

Roosting behaviour of Long-tailed Ducks in relation to possible oil pollution

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Introduction

The development of an oil pipeline terminal on an island in Scapa Flow, Orkney, with the prospect of numerous tanker movements, and the attendant risks from oil spillages, prompted the Nature Conservancy Council to commission the Royal Society for the Protection of Birds to undertake seabird surveys in Orkney during 1974–1978. This report outlines the work done on the roosting behaviour of the Long-tailed Ducks *Clangula hyemalis* which wintered in Scapa Flow, 1976–78.

For fairly obvious reasons, roosting of seabirds has not been studied intensively, but Johnsgard (1975) summarised the general pattern of activity in Long-tailed Ducks as 'one of foraging during the daylight hours in fairly shallow waters and moving to deeper bays or the open ocean for nocturnal resting'.

The winter population in Scapa Flow

In Orkney, counts and observations by David Lea have shown that there is a substantial winter population of Long-tailed Ducks in Scapa Flow. In most years, the ducks arrive in October, with numbers building up slowly over the course of the winter to reach a peak of over 2000 individuals by February. Numbers begin to decline in late April, and most have departed for their breeding grounds by the end of May. There are other flocks in Orkney waters, especially in the sounds around the island of Wyre, and it is likely that the total winter population of Long-tailed Ducks in the island group may be of the order of 6000 birds.

The assessment of population levels in offshore birds is a difficult task, but at present it is considered that about 20,000 Long-tailed Ducks may winter in Britain (H. Milne pers. com.) most of them off eastern and northern Scotland; the Scapa Flow population thus comprises a significant proportion of the British winter stock.

The ducks' daytime distribution

From numerous observations by Lea and

myself, it was evident that the birds usually fed in water up to 10 m deep, though occasionally in depths of up to 20 m. The generalised daytime distribution of these ducks in the Flow is adequately represented in Figure 1.

Roosting behaviour

During the early months of 1974, Lea and G. Morison had established the fact that several of the daytime flocks left their shallow-water feeding areas at, or just before, dusk and headed out into the deeper water of Scapa Flow. My continuation of this work was done during the two winters of 1976–7 and 1977–8.

The main objects of the work were (i) to establish whether deepwater roosting was a normal behaviour pattern; (ii) to discover the roost sites; and (iii) if possible, to plot the distribution of roosting ducks.

The movements of the evening roost flights had to be followed on the few calm bright evenings, since these ducks can be remarkably difficult to spot on the sea if there is any wave movement. The birds often flew long distances in failing light, and the line of flight had to be followed through a telescope until the birds either disappeared from view or were seen to come down on to the sea surface. It was found that in calm air the birds would fly to roost at a rate of about 1 km per minute. A combination of timing the flights and obtaining bearings thus enabled sites where the birds pitched to be plotted with an accuracy adequate in the preparation of small scale maps (see Figure 1).

In most of the situations observed, Long-tailed Ducks would end their diving (and presumed feeding) up to an hour before the roost flight. There may then be some preening and flying about, but most birds remained relatively inactive on the sea surface or, at some sites, began very slowly to swim out towards the open sea. A few would then rise and fly out into the Flow, though not always in a straight line, and other birds would follow at intervals; all flights were close to the surface of the sea. If more than 20 birds were in a particular bay, it was very rare for them all to leave at once. The roosting flight usually comprised a straggle

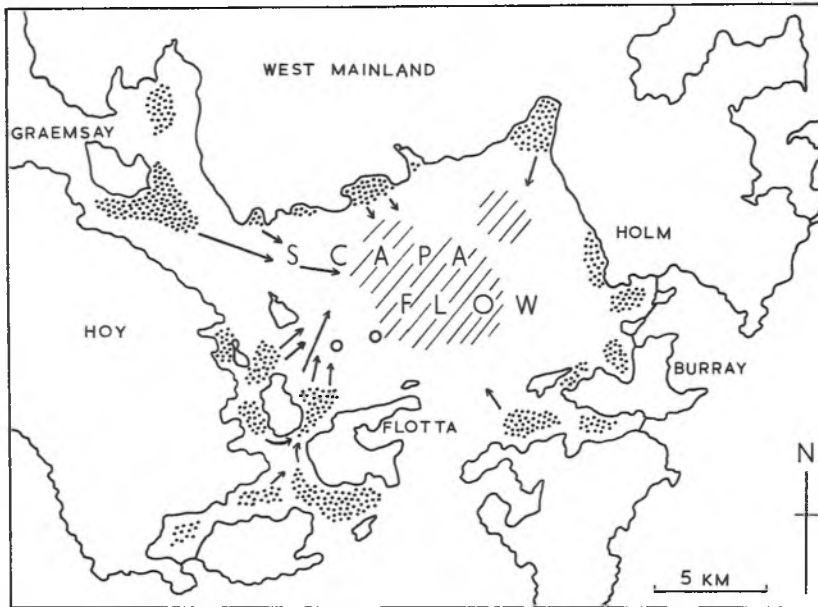


Figure 1. Long-tailed Ducks in Scapa Flow, Orkney: daytime distribution, observed roost flights and areas where ducks were found at night.

of small parties, sometimes even single birds, with departures spread over a period of up to 45 minutes. Morison, early in 1974 did once see a flypast of several hundred birds from the main feeding area near Graemsay, but perhaps these had been prematurely disturbed because all other observations—of his and mine—were of flocks of not more than about thirty. Distances between feeding and roosting sites varied between 3 and 12 km.

Naturally, the timing of the roost flight was linked to sunset, and varied according to the time of year, but the large majority of birds left their feeding areas before it became too dark for a human observer to see them in flight.

Scapa Flow at night

I was able to make boat journeys through central parts of Scapa Flow: three at and just after dusk, and one just before dawn. Apart from occasional Guillemots *Uria aalge*, Long-tailed Ducks were the only birds positively identified in the light of a movable, cabin-mounted searchlight. It was not possible to spot floating birds on the radar screen because of background 'noise' coming from waves. The ducks seen were scattered in

small parties, never of more than 20 birds, over a large part of Scapa Flow.

Only rarely were these ducks recorded near the shore at night: for two years I lived close to a bay where up to 20 regularly fed during the day, and on only one occasion were birds heard calling on a calm night; Lea (*pers. com.*) only heard them twice during four years' residence near Scapa Flow.

An oiling incident

On 5 March 1977, about 20 tons of North Sea crude oil was spilt at one of the single point tanker moorings in Scapa Flow. After the initial late-morning spillage, caused when hoses were jettisoned into the sea, there were further leaks from a damaged pipe near the base of the mooring tower. The oil moved in front of a strong westerly wind, but the wind later swung round to the south and the attenuated slick moved northwards right across the width of Scapa Flow and therefore across the roost area of the Longtailed Ducks. Luckily however, this oil movement occurred during the day (when the ducks were away at their feeding sites). Only 14 ducks were found ashore oiled—most of them perhaps caught on a lee shore as the oil bore down on some of the bays used for feeding. Of the 110 birds known to have been

oiled in the incident, the majority were auks (*Alcidae*). This was a lucky escape for the ducks, but an oil spillage could obviously have a disastrous effect on their numbers in Scapa Flow.

Discussion

It is widely assumed that Long-tailed Ducks move to spend the night away from land as a protection against predators. The habit is evident in a variety of other diving ducks, e.g. Goldeneye *Bucephala clangula* moving to the centre of a reservoir in England (Linsell 1969), or to a site on a wide river in USA (Breckenridge 1953), or to a sea bay in Sweden (Nilsson 1974). Presumably this behaviour prevents their being blown on to a lee shore during a dark night. Although Long-tailed Ducks were once seen at night roosting out in the Flow in winds of Beaufort Force 6, it is not known whether the normal dispersion of roosting birds is maintained through the gales which frequently occur in Orkney. Eiders *Somateria mollissima*, by contrast, usually swim only as far as the mouths of the bays; they were never seen to flight out into Scapa Flow in the evening, nor were they found in the deeper water of the Flow at night.

Long-tailed Ducks in Orkney in winter are almost exclusively maritime, though one group of up to 250 regularly feeds on a brackish lake. Some feeding areas lie at sites with strong tidal currents, but the roost area has relatively little tidal movement and hence the birds can reduce their energy expenditure by flying there. However, birds also move out from feeding bays with very little tidal water movement, so energy conservation is evidently not the main reason.

Another aspect of the ducks' move to deeper water is perhaps the need to find an undisturbed roost. It is not known for how long the ducks have exhibited the roosting behaviour outlined above for Scapa Flow. Certainly Bewick (1826) mentioned evening movements of Long-tailed Ducks in Orkney and Shetland, though without giving further details, and the phenomenon had evidently been observed elsewhere in the nineteenth century: by Graham, quoted by Gray (1871) at Iona, Argyllshire, and by Mackay (1892), quoted by Johnsgard (1975), in the Nantucket area of Massachusetts. The element of tradition seems to rank highly in duck behaviour (Hochbaum 1955; Nilsson 1972), and the Flow's evening flight may have been operating for many years, despite the distur-

bance caused by the presence of the British fleet in the two wars. Since the start of construction work on the Flotta oil terminal, there has been a large increase in the number of boat movements in the Flow. Many of them take place during darkness, when the Long-tailed Ducks are roosting. In addition, since December 1976, an enormous flare has been burning off 'unwanted' gas; this has lit up much of the surface of the Flow, including the roost areas. However, as far as one can tell from observations over the years 1974–78, the ducks' pattern of roosting behaviour has not been drastically disrupted.

The roost areas lay very close to the two single point moorings at which tankers discharged ballast water (into a separation tank ashore) and took on crude oil. In the event of a night-time spillage remaining undetected for an hour or so, a moderate wind from the southwest could move oil over the sea surface right into the roost area. The ducks roost in scattered small parties, so the majority would be unlikely to become oiled. Curry-Lindahl (1960) concluded that Long-tailed Ducks in the Baltic were particularly vulnerable to lethal pollution from waterborne oil; Joensen (1973) reported on two separate oiling incidents in Denmark in 1972 when about 60,000 seaduck were killed, and he suspected in both cases that relatively small amounts of oil were responsible for these huge mortalities. In February 1978, 241 grebes and about 700 diving ducks were affected when a relatively small amount of oil passed at night through an area in the Firth of Forth where evidently they were roosting gregariously (Campbell *et al.* 1978).

Despite the vigilance of the oil company and the Harbour Authority in Scapa Flow, one cannot be sanguine in a situation where several spills have occurred in the first year of the oil terminal's operations.

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Summary

Up to 2000 Long-tailed Ducks *Clangula hyemalis* winter in Scapa Flow, Orkney, feeding during the day in areas of shallow water; they probably comprise about 10% of the numbers wintering in Britain. Birds fly out before dusk to the deeper water of Scapa Flow, where they apparently roost in

small parties scattered over a fairly wide area. North Sea oil arrives by pipeline at a terminal on an island in the Flow, and is unloaded by tankers at two moorings near the roosting areas; one oil slick has already crossed these roost areas during the daytime, and it is feared that a night-time spillage could have serious consequences for the ducks.

References

- Bewick, T. 1826. *A history of British birds*. Newcastle: Longman.
Breckenridge, W. J. 1953. Night rafting of American Goldeneye on the Mississippi River. *Auk* 70: 201-4.
Campbell, L. H., Standring, K. T. & Cadbury, C. J. (1978). Firth of Forth oil pollution incident, February 1978. *Mar. Pollut. Bull.* 9: 335-9.
Curry-Lindahl, K. 1960. Serious situation with regard to Swedish populations of Long-tailed Duck (*Clangula hyemalis*) *IWRB Newsletter* 10:15-18.
Gray, R. 1871. *The birds of the west of Scotland*. Glasgow: Thomas Murray.
Hochbaum, H. A. 1955. *Travels and traditions of waterfowl*. Minneapolis: University of Minnesota Press.
Joensen, A. H. 1973. Danish seabird disasters in 1972. *Mar. Pollut. Bull.* 4: 117-8.
Johnsgard, P. A. 1975. *Waterfowl of North America*. Bloomington: Indiana University Press.
Linsell, S. E. 1969. Pre-dusk and nocturnal behaviour of Goldeneye, with notes on population composition. *Wildfowl* 20: 75-77.
Mackay, G. H. 1892. Habits of the Oldsquaw (*Clangula hyemalis*) in New England. *Auk* 9: 330-7.

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Two male Long-tailed Ducks *Clangula hyemalis*; the near bird is in full winter plumage, the further one is moulting into it. (*Philippa Scott*)

