

Archipelago bird populations in Finland: monitoring and recent changes

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The paper reviews changes in the populations of Finnish archipelago birds in 1960–1980. During the study period a few areas were censused regularly, most of these islands being protected. The data suggests increases in *Cygnus olor*, *Anser anser*, *Somateria mollissima*, *Haematopus ostralegus*, *Stercorarius parasiticus*, *Larus canus*, *L. marinus*, *L. argentatus*, *Sterna paradisaea*, *Cephus grylle* and *Alca torda*. The species that have decreased include *Aythya marila*, *Melanitta fusca*, *Charadrius hiaticula* and *L. fuscus*. There are regional differences in the trends.

It is argued that the strategy employed so far in monitoring archipelago birds in Finland, censuses of mainly protected study areas, may give unreliable and unduly encouraging results. Data from unprotected areas (i.e. the majority of the islands) suggest that large-scale declines may have started recently in many populations. A suitable monitoring programme is briefly outlined. This should comprise censuses covering all types of islands and large regions, using standard census techniques and including production studies.

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Introduction

The Finnish coast washed by the brackish waters of the Baltic, has a strongly indented coastline and a vast archipelago consisting of tens of thousands of islands, islets and skerries. These host a rich bird community, a peculiar mixture of both fresh-water and marine species. The term “archipelago bird” here means species that breed mainly on treeless islands. Species bound to the terrestrial habitats of wooded islands, birds of coastal bays and all passerines are excluded. The archipelago birds thus comprise some of the swans, geese and ducks (*Anseriformes*), and some waders, skuas, terns, gulls and auks (*Charadriiformes*).

This paper, based on published information, reviews recent trends (1960–1980) in archipelago birds. During the present century, the interest in these birds has fluctuated. A number of pioneering studies were carried out in the 1920s and 1930s (Bergman 1939), and a chain of monitoring areas was set up by the game authorities (Grenquist 1965). These areas produced results up to the early 1960s. During the period covered here, monitoring has been carried out in a few areas on a more or less irregular basis, with only sporadic publication of results. This is unfortunate, since some evidence (Bergman 1965, Kilpi 1983, Kilpi et al. 1984) suggests that drastic changes have taken place during the 1960s and 1970s. Careful documentation of changes might have enabled us to react earlier and take the appropriate protective measures.

The study areas and data used

Fig. 1. shows the different archipelagoes along the Finnish coast and the study areas cited in the text. Jaatinen's (1984)

classification has been simplified, but it should give a rough idea of the extent and structure of each major region and the habitats available there. The southern archipelagoes have a greater relief than the northern ones, and islands composed of bedrock predominate. The northern archipelagoes are lower, and the islands are built up of morainic material.

The archipelagoes can be divided into several zones, mainly on the basis of the degree of exposure (Häyrén 1900). Three zones can easily be discerned in the archipelago of the Gulf of Finland (the inner, middle and outer zones). Most treeless islands occur in the outer zone, and hence the bird community treated here is typical of this zone. The archipelago of the Archipelago Sea is structurally more complex, and the zones occur around central islands surrounded by groups of smaller islands.

The stability of the landscape is greater in the southern archipelagoes. In the northern archipelagoes, the land upheaval and habitat succession are more rapid (Jaatinen 1984, Väisänen & Järvinen 1977a,b). The habitats available differ among the archipelagoes, so that the bird community also differs. For a general picture of the geographic distribution of the species, see Hyttiä et al. (1983). It should be noted, that other factors besides habitat availability affect the distribution of the species, such as the availability of certain food resources.

I have used data from a few areas which can be regarded as monitoring areas (Table 1). In addition, a number of special studies have been consulted and these will be cited whenever used in the next section. The methods employed in the study areas have varied. Most census work has involved nest counts, but other criteria of breeding have also been used (e.g. number of pairs or adult birds present). The quality of the censuses also varies from year to year even within the same area (Hildén 1964, Väisänen & Järvinen 1977a).

Recent population trends

Increasing species

The Mute Swan *Cygnus olor*. The Mute Swan bred for the first time in Åland in 1934, and in the Archipelago Sea in 1958. The species has increased and expanded its range in the 1970s. The Mute Swan is primarily a species of coastal

bays, but it also breeds commonly in the outermost archipelago. In 1970 the total population for Åland and the southwestern part of the Archipelago Sea was estimated at 125 pairs, and in 1975 the estimate was 400 pairs on Åland alone (Tenovuo 1975, 1976).

The Greylag Goose *Anser anser*. Though the records are insufficient, the Greylag Goose is apparently increasing in the Archipelago Sea and the Gulf of Finland (Blomquist & Tenovuo 1980, Kilpi unpubl.). On the other hand, data published from Hailuoto, Bay of Bothnia, indicate a decrease in the 1970s (Vikberg 1980). Recently, however, Pulliainen & Tynjälä (1984) reported a general increase in the northern part of the Bay of Bothnia.

The Eider *Somateria mollissima*. The most numerous duck in the Finnish archipelago, the Eider has increased up to 1980 in both the central and marginal parts of its range (Fig. 2). Stjernberg (1982) summarized data from 10 areas in 1969–81, and concluded that the Finnish population had probably doubled between 1973 and the early 1980s. The total figure put forward for the population in 1973 was 175 000 pairs (Almkvist et al. 1974), the population should thus now exceed 350 000 pairs.

The Oystercatcher *Haematopus ostralegus*. The data available indicate an increase. On Trollö 13 pairs were recorded in 1963 and 26 in 1977, but on the whole the trend is poorly documented. Very recently, Valste & Palmgren (1984) concluded that the species has increased in the western part of the Gulf of Finland.

The Arctic Skua *Stercorarius parasiticus*. Stjernberg (1983 and unpubl.) has indicated an increase along most of the coast, with expansion into new areas.

The Common Gull *Larus canus*. The Common Gull increased in all the monitoring areas up to the time of the last censuses (see Fig. 3). Since the late 1960s, however, the species has suffered a drastic decline in the Gulf of Finland (Bergman 1965, Kilpi et al. 1984), on both protected (M. Hario, pers. comm.) and unprotected islands.

The Herring Gull *L. argentatus*. Bergman (1965), Kilpi et al. (1980) and Kilpi (1983) have reported on the population trends, showing substantial growth in all the major study areas. The densest population breeds in the central and western parts of the Gulf of Finland (Kilpi et al. 1980), where the population increased from some 1200 pairs in 1965 (Bergman 1965) to at least 12 000 pairs in 1979 (Kilpi et al. 1980 and unpubl.). Due to control measures, it has since declined.

The Great Black-backed Gull *L. marinus*. Another successful gull, the Great Black-backed, has increased in the Gulf of Finland from 200 pairs in the late 1950s to at least 410 in 1979 (Kilpi et al. 1980) and well over 500 pairs in 1984 (Kilpi et al. 1984). The number of pairs in the monitoring areas is too small for definite conclusions.

The Caspian Tern *Sterna caspia*. Väisänen (1973) suggested that the whole Baltic population doubled between c. 1950 and 1970, with half of this population breeding on the Finnish coast (see also Staav 1979). Recently, Kilpi (1984) reported a decline in the numbers of chicks ringed, which is not thought to be a consequence of a decreased ringing effort. According to the very preliminary results of a large-scale inventory carried out in 1984 (M. Hario et al., unpubl.), the population seems to have declined somewhat since the 1970s. The population at Valassaaret has been stable for the last 10 years.

The Arctic Tern *S. paradisaea*. v. Haartman (1982) demonstrated an increase in his study area in the northern part of the Archipelago Sea. This increase seems to be corroborated by the data from Trollö and Valassaaret. The records made on Krunnit between 1959 and 1970 suggest a stable population, while the data from Aspskär (Grenquist 1965) may indicate a decline.

The Black Guillemot *Cephus grylle*. The records from Valassaaret indicate a continuous increase, but the species is declining in the Gulf of Finland (Fig. 4).

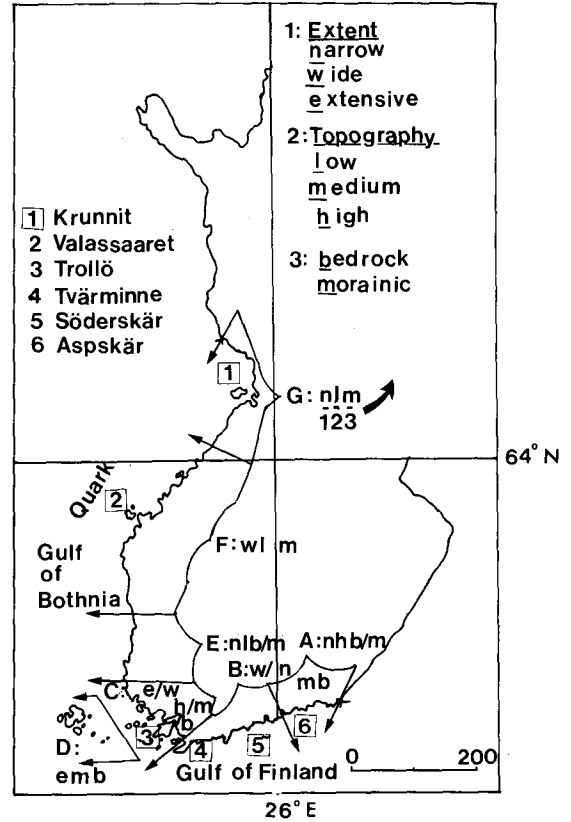


Fig. 1. The coast of Finland, and its archipelagos (modified from Jaatinen 1984). Numbers mark the monitoring areas used, other localities mentioned in the text are also given.

Table 1. Study areas for which data exist for the period 1960–1980, and sources consulted (compare with Fig. 1). Aspskär, Söderskär, Valassaaret and Krunnit can be considered as entities; they are groups of islands, Valassaaret being a whole miniature archipelago. Trollö is less exposed than the other areas.

Area	Islands	Status	Sources used	Time analysed
Aspskär	6	Protected	Grenquist 1965 Malkio et al. 1982	1965–1981
Söderskär	25	Protected	Hario & Stenman 1980	1964–1978
Trollö	90	Unprotected	Lemmetäinen 1980	1963–1977
Valassaaret	60	Protected	Hildén et al. 1978 Hildén 1983	1960–1978 (1983)
Krunnit	22	Protected	Väisänen & Järvinen 1977a,b	1959–1970

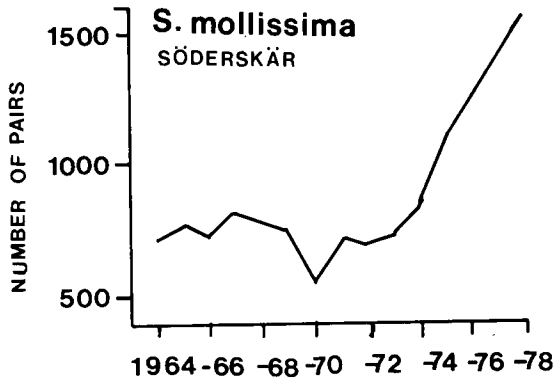


Fig. 2. Development of the Eider population on Söderskär according to Hario & Stenman (1980). The numbers are based on very detailed nest counts.

The Razorbill *Alca torda*. An increase has occurred at Aspskär, which supports the largest single colony of this species in Finland (c. 300 pairs, Malkio et al. 1982). In the Quark, the number of individual Razorbills in 22 colonies rose from 215 in 1957–60 to 668 in 1972–76 (Hildén 1978). The Baltic population has probably not yet reached the level of the 1930s. The Razorbill population suffered a severe decline in the 1940s (v. Haartman 1947).

The Guillemot *Uria aalge*. The single colony known in Finland (Aspskär) was established in 1957, and increased from 15 pairs in the late 1970s to 31 pairs in 1981, probably largely due to immigration from the Swedish colony at Stora Karlsö (Hario 1982).

Decreasing species

The Scaup *Aythya marila*. The Scaup has a northern distribution, being absent from the Gulf of Finland and the Archipelago Sea. The species shows fairly large fluctuations

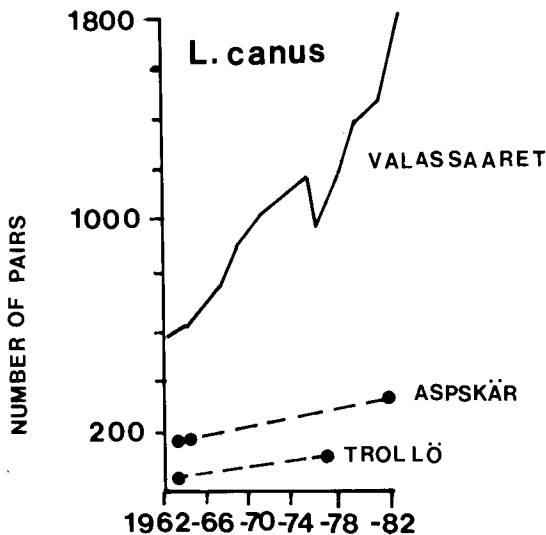


Fig. 3. Development of the Common Gull population on Valassaaret (Hildén 1983), Trollö (Lemmetyinen 1980) and Aspskär (Grenquist 1965, Malkio et al. 1982). Censuses on Trollö in 1963 and 1977, and on Aspskär 1962, 1963 and 1981 included.

in numbers from year to year, but the trend on Valassaaret is clear, from a peak of 125 pairs in 1972 to only 8 pairs in 1983.

The Velvet Scoter *Melanitta fusca*. At Valassaaret the species has remained at the same level throughout the study period; it has decreased at Krunnit, remained stable at Trollö and decreased since the late 1950s at Aspskär (see also Grenquist 1965). Harberg (1978) has reported a severe decline since c. 1960 in the Åland archipelago.

The Ringed Plover *Charadrius hiaticula*. The species has never been numerous in the archipelago, but a decline seems reasonably certain. At Valassaaret, where a maximum of 10 pairs was recorded in 1960, the species disappeared in 1975, and has not bred since (Hildén et al. 1978, Hildén 1983). At Trollö, 4 pairs in 1960, none in 1977; at Aspskär 4 pairs in 1960, 1 (?) in 1981. At Krunnit 49 pairs in 1959, but only 16 pairs were found in 1970.

The Lesser Black-backed Gull *L. fuscus*. The population trends of this species have been treated in a previous study (Kilpi 1983), which includes all the monitoring areas. A decline was reported for all the areas except Krunnit (only up to 1970). In the Gulf of Finland, the Lesser Black-backed started to decline when the Herring Gull had reached a fairly high population density in the 1960s, but further studies are needed to clarify the possible effect of the Herring Gull upon the Lesser Black-backed.

Stable species, or insufficient data

The Tufted Duck *Aythya fuligula*. The populations of the Tufted Duck are known to fluctuate greatly from one year to another (see v. Haartman & Elfving 1957, who related this to the ice conditions of the Baltic). The data from Valassaaret indicate a fairly stable population with strong fluctuations.

The Common Tern *S. hirundo*. The Common Tern population has probably been stable at Krunnit (1959 51 pairs, 1970 48 pairs). On Valassaaret, the species seems to have been stable, but a sudden increase occurred in 1983. At Trollö, it seems to have decreased somewhat, and a decrease is likely on Aspskär. The trend remains largely unclear, partly because the tern is capricious in its choice of breeding locality.

The data available for two waders, the Turnstone *Arenaria interpres*, and the Redshank *Tringa totanus*, are either too scanty (Aspskär, Trollö) to warrant any conclusions, or too vague (Valassaaret). The population on Valassaaret is said to be stable. Recently, Valste & Palmgren (1984) indicated an increase during the last 60 years in the western part of the Gulf of Finland, but during recent decades, both species have definitely decreased in the central, and also the western, part of the Gulf (Kilpi et al. 1984).

The Goldeneye *Bucephala clangula*, Goosander *Mergus merganser* and Red-breasted Merganser *M. serrator* have been insufficiently monitored, and no conclusions can be made. In addition, the two first species are almost entirely dependent on nest-boxes.

Discussion

Since the study areas are small, many less abundant species occur there in low numbers, and adequate samples cannot be obtained (e.g. the Mute Swan, Greylag Goose, some waders, the Arctic Skua). Less abundant species require a very different monitoring strategy, involving censuses over wide areas (see Tenovuo 1975 on the Mute Swan). Even in the case

of the abundant species we can ask whether the results from the monitoring areas can be generalized to cover the whole archipelago, or even the segment they represent. The total number of islands censused within the monitoring areas is c. 200. The total number of islands of over 0.3 ha in the archipelagoes exceeds 28 000 (Hustich 1964), and these vary widely in their potential for sustaining a rich bird community. Even if we assume that the census islands reflect the habitat distribution on these islands as a whole (which they probably do not), a very large difference still remains; the majority of the census islands are protected. Protected islands are in the minority among all the islands (Borg 1974), and the events on their breeding grounds may not reflect the changes on unprotected islands. According to Borg (1974), 407 larger islands (> 1 ha) and 746 smaller islands are protected. No evaluations are available of the ratio of the pairs of various species on the protected islands to their total populations. In view of the low numbers of protected islands, I suspect that only a small fraction breeds on protected islands.

On the unprotected islands, the degree of disturbance varies a great deal. With respect to human interference, at least the following categories can be distinguished:

- islands with permanent residents
- islands with summer residents
- islands frequently used by boaters and campers
- islands reserved for the military forces (public landing prohibited, many islands very peaceful, but some used as gunnery targets)
- islands not often used by boaters or campers (very remote or barren sites, supporting large colonies of, for instance, Herring Gulls)

Thus, it may be hazardous to generalize the results obtained on the census islands, and even disastrous from the point of view of conservation decisions, since the census areas may give a skewed picture of the real situation. Some published results show striking differences in the development of the avifauna on protected and unprotected sites (Väisänen & Järvinen 1977b).

As yet, we do not know just how big a discrepancy exists between the trends presented here and the trends on a regional scale or in the total populations. It would seem that a new strategy is required for reliable monitoring of archipelago birds. What we need is a system where population studies are carried out:

- on all types of islands
- as large, regional surveys for some species
- in all parts of the archipelago
- using standard, and reliable, census methods
- with attention to production as well
- as in-depth autecological studies on single species.

If such a monitoring program is considered worthwhile, we would have a fair chance of producing reliable data on population ups and downs, and obtaining a sound basis for conservation planning. One step

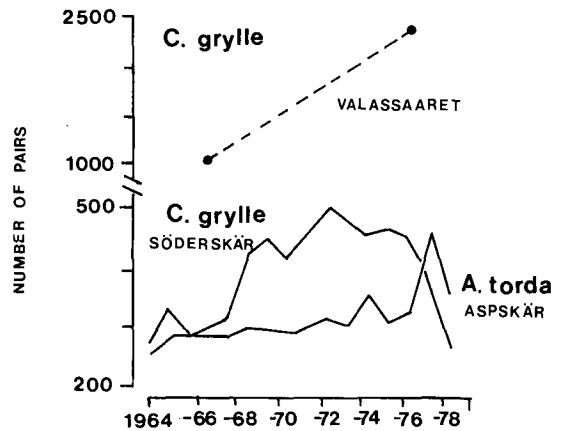


Fig. 4. Changes in the Black Guillemot population on Valassaaret (upper graph, Hildén et al. 1978), and the Black Guillemot and Razorbill populations at Aspskär (Hario & Stenman 1980). The Valassaaret graph is based on only a few censuses. The Razorbill colony at Aspskär is the largest single colony of this species on the Finnish coast.

in this direction would be to re-establish the areas used by Grenquist (1965), and to promote publication of faunistic data, which is currently unfashionable among ornithologists.

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Selostus: Suomen saaristolinnusto: viimeaikaisista muutoksista ja seurannasta

Suomessa saaristolintuja (= puuttomien luotojen lajisto) on tutkittu melko ahkerasti aina 1930-luvulta lähtien. Valtion Riista- ja kalatalouden tutkimuslaitoksen merellisillä seuranta-alueilla seurattiin populaatioiden kehitystä aina 1960-luvun alkuun, jonka jälkeen toiminta osittain lakkasi. Tämän tutkimuksen kattaman ajanjakson toistuvia laskentoja on tehty vain muutamilla alueilla, Suomenlahdella Pernajan Aspskärillä, Porvoon mlk:n Söderskärillä, saaristomeren Trollön alueella, Merenkurkun Valassaarilla ja Perämeren Kruneilla. Näistä kaikki alueet paitsi Trollö ovat suojelualueita. Näiden seuranta-alueiden lisäksi on ajanjaksolta julkaistu muutamia laajempia yksittäisiä lajeja tai lajiryhmiä käsitteleviä töitä.

Tutkittuna ajanjaksona seuraavat lajit ovat runsastuneet: kyhmyjoutsen, merihanhi, haahka, meriharakka, merikihu, kala-, harmaa- ja merilokki, räyskä, lapintiira, riskilä, ruokki ja etelänkiisla. Kiistatta taantuneita lajeja ovat lapasotka, pilkkasiipi, tylli ja selkälokki. Edellä olevat tiedot ovat yleistyksiä koko levinneisyysalueelta; paikallisesti suuntaus saattaa poiketa esitetyistä. Lisäksi monet tässä runsastuneiksi mainitut lajit ovat aivan viime vuosina alkaneet taantua (haahka, kalalokki, paikoin riskilä ja räyskä). Seuranta-alueiden antama kuva tukkasotkan, kalatiiran, karikukon, punajalkaviklon ja harvalukuisten *Anas*-lajien sekä molempien koskeloiden kannankehityksestä on epäselvä. Ainakin mainitut kahlaajat ovat laajoilla alueilla taantuneet.

Kirjoituksessa painotetaan sitä, että luotettavan seurannan kannalta saaristolintututkimus on jonkinlaisessa krii-

sissä. Ne harvat alueet joita tutkitaan ovat suureksi osaksi suojelualueita. Näillä alueilla kantojen kehitys saattaa poiketa suuresti "normaalikäytössä" olevien saaristojen lintukantojen kehityksestä. Suojelusuunnitelmien laadinnan kannalta on arveluttavaa käyttää näiltä alueilta saatuja tuloksia. Seurannan piiriin pitäisi ottaa kaikenkattavia saaria kaikista eri saaristoista, laajat inventoinnit joidenkin lajien kohdalla ja myös poikastuotannon mittausta. Lisäksi olisi syytä kiinnittää huomiota yhdenmukaisten takseerausmenetelmien kehittämiseen sekä myös syvällisesti tutkia varsinkin taantumien syitä. Saaristolinnusto on nykyään menettämässä kiihtyvään tahtiin pesimäympäristöään ihmisen vapaa-ajan harrastusten takia. Saaristolintujen populaatiokehitystä pitäisi tutkia suhteessa mm. tähän. Suojelualueiden pinta-ala on yhteensä häviävän pieni suhteessa koko saariston pinta-alaan, eivätkä suojelualueiden lintukannat yksinään riitä ylläpitämään elinvoimaista saaristolinnustoa.

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