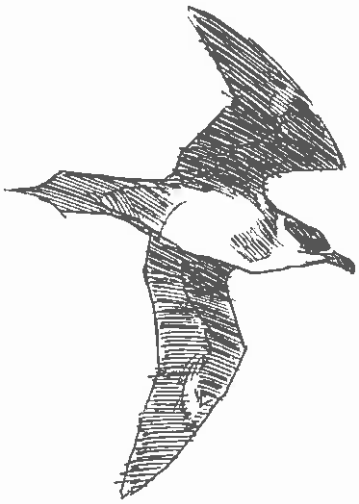


Arctic skua *Stercorarius parasiticus*

Status

Non-SPEC

National monitoring

Seabird Colony Register (SCR).
Seabird Monitoring Programme (SMP).
Orkney and Shetland were surveyed as a whole in 1992, Hoy in 1996, other colonies 1985–1987, but 1996 figures are available for Handa and St Kilda.
Seabird 2000 (1999–2001).

Population and distribution

Britain holds 1–3% of the world's population of breeding arctic skuas (Lloyd et al 1991). The species breeds on coastal moorlands in the extreme north and west of Scotland. The population increase in the 1970s and early 1980s probably followed that of other seabird species that arctic skuas kleptoparasitise (*88–91 Atlas*). Over half of British arctic skuas breed in Shetland, where numbers have been declining since the late 1980s (Ewins et al 1986, Weirs et al 1988). Although there are several threats to the species, the main problem on Shetland recently has been a lack of food. The UK breeding population is around 3,200 territories (*Population Estimates*).

Ecology

Compared with great skuas, arctic skuas prefer lower slopes and drier ground, breeding on heathland and mossy vegetation. The clutch, usually of two eggs, is laid from late May, and young hatch from late June. Incubation lasts 25–28 days and young fledge to maturity in 25–30 days. The young can leave the nest within a few days of hatching, and the brood usually separates, though chicks do not normally wander more than 100–200 m from the nest (*BWP*).

Breeding season survey – population

The same methods can be used for monitoring population and productivity of both arctic and great skuas. These methods are taken from the *Seabird Monitoring Handbook*.

Information required

- maximum number of Apparently Occupied Territories
- maps showing their location
- the number of non-breeding birds.

Number and timing of visits

Three visits, late May to mid-July, preferably June.

Time of day

Any time, but note the time of day of the count as this can affect the number of non-breeding birds recorded in the colony. If non-breeding

birds are to be counted, this is best done just before sunset as non-breeders form into 'clubs' at this time (Klomp and Furness 1990, 1992). Spend as much time as necessary.

Weather constraints

Throughout the season, to minimise the risk of chilling eggs or chicks, avoid colony visits during heavy rain, strong winds, prolonged wet weather or fog.

Sites/areas to visit

Coastal grassy moors in the extreme north and west of Scotland.

Equipment

- 1:10,000 map of the area
- clipboard
- padded hat and/or bamboo cane
- transect markers.

Safety reminders

Only visit an area at dusk if you have previously visited it during the day. A reliable person should always know where you are and when you are due back. Take care on steep slopes, especially next to cliffs (appropriate gripped footwear should be worn). Skuas are likely to dive at anyone entering a breeding colony. A padded hat will provide some peace of mind (birds may injure themselves on hard hats).

Disturbance

Disturbance in colonies with high densities of nesting birds makes counting difficult. In such situations sit or stand still for a few minutes at periodic intervals, to allow the birds to resettle in their territories. Avoid disturbing colonies in wet weather, especially those with high breeding densities where birds are more likely to be put off their eggs. Great care should be taken not to flush young skuas, as they are very vulnerable to predation by neighbouring adult skuas.

Methods

The whole colony needs to be surveyed, therefore one of the first tasks is to find and map its extent. If the colony is very large, with birds nesting at a low density, it may be necessary to check different areas over successive days. Once the extent of the colony is mapped, mark parallel transects on the map. Allow about 500 m between each transect, but make them closer together according to the density of the colony and the nature of the terrain (eg if the ground is undulating and some areas are not visible from the transects). Mark the beginning and end of each transect on the ground to make them more accurate.

Walk each transect, stopping at regular intervals (eg every 200–300 m) and thoroughly scan all round with binoculars and telescope. Record all Apparently Occupied Territories (AOTs).

Score an AOT if any of the following are seen:

- nest, eggs or chicks
- apparently incubating or brooding adult
- adults distracting or alarm-calling
- a pair or single bird in potential breeding habitat.

The following should not be scored as AOTs:

- bird(s) flying past en route to somewhere else

- feeding individual(s)
- **single** bird (or pair) which is flushed from an area, and which then flies completely out of sight
- three or more skuas of the same species regularly together but not showing signs of territoriality.

Record all evidence of territorial skuas by plotting sightings on large-scale maps using different codes for (eg) nests, eggs and adults giving alarm-calls. Take care not to count the same AOT more than once from the same or different transects.

Territorial birds may utilise prominent mounds in their territories and these can be a useful indicator of an AOT (though territorial birds may use more than one mound). In dense colonies it is worth taking extra time to observe territorial behaviour to avoid assigning to different territories members of the same pair which are standing apart.

The breeding population should be reported as the maximum number of AOTs recorded on a single visit.

Wherever possible, census the number of non-breeding skuas in the colony. These birds tend to gather in groups or 'clubs' that occupy small areas about 50–100 m wide. The number of these birds changes throughout the day; counts just before dusk are best, but always note the time of the count. Report the number of non-breeding birds seen in clubs on each visit.

For arctic skuas, record the relative proportions of light and dark colour phases of territorial birds.

Breeding season survey – productivity

Method 1

This method is the least intensive of the two.

Information required

- number of young fledged per AOT.

Number and timing of visits

Two visits, a week or two apart, first visit about one week after first fledging 20–25 July. (This is ignoring the need to visit in May/June to assess numbers of AOTs.)

Time of day

Any time.

Weather constraints, Sites/areas to visit, Equipment, Safety reminders, Disturbance

As for the population survey (above).

Methods (*Method 1: Young fledged per Apparently Occupied Territory*)

Productivity can be assessed for whole colonies (especially smaller ones, of say <100 AOTs) or for sample areas of larger colonies. If sample areas

are to be used, these should be selected randomly. In large colonies, try to follow 50–100 AOTs in total, preferably in two or more areas of similar population size. Further details on sampling techniques are given in the *Introduction* and in the *Seabird Monitoring Handbook*.

Well-grown chicks are those which have lost more than half of their down feathers on the mantle/scapulars/upperwing coverts. Fledged chicks stand up and are easy to see, whereas chicks that have not yet flown crouch and hide. Recent fledglings appear more round-winged than adults and fly rather poorly. Fledgling arctic skuas have a distinctive dark 'scaly' plumage because their dark brown feathers are edged light brown, while fledgling great skuas appear more uniformly dark than adults.

Assess the numbers of AOTs in late May/June using methods given for population monitoring. The visit dates (above) can be further refined by noting the approximate ages of chicks seen in June, thus allowing calculation of when first chicks are likely to fledge. Using similar transect and scanning methods as for population monitoring (see above), map and count fledglings and well-grown chicks. Arctic skuas first fly when about four weeks old and great skuas at about six weeks. Fledglings of both species tend to remain in their natal area for one to three weeks after fledging.

If possible, try to relate each fledgling or chick to a territory. Adults generally defend chicks that cannot fly, but once chicks have fledged the adults are much less inclined to swoop at people and tend to fly off with their fledglings, giving aerial protection. In a large or dense colony, large numbers of flying young can cause confusion; it is important to retreat to a good vantage point to let the birds settle down before continuing the survey. Be aware that some large chicks may be difficult to see, even if vegetation cover is limited. Some prior experience or practice at locating chicks is advisable. If individual fledglings cannot be related to particular territories, use the maximum total count of fledglings and near-fledglings as your estimate.

Keep a separate note of any smaller chicks present (ie ones that are still mainly downy above). If possible, re-check territories containing these small chicks a week or two later, especially if about 20% of the total of young birds are small on the first date. This will improve the accuracy of the final estimate of productivity.

When calculating productivity for the colony as a whole, or for each sample plot, divide the number of large chicks or fledglings produced by the number of AOTs. For two or more sample areas, express the colony's productivity as the mean ± standard deviation of the individual plot figures.

It is useful to record the numbers of dead (uneaten) and dead (eaten) chicks/fledglings seen in the colony.

Method 2

This more intensive method follows the fate of individually marked nests, in either the whole colony or sample areas of a colony.

Information required

- number of young fledged per individually marked nest.

Number and timing of visits

At a minimum, visit every 5–7 days from around the date of first hatching throughout the chick-rearing period. If possible, also visit two or three times at intervals of 10–15 days during the main incubation period. The main incubation period is late May to mid-June for arctic skuas and mid-May to mid-June for great skuas.

Time of day

0900–1600 BST; visit at different times on different days.

Weather constraints, Sites/areas to visit

As for the population survey (above).

Equipment

- marked stakes or bamboo poles
- indelible pen
- ringing/processing equipment.

Safety reminders, Disturbance

As for the population survey.

Methods (*Method 2: young fledged per marked nest*)

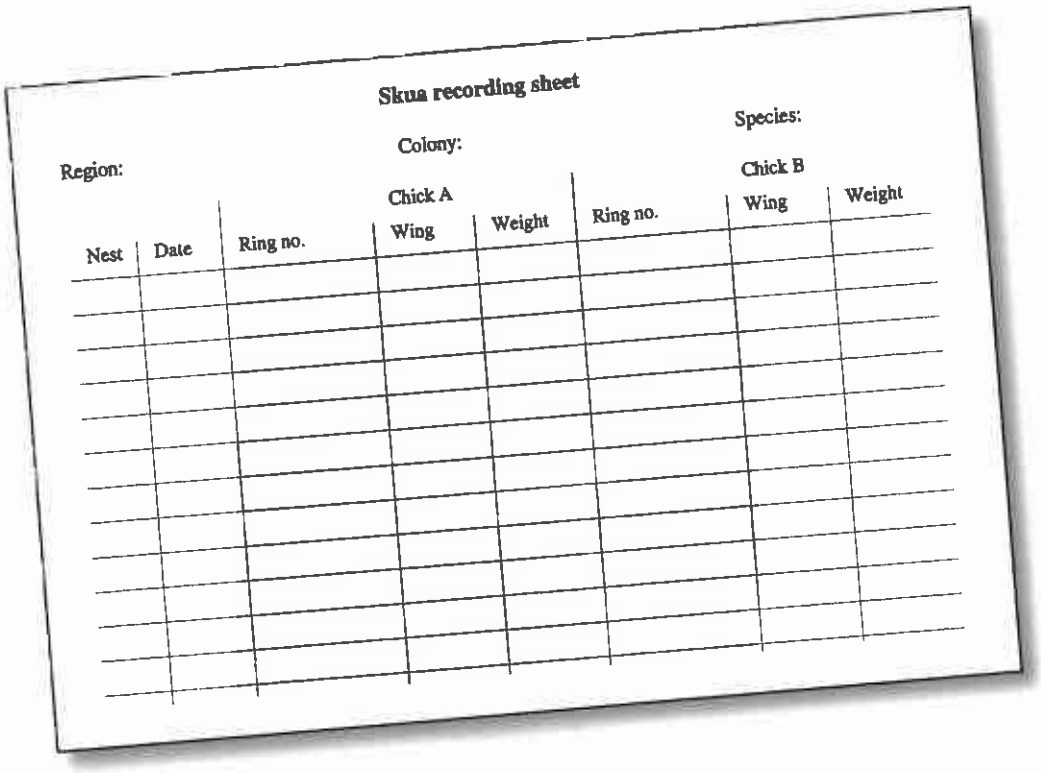
On the first visit, during the main incubation period, scan from suitable vantage points to locate incubating adults or other birds at nest-scrapes. Mark each nest with a bamboo pole or wooden stake. To reduce disturbance, try to note the position of several adjacent nests before marking them, rather than pinpointing and marking each nest separately. After each nest or group of nests is marked, locate a suitable vantage point nearby from which to continue searching.

Ideally, place nest-markers a set distance and direction from the nest (say 5 m south-west). Take care to ensure that nest-markers are not too obvious, to avoid attracting the attention of people or predators to nests. The position of marked nests should be noted on 1:10,000 maps, with notes on any useful landmarks nearby, to aid locating nests later.

At the next visit (10–15 days later), and on each subsequent visit, note the contents of each nest already marked and search for and mark any other nests that have appeared since the previous visit.

Once hatching begins, visit every 5–7 days. As a minimum, keep a note of the approximate size/age of each chick. Note also any dead chicks and any evidence of cause of death. Chicks should be rung (by a licensed ringer only) as soon as they are old enough (usually about 10 days) to allow individual identification. Chicks of 10 days and older wander considerably, so ringing is essential in obtaining accurate data on production from individual marked nests. If time allows, on each date weigh each chick to the nearest gram, and measure the wing (flattened, straightened chord of outer wing, excluding down) using a stopped wing rule. This will provide information on growth rates, which may give an indication of food availability. Measuring the wings of dead chicks may indicate age at death. Take care that handled chicks remain crouched and do not wander off (loose vegetation placed gently over their heads may ensure this). Record such information on a standard form (Figure 1).

Assess numbers of chicks fledging by visiting nests every 5–7 days from around the date of first fledging onwards (roughly over the period 10



Skua recording sheet

Region: Colony: Species:

Nest	Date	Chick A Ring no.	Chick A Wing	Chick A Weight	Chick B Ring no.	Chick B Wing	Chick B Weight

Figure 1
A sheet for recording skua productivity, as recommended by the *Seabird Monitoring Handbook*.

July to 10 August). Record numbers and approximate ages/sizes of chicks associated with each nest. Visits should continue until the outcome of each nest is known. Assume that any chicks surviving to four weeks old (arctic skua) or six weeks (great skua) will fledge successfully.

Express productivity as number of chicks fledged per nest found with eggs. Where two or more sample plots of a colony are studied, use the mean ± standard error of the individual plot figures.

Keep a separate note of any known post-fledging mortality, although quantitative assessment of this is difficult and it is not incorporated in the productivity assessment.

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