

SEMI-NATURAL MEADOWS AND OTHER TRADITIONAL RURAL BIOTOPES IN SW FINLAND (SATAKUNTA)

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ABSTRACT - In the middle of 19th century the area of meadows was at its largest in Finland, about 1.6 million hectares. Thereafter the meadow area has decreased dramatically. Finnish Environment Institute has led the inventory of traditional rural or agricultural biotopes in Finland since 1992. Until now the results have been published only in the regions of Satakunta, North Ostrobothnia and North Karelia. In Satakunta 280 sites of valuable traditional rural biotopes (1160 hectares) were found and most of them were grazed by cattle. Of these 39% (457 ha) were meadows including shore meadows. All meadows with the exception of shore meadows were very small (< 2 ha). Other traditional rural biotopes were wooded pastures (258 ha), grazed forests (183 ha) and some others (79 ha). The meadows were classified according to the physiognomic and floristic determinants. Nutrient-poor rocky meadows, nutrient-poor dry short herb meadows, dry grass meadows, dry grass-herb meadows, scrub meadows and humid or moist meadows were rare in Satakunta. Mesophilous meadows were divided to short herb meadows, grass meadows and tall herb meadows and they covered altogether 96 ha (8%) in Satakunta. Grazed lake and river shore meadows covered about 110 ha (9,5%) and were quite often dominated by short sedges and grasses. Studied seashore meadows covered 188 ha, making 16 % of all valuable traditional rural biotopes in Satakunta. There were three very large seashore meadows in the Pori region. In the traditional rural biotopes of Satakunta 14 nationally threatened species were found.

KEY WORDS - semi-natural meadow, traditional rural biotope, grazing, vegetation type, threatened species.

NOMENCLATURE - Hämet-Ahti *et al.* (1998).

INTRODUCTION

NATIONAL INVENTORY ON TRADITIONAL RURAL BIOTOPES

Finnish Environment Institute has led the inventory project concerning the traditional rural or agricultural biotopes in Finland since 1992. These biotopes were created by traditional agriculture, mowing, grazing, leaf fodder collection and slash

and burn cultivation and they include meadows, dry meadows, wooded meadows, wood pastures, grazed forests and slash and burn forests. The goal of the project was to find out the traditional rural areas which have the highest biodiversity, the finest sceneries and highest cultural and historical values. The data was gathered with nationally uniform methods (Pykälä *et al.*, 1994). One task of the project was to study management methods and their influence to fauna and flora (Leivo & Pykälä, 1993). The project was very much needed because there was very scarce recent literature on these biotopes (see e.g. Haeggström, 1983, 1990; Hinneri, 1994; Hinneri & Lehtomaa, 1994).

I have been studying the state of traditional rural biotopes, e.g. semi-natural grasslands, wooded pastures and grazed forests in the region of Satakunta in SW Finland (Jutila *et al.*, 1996). The results of the inventory have been published in addition to Satakunta also in North Ostrobothnia (Vainio & Kekäläinen, 1997) and in North Karelia (Grönlund *et al.*, 1998). The most important criteria for the evaluation of the sites were former and present land use, vegetation and flora.

THE DEVELOPMENT AND DECREASE OF SEMI-NATURAL MEADOWS

Naturally meadows belong to boreal vegetation only by the seashore, in narrow strips around lakes, along flooding rivers and on some mountains and rocky hills (Jutila, 1995). During the stone age man shifted gradually from hunting to farming. Already before 3000 years B.C. cattle was kept aside slash-and-burn cultivation (Ekstam *et al.*, 1988). Winter fodder was collected from shore meadows and later these natural meadows were broadened by clearing, grazing and mowing. Grassland was cleared also in peatlands and moist forests. The common practice was that the fields and the mown meadows were fenced and the cattle was allowed to wander in surrounding woods and meadows (Haapanen *et al.*, 1993).

Slash-and-burn cultivation has been the first and for long the most important form of agriculture in the region of Satakunta, as well as in whole Finland. In 17th century the field farming was the main way of cultivation, but slash-and-burn cultivation supplemented it. During the traditional agriculture the fields were mainly for the production of breadgrain. The manure that piled up in cowsheds during winter was used to fertilize small fields. The winter fodder for the cattle was grown in meadows. Cattle grazed in forests and wooded meadows during the summer and was let to the meadows only after mowing and collection of the fodder (Haapanen *et al.*, 1993).

A characteristic feature in meadows was a negative nutrient balance. The grass was harvested and even manure let by cattle during aftermath grazing were collected and transported to fields. Nutrient stress and disturbance by animals, scythe and fire made it possible for less competitive species and species that could recover from disturbance to increase in abundance. Mowing and cattle grazing with eating and trampling prevented shadowing and competition of fast growing species (Ekstam *et al.*, 1988).

In the middle of 19th century the area of meadows was at its largest in Finland, about 1.6 million hectares: two times the total area of fields (Haapanen *et al.*, 1993). Thereafter the meadow area has decreased dramatically everywhere in Finland and meanwhile the area of arable land has increased, clearly exceeding the area of me-

adows. According to the agricultural statistics the area of semi-natural meadows in Satakunta was 32 000 ha in 1910, 19 236 ha in 1921, and decreased to 700 ha in 1973, last time it was registered in statistics. The area of mown meadows has decreased even more dramatically in Finland and there are practically no such meadows any more in Satakunta. Also the leaf fodder collection, which used to be common in the southern parts of Satakunta has ceased.

Altogether the area of all traditional rural biotopes has strongly decreased in Finland during the last decades. This trend has caused a threat to the biodiversity, because semi-natural meadows and other traditional rural biotopes are species rich habitats, where many endangered species and many rare vegetation types are found.

MATERIAL AND METHODS

STUDY AREA

Satakunta belongs mainly to the southern boreal vegetation zone. The north-western parts belong to the middle boreal zone. The region of Satakunta has many habitat types, for example a long Baltic coastline, the valley of River Kokemäenjoki and large esker areas. The region of Satakunta can be divided roughly to two landuse types: South Satakunta is characterized by intensive crop production and North Satakunta is showing a more forested landscape with higher numbers of cattle in the farms.

The guide for the inventory of traditional rural landscapes (Pykälä *et al.*, 1994) was mainly followed. The flora of the sites were studied by subareas, which were based on land use and vegetation types. Also dominant species were detected in each area. Land use of the sites were surveyed based on the land-owner interviews. The value and the state of the sites, the threats and the management needs were evaluated by sites.

RESULTS

In Satakunta 280 sites of valuable traditional rural biotopes and covering only 1160 hectares are found. This is only 0,14% of the area of this region. 39% of traditional rural biotopes, i.e. 457 ha, are meadows including shore meadows. Other traditional rural biotope types are wooded pastures (258 ha), grazed forests (183 ha) and other attached biotope types (79 ha). In wooded pastures the ground layer is dominated by meadow vegetation and the crown cover is 10-35%.

Twelve traditional rural biotopes are considered as nationally valuable, 62 as regionally valuable and the rest are locally valuable. Largest area of traditional rural landscape types is found in the town of Pori, where the seashore meadows cover large areas. The number of traditional rural biotopes, and particularly the proportion of wooded types concentrate to the northern parts of the region, particularly to the municipalites of Siikainen and Merikarvia.

The meadows are classified according to the physiognomic and floristic determinants to the types shown in Table 1. In Satakunta 162 ha of meadows have been

found apart from the shore meadows. **Heath** areas are only found in the archipelago; they are very small.

Rocky meadows cover only 3% of all traditional rural biotopes in Satakunta, making 31 ha. They are mainly found near the coast. Rocky meadows are nutrient-poor and dominated by *Festuca ovina*, *Calamagrostis epigejos*, *Sedum acre*, *Woodsia ilvensis* and *Lychnis viscaria*. Most of the rocky meadows are very small (the biggest 2 ha) and many of them are overgrowing due to exclusion of grazing. Calcareous rocky meadows have not been found in Satakunta.

Dry meadows are also fairly rare, 28 ha and 2 % of all traditional rural biotopes in Satakunta. Scrub meadows are dry meadows which used to be common in the beginning of this century, but are nowadays very rare in Finland. Only one small scrub meadow in North Satakunta has been recorded. Typical species in this meadow are *Antennaria dioica*, *Calluna vulgaris*, *Deschampsia flexuosa*, *Empetrum nigrum*, *Nardus stricta*, *Pyrola rotundifolia*, *Salix repens*, *Vaccinium myrtillus*, *V. vitis-idaea* and *V. uliginosum*. Nutrient-poor and dry short herb meadows are the most common dry meadows (17 ha). The dominant species in these meadows are *Campanula rotundifolia*, *Dianthus deltoides*, *Festuca ovina*, *Galium verum*, *Pilosella officinarum*, *Lychnis viscaria* and *Fragaria vesca*. Also *Arabis glabra*, *Silene nutans* and *Avenula pubescens* are found. Dry grass meadows are dominated by grasses such as *Agrostis capillaris*, *Festuca ovina* and *Calamagrostis epigejos*. Dry grass-herb meadows are characterised by *Avenula pubescens*, *A. pratensis*, *Festuca ovina* and *Galium verum*. In Satakunta both dry grass and dry grass-herb meadows are rare. All dry meadows were very small, the biggest being only 1 ha.

Mesophilous meadows are mainly small (the biggest 1,8 ha) and covered altogether 96 ha (8%) in Satakunta. Most valuable mesophilous meadows are dominated by several short herbs e.g. *Leucanthemum vulgare*, *Polygonum viviparum*, *Knautia arvensis*, *Pimpinella saxifraga*, *Fragaria vesca*, *Ranunculus polyanthemus*, *Trifolium medium* and *Succisa pratensis*. Also *Agrostis capillaris*, *Anthoxanthum odoratum* and *Festuca rubra* are abundant. Overgrowing and nutrient-rich mesophilous meadows are often dominated by grass species or competitive, nitrogen demanding herb species, such as *Anthriscus sylvestris*, *Taraxacum* spp., *Trifolium repens*. So called mesophilous tall herb meadows are dominated by *Geranium sylvaticum* and *Cirsium helenioides*.

Humid or moist meadows which are not located by shores are rare in Satakunta. Only remnants of valuable moist *Deschampsia cespitosa* or tall herb meadows (dominated by *Filipendula ulmaria*) have been found (2 ha).

In the inventory only such shore meadows which are known to have been traditionally managed, e.g. grazed or mown, were included. Shore meadows cover larger area than other meadow types (about 300 ha). Grazed **lakeshore meadows** are fairly small and cover altogether about 30 ha. The dominant lakeshore meadow types are bulky sedge meadows (*Carex aquatilis*, *C. rostrata* and *C. acuta* dominated) and moist high herb meadows (*Filipendula ulmaria* dominated) and moist grass meadows (*Deschampsia cespitosa*).

Grazed **river shore meadows** are also fairly rare, but still covering about 80 ha due mainly to one large pasture in Pori. The vegetation and seed bank of this nationally valuable meadow of Fleiviiki has been studied by Jutila (1996, 1997a, 1999). One part of this meadow is grazed by cattle and horses, and another part is grazed

by sheep. Several vegetation types can be found from wet marshes to patches of heathlike dry meadows dominated by *Nardus stricta* and *Festuca ovina*. Mesophilous *Carex nigra* - *Potentilla anserina* - *Trifolium repens* meadows, moist *Calamagrostis stricta* - *Festuca rubra* - *Potentilla palustris* - *Carex nigra* meadows and moist *C. stricta* - *C. nigra* - *Eriophorum angustifolium* meadows are common.

Studied seashore meadows covered 188 ha, making 16 % of all valuable traditional rural biotopes in Satakunta. 70 % of these seashore meadows were grazed. Many areas have been left without management and the reed stands have been spreading. Short-growth rush, grass and sedge meadows are rare and salt marshes very vulnerable in Satakunta.

There are three very large **seashore meadows** in the Pori region. I have been studying the diversity and the effects of grazing on vegetation and seed bank of these seashore meadows (Jutila, 1997b, 1998a, b, 1999). The hydrolittoral of grazed seashore meadows is dominated by *Agrostis stolonifera*, *Carex mackenziei* and *Eleocharis uniglumis* (table 2). Where the grazing has continued only for a short time or the intensity has been low, reed stands can be found. The lower part of geolittoral is dominated by perennial graminoids, such as *Agrostis stolonifera*, *Juncus gerardii*, *Calamagrostis stricta*, *Phragmites australis* and *Carex mackenziei*. The abundances of many herbaceous species (e.g. *Lathyrus palustris*) increase in middle and furthermore in upper geolittoral. In epilittoral *Agrostis capillaris*, *Carex nigra*, *Festuca rubra*, *Deschampsia cespitosa* and *Poa subcaerulea* dominate. On fine-grained grazed shores *Deschampsia cespitosa* meadows with or without *Viola palustris* are typical and on a coarser-grained substrate (till) *Deschampsia flexuosa*, *Galium verum* and *Anthoxanthum odoratum* dominated meadows are found. In ungrazed transects on finer-grained substrate epilittoral vegetation dominated by *Alnus glutinosa*, *Filipendula ulmaria*, *Lysimachia vulgaris*, *Hierochloa odorata* and forest plants are found (table 2). Salt marsh patches are found in grazed Eteläranta.

About 70% of the traditional rural biotopes are grazed in Satakunta. In meadows the proportion is somewhat smaller: 16% of rocky meadows, 32% of dry meadows, 46% of mesic and moist meadows, 57% of river and lakeshore meadows and 70% of seashore meadows. Only few small meadows are mown.

In the traditional rural biotopes of Satakunta 14 nationally threatened species were found. Eight of them are nationally threatened vascular plants. In addition 18 regionally threatened vascular plant have been recorded. The most remarkable of the threatened vascular plant species is *Galium saxatile*, which is only growing in two locations in Finland. This both nationally and regionally threatened species concentrates on the coastal area. Most of the threatened species were only found in one site. The most common of the regionally threatened species are *Coeloglossum viride*, which was found in seven sites, and *Filipendula vulgaris*, which was growing in five sites. 80 vascular plant species are regarded as noticeable e.g. fairly rare species. About 41% of these species were found only in one or two sites. The most abundant of these noticeable species are *Dianthus deltooides* in 37% of the traditional rural biotopes in Satakunta, *Galium verum* in 31% of the sites, *Polygonum viviparum* in 29% of the sites and *Antennaria dioica* in 17% of the sites, respectively. The populations of these species have been declining.

The number of meadow plants decreases to the north. Examples of species of the southern flora type are, in the coast, *Cerastium semidecandrum* and *Cardamine*

hirsuta and elsewhere *Avenula pubescens*, *Filipendula vulgaris*, *Trifolium arvense* and *Vicia tetrasperma*. There are only few plant species which represent the northern flora type and have benefited from the traditional land use, such as *Coeloglossum viride*, *Nardus stricta* and *Polygonum viviparum*.

DISCUSSION

The state of traditional rural biotopes is alarming in Satakunta (see Jutila *et al.*, 1996) and in whole Finland. During the last century the meadow area has decreased to less than 1% of the area in the end of 19th century. In Satakunta 1160 ha of traditional rural biotopes are found. This is only 0,14% of the land area in this region. In North Ostrobothnia (Vainio & Kekäläinen, 1997) the area of these biotopes was 2614 ha (0,05%) and in North Karelia (Grönlund *et al.*, 1998) 454 ha (0,025%), respectively (table 3). In the whole of Finland the total area of traditional rural biotopes is clearly less than 20 000 ha, which is only <0,06% of the land area. In the middle of the 19th century, when the area of meadows was at its largest in Finland, it covered about 1.6 million hectares making about 5% of the land area (Soininen, 1974). The inventory of traditional rural biotopes in Satakunta has been estimated to cover 80% of the sites. Since the inventory some new sites have been found, but the results can be seen as indicative of the real situation in the region.

In Satakunta there were 457 ha of seminatural grasslands, which is 39% of the area of traditional rural biotopes in this region. In North Ostrobothnia and North Karelia the figures are 936 ha (36%) and 120 ha (26%), respectively. Most of the seminatural meadows are shore meadows in coastal area, in North Ostrobothnia (835 ha) and in Satakunta (300 ha), but inland, in North Karelia shore meadows cover only 4 ha. In Satakunta you can still find 162 ha of rocky, dry, mesic and moist meadows, while in North Ostrobothnia and North Karelia there are only slightly over 100 ha of them (Jutila *et al.*, 1996; Vainio & Kekäläinen, 1997; Grönlund *et al.*, 1998).

The number of traditional rural biotopes, and particularly the proportion of wooded types is concentrated to the northern parts of Satakunta, e.g. in the municipality of Siikainen, where 20% of the sites are located (Jutila & Vanamo, 1994). This is understandable because in these areas the forest covers the largest part of landscape and there are still cattle in many farms.

The meadow classification used in this study is quite new (Pykälä *et al.*, 1994) and some other classifications have also been presented (see e.g. Haeggström *et al.*, 1995). There is clearly a further need to develop the mainly physiognomic classification to a more floristic one. This would also allow a comparison of the Finnish data with data from abroad, e.g. within the European Vegetation Survey.

Heaths typically locate in the coastal zone of Finland. In North Ostrobothnia they covered about 20 ha, but in Satakunta only small patches were recorded (Jutila *et al.*, 1996; Vainio & Kekäläinen, 1997).

Rocky meadows are rare in Satakunta, but even rarer in North Ostrobothnia and North Karelia. Rocky meadows are most common in the south western parts of Finland. Calcareous rocky meadows are not found in Satakunta, but very small patches have been found in North Karelia (Jutila *et al.*, 1996; Vainio & Kekäläinen,

1997; Grönlund *et al.*, 1998).

Dry meadows are even rarer in North Ostrobothnia and North Karelia than in Satakunta. These meadows are typically very small and dominated by short grasses and herbs. Quite often they are some kind of transitions between dry and mesic meadows. Scrub meadows are very rare in all the three regions, as well as in whole Finland. Dry grass-herb meadows, characterised by *Avenula* species have a southern distribution in Finland and are found in Satakunta, but not in North Ostrobothnia and North Karelia (Juttila *et al.*, 1996; Vainio & Kekäläinen, 1997; Grönlund *et al.*, 1998).

Mesophilous and moist meadows are mainly small (the biggest 1,8 ha), overgrowing and connected to silage fields. In North Karelia (102 ha) there have been recorded a slightly more of these meadows than in Satakunta (98 ha), but in North Ostrobothnia the area is clearly smaller (70 ha). In North Ostrobothnia flood meadows (158 ha) and peatland meadows (1228 ha) have been found, which are not recorded in the two other regions (Juttila *et al.*, 1996; Vainio & Kekäläinen, 1997; Grönlund *et al.*, 1998).

Even though there are quite few **lakeshore meadows** in Satakunta the area of these meadows has been found to be even much smaller in North Ostrobothnia (9 ha) and North Karelia (4 ha). Flood meadows are not found in Satakunta, but in North Ostrobothnia they are quite typical (158 ha) along big rivers (Juttila *et al.*, 1996; Vainio & Kekäläinen, 1997; Grönlund *et al.*, 1998).

The **seashore meadow** area is clearly larger in North Ostrobothnia (668 ha) than in Satakunta (188 ha), but so is also the area of the region. Proportionally Satakunta has more seashore meadows. Due to the difference in the salinity of sea water and distribution areas of some shore species in these two coastal areas of Finland, the vegetation of the seashores is somewhat different. The vegetation zonation is very obvious in seashore meadow vegetation (Juttila, 1997b; 1998b). The vegetation types found resemble some of the ones produced by Tyler (1969) and Vartiainen (1980).

Despite of many earlier studies on seashore vegetation (Häyren, 1902; Brenner, 1921; Lemberg, 1933; Fagerström, 1954; Buch, 1959; Palmgren, 1961; Siira, 1970; Vartiainen, 1988) and some newer efforts (Toivonen & Leivo, 1993; Pählsson, 1994), the classification of seashore meadow vegetation is still unsatisfactory in Finland. Salt marshes have the most endangered vegetation in the seashores.

In Satakunta quite a few threatened species (8 nationally + 18 regionally threatened) were found in the traditional agricultural habitats; in North Ostrobothnia there were somewhat more (11+32) and in North Karelia clearly less (4+3) (Juttila *et al.*, 1996; Vainio & Kekäläinen, 1997; Grönlund *et al.*, 1998). In general traditional rural biotopes are very important for threatened species. 21% of threatened species, i.e. 363, live in culture induced habitats to which also most traditional rural landscapes can be included. According to the Report on the Monitoring of Threatened Animals and Plants in Finland in moist, mesic and dry meadows and in wooded pastures occur altogether 273 threatened species (Rassi *et al.*, 1992).

Most of the traditional rural biotopes are managed by grazing in Finland. The proportion of grazed biotopes both in Satakunta and in North Karelia were 70%, while it was only 27% in North Ostrobothnia, where 2% of the sites were still mown (Juttila *et al.*, 1996; Vainio & Kekäläinen, 1997; Grönlund *et al.*, 1998). Most of the traditional rural biotopes are overgrowing or their value has decreased due to nutrient enrichment. In order to save traditional rural biotopes they must be taken care in all

land use and management.

It has been estimated that in order to save the biodiversity of traditional rural biotopes in Finland 60 000 hectares of these biotopes should be managed. Of this area 25 000 ha should be meadows. Since Finland joined the EU, the farmers have had the possibility to apply financial support (E.C.'s agri-environmental programme) for taking care of traditional rural biotopes. The supportive system should be further developed to better take into account biodiversity issues. A small amount of the funding is used for pilot projects. In Satakunta one of them (Management of biodiversity in agriculture) is trying to advice farmers to manage biodiversity in their land and one part of this project has been the study of the vegetation of some meadows (Ojala *et al.*, 1996; Majuri *et al.*, 1997).

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TABLE 1 - VALUABLE MEADOWS OF SATAKUNTA (JUTILA *ET AL.* 1996) IN HECTARES. IN PARENTHESIS IS SHOWN THE PERCENT OF THE MEADOW TYPE OF ALL THE TRADITIONAL RURAL BIOTOPES IN SATAKUNTA.

MEADOW TYPES ACCORDING TO PYKÄLÄ *ET AL.* 1994.

Heaths (moors)	2 (0,17%)
<i>Calluna vulgaris</i> - <i>Empetrum nigrum</i> heaths	0
<i>Calluna vulgaris</i> with short herbs	0
grassy <i>Calluna vulgaris</i> heaths	2
Meadows (on mineral soils)	160 (13,8%)
Rocky meadows	31 (3%)
Nutrient-poor rocky meadows	31
Nutrient-rich rocky meadows (calcareous rocky meadows)	0
Dry meadows	28 (2%)
Scrub meadows	1
Nutrient-poor dry short herb meadows	17
Nutrient-rich dry short herb meadows	0
Dry grass meadows	5
Dry grass-herb meadows characterised by <i>Avenula pubescens</i>	5
Mesophilous meadows	96 (8%)
Mesophilous grass meadows	20
Mesophilous short herb meadows	56
Mesophilous tall herb meadows	10
Humid or moist meadows	2
Moist grass meadows (<i>Deschampsia cespitosa</i>)	1
Moist tall herb meadows	1
Nutrient-rich moist meadows	0
Lake and river shore meadows	112 (10%)
<i>Eleocharis parvula</i> , <i>E. acicularis</i> communities	
Reed stands	
(<i>Phragmites australis</i> , <i>Eleocharis palustris</i> , <i>Schoenoplectus lacustris</i> communities)	
Shore meadows dominated by high sedges	
(<i>Carex lasiocarpa</i> , <i>C. rostrata</i> , <i>C. acuta</i> , <i>C. aquatilis</i> , <i>C. elata</i> , <i>C. vesicaria</i> , <i>C. cespitosa</i> and <i>C. nigra</i> subsp. <i>juncella</i> communities)	
Shore meadows with short growing rushes, grasses and sedges	
(<i>Agrostis stolonifera</i> , <i>Carex nigra</i> - <i>Lathyrus palustris</i> , <i>C. nigra</i> - <i>Juncus</i> ssp., <i>A. canina</i> - <i>C. nigra</i> , <i>C. serotina</i> communities)	
Shore meadows with tall vegetation	
(<i>Phalaris arundinaceae</i> , <i>Calamagrostis canescens</i> - <i>C. purpurea</i> , <i>C. stricta</i> , <i>Eriophorum angustifolium</i> - <i>Potentilla palustris</i> , <i>Hierochloe odorata</i> , <i>Filipendula ulmaria</i> , <i>Deschampsia cespitosa</i> , <i>Glyceria fluitans</i> , <i>Scirpus sylvaticus</i> communities)	

Seashore meadows**188 (16%)***Eleocharis parvula*, *E. acicularis* communities

Reed stands

(Bolboschoenus lacustris, Schoenoplectus tabernaemontani, S. lacustris, Phragmites australis, Equisetum fluviatile, Eleocharis palustris)

Shore meadows dominated by high sedges

(Carex aquatilis, C. halophila, C. paleacea, C. nigra subsp. *juncella)*

Shore meadows with short growing rushes, grasses and sedges

(Eleocharis uniglumis - Agrostis stolonifera, Carex mackenziei, A. stolonifera - Calamagrostis stricta - Juncus gerardii, Festuca rubra, Calamagrostis stricta - Carex nigra, Blysmus rufus, C. serotina)

Shore meadows with tall vegetation

(Festuca arundinaceae, Phalaris arundinaceae, Calamagrostis canescens - C. purpurea, C. stricta - Eriophorum angustifolium, Hierochloa odorata, Filipendula ulmaria, Deschampsia cespitosa, fen shore meadow)

Communities on saline soils

Salicornia europaea communities*Puccinellia distans* subsp. *borealis* communities*Triglochin maritima* communities*Spergularia salina* communities*Eleocharis uniglumis - Carex paleacea* communities*Puccinellia phryganodes* communities*Spergularia salina - Calamagrostis stricta* communities*C. stricta - Rumex acetosella* communities*C. stricta - Eriophorum angustifolium* communities

Short epilittoral meadows

Deschampsia flexuosa - Galium verum communities**Flood meadows****0***Equisetum fluviatile* flood meadows

High sedge flood meadows

Moist grass flood meadows

Mesophilous grass flood meadows

Mesophilous tall herb flood meadows

Dry flood meadows (short herb flood meadows)

TABLE 2 - CORRESPONDING MEADOW VEGETATION TYPES IN GRAZED AND UNGRAZED SEASHORES IN SATAKUNTA
(BY H. JUTILA, 1998)

Grazed	Ungrazed
Hydrolittoral	
* <i>Eleocharis acicularis</i>	* <i>Phragmites australis</i>
* <i>Schoenoplectus tabernaemontani</i>	* <i>P. australis</i> - <i>S. tabernaem.</i>
* <i>A. stolonifera</i> - <i>Eleocharis uniglumis</i>	* <i>A. stolonifera</i> - <i>P. australis</i>
<i>stricta</i> - <i>mites australis</i>	* <i>Agrostis stolonifera</i> - <i>Calamagrostis</i> <i>Juncus Gerardii</i> - <i>Phrag-</i>
Geolittoral	
* <i>Juncus gerardii</i>	* <i>Juncus gerardii</i>
* <i>Poa subcaerulea</i>	
* <i>Festuca rubra</i> - <i>Leontodon autumnalis</i>	* <i>F. rubra</i> - <i>J. gerardii</i> - <i>P. australis</i>
* <i>Calamagrostis stricta</i>	* <i>Calamagrostis stricta</i>
	* <i>C. stricta</i> - <i>P. australis</i>
	* <i>Lathyrus palustris</i> - <i>Festuca rubra</i>
<i>tea</i>	* <i>L. palustris</i> - <i>P. australis</i> - <i>A. gigan-</i>
Transition zone	
* <i>Elymus repens</i>	
* <i>Agrostis gigantea</i> - <i>Angelica sylvestris</i>	* <i>Agrostis gigantea</i> (- <i>Vicia cracca</i>)
	* <i>Filipendula ulmaria</i> - <i>Anthoxanthum</i> <i>odoratum</i> - <i>P. australis</i> - <i>A. capillaris</i>
Epilittoral	
* <i>Agrostis capillaris</i>	* <i>Agrostis capillaris</i> (- <i>Viola canina</i>)
* <i>Galium verum</i> - <i>Deschampsia flexuosa</i>	* <i>Deschampsia flexuosa</i>
* <i>A. capillaris</i> - <i>Danthonia decumbens</i> - <i>Carex nigra</i>	
* <i>C. nigra</i> - <i>A. capillaris</i>	* <i>Carex nigra</i> - <i>Hierochloe odorata</i>
* <i>Festuca rubra</i> - <i>F. ovina</i> - <i>Carex nigra</i>	
* <i>Deschampsia cespitosa</i> - <i>Viola palustris</i>	
* <i>Deschampsia cespitosa</i>	
* <i>Silene dioica</i>	
	* <i>Filipendula ulmaria</i> - <i>Vicia cracca</i>
	* <i>F. ulmaria</i> - <i>Lysimachia vulgaris</i>

TABLE 3 - THE AREA OF VALUABLE TRADITIONAL RURAL BIOTOPES IN THREE REGIONS OF FINLAND.
A MEANS AREA IN HECTARES AND **%** IS THE PROPORTION OF BIOTOPE OF ALL TRADITIONAL RURAL BIOTOPES.
 RESULTS SLIGHTLY MODIFIED FROM JUTILA, PYKÄLÄ & LEHTOMAA (1996),
 VAINIO & KEKÄLÄINEN (1997) AND GRÖNLUND *ET AL.* (1998).

	Satakunta		North Ostrobothnia		North Karelia	
	A	%	A	%	A	%
Heath	2	0.17	19.60	0.75	0	0.00
Rocky meadow	32	2.76	0.30	0.01	1	0.22
Dry meadow	30	2.59	11.10	0.42	12	2.65
Mesic and moist meadow	98	8.45	69.50	2.66	102	22.52
Flood meadow	0	0.00	158.20	6.05	0	0.00
Lake and river shore meadow	112	9.66	9.00	0.34	4	0.88
Seashore meadow	188	16.20	668.10	25.56	0	0.00
Peatland meadow	0	0.00	1228.00	46.98	0	0.00
Wooded pasture	183	15.78	58.20	2.23	76	16.78
Slash-and-burn forest	0	0.00	0.00	0.00	122	26.93
Grazed forest	435	37.50	306.70	11.73	124	27.37
Other	80	6.90	85.50	3.27	12	2.65
Altogether	1160	100.01	2614	100	453	100.00