Seasonal movements and distribution of the Spectacled Eider

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Recent observations on the biology of the Spectacled Eider *Somateria fischeri* in the Siberian arctic (Kistchinski & Flint 1974) and in western Alaska (Dau 1974) have considerably expanded our knowledge of this eider on the nesting grounds. Previous observations on various aspects of the biology of this species have been presented for Siberia by Birula (1907), Buturlin (1906), Mikhel (1935), Uspenski *et al.* (1962), Vorobyev (1963), Portenko (1972) and Ostapenko (1973), and for Alaska by Nelson (1883, 1887), Murie (1924), Myres (1958), Dufresne (1924), Conover (1926), Gillham (1941), Brandt (1943), Bailey (1948), Johnsgard (1964), Dau (1972) and Mickelson (1973).

Very little information has been reported on the biology of the Spectacled Eider away from the nesting grounds. This unsatisfactory situation is demonstrated by the brief discussions on distribution presented in Bellrose (1976), Johnsgard (1976) and Palmer (1976). We present a discussion of the known distribution of this species, from available published and unpublished sources up to 1975, along with observations on its spring migration on the Yukon-Kuskokwim Delta in western Alaska, and the Indigirka Delta in the Siberian arctic. Post-breeding migration routes, moulting areas and winter distribution of the Spectacled Eider are poorly understood and are also analysed.

Spring migration

Spring arrival dates of Spectacled Eiders on their nesting grounds vary from year to year (Table 1). Spring (March–May) patterns and ice conditions dictate the availability of open water in the northern Bering Sea and appear to be very important factors affecting the time of arrival of these birds on the nesting grounds. In early May the offshore coastal fringe of the Yukon-Kuskokwim Delta consists of varying widths of shore fast ice and adjoining areas of broken and drifting ice. Open leads associated with this area of disturbed ice appear to be the routes used by the majority of migrating eiders and several other waterfowl species. In Bering Strait, northern Bering Sea and southern Chukchi Sea where the May ice pack is more extensive (Figure 1), the periodic opening and closing of the leads dictate the location and concentration of the spring passage of eiders. Bailey (1948) reported that the first Spectacled Eiders recorded at Wales, Alaska, during the spring of 1921 were seen on 16th May and the main passage on 3rd June. The following spring the first sighting was 28th May and due to the leads in Bering Strait being closed at the peak of migration far fewer birds were seen, their northward passage being distributed over a wide area. In some years, Spectacled Eiders can be abundant during spring migration at various locations near the eastern shores of the Chukotski Peninsula between Lawrence Bay and Whalen. Such unusual occurrences are believed to be due to coastal ice conditions since during most years very few are seen (Portenko 1972).

It appears that during March and April Spectacled Eiders congregate *en masse* in the vicinity of Bering Strait and adjacent areas of the Bering and probably Chukchi Seas. Pair formation may well occur in assemblages. The scarcity of spring observations suggests that this staging must occur in open leads far from shore. Spring passage of paired birds to the nesting ground likewise appears to take place among ice floes far from shore and *en masse*. On 29th May 1973, G. M. Kosygin (pers. com.) observed a mass migration of Spectacled Eiders at 62°43′N, 170°18′W (approximately 65 km south of St Lawrence Island) however flight direction is not available.

Observations on the spring migration of Spectacled Eiders were carried on daily in 1972 at Old Kashunuk Village on the outer Yukon-Kuskokwim Delta from their first arrival on 16th May until early June by when nesting was in progress. During the major influx period of 23rd–26th May 82% of the flocks and 93% of the total number of birds arrived from the north west (Figure 2). During the spring of 1924, Conover (1926) and Murie (1924) reported that nearly all the Spectacled Eiders observed in the Hooper Bay area, Alaska, arrived from the north. This pattern is strikingly in contrast to all other waterfowl species which migrate past or nest in the area, including the other three species of eider. These observations support

Table 1. Spectacled Eider spring passage and nesting ground arrival dates.

First dates of spring passage

Alaska	Date	Source	Siberia	Date	Source
Yukon-Kuskokwim Delta, Offshore Waters	2nd, 4th, 5th, 6th, 15th May	Conover 1926 Dufresne 1924 Gabrielson & Lincoln 1959 Murie 1924 Nelson 1887	Cape Tehaplina, 1902	23rd April	Portenko 1972
			Whalen	15th May	Portenko 1972
			Kolyuchin Bay, 1879	18th May	Palmen 1887
St Lawrence Island	13th May	Fay 1961			
Cape Prince of Wales	2nd, 16th May	Bailey 1943			
Icy Cape	24th May	Gabrielson & Lincoln 1959			
Wainwright	28th May	Bailey 1948			

Dates of arrival on nesting grounds

Alaska	Date	Source	Siberia	Date	Source
Yukon-Kuskokwim Delta Nesting Areas	12th May 1969 15th May 1970 24th May 1971 16th May 1972 18th May 1973	Mickelson 1973 Our Data	Chaunskaya Bay	26th May 1970	Ostapenko 1973
			Konkovaya River	30th May 1957	Vorobyen 1963
			Westwards of the Kolyma Delta		
Barrow/Teshekpuk Lake Area: Cape Simpson to Cape Halkett	26th May	Gabrielson & Lincoln 1959	Indigirka Delta	8th June 1971	Our data
			Mouth of Khromskaya Bay	4th June 1960	Priklonski *et al.* 1962

Note: Due to the limited number of observations available, dates are not consistent by year and should be considered a flexible pattern dependent on environmental conditions.

the contention that Spectacled Eiders stage *en masse* in northern Bering Sea or Bering Strait.

Spectacled Eiders do not appear on the eastern Siberian nesting grounds until the last week of May at the earliest. In years when environmental conditions delay nesting first arrivals may be as late as the end of the first week of June. In the Indigirka Delta and at Khromskaya Bay all Spectacled Eiders observed arrived from the east. Nearly all of the Spectacled Eiders migrating on to the Indigirka and Yukon-Kuskokwim Delta nesting grounds arrive paired, in small to moderate-sized flocks over a three to four day period (Table 2).

Nesting distribution and densities

The coastal fringe of the Yukon-Kuskokwim Delta is the primary home of the Spectacled

Table 2. Spectacled Eider spring flock sizes and composition during arrival on the nesting grounds.

	Yukon-Kuskokwim Delta	Indigirka Delta
Dates	16–26 May 1972	9–13 June 1971
Number of flocks	103	11
Number of birds	543	141
Males to females	1·11:1 (286:257)	1·05:1 (72:69)
Flock size: Singles	4	—
Pairs	72 (36)*	2 (1)*
3 to 10 birds in flock	294 (53)*	33 (5)*
11 to 30 birds in flock	173 (10)*	106 (5)*

* Number of birds; number in brackets represents number of flocks.

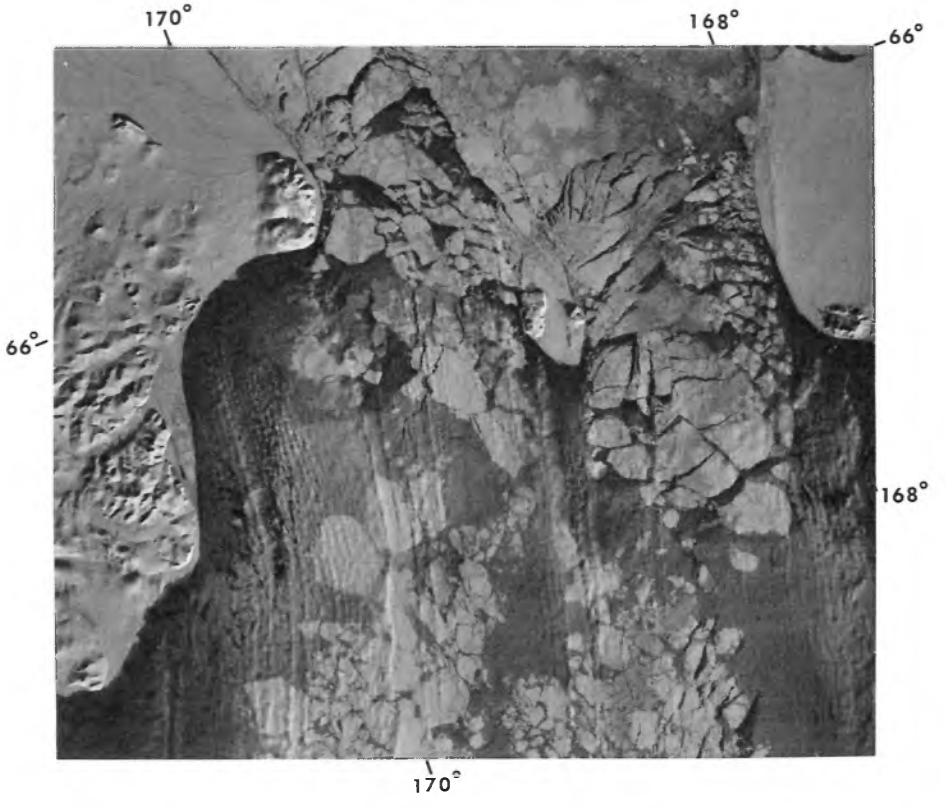

Figure 1. Satellite imagery of the Bering Strait region, 7th March 1973.

Eider in Alaska. The corresponding area in the Siberian arctic is the delta of the Indigirka River and the coastal tundras from Kromskaya Bay to Chaunskaya Bay (Figure 3). Sporadic nesting of the Spectacled Eider has been recorded as far west as the delta of the Lena River and Kotelnyi Island (New Siberian Archipelago), southward to the Berelyakh River and eastwards to Tenkurgin Lagoon (Buturlin 1906, 1910; Birula 1907; Thayer & Bangs 1914; Uspenski *et al.* 1962; Vorobyev 1963, 1973; Ostapenko 1973; Portenko 1972; A. V. Kretchmar, V. E. Flint, V. G. Panchenko, pers. com.). In North America the Spectacled Eider is an uncommon to rare nesting species in coastal tundra areas north and east of the Yukon-Kuskokwim Delta to the vicinity of the Colville River (Nelson 1883, 1887; Bailey 1948; Kessel & Caude 1958). The exception to this pattern exists in the vicinity of Teshekpuk Lake from Cape Simpson to Cape Halkett where the Spectacled Eider has been reported as a common nester (Bailey *et*

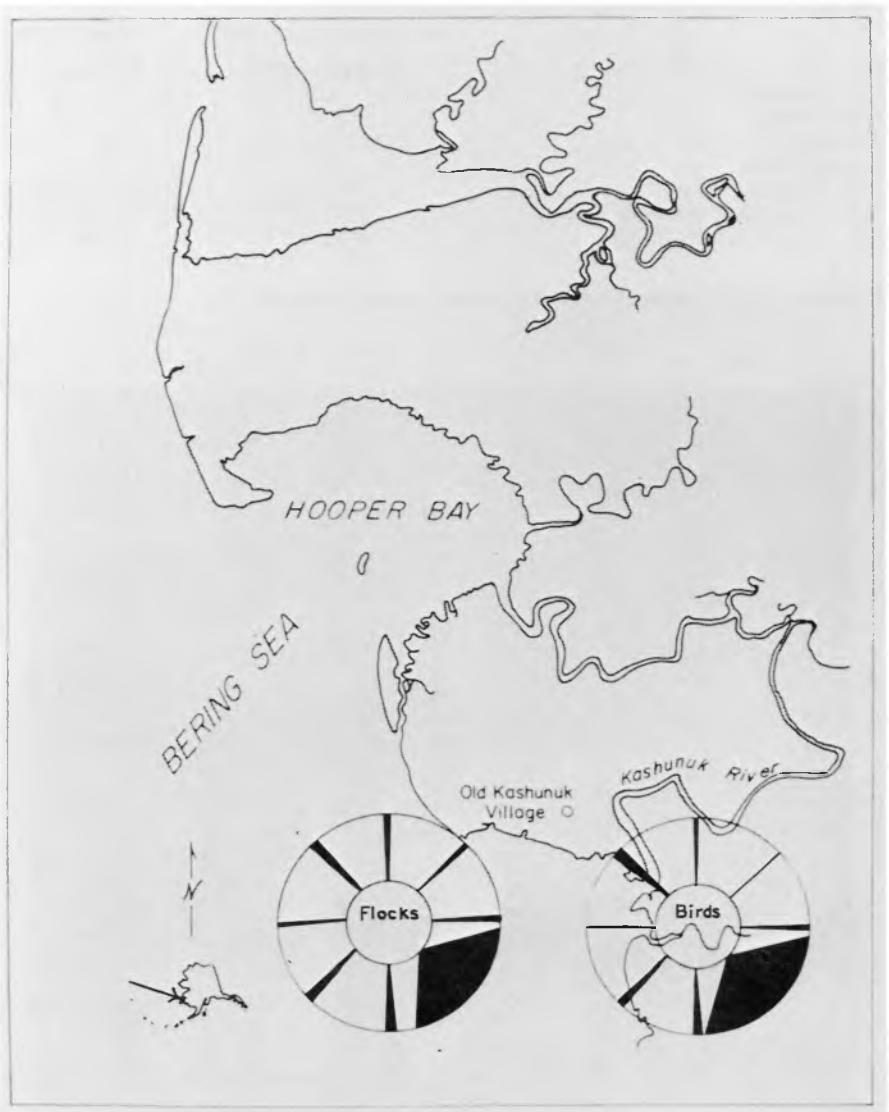

Figure 2. Directional analysis of the spring migration of Spectacled Eiders on the outer Yukon-Kuskokwim Delta.

al. 1933; Gabrielson & Lincoln 1959; Myres 1958). Eskimos have reported its nesting on St Lawrence Island (F. H. Fay, pers. com.). From Cape Prince of Wales to Cape Thompson the presence of this species is classified as uncommon to rare (B. Kessel, pers. com.). Sightings of this bird were made at the mouth of Arctic River on 26th June 1970 (seven birds), Nugnugaluktuk River on 26th June 1973 (two males) and in Lopp Lagoon on 3rd July 1974 (one subadult male). However the mouth of the Arctic River was the only location at which Kessel believed this species was nesting. A straggler recorded on Banks Island, Northwest Territories, Canada (Manning *et al.* 1956) is the easternmost summer record.

The outer maritime portions of the deltas of the Indigirka, Kolyma and Yukon-Kuskokwim Rivers support the largest nesting densities. Here Spectacled Eiders are the most abundant nesting eider and in some cases outnumber the other breeding duck species. In high density areas a rapid decrease in nesting density occurs farther inland (Table 3). Incomplete information on the nesting of the Spectacled Eider inland from the maritime portion of the Yukon-Kuskokwim Delta suggests that densities may be similar to those found on the corresponding portion of Indigirka Delta by Kistchinski & Flint (1974). Spectacled Eiders have not been observed on the Yukon-Kuskokwim Delta farther than 30 km inland, and very little if any nesting occurs farther than 20 km inland. On the Indigirka Delta, some Spectacled Eiders can occasionally be found 100 to 120 km inland.

It is estimated that the delta of the Indigirka River supported from 17,000 to 18,000 pairs of Spectacled Eiders in 1971. The Yukon-Kuskokwim Delta supports approximately 50,000 pairs in an average production year, with as many as 70,000 nesting pairs in a year of high productivity. The remainder of the Siberian and Alaskan portions of the population can be provisionally estimated as 30,000 to 40,000 pairs, and approximately 3,000 pairs, respectively. The total number of adult Spectacled Eiders which arrive for nesting in the spring is about 200,000 in an average year.

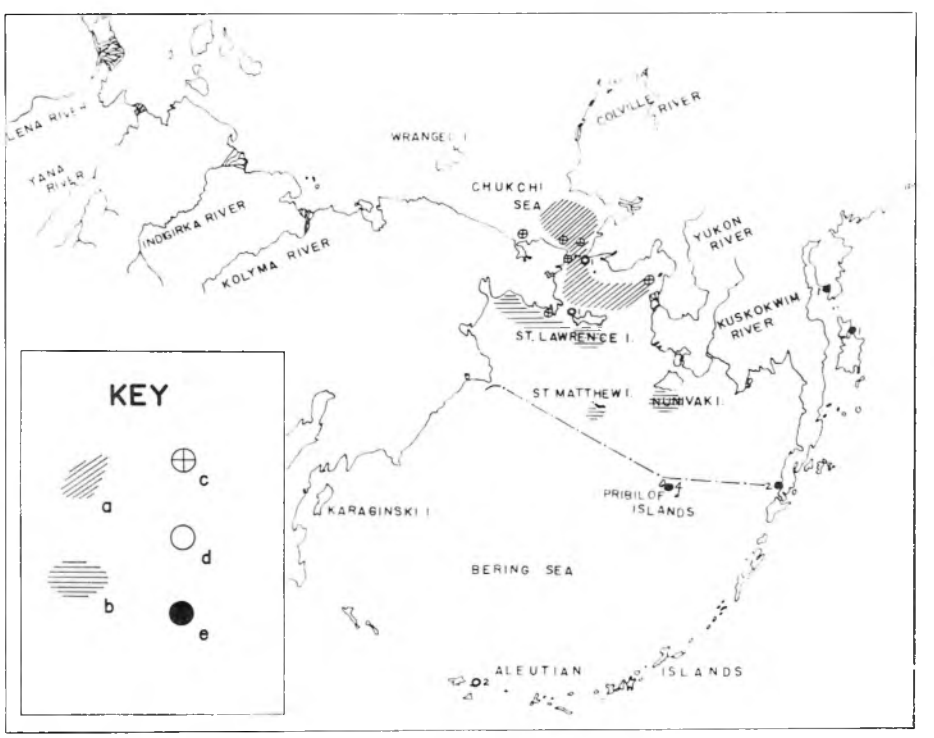

Figure 3. Nesting distribution of the Spectacled Eider. (a) High density nesting areas. (b) Areas in northern Bering Sea containing depths of less than 20 fathoms (36·5 m). (c) Main nesting area. (d) Probable total nesting distribution. (e) Occasional nesting (confirmed data). (f) Occasional nesting (unconfirmed data).

Table 3. Population densities of Spectacled Eiders on the main nesting grounds.

Yukon-Kuskokwim Delta	Pairs (June) or Females (July)/10 km² (mean)	Total area (km²)	Total spring numbers (pairs)
Maritime Province (0 to 15 km from coast)	30–68 (44)	9,600	42,240
Central Province (15 to 20 km from coast)	Estimate (10)	4,500	4,500
Inner Province (20 to 30 km from coast)	Estimate (2)	5,000	1,000
Total		19,100	47,740
Indigirka Delta	Pairs (June) or Females (July)/10 km² (mean)	Total area (km²)	Total spring numbers (pairs)
Maritime Province (0 to 35 km from coast)	33–60 (47)	3,100	14,570
Central Province	8–12·5 (10)	1,800	1,800
Inner Province	0–5 (2·5)	4,300	1,075
Total		9,200	17,445

Subadult males appear in very low numbers during spring migration on the Yukon-Kuskokwim Delta and not at all on the Indigirka Delta. Subadult females appear in limited numbers in both areas. Subadult birds of both sexes make up an unknown percentage of the total population and are unrepresented in our estimate. It is likely, as is the case with the other eiders, that non-breeding subadults make up a large portion of the population and remain primarily in offshore waters.

Single individuals and small flocks of non-breeding Spectacled Eiders have been seen by various observers near the shores of the Chukotski Peninsula from Providence Bay to Ayon Island as well as near St Lawrence Island (Portenko 1972). Large flocks are nearly unknown. The sighting of 100 to 150 non-breeding Spectacled Eiders on 23rd June 1914 by W. Percy reported by Phillips (1926) (in Portenko 1972), in foggy seas between Lawrence Bay and Cape Dezhnev is the only record of its kind. Contrary to the other eider species, non-breeding Spectacled Eiders probably occur farther north and far offshore during the nesting period among ice floes of the Bering Strait and Chukchi Sea.

Dispersal from the nesting grounds

Adult male Spectacled Eiders usually start departing from the Yukon-Kuskokwim Delta during the last week of June. A similar departure usually occurs on the Indigirka Delta and near Chaunskaya Bay. The latest observed occurrence of an adult male on the Yukon-Kuskokwim and Indigirka Deltas is 1st July and 15th July, respectively. It appears that adult male Spectacled Eiders are present on the Yukon-Kuskokwim and Indigirka Deltas for a maximum of five and four weeks, respectively. An eastward passage of male Spectacled Eiders was recorded north-west of the Indigirka Delta at the end of June (Uspenski *et al.* 1962) representing a departure from the nesting grounds. Moderate-sized flocks (fewer than 50 individuals) of adult male Spectacled Eiders are present in offshore waters near Hooper and Igiak Bays in western Alaska in the first two weeks of July (C. Dau, unpublished; D. Stout, pers. com.). These birds depart by mid-July apparently in a north-westerly direction as this species was not encountered during extensive aerial surveys over offshore waters to the south.

Bailey (1948) observed a southward moult migration of all four species of eider at Whalen, Siberia on 11th July 1921 and believed that this passage was made up of both Siberian and Alaskan birds as no similar migration occurred at Wales on the Alaskan side of Bering Strait. Portenko (1972) however, in 1934 saw migrating flocks of Spectacled Eiders on only 3rd and 4th July near Inchoun; he did not detect any migration near Whalen. No ornithologists who have worked on the north coasts of the Chukotski Peninsula since 1921 have been Spectacled Eiders (except single birds) among the huge flocks of Common or Pacific *Somateria mollissima v-nigra*, King *S. spectabilis* and Steller's Eiders *Polysticta stelleri*, moving east along the shores westward of Cape Serdze Kamen in July and August.

Adult male and non-breeding Spectacled

Eiders, having departed the Siberian nesting grounds, probably move to areas far offshore north of Bering Strait in the Chukchi Sea (Figure 4). Some birds undoubtedly pass through Bering Strait to moulting areas in northern Bering Sea; however, due to their apparent tendency to migrate far offshore only under adverse conditions would their movement possibly be detected. We believe it is likely that the moulting areas of adult males and non-breeders may directly coincide with the summer and fall haunts of the subadult segment of the population. Nelson (1883) discovered a large flock of adult male Spectacled Eiders in eclipse plumage 40 km west of Stuart Island, in southern Norton Sound, on 15th September, however, no more recent sightings have been reported for that area of western Alaska.

Observations of the movements of small mixed flocks of subadult females and apparently unsuccessful nesting adult females on the Indigirka and Yukon-Kuskokwim Deltas suggest that they, contrary to adult males, remain on the nesting grounds (especially the maritime portions of the deltas) in July. These birds leave the Yukon-Kuskokwim Delta by mid-August. V. M. Zenzinov's (Zhitkov and Zensinov 1915) observation of flocks of female Spectacled Eiders numbering in the hundreds from 18th July to 8th August 1912, near the sea on the Indigirka Delta were probably of subadults, non-breeders and possibly unsuccessful breeders. Similarly, the report of J. Koren (Thayer & Bangs 1914) of large numbers of Spectacled Eiders in the plumage of females flying around or swimming in a lake 48 km east of Cape Bolshoi Baranov, probably relates to flocks of such females.

Adult female Spectacled Eiders with young have all left the Yukon-Kuskokwim Delta by mid-September (Dau 1974; P. G. Mickelson, pers. com.). Females with fledging young were found on the Indigirka Delta on 30th and 31st August (Mikhel 1935), and non-flying young on Tenkurgin Lagoon on 18th September (Thayer & Bangs 1914). This sighting of flightless young in the third week of September shows that some young are produced on the more northern nesting area at least two weeks

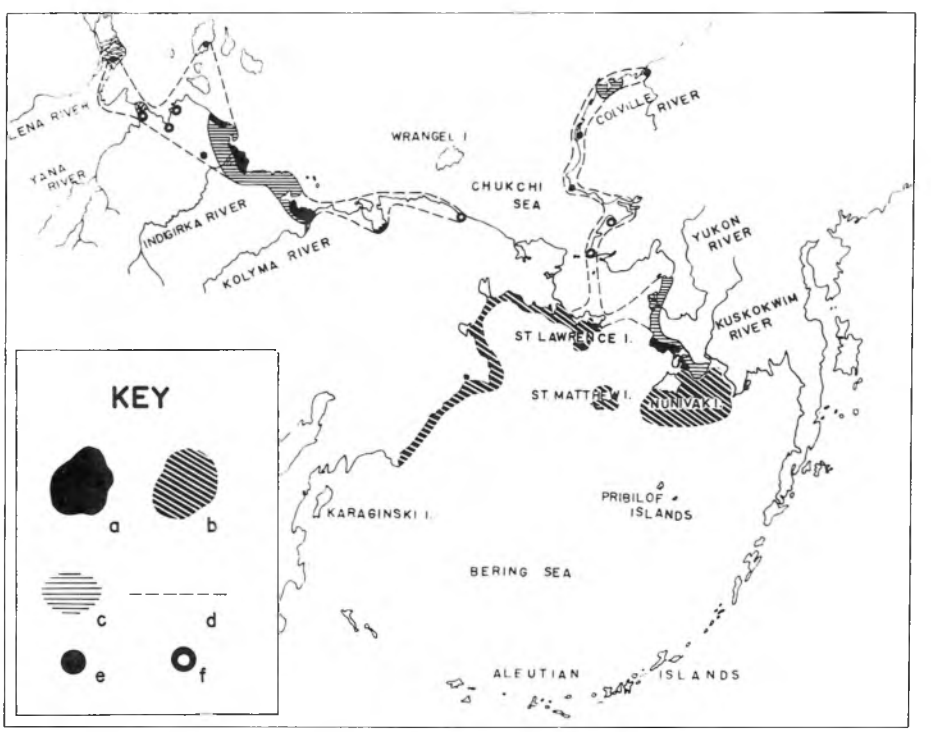

Figure 4. Distribution of the Spectacled Eider off the nesting grounds. (a) Probable primary moulting area. (b) Probable primary wintering area. (c) Actual observations of moulting Spectacled Eiders. (d) Winter sighting with number seen (unconfirmed data). (e) Winter sightings with number seen (confirmed data).

after the hatch is completed on the Yukon-Kuskokwim Delta.

It is uncertain where adult females with young undergo the postnuptial moult. Shallow water areas along the coasts adjacent to the Alaskan and Siberian nesting grounds may be utilized for a short period of time as staging areas; however, we believe the actual moult takes place far offshore, possibly in association with the adult males and subadults. On 8th September 1973, hundreds of Spectacled Eiders were seen in the mouth of the Koliutchyn Bay (Chukchi Sea) while this area was congested with heavy pack ice. Eight exhausted birds weighing from 900 to 1,150 grams were taken, six were sexed and proved to be females, one of them young (G. M. Kosygin pers. com.). Such an observation of a large assemblage of Spectacled Eiders close to the coast in autumn was very unusual and probably related to the hard ice condition. Autumn findings of Spectacled Eiders are very rare, with the only sight records and specimens from Whalen and Providence Bay in eastern Siberia, and St Lawrence and Nunivak Islands in Alaska.

Winter distribution

The scarcity of winter observations of the Spectacled Eider and their unusual spring migration pattern on the Yukon-Kuskokwim Delta suggests that they congregate in wintering areas distinct from those which support the majority of the other species of eiders. Sight records from eight localities and five specimen records comprise all the reported winter records in the Bering Sea and adjoining waters (Figure 4). Extralimital winter sight and specimen records have been reported for Vancouver Island, British Columbia (R. W. Campbell, pers. com.) and California (Moffitt 1940), respectively. The winter sighting of a single male at Vardø Harbour, Norway (Johnsen 1937), and a group of two males and three females near Pechenga on the Kola Peninsula, western Soviet arctic (Meinertzhagen 1938), are the westernmost sighting of the Spectacled Eider in winter.

During the winter months varying amounts of open water in Bering Sea allow some eiders to winter south of St Matthew, St Lawrence and Nunivak Islands (Figure 5)

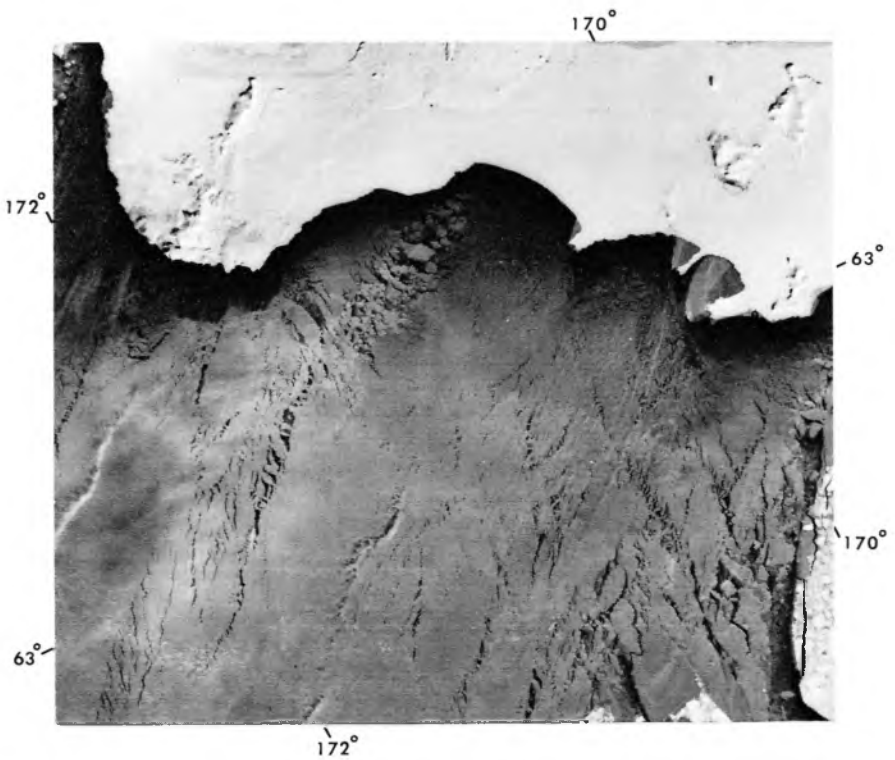

Figure 5. Satellite imagery of St Lawrence Island, Alaska, 6th March 1973.

and south of the Chukotski Peninsula. During mild winters such as 1973 (Figure 6) the conditions in northern and central Bering Sea would not drastically limit the wintering of large numbers of eiders. However, during severe winters ice conditions may possibly render these areas less stable and hence only intermittently suitable. The ecological requirements of the Spectacled Eider in winter are unknown. It is likely that they are similar to those of the King and Common Eiders, and that water depths suitable for benthic foraging are an important restriction. Based on observations of other eiders and sea ducks in general, water depth in the 15–18 fathom (27–33 m) range would be marginal for bottom feeding by Spectacled Eiders with preferred depths probably being considerably less. If this hypothesis on the winter requirements of the Spectacled Eider is correct little suitable habitat is available in northern Bering Sea, even during a mild winter. Wintering of eiders also occurs in and along the southern edge of the Bering Sea ice pack. However, limited investigations have not produced any sightings of Spectacled Eiders (Irving *et al.* 1968; McRoy *et al.* 1971). Common and King Eiders are observed along the ice pack edge and south of the Bering Sea islands. Sightings from the Pribilof Islands show that some limited wintering of this species probably occurs along or south of the edge of the Bering Sea ice pack. We propose that

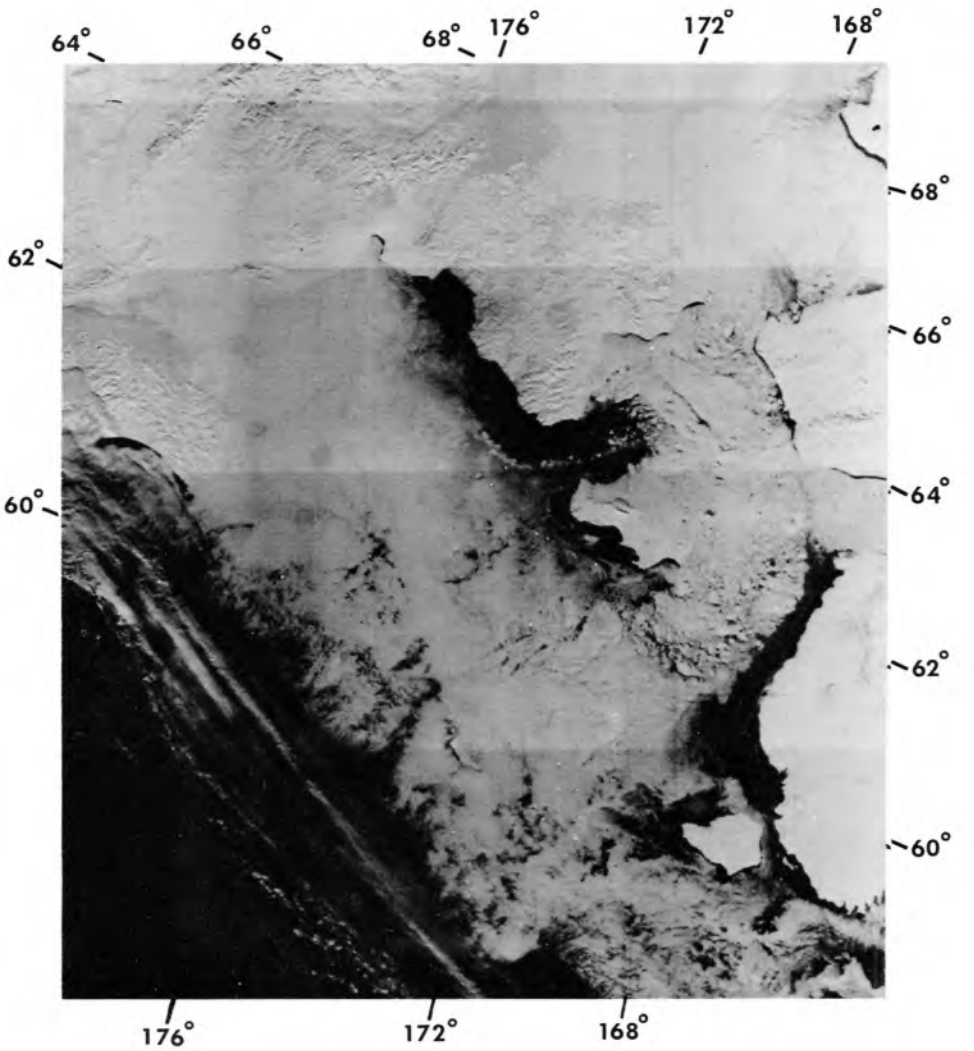

Figure 6. Satellite imagery of the northern Bering Sea, 27th February 1973.

wintering in this area varies year to year based on various environmental parameters and is not to be considered the most preferred location.

The early report by Turner (1886) that Spectacled Eiders are breeders and constant residents in the Aleutian Islands is obviously erroneous. The unconfirmed winter sighting of two Spectacled Eiders at Shemya Island in the western Alutians is the only recent report of this species in the island group. Dall (1873) reported them as rare winter residents at Unalaska, but they have not since been reported in that area. Due to the rapid increase in water depth north and south of the Aleutian Islands, wintering sea ducks must remain fairly close to shore usually in bays or habours, for bottom feeding. Even though the Aleutian Islands are remote and poorly inhabited it is unlikely that the distinctive Spectacled Eider could winter there undetected in any appreciable numbers.

Spectacled Eiders have never been recorded in the coastal waters surrounding the Commander Islands (S. V. Marakov, pers. com.), Karaginski Island near Kamchatka (Gerasimov & Vyatkin 1972) or in Korf Bay and the Oliutorski Gulf (A. A. Kistchinski, unpublished), nor near the Kurile Islands. In all of these waters from Korf Bay southwards, Common, Steller's and in some locations King Eiders are more or less common during the winter months.

Because winter sightings of the Spectacled Eider are so uncommon and are usually of single birds or very small groups we believe that its winter distribution is extremely restricted. It is doubtful that a population as large as that of the Spectacled Eider can be wintering undetected in an area other than the Bering Sea. We believe this eider is then highly gregarious and that both the Siberian and Alaskan components of the population are together in open water areas, large leads or polynyas of the Bering Sea ice pack as far north as ice conditions permit. Judging from satellite photographs, we may suggest that the open leads southwards of Nunivak, St Lawrence and St Matthew Islands, and near the south coast of the Chukotski Peninsula, should be explored initially. Winter records of Spectacled Eiders known up-to-date are probably not representative of the wintering range but rather reflect the restricted possibilities of ornithological observations during this season.

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Summary

Observations show that the nesting patterns of the Spectacled Eider, *Somateria fischeri* are similar on their Alaskan and Siberian nesting areas. Adult males are the first to leave the nesting grounds, doing so during the incubation period. Subadult males are rarely encountered on the nesting grounds and but few subadult females. Seasonal movements to and from the nesting grounds are poorly known. Published and unpublished data on the distribution in fall and winter are summarized and interpreted in conjunction with information on the dynamics of the Bering Sea ice pack as revealed by Satellite photographs.

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Two families. Above: Red-crested Pochard *Netta rufina*. Below: Greater Magellan Geese *Chloëphaga picta leucoptera*. (*K. Portman*).