

**Aerial population survey of common eiders and other waterbirds in near shore waters and along barrier islands of the Arctic Coastal Plain of Alaska, 24-26 June 2008**

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## SUMMARY

The tenth consecutive aerial survey of common eiders and other waterbirds along the coastline of the Arctic Coastal Plain (ACP) of Alaska, including barrier islands, was conducted from 24 to 26 June 2008. Observations were made from an amphibious Cessna 206 (N61599) by a pilot/observer and right seat 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 linear kilometers, respectively, of barrier island and peninsular habitats off Kasegaluk Lagoon and from Point Barrow to Demarcation Bay. Shorefast ice along the Chukchi Sea coast was much more extensive in 2008 than 2007 and fog prevented a complete survey. Beaufort Sea ice cover was less extensive in 2008 than in 2007 and, with the exception of southern Dease Inlet, the area was completely surveyed. River mouths and most lagoons were either ice free or had considerable open water and in addition, there was a considerable increase in open water along exposed shorelines in 2008. As in previous years most near shore sea ice was deteriorating rapidly and was usually covered with melt water.

A total of 1,774 common eiders, including 960 indicated breeding pairs (pairs+single adult males), were observed in 2008. Of these, 1,761 birds and 955 pairs observed within areas surveyed during previous years were used for estimating population trends. Total observed and indicated breeding pairs were up 20.5 and 58.1 percent, respectively, from comparable areas flown 2007 and down 26.0 and up 13.9 percent, respectively, from the long-term averages for these areas (1999-2007). Total common eiders shows considerable annual variation with a positive annual trend of 0.2 %/year. Number of indicated breeding pairs has showed less variability and is increasing at 4.7%/year. In 2008, indices of total birds and indicated breeding pairs increased along the central and eastern Beaufort Sea coast in comparison to 2007 while at Kasegaluk Lagoon there was a decline in total birds and increase in indicated pairs. Fog precluded surveying of some segments along the Chukchi Sea coast (i.e. Segments 8-11) and minimally affected others (i.e. portions of Segments 5-7). Proportional changes in the common eider population were calculated based on areas actually flown in 2008. Numbers of other primary waterbird species observed in 2008 were: long-tailed duck 2,249, glaucous gull 2,601, greater white-fronted goose 1,107, surf scoter 3,570, Pacific brant 2,669, king eider 2,289, Canada goose 266, lesser snow goose 2,145, greater scaup 483, and northern pintail 1,381. The low numbers of yellow-billed loons (n=18) observed in 2008 (1999-2007 avg. 52.4) likely resulted from favored areas along the Chukchi Sea coast being obscured by fog.

## INTRODUCTION

This report summarizes the tenth consecutive year of aerial survey efforts with goals of estimating size, trend, demography, and distribution of the breeding population of common eider along the coastline of the Alaskan ACP (Dau and Taylor 2000a, 2000b, Dau and Anderson 2001, 2002, Dau and Hodges 2003, Dau and Larned 2004, 2005, 2006, 2007). Also indexed were habitat conditions within the survey area. The survey area extends north and east from Omalik Lagoon along the Chukchi Sea to Point Barrow then east along the Beaufort Sea to the Canadian border (Figures 1 and 2).

## METHODS

The survey is timed to coincide with egg laying and early incubation when pair bonds are intact and males remain in the vicinity of breeding sites. Available literature summarized by Johnson and Herter (1989), subsequent studies, and this survey were used to estimate breeding phenology and appropriate survey timing. Observations were made from an amphibious Cessna 206 flown at approximately 100 knots and an altitude of 45 meters ASL/AGL. Observations, made from both sides of the aircraft by the pilot/observer (left) and observer (right), were entered into laptop computers using remote microphones. A custom record program interfaced with the aircraft Global Positioning System (GPS), geo-referenced observations. The survey area extended up to 1.6 km seaward of terrestrial habitats (i.e. mainland, peninsula and barrier island shorelines) when open water existed. Deviations were made when flocks were detected farther offshore (i.e.  $\leq 3$  km). Flight routes followed shorelines and included all island, peninsula, bay and lagoon habitats as well as near shore waters. Flight tracks were periodically checked on laptop computers using moving map programs to help ensure complete coverage of the survey area.

The survey area includes 30 mainland shoreline segments and 22 islands or island groups (Figs. 1 and 2). Maps (either 1:250,000 or 1:63,360 scale condensed sequentially on flip-charts) were consulted during the survey primarily to identify segment start and stop points. Observations on habitat, survey and ice conditions were made for each survey segment. Satellite images and graphic sea ice analyses prepared by the National Weather Service to portray ice cover during the survey (Figure 3). Whenever possible, sex and age (i.e. adult or subadult) of single birds and composition of flocks were determined for waterfowl species. Flocks that could be identified as assemblages of single adult males or pairs were recorded as singles or pairs as appropriate. Observations of common eiders and other species were summarized by survey segment (Tables 1 and 2) and for the total survey area (Table 3). The distribution, sex and age composition and numbers of common eiders were recorded by survey segment and summarized to provide a total observed population size (singles+2x pairs+birds in flocks) and the number of indicated breeding pairs (single males + pairs) (Tables 4a-b and 5). We assumed single male common eiders represented breeding pairs with females undetected at nests. Single males were not doubled to estimate population size because we also count single females which are excluded in standardized USFWS pair surveys (USFWS and CWS 1987).

## STUDY AREA/CONDITIONS

Physical descriptions of individual survey segments and the following groupings of segments are described by Dau and Taylor (2000). Ice conditions based on satellite imagery and National Weather Service analyses along with observed conditions encountered during the survey in 2008 were:

### *Omalik Lagoon to Point Barrow (Segments 1-11)*

Omalik Lagoon was ice free. Kasegaluk Lagoon north to Sitkok Point had approximately

2% ice cover and north to Point Lay 15% of the lagoon was ice covered. Kasegaluk Lagoon from Point Lay to Utukok Pass (Segment 4) and mid-way north in Segment 5 was ice free. North to Icy Cape, lagoon ice increased from 50 % to 80-90%. From Icy Cape south to Point Lay variable shorefast ice to three miles seaward was present with open water beyond. Icy Cape to Nokotlek Point was 80-95 % ice covered (Segment 6) as was the remainder of the north portion of Kasegaluk Lagoon (Segment 7) with continuous shorefast ice seaward. Shorefast ice with little open water persisted north to Point Barrow (Segments 8-11). Peard Bay appeared 98% ice covered although fog prevented surveying the area. Fog also prevented surveying near Icy Cape (parts of Segments 5- 6) and all of Segments 8-11 which were therefore not included in the analysis. Only the largest onshore lakes had remnant ice and the tundra was snow free. With the exception of patchy to continuous fog, survey conditions were good with overcast ceilings of  $\leq 760$  m and northerly winds of 10-20 knots. Temperatures were 35 to 40°F.

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

Only the northern portion of Dease Inlet (Segment 13) was surveyed due to extensive ice cover to the south. Shorefast ice was continuous north of spits and barrier islands of Elson Lagoon with 10-20 m open water or water over ice along the shore. South of these spits and islands there was 200-800 m of open water. Elson Lagoon was 98 % ice covered with extensive surface melt. Smith Bay (Segment 15) had 100 m of open water along the west shore. The eastern shore of Smith Bay had 20 m of open water with a narrow band of broken, melting ice and open water beyond. Drew Point had 5-8 km of open water decreasing to 1.5 km to the east and then mostly shorefast ice to Cape Halkett. Pokok Bay was ice free and there was a 10-40 m band of melt water along the coast east and west to Cape Halkett. Harrison Bay (Segment 16) had 40-100 m of open water along the west shore with melt water covered ice beyond. Kogru Inlet was 50% ice covered and there was open water from Eskimo Islands to the Colville River Delta. Colville River channels were ice free as was the coastline to 10-12 km offshore and lakes were ice free. There was no snow cover in any segments east of Point Barrow. Survey conditions were good with high scattered ceilings and occasional moderate glare. Winds were northerly at 5-15 knots and temperatures increased from 45° to 58°F throughout the day. Visibility was unrestricted to >80 km.

*Colville River Delta to the Canning River Delta (Segments 19-21, 190-214)*

There was open water west of a line from Thetis Island to Oliktok Point. Simpson Lagoon east to Gwydyr Bay had 60-95% ice cover with surface melt water except the mouth of the Kuparuk River was ice free. Eastward there was 200 m of shorefast ice and overall 40% ice cover of Simpson Lagoon. North of barrier islands (Thetis Island to Long Island) there was shorefast ice with 0-20 m of open water near shore. Open water was present around both Stump and Egg islands. Prudhoe Bay had open water south of a line from West Dock to the Niakuk Islands with melt covered ice to the north. From Niakuk Islands east to Tigvariak Island there was 800-1200 m open water nearshore and patchy ice beyond. Tigvariak and Lion Point islands had 10 m open water to the north with continuous ice covered with melt water beyond. Stefansson Sound from Mikkelsen

Bay east to Brownlow Point had 90% shorefast ice with surface melt. Point Thompson and Bullen lagoons were ice free with a band of 10-50 m of open water nearshore. All barrier islands had shorefast ice to the north and there was 1.5-3 km openwater south and east of Flaxman Island. Survey conditions were good with moderate glare, high scattered ceilings and NNW winds of 15 knots. Temperature was 45°F.

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

The lagoon from Brownlow Point to the Canning River mouth was ice free except for the eastern 1/3 which had 50% coverage of ice covered by melt water. North of barrier islands was 50% ice cover to 8 km offshore then continuous melting ice. Camden Bay was 60-80% ice covered with 1.5-2.5 km of open water along the shore. Lagoons from Anderson Point to Demarcation Bay were ice free with the exception of Nuvagapak Lagoon which had 80% coverage of deteriorating ice. Offshore was 30-50% open water increasing to 90% to  $\geq 15$  km north of Demarcation Bay. Demarcation Bay had 800 m of shorefast ice along the west shore resulting in overall 10% ice cover of the bay. Survey conditions were good with moderate glare, high scattered ceilings and northerly winds of 8-20 knots. Temperature was 55-65°F.

## **RESULTS/DISCUSSION**

A total of 1,761 common eiders, including 955 indicated breeding pairs, were observed in survey segments comparable to 1999-2007 efforts (Tables 4a-b and 5). Total birds and indicated breeding pairs increased by 20.5 and 58.1 percent, respectively, from 2007 counts (of comparable areas) of 1,461 birds and 604 pairs. Total birds and indicated breeding pairs in 2008 declined 26.0 and increased by 13.9 percent, respectively, from the 1999-2007 averages of  $2,378 \pm 302$  (1SD, range 1,017-4,154) birds and  $839 \pm 258$  (1SD, range 522-1,267) pairs. The decline in total birds and increase in indicated breeding pairs of common eiders from 2007 resulted from increases along the central and eastern Beaufort Sea coast where habitat conditions were good (Table 5, Figure 4). Total birds declined in Kasegaluk Lagoon but indicated breeding pairs slightly increased and habitat conditions appeared unchanged from 2007. Increasing trends in numbers of both total birds (0.2%/yr) and indicated breeding pairs (4.7%/yr) have been documented with inter-annual estimates of pairs being least variable (Figure 5).

Flocked birds in 2008 totaled 465 (26.2% of total), which is a proportional decrease in comparison to 2007 (902 birds, 46.6% of total). This may indicate that Canadian breeders had passed the area prior to our survey. Brown plumaged birds predominated in flocks in 2008 but overall, adult males have predominated in eight of ten years (Table 7). No subadult male were observed in 2008 or 2007, otherwise, 19 (0.6% of total observations) were observed in 2006, two (0.1%) in 2005, 30 (1.3%) in 2004 and none in 2002 or 2003. When observed, subadult common eiders have been primarily along the Chukchi Sea coast and their overall low occurrence suggests that breeding adults predominate along the ACP of Alaska.

The extent of ice cover and the presence and distribution of offshore leads may affect migratory phenology of common eiders along the ACP. The potential “short-stopping” of Canadian migrants in some years may be an important factor affecting total numbers of birds observed during our survey (Figure 5). However, our subjective observations of ice conditions are all within 10 km of shore and we are unable to determine the presence of leads further offshore and to what extent common eiders may use them.

The number of indicated breeding pairs is believed to be indicative of reproductive effort along the ACP of Alaska and increasing numbers (i.e. 4.7%/year) exhibit less variability than the estimates of total birds (Table 5, Figures 4 and 5). To better understand trends in total birds and breeding pairs it would be valuable to understand the migratory phenology and size of the larger Canadian component of the Pacific population. With respect to annual changes in distribution of Alaska breeders, it would be important to 1) evaluate fidelity of individual pairs to breeding sites and 2), if individual pair distribution varies in relation to nesting conditions, quantify the effect on annual productivity. From 2000-2002, Flint et al. (2003) documented low productivity and recruitment of common eiders at some sites along the coast of the central Beaufort Sea and suggested the population would decline unless supplemented by immigration or infrequent years of high recruitment.

Preferred nesting sites are on barrier islands and peninsulas where driftwood, detritus and vegetation provide nest cover. Subjective estimates of the amounts of driftwood (i.e. none, low, moderate, high) have been made for central Beaufort Sea barrier islands as part of this survey (C. Dau, unpublished). In 2008, driftwood increased 13.8 percent overall, increasing on 6 islands, decreasing on 5 remaining the same on 13 in relation to observations from 1999-2007. Storm surges, wind and tide erode vegetation and can add or remove driftwood which in turn affects the suitability of breeding sites to nesting common eiders. Our subjective observations suggest nesting conditions for common eiders along the central Beaufort Sea coast in 2008 was slightly better than in 2007, based on the increased number of indicated breeding pairs the relative amount of driftwood essential for nest sites.

## **RECOMMENDATIONS**

- 1) Continue annual aerial survey to quantify and monitor the distribution, abundance, demographics, and habitat use of the Alaska ACP by common eiders. Distribution, abundance and demography may correspond to annual habitat conditions hence; continuation of this survey will help document long-term patterns of use.
- 2) Encourage the collection of ground survey data of birds and nests to aid in refining survey timing and potentially provide air:ground visibility indices.
- 3) Continue to explore ocular and photographic techniques to index nesting conditions (i.e. the amount and distribution of driftwood).

- 4) Encourage the initiation of comparable breeding population surveys of common eiders within the range of the Pacific population in the Canadian Arctic.

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Table 1. Species totals by segment along barrier islands of the ACP, 24-26 June, 2008.

Species	Segment Number																				Total			
	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	211	212		213	214	
ARTE			1		1						4	10			3	10				179				<b>208</b>
BLBR							1	1		11							4							<b>17</b>
CAGO																	1							<b>1</b>
COEH <sup>1</sup>							1			1									1			4		<b>7</b>
COEI	3	2	5	9	2	2	15	167	58	65	22	31	22			51	20	7	181	16	35			<b>713</b>
CORA			2		1																			<b>3</b>
GLGU	9	5	3	2	68	5	7	32	26	153	28	2	3			10	15		17	1	1			<b>387</b>
GRSC										20							25					7		<b>52</b>
GYRF				1																				<b>1</b>
KIEI		4		10		2		2	1	1						6	13		23			1		<b>63</b>
LTDU		1		15			6		1							452		30	134					<b>639</b>
PAJA				5																				<b>5</b>
PALO				2		1	2	3				2												<b>10</b>
RBME		14		16	6	1	15								2	50			6			19		<b>129</b>
SAGU												2						1	3					<b>6</b>
LSGO										1150														<b>1150</b>
SNOW					1																			<b>1</b>
SUSC				50												150			370		750			<b>1320</b>
TUSW																	4				1			<b>5</b>
WFGO				26	26																			<b>52</b>
WWSC																6								<b>6</b>
YBLO								1																<b>1</b>

<sup>1</sup> COEH = common eider hens in singles and flocks.

Table 2. Species totals by segment along ACP mainland shoreline, 24-26 June, 2008.

Species	Segment Number <sup>2</sup>																							Total		
	1	2	3	4	5	6	7	12	13	14	15	16	17	19	20	21	22	23	24	25	26	27	28		29	181
ARTE	10	91	180	395	2		141	223													2					1044
BLBR	3	697	296	708	112	51	95	25	105	103	57	15	225	59	63					10	7				21	2652
BLSC	9	1																		5						15
CAGO										62	160	20	15	3	1			2		2						265
COEH <sup>1</sup>				4		2	2				4					3				2	2		2	3		24
COEI	2		48	210	21	45	32				7			33	42	90	29	33	31	139	169	2	29	68		1030
COME																	1							12		13
GLGU	118	321	37	299	224	32	25	53	61	37	19	12	105	93	60	24	111	59	4	241	110	23	46	68	20	2202
GRSC	2									145				20			20	25		100	34	10	75			431
KIEH <sup>1</sup>			3										2	3		2										10
KIEI			33	1248	705				2	10	16	36	13	4	81	2	6		23	28			10			2217
LSGO		204	127						30	70			10	507	34					1					12	995
LTDU	33	161	79	255			65	269	1	4	67	3		6	11	1	156	53	151	12	81	2	157	5	1	1573
NOPI		151	160	60				6	4	251	73		15	218	16				5		3		195	2	222	1381
PAJA		71	3	2	1		1	1					2			1					1					83
PALO	1	1		1		2	1	16	1	3	15	3	9	10	1	2	3	1		4	3	3	7	1		88
POJA	1	1					3	1		2																8
RBME	28		6	5	18		91			8	2		1	16	5	7	10	32		21	217	15	74	70		626
RTLO	2	2	3	14	10			30	1	2	5	2		1			4		2	2	3	2	1	2		88
SAGU								97			40															137
SMSH				20					1																	21
SNOW																						1				1
SPEI				15							7															22
STEI		2																								2
SUSC				20										600		20	60	881		155	514					2250
TUSW		4	1		1		1			11			2	1	1	2	1	2	5		9	7	1		1	50
USCO <sup>1</sup>																			15							15
WFGO	103	120	14	1		4	15	1	10	6	59	123	423	74	10			6	12	8	6	15	35	6	4	1055
WWSC											1			6			25	30		28	21	40	284	185		620
YBLO		1					7						7	1									1			17

<sup>1</sup> COEH, KIEH = common and king eider hens in singles and flocks. USCO = unidentified scoter.<sup>2</sup> Segments 8-11, 18 not surveyed.

Table 3. Total birds for all areas, ACP coastline, 24-26 June 2008.

Species	Mainland <sup>3</sup>	Barrier Isl.	Total
ARTE	1044	208	<b>1252</b>
BLBR	2652	17	<b>2669</b>
BLSC	15		<b>15</b>
CAGO	265	1	<b>266</b>
COEH <sup>1</sup>	24	7	<b>31</b>
COEI	1030	713	<b>1743</b>
COME	13		<b>13</b>
GLGU	2202	387	<b>2589</b>
GRSC	431	52	<b>483</b>
GYRF		1	<b>1</b>
KIEH <sup>1</sup>	10		<b>10</b>
KIEI	2217	63	<b>2280</b>
LESG	995	1150	<b>2145</b>
LTDU	1573	639	<b>2212</b>
NOPI	1381		<b>1381</b>
PAJA	83	5	<b>88</b>
PALO	88	10	<b>98</b>
POJA	8		<b>8</b>
RBME	626	129	<b>755</b>
RTLO	88		<b>88</b>
SAGU	137	6	<b>143</b>
SMSH	21		<b>21</b>
SNOW	1	1	<b>2</b>
SPEI	22		<b>22</b>
STEI	2		<b>2</b>
SUSC	2250	1320	<b>3570</b>
TUSW	50	5	<b>55</b>
USCO <sup>1</sup>	15		<b>15</b>
WFGO	1055	52	<b>1107</b>
WWSC	620	6	<b>626</b>
YBLO	17	1	<b>18</b>

<sup>1</sup> COEH, KIEH = common and king  
eider hens in singles and flocks.

<sup>2</sup> USCO = unidentified scoter.

<sup>3</sup> Mainland segments 8-11, 18 not surveyed.

Table 4a. Common eider sex and age composition and totals in shoreline segments, ACP, 2008.

SEGMENT	SINGLES		PAIRS		JUVENILE MALES	FLOCKED BIRDS		TOTAL OBSERVED <sup>3</sup>
	Adult Male	Female	No.	Indicated Total <sup>1</sup>		Total	Male:Dark Birds <sup>2</sup>	
1			1	1				2
2								0
3	10		7	17		24	6:8	48
4	42	4	23	65		118	22:41	210
5 <sup>4</sup>	13		4	17				21
6 <sup>4</sup>	35	2	5	40				47
7 <sup>4</sup>	14	2	9	23				34
8 <sup>5</sup>								Not surveyed
9 <sup>5</sup>								Not surveyed
10 <sup>5</sup>								Not surveyed
11 <sup>5</sup>								Not surveyed
12								0
13								0
14								0
15	1	4	3	4				11
16								0
17								0
18 <sup>6</sup>								Not surveyed
19	21		6	27				33
20	18		12	30				42
21	36	3	27	63				93
22	13		8	21				29
23	6		6	12		15	8:7	33
24			3	3		25	12:13	31
25	38	2	31	69		39	15:9	141
26	54	2	40	94		35	18:17	171
27			1	1				2
28	11	2	9	20				31
29	10	3	4	14		50		71
181								0

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

<sup>2</sup> Flocks from which sex ratios were obtained. Dark birds = females and subadults.

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

<sup>4</sup> Some obscuration by fog (est. 2% of Segment 5 and 5% of Segments 6-7).

<sup>5</sup> Not surveyed due to fog.

<sup>6</sup> Omitted.

Table 4b. Common eider sex and age composition and totals in barrier island segments, ACP, 2008.

SEGMENT	SINGLES		PAIRS		JUVENILE MALES	FLOCKED BIRDS		TOTAL OBSERVED <sup>3</sup>
	Adult Male	Female	No.	Indicated Total <sup>1</sup>		Total	Male:Dark Birds <sup>2</sup>	
190	1		1	2				3
191			1	1				2
192	3		1	4				5
193	1		1	2		6		9
194			1	1				2
195			1	1				2
196	13	1	1	14				16
197	58		12	69		85		167
198	44		7	51				58
199	35	1	15	50				66
200	10		6	16				22
201	27		2	29				31
202	7		1	8		13		22
203								0
204								0
205								0
206	11		20	31				51
207	8		6	14				20
211	5		1	6				7
212	86	1	20	106		55		182
213	8		4	12				16
214	9	4	13	22				39

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

<sup>2</sup> Flocks from which sex ratios were obtained. Dark birds = females and subadults.

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

Table 5. Proportional distribution of totals and indicated pairs of common eiders along the ACP, 1999-2008.

AREA (Nos.)	1999 (%)		2000 (%)		2001 (%)		2002 (%)		2003 (%)		2004 (%)		2005 (%)		2006 (%)		2007 (%)		2008 <sup>1</sup> (%)	
	Total	Pairs	Total	Pairs	Total	Pairs	Total	Pairs	Total	Pairs	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)	1553 (51.2)	414 (30.9)	664 (25.7)	317 (28.3)	642 (20.7)	223 (18.5)	596 (30.8)	142 (21.0)	364 (20.5)	162 (16.9)
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)	109 (3.6)	48 (3.6)	81 (3.1)	42 (3.7)	531 (17.1)	83 (6.9)	230 (11.9)	42 (6.2)	No survey	No survey
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)	784 (25.8)	512 (38.2)	733 (28.4)	375 (33.5)	620 (20.0)	437 (36.2)	519 (26.8)	289 (42.8)	888 (50.1)	559 (58.2)
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)	523 (17.2)	341 (25.4)	1084 (42.0)	377 (33.6)	1239 (39.9)	445 (36.9)	346 (17.9)	173 (25.6)	509 (28.7)	234 (24.4)
Other areas (1,8-9,11-17)	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)	64 (2.1)	25 (1.9)	19 (0.7)	10 (0.90)	70 (2.3)	19 (1.6)	245 (12.7)	30 (4.4)	13 (0.7)	5 ( $<0.5$ )
TOTALS	1353	572	2649	863	2837	676	4449	841	2123	874	3033	1340	2581	1121	3102	1207	1936	676	1774	960

<sup>1</sup> Segments 8-11, 18 not surveyed in 2008.

Table 6. Species totals for all areas, ACP, 1999-2008.

Species	Total Birds Observed									
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008 <sup>7</sup>
AGWT	0	0	0	6	0	0	0	3	0	
AMWI	0	0	0	0	0	10	2	0	5	
ARTE	901	127	1530	241	671	1628	654	407	690	1252
BLBR	2329	1411	2215	1319	2656	3836	1843	3242	2254	2669
BLGU	1	8	18	9	823	4	1	3	0	15
BLKI	0	0	29	92	0	15	3	10	0	
BLSC	3	0	0	546	0	14	35	29	10	
CAGO	1554	659	465	425	823	577	794	1391	293	266
CEJV <sup>1</sup>	18	8	10	0	0	30	2	19	0	
COEH <sup>2</sup>	92	330	295	215	114	88	60	176	59	31
COEI <sup>3</sup>	1243	2311	2532	4234	2009	2915	2519	2907	1877	1743
COGO	0	0	0	0	0	0	0	0	1	
COLO	0	0	1	0	2	0	2	5	0	
COMU	0	0	0	40	0	0	0	0	0	
COME	0	0	4	0	0	0	0	65	4	13
CORA	0	0	1	2	2	1	0	0	0	3
EIHE <sup>2</sup>	0	0	0	0	0	0	0	5	0	
GOEA	0	0	0	0	0	0	0	1	0	
GLGU	4462	3345	5499	2703	7031	5478	3959	1988	2077	2601
GRSC	1011	944	744	99	495	408	602	905	840	483
GWFG	521	1269	623	425	255	1411	454	2540	1703	1107
GYRF	0	0	0	0	0	1	0	1	0	1
HEGU	0	0	0	0	0	0	0	2	0	
JAEG	0	12	0	0	1	4	0	5	0	
KEJV <sup>1</sup>	0	0	0	0	0	1	0	1	0	
KIEH <sup>2</sup>	9	61	48	146	35	37	24	72	13	10
KIEI	892	427	1716	10719	5334	2327	1013	3067	1664	2279
LGSH	0	0	0	0	7	0	2	0	0	
LSGO	124	986	192	164	454	468	774	1060	2279	2145
LTJA	1	3	0	0	1	5	0	1	0	
LTDU	4890	5726	5544	5110	9724	3527	3972	7776	3449	2249
MEGU	0	0	8	21	0	0	0	0	0	
MESH <sup>4</sup>	0	0	62	0	0	0	0	0	0	
NOFU	0	0	0	1	0	0	0	0	0	
NOPI	1268	779	2752	516	879	751	553	1651	1366	1381
NSHO	0	0	0	0	0	0	0	8	0	
PAJA	4	9	81	7	10	3	5	19	36	88
PALO	443	429	208	537	325	315	166	1272	461	98
POJA	0	3	0	0	4	0	0	10	2	8
RBME	710	1985	194	108	265	643	495	633	169	755
RLHA	0	0	0	0	0	0	0	1	1	
RTLO	85	198	154	64	233	159	81	253	117	90
SACR	2	2	2	2	1	0	0	0	0	
SAGU	99	4	442	20	185	106	83	210	161	143
SMSH <sup>4</sup>	0	3	0	0	0	4	8	228	0	21
SNOW	14	0	1	6	4	0	15	117	2	2

Table 6 (continued). Species totals for all areas, ACP, 1999-2008.

Species	Total Birds Observed									
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008 <sup>7</sup>
SPEH <sup>2</sup>	2	0	0	0	0	1	0	7	0	
SPEI	11	15	45	14	8	13	18	108	12	22
STEI	0	0	2	1	0	0	0	5	2	2
STEH <sup>2</sup>	0	0	0	0	0	0	6	0	0	
SUSC	2073	11113	2644	1500	5764	1543	3220	5591	1190	3570
TUNE <sup>5</sup>	9	0	0	1	1	0	0	0	0	
TUSW	32	84	30	269	49	50	83	180	75	55
UNEI <sup>6</sup>	0	0	0	0	0	0	0	0	150	15
WWSC	128	765	1622	1485	931	1159	1235	3775	94	626
YBLO	40	51	40	34	48	91	23	99	46	18

<sup>1</sup> CEJV, KEJV = COEI and KIEI juveniles in singles and flocks.

<sup>2</sup> COEH, KIEH, SPEH, STEH = common, king, spectacled or Steller's eider hens in singles and flocks

(EIHE = unidentified eider hen).

<sup>3</sup> COEI = single adult males and birds in pairs and flocks.

<sup>4</sup> MESH = medium shorebird; SMSH = small shorebird.

<sup>5</sup> TUNE = tundra swan nest.

<sup>6</sup> UNEI= unidentified eider, USCO= unidentified scoter.

<sup>7</sup> Mainland segments 8-11, 18 not surveyed.



Table 7. Common eider flock composition, Alaska ACP, 1999-2008.

Year	Flock Total	Total Classified	Adult Males	Brown Birds <sup>1</sup>	Ratio <sup>2</sup>
1999	546	351	129	222	0.6:1
2000	1469	1191	613	578	1.1:1
2001	1785	1546	930	616	1.5:1
2002	3083	2423	1533	890	1.7:1
2003	815	363	189	174	1.1:1
2004	1033	991	665	326	2.0:1
2005	998	743	468	275	1.7:1
2006	1159	329	171	158	1.1:1
2007	902	591	333	258	1.3:1
2008	465	176	81	95	1:1.2

<sup>1</sup> Brown Birds = Females and Subadults.

<sup>2</sup> Adult Male:Brown  
Birds.

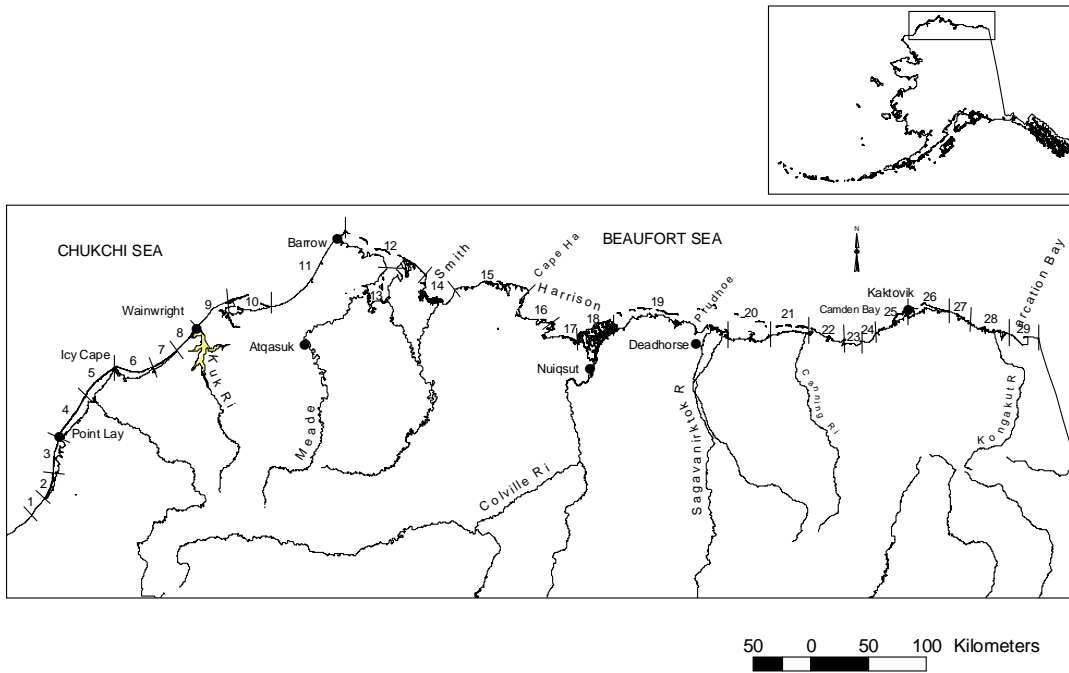


Fig. 1. Location of aerial survey segments searched for common eiders along the Arctic Coast, Alaska

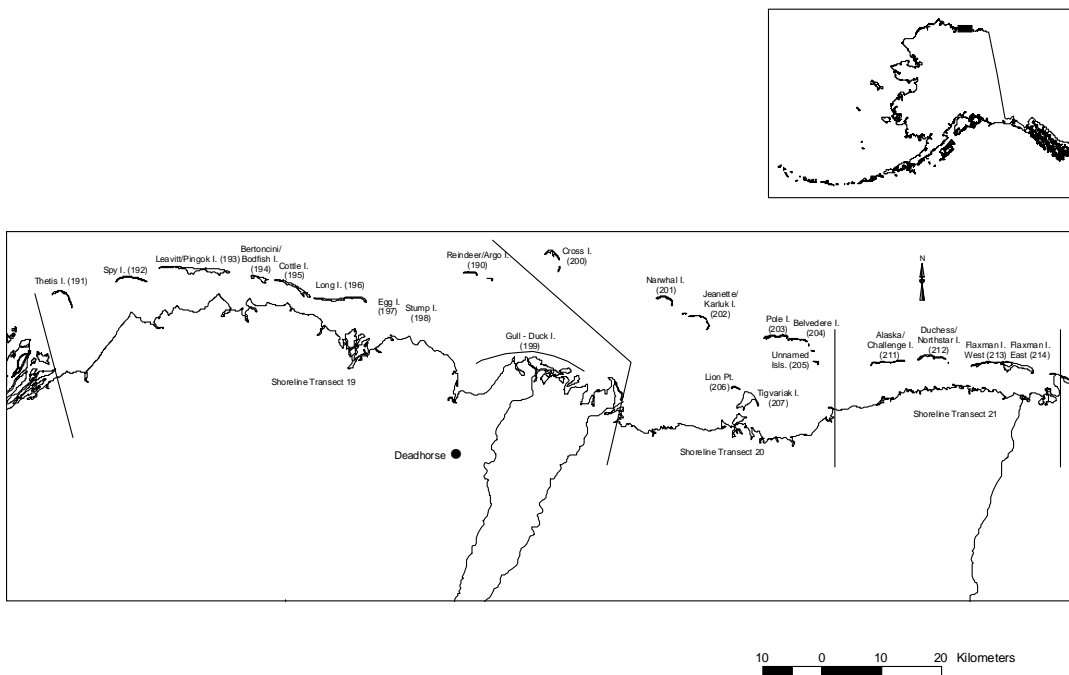


Fig. 2. Survey segments, including coastline and barrier islands, along the central Arctic Coastal Plain, Alaska.

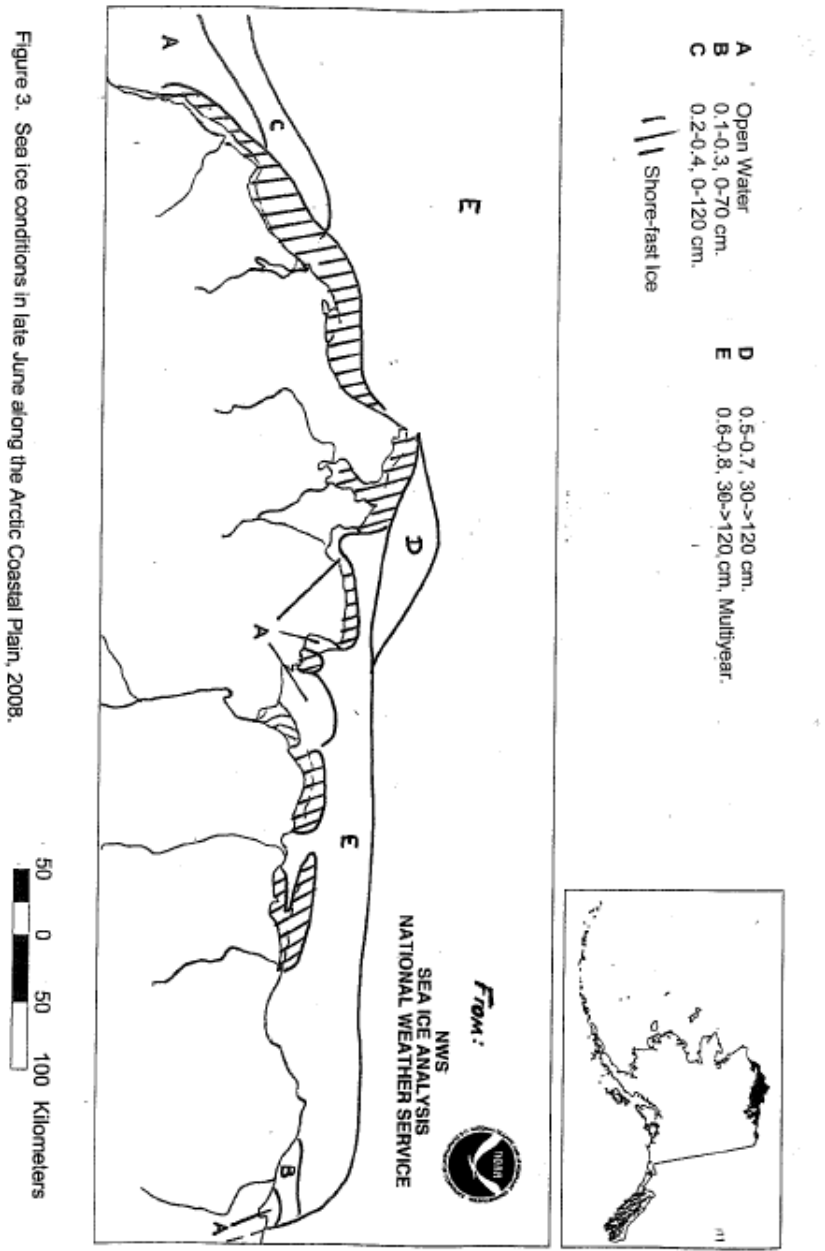


Figure 3. Sea ice conditions in late June along the Arctic Coastal Plain, 2008.

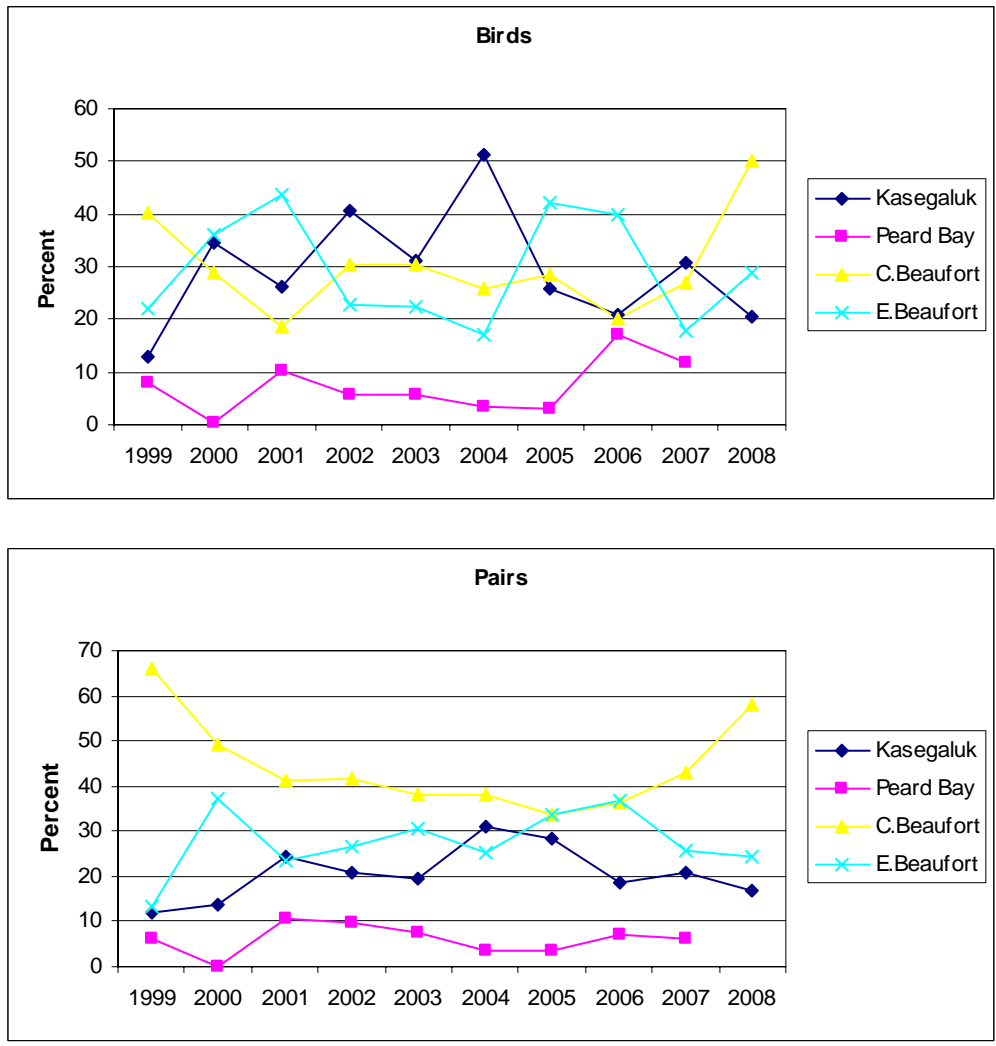


Figure 4. Trends in percent distribution of total and indicated breeding pairs of Common Eiders

