Clutch sizes of the Spectacled Eider on the Yukon-Kuskokwim Delta, Alaska.

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Observations on the nesting biology of the Spectacled Eider *Somateria fischeri* were made on a 10·4 km² (4-square-mile) study area on the Clarence Rhode National Wildlife Range in western Alaska during the summers of 1972 and 1973 (Dau 1974). Data for the period 1969 to 1971 collected by Mickelson (1973) are included. Clutch sizes ranged from one to eight eggs, annual means 3·9 to 5·0. The total number of nests ranged from 32 to 67 (Table 1).

Table 1. Number of nests and average clutch sizes, 1969–1973.

	1969	1970	1971	1972	1973
Number of nests	37	67	32	33	44
Average clutch size	3·9	4·7	4·4	4·7	5·0

Nearly all of the study area consists of *Carex*-dominated wet, sedge-grass, meadows. Five percent is upland, heath tundra. Roughly half the area is covered by shallow fresh to brackish water ponds. Pond shorelines and small islands are the most favoured nesting sites. Nesting islands are for the most part small; mean length of 58 was 3·96 m (13·0 feet), width 1·7 m (5·6 feet), height 0·2 m (0·7 feet).

For the most part spring thaw and run-off, which dictate nest site availability, are controlled by weather patterns in late April and May. Conditions during freeze-up in the autumn can also delay the spring thaw if flooding, ice formation and snow fall are extensive. Fewer nests were found when spring thawing was retarded from five to ten days in 1969 and 1971. The mean number of eggs laid per nest in 1969 was also significantly lower than the mean in 1970 ($0·001 < P < 0·01$), 1972 ($0·01 < P < 0·05$), and 1973 ($P < 0·001$). In 1971 the mean was significantly lower only with regard to 1973 ($0·05 < P < 0·1$). The nesting seasons of 1970, 1972 and 1973 were essentially normal and no significant differences were found between their mean clutch sizes. In retarded years Barry (1960) recorded reduced clutch sizes in the Atlantic Brant *Branta bernicla hrota*. Barry (1967) found that the most important factor affecting reproduction of arctic nesting geese was the rate at which the habitat became clear of snow and dry enough to permit nest site selection and egg laying.

In 1972 and 1973, 85·7 per cent of the Spectacled Eider nests were initiated within the first ten days of the nesting period (Table 2). Mean clutch size for nests initiated in the first five days was significantly larger than that for nests initiated from day 6 to day 10 ($0·001 < P < 0·01$) and day 11 to day 15 and day 16 to day 20 ($0·01 < P < 0·05$).

Table 2. Clutch sizes in relation to onset of laying date.

Days from start of laying period	Number of clutches	Number of eggs	Average clutch size
0–5	29	165	5·7
6–10	31	153	4·9
11–15	5	23	4·6
16–20	5	23	4·6

The larger mean clutch sizes in 1970, 1972 and 1973 and the fact that significantly larger clutches are laid in the first five days may suggest that nesting and egg laying patterns vary with age of the female. Kistchinski & Flint (1974) recorded a colour pattern difference in female Spectacled Eiders in N.E. Siberia that in my study I termed 'juvenile' female. Twenty-five percent of the birds of this plumage type collected in Siberia had bred. On the Yukon-Kuskokwim Delta such birds arrived in small numbers after the initiation of most nests and took no part in breeding.

Other waterfowl studies have shown that older, experienced females nest earlier in the season and lay larger clutches (Morse *et al.* 1969; Brakhage 1965). Females which had nested before, probably in the same general area, would very likely select nest sites with less delay than would females returning to the nesting grounds for the first time. The small number of adult female Spectacled Eiders marked in 1972 showed a high degree of homing and nested near their previous year's

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nest site in 1973. Older, experienced females might also be better able to contend with stress associated with late years and to nest successfully with reduced clutches. In the European race of the Common Eider *Somateria m. mollissima* fewer birds nest in late seasons and adult females of known breeding history tend to lay fewer eggs than they did in other years (H. Milne pers. com.). Regression analysis of Spectacled Eider clutch sizes in relation to days from first arrival in 1969 and 1971 versus 1970, 1972, and 1973 on the study area showed differences between the means which were approaching significance at the 0·05 confidence level (regression, pooled data $y = 6{\cdot}4 - 9{\cdot}6$ (day) where y = clutch size) (Figure 1). Barry (1960) suggests that smaller clutches are laid by Atlantic Brant in late years because some would-be eggs are resorbed. This may also be the case in the Spectacled Eider, but the discrepancy in clutch size between early and late nests independent of seasonal condition is due partially to the completion of clutches, the first eggs of which were destroyed by predators.

No conclusive evidence of a successful renest after the destruction of a complete clutch was found. An adult plumaged female observed on a nest with no eggs and very little down fully one month after the departure of the last males from the breeding grounds was collected on 28th July 1972. It had a distended oviduct and an obvious brood patch indicating previous down deposition. I considered this an example of aberrant nesting behaviour rather than an unsuccessful renesting attempt. Kistchinski & Flint (1974), however, did have evidence of renesting in Siberia. Examination of ovaries from their collected birds revealed ten or more 'scars' of broken follicles; one female with seven to eight follicle 'scars' had an extensive brood patch.

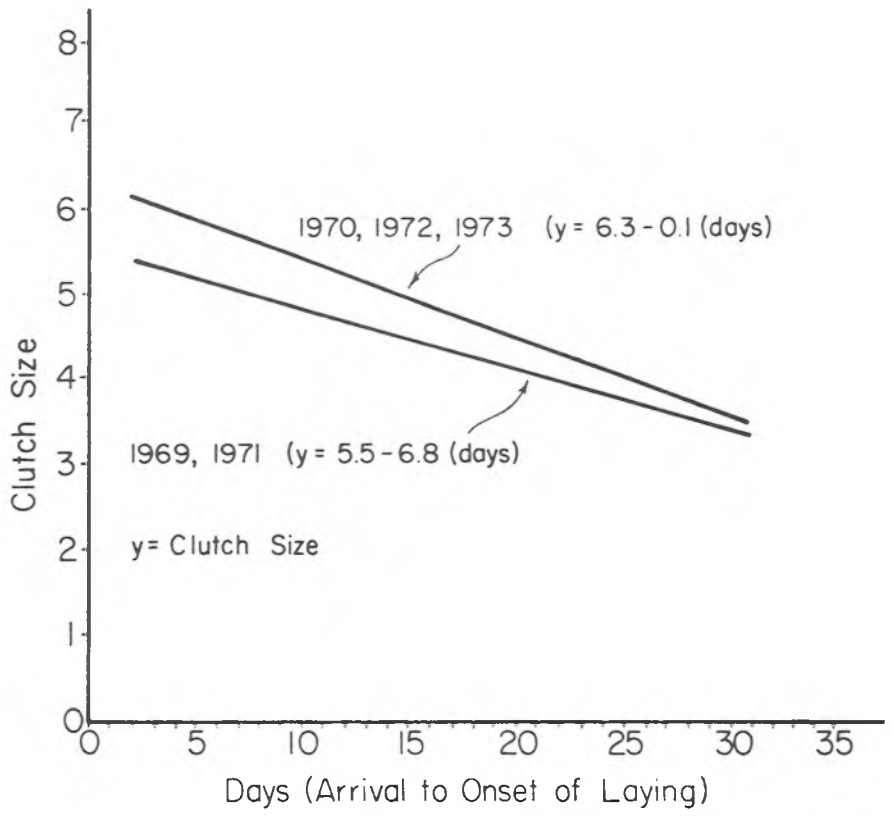

Figure 1. Regression analysis of Spectacled Eider clutch sizes in relation to date of spring arrival.

Summary

Nesting patterns of the Spectacled Eider *Somateria fischeri* on the Yukon-Kuskokwim Delta appear to be dictated by the timing and duration of the spring break-up period. Late springs which retarded nest site availability reduced both nesting density and clutch size. Available information suggests that female Spectacled Eiders return to previously used nesting areas. Renesting of this species has not been recorded on the Yukon Kuskokwim Delta but has been observed on their Siberian nesting grounds. Observations suggest that only adult females nest on the Yukon Kuskokwim Delta however nesting of sub-adult females appears to occur in Siberian nesting areas.

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