

Aerial population survey of common eiders and other waterbirds in near shore waters and along barrier islands of the Arctic Coastal Plain of Alaska, 25-29 June 2002

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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 fourth consecutive year from 25 to 29 June 2002. Observations were made from a Cessna 206 amphibian (N736) by Dau and Anderson as pilot/observers. The study area flown since the survey was initiated in 1999 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 four survey years (1999-2002) increased in progressive lateness relative to habitat availability and sea ice conditions. Preliminary observations suggest the phenology of common eider nesting was delayed at least ten days (USGS-BRD) from 2001.

A total of 4,449 common eiders, including 841 indicated breeding pairs, was observed in 2002. These counts were up 56.8 and 24.4 percent, respectively from the 2001 observations of 2,837 birds and 676 indicated pairs. Percent distribution increased in Kasegaluk Lagoon and along the central Beaufort Sea coast and decreased at Peard Bay and east of the Canning River Delta likely due to the amounts of open water and the possible short-stopping of migrants. In 2002 the central Beaufort Sea coast and Kasegaluk Lagoon accounted for 30.3 and 40.5 percent of total common eider observations and 41.6 and 21.0 percent of indicated breeding pairs. Other waterbird species observed and their change from 2001 included long-tailed ducks 5,110 (-8%), glaucous gull 2,703 (-51%), Pacific brant 1,319 (-41%), surf scoter 1,500 (-43%), Canada goose 425 (-9%), northern pintail 516 (-81%), greater scaup 99 (-87%) and king eider 10,865 (+633%).

INTRODUCTION

This report summarizes the fourth 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 is designed to provide an estimate of numbers and trends of Alaskan breeding common eiders along the Chukchi and Beaufort sea coastline. These data will be useful in interpreting migration counts of the combined Alaska and Canadian populations at Barrow (Suydam et al. 2000).

METHODS

The survey is timed to coincide with early incubation while male eiders are in the vicinity of breeding sites. Ground surveys of nesting birds have been used to determine breeding phenology and appropriate survey timing. A Cessna 206 amphibian flown at approximately 110 knots and an altitude of 45 meters ASL/AGL was used. 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. Computers were interfaced with the aircraft Global Positioning System (GPS) and observations were collected using record and transcribe programs designed by Jack Hodges (MBM-Juneau). Meandering flight routes followed mainland and barrier island

shorelines and adjacent near shore waters providing complete coverage from the shore to 1.6 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 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 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 recorded by the pilot 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+flocks) (Tables 4 and 5). The companion aerial videographic survey of barrier islands of the central Beaufort Sea, performed from 1999-2000 (Anthony 1999), was not flown in 2002 due to later breeding phenology.

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 ice free with approximately 100 m of brash ice extending seaward with open water beyond. The southern half of Kasegaluk Lagoon was ice free. Ice cover in the northern half of the lagoon averaged 40 percent. Shore fast ice and brash along the northern portion of Kasegaluk Lagoon varied from 200 m to 3 km in width. Approximately 400 m of shore fast ice and brash was present from Kasegaluk Lagoon to Peard Bay. Peard Bay was 95 percent ice covered with mostly open water offshore. From Peard Bay to Barrow there was continuous shore fast ice with some 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 and up to 400 m of open water to the south. The lagoon was 95 percent ice covered and shore fast to the mainland. The southern and eastern portions of Dease Inlet were mostly ice free with the remainder continuous ice. The shoreline of Smith Bay had up to 1 km of open water with the remainder continuous ice with melt on top. Harrison Bay and Kogru Peninsula had mostly shore fast ice with melt on top. There was open water to ≥ 15 km off

the Colville River Delta.

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

Waters from Thetis Island to the mainland and east to Oliktok Point were mostly ice free. Thetis Island had mostly shore fast ice to the north. Simpson Lagoon from Oliktok Point to Long Island (east) had mostly continuous ice cover with melt on top. Shore fast was north of islands. Gwydyr Bay had some open water at the mouth of the Kuparuk River with other areas ice covered with melt on top. Some open water occurred in near shore waters east to Foggy Island Bay. East of Foggy Island Bay there was continuous ice with up to 20 and 10 m open water south and north, respectively, of islands. The exception was from Challenge Island to North Star Island where up to 150 m of open water occurred to the south. Tigvariak Island and Lion Point had approximately 20 m of shore fast ice to the north and open water to the south. From Badami to Bullen Point there was 50-100m of open water along the mainland shore. East to Brownlow Point there was continuous shore fast ice along the mainland shore and around islands.

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

The lagoon off the Canning River was 10 percent ice covered with shore fast ice north of the barrier islands. Ice cover in lagoons east to Barter Island was up to 50 percent with those to the east mostly ice free. Camden Bay was ice covered except near small islands. Continuous shore fast ice was present north of barrier islands of Arey, Kaktovik, Jago, Tapkaurak and Oruktalik lagoons and east to the Canadian border. Demarcation Bay was approximately 85 percent ice covered with up to 200 m of open water along the east shore.

RESULTS/DISCUSSION

Common eider nests on islands of the central Beaufort Sea were being initiated from approximately 28 June to 5 July or later (D. Lacroix, Reed USGS-BRD). We have no nest chronology data for the Chukchi Sea coast with the exception of one nest near Point Lay which had a partial clutch of 3 eggs on 23 June (R. Ritchie, ABR, Inc.). It appears the 2002 survey took place when most pairs were engaged in nest initiation and early laying. Previous surveys (1999-2001) occurred during early incubation. Breeding pairs probably were established on prospective territories or had initiated nests during the 2002 survey and we believe indicated breeding pair data is appropriate for comparison to previous years.

A total of 4,449 common eiders, including 841 indicated breeding pairs, were observed in 2002 (Figure 1 and 2, Table 3 and 4). Total birds and indicated breeding pairs were up 56.8 and 24.4 percent, respectively, from the 2001 counts of 2,837 birds and 676 pairs. Progressively more severe sea ice conditions from 1999-2002 parallel increases in total common eiders observed on the survey (Table 6). Estimates of indicated breeding pairs from 1999-2002 varied from 572 to 863 ($\bar{738} \pm 139$ 1SD) and did not follow the same pattern as total birds. These data may indicate an actual increase in population size or short-stopping of Canadian migrants as well as variability in annual reproductive effort.

Flocked adults in 2002 totaled 3,083 (69.3% of total), an increase from the 1,280 (45.1% of total) observed in 2001. Males predominated in flocks in 2002 (1.7:1) and 2001 (2.7:1). Adult 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. No subadult males were observed in 2002; however, they made up 1.3, 0.3 and 0.4 percent of total observations in 1999, 2000 and 2001, respectively.

As in previous years (Dau and Taylor 2000; Dau and Anderson 2001), observations in 2002 showed indicated breeding pairs of common eiders were most numerous along the central Beaufort Sea coast (350 indicated pairs, 41.6% of total) and near Kasegaluk Lagoon (177 indicated pairs, 21.0% of total) (Tables 1, 2 and 4). In 2002, the relative proportion of total common eiders and indicated breeding pairs increased along the central Beaufort Sea coastline and at Kasegaluk Lagoon (Table 5).

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) Evaluate aerial videographic data from 1999-2001 to determine its usefulness in estimating numbers of nests on barrier islands along the central Beaufort Sea coastline.

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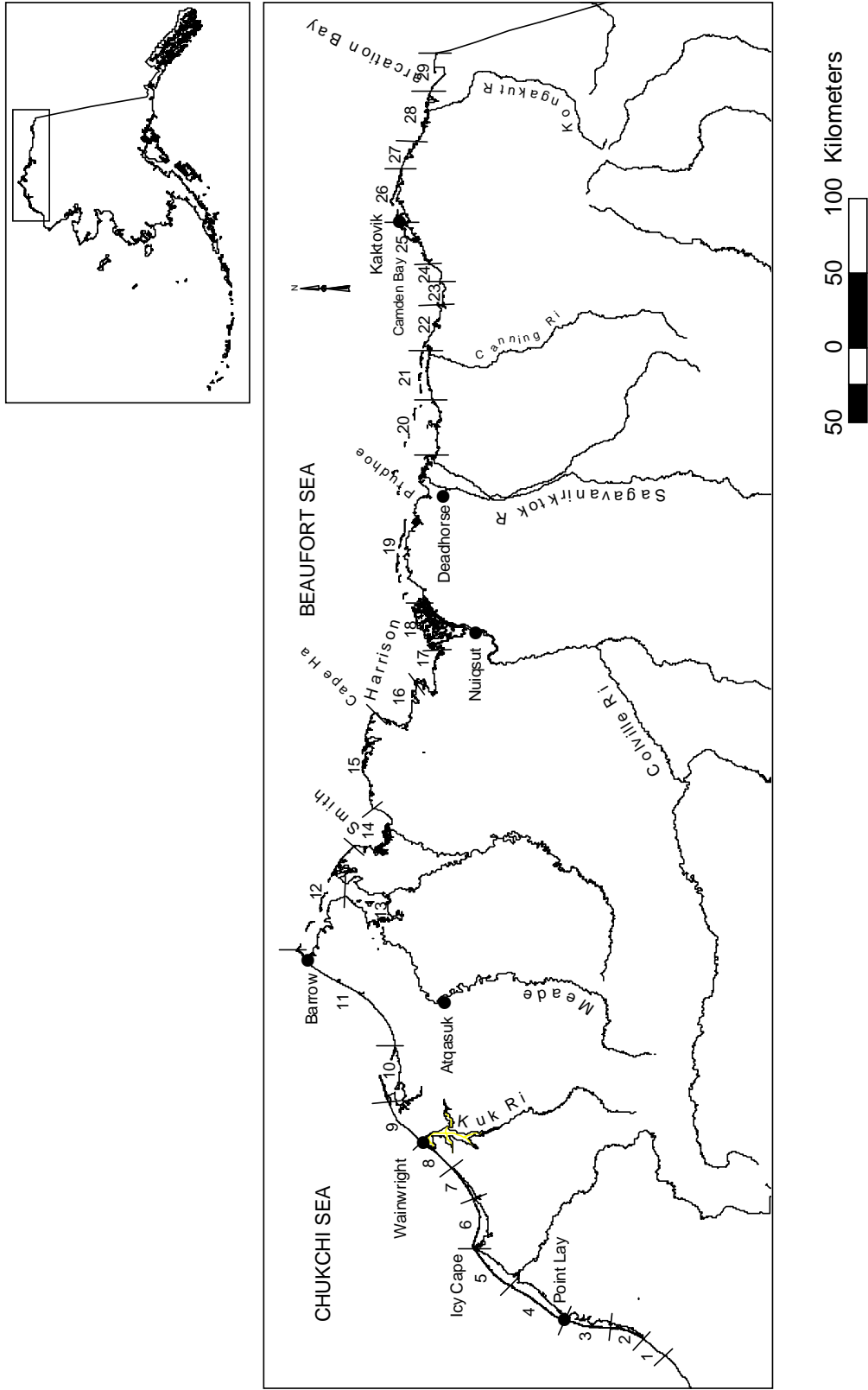


Fig. 1. Location of aerial survey segments searched for common eiders along the Arctic Coast, Alaska

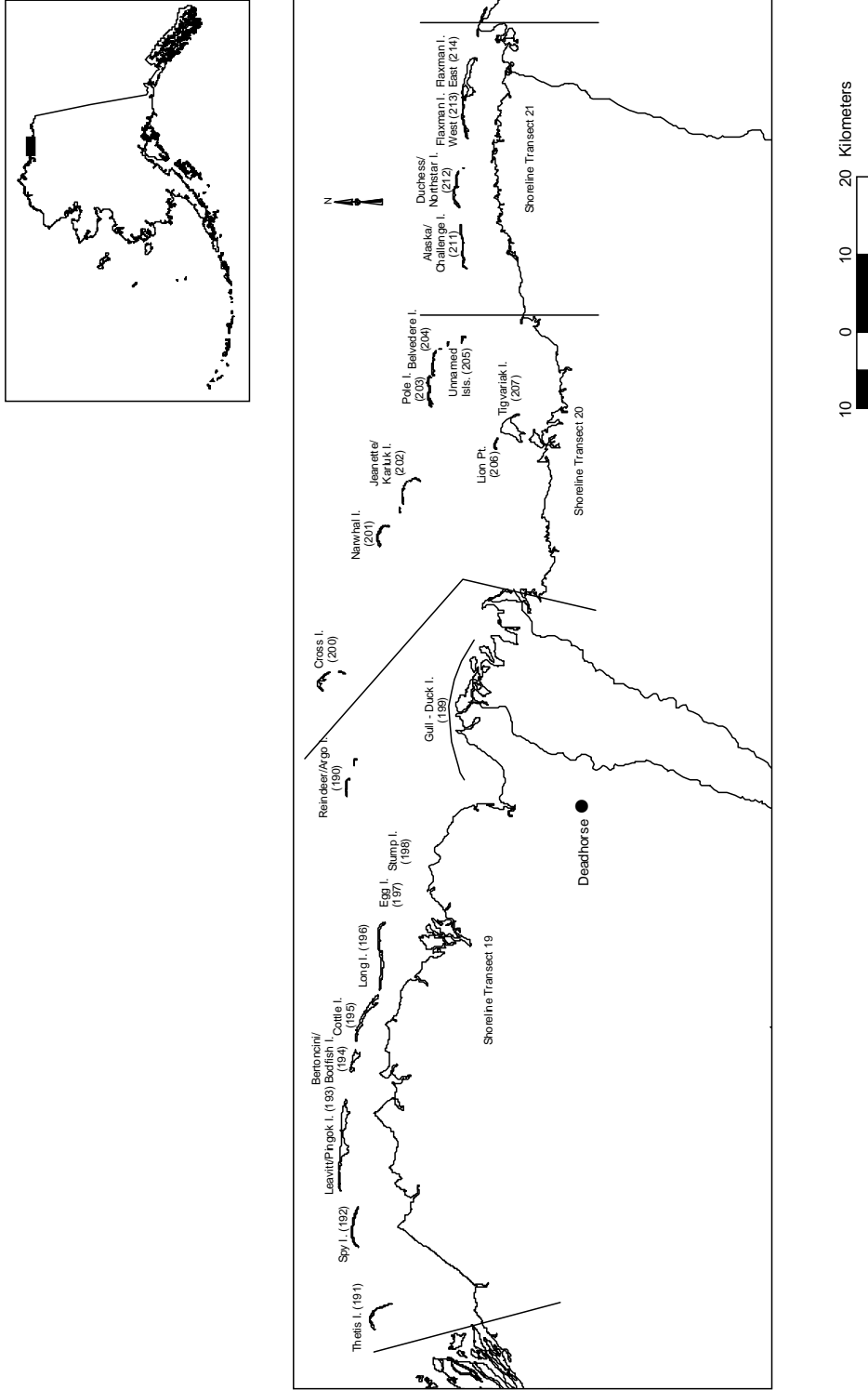


Fig. 2. Survey segments, including coastline and barrier islands, along the central Arctic Coastal Plain, Alaska.

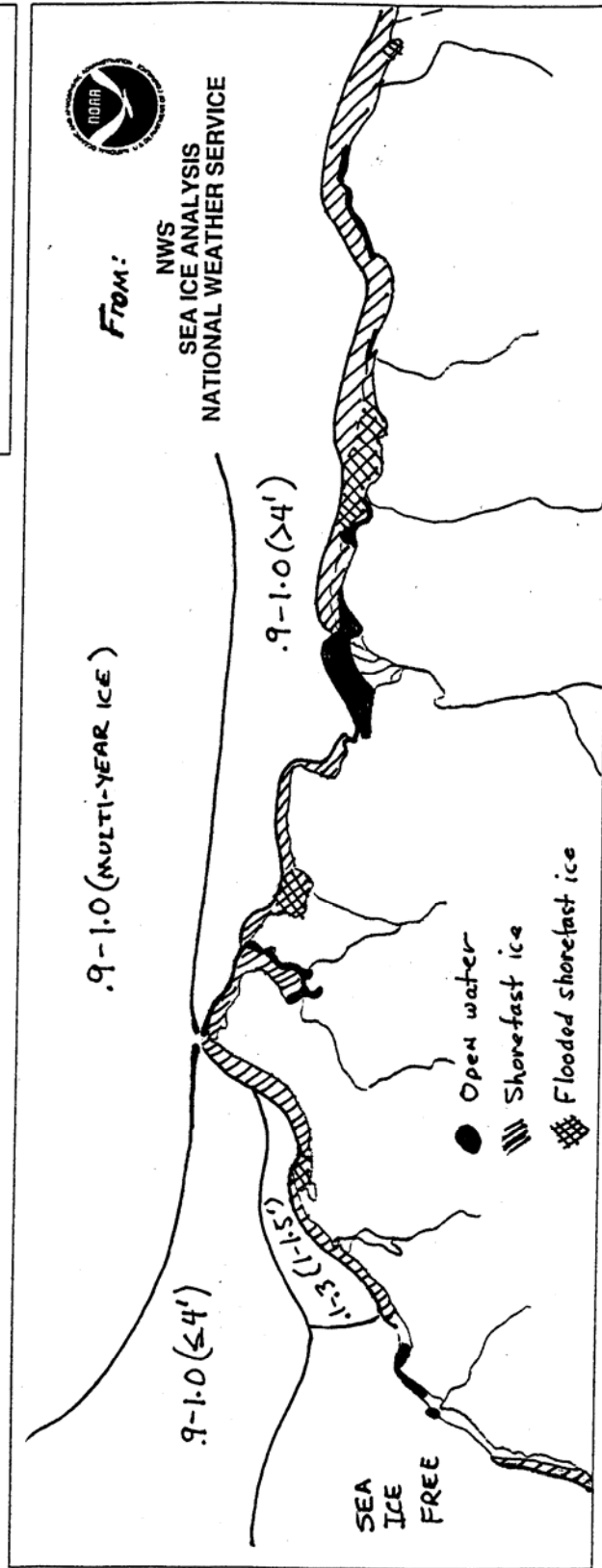
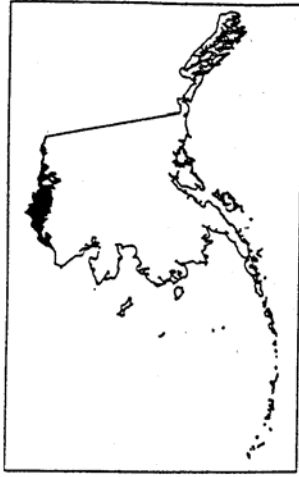


Figure 3. Sea ice conditions in late June along the Arctic Coastal Plain, 2002.

Table 1. Species totals by segment along barrier islands of the ACP, 25-29 June, 2002.

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																		2			2
BLBR							1			121				30							152
BLSC			30		5		450			1											486
COEH ¹	1		2	1	1			1	2			2			1	2		13			26
COEI	15	20	16	4	6	2	19	204	20	541	24	16	6	6	6	12	31	72	7	8	1035
CORA											2										2
GLGU	7	4	1	16			9	11	32	225	31		1	7	1		1	2	1		349
GRSC							2														2
KIEH ¹					1		3			1											5
KIEI		13		7		4	9	60		50							30	2		8	183
LTDU	36		63	131	8	410	24	497	55	147	38	115	1	98		35	121	86	2	110	1977
PALO		4	10	22	14	1	5	2	1	34		3	1	4		3	5	2	4	1	116
RBME		4	1							11										5	21
RTLO	1	4	4	3	1		1			14											28
SNGO										106											106
SNOW		1																			1
SPEI										4											4
SUSC				5			107	6		11										20	149
WWSC				2	2		8	20		202										27	261
YBLO					1					2									1		4

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

Table 2. Species totals by segment along ACP shoreline, 25-29 June, 2002.

Species	Segment Number																												Total		
	1	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
AGWT																6															6
ARTE			26	126	1	3						64			1							17							1		239
BLBR	5		30	5	206	181	47			18		55	3	15	18	34	130	398		22										1167	
BLGU												9																		9	
BLKI	2	4	50	21		10		3		2																				92	
BLSC					10															45	5									60	
CAGO															199	50	29	30	10	14	91									2	425
COEH ¹			3	6	2	3				19	1								5	84	3	1	5	22	1		24	10		189	
COEI	5	13	21	331	161	1092	170			239					31			4	55	138	171	13	14	231	106		292	112		3199	
COMU										40																				40	
GLGU	25	56	64	264	46	85	23	177	27	213	13	542	68	26	27	12	28	26	74	127	23	26	55	10	188	62	21	23	2	21	2354
GRSC			6		1	1							4								12		65				7		1		97
KIEH ¹			2		1	8	2	10			17						16			1	68	13		1				2		141	
KIEI			35	2	178	3575	1634	1612	75	1534	1455	1			15	3	43	8	4	113	84	105	2	2	16	36		4		10536	
MEGU				5				15							1															21	
NOFU										1																				1	
NOPI		142		80		156				1		1	4		45			12	5	32	3					35				516	
NOSH		2																												2	
LTDU	2	36	19	48	100	4	195	16	70	484	155	615	15	15	382	26	1		55	86	149	80	92		34	90	1	340	23	3133	
PAJA	1							3														1							2		7
PALO	4		3	4		8	3	1	2	236	50	22	2		3				18	19	8	7	1	1	7	7	2	8	5	421	
RBME	3											15			2		2		3	3		5			9	6		18	21		87
RTLO	3	2				2					4	8	2		5		2		3	1	1	2							1		36
SACR			2																												2
SAGU		8				12																									20
SNGO						2									20			10	26												58
SNOW										3			1													1					5
SPEI										4	6																				10
STEI										1																					1
SUSC		1		4											2	28			51	220	31		295	30	74	20		595			1351
TUSW		4	12										187					31		23	4			1					7		267
WFGO		29	3			50				2			20		75	7	14	54	69	20					3		45			34	425
WWSC			20																			42	7		111			992	52		1224
YBLO						8				4	1		1		2	1	3		4	1		2				2			1		30

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

Table 3. Total birds for all areas, ACP, 25-29 June 2002.

Species	Total Birds Observed		
	Shoreline	Barrier Isl.	Overall
AGWT	6		6
ARTE	239	2	241
BLBR	1167	152	1319
BLGU	9		9
BLKI	92		92
BLSC	60	486	546
CAGO	425		425
COEH ¹	189	26	215
COEI	3199	1035	4234
COMU	40		40
CORA		2	2
GLGU	2354	349	2703
GRSC	97	2	99
KIEH ¹	141	5	146
KIEI	10536	183	10719
LTDU	3133	1977	5110
MEGU	21		21
NOFU	1		1
NOPI	516		516
NOSH	2		2
PAJA	7		7
PALO	421	116	537
RBME	87	21	108
RTLO	36	28	64
SACR	2		2
SAGU	20		20
SNGO	58	106	164
SNOW	5	1	6
SPEI	10	4	14
STEI	1		1
SUSC	1351	149	1500
TUSW	269		269
WFGO	425		425
WWSC	1224	261	1485
YBLO	30	4	34

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

Table 4a. Common eider sex and age composition and totals in shoreline segments, ACP, 2002.

SEGMENTS	SINGLES			PAIRS		FLOCKED BIRDS		TOTAL ³
	Adult Male	Juv. Male	Female	No.	Indicated Total ¹	Total	Male:Female ²	
1	3			1	4			5
2	1			1	2	10	5:05	13
3	9			6	15	3	0:03	24
4	19			16	35	286	125:131	337
5	14		2	32	46	83	52:22:00	163
6	26		3	38	64	990	330:329	1095
7	12			4	16	150	60:60	170
8								
9								
10	32		4	51	83	120	25:43:00	258
11			1					1
12								
13								
14								
15								
16	3				3	28	4:24	31
17								
18								
19	4				4			4
20	11		3	22	33	2	0:02	60
21	16		1	42	58	121	0.145138889	222
22	25			19	44	111	18:03	174
23	3		1	5	8			14
24				7	7	5	5:00	19
25	30		3	27	57	166	142:24:00	253
26	23		1	12	35	59	55:00:00	107
27								
28	27		2	17	44	253	218:32:00	316
29	12		1	17	29	75	53:13:00	122
181								

¹ Single males+pairs = Indicated total pairs.

² Flocks from which sex ratios were obtained.

³ Total= singles+2x pairs+ flocks.

Table 4b. Common eider sex and age composition and totals in barrier island segments, ACP, 2002.

SEGMENT	SINGLES			PAIRS		FLOCKED BIRDS		TOTAL ³
	Adult Male	Juv. Male	Female	No.	Indicated Total ¹	Total	Male:Female ²	
190	1		1	7	8			16
191	4			8	12			20
192			2	8	8			18
193			1	2	2			5
194	4		1	1	5			7
195				1	1			2
196	2			3	5	11	11:00	19
197	24		1	30	54	120	95:00:00	205
198	6		2	7	13			22
199	21			20	41	480	330:100	541
200	8			8	16			24
201			2	8	8			18
202				3	3			6
203				3	3			6
204	2		1	2	4			7
205	2		2	5	7			14
211	9			11	20			31
212			3	36	36	10	0:10	85
213	1			3	4			7
214	2			3	5			8

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 common eiders along the ACP, 2001-2002.

AREA (Segment Numbers)	2001		2002	
	Total Birds(%)	Ind. Pairs(%)	Total Birds(%)	Ind. Pairs(%)
Kasegaluk Lagoon (2-7)	747 (26.3)	165 (24.4)	1802 (40.5)	177 (21.0)
Peard Bay (10)	288 (10.2)	73 (10.8)	258 (5.8)	83 (9.9)
Central Beaufort Sea Coast (18-21, 181-214)	531 (18.7)	277 (41.0)	1347 (30.3)	350 (41.6)
Canning R.- Demarcation Bay (22-29)	1242 (43.8)	158 (23.4)	1005 (22.6)	224 (26.6)
Other Areas	29 (1.0)	3 (0.4)	37 (0.8)	7 (0.8)
TOTALS	2837 (100.0)	676 (100.0)	4449 (100.0)	841 (100.0)

Table 6. Species totals for all areas, ACP, 1999-2002.

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