

## Distribution and numbers of the Pink-footed Goose in Central Iceland, 1966-69

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### Introduction

This report is based on the work of three expeditions to Central Iceland, which have extended the study of the biology of the Pink-footed Goose *Anser brachyrhynchus* begun by the Wildfowl Trust in 1950. In 1966, a Radley College Expedition investigated the region from 31st July to 5th September, spending ten days in Þjorsarver. In 1969, an Oxford University Expedition was based in the area from 1st July to 30th August, where they were assisted by a second Radley College Expedition from 28th July to 14th August.

During the period covered by the 1969 expeditions, an area of some 800 square kilometres, from Miklumyrar in the south to Gudlaugstungur in the north, was checked for evidence of breeding Pinkfeet. In addition to this, the river gorges of the Kerlingarfjöll, and Þjorsarver itself, were also investigated (Figure 1).

We were attempting to provide up-to-date knowledge about the Pinkfoot breeding distribution and numbers in view of the reported threat to inundate the Þjorsarver oasis in the course of hydro-electric developments. In 1969, both expeditions encountered almost continuous, unpleasant weather conditions.

### Distribution outside Þjorsarver

In the two years visits have been made by our expeditions to every area of meadow of significant size in the central highland region where Pinkfeet could breed, and the sides of many gorges have been examined. This represents the most likely overflow area from Þjorsarver, there being no serious barriers to the movement of geese and goslings from Þjorsarver to the west. To the east and south-east of Þjorsarver lies a huge tract of lava desert terminating in the Vatnajökull glacier. Although this area was not surveyed by our expeditions, it seems unlikely that Pinkfeet could breed in any significant numbers in this region, owing to lack of suitable habitat.

To the north and north-east of Hofsjökull, small numbers of breeding Pinkfeet have been reported from localities in the headwaters of the rivers Skjalfandafljót, Jökulsa a Fjöllum and Jökulsa a

Bru but it is probable that the total numbers of nests in these systems does not exceed 400, although most of these areas have not been examined for over 20 years (Scott, Fisher and Gudmundsson 1953; Yeates 1955). The Pinkfoot is restricted in Iceland to the Central Highlands, and is replaced as a breeding species in lowland and agricultural areas by the Grey-lag *Anser anser*. Pinkfeet belonging to the same population also occur in East Greenland. The number of breeding pairs is unknown but it is unlikely to exceed 1,000 (Christensen 1967).

Within the area between Hofsjökull and Langjökull glaciers from Miklumyrar in the south to Gudlaugstungur in the north, the following localities have been examined.

### The Kerlingarfjöll and southern meadows

Jökulfall: 70 nest sites of which a maximum of 50% are occupied in any one year. In 1966, an estimated 35 nests were occupied; in 1969, about 10, an apparent decrease. Small isolated Pinkfoot breeding colonies are known to be subject to wide and rapid fluctuation (Yeates 1955).

Kerlingaralda: five nests found, all occupied (1969) but only the northern third of this gorge system was covered.

Kisubotnar: evidence of breeding, in small numbers only, cited by Blurton Jones and Gillmor (1955) and our expedition (1966). Not examined in 1969.

Miklumyrar: surveyed only in 1969 (7th July). Twenty-one pairs with goslings counted. No nests were found.

Hrafntoftaver: surveyed only in 1969, when 11 pairs with goslings were found. There was one old nest on a roof of a kofi (hut).

Pinkfeet in both of these areas are presumed to have bred in the gorge systems of Kerlingarfjöll and to have moved down to the richer vegetation in these meadows. A walk of up to fifteen miles for a goose family does not appear to be unusual (J. Kear pers. com.).

Hvitarnes: on 6th August 1966, about 300 non-breeders were present. On 10th July 1969, no Pinkfeet were recorded and examination of the possible breeding sites in the river Froda gorges provided no evidence of breeding (Oxford Expedition).

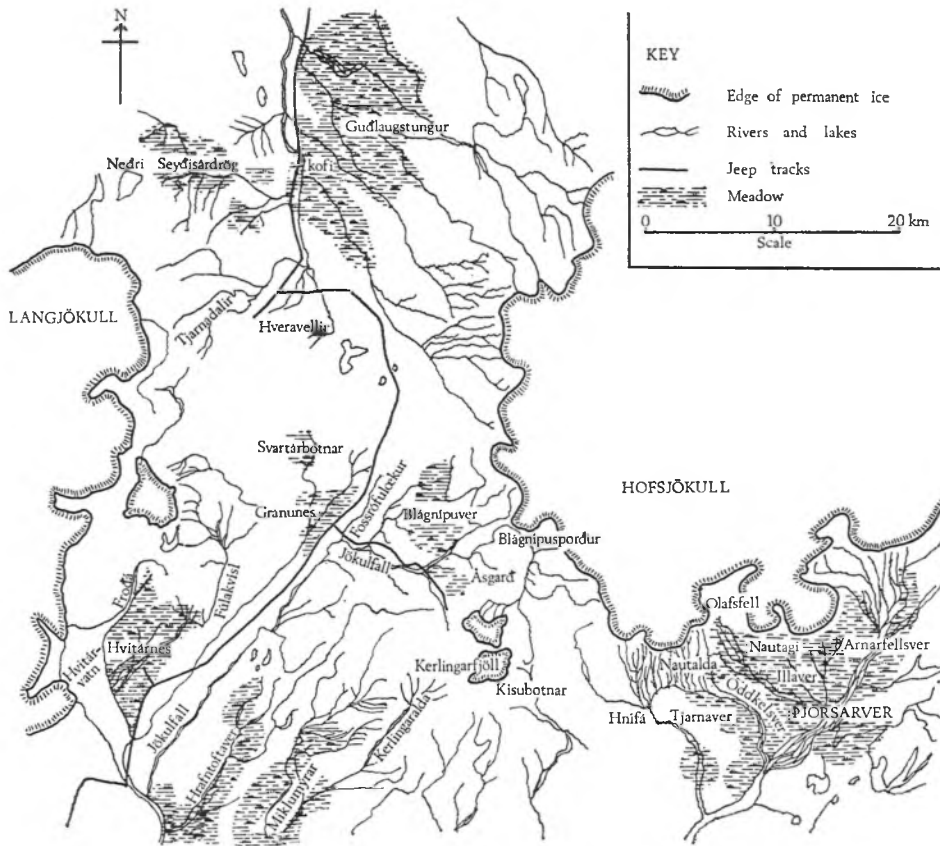


Figure 1. Central Iceland

### The central meadows

**Blagnipuver:** in 1966, 70 flightless Pinkfeet were reported in early August, without goslings. On 3rd July 1969, 32 geese and goslings present, but were not seen after 7th July (Oxford Expedition), nor on 29th July (Radley College Expedition).

**Granunes and the Svartarbotnar meadows:** in 1966, four flocks totalling approximately 100 birds were seen in late August, possibly non-breeders. An eggshell was found but no nests or other evidence of breeding. In 1969, 7th-12th July, no geese were reported (Oxford Expedition). On 30th July, 31 geese; 12 large goslings, 14 flightless adults, and 5 flying adults which were probably non-breeders. Two eggshells found suggested breeding here (Radley College Expedition).

To the south-west of Granunes nine well-grown, flightless and apparently

orphaned goslings, and one freshly killed bird, were found.

The relationship between numbers of Pinkfeet present in Blagnipuver and Granunes in 1969 suggests that the families and non-breeders moved from Blagnipuver to Granunes during early July.

**Blagnipuspordur:** in 1969, two pairs, each with three goslings, were present during the whole of July. Five nests (3 new, 2 old) were found along Jökulvisl gorge. Five presumed non-breeders were on moraine lakes at the head of Jökulvisl (Oxford Expedition).

### The northern meadows

**Tjarnardalur:** no evidence of geese was found in 1966 nor on 21st July 1969 (Oxford Expedition).

**Nedri Seydisardrog:** there were 13 adult Pinkfeet on 11th August 1966, but

none on 21st July 1969 (Oxford Expedition).

Gudlaugstungur: on 12th-13th August 1966, four separate flocks totalling 39 flightless adults, were seen and one nest found on the roof of a kofi. On 21st July 1969, no Pinkfeet were recorded. The old nest on the kofi was still present. The entire area was covered completely between 10th and 12th August. Two hundred Pinkfeet were recorded, all fully flighted and presumed non-breeders, there being no goslings (Oxford Expedition).

The total area of the Seydisardrog and Gudlaugstungur meadows exceeds that of Þjorsarver, and would appear to be the only possible alternative breeding ground for the Þjorsarver colony. Why this region has not been colonised by Pinkfeet, despite the increasing number of adult birds apparently unable to breed (Boyd and Ogilvie 1969), remains uncertain. Þjorsarver, being in the precipitation shadow of the Hofsjokull, may provide more settled weather conditions and earlier snowmelt. This may be critical, especially during the early part of the breeding season in May and June. Gudlaugstungur appears to be drier and its vegetation to differ from that of Þjorsarver, but an extensive botanical survey, such as that made for the latter by Sladen (1960), would be required to establish this. No vegetation maps for Gudlaugstungur have yet been published but the sedges and mosses (*Carex/Rhacomitrium* association), so abundant in Þjorsarver, may well not occur in sufficient quantity to support a large breeding population of Pinkfeet.

#### The population in Þjorsarver

Since 1951 this area, which includes Hnifarver, þufuver and Eyvindarkaver, has been known to hold the largest breeding population of Pink-footed Geese in the world (Scott, Fisher and Gudmundsson 1953). The 1953 Wildfowl Trust expedition (Scott, Boyd and Sladen 1955) estimated that it held at least 18,400 geese, comprising 8,200 adults and 10,200 goslings. That Þjorsarver remained of paramount importance as a breeding ground was confirmed, in general terms, by an aerial survey in 1964 (H. Boyd unpublished) and by the expedition of 1966 (Hardy 1967). In 1969 the opportunity arose to make a round quantitative assessment of numbers.

One of the objects of the Oxford expedition was to obtain a series of blood samples for esterase analysis. A compari-

son of the types and quantities of these enzymes with those from Pink-footed Geese in Spitsbergen might then throw light on the degree of genetic separation that had taken place between these two isolated populations (which do not even mix on the wintering grounds). Towards the end of our stay we therefore arranged a drive of the flightless birds, using the techniques developed with such success by the 1953 expedition. Since we only needed a few hundred birds at most, we confined the drive to a small area of approximately eight square kilometres on the northern outskirts of Þjorsarver. Even so, from this relatively small area we rounded up 3,000 birds. We decided that with such a large sample we should attempt to make as accurate estimates as we could both of the total and of the proportion of goslings. About 1,000 birds were penned for the purpose of blood sampling, while the remainder were allowed to disperse. The age ratio in the penned sample was approximately 8 adults to 10 goslings. These figures have since been confirmed from both ciné and still photographs.

The total area of Þjorsarver, calculated from a 1:50,000 map (AMNS. U.S. Army 1949) is about 120 sq. km. The area covered by vegetation (Iceland Survey Department 1967) is about 82 sq. km. If we make the assumption, admittedly unproven, that the geese were evenly distributed over the vegetated area, then our catch would represent 8/82 of the total population. This latter would thus be estimated at approximately 30,700, comprising 13,600 adults and 17,100 goslings.

Age ratio counts made during the November 1969 census of Pinkfeet in Britain revealed 24.4% young birds and a mean brood size of 2.2 (Ogilvie pers. com.). The total count was 74,000 geese, so the number of successful parents in the population was 16,400. Britain forms the sole wintering area for the Iceland and East Greenland Pinkfeet, so we can say that Þjorsarver held over 80% of the breeding pairs in 1969, and thus remains by far and away the most important breeding area. Despite the increased pressure there must be on the resources of Þjorsarver, with a breeding population increased 66% over the 1953 level, there appears, as we have seen earlier, little indication of spilling over into the vegetation oases to the north and west. This further strengthens the conclusion that those areas are in some way unsuitable for breeding Pinkfeet.

It is to be expected that the percentage of young found in Britain in November should be much lower than we found in Þjorsarver (55.7%) because the non-breeders from elsewhere would be included in the wintering flocks. They are now four times as numerous as breeders (Boyd and Ogilvie 1969), another suggestion that breeding sites are scarce. The mean family size accords well with that for Þjorsarver, 2.5 young per pairs, especially as further young would obviously be lost between August and November. Many of those in Þjorsarver were still so small that they would be unlikely to attain sufficient size and strength to migrate out when the first snows fell in September. The cooling and general deterioration of Iceland's summer climate (Kristjánsson 1969) is undoubtedly a factor in reducing breeding success, and one that may become increasingly serious.

### Conclusion

Þjorsarver remains the vital breeding headquarters of the British-wintering

Pink-footed Geese. It is ecologically unique and its use as a breeding ground could easily be jeopardised by any permanent alteration of water levels brought about by hydro-electric dams on the Þjorsa River. At present the geese find their necessary dry nesting sites only a foot above the general water level. Certainly the ultimate proposal, reported to be currently under consideration, to turn the whole of Þjorsarver into a vast storage lake would be disastrous. Even if the geese retreated to higher ground to build their nests, they would be deprived of the feeding meadows into which they lead their young.

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### Summary

In the summers of 1966 and 1969 members of Radley College and Oxford University Expeditions spent a total of thirteen weeks in Central Iceland, primarily working on the Pink-footed Goose.

Possible breeding areas to the north and west of the main concentration in Þjorsarver were found to hold only a few, mainly non-breeding, geese. A sampling technique gave a rough estimate of the population of Þjorsarver as comprising 13,600 adults and 17,100 goslings. The increase over 1953 estimates is in accord with that of the whole British-wintering population. The Þjorsarver area remains of paramount importance to this population and its proposed flooding under a hydro-electric scheme would be disastrous.

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### Footnote:

A helicopter survey of Þjorsarver in June 1970 revealed about 10,700 nests, proving the area to be of even greater importance than hitherto suspected. The full results will be published in WILDFOWL 22.