

Nest sites of the Common Gull *Larus canus* in relation to ice age geology and other factors

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In an area of 16.6 km² (water + small islands) in the inner archipelago of SW Finland, the breeding population of Common Gulls was c. 25 pairs. The pairs bred singly on woodless points of wooded islands, on woodless rocky islands and on small rocks with very little vegetation, without showing a clear preference for any of these types of nest sites. Nesting occurred exceptionally on other sites.

On wooded islands the Common Gull preferred points directed mainly northwestward (W—NE). During the ice age the ice-cap grew chiefly from NNW—NW to SSE—SE, polishing the striking side of the islands but depositing rock fragments on the opposite "lee" side. The latter consequently offers more suitable conditions for vegetation to grow, and is avoided by Common Gulls. Terns show the same predilection for NW points, and so do also the birds nesting as commensals in their colonies (mainly *Aythya fuligula*, *A. ferina* and *Tringa totanus*).

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Though the nest sites of most European birds are known in broad outline, detailed knowledge of where birds place their nests and why is still lacking (Berthold 1978). The protection the nest site offers against disintegration of the nest, predators and adverse weather conditions, as well as the availability of the sites and the competition for them are factors strongly influencing breeding success. Therefore, natural selection promotes behavioural mechanisms ensuring the choice of favourable sites. There are good indications that nest site choice in gulls is governed by innate releasing mechanisms (Goethe 1960). The choice of nest site will, in its turn, influence habitat selection (e.g. Palmgren 1932a, b on nest site and habitat

of the Sparrow Hawk *Accipiter nisus* and Goldcrest *Regulus regulus*).

In 1979 an investigation was made of the nest sites of the Common Gull *Larus canus* in the waters around Lemsjöholm in the inner archipelago of SW Finland, 30 km W of the city of Turku. The study of the breeding habits of our gulls and terns has mainly been restricted to the offshore parts of the archipelago, where their abundance is high, whereas the inner archipelago has been largely neglected (see also v. Haartman et al. 1963—72, p. 461). This gives a somewhat one-sided picture of their breeding habits.

The study area (Fig. 1) was about 6.4 by 5.6 km. Of this area 19.2 km² were mainland plus three larger islands (Rymättylä, Livonsaari and Kaita), the rest (16.6 km²) being

water and small islands, with a maximum length of 0.65 km. The islands may be divided into three types:

(1) Wooded islands. In the study area the Common Gull does not nest in the wood but may nest on rocky treeless points.

(2) Rocky woodless islands of some size. These islands may have a few trees, usually pines, or they may be treeless. The border between this type and types (1) and (3) is not sharp.

(3) Small rocks. They are smaller than the preceding type and have little or no higher vegetation, but usually offer enough crevices, platforms and similar spots for the Common Gull to nest. Small rocks, submerged at high water or easily washed over during storms, were not occupied by breeding birds and are not considered here.

In 1979 most islands were censused four times. On the wooded islands nests of Common Gulls are rather difficult to find. The gulls may show alarm behaviour not only at their breeding sites but also on adjacent islands, and much unnecessary searching is caused by such false alarms. Also, the young may swim from the breeding sites and settle on other islands. Occurrence of young is therefore a poor indication of breeding on a certain island and a check must be made by searching for the remains of a nest. Scrutinizing the rocky shores from a long distance with a pair of high-power binoculars or a telescope turned out to be helpful, as the nesting sites without exception overlook the sea. On rocky woodless islands and small rocks there is no difficulty in finding the nests.

In two cases rudiments of nests were found on wooded islands, but they were never finished, though pairs were seen at both places. These sites are shown with question-marks in Fig. 1.

If any pairs were overlooked, they are most likely to have existed in the SE corner or E margin of the area, or, less probably, in its SW corner. In a colony of Herring Gulls *Larus argentatus* (the northernmost island marked with an arrowhead in Fig. 1) there may have been two nests instead of one. I consider it possible that the population was about 10 per cent larger than the figures given in this text.

Including the two presumably non-breeding pairs, there were 25 pairs in all in the area of 16.6 km². Comparable figures from other areas in the inner archipelago of the Baltic are not available. In the handbook by v.

Haartman et al. (1963—72) the figures given for two lakes in interior Finland are 5 pairs on 250 km² and 45 on 150 km². Both censuses were, however, made in the mid-fifties, when Common Gull numbers were generally lower than today.

Within the study area the Common Gulls do not form colonies, but colonies from a few to about 10 pairs occur in its immediate surroundings. It is a common phenomenon in the Finnish archipelago that gulls and terns are strictly macroterritorial (one pair, one island) as long as their population is relatively small, but start to form colonies as soon as the population reaches a certain density.

Three conditions have usually to be fulfilled if a site is to be acceptable to the Common Gull for nesting. First, there has to be a foundation, guaranteeing that the nest will not disintegrate. Usually a niche, crevice or platform is chosen. A certain small flat rock was not used as a nest-site until a little platform of stones had been built on it as a base for bonfires.

Another factor contributing to the suitability of a nest-site is the view from it. Common Gulls chose sites overlooking at least a sector of the sea. They do not, however, usually place the nest on, or even near, the top of a rock, in contrast to certain other Larids, such as the Great Black-backed Gull *Larus marinus* or the Caspian Tern *Sterna caspia*. Instead, the mate not incubating spends much time guarding on a good outlook in the vicinity of the nest (sometimes as far away as 100 m). The places chosen as such outlooks are mainly steep rocks, but also trees, often dead ones, and man-made structures like flagpoles. The habit of sitting in tree-tops may be partly responsible for the occasional choice of a tree for nesting, which is

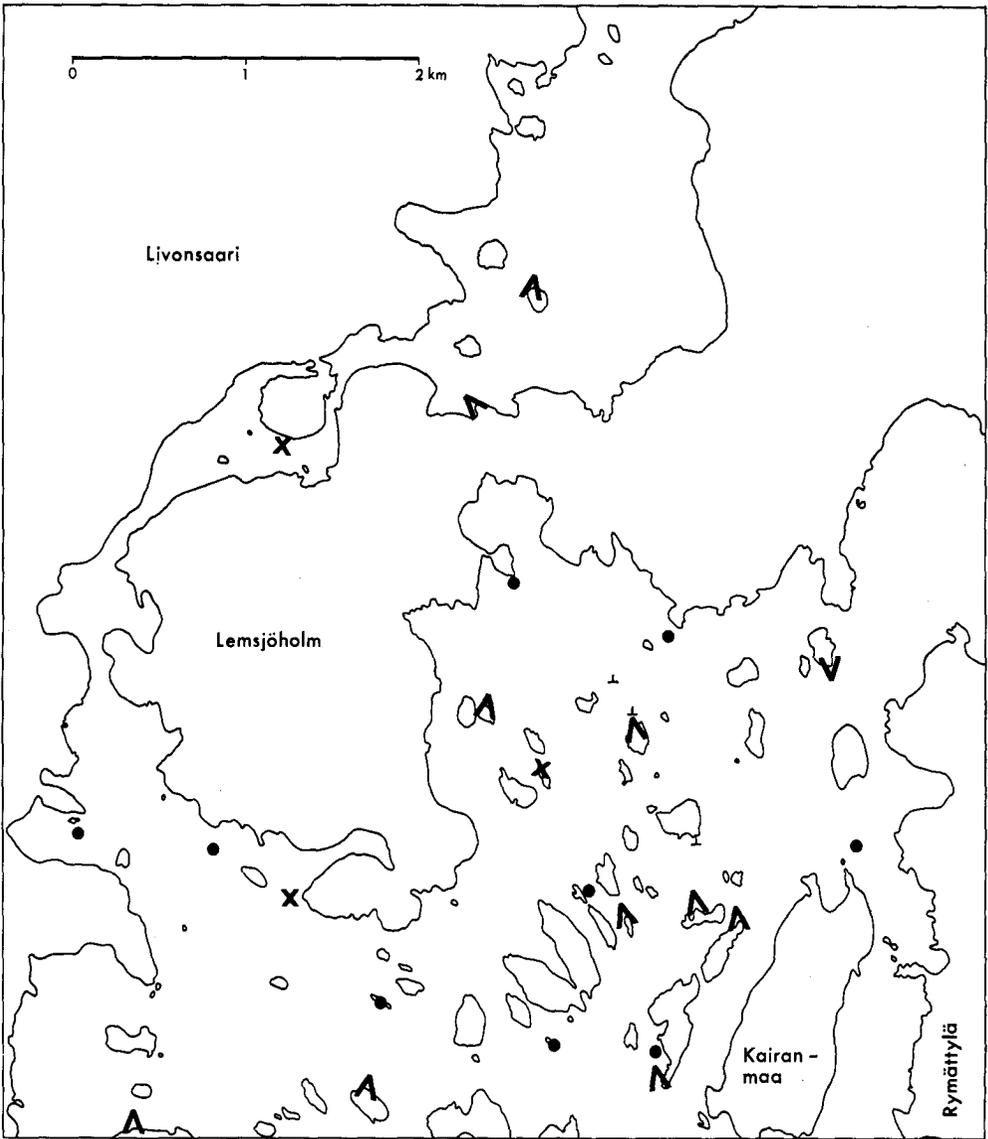


FIG. 1. The study area. Arrowheads = nests of the Common Gull on rocky points of wooded islands, the arrowhead showing the approximate direction of the point. ? = nests started but not finished. ● = nests on rocky woodless islands and small rocks. × = aberrant sites.

not so very infrequent among the versatile Common Gulls.

Goethe's (1960) systematic survey

of the types of nest site chosen by the larger gulls also applies in many respects to the Common Gull. The use of

a platform with a "back" (*Nestlehne*) or a nesting niche restricts the view from the nest but, at the same time, limits its visibility from the ground.

A third factor influencing nest site selection is the distance from the nearest trees. Predators, mainly the Hooded Crow *Corvus cornix* may strike from trees. The smallest distances from the nest to the nearest tree were 7 m (pine, only 3 m tall), 13 and 14 m (pines, about 6 m tall).

Though exact data are lacking, it was evident that few clutches of the Common Gull were lost in 1979 (only one case known). In other parts of the Baltic losses may, however, be severe (Mägi 1978).

As on islands in Finnish lakes (Lumiala 1937), the Lesser Black-backed Gull *Larus fuscus* in my study area usually nested in the wooded part of the islands. Competition with the Common Gull for nest sites is, therefore, excluded. A consequence of their different breeding sites is probably that Common Gulls occupy their breeding grounds immediately after arrival, whereas Lesser Black-backed Gulls remain standing on the ice outside their breeding islands for a prolonged period.

Some competition occurs between the Common Gull and the Herring Gull. In the spring of 1979 a pair of Common Gulls appeared at an old nesting place, but was soon replaced by a pair of Herring Gulls. The Herring Gull nest was not completed and no eggs were laid. In other cases replacement of Common Gulls by Herring Gulls was likely, though not actually observed.

The types of islands where Common Gulls nested in 1979 are shown in the following table. The average errors of the percentages are given:

Type of island	Wooded	Rocky woodless	Small rocks
Number	57	16	15
Occupied	11	5	5
Percentage	19 ± 5.2	31 ± 11.6	33 ± 12.1

The difference between the wooded islands and all the woodless ones (rocky woodless + small rocks) is not statistically significant.

The nest sites of the Common Gull on the wooded islands (Fig. 1) were generally placed on points or shores facing W—NE, mainly NW. In the following they will be referred to, for convenience, as NW points. In one case a NW point was actually close to the south end of an island, but here the shore clearly curved towards the NW. The single nest found on the mainland shore was also on a NW point. Among the sites known before 1979 were at least five other NW points, as against a single further SE point. In 1979 the score was 10 to 1 in favour of NW points. If two started, but never finished nests are included, the score was 12 to 1. The total score, including sites known from earlier summers, was 17 to 2, i.e. 88 % ± 7.4 NW points.

The colonies of terns (*Sterna hirundo* and *S. paradisaea*) and birds breeding in their company (Tufted Duck *Aythya fuligula*, a few Pochards *A. ferina* and Redshanks *Tringa totanus*) also choose NW points when they breed on wooded islands. In 1979 there were two such mixed colonies on NW points, and none on SE points. On a further NW point the terns' nests were plundered before their commensals had started nesting. In earlier years at least four other NW points were occupied by such mixed colonies, as against a single SE point.

The reason why birds prefer to nest on cliffs with a certain direction are, of course, manifold. Early breeding

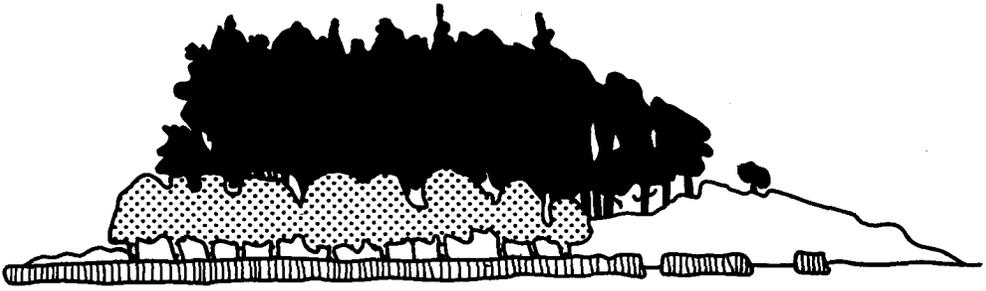


FIG. 2. Schematic picture of wooded island in the study area. The bare, rocky NW point is to the left. White = rock, black = pines, spruce, dotted = alders, hatched = reeds.

species may utilize south-facing slopes because these become snow-free earlier. Archipelago birds do not lay so early and have no simple physical advantage in nesting on NW points. On the other hand, the geomorphology of the NW and SE points is quite different.

During the ice age(s) the ice cap grew mainly from NNW-NW to SSE-SE, exerting enormous pressure on the underlying rocks not only in a vertical but also in a horizontal direction. The abrasion caused by the ice with its embedded rock fragments polished the striking (*stoss*) side of the rocks to shields and domes (see Fig. 2; for a description with illustrative photographs, see Hausen 1947), though the varying resistance of different minerals (in the present area granite and gneiss-granite, Moberg 1887) resulted in numerous irregularities in the surface, suitable as nest sites for gulls. Scratches caused by the moving rocks show the exact direction in which the ice cap was moving.

On the "lee" side of the rocks the situation was quite different. Here, the ice on its way forwards and downwards deposited accumulated masses of gravel and stones. The lee sides of the islets are, therefore, much more ragged than their polished striking sides.

In the postglacial period the present archipelago was submerged below the Baltic and its forerunners. Some sediments must have been deposited even at an early stage, but as the islands began to rise above the sea (the rate of uplift is now more than 60 cm per century) this process was speeded up. During periods of high water and storms, algae (mainly *Fucus*) and higher aquatic plants (especially *Phragmites*) are washed up and form banks on the shores, especially those that are less polished and steep. Finally, this organic matter decays into soil, offering substrates for a vegetation succession whose climax is forest. This process is less rapid on the glacial striking side of the islands, making it more favourable as a breeding site for gulls, terns, and their commensals.

On rocky woodless islands, and even more on small rocks, there is no visible preference among the Common Gulls for a certain side of the islands. Also, on wooded islands in the somewhat more marine region outside the study area, hardly any preference for NW points is evident, as the distance between the shoreline and the nearest trees is great enough on all sides of the islands.

The Common Gull is the most versatile of our gulls with respect to its choice of nest

sites. In 1979 the following aberrant sites were noted in the study area:

(1) A nest on the top of the stump of a large broken pine, 2.2 m above the ground. Breeding in trees has been observed repeatedly in Finland (v. Haartman et al. 1963—72).

(2) A nest at the border of a dense clump of reeds, growing in shallow water in a eutrophic bay and forming a small "island" a few square metres in size. The nest was unusually large. Nesting in dense reeds has been observed by Fritzen & Tenovuo (1957) in a very large eutrophic bay, where nesting in clumps of *Carex* was common.

(3) A nest on a large stone on the shore of a small rocky woodless island. This is a much more common site in lakes and in some other parts of the archipelago, where the geomorphology is different.

(4) A nest on the shore of the mainland. The site was the usual: a rocky shore facing NW. I never saw any other nests on the mainland in this area.

In a lake in central Sweden I have seen a Common Gull's nest on a landing stage, and in Finland nests have been found, for instance, on the roofs of buildings, but no such man-made structures were used as nest sites in my study area.

Selostus: Kalalokin pesäpaikat ja niiden riippuvuus jääkauden geologiasta ja muista tekijöistä

Lounais-Suomen sisäsaaristossa pesi v. 1979 n. 25 kalalokkiparia 16.6 km²:n suuruisella alueella, mukaan luettuna vesi ja pienet saaret. Parit pesivät yksitellen metsäisten saarten kallioisilla niemikkeillä, metsättömillä kareilla sekä kallioisilla pikkukareilla, ilman selvää mieltymystä mihinkään näistä tyypeistä. Poikkeuksellisia pesimäpaikkoja olivat mantereen kallioranta sekä erään eutrofisen lahden ruoikkosaareke. Yksi pesä metsäisellä pikkusaarella oli katkaistun männynrungon päässä.

Metsäisillä saarilla kalalokki yleensä pesi luoteeseen suuntautuvilla (W—NE) niemikkeillä. Jääkaudella mannerjäätikkö liikkui pääasiassa suunnassa NNW—SSE, höyläten saarten luoteispäitä, mutta aiheuttaen soran ja

kivien kasaantumista saarten vastaiselle "varjo-puolelle". Tästä syystä luoteispäät ovat yleensä vailla kasvillisuutta, eritoten metsää, jota taas kasvaa kaakkoiskärjissä melkein rantaan asti. Saarten luoteispäät ovat täten yleensä edullisempia kalalokeille pesäpaikkoina.

Tiirat reagoivat samalla tavoin pesiessään sisäsaariston metsäisillä saarilla, ja niin tekevät myös niiden yhdyskunnissa pesivät muut lajit (tukka- ja jossain määrin punasotka, punajalkaviklo).

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