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The shore- and waterbirds on some grazed and ungrazed islands on the Finnish west coast

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The study deals with the shore- and waterbirds on 12 low moraine islands (areas 2.0–23.6 ha) on the Finnish east coast. Five of the islands were still grazed during the study year or until very recently, while the other seven were mostly covered with forest. Of the shore- and waterbirds counted, 86% nested on the grazed islands. The density of breeding birds was significantly higher on the grazed islands than on the ungrazed ones, but there was no statistically significant difference in the numbers of species or pairs.

Although many topographic features of the islands may influence the composition of the bird fauna, there was a significant correlation between the proportion of open areas (i.e. low grass meadows and areas with scanty bushes) and the density of the shore- and waterbirds. The bird density was 1.5–13.3 pairs/ha on the ungrazed islands (13–26% open areas), and 10.6–74.5 pairs/ha on the grazed islands (28–100% open areas). I suggest that continuation of grazing for keeping at least 40% of a grazed island open would be a practical and cost-effective method of ensuring a fairly rich shore- and waterbird fauna.

1. Introduction

Nordic ecologists commonly recognize changes in land use as an important factor that may lead to profound changes in the flora and fauna, even over a period of a few decades. In Finland, for instance, the changes in forestry and the abandoning of traditional farming methods have greatly altered the habitats and their fauna (e.g. von Haartman 1975, Ahlén 1977, Rassi et al. 1986).

In fact, the rapid change of former open and forested meadows seems to be one of the major factors endangering the more than 1000 threatened species in Finland. Rassi et al. (1986) calculated that 158 Finnish species are unfavourably affected by this environmental change, the number being higher than for any other threat factor.

Data so far collected on formerly grazed shore meadows show that when the management is terminated, the species assembly changes markedly and the density of the avifauna decreases. Bird groups that may almost totally disappear in certain areas are the waders and the ducks (Larsson 1969, von Haartman 1975, Soikkeli & Salo 1979, Siira & Eskelinen 1983, Salo 1984, Ottosson et al. 1989; see also Lampolahti 1984, Johansson et al. 1986). However, several passerines and waterbirds may also benefit from the changes in the shore meadows (e.g. Larsson 1969, von Haartman 1982, Salo 1984).

In this paper, I shall deal with a set of small or medium-sized islands in the Ostrobothnian archipelago, almost half of which have been subjected to grazing until very recently. I wish to determine

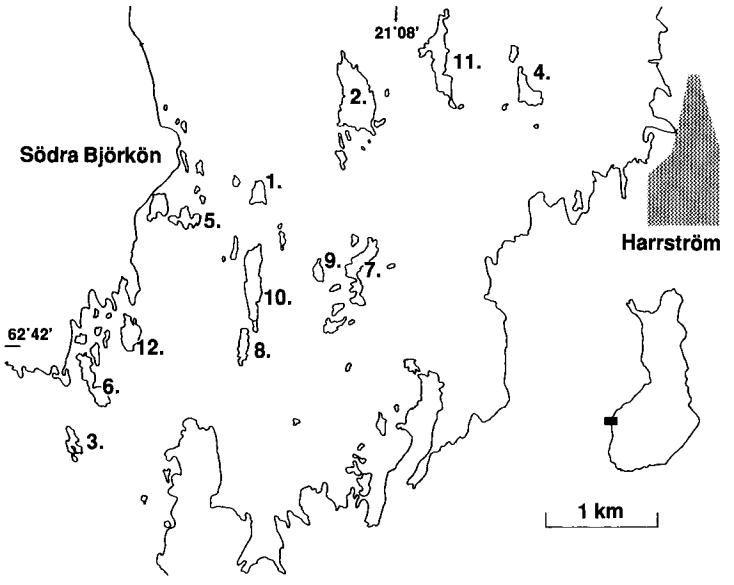

Fig. 1. The study area in the Harrström archipelago. The islands censused are denoted by numbers (1–12), which are the same as in Table 1.

whether the composition of shore- and waterbirds on the grazed islands differs from that on ungrazed islands, and if the possible differences observed could be maintained by simple management.

2. Material and methods

On 23 and 25 May 1989, I censused the waders and waterbirds on 12 islands in the Harrström area in the commune of Korsnäs (62°42′N, 21°08′E) (Fig. 1). Some preliminary observations had been made in May 1988 (see Ulfvens 1988a).

The census was performed by walking on the shore around every island studied. I interpreted one wader or one duck giving alarm calls as a pair. The census was performed so late that some of the Eiders *Somateria mollissima* had probably completed their incubating (on 25 May I saw Eider young on the water in the area studied). The number of breeding Eiders is therefore most probably underestimated. This may also be true of early breeding dabbling ducks. However, these sources of error should not bias the final result as long as they affect the whole material uniformly.

The larids were censused either by counting nests or by counting adult birds flying above the colonies; in the latter case I added 10% to the number of birds observed, as some of the birds are probably absent from the colonies (Haldin & Ulfvens 1987).

The islands studied are all geomorphologically rather similar. They are low moraine islets, which are surrounded by very shallow littorals. Only a few islands have small areas of polished rocks (these islands are also low with shallow littorals). Thus differences in the general topography of the islands should not bias the results. The wooded and grazed islands (Table 1) do not differ statistically in their areas ($t=0.2$, $df=10$, $P=0.86$).

Grazing with sheep, cattle and horses was earlier common in the Ostrobothnian archipelago (e.g. Smeds 1935, Österholm 1983, Schwanck 1983), but at least five of the 12 study islands have not been grazed for many years (Table 1). In 1988 and 1989, grazing animals were present on three islands only (Gråsjälsgrynnan, Täljknivshällorna and Yttre Utstenarna), but five islands in all have recently been subjected to grazing (Table 1).

The grazed islands differ clearly from the ungrazed ones. They have large areas with open shores, low grass meadows and often only scattered bushes, whereas the ungrazed islands have dense woods of alder *Alnus incana*, birch *Betula*

pendula and spruce *Picea abies*. On the latter islands shore meadows are scanty and mostly confined to the points.

Differences may also occur between the grazed islands, as the shore vegetation may be higher on those islands that have not been grazed for some years than on permanently grazed islands. However, this difference should not be pronounced early in the spring when the growing season has not yet started in the archipelago. The occurrence of a few reed stands may be beneficial, as it adds to the heterogeneity of the islands and offers protection for breeding ducks.

Of course, the selection of the islands may lead to errors if, for instance, the grazed islands are typical bird colony islands, whereas the wooded islands are not. However, a totally random selection of islands is no longer possible, as there are very few grazed islands in the area studied. I decided to census all islands that are still grazed and to compare these with neighbouring wooded islands.

There are summer cottages on nine of the islands studied, but this probably does not cause any disturbance of the bird fauna in May, because the cottages are mostly used later in the season (my own observations). One exception may be Lillberget, where there are seven cottages, some of which are frequently used by fishermen from early spring onwards.

I estimated the proportion of open areas with low grass and scanty bushes of *Alnus* and *Juniperus* in the field and then calculated the areas from maps. The values obtained are only approximate.

3. Results

There are on average nine shore- and waterbird species nesting on each island studied. The number of pairs per island is rather high and the density also seems to be fairly high (Table 1), in comparison, for instance, with data from the Krunnit Islands (Väisänen & Järvinen 1977).

When comparing the grazed and the wooded islands, we find a clear difference (Table 2). In absolute numbers there are considerably more nesting shore- and waterbird species and pairs on the grazed than on the wooded islands, though the difference is not statistically significant. As regards the bird density, however, the grazed islands differ significantly from the wooded ones. On the grazed islands, the average number of pairs of breeding shore- and waterbirds is 8.5 times as high as on the wooded islands and the average density is 6.8 times as high.

Two of the wooded islands (Lassgrynnor and Lillberget) have fairly large, stony and bushy meadows along their shores and therefore differ from the other wooded islands, on which the open

Table 1. Characteristics of the islands studied. Note that there are tree stands and shore meadows on both the grazed and ungrazed islands, but woods clearly predominate on the ungrazed islands. The numbers of the islands refer to Fig. 1.

Name	Type of island	Area ha	No.of species	No. of pairs	Density pairs/ha
1. Bockhällorna	Ungrazed	2.6	5	19	7.3
2. Bäcksgrundet	Ungrazed	23.6	8	35	1.5
3. Gråsjälsgrynnan	Grazed	2.0	12	149	74.5
4. Inre Utstenarna	Grazed	5.4	6	57	10.6
5. Lassgrynnor	Ungrazed	3.5	11	28	8.0
6. Lillberget	Ungrazed	5.0	5	28	5.6
7. Mittigrynnorna	Grazed	8.2	11	409	49.9
8. Själlösbådan	Ungrazed	3.0	6	40	13.3
9. Täljknivshällorna	Grazed	2.0	7	88	44.0
10. Utterstenarna	Ungrazed	9.9	8	58	5.9
11. Yttre Utstenarna	Grazed	16.9	19	745	46.6
12. Östsynnerstbådan	Ungrazed	4.1	8	19	4.6

shore is usually narrower than 10 m. I excluded these untypical wooded islands from the material and compared the remaining five wooded islands with the five grazed islands; the density differed significantly, as for all the islands studied (Table 2).

Some of the wooded islands have small colonies of terns and Common Gulls *Larus canus*, but the majority of gulls and terns in my material occurred on the grazed islands (67% of the terns, 75% of the Common Gulls and 100% of all other larids observed). Of the diving ducks, 76% were observed on grazed islands and 24% on wooded islands; 58% of the dabbling ducks and 71% of the waders were seen on grazed islands.

The distribution of shore- and waterbirds between the two categories of islands differed clearly when I grouped the birds into waders, dabbling ducks, diving ducks, larids and others (χ^2=56.6, df=4, P<0.001). All in all, 86% of the shore- and waterbirds nested on the five grazed islands.

There was a significant correlation between the proportion of open areas on an island and the density of the breeding shore- and waterbirds (Fig. 2).

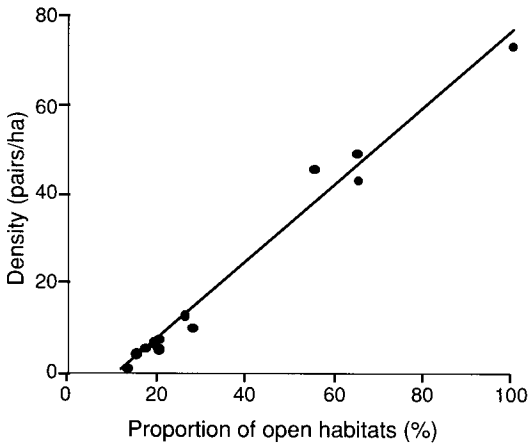

Fig. 2. Regression (y = –9.45+0.87x, P < 0.001) of the density of shore- and waterbirds (pairs/ha) on the proportion (%) of open habitats on the islands studied. The point farthest to the right does not influence the result.

4. Discussion

Although the material presented here is small, the study shows that open, grazed islands support a clearly richer assemblage of shore- and waterbirds than wooded islands which have not been subjected to grazing for decades. In itself, this result is not surprising, as it is obvious that large colonies of archipelago birds (often dominated by larids) occur mostly on open and treeless islands (e.g. Väisänen & Järvinen 1977: table II).

However, the results of this study are not as trivial as it might seem: in an area like the one studied here, considerable benefits to the archipelago bird fauna could be achieved by continuing grazing and/or shore harvesting on some of the islands, which otherwise may undergo major successional changes. If this is not done, it is probable that the waterbird fauna will become impoverished due to the growth of dense reeds, bushes and groups of trees on the formerly open parts of the islands (cf. Siira 1970, Salo 1984). The changes in the vegetation are accelerated by the marked eutrophication, mainly caused by effluents from the mink and fox farms (e.g. Schwanck 1974, Sevola 1978).

Table 2. Comparisons (t-tests) between some characteristics of the ungrazed and grazed islands studied. Means ± SD indicated. n is 7 for the ungrazed islands and 5 for the grazed islands. The P-values in parenthesis refer to a comparison in which the two least typical ungrazed islands were excluded (see the text for explanations).

	Ungrazed islands	P	Grazed islands
Area (ha)	7.4 ± 7.6	0.86 (0.70)	6.7 ± 5.8
No. of species	7.3 ± 2.1	0.16 (0.13)	11.0 ± 5.1
No. of pairs	32.4 ± 13.6	0.08 (0.08)	289.6 ± 289.9
Density (pairs/ha)	6.6 ± 3.6	<0.01 (<0.01)	45.1 ± 22.8

Fig. 3. The richest shore- and waterbird fauna on the islands studied was observed on Yttre Utstenarna. This island is still grazed, and open shore meadows comprise about 55% of its area. Photo by the author on 28 May 1988.

The question still arises whether there is a causal connection between grazing and the richer fauna observed on the grazed islands. In fact, the labyrinthine shores of Mittigrynnorna and Yttre Utstenarna may have favoured the bird fauna, as small bays offer protection and foraging sites for the birds (e.g. Hildén 1964). However, the southern part of e.g. the wooded island Bäcksgrundet also contains shallow and protected bays, but this is not reflected in any marked way in the composition of the waterbird fauna of the island. Other landscape features may also influence the distribution of the bird fauna (e.g. Soikkeli 1965), but as the area studied is in general topographically uniform, such differences between the islands probably have only marginal effects.

Archipelago birds are known to differ in their habitat preferences and several waders and ducks may prefer wooded islands to open and treeless islands (Väisänen & Järvinen 1977, Helle et al. 1988). However, this factor should not markedly bias this study as, except for Gråsjälsgrynnan (Table 1, Fig. 2), the grazed islands censused were wooded to some extent and thus should also be suitable for species preferring older successional stages of islands.

There does in fact seem to be a fairly direct relation between the faunal richness and the proportion of the open, treeless area on an island (Fig. 2). The rich nutrient content of the water, the shallow littorals and the near-by farms (which serve as foraging sites, especially for several larids) are other factors contributing to the faunal richness in the area studied.

The positive influence of grazing on the fauna of an island is most probably hierarchical and self-perpetuating. Firstly, open areas offer breeding sites for larid colonies (e.g. Väisänen & Järvinen 1977), and these attract several waterbird species (e.g. Hildén 1964, Ulfvens 1988b), which increases the richness of bird species. Secondly, several species are specialized in breeding and foraging in areas with low grass and on shores which are free of higher vegetation (e.g. Ottosson et al. 1989). Thirdly, the habitat heterogeneity on grazed islands with some remaining tree stands probably attracts species which would not breed in any significant numbers on islands with uniform grass meadows or forests (e.g. Larsson 1976).

von Haartman (1975) pointed out that shores "grazed by cows are a very pleasant feature of the scenery, well worth preserving locally. If nothing is done, they will soon disappear in the southern part of the country". It seems clear that continuation of grazing on mainland shores and open islands can improve the landscape in several ways. The aesthetic value of a neatly grazed shore meadow is clear to many people and if, as it seems,

the faunal density and diversity can be promoted by grazing, this will definitely increase the value of the landscape for many people.

From the conservation point of view, an important consideration is that the grazed islands provide breeding habitats for rare or endangered species. In the area studied, some pairs of the vulnerable *Calidris alpina schinzii* occur on shore meadows (Perttula 1988). The preservation of this local population calls for active management of its nesting sites (Ulfvens 1988a).

It should be pointed out that when the grazing and/or shore harvesting is used for conservation purposes, total elimination of bushes and trees is not generally necessary. All the grazed islands included in this study had woods or sparse stands of birch and alder. In fact, on the island with the most diverse shore- and waterbird fauna (Yttre Utstenarna), alder and birch stands covered at least 45% of its area (see Fig. 3).

As is seen in Fig. 2, a fairly rich shore- and waterbird assemblage may occur on islands on which open habitats form at least 40% of the total area. In practice, of course, the proportion of open habitats achieved will most probably be determined by such factors as the financial resources and the availability of labour and grazing animals. Still, as a general goal, open areas covering at least 40% of the island can be recommended, as the shore- and waterbirds on such islands seems to differ from those on islands more or less covered by woods. It should be borne in mind that the occurrence of dense deciduous stands on the grazed islands may promote the presence of crows and other nest robbers. Of course, special autecological aspects should be noted for threatened species (see Johansson et al. 1986).

These viewpoints may not apply as such to steep islands with rocky shores, for instance in the archipelagoes of southern Finland. General recommendations for the management of shore meadows have been presented elsewhere (Johansson et al. 1986, see also Larsson 1976).

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Sammanfattning: **Häckande vadare och sjöfåglar på några betade och obetade skär i södra Österbotten**

Undersökningen behandlar förekomsten av vadare och sjöfåglar på 12 skär med arealen 2,0–23,6 ha i skärgården i Korsnäs. Fem av skären betades ännu i samband med undersökningen eller tills helt nyligen, medan de övriga sju skären inte hade betats på lång tid och till största delen var bevuxna med skog. 86% av de observerade vadarna och sjöfåglarna häckade på de betade skären. I fråga om olika grupper av fåglar var den andel som noterades på de betade skären som följer: 67% av tärnorna, 75% av fiskmåsarna, 100% av alla andra måsfåglar, 76% av dykänderna, 58% av simänderna och 71% av vadarna. På de betade skären noterades signifikant högre täthet av häckande vadare och sjöfåglar än på de obetade skären.

Materialet uppvisar en signifikant korrelation mellan andelen öppna ytor på skären (i form av låggräsängar och områden med endast spridda buskar) och tätheten av häckande vadare och sjöfåglar. På de obetade skären fanns det 13–26% öppna ytor och 1,5–13,3 par/ha, medan motsvarande siffror på de betade skären var 28–100% öppna ytor och 10,6–74,5 par/ha. Mot den här bakgrunden kan man generellt föreslå att en betydande naturvårdsvinst kan nås till skäliga kostnader ifall minst 40% av ett betat skär hålls öppet. Denna slutsats kan emellertid knappast tillämpas på de klippiga skären längs Finlands södra och sydvästra kust.

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