs on both pilot and observer computers helped ensure coverage of the survey area. Flights were conducted in calm or light winds whenever possible and during mid-day to maximize height of the sun-angle, reduce glare and increase the visibility of birds on the water.

The survey area includes 30 shoreline segments and 18 islands or island groups identified on 1:250,000 scale topographic maps (Figs. 1 and 2). Insular areas along the central Beaufort Sea coast were identified on 1:63,360 scale topographic maps. Maps were consulted during the survey primarily to identify segment start and stop points. General observations on habitat and survey conditions were recorded by the observer and along with sea surface analyses prepared by the National Weather Service, were used to portray ice conditions during the survey (Fig. 3). For waterfowl species, sex and age of single birds and composition of flocks were determined whenever possible. Observations of common eiders and other species were summarized by barrier island and shoreline survey segments (Tables 1 and 2) and for the total survey area (Table 3). The distribution and sex and age composition of common eiders and the number of indicated breeding pairs (single males+pairs) throughout the survey area were determined to estimate the proportion of breeding birds and total population size (singles+2x pairs+birds in flocks) (Tables 4 and 5).

STUDY AREA/CONDITIONS

Omalik Lagoon to Point Barrow (Segments 1-11)

Coverage and a physical description of this and following portions of the survey area are described by Dau and Taylor (2000).

Omalik Lagoon was omitted in 2003 to conserve fuel. The southern half of Kasegaluk Lagoon from Icy Cape was ice free. Ice cover in the northern half of the lagoon averaged 20 percent. Brash along seaward side of barrier islands in the northern portion of Kasegaluk Lagoon varied from 10 to 20 m in width. A narrow band of shore fast ice, occasionally to 2 km offshore, was present at Peard Bay. Peard Bay itself was 90 percent ice covered with melt on top with a 200 m band of open water near the entrance. From Peard Bay to Barrow there were two floating pans of broken shore ice approximately 3 by 5 km in size with melt on top.

Point Barrow to the Colville River Delta (Segments 12-18, 181)

Mostly continuous shore fast sea ice occurred in this area. Barrier islands of Elson Lagoon had shore fast ice to the north. The lagoon from Cooper Island west was 99 percent ice covered and shore fast to the mainland with the lagoon east of Cooper Island ice free. Dease Inlet had a 50 m band of open water along the east shore and around Oarlock and Tiny islands. The west shore had a 400 m band of open water and the remainder of Dease Inlet and northern Admiralty Bay was continuous ice with melt on top. The west shoreline of Smith Bay had 50 to 1200 m of open water, narrowest near Cape Simpson. The east shore south of Drew Point had 200 m of open water along the shore with the remainder of Smith Bay continuous ice with melt on top. Harrison Bay and Kogru Peninsula were 95 percent ice with melt on top with a 20 m band of open water along the shore (Harrison Bay). From Atigaru Point east, 200 m of open water along shore increased to ice free conditions at Nechelik Channel. Open water extended ≥ 15 km north of the Colville River Delta.

Colville River Delta to the Canning River Delta (Segments 18-21, 190-214)

Waters from Thetis Island to the Colville River Delta were mostly ice free. Thetis Island had continuous ice to the north and south with 5 and 20 m bands of open water north and south, respectively. Simpson Lagoon from Oliktok Point to Beechey Point had 80 percent ice cover with melt on top. Gwydyr Bay was mostly ice free and from Storkerson Point to Stump Island there was 30 percent ice cover with melt on top increasing to 40 percent to West Dock. Shore fast ice was mostly continuous north of islands. A line of continuous ice was present from West Dock to Gull Island to Endicott Dock and to the north. Prudhoe Bay south of Gull Island was 70 percent ice covered with open water around the Niakuk Islands and the mainland shore. Western Foggy Island Bay was open water near the Sagavanirktok River delta. There was continuous ice with melt in the remainder of the bay with a more extensive ice line from Narwhal Island to Tigvariak Island. Continuous ice north of the barrier islands persisted east to Flaxman Island with nearly continuous ice within lagoons. From Dutchess Island east there was ≥ 400 m of open water with broken ice increasing to mostly open water south of Flaxman Island and at Brownlow Point.

Canning River Delta to the Canadian Border (Segments 22-29)

The western 1/3 of the Canning River lagoon was ice covered with the central portion ice free. The eastern portion of the Canning River lagoon was 50 percent ice covered with a 800 m band of open water along the mainland shore. With the exception of 20 m of open water near shore, there was continuous ice with melt on top north of the barrier islands. Lagoons east to Demarcation Bay were mostly ice free. Camden Bay was ice covered with about 30 percent covered by melt water except for open water near small islands southeast of Konganevik Point. Continuous shore fast ice with a narrow shore band of open water (≤ 10 m) was present north of barrier islands of Arey, Kaktovik, Jago, Tapkaurak and Oruktalik lagoons and east to Demarcation Bay. The western portion of Demarcation Bay was mostly ice free. The eastern shore had a 1.6 km band of open water with continuous ice with melt on top over the remainder of the bay. The shoreline from Demarcation Bay to the Canadian border was not surveyed to conserve fuel.

RESULTS/DISCUSSION

Common eider nest initiation was peaking on Long and Egg islands along the central Beaufort Sea on approximately 22 June (J. Reed USGS-BRD). Nest chronology data is lacking for the remainder of the Beaufort Sea and Chukchi Sea coasts with the exception of a presumed late nest initiated around 2 July at Kasegaluk Lagoon (R. Suydam, North Slope Borough). The 2003 survey was timed to coincide with pair residency at breeding sites (i.e. nest initiation and early egg laying) and is appropriate for comparison to previous years. Previous surveys (1999-2002) occurred during early incubation. Completion of the survey from nest initiation through early incubation is essential to insure that pairs are still intact which allow an accurate estimation of the number of indicated breeding pairs.

A total of 2,123 common eiders, including 874 indicated breeding pairs, were observed in 2003 (Figures 1 and 2; Tables 3 and 4). Total birds and indicated breeding pairs were down 52.3 and up 3.9 percent, respectively, from the 2002 counts of 4,449 birds and 841 pairs. Total birds and indicated pairs in 2003 were down 20.8 and up 14.2 percent, respectively, from the 1999-2003 averages of $2,682 \pm 1,143$ (1SD, range 1,353-4,449) birds and 765 ± 135 (1SD, range 572-874) pairs. As in previous years, observations indicated breeding pairs of common eiders were most numerous along the central and eastern Beaufort Sea coast (331 indicated pairs, 37.9% of total and 267 indicated pairs, 30.5% of total, respectively) and near Kasegaluk Lagoon (171 indicated pairs, 19.6% of total) (Tables 1, 2, 4 and 5; Figure 4).

Flocked adults in 2003 totaled 815 (38.4% of total), a dramatic decrease from the 3,083 (69.3% of total) observed in 2002. Males slightly predominated in flocks in 2003 (1.1:1) versus 2002 (1.7:1). No subadult males were observed in 2003 or 2002; however, they made up 1.3, 0.3 and 0.4 percent of total observations in 1999, 2000 and 2001, respectively.

Progressively more severe sea ice conditions from 1999-2002 paralleled increases in total common eiders observed with a dramatic increase in 2002 (Tables 5 and 6). Beaufort Sea ice coverage in 2003 was nearly as extensive as in 2002 but with more surface melt. Survey data seem to indicate a relatively stable number of breeding pairs along the ACP of Alaska with total numbers reflective of migration timing which could result in short-stopping of Canadian migrants. Inter-annual variability in sea ice composition and distribution appears to affect the total numbers of common eiders observed on this survey. It is encouraging that the estimates of indicated breeding pairs shows less variability than do estimates of total birds, suggesting this survey may be providing a useful index of trend in Alaska breeders along the ACP. Variability in numbers of common eiders and changes in quality of their breeding habitat (i.e. amount and distribution of drift wood on barrier islands) suggests this survey should be continued to determine long-term patterns of distribution and habitat use.

RECOMMENDATIONS

1) Continue this annual aerial survey timed to coincide with onset of incubation to monitor the distribution, abundance, composition, and habitat use of the common eider population summering along the Alaska ACP.

2) Collaborate with other researchers to obtain ground survey data of birds and nests within the survey area to aid in survey timing and to potentially provide air:ground visibility indices.

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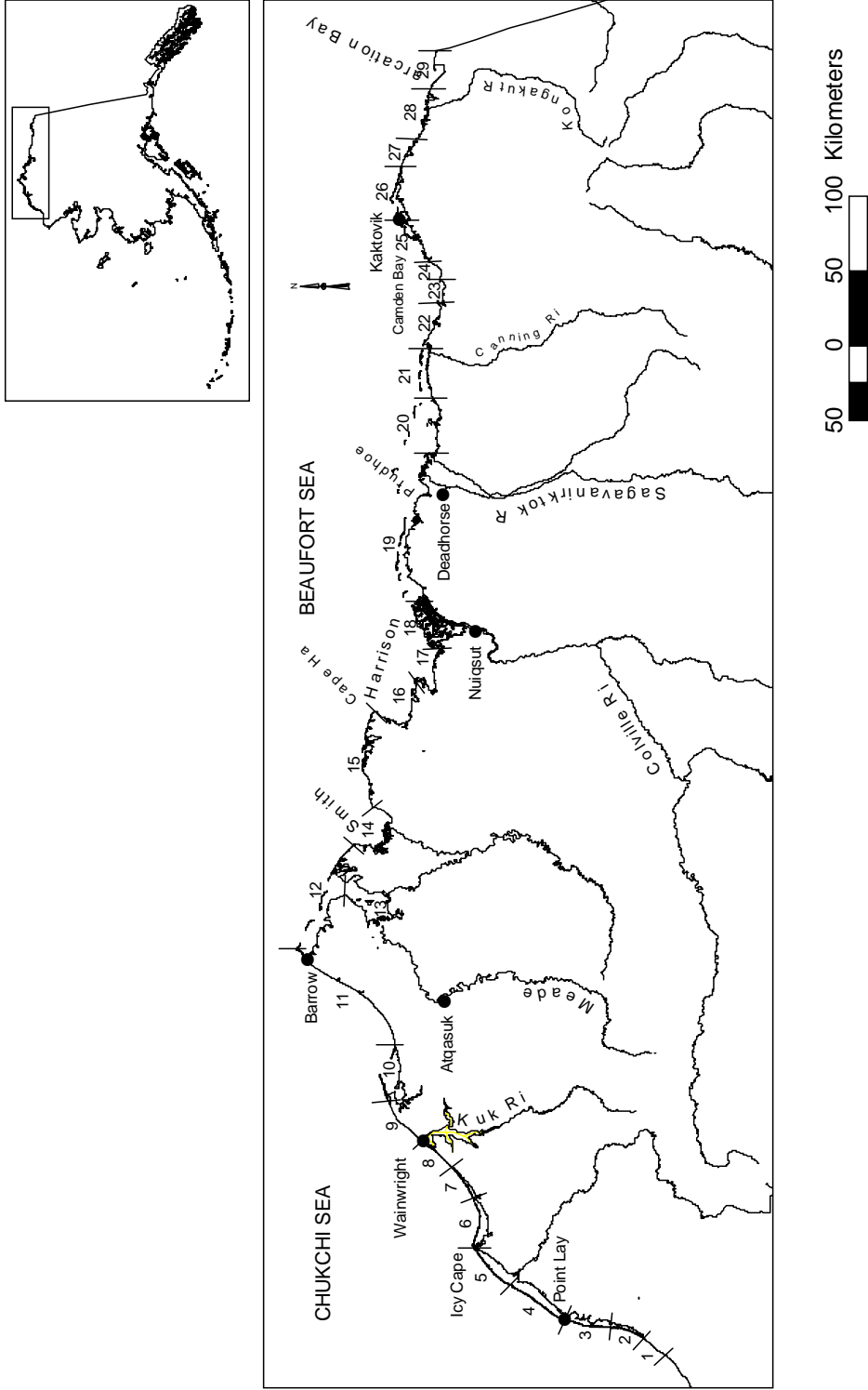


Fig. 1. Location of aerial survey segments searched for common eiders along the Arctic Coast, Alaska

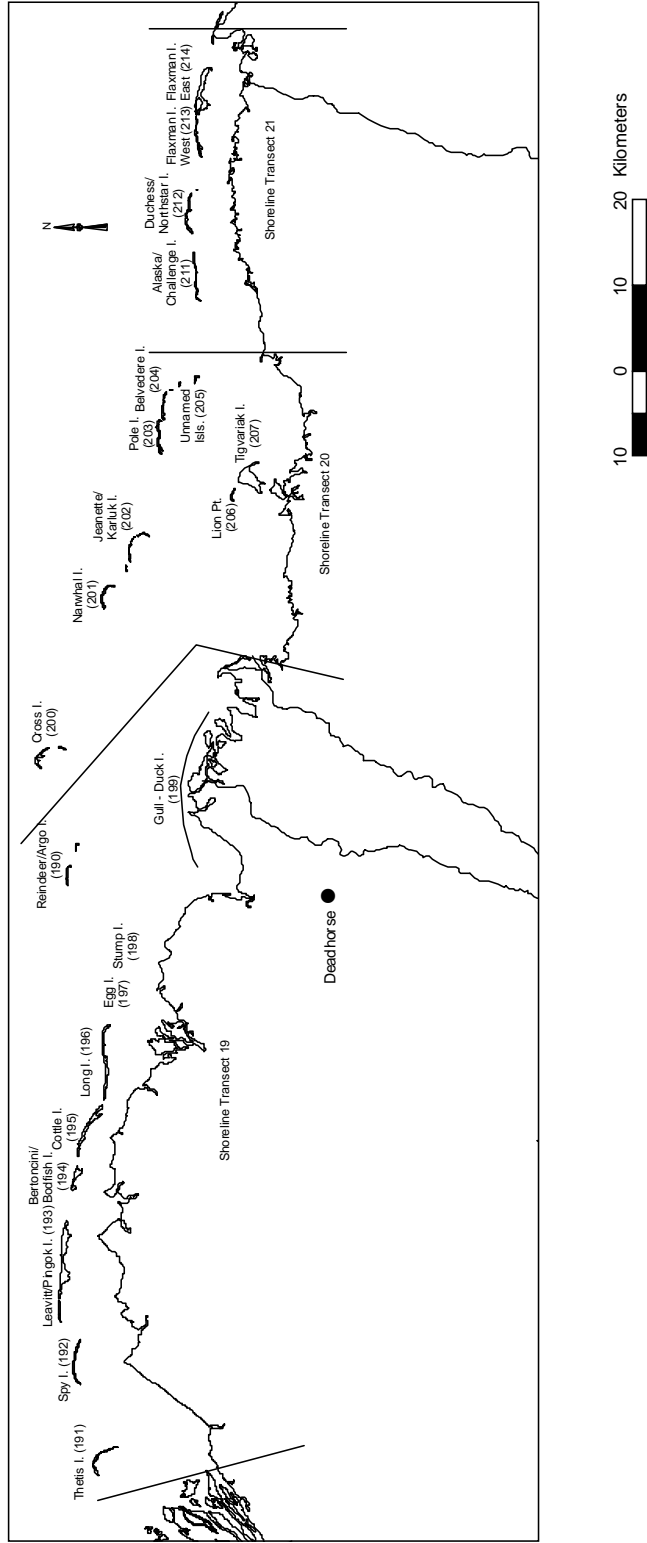
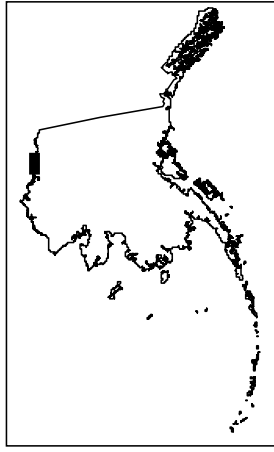


Fig. 2. Survey segments, including coastline and barrier islands, along the central Arctic Coastal Plain, Alaska.

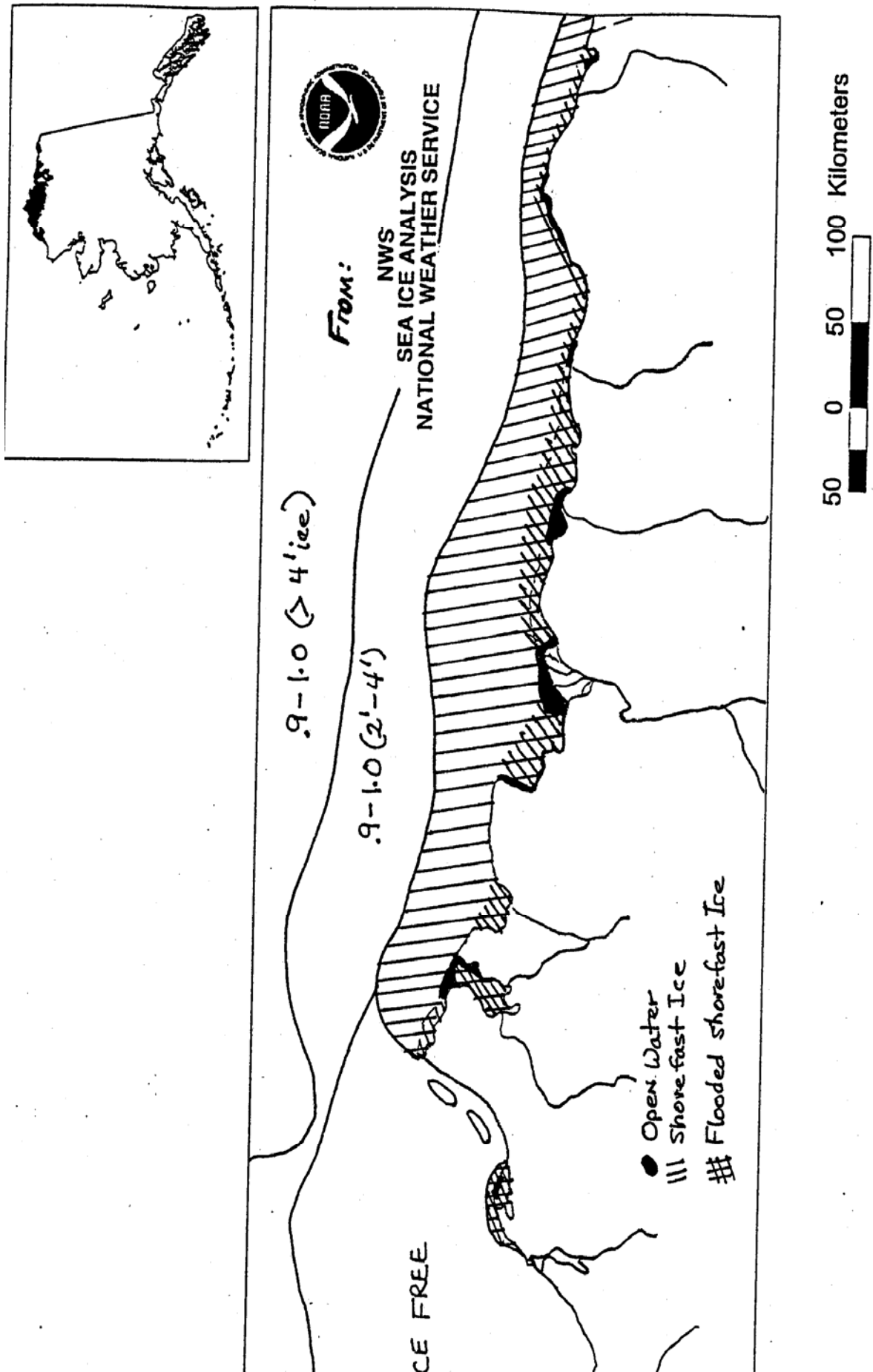


Figure 3. Sea ice conditions in late June along the Arctic Coastal Plain, 2003.

Table 1. Species totals by segment along barrier islands of the ACP, 27-30 June, 2003.

Species	Segment Number																			Total	
	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	211	212	213		214
ARTE			1		10						7		5	3		17	2	11			56
BLBR					10			30	7	30											77
COEH ¹			1	1					2	8			3							1	16
COEI	7	6	2	2	2	2		120	52	50	39	27	15	9	12		19	39	10	11	424
CORA	2																				2
GLGU	10	6	6	4	8		3	23	77	326	40	1	4	4	9	3	12	3	3	18	560
GRSC						3	16														19
KIEI					4	2		4	9								3				22
LTDU	25	10	46	111	52	55	618	167	21	35	12	75	90	21		77	11	11	6	4	1447
PALO	1			4			1	4		14	3	3				2	6	5	1	3	47
POJA				1																	1
RBME				10			9	7	3										5		34
RTLO				4	4			2		4			5			1	3				23
SAGU														4							4
SNGO										392											392
SUSC						200	150	570	250	6		22					15				1213
WWSC						2															2
YBLO						2	1	4													7

¹ COEH = common eider hens in singles and flocks.

Table 2. Species totals by segment along ACP shoreline, 27-30 June, 2003.

Species	Segment Number																												Total	
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29		181
ARTE	51	45	256	1	31	37			11		154		4											16	2	1	6		615	
BLBR	18	30	133	331	211	108		1	585	26	234	150	10	112	314	55	143	73					20			2	3	20	2579	
CAGO	29	9		2		35			18		32	61	121	450	33	6	19	6	2										823	
COEH ¹	2	1	2	43	4	2	2		6		1								17	1		2		5		3	6	1	98	
COEI	4	28	218	114	201	39	2		115	33	6		20					6	111	66	239	27	49	60	74	2	148	23	1585	
COLO											2																		2	
GLGU	58	278	1763	521	939	188	35	346	115	179	377	93	119	259	24	16	40	251	101	33	33	27	2	265	217	18	34	85	55	6471
GRSC	8	219	210															20	3		10			2			4		476	
JAEG																								1					1	
KIEH ¹				2	1				10	5				1	1	5		2		4							4		35	
KIEI		9	26	5	243	8			44	4329	172	3	19	8	2	16		11	80	21	300		6	3		2	5		5312	
LTDU	351	453	4	35	187	17			234	4240	293	147	268	222	23	41	2	160	73	1	185	217	230	11	31	6	465	355	26	8277
LTJA			1																										1	
NOPI	371	20	50	82	75					6	74	4	2	42	28	7	52			4			5		20		5	32		879
PAJA	1	1		2	2				1						2													1		10
PALO	3	5	5		5	1	2		2	54	27	3	37	20	11	5		49	6	5	10	5	1	2	9	3	1	1	6	278
POJA				1							2																		3	
RBME	25	21	3		4	1				46		3	20	1	10			14	5		17			11	2			48	231	
RTLO	1	15	6	3	12				3	7	95	3	12	3	3	2	3	16	5		5	3	1	1			2	1	8	210
SACR	1																													1
SAGU				3	1						113		1	2			61													181
SNGO		16								1			7				12	26												62
SNOW												1		1							1			1					4	
SPEI											1				1			4											2	8
SUSC	124	113	25							10	1		91			50	11	1113	170	15	480	239	358	172	44	115	329	1083	8	4551
TUNE																	1													1
TUSW	2				4	10			6			6			2	2	11					2					2	2	49	
WFGO	25	2	13			1			2		1	4	8	41	13	32	112	1												255
WWSC					1															25	20			16	58		674	135	929	
YBLO		2		3	5				4	12		1	5	4		1		2				1					1		41	

¹ COEH, KIEH = common and king eider hens in singles and flocks.

Table 3. Total birds for all areas, ACP coastline, 27-30 June 2003.

Species	Shoreline	Barrier Isl.	Total
ARTE	615	56	671
BLBR	2579	77	2656
CAGO	823		823
COEH ¹	98	16	114
COEI	1585	424	2009
COLO	2		2
CORA		2	2
GLGU	6471	560	7031
GRSC	476	19	495
JAEG	1		1
KIEH ¹	35		35
KIEI	5312	22	5334
LGSH	7		7
LTDU	8277	1447	9724
LTJA	1		1
NOPI	879		879
PAJA	10		10
PALO	278	47	325
POJA	3	1	4
RBME	231	34	265
RTLO	210	23	233
SACR	1		1
SAGU	181	4	185
SNGO	62	392	454
SNOW	4		4
SPEI	8		8
SUSC	4551	1213	5764
TUNE	1		1
TUSW	49		49
WFGO	255		255
WWSC	929	2	931
YBLO	41	7	48

¹ COEH, KIEH = common and king eider hens in singles and flocks.

Table 4a. Common eider sex and age composition and totals in shoreline segments, ACP, 2003.

SEGMENTS	SINGLES			PAIRS		FLOCKED BIRDS		TOTAL ³
	Adult Male	Juv. Male	Female	No.	Indicated Total ¹	Total	Male:Female ²	
1								NA
2	2		2	1	3			6
3	16		1	6	22			29
4	13		2	11	24	183	45:55:00	220
5	20		3	39	59	56	14:42	157
6	23			23	46	136	12:12	205
7	4		2	13	17	9	7:02	41
8			2	1	1			4
9								0
10	19		3	48	67	3	0:03	121
11	31			1	32			33
12	4		1	1	5			7
13								0
14	2			2		14	11:03	20
15								0
16								0
17								0
18								0
19	2			2	4			6
20	19		1	7	26	94	0:16	128
21	2		1	32	34			67
22	45			28	73	138	100:25:00	239
23	3			7	10	12	0:02	29
24	10			12	22	15		49
25	20		5	20	40			65
26	40			17	57			74
27				1		3	0:03	5
28	41		6	15	56	77		154
29	15		1	4	19			24
181								0

¹ Single males+pairs = Indicated total pairs.

Table 4b. Common eider sex and age composition and totals in barrier island segments, ACP, 2003.

SEGMENT	SINGLES			PAIRS		FLOCKED BIRDS		TOTAL ³
	Adult Male	Juv. Male	Female	No.	Indicated Total ¹	Total	Male:Female ²	
190	3			2	5			7
191	6				6			6
192			1	1	1			3
193			1	1	1			3
194				1	1			2
195				1	1			2
196								0
197	9			18	27	75		120
198	38		2	7	45			54
199	30			10	40		0:08	58
200	27			6	33			39
201	13			7	20			27
202	3			6	9		0:03	18
203	3			3	6			9
204	6			3	9			12
205								0
211	17			1	18			19
212	21			9	30			39
213	2			4	6			10
214	7		1	2	9			12

¹ Single males+pairs = Indicated total pairs.

² Flocks from which sex ratios were obtained.

³ Total= singles+ 2x pairs+ flocks.

Table 5. Proportional distribution of totals and indicated pairs of common eiders along the ACP, 1999-2003.

AREA (Segment Numbers)	1999		2000		2001		2002		2003	
	Total(%)	Pairs(%)	Total(%)	Pairs(%)	Total(%)	Pairs(%)	Total(%)	Pairs(%)	Total(%)	Pairs(%)
Kasegaluk Lagoon (2-7)	176 (13.0)	69 (12.1)	914 (34.5)	119 (13.8)	747 (26.3)	165 (24.4)	1802 (40.5)	177 (21.0)	657 (31.0)	171 (19.6)
Peard Bay (10)	106 (7.8)	36 (6.3)	7 (0.3)	1 (0.1)	288 (10.2)	73 (10.8)	258 (5.8)	83 (9.9)	121 (5.7)	67 (7.7)
Central Beaufort Sea Coast (18- 21, 181-214)	542 (40.1)	378 (66.1)	760 (28.7)	424 (49.1)	531 (18.7)	277 (41.0)	1347 (30.3)	350 (41.6)	647 (30.5)	331 (37.9)
Canning R.- Demarcation Bay (22-29)	299 (22.1)	75 (13.1)	956 (36.1)	319 (37.0)	1242 (43.8)	158 (23.4)	1005 (22.6)	224 (26.6)	476 (22.4)	267 (30.5)
Other Areas	230 (17.0)	14 (2.5)	12 (0.5)	0	29 (1.0)	3 (0.4)	37 (0.8)	7 (0.8)	222 (10.4)	38 (4.3)
TOTALS	1353	572	2649	863	2837	676	4449	841	2123	874

Table 6. Species totals for all areas, ACP, 1999-2003.

Species	Total Birds Observed				
	1999	2000	2001	2002	2003
AGWT	0	0	0	6	0
ARTE	901	127	1530	241	671
BLBR	2329	1411	2215	1319	2656
BLGU	1	8	18	9	823
BLKI	0	0	29	92	0
BLSC	3	0	0	546	0
CAGO	1554	659	465	425	823
CEJV ¹	18	8	10	0	0
COEH ¹	92	330	295	215	114
COEI	1243	2311	2532	4234	2009
COLO	0	0	1	0	2
COMU	0	0	0	40	0
COME	0	0	4	0	0
CORA	0	0	1	2	2
GLGU	4462	3345	5499	2703	7031
GRSC	1011	944	744	99	495
JAEG	0	12	0	0	1
KIEH ¹	9	61	48	146	35
KIEI	892	427	1716	10719	5334
LGSH	0	0	0	0	7
LTJA	1	3	0	0	1
LTDU	4890	5726	5544	5110	9724
MEGU	0	0	8	21	0
MESH ¹	0	0	62	0	0
NOFU	0	0	0	1	0
NOPI	1268	779	2752	516	879
PAJA	4	9	81	7	10
PALO	443	429	208	537	325
POJA	0	3	0	0	4
RBME	710	1985	194	108	265
RTLO	85	198	154	64	233
SACR	2	2	2	2	1
SAGU	99	4	442	20	185
SMSH ¹	0	3	0	0	0
SNGO	124	986	192	164	454
SNOW	14	0	1	6	4
SPEH ¹	2	0	0	0	0
SPEI	11	15	45	14	8
STEI	0	0	2	1	0
SUSC	2073	11113	2644	1500	5764
TUNE ¹	9	0	0	1	1
TUSW	32	84	30	269	49
WFGO	521	1269	623	425	255
WWSC	128	765	1622	1485	931
YBLO	40	51	40	34	48

¹ CEJV = COEI juveniles in singles or flocks; COEH, KIEH, SPEH = common, king or spectacled eider hens in singles or flocks; COEI = single adult males and pairs; MESH = medium shorebird; SMSH = small shorebird; TUNE = tundra swan nest.