

**Aerial population survey of common eiders and other waterbirds in nearshore waters and along barrier islands of the Arctic Coastal Plain of Alaska, 30 June -3 July 2001**

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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 third consecutive year from 30 June to 3 July 2001. Observations were made from a Cessna 206 amphibian (N736) by a new pilot/observer (Anderson) and previous observer (Dau). The study area, consistent between years, encompassed 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 three survey years (1999-2001) increased in progressive lateness relative to habitat availability and sea ice conditions with 2001 up to one week later than 2000.

A total of 2,837 common eiders, including 676 indicated breeding pairs, were observed in 2001. These counts were up 7.1 and down 21.7 percent, respectively from the 2000 observations of 2,649 birds and 863 pairs. Percent distribution declined near Kasegaluk Lagoon and along the central Beaufort Sea coast and increased at Peard Bay and east of the Canning River Delta. In 2001 the central Beaufort Sea coast and Kasegaluk Lagoon accounted for 18.7 and 26.3 percent of total common eider observations and 41.0 and 24.4 percent of indicated breeding pairs. Other waterbird species observed and their change from 2000 included long-tailed ducks 5,544 (-3.2%), glaucous gull 5,499 (+64.4%), Pacific brant 2,215 (+157.0%), surf scoter 2,644 (-76.2%), Canada goose 465 (-29.4%), northern pintail 2,752 (+344.4%), greater scaup 744 (-21.2%) and king eider 1,716 (+351.6%).

## **INTRODUCTION**

This report summarizes the third consecutive years of aerial survey effort to estimate common eider population size, demography and distribution along the Arctic Coastal Plain north and east from Omalik Lagoon on the Chukchi Sea to the Canadian border on the Beaufort Sea. This survey may further provide an estimate of the proportion of Alaskan Beaufort Sea breeding common eiders within the larger combined Alaska and Canadian populations estimated during migration at Barrow (Suydam et al. 2000).

## **METHODS**

Survey timing during early incubation while male eiders are in the vicinity breeding sites. Males gather into flocks and eventually disperse from breeding areas as incubation proceeds so survey timing is important to estimate the number and distribution of indicated breeding pairs.

The survey was conducted in a Cessna 206 amphibian flown at approximately 110 knots and an altitude of 45 meters ASL/AGL. Observations, made out both sides of the aircraft by the pilot/observer (left) and observer (right), were entered directly into laptop computers using remote microphones. A meandering flight route followed mainland and barrier island shorelines and adjacent nearshore waters. Flights were conducted in calm or light winds during mid-day to

maximize height of the sun-angle, reduce glare and increase the visibility of birds on the water.

The survey area included 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 which were later included in the companion videographic nest survey were identified on 1:63,360 scale topographic maps. Maps were consulted primarily to identify segment start and stop points. General observations on habitat and survey conditions were opportunistically recorded and compared with sea surface analyses prepared by the National Weather Service (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+flocks) (Tables 4 and 5). The number of indicated breeding pairs of common eiders along barrier islands of the central Beaufort Sea can be compared with the number of nests observed during ground nesting surveys of the same islands.

The companion aerial videographic project of barrier islands of the central Beaufort Sea was performed each year of the survey with the hopes of developing a technique for estimating the number of common eider nests (Anthony 1999). The videographic survey was flown in the same aircraft used during the preceding population survey. Ground surveys on selected islands, being conducted by USGS-BRD and LGL Alaska Research Associates, Inc., may provide useful air:ground ratios for birds and nests.

## **STUDY AREA/CONDITIONS**

### *Omalik Lagoon to Point Barrow*

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

Omalik Lagoon was free of ice with 0.8 km of shore fast ice extending seaward with open water beyond. The southern third of Kasegaluk Lagoon had 30 percent deteriorating ice cover. Ice cover in the central and northern thirds of the lagoon were 30-50 and 90 percent, respectively. Shore fast ice along Kasegaluk Lagoon varied but decreased from the central portion (1.6-4.5km) to the northern portion (50m) with open water to seaward. Little shore fast ice was present off Wainwright with 1.6-2km of broken ice in the northern third of the inlet. Peard Bay was 90 percent ice covered with open water offshore decreasing from very little off Peard Bay to 2km off Barrow. At Barrow there was a narrow offshore lead with continuous broken ice beyond.

### *Point Barrow to the Colville River Delta*

Mostly continuous broken sea ice occurred in this area. Barrier islands of Elson Lagoon had 10m of open water to the north and 30m to the south. The lagoon was 95 percent ice covered

and shore fast to the mainland. The southwest portion of Smith Bay had 400m of open water near shore with the remainder continuous ice with melt on top. Harrison Bay had 50m of open water along the west side with continuous ice over the remainder. North of the Kogru Peninsula there was 20m of open water nearshore. There was open water to  $\geq 15$ km off the Colville River Delta.

#### *Colville River Delta to the Canning River Delta*

Waters from Thetis Island to the mainland and east to Oliktok Point were ice free. Simpson Lagoon from Spy Island and Oliktok Point to Long Island (east) had continuous ice cover with the exception of up to 100m of open water along the mainland shore. Ice was shore fast north of islands. Gwydyr Bay was 30 percent ice covered with open water around Egg and Stump islands and in nearshore waters east to Foggy Island Bay. East of Foggy Island Bay, 0.8km open water/brash was found along the shore with continuous ice to the islands. Tigvariak Island had continuous shore fast ice to the north and open water south of a direct line east to Badami. From Badami to Bullen Point there was 50-100m of open water along the mainland shore. East to Flaxman Island there was <50 m of open water along the mainland shore. A little open water was present along the south sides of the Maguire Islands and Flaxman Island with nearly continuous shore fast ice to the north. An area of open water was present between Flaxman Island and Brownlow Point.

#### *Canning River Delta to the Canadian Border*

A strip of open water approximately 0.8km in width was found north of barrier islands east from the Canning River Delta with continuous ice to the north. Ice covered nearshore waters south of barrier islands with an average of 10m of open water along the mainland shore east to Demarcation Bay. The eastern portion of Camden Bay was broken/deteriorating ice. Continuous shore fast ice was present north of barrier islands of Arey, Kaktovik, Jago, Tapkaurak and Oruktalik lagoons with approximately 100m open to the south. The lagoons were mostly open with the exception of 30 percent ice cover in the east end of Jago Lagoon. Demarcation Bay was approximately 80 percent ice covered and east to the Canadian border there was 30m of open water along the shore with continuous ice to the north.

## **RESULTS/DISCUSSION**

Peak onset of incubation estimated to be occurring about 20 June with most nests hatching around 20 July (R. Lanctot USGS-BRD, pers. comm.). Our survey took place during early incubation in 2001 and was appropriately timed to observe intact breeding pairs.

A total of 2,837 common eiders, including 676 indicated breeding pairs, were observed in 2001 (Figure 1 and 2, Table 3 and 4). Total birds were up 7.1 percent and indicated breeding pairs were down 21.7 percent, respectively from the 2000 counts of 2,649 birds and 863 pairs. These data may indicate an actual increase in population size or a short-stopping of Canadian migrants as well as a probable reduction in reproductive effort evidenced by the decline in indicated breeding pairs.

A total of 638 single adults was up 2.6 percent from the 622 observed in 2000. The proportions of males and females, skewed strongly towards males in 1999 and 2000, were similar in 2001 (53.8% males: 46.2% females). Single adults accounted for 22.5 percent of total observations compared to 23.5 percent in 2000. Flocked adults in 2001 totaled 1,280 (45.1% of total), a decline from the 1469 (55.5% of total) observed in 2000. Males predominated (2.7:1) in flocks in 2001 versus (1.1:1) in 2000. Subadult males made up 1.3, 0.3 and 0.4 percent of total observations in 1999, 2000 and 2001, respectively. During all three years, the few sightings of subadult males were along the Chukchi Sea coastline.

As in 1999 and 2000 (Dau and Taylor 2000), observations in 2001 indicated breeding pairs of common eiders were most numerous along the central Beaufort Sea coast (531 birds, 18.7% of total; 277 indicated pairs, 41.0% of total) and near Kasegaluk Lagoon (747 birds, 26.3% of total; 165 pairs, 24.4% of total) (Tables 1, 2 and 4). In 2001, the relative proportion of total common eiders and breeding pairs, declined along the central Beaufort Sea coastline. At Kasegaluk Lagoon, total common eiders declined while indicated breeding pair increased (Table 5). We observed increases in total common eiders at Peard Bay and from the Canning River to Demarcation Bay in 2001.

## **RECOMMENDATIONS**

- 1) Continue this annual aerial survey timed to coincide with onset of incubation to assess the distribution, abundance and composition 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 provide visibility indices for ocular and videographic surveys.
- 3) Conduct an annual aerial videographic survey to estimate numbers of nests on barrier islands along the central Beaufort Sea coastline.
- 4) Assess ice conditions in estuarine habitats and offshore in the Chukchi and Beaufort seas.

## **LITERATURE CITED**

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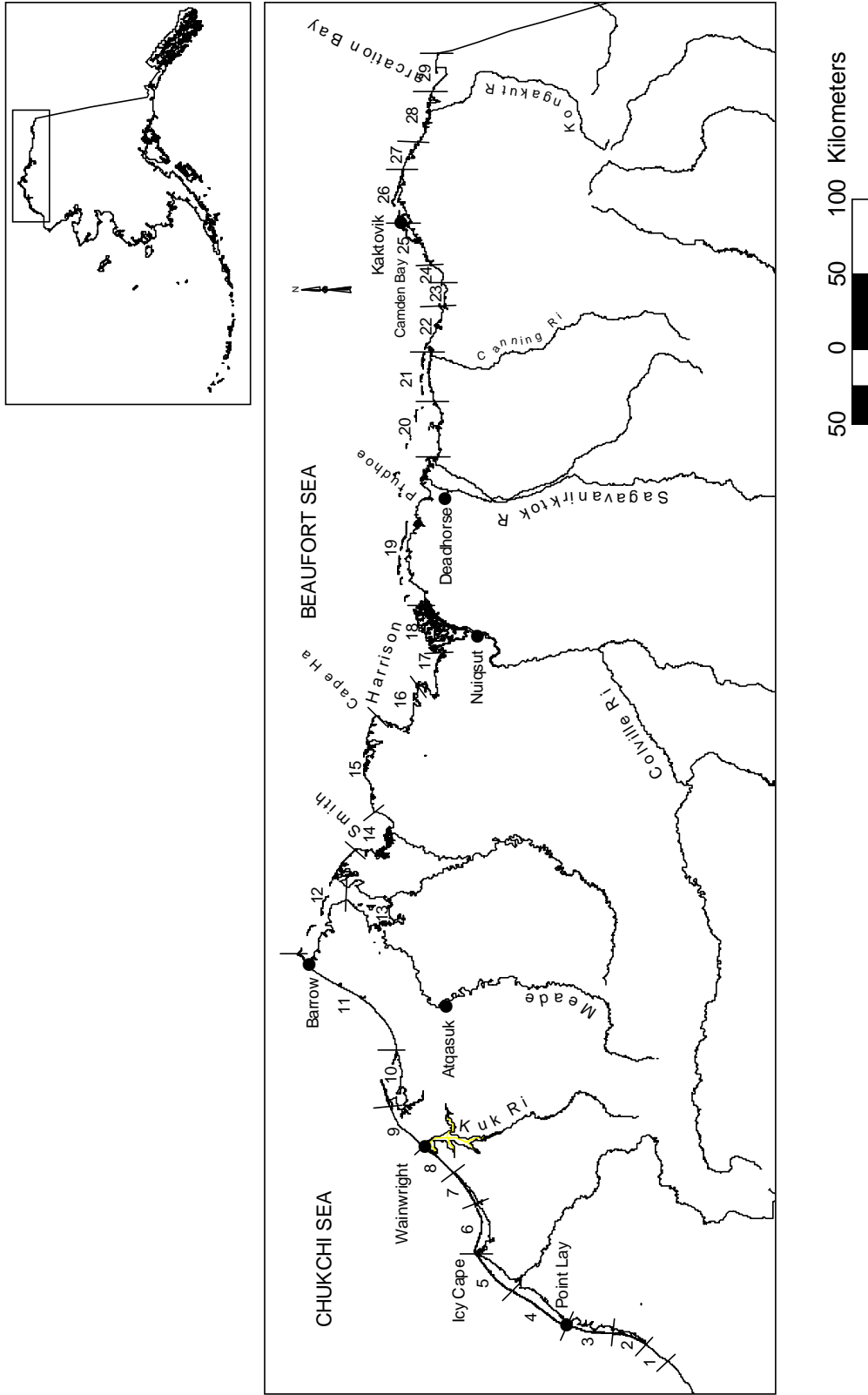


Fig. 1. Location of aerial survey segments searched for common eiders along the Arctic Coast, Alaska

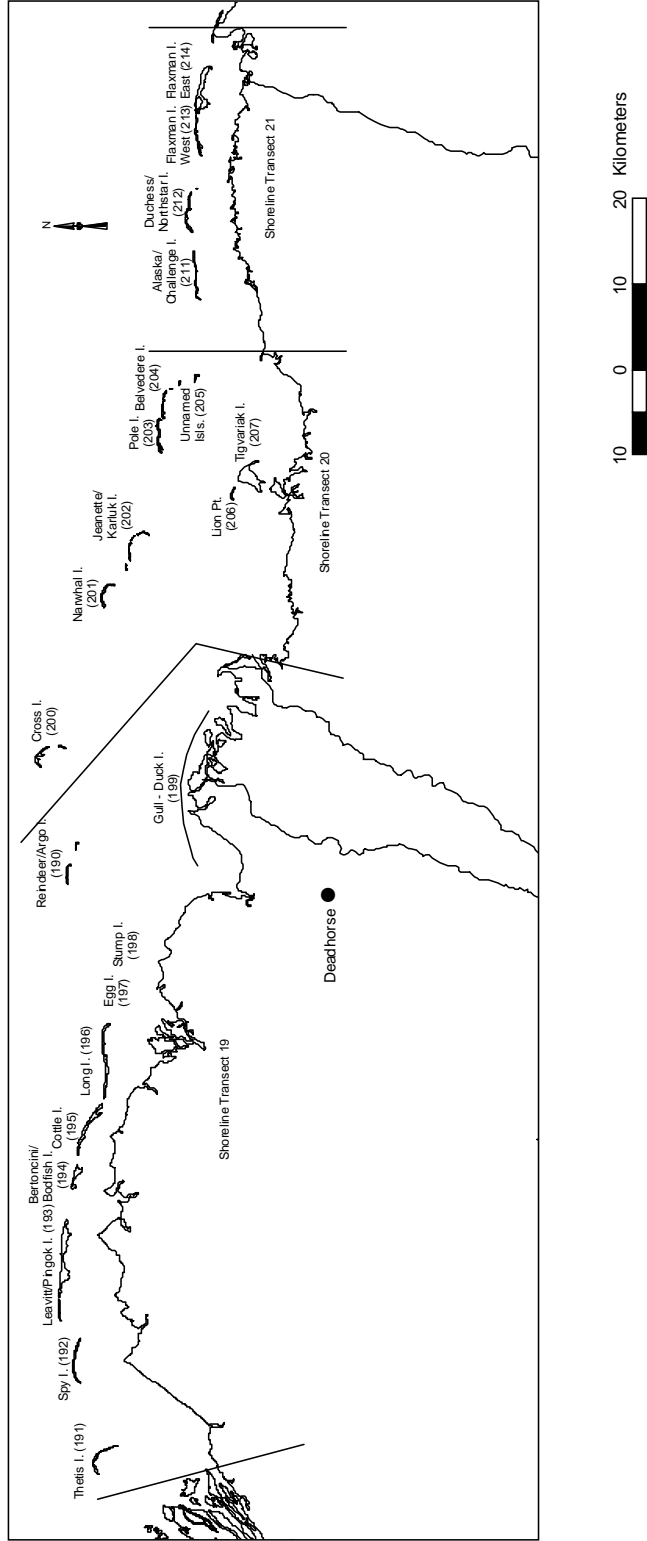
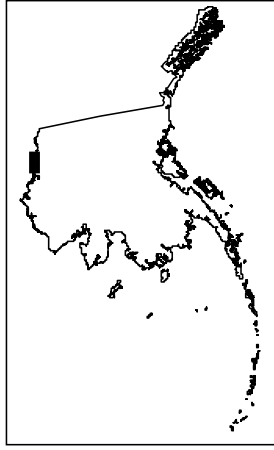


Fig. 2. Survey segments, including coastline and barrier islands, along the central Arctic Coastal Plain, Alaska.



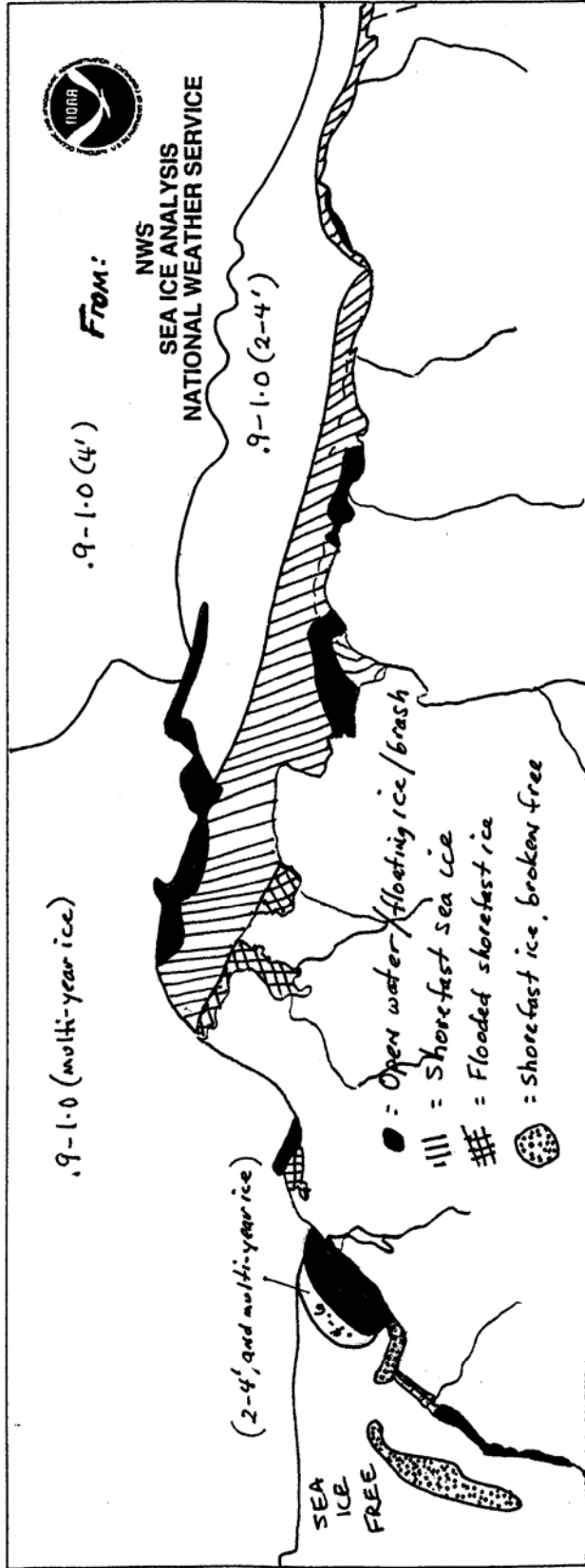


Figure 3. Sea ice conditions in early July along the Arctic Coastal Plain, 2001.



Table 2. Species totals by segment along ACP shoreline, 30 June-3 July, 2001.

Species	Segment Number																												Total						
	1	2	3	4	5	6	7	8	9	10	11	12	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	27		27	28	29	181		
ARTE	2	406	284	62	419	54	165	10	25	35	1	28			6										2								1499		
BLBR	18		16		983	247				35	20	60	75	85	92	260	29	180	8		50			4				1					2163		
BLGU												18																			1		18		
BLKI	10	1	10					8																										29	
CAGO														324	121	4	16																	465	
CEJV			5	3		2																												10	
COEH	3		12	33	16	11			9	10		1						1	12	36	2	40	1	1	14	21		19	21		19		242		
COEI	4	59	17	214	163	183	26		2	279		12						10	34	8	246	12	110	380	54	10	314	18	10	314	18		2155		
COLO																														1		1		1	
COME																								4										4	
GLGU	59	616	274	272	295	105	139	870	1139	25	750	121	76	43	10	14	5	42	56	18	8	2	4	39	81	53	18	55	53	18	55	6	5195		
GRSC		25	2	129														135	23			1	30		70		23	80		23	80		518		
HASE		1	1																													1		1	3
KIEH				17					8								1	7			1		2	2							4			4	42
KIEI				71		760	145			61	100	13	2	2	2	10	2	9	65	90	247			111	4									1694	
MEGU				4				1		3																									8
MESH		62																																	62
NOPI		2483	35	130								35	7	4	18	5	17			10	8													2752	
OLDS	115	600	529	611	294	36	61	5	144	92	105	688	63	15	41		1	25	60	2	10	1	52	112	993	145	178	224	145	178	224	2	5204		
PAJA		64	3	2	2	1		2		2																									76
PALO	15	16	5	6	9	4			6	11	10	2	1	8	2			22	9	16	5	2	10	3	13	3	7	2	3	7	2		187		
RBME	46	5		9	3	7			6	1							2		4	9	3			5	21	10	3	48	10	3	48		182		
RTLO	23	1	12	4	2	1				1	2	52	10	8			1	2	2	3	5		2	2	1	2	1	4	2	1	4		141		
SACR		2																																	2
SAGU		5	2		4				394			25	10																						440
SCAU			220																																220
SNGO	1		3	5									1						178																188
SNOW				1																															1
SPEI										40																									40
STEI	2																																		2
SUSC			3	9															238	5	3	15	100	60	1066	489		128	505		128	505		2621	
TUNE																	1																		1
TUSW		2	2										2	2		5	1		5				2	2			6				6			29	
WFGO	154	90	12										105	10		208	34							5										618	
WWSC										5								50			1			45		21	130	1185	137	130	1185	137		1574	
YBLO		6	2	12	2	1						2		2					3				2	2		1		1				1		36	

Table 3. Totals for all areas, ACP, 30 June-3 July 2001.

Species	Total Birds Observed		Overall
	Shoreline	Barrier Isl.	
ARTE	1499	31	1530
BLBR	2163	52	2215
BLGU	18		18
BLKI	29		29
CAGO	465		465
CEJV	10		10
COEH	242	53	295
COEI	2155	377	2532
COLO	1		1
COME	4		4
CORA		1	1
GLGU	5195	304	5499
GRSC	738	6	744
KIEH	42	6	48
KIEI	1694	22	1716
LTDU	5204	340	5544
MEGU	8		8
MESH	62		62
NOPI	2752		2752
PAJA	76	5	81
PALO	187	21	208
RBME	182	12	194
RTLO	141	13	154
SACR	2		2
SAGU	440	2	442
SNGO	188	4	192
SNOW	1		1
SPEI	40	5	45
STEI	2		2
SUSC	2621	23	2644
TUSW	30		30
WFGO	618	5	623
WWSC	1574	48	1622
YBLO	36	4	40

Table 4a. Common eider sex and age composition and totals by segment, ACP, 2001.

TRANSECT	SINGLES			PAIRS		FLOCKED BIRDS		TOTAL <sup>3</sup>
	AdultMale	Juv. Male	Female	No.	Indicated Total <sup>1</sup>	Total	Male:Female <sup>2</sup>	
1	1				1	6	0:03	7
2	6			12	18	29	18:11	59
3	3	5	1	7	10	11	0:11	34
4	42	3	2	30	72	143	48:84	250
5	11		3	21	32	123	6:32	179
6	8	2	3	19	27	145	36:72	196
7	3			3	6	17	2:04	26
8								0
9				1	1			2
10	33		4	40	73	171	66:98	288
11						10	0:10	10
12				1	1	10	5:05	12
13								0
14			1					1
15								0
16								0
17								0
18								0
19			1	5	5			11
20	8		2	13	21	10	0:10	46
21			1	4	4	35	0:35	44
22	29		2	24	53	169	119:00:00	248
23				6	6	40	0:40	52
24	2		1	4	6	100	90:10:00	111
25	5		1	5	10	365	290:75	381
26	8		1	23	31	13	0:13	68
27			1	5	5	20	0:20	31
28	30			7	37	270	250:20:00	314
29	2		1	8	10	18	0:18	37

<sup>1</sup> Single males+pairs = Indicated total pairs.

<sup>2</sup> Flocks from which sex ratios were obtained.

<sup>3</sup> Total= singles+2x pairs+ flocks.

Table 4b. Common eider sex and age composition and totals by segment, ACP, 2001.

TRANSECT	SINGLES			PAIRS		FLOCKED BIRDS		TOTAL <sup>3</sup>
	AdultMale	Juv. Male	Female	No.	Indicated Total <sup>1</sup>	Total	Male:Female <sup>2</sup>	
190	3			1	4			5
191	11			5	16			21
192	1			2	3	4	0:04	9
193								0
194								0
195								0
196	11			13	24	35		72
197	3		1	4	7			12
198	42		1	7	49	20	0:20	77
199	26		1	4	30			35
200	11		2	14	25			41
201	8			4	12			16
202	1			3	4			7
203	7			4	11			15
204	1		1	1	2			4
205	1			3	4			7
211	6			12	18	13	0:13	43
212	17		2	10	27	2	0:02	41
213	2			6	8			14
214	1			2	3	6	0:6	11

<sup>1</sup> Single males+pairs = Indicated total pairs.

<sup>2</sup> Flocks from which sex ratios were obtained.

<sup>3</sup> Total= singles+ 2x pairs+ flocks.

Table 5. Proportional distribution of common eiders along the ACP, 2000-2001.

AREA	2000		2001	
	Total Birds(%)	Ind. Pairs(%)	Total Birds(%)	Ind. Pairs(%)
<b>Kasegaluk Lagoon</b>	914 (34.5)	119 (13.8)	747 (26.3)	165 (24.4)
<b>Peard Bay</b>	7 (0.3)	1 (0.1)	288 (10.2)	73 (10.8)
<b>Central Beaufort Sea Coast</b>	760 (28.7)	424 (49.1)	531 (18.7)	277 (41.0)
<b>Canning R.- Demarcation Bay</b>	956 (36.1)	319 (37.0)	1242 (43.8)	158 (23.4)
<b>Other Areas</b>	12 (0.5)	0	29 (1.0)	3 (0.4)
TOTALS	2649 (100.0)	863 (100.0)	2837 (100.0)	676 (100.0)

Table 6. Species totals for all areas, ACP, 1999-2001.

Species	Total Birds Observed		
	1999	2000	2001
AGWT	0	0	0
ARTE	901	127	1530
BLBR	2329	1411	2215
BLGU	1	8	18
BLKI	0	0	29
BLSC	3	0	0
CAGO	1554	659	465
CEJV	18	8	10
COEH	92	330	295
COEI	1243	2311	2532
COLO	0	0	1
COMU	0	0	0
COME	0	0	4
CORA	0	0	1
GLGU	4462	3345	5499
GRSC	1011	944	744
JAEG	0	12	0
KIEH	9	61	48
KIEI	892	427	1716
LTJA	1	3	0
LTDU	4890	5726	5544
MEGU	0	0	8
MESH	0	0	62
NOFU	0	0	0
NOPI	1268	779	2752
PAJA	4	9	81
PALO	443	429	208
POJA	0	3	0
RBME	710	1985	194
RTLO	85	198	154
SACR	2	2	2
SAGU	99	4	442
SMSH	0	3	0
SNGO	124	986	192
SNOW	14	0	1
SPEH	2	0	0
SPEI	11	15	45
STEI	0	0	2
SUSC	2073	11113	2644
TUNE	9	0	0
TUSW	32	84	30
WFGO	521	1269	623
WWSC	128	765	1622
YBLO	40	51	40