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SEMINAR FOR THE BOREAL REGION

FIELD VISITS

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KESKKONNAMINISTEERIUM

CONTENTS

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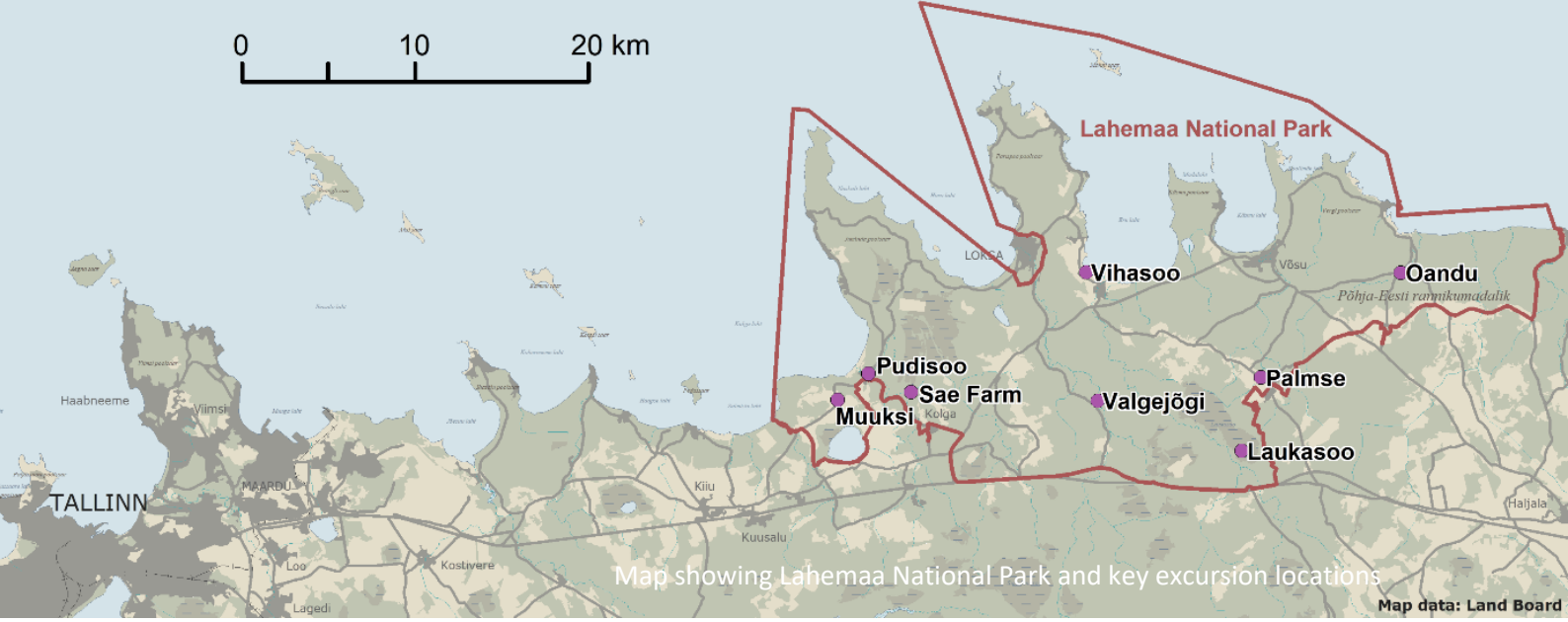
INTRODUCTION

The Environmental Board, the competent authority for nature conservation in Estonia, offers two excursions for participants of the third Natura 2000 Seminar for the Boreal Region. The excursions will feature habitats and projects within Lahemaa National Park, established for the preservation, protection and restoration of nature, landscapes and cultural heritage as well as to promoting sustainable use of the coastal area of Northern Estonia. The Lahemaa National Park is part of the pan-European Natura 2000 network both under the Birds' and Habitats Directive.

LAHEMAA NATIONAL PARK – THE BASICS

- **Founded**: 1971
- **Location:** Harju County, Kuusalu rural municipality; Lääne-Viru County, Haljala and Kadrina rural municipalities
- **Area**: 74,784 ha, 47,910 ha of which is land
- **Rules of protection**: Regulation no. 18 of 19 February 2015 "Rules of protection of Lahemaa national park" by the Government of the Republic
- **Management plan**: 2016 (2016–2025)

Additional details of the habitats, issues and management of Lahemaa National Park are provided in Annex 1.



LAHEMAA – SHORT PROGRAMME AND TOUR GUIDES

The two excursions are linked to the four habitat ecosystems central to the programme:

EXCURSION 1

GRASSLAND & FOREST HABITATS

- **Muuksi** Alvars (Kaidi Silm, Kristiina Jürisoo)
- Coastal Meadows, **Vihasoo** (Kaidi Silm, Kristiina Jürisoo)
- **Sae Farm**, Estonian sheep and management of dry meadows (Imbi Jäetma)
- Lunch at **Sae Farm**
- **Oandu** Forest Nature Trail and Oandu Visitor Centre (Riina Kotter)

EXCURSION 2

FRESHWATER & WETLANDS HABITATS

- Restoration of Freshwater Pearl Mussel Stream (Katrin Kaldma)
- Restoration of salmon habitats, removal of dams at **Valgejõe** (Meelis Tambets)
- Lunch at **Palmse Pub**
- **Laukasoo** Bog restoration (Jüri-Ott Salm, Marko Kohv)

Grazed coastal meadow

EXCURSION 1 – GRASSLAND & FOREST HABITATS

1.1. Background information on meadows

In Estonia there are 77 000 ha of semi-natural (SN) habitats registered in the environmental database, with national targets for key SN habitat types (Table 1).

Habitat	Target 2020	In management 2018	In restoration 2018
Coastal meadow (1630*)	10800	10377	1340
Juniper community (5130)	500	312	86
Dry grassland and scrubland facies on calcareous substrates (6210*, 6210)	2420	2364	151
Fennoscandian lowland species-rich dry to mesic grasslands (6270*)	1880	1528	37
Alvars (6280*)	7700	3834	962
***Molinia* meadows on calcareous, peaty or clayey, silt-laden soils (6410)**	650	614	29
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (6430)	370	1144	106
Alluvial meadows (6450)	12200	8371	523
Lowland hay meadows (6510)	1340	2166	186
Wooded meadow (6530*)	3300	748	446
Alkaline fens (7230)	1900	1457	382
Wooded pasture (9070)	1650	858	262
Total	45000	33789	4511

Table 1 – National targets by habitat types ***(hectares)***

Since 2007, subsidies for maintaining semi-natural habitats have been paid through the Estonian Rural Development Programme (ERDP). There is a distinction between restoration and management subsidy scheme, with no double funding allowed. However, overgrown areas are not eligible for EU management subsidy through the ERDP).

After the restoration period each area is evaluated and if in suitable condition then management is carried out by the farmer under the EU subsidy for semi-natural habitats.

Both restoration and managed areas must be mapped as semi-natural habitat in the environmental register and designated as protected areas (Table 2).

The restoration support rate varies by habitat and by the thickness and height of any brushwood; the range is €135-885/ha/year. Wooded meadows (6530*) and alvars (6280*) have the highest support rate and the support rate for cutting and grazing of reeds is €231 /ha/year. The support rate for fence building is €1/metre every 5 years.

RESTORATION

- National semi-natural habitat restoration scheme (EB) – state budget
- LIFE projects - LIFE to alvars, WOODMEADOWLIFE (presented by EB), CoastNet LIFE.
- Restoration in state lands: Cohesion Fund (The State Forest Management Center),
- Open call for NGO-s (not active).

Supported activities:

- Cutting the bushes and trees
- Chopping scrubs and hammox
- Cutting reed
- Building fences

Duration

- 1-3-year contract

Applicants

- Around 200

MANAGEMENT

- Rural Development Plan
- Subsidy paid by Agricultural Registers and Information Board (paying agency), which is under Ministry of Rural Affairs

Supported activities:

- Mowing and collecting hay
- Grazing

Duration

- 5-year commitment

Applicants

- Around 900

Table 2 - Restoration and management activities

Grazing and mowing have different rates for management support:

- Mowing a wooded meadow €450/ha/year;
- Grazing on a wooded pasture €250/ha/year;
- Grazing on meadow with junipers €250/ha/year;
- Grazing on another meadow €150/ha/year;
- Mowing another meadow €85/ha/year;
- Maintenance of coastal areas important for the protection of species €232/ha/year.

A single area payment (SAP) may also be applied to eligible meadows.

Restoration needed on coastal meadow

1.2. Semi-natural meadows at Lahemaa National Park: Muuksi alvar and Vihsaoo coastal meadow

A range of semi-natural biotic communities occurs across 2,543 ha in the Lahemaa National Park, representing 5.3% of the land area. Communities are wooded meadows, wooded pastures, coastal meadows, floodplain meadows, flooded meadows, alvars, juniper groves, and grasslands on mineral soils. About half of the area made up of various grasslands on mineral soils; flooded meadows are mostly around the Palmse-Vihasoo and Muuksi area on about 360 hectares (14.4% of semi-natural biotic communities); floodplain meadows are represented on the banks of Valgejõe, Loobu rivers and Mustoja brook on 240 hectares (9.6%) and coastal meadows stretch across a similar area. Meadows also include wooded meadows, paludified meadows, wooded pastures and juniper groves. In Lahemaa, about 950 ha is being managed under conservation subsidies for restoration and maintenance and single area payment.

Restoration needed on alvar

Grazed alvar

NATURA HABITATS AT VIHASOO

VIHASOO

1630* Boreal Baltic coastal meadows
6270* Fennoscandian lowland species-rich dry to mesic grasslands
6450 Northern boreal alluvial meadows
6510 Lowland hay meadows
9070 Fennoscandian wooded pastures
7230 Alkaline fens

Most of semi-natural grasslands in Lahemaa are small and fragmented, with Vihasoo-Kasispea coastal meadows and Muuksi alvars amongst the most compact.

1.3. Sae Farm

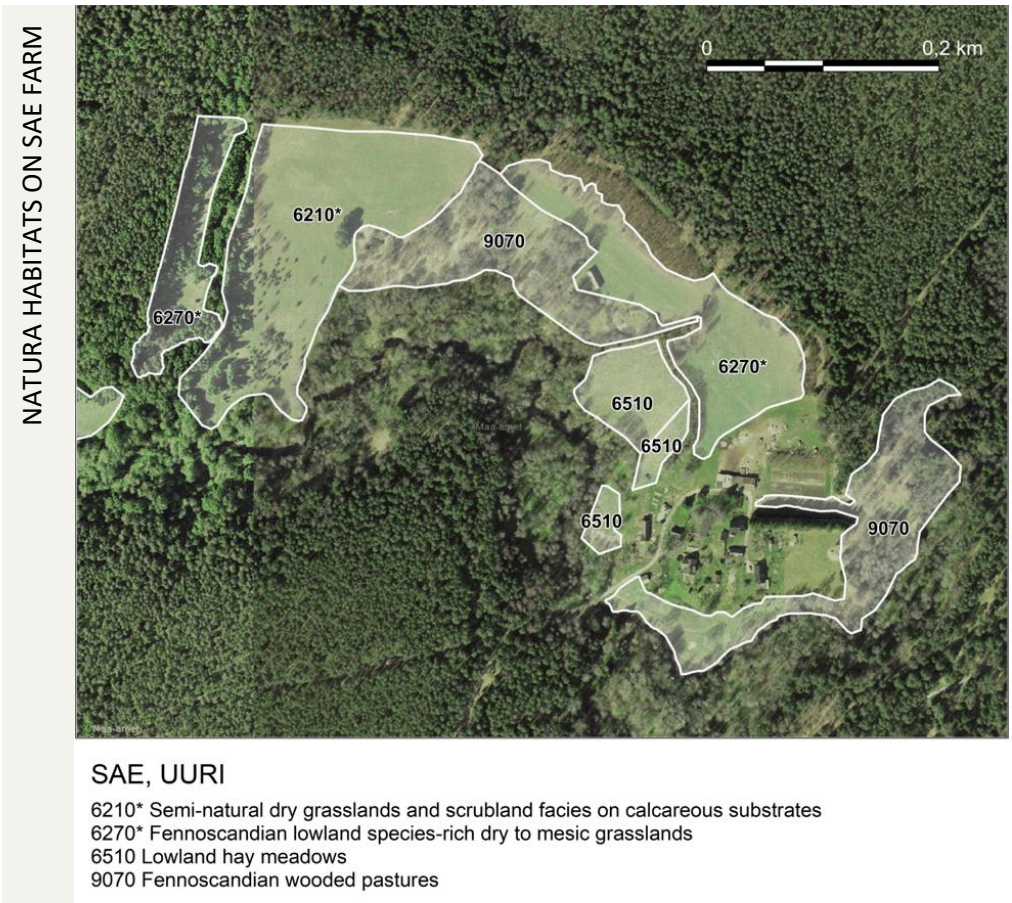
Apart from a period from the end of World War II to 1990, Sae Farm has been managed by the same family for over two hundred years. The 110ha farm is surrounded by the Pärlijõgi river, which means 'pearl mussel river'. Freshwater pearl mussel is an EU Red Book species, there are currently about 35,000 individuals and their collection is banned. The entire farm is part of a Natura 2000 area, designated for semi-natural habitats, with grazing obligation on 13 ha.

In 2003, the family started to look for a domestic animal to graze the areas cleared of bushes and forest. It had to be lightweight, as the soil is sandy, and it had to be of Estonian origin. They discovered a small number of indigenous sheep that had survived on remote islands and in border regions of Estonia. These are Estonian native sheep that belong to the Northern European short-tailed sheep family and are the oldest domestic animals in Estonia (as confirmed by genetic test in 2006). The flock of Lahemaa Sheep currently has 100 Estonian native ewes and have grazed the semi-natural habitats on the farm since 2005.

Sae Farm is not only committed to the preservation and popularization of Estonian native sheep. In addition, courses are run introduce the forgotten crafts related to sheep and wool: carding, spinning, felting and dyeing with plants and mushrooms. Tourists are important and there is a small shop focussing on handmade products in natural colours.

In 2013, the three first native chickens, found on Vormsi island, arrived at the farm. Today there are 20 of them.

Almost 12 years ago, the family introduced Maremmano-Abruzzese sheepdogs to Estonia. As the farm is situated in the middle of the forest, possible predation by bear, wolf, lynx, fox, and eagles. There are now have six dogs for guarding and protecting the two native breeds and the farm.



1.4. Oandu Forest Nature Trail

One of the most important habitats in the national park is the large forest cover with little human influence. These support many plant and fungus species, nearly all Estonian mammals and many species of birds and other animals. The total mapped area of forest habitat types listed in the Habitats Directive is 16,880 ha.

The forest habitats, and the species characteristic to them, are threatened by forestry works. The most significant forest habitats are included in a conservation zone where forest management is prohibited. Forests of the limited-management zone are threatened by the cutting of broadleaf trees and old, dead trees. A risk factor for wet bog forests and bog habitats is modification of the natural water regime with drainage and old drainage ditches are preserved in conservation zones.

The Oandu forest nature trail is a 4.7 km long circular trail within the Lahemaa National Park. The trail passes through ancient coastal landscapes, different developmental stages of forest and areas with signs of animal activity.

Beaver dams change fluvial habitats, cause the erosion of river banks, bring in sediments and block the migrations of salmon and trout, the intermediary hosts of the freshwater pearl mussel.

EXCURSION 2 – Freshwater & Wetlands Habitats

2.1. The Pärlijõgi/Pudisoo (Pearl) River

At the beginning of the 20th century, the freshwater pearl mussel (FPM), *Margaritifera margaritifera*, was widespread and abundant. However, Central-Europe populations have decreased dramatically, by up to 90% by the end of 20th century. This trend is ongoing and is now seen in all European populations. The damage and loss of habitats (fast-flowing cool rivers and streams) are the main threats to the species. In Estonia today, the FPM is only present in a single river and the population there is small and decreasing. The average age of individuals in the population is 60 years and higher and no reproduction is taking place. The species is considered one of the rarest and most endangered animals in Estonia.

The main factors in the species' decline are the obstructions of flowing streams, irrigation of farm and forest land and the pollution of water with nutrients. The Estonian Environmental Board (EEB) started active protection measures in Pudisoo/Pärlijõgi river in 2014 to reduce negative factors affecting FPM population. The ecological condition of Pärlijõgi River has been partly restored on a 15-kilometre section, including reduction of fine sediments, increasing passage opportunities for FPM host fish and restoring natural conditions in parts where river has been straightened. Research has indicated that FPM reproduction in the Pärlijõgi river is now taking place, with the host fish infected with the FPM glochidia. However, there have been no FPM juveniles found in the river. This may be because the riverbed has previously accumulated large areas of fine-grained sediments that hinder the settlement and development of juveniles.

As a part of CoastNet LIFE project an artificial, or semiartificial, breeding programme is under development to secure the conservation of the local FPM population. This is a challenging and totally novel approach for Estonia and the LIFE project which started last year will see the creation of the specific conditions and identification of suitable locations for

repopulating the river as its main aim. It is necessary to improve the quality of the microhabitats for the FPM juveniles, increasing the survival rate of juveniles in their natural living conditions. As a result of other elements of the project, the local community, including landowners, hunting societies and others, has been made aware of the rarity of the species, the threats to its survival and why and how it can be protected.

2.2. The Valgejõgi River

Seven waterways flow through the Lahemaa national park – the Kolga, Pudisoo, Võsu, Loobu and Valgejõgi rivers and the Mustoja and Altja brooks. Of these, the Loobu and Valgejõgi are the biggest through the rivers in Lahemaa are small and fast-flowing. Salmon and trout come to spawn here, and their offspring spend the first years of their life in the rivers and smaller fish species, such as the spined loach, bullhead and bleak also inhabit these waters. The populations of fish in these rivers are limited by several dams that interrupt the journey from the sea to spawning grounds.

In the Valgejõgi River, the area of spawning sites and juvenile fish habitats for different species have been measured; salmon 19.06ha, trout 23.55ha, grayling 21.19ha and river lamprey 4.54ha. It has been estimated that these habitats could potentially produce up to 16,529 salmon and 9,788 trout two-year-old smolts. Currently, the Valgejõgi River, together with tributary streams is probably the river with the highest potential for spawning of salmon and trout of those open to highly migratory fish in Northern Estonia. In all of Estonia, only the Pärnu River system has a greater potential for salmonid smolts.

Tree trunks put in the stream direct the flow, collect sediment and aid rinsing to clear the natural gravel bottom, indispensable for the survival of juvenile freshwater pearl mussel

Building peat dams in January 2019. Photo: M. Kohv

2.3. Laukasoo

As of the latest survey in 2009, Laukasoo mire consists of two parts of 343.12ha and 170.92ha. Following classification of the Estonian vegetation site types the area is described as pool-ridge bog and treed and treeless hummock bog habitats. In addition, 17.7ha of ombrotrophic bog forest and treed hummock bog are present. The mire area provides habitat for the following protected species: western capercaillie (*Tetrao urogallus), northern goshawk (Accipiter gentilis), common buzzard (Buteo buteo), , smooth newt (Triturus vulgaris), common frog (Rana temporaria), common toad (Bufo bufo), the dark whiteface dragonfly (Leucorrhinia albifrons), stag's horn clubmoss (Lycopodium clavatum),* and the lesser butterfly orchid (*Platanthera bifolia).*

There is extensive forest drainage around the borders, together with former peat extraction sites, again with drainage ditches, in the north-west of the project area. Drainage ditches link bog pools and have lowered their water level, therefore the influence of drainage extends deep into the 7110* habitats (active raised bogs). Former peat extraction sites are covered with relatively dense forest and so restoration of sites to natural open bog habitat requires forest clearance as well as the removal of drainage.

The EU LIFE MIRES ESTONIA project finances restoration activities. Pre-planning started in 2015 with project delivery beginning in January 2019. In the course of restoration activities, 477 peat dams of seven types will be established and 1.7km of drainage ditches will be filled. Area of forest clearance will cover 54ha in order to restore open raised bog habitats, overgrown since the 1960s. An additional 17ha will be cut in order to establish access for machinery in order to close drainage ditches. Most of the work is planned to be finalised by November 2019.

The aim is to improve or restore water regime in following habitats (ha):

3160	Natural dystrophic lakes and ponds	13.0
3260	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	0.0
6450	Northern boreal alluvial meadow	0.0
7140	Transition mires and quaking bogs	19.0
7230	Alkaline fens	0.0
9050	Fennoscandian herb-rich forests with *Picea abies*	0.0
7110*	Active raised bogs	453.3
9010*	Western Taïga	110.0
9080*	Fennoscandian deciduous swamp woods	38.0
91D0*	Bog woodland	72.0
Total		**705.3**

Monitoring of water level, amphibians, birds, butterflies and archaeology is ongoing. Drones are used for monitoring changes in vegetation cover in addition to traditional botanical monitoring.

Important note. During the excursion participants are introduced to different restoration techniques of the damaged bog and we will also visit intact bog with lots of bog pools. **Rubber boots or good hiking boots are recommended**. Total walking distance ca 4 km in natural and restored mire area.

Project "Conservation and Restoration of Mire Habitats" (LIFE Mires Estonia; project no: LIFE14 NAT/EE/000126) is implemented with the contribution of the LIFE financial instrument of the European Community

Building peat dam with reinforcement. Photo: M. Kohv

ANNEX 1 - Lahemaa National Park

The two excursions will feature habitats and projects within Lahemaa National Park. This has been established for the preservation, protection, restoration, research and restoration of the nature, landscapes, cultural heritage and to promote sustainable use of the coastal area of Northern Estonia. The Lahemaa National Park is part of the pan-European Natura 2000 network both under the Birds' and Habitats Directive.

Key points

- **Founded**: 1971
- **Location:** Harju County, Kuusalu rural municipality; Lääne-Viru County, Haljala and Kadrina rural municipalities
- **Area**: 74,784 ha, 47,910 ha of which is land
- **Rules of protection**: Regulation no. 18 of 19 February 2015 "Rules of protection of Lahemaa national park" by the Government of the Republic
- **Management plan**: 2016 (2016–2025)

Introduction

The role of man in nature conservation is important in Lahemaa National Park: natural and cultural values are preserved with the help of residents. Protection regulations help ensure the preservation of traditional land cover and use of land, maintain the settlement structure and traditional features of natural and cultural heritage landscapes. The National Park plays an important part in preserving the coast of Northern Estonia with largely unmanaged forests, juniper groves and other communities, along with preserving and restoring cultural values.

The national park is outstanding in Estonia and in Europe for its large number of erratic boulders and blockfields. A notable formation in the area is the North-Estonian klint, a steep

limestone escarpment. The highest points on the limestone ridge in Lahemaa are Muuksi (47m) and Tsitre (45m) and the limestone ridge is easily seen in Nõmmeveski, Joaveski and Vasaristi. There are eight larger rivers in the national park, part of which form waterfalls from the klint bank. Rivers and brooks with habitats listed in the Habitats Directive are mapped across 188ha.

Approximately one-third of the national park (26,874 ha) is marine, made up of the Gulf of Finland. This is generally shallow, but it has a very varied relief along the seabed; it is a few metres deep at the centre of the bay but reaches 100 metres in several places. The coastline within the borders of Lahemaa National Park is approximately 145km, with many inlets and bays, and there are 7,952 hectares of Habitats Directive coastal habitat.

Between the escarpment and the sea there is a coastal shallow with dune ridges, coastal banks, lakes and mires. On Pärispea peninsula, the Maalaht and Ulglaht bays form resting and feeding sites for migratory waterfowl. The largest lake is Kahala, in the klint bay (346 ha). Ter are also the dyseutrophic Lohja lake (56.8 ha) and Käsmu lake (43 ha).

Lahemaa National Park is one of Estonia's largest protected forest areas. The forest is the dominant ecosystem in the protected area, covering approximately 34,300 ha of the area (~73% of land area). There are approximately 3,425 ha of mires on the protected area (~4.6% of the national park and 7.3% of terrestrial area). The formation of mires is largely related to coastal processes. Many mires have formed in concave areas between coastal formations or as a result of vegetation development in lakes. There are 1,837ha of Habitats Directive habitats.

Semi-natural vegetation communities (wooded meadows, wooded pastures, coastal meadows, floodplain meadows, flooded meadows, alvars, juniper groves, meadows and grasslands on mineral soils) form about 2,543 ha in the national park (5.3% of the national park). Approximately half of this is formed by various grasslands on mineral soils. There are about 360 ha of flooded meadows, mostly around the Palmse-Vihasoo and Muuksi area (14.4% of semi-natural biotic communities). There are 240ha of Floodplain meadows to be found on the banks of Valgejõe, Loobu rivers and Mustoja brook (9.6% of semi-natural biotic communities); coastal meadows stretch across a similar area.

222 species of birds have been recorded in the Lahemaa area, making this an important area for birds. The national park lists 63 bird species of the Birds Directive. Of the Annex I bird species, the white-tailed eagle (*Haliaeetus albicilla*), osprey (*Pandion haliaetus*), golden eagle (*Aquila chrysaetos*), lesser spotted eagle (*Aquila pomarina*), black stork (*Ciconia nigra*), Eurasian eagle-owl (*Bubo bubo*) and dunlin (*Calidris alpina schinzii*) nest or have nested in Lahemaa.

The variety of habitats, the coastal area and rivers as well as Lake Kahala, results in an abundance of invertebrates in Lahemaa. The Annex I freshwater pearl mussel (*Margaritifera margaritifera*) occurs here, the only established site in Estonia. The narrow-mouthed whorl snail (*Vertigo angustior*) is known from one coastal meadow. There are data on nearly 2,000 species of insects, 60 of which are of importance for nature conservation. Notable are the

scarce fritillary (*Euphydryas maturna*), large copper (*Lycaena dispar*) and the mostly bog-residing large white-faced darter (*Leucorrhinia pectoralis*).

Eight orders of mammals, with nearly 50 species, are to be found in the national park. Of the protected species of mammals, bats of Annex II are present: the pond bat (*Myotis dasycneme*) is one of the target species. The protected Eurasian otter (*Lutra lutra*) is also found here.

The fish whose habitats are protected in Lahemaa are the spined loach (*Cobitis taenia*), European bullhead (*Cottus cobio*), European river lamprey (*Lampetra fluviatilis*) and the Atlantic salmon (*Salmo salar*). All live or spawn in the National Park's rivers.

44 protected plant species and ten protected fungi have been identified in Lahemaa. Notable plants include the chamomile grape-fern (*Botrychium matricariifolium*) and Siberian lettuce (*Mulgedium sibiricum*); notable fungi include the witches cauldron (*Sarcosoma globosum*) and the earth tongue (*Geoglossum arenarium*). Protection measures have been established for two orchid species, the early coralroot (*Corallorhiza trifida*) and the lesser twayblade (*Listera cordata*). 307 species of mosses have been recorded, 12 of which are protected, along with 398 species of lichen have been recorded, 21 of which are protected. Most protected species of moss and lichen grow on blockfields and erratic boulders, such as the black rock-moss (*Andreaea rupestris*) and Mougeot's xanthoparmelia lichen (*Xanthoparmelia mougeotii*).

Primary risk factors for protected values

The open landscapes, meadow communities and the plant and bird species they support are threatened by the abandonment of traditional land use, resulting in encroachment of meadows and reed growth in coastal areas. Meadows may also be destroyed as a result of excessively intensive management. The largest modifying factor for the landscape features is building; valuable habitats and communities are destroyed permanently in the course of construction work.

Bodies of freshwater are threatened by diffuse and point pollution, modifications of the shoreline and cutting trees on riverbanks. Man-made dams on rivers stop fish from moving up- and downstream, restrict water flow and alter the natural water regime. The only habitat for the freshwater pearl mussel in Lahemaa National Park is threatened by the building of beaver dams, sediment pollution and decrease of trout density in the river. Lake habitats are threatened by eutrophication.

The largest risk factors for marine and coastal habitats are related to direct human influence: oil pollution, large mining works, digging outside the protected area and construction. In the coastal area, risk factors include off-road driving of vehicles and building fires outside designated sites.

The increase of visitors threatens rare species. Cultural heritage is threatened by changes in traditional use of land as grasslands and cultivated land fall out of use or are built up.

Settlement structure is threatened by division and building of land units, without consideration for the settlement structure established in the area.

Measures of organizing protection

Lahemaa National Park is zoned into two fully protected nature reserves, 43 conservation zones and nine limited management zones. Human presence and activities are prohibited in the nature reserves while exploitation of natural resources and economic activities are prohibited in the conservation zone. Movement restrictions have been established for the protection of rare species in 13 of the conservation zones while separate restrictions are established to protect coastal areas, including building exclusion zones and restrictions on logging. A limited management zone is a managed part of the national park where regulated economic activities are permitted. Separate limited management zones have been formed to protect the settlement structure and the parks; marine areas are also part of the limited management zone.

In general, bog and forest communities zoned in a conservation zone are preserved as a result of natural processes. Various activities to protect species are included in a management plan, such as: maintaining the growth sites of the chamomile grape-fern and mosses, maintenance of the habitat site of the freshwater pearl mussel, removing beaver dams and other flow restrictions from flowing bodies of water and maintaining the spawning sites of amphibians. Restoration works are planned for bog areas damaged by draining in Koljaku-Oandu spring bog along with the Aabla, Hara, Laukasoo and Viru bog border areas. Restoration of communities is planned for forested areas damaged by cutting and drainage.

Preservation of semi-natural biotic communities will be achieved by restoring meadow communities on approximately 2,800ha with the area of these communities begin well-maintained must be approximately 3,500ha by the end of the management period. Preservation of landscape values is planned by way of opening views, maintaining alleys and parks, maintaining single objects (trees, erratic boulders) and objects of historical and cultural value, landscape elements and prehistoric landscapes.

Important works for direction and management of visitors include developing and maintaining trails; 14 trails and four viewing platforms are planned for the national park. In addition, four visiting routes are being developed, and the permanent exhibition of the Lahemaa visitor centre, camping areas, fire sites and parking lots will be maintained. The plan prescribes new information boards, leaflets, study programmes and a multimedia programme introducing the national park. The most significant training being planned is for tour guides and Junior Rangers.