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ACTION PLAN FOR SEMI-NATURAL GRASSLANDS

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IMPORTANT TERMS AND ABBREVIATIONS

Terms

Favorable habitat status - A habitat status is considered to be favorable if its natural range and the areas it covers within its range are of a constant size or expanding, the specific structure and functions necessary for its long-term survival are operational and are likely to continue to be operational in the foreseeable future, and the status of species typical of the habitat is favorable.

Favorable status of a species - A status of a species is considered to be favorable if its abundance indicates that the species will remain a viable component of its natural habitats in the distant future if the species' natural range does not decline and there is and is likely to continue to be, sufficient habitat for the long-term survival of the species' populations.

"Habitat type" means a habitat listed in Annex I to the European Union Habitats Directive that is in danger of extinction within its natural range or has a small natural range.

Habitat - an area different from its surroundings in terms of natural conditions, suitable for the life of certain species of animals, plants, or fungi.

Protected natural objects - protected areas, special conservation areas, protected species and fossils, permanent habitats, and individual protected natural objects in accordance with the Nature Conservation Act.

Birds Directive - Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds. The directive regulates the protection and use of birds and aims to protect wild birds and their main habitats throughout the European Union.

Habitats Directive - Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora. The purpose of the directive is to maintain or, where necessary, restore natural habitats and species of European Union importance other than birds to favorable conservation status.

Natura 2000 network - a network of protected areas in the European Union aimed at conserving and restoring valuable and endangered habitat types, as well as protecting endangered species and their habitats. The Natura 2000 network consists of sites selected under Article 4 (1) and (2) of the Birds Directive and sites selected under Articles 3 (1) and 4 of the Habitats Directive.

Semi-natural grassland - an area with natural biota formed under the influence of long-term human activities (mowing, grazing). The main semi-natural grassland common in Estonia are wooded meadows, alvars, paludified meadows, wet meadows, coastal meadows, flooded meadows, grasslands on mineral soil, and wooded pastures. A general description of the meadow habitats is provided in Annex 1 of the Action Plan.

Support communities - communities that may not be meadow communities that have formed over a long term, but whose existence is important as alternative habitats and distribution corridors to ensure the favorable status of species characteristic of semi-natural grassland.

Abbreviations

EELIS Estonian Nature Information System

SNC Semi-natural Community

EU European Union

EB Environmental Board

MoE Ministry of the Environment

KAUR Environment Agency

KEMIT Information Technology Center of the Ministry of the Environment

MoRA Ministry of Rural Affairs

ARIB Agricultural Registers and Information Board

RMK State Forest Management Center

ESCCA Estonian Semi-natural Community Conservation Association NCS Nature Conservation Subsidy

CF European Union Cohesion Fund

ERDF European Regional Development Fund

EARDF European Agricultural Fund for Rural Development

EIC Environmental Investment Center

LIFE LIFE program

CAP single area payment, from 2023 basic income support payment

ERDP Estonian Rural Development Plan CAP Common Agricultural Policy

ICPA Important Coastal Protection area

ER SNC Map layer of semi-natural communities in the Environmental Register

INTRODUCTION

Semi-natural grassland and communities are grasslands that have traditionally been used as pastures or haylands. The biota of the semi-natural grassland is natural; the semi-natural grassland have not been plowed fertilized, and no seeds of cultivated plants have been sown to them at the known time. The most common semi-natural grassland in Estonia are alvars, grasslands on mineral soil, flooded meadows, wet meadows, wooded meadows, wooded pastures, and coastal meadows. All our semi-natural communities are included in the range of habitats protected at the European Union level. Maintaining their favorable status is necessary both in Estonia and elsewhere in Europe, and maintaining them is a very important area of responsibility for our nature conservation.

Semi-natural grassland are characterized by a very large diversity of herbaceous plants, so Estonian semi-natural grassland are an important habitat for almost 700 vascular plant species[1]. Estonian semi-natural grassland also stand out with their rare small-scale species richness. Laelatu wooded meadow is one of the most species-rich communities in the world.[2] The species richness of vegetation also creates conditions for the abundance of other groups of biota; many insects, birds, mosses, lichens, and soil biota are associated with meadows. It is important to know that the species associated with semi-natural grassland are Europe's indigenous biota: meadow species inhabited ancient natural open and semi-open ecosystems that were widespread in Europe at least since the Pleistocene (2.4 million years ago), hundreds of thousands of years before the appearance of humans.[3]The widespread distribution of meadows and the large herbivores that have kept them open for millions of years is also the reason why many European species are associated with meadows and semi-open ecosystems. However, during the last millennia, man and cattle have played a leading role in keeping landscapes open, and thus the natural values of semi-natural grassland and related species are preserved only with our help. Without mowing or grazing, the meadows become overgrown and eventually afforested, grow full of reed beds, and then change their species composition.

Semi-natural communities play an important role in the conservation of biodiversity in the open landscape, as they provide habitat and feeding for many rare species of fungi, animals, and plants and help to preserve the biodiversity of agricultural land and the diversity of the landscape. Estonian semi-natural grassland are important providers of natural goods or ecosystem services[4], ensuring the preservation of pollinators[5], natural enemies of pests, and rich soil biota. Meadows are important and stable carbon sequestrants/storers and mitigators of climate change. The purpose of the maintenance of semi-natural grassland is to ensure the preservation of habitats and the species that depend on them.

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[1] Pärtel, M., Helm, A., Roosaluste, E., Zobel, M. 2007. Bioloogiline mitmekesisus Eesti pool-looduslikes ökosüsteemides. Punning, J. M. (Ed.). Keskkonnauuringute nüüdisprobleeme. Tallinn: Institute of Ecology, Tallinn University, 223−302.

[2]Association for the Protection of Semi-Natural Communities & Estonian Center for Applied Research CentAR OÜ, 2019. Poollooduslike koosluste jätkusuutliku majandamise tagamise analüüs.

[3] Dengler, J., Janišová, M., Török, P., Wellstein, C. 2014. Biodiversity of Palaearctic grasslands: a synthesis. Agriculture, Ecosystems & Environment, 182, 1–14.

[4] 4Project "Tools needed for assessing, forecasting and making available of the data of the socio-economic and climate-related environment status of biodiversity", https://www.keskkonnaagentuur.ee/et/eesmargid-tegevused/projektid/elme

[5] Projekt „ForBee", https://www.forbee.ee/

Habitat protection and restoration are important for adapting to climate change and ensuring that species richness is maintained. In order to ensure the protection of biodiversity, a network of protected areas has been established; these are the core areas for the protection of biodiversity. Adequate habitat area and cohesiveness - a well-functioning habitat network - are essential for biodiversity conservation, which is why landscapes outside protected areas must also contribute to the conservation of natural values. It is also important to emphasize the cohesion and diversity of landscapes outside protected areas. In order to ensure the preservation of diverse natural benefits and the good condition of meadow biota, meadow communities, and their support areas must be found in all Estonian landscapes.

Semi-natural grassland are not only important from a nature conservation point of view but also have a socio-economic impact, as their maintenance is an important source of livelihood in rural areas. The maintenance of semi-natural grassland diversifies rural life and ensures the diversity of food production practices and a diverse food supply throughout Estonia. The food from the semi-natural grassland is clean free of plant protection products and fertilizers. This, in turn, supports better health and well-being of people. According to a report prepared by the European Commission, support for the restoration of semi-natural grassland and maintenance for the preservation of semi-natural grassland is one of the most effective investments within the framework of the common agricultural policy that preserves the diversity and biodiversity of agricultural landscapes.[6]The existence of semi-natural grassland in good condition also supports the tourism sector, preserving the traditional and beautiful landscape and the opportunity to get acquainted with different species of animals and plants. Semi-natural grassland and landscapes are an important part of our cultural history, identity, and sense of the landscape.

[6] European Commission Report "Evaluation of the Impact of the CAP on Habitats, Landscapes, Biodiversity", https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/ext-eval -biodiversity-final-report_2020_en.pdf

PURPOSE AND SUMMARY OF THE ACTION PLAN

The action plan for semi-natural grassland sets goals for the preservation and restoration of semi-natural grassland provides an overview of the current situation and risk factors and describes activities to achieve the goals until 2027.

The objectives of the action plan are:

- increased awareness of the values and care of meadows;
- improved cohesion of semi-natural grassland and effectiveness of protection;
- improved quality of care and consistent management;
- Organized data capture.

In order to achieve the goals, it is necessary to:

- ensure adequate funding for the maintenance and restoration of semi-natural grassland;
- be based on the cohesion of the habitats and the species protection aspect when restoring the areas;
- establish a counseling system supporting landowners, maintainers and restorers of semi-natural communities;
- carry out developments for the organization and management of databases.

It is also important to raise stakeholder awareness, ensure the sustainability of meadow maintenance, including investment, improve maintenance quality, continue surveys and inventories to ensure up-to-date data, and assess the effectiveness of restoration and maintenance. In order to ensure the protection and cohesion of semi-natural grassland, support for their maintenance must also be provided outside protected areas.

In 2020, there were a total of approximately 41,000 ha of semi-natural grassland in maintenance and restoration. In order to contribute to the preservation of meadow habitats and the improvement of the favorable status of related species, the goal is to maintain semi-natural grassland on at least 50,000 hectares by 2027. In order to achieve the goal, areas with high restoration value which provide the best landscape cohesion and where the ecological efficiency is the highest have been mapped. Restoration of these areas is one of the priorities.

The implementation of the action plan is effective if the condition of the meadow habitats has not deteriorated and the trends of the condition are positive, the general awareness of the values of semi-natural grassland has increased, 50,000 hectares of semi-natural grassland are under maintenance, and the circle of caregivers has expanded. Areas with a high restoration value have been restored, which has improved the landscape cohesion of the semi-natural grassland, the data set of the semi-natural grassland has been organized, and a comprehensive database has been created, which also reflects the distribution data of the semi-natural grassland all over Estonia.

The budget for the activities necessary for the preservation and restoration of semi-natural communities for the period 2021-2027 is estimated to be at about 90.7 million euros.

1. LEGAL BASIS AND LINKS WITH OTHER STRATEGIC DOCUMENTS

The Action Plan for Semi-natural grassland helps to implement the goals set in EU directives, including the Habitats and Birds Directive and other strategic documents. The most important strategic documents are the following.

- Rio de Janeiro Convention on Biological Diversity, post-2020 global biodiversity framework[7](under development). The goal of the strategy for the year 2050 is that biodiversity is valued, conserved, restored, and used wisely while preserving ecosystem services.
- The European Green Agreement[8] and the related EU Biodiversity Strategy until 2030 and the Farm to Plate Strategic Plan and the European Climate Pact. The Member States must ensure that the trend and status of any protected habitat or species do not deteriorate by 2030. It is also stated that at least 10% of agricultural land must be covered by diverse landscape elements in order to ensure the interconnection of habitats. These goals contribute to climate change mitigation and adaptation - nature restoration and biodiversity-friendly sustainable land use are key nature-based solutions to mitigate climate change.
- The European Landscape Convention[9] is the main framework for landscape protection. Contains guidelines for preserving the various values of our landscapes, including natural assets and cultural heritage.
- The UN 2030 Agenda for Sustainable Development "Transforming our World: The 2030 Agenda for Sustainable Development[10], 15 aims to protect and restore terrestrial ecosystems and promote their sustainable use and halt and reverse biodiversity loss.
- The EU Pollinators Initiative[11], one of the aims of which is to protect the natural habitats of pollinators and to improve the habitats of pollinators in the agricultural landscape.
- Fundamentals of climate policy until 2050[12], development plan for adaptation to climate change until 2030[13]. One of the objectives is to ensure the diversity of species, habitats, and landscapes in a changing climate, as well as the favorable condition and integrity of terrestrial ecosystems and the provision of sufficient and high-quality socio-economically important ecosystem services. The diverse biota sought, protected areas of sufficient size and communities in good condition will ensure greater ecological resilience to both biodiversity and other anthropogenic factors that reduce biodiversity.
- Estonia 2035[14](draft), one of the principles to be followed in policy-making is to improve the quality of the natural environment preserve and increase biodiversity,

[7] Global biodiversity framework for the period after 2020, https://www.cbd.int/conferences/post2020
[8] European Green Deal, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green- deal_et
[9] European Landscape Convention, https://www.envir.ee/et/euroopa-maastikukonventsioon
[10] Transforming our world: the 2030 agenda for sustainable development, https://www.riigikantselei.ee/sites/default/files/content-editors/Failid/SA_eesti/saastva_arengu_tegevuskava_2030_uro_et.pdf
[11] EU pollinators initiative (COM(2018)395), https://eur-lex.europa.eu/legal-content/et/TXT/?uri=CELEX:52018DC0395
[12] General Principles of Climate Policy until 2050, https://www.envir.ee/et/eesmargid-tegevused/kliima/kliimapoliitika-pohialused-aastani-2050-0
[13] Climate Change Adaption Development Plan until 2030, https://www.envir.ee/sites/default/files/kliimamuutustega_kohanemise_arengukava_aastani_2030_0.pdf
[14] Strateegia „Eesti 2035", https://www.riigikantselei.ee/et/Eesti2035

including the restoration of habitats, the improvement of the condition of species, and the necessary investments. The protection of semi-natural landscapes is considered important.

- Estonian Environmental Strategy until 2030[15], the objectives of which include ensuring the existence of habitats and communities necessary for the preservation of viable populations of species and preserving cohesive landscapes.
- The Program for the Protection and Use of the Environment 2020-2023[16], aims to ensure the favorable status of species and habitats and the diversity of landscapes.
- The Habitats and Birds Directive[17], which aims to contribute to the conservation of biodiversity in the European Union, including the achievement of favorable conservation status for habitats and species. The Natura 2000 network has been set up on the basis of these directives.
- The Nature Conservation Act[18], the purpose of which is to the protection of nature by preserving diversity, ensuring the favorable condition of natural habitats and species of wild fauna, flora, and fungi. The aim is also to preserve the natural environment or its elements of cultural-historical and aesthetic value and to contribute to the sustainable use of natural resources.
- Estonian Nature Conservation Development Plan until 2020[19], one of the goals is to ensure the favorable condition of species and habitats and the diversity of landscapes, and the functioning of habitats as a unified ecological network.
- Natura Financing Action Plan 2021-2027[20](draft), which sets objectives and priority actions until 2027.
- The Agriculture and Fisheries Development Plan to 2030[21](under development), one of the aims of which is to contribute to the protection of biodiversity, promote ecosystem services, and preserve habitats and landscapes.
- EU Strategic Plan for the Common Agricultural Policy 2021-2027[22](under development). The strategy plan under development includes a number of important support measures, including support for the maintenance of semi-natural communities, which will contribute to increasing the biodiversity of the agricultural landscape.

Other important international agreements obliging to protect the biodiversity of semi-natural grassland are the Berne Convention for the Protection of European Flora and Fauna and their Habitats, the Bonn Convention for the Protection of Migratory Species (including the AEWA Agreement), and the UNESCO World Cultural and Natural Heritage Convention.

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[15] Eesti Keskkonnastrateegia aastani 2030, https://www.riigiteataja.ee/aktilisa/0000/1279/3848/12793882.pdf
[16] Keskkonnakaitse ja -kasutuse programm aastateks 2020–2023, https://www.envir.ee/sites/default/files/ESO/keskkonnakaitse_ja_-kasutuse_programm_2020_2023.pdf
[17] Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds.
[18] Nature Conservation Act https://www.riigiteataja.ee/akt/110072020057
[19] Eesti looduskaitse arengukava aastani 2020, https://www.envir.ee/sites/default/files/lak_lop_0.pdf
[20] Prioritised action framework (PAF) for Natura 2000 in Estonia, https://www.envir.ee/sites/default/files/paf_estonia_2021_2027.pdf
[21] Development Plan for Agriculture and Fisheries until 2030 (under development), https://www.agri.ee/et/pollumajanduse-ja-kalanduse-valdkonna-arengukava-aastani-2030
[22] EU Common Agricultural Policy Strategic Plan 2021-2027 (under development) https://www.agri.ee/et/upp-strateegiakava-2021-2027

2. GENERAL PURPOSE FOR THE PRESERVATION OF SEMI-NATURAL GRASSLAND

The long-term goal of the protection of semi-natural grassland is to ensure the favorable condition of these habitats and the preservation of the biota associated with the meadows. It is important that ecosystem services related to semi-natural grassland and the cultural heritage related to valued semi-natural grassland are ensured in Estonian landscapes, including the agricultural landscape.

The semi-natural grassland that have survived so far are all valuable and rare habitats whose biota is endangered all over Europe, including Estonia, due to the lack of space. All of our semi-natural communities are included in the range of habitats protected at the EU level, and this action plan will help achieve the Habitats Directive's goal of ensuring the favorable status of semi-natural grassland. The European Green Deal aims to have all ecosystems functioning, restored, and adequately protected by 2050. The United Nations (UN) Decade of Ecosystem Restoration is also under way[23].

According to previous estimates, about 60,000 hectares of semi-natural communities need to be preserved in protected areas. Based on an assessment of the ecological performance of semi-natural habitats, it is necessary to ensure the conservation of 66,000-86,000 hectares of semi-natural grassland in protected areas in order to ensure the survival of 90-100% of the habitats of protected species associated with these areas[24]. Support communities help to improve and maintain the cohesion of semi-natural grassland in the landscape. Support communities include, for example, valuable suitably maintained (including no pesticides) permanent grassland, species-rich shoulder communities (species-rich and well-maintained road shoulders), ecosystems under powerlines, and other well-maintained ecosystems suitable for meadow species, such as grazed sparse forests.

Approximately half of Estonia's protected species are associated with semi-natural meadow communities[25]. If the condition of the semi-natural grassland is favorable, it will help to achieve a better status for many species. In order to preserve the biodiversity of meadow communities and the benefits of nature, priority must be given to preserving, maintaining, and restoring the preserved historical semi-natural grassland in protected areas. In order to ensure cohesion, it is important to preserve semi-natural grassland also outside protected areas[26]. In addition, it is necessary to maintain and establish meadow support communities, which will improve the landscape cohesiveness of the habitats.

In order to preserve species and habitats and to ensure the sustainability of agriculture, the use of semi-natural grassland must be encouraged, and these communities must be considered a necessary and important part of agricultural land[27]. As semi-natural grassland can be maintained primarily by way of agricultural activities (mowing, grazing), the

[23] https://www.decadeonrestoration.org/
[24] Helm, A., Toussaint, A. 2020. Poollooduslike koosluste ökoloogilise toimimise hinnang. University of Tartu, Institute of Ecology and Earth Sciences.
[25] Helm, A., Toussaint, A. 2020. Poollooduslike koosluste ökoloogilise toimimise hinnang. University of Tartu, Institute of Ecology and Earth Sciences.
[26] Association for the Protection of Semi-Natural Communities & Estonian Center for Applied Research CentAR OÜ, 2019. Poollooduslike koosluste jätkusuutliku majandamise tagamise analüüs.
[27] Euroopa Komisjon, 2019, Evaluation of the impact of the CAP on habitats, landscapes, biodiversity Final Report, https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/ext-eval-biodiversity-final-report_2020_en.pdf

caretakers of these communities must be supported and recognized. Food produced on semi-natural grassland and other added value, such as tourism and cultural heritage, must also be valued; moreover, the socio-economic impact in rural areas is important.

In order for society to value semi-natural grassland, it is necessary to provide comprehensive information to landowners, carers, and society as a whole about the ecological and cultural values of semi-natural communities.

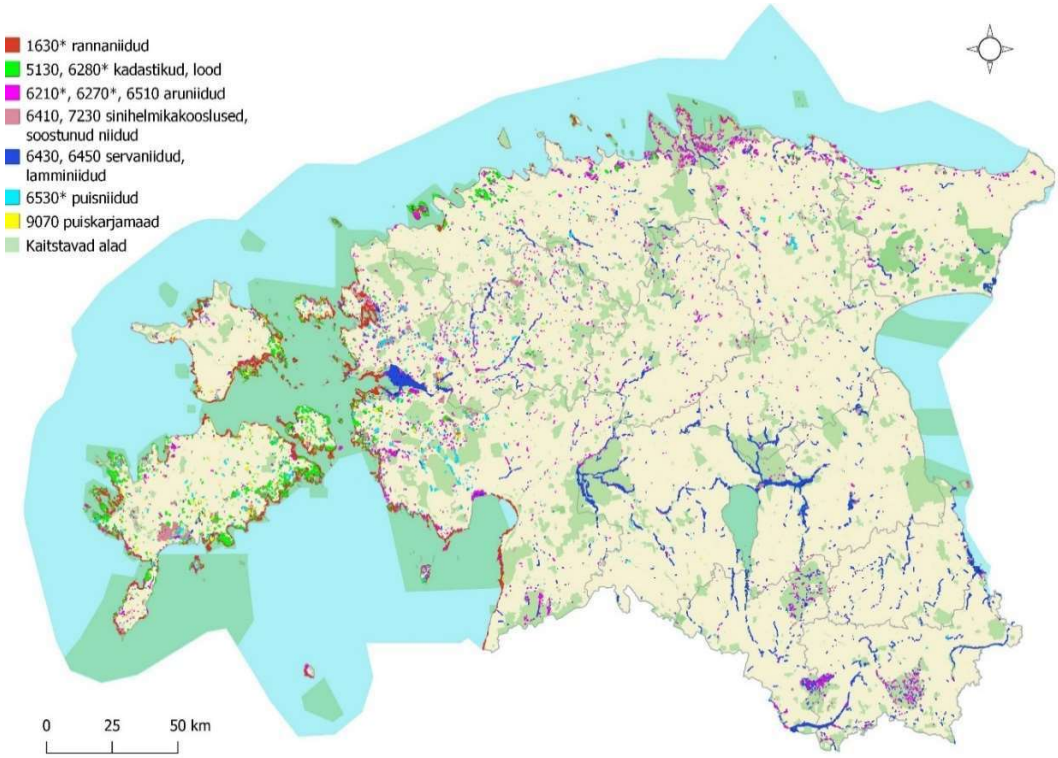
3. CURRENT SITUATION

3.1. Distribution

Meadow communities have historically been widespread throughout Europe, but their area has shrunk in all regions due to land-use change and agricultural intensification.

At the beginning of the 20th century, semi-natural grassland covered a considerably larger part of Estonia than today. At that time, semi-natural grassland were estimated to make up to 40% of Estonia's territory[28], or 1.8 million hectares, in the 1950s, about 1.1 million hectares[29]. The area of semi-natural grassland began to decline after World War II when manual work was replaced by large-scale production and intensive agriculture. As a result, difficult-to-manage grasslands were abandoned, overgrown, and over time were covered with shrubs, reed beds, or forest. Also, from the 1950s onwards, the drainage of paludified meadows and formerly maintained fens and the afforestation of areas unsuitable for intensive agriculture were started.[30]

As of 2020, there are an estimated 130,000 hectares of semi-natural grassland, of which almost 88,000 hectares are protected areas (Figures 1 and 2, respectively).[31]



[28] Kukk, T. Sammul, M. 2006. Loodusdirektiivi poollooduslikud kooslused ja nende pindala Eestis. Eesti Eesti Looduseuurijate Seltsi aastaraamat vol 84: Tartu: Eesti Looduseuurijate Selts, 114–158.

[29] Laasimer, L. 1965. Eesti NSV Taimkate. Eesti NSV Teaduste Akadeemia Zooloogia ja Botaanika Instituut. Tallinn: Kirjastus Valgus.

[30] Örd, A. 2000 Kaitsemetsad ja nende majandamine Eestis. Ed. Ivar Etverk, Aino Kalda. Tartu: Keskkonnaministeerium; DANCEE

[31] Helm, A., Toussaint, A. 2020. Poollooduslike koosluste ökoloogilise toimimise hinnang. University of Tartu, Institute of Ecology and Earth Sciences.

Figure 1. Distribution of semi-natural grassland by habitat types throughout Estonia. Source: Assessment of the ecological functioning of semi-natural communities, combined map layer covering different layers of semi-natural communities compiled in the course of the work

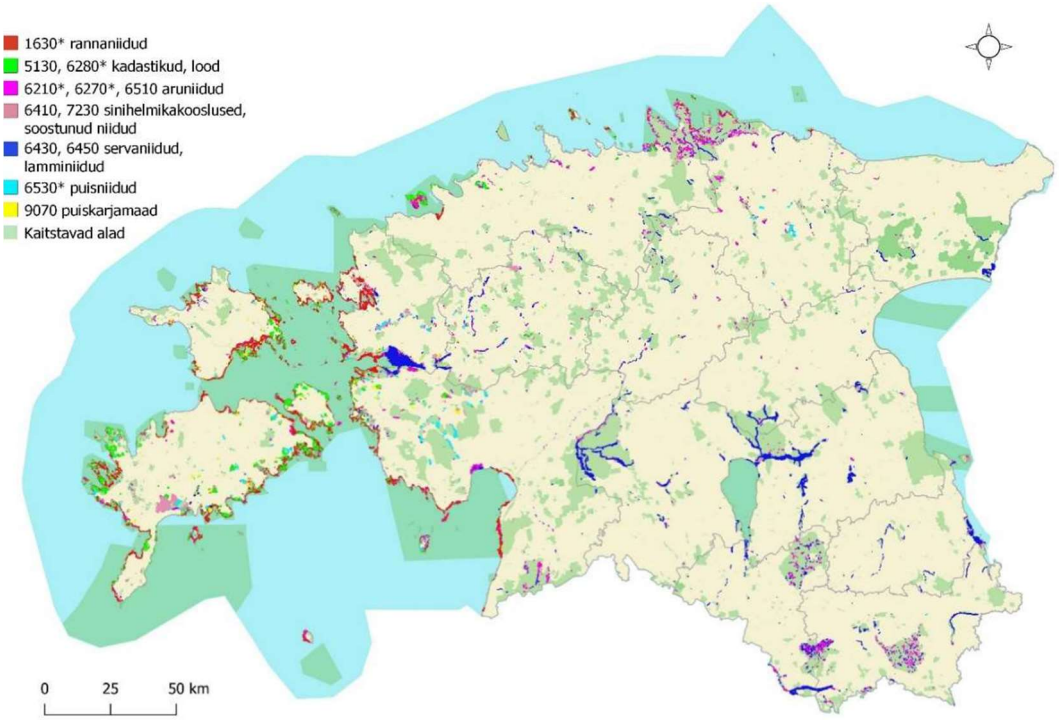


Figure 2. Distribution of semi-natural grassland in protected areas. Source: Assessment of the ecological functioning of semi-natural communities, combined map layer covering different layers of semi-natural communities compiled in the course of the work

Although historically, semi-natural grassland have been widespread throughout Estonia, now most of them have been preserved and maintained in Western Estonia. In Central Estonia, the number of maintained areas is limited to a few hundred hectares. At the same time, those areas where very few semi-natural grassland have been preserved to date are very important for restoration and maintenance, precisely in order to improve the regional coverage and cohesion of the meadows.

The basis for the organization of restoration and maintenance is the database of semi-natural communities of the Environmental Register in EELIS, which contains semi-natural grassland remaining in protected areas. Distribution data are publicly available from the Land Board's X-GIS2 service.[32]
The distribution of semi-natural grassland in protected areas by habitat type and maintained areas is presented in Annex 2 of the Action Plan.

3.2. Ecological status

The ecological status of semi-natural grassland has been affected primarily by the intensification of agriculture and land-use change. In its State of the Environment Report 2020 [33], the European

[32] https://xgis.maaamet.ee/xgis2/page/link/VWtkGOn
[33] European Court of Auditors, 2020, Biodiversity on Farmland: The CAP has not helped to halt the decline, https://www.eca.europa.eu/Lists/ECADocuments/SR20_13/SR_Biodiversity_on_farmland_ET.pdf

Environment Agency identified agriculture intensification as one of the main causes of biodiversity loss and ecosystem degradation in Europe. Landscapes that were diverse in the past, consisting of many small fields and habitats, have become homogeneous due to intensification (see Figure 3). This has led to a reduction in the number and diversity of wild plants and, consequently, of animals.

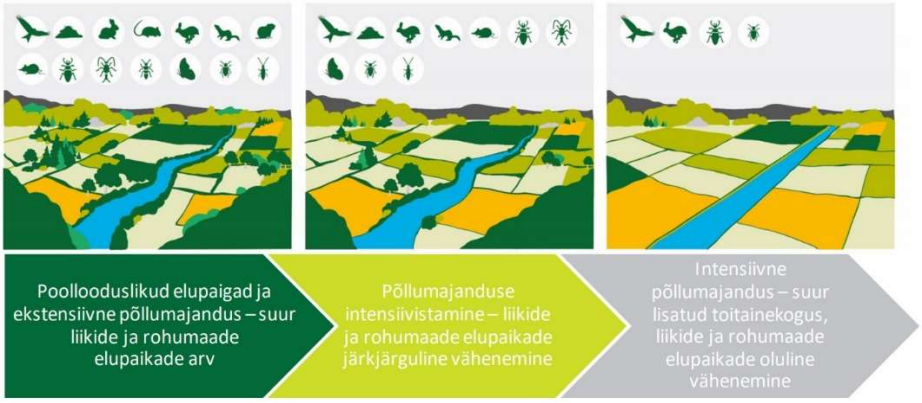


Figure 3. Decline of biodiversity of farmland due to the intensification of land use[34]

As in Europe in general, the structure of the landscape in Estonia has become poorer as agriculture intensifies. Between 1983 and 2018, the Estonian farmland bird index (14 most common breeding birds in the cultivated landscape) has fallen by 50%[35]. The biodiversity of the agricultural landscape and the diversity of the landscape are measured using the Farmland Bird Index[36], which is on a declining trend in Estonia. The use of semi-natural grassland must be encouraged in order to preserve species and habitats and ensure the sustainability of agriculture. Semi-natural grassland are the core areas in the agricultural landscape for pollinators and natural enemies of pests, which also provide the corresponding ecosystem services to the rest of the agricultural land.[37] In order to ensure the biodiversity and mosaicity of landscapes, diversified land use, the establishment of smaller fields, and the avoidance of large areas without landscape elements must be encouraged.

3.2.1. Status of communities

The action plan addresses the 12 habitat types listed in Annex I of the Habitats Directive (Table 1) for the case in which favorable status must be ensured. In accordance with Article 17 of the Habitats Directive, Member States are required to report to the European Commission every six years on the status of all habitat types. The habitat type report contains four components: the distribution of the habitat type, the area, the status of structures and functions, and the state of future prospects. Based on the status of these four components, an overall assessment of the conservation status of the habitat type is provided. Estonia has submitted a status report on the habitat types in Annex I of the Habitats Directive for 2007, 2013 and
2019.
According to a report submitted in 2019, only four habitat types are in a favorable condition among the semi-natural grassland: juniper shrubs, purple moor-grass communities, moisture-loving high

[34] European Court of Auditors, 2020, Biodiversity on Farmland: The CAP has not helped to halt the decline.
[35] Keskkonnaagentuur, 2020, Eesti looduse kaitse aastal 2020 – Eesti looduse mitmekesisus, https://www.keskkonnaagentuur.ee/sites/default/files/elk_2020_est.pdf
[36] Maaeluministeerium, „Põllumajanduse ja kalanduse valdkonna arengukava aastani 2030" eelnõu https://www.agri.ee/sites/default/files/content/arengukavad/poka-2030/poka-2030-eelnou-2020-02-21.pdf
[37] Ministry of Rural Affairs, Draft Development Plan for Agriculture and Fisheries until 2030 https://www.agri.ee/sites/default/files/content/arengukavad/poka-2030/poka-2030-eelnou-2020-02-21.pdf

grasses, and meadows with a meadow foxtail and great burnet. Wooded meadows and paludified meadows are in poor condition.

The condition of coastal meadows, grasslands on mineral soil, alvars, and flooded meadows has been assessed as insufficient.[38]

An overview of the 2019 report is presented in Table 1.

The main reason for the disadvantage is the cessation of meadow management, which in turn changes the species composition of the communities. Improving the condition of habitats is a time-consuming process. Investments in habitat restoration and maintenance can be seen as a positive trend in habitat assessments, for example, in coastal meadows and alvars. As the historical meadow areas are of great ecological importance, as the seed bank and the remaining populations of the species have been preserved there, and the potential for recovery of such areas is very high if suitable restoration takes place, the existing restoration activities must be continued.

[38] Report under Article 17 of the Habitats Directive (92/43/EEC): http://cdr.eionet.europa.eu/Converters/run_conversion?file=ee/eu/art17/envxtxasa/EE_habitats_reports-20190725-083848.xml & conv = 589 & source = remote

Table 1. Estimates of the status of habitats, area, structure and functions and future prospects for the reporting period 2013–2018 and the overall assessment obtained based on them together with the latest trend[39]

Habitat type	Code	Distribution area	Surface area	Structure	The future	Overall assessment	Trend
Coastal meadow	1630*	FV	FV	U1	FV	U1	↑
Juniper field	5130	FV	FV	FV	FV	FV	→
Dry meadow on calcareous soil	6210	FV	FV	U1	U1	U1	→
Species-rich meadow on non-calcareous or slightly	6270*	FV	FV	U1	U1	U1	→
Alvar	6280*	FV	FV	U1	FV	U1	↑
Purple moor-grass community	6410	FV	FV	FV	FV	FV	→
Moisture-loving tall grassland	6430	FV	FV	FV	FV	FV	→
Flood meadow	6450	FV	FV	U1	U1	U1	↓
Meadow with meadow foxtail and	6510	FV	FV	FV	FV	FV	→
Wooded meadow	6530*	U1	U1	U2	U2	U2	?
Species-rich fens[40]	7230	FV	U1	U1	U2	U2	↓
Wooded pastures	9070	FV	FV	U1	U1	U1	↑

FV = favorable
U1 = insufficient
U2 = bad
An asterisk (*) indicates priority habitat types for protection of which the EU has a special responsibility.

[39] Protection of Estonian nature in 2020 - Diversity of Estonian nature. 2020. Environmental Agency.
[40] Assessment of the entire 7230 habitats, but this can also be transferred to paludified meadows. According to the data of EELIS ER_SNC there are 5,800 hectares of paludified meadows out of 7,230 habitats.

3.2.2. Status of species

Semi-natural grassland are habitats to many protected, rare, and endangered species. In 2017–2020, semi-natural grassland (incl. wooded meadows) were home to approximately one-fifth of the species considered in the threat assessment of the Estonian Red List (over 13,500). At the same time, a quarter (25%) of regionally endangered species are associated with meadows[41].

Of the species groups that use semi-natural grassland as habitat, the breeding birds (65 species), about half of which are endangered, are in the most disadvantaged position. The risk assessment of vascular plants revealed that the condition of species of dry, especially sandy habitats, has deteriorated the most in the last decade. This is due to the cessation of habitat management[42]. The condition of vascular plant species in paludified meadows has also deteriorated. According to the 2018 Red List, half of Estonia's ten domestic amphibian species are endangered. Of these, two species are directly related to semi-natural grassland: the European green toad and the natterjack toad. The European green toad, whose main breeding grounds were in alvars and floodplain meadows in Eastern and Southern Estonia, is now extinct in Estonia. The natterjack toad, which was still a common species in the coastal meadows of Western Estonia in the 1960s, is now one of the most endangered species. This is due to the drainage, afforestation, and cessation of grazing of coastal meadows.[43]

The assessment of the threat to butterflies showed that species that depend on semi-natural grassland (especially heathland, sand dunes, and alvars) were in a significantly worse condition than species that do not depend on the status of heritage meadows.[44] Butterfly species characteristic of meadows has found a substitute habitat in the form of other communities (incl. clear-cut areas, strips of grassland, forest rides). This cannot be considered a satisfactory situation as many of these habitats are temporary. As semi-natural grassland have disappeared from the landscape, clear-cut areas and other open forest landscape communities have remained the only open habitats in many places.[45]
Given the short-term suitability of clear-cut areas for open area species and their negative impact on forest species, sustainable forest management should be based on the long-term needs of different habitat species. In order to maintain the diversity of butterflies in open landscapes in the future, it is necessary to restore the original habitats of butterfly species to the landscape in order to ensure long-term open habitats.

According to the latest report of Article 17 of the Habitats Directive 46 (2013–2018)[46], the

[41] Red List of Estonian Species. Species risk assessments. Estonian Nature Information System (EELIS) Environmental Agency (11.01.2021).
[42] Kull, T., Kalamees, R., Kaljund, K., Kull, Tiiu, Leht, M., Luuk, O., Mesipuu, M., Mäemets, H., Pihu, S., Reier, Ü., Roosaluste, E., Rünk, K., Saar, P. 2018. Summary of vascular plant risk assessment results 2017–2018. https://infoleht.keskkonnainfo.ee/GetFile.aspx?id=1947479558
[43] Leivits, A. 2019. Liikide ohustatuse hindamine Eestis: praegune seis ja edasised vajadused. - Book: Tiiu Kull. Liigikaitse Eesti ajateljel. Tartu: Eesti Loodusfoto. http://infoleht.keskkonnainfo.ee/GetFile.aspx?id=707644898
[44] Tiitsaar, A., Õunap, E., Jürivete, U. 2018 Summary of the results of the risk assessment for butterflies (Lepidoptera). https://infoleht.keskkonnainfo.ee/GetFile.aspx?id=-1600204994
[45] Kreitsberg, R. 2018. Changes force to move: will meadow butterflies find refuge in clear-cut areas? https://novaator.err.ee/653258/muutused-sunnivad-kolima-kas-niiduliblikad-leiavad-pelgupaiga-raiesmikel
[46] Leivits, M. 2020. Habitats Directive species and their status. Roasto, R., Tampere, U. (ed.). Estonian nature protection in 2020. Tallinn: Environment Agency, 106-111. https://www.keskkonnaagentuur.ee/sites/default/files/elk_2020_est.pdf

species related to semi-natural grassland are in poor status on heathland and green toad, and in poor condition common head, Estonian heather, left-winged snail, hermit beetle, grasshopper and mud frog. Compared to previous reports, the status of large blue and European green toads (regionally extinct) has deteriorated.

Similar to the threat assessment for the Red List, according to the latest report under Article 12 of the Birds Directive (2013-2018)[47], meadow breeding birds are in the worst status in terms of habitat preference. For example, an abundance of the corncrake, common snipe, and Eurasian curlew has been significantly reduced[48]. Among the species nesting in the meadows, the grasshopper, the black-tailed vulture, the radar, and the red-footed tern are also declining.[49] It is not known whether the decline is due to the poor condition of semi-natural grassland or the intensive management of cultivated grasslands.

If we look at the birds of meadows and cultivated landscapes (incl. fields) together,
31 out of 53 species show a declining trend in numbers in the last 40 years. The number of farmland birds is decreasing throughout Europe, including Estonia. Decreases in farmland birds are associated with the use of farmland, nitrogen fertilizers, and pesticides. The species with the most declining numbers in the years 1984–2017 have been, for example, the barred warbler, western yellow wagtail, the Eurasian curlew and the corncrake.[50]

3.2.3. Impact of maintenance on habitats and species

The Environmental Agency has analyzed the impact of the maintenance of semi-natural grassland on the basis of monitoring data on plant communities and birds collected during the state environmental monitoring[51]. The Environment Agency has also analyzed the impact of semi-natural meadow maintenance on the abundance and species richness of diurnal butterflies[52]. In the course of the analysis, it was found that the representativeness, floristic value, preservation of functions, and nature conservation value of the monitored community types were significantly higher in all supported community types (alvars, floodplain meadows, paludified meadows, dry grasslands, and coastal meadows) in areas with support for semi-natural community maintenance than in areas without support. Data on the monitoring of hatchery birds and great snipes in coastal meadows were observed and the number of individuals, and it was found that the higher the proportion of the area supported by the maintenance of a semi-natural habitat at the monitoring site, the higher the number of individuals, the number of protected species and the number of protected

[47] Leivits, M. 2020. Species of the Birds Directive and their status. Roasto, R., Tampere, U. (ed.). Estonian nature protection in 2020. Tallinn: Keskkonnaagentuur, 112–123.
https://www.keskkonnaagentuur.ee/sites/default/files/elk_2020_est.pdf
[48] Artikkel „Eesti lindude staatus, pesitsusaegne ja talvine arvukus 2013–2017", https://www.eoy.ee/pics/757_Elts_et_al_2019-1.pdf
[49] Leivits, M. 2020. Habitats Directive species and their status. Roasto, R., Tampere, U. (ed.). Estonian nature protection in 2020. Tallinn: Environmental Agency.
[50] Marja, R., Nellis, R. 2018. The change in the number of farmland birds in Estonia in the period 1984–2017 and its relation to agriculture and predators.
[51] Evaluation of the effectiveness of maintenance support for semi-natural communities for biodiversity through national environmental monitoring 2019.
Keskkonnaagentuur, https://www.keskkonnaagentuur.ee/sites/default/files/plk- de_efektiivsus_aruanne.pdf
[52] Impact of maintenance of semi-natural communities on diurnal butterflies based on national monitoring data. 2020.
Keskkonnaagentuur, https://www.keskkonnaagentuur.ee/sites/default/files/aruanne_paevaliblikad.pdf

individuals in the coastal meadows. In the case of great snipes, it was found that the higher the number of supported areas within a radius of 1000 meters from the monitoring point, the higher the number of individuals.

As a result of the analysis of diurnal butterflies, it was found that the maintenance of meadows has a positive effect on diurnal butterflies. The number of diurnal butterflies was higher in the maintained areas than in the non-maintained areas. Along with the increase in the area of the supported semi-natural community in the vicinity of the maintained areas, the number of all diurnal butterflies, as well as specimens specializing in meadows and the number of species of meadow butterflies, will increase. Meadow butterflies, a group of diurnal butterflies more sensitive to habitat overgrowth, were also negatively affected by the time elapsed since maintenance. The more time had elapsed since the last maintenance, the fewer specimens of meadow species were found in the area.

The results of the national monitoring thus show that if the communities are managed (with maintenance support for the maintenance of a semi-natural community), the status of the species is also better. If management is lacking or insufficient, species and the general condition of communities also suffer.

3.3. Organization of protection

Most of Estonia's protected areas belong to the European Natura 2000 network of protected areas. Semi-natural grassland are protected on various types of protected natural objects, including protected areas, conservation areas, permanent habitats, and individual objects. An overview of the distribution of semi-natural grassland by protected natural objects is presented in Table 2.

Tabel 2 Distribution of semi-natural grassland among protected natural objects as of 2020

Protected natural object	Area (hectare)
Special conversation area	29 001
National park	18 826
Protected area	15 443
Landscape protection area	12 706
Permanent habitat	741
Single object	19

Several restrictions have been set for the protection of semi-natural grassland, which are allowed by §§ 14, 30, 31 and 33
of the Nature Conservation Act. This mainly means avoiding construction activities and the construction of new land improvement systems. On protected natural objects, semi-natural grassland remain in different zones - special protection zones or limited management zones. There is no very definite preference for the choice of the zone, as the semi-natural grassland can be protected both in the special protection zone (designated 27 754 hectares) and in the limited management zone (designated 19 340 hectares). The exception in the choice of the zone is wet meadows. As it is also possible to intervene in the maintenance of existing land improvement systems in special management zones, in the case of wet meadows, where drainage may lead to the degradation of the meadow, the regime of the special management zone has been used. Some meadows may also have movement restrictions necessary to

protect sensitive species (such as coastal meadow birds), which is why they have been included in the special management zone for the purpose of applying movement restrictions. However, the purpose of the natural special management zone is to protect natural processes (human intervention should not take place), but there are almost 1,450 hectares of semi-natural grassland in this zone. It is therefore important to ensure that the protection rules for these meadows allow them to be maintained or, if necessary, amended. When designing the protection procedure for semi-natural grassland, it is also necessary to take into account the fact that, depending on the zone in which the semi-natural grassland fall, landowners or possessors of lands may find themselves in an unequal situation, as no land tax has to be paid for land in the special management zone. However, this is required in the limited management zone, which may affect the profitability of maintaining these meadows and the rental price of the land.

The majority or 51% of the semi-natural grassland are located on private land, 45% on state land, and 4% of the land is still on state-owned land or land that is not registered in the cadastre due to shoreline changes. According to the Estonian topographic database, semi-natural grassland remain on various land parcels, such as forest land, cultivated land, wetlands, and the sea. Modification of land parcels in a protected area requires the consent of the protected area manager, but compliance with this requirement has been problematic at present. In practice, there have been cases where the semi-natural meadow is destroyed by plowing or damaged by inappropriate economic practices (sowing, reforestation). If the semi-natural meadow remains on the agricultural land parcel, then there is no legal change in the agricultural land parcels, and normal agricultural activities can be carried out in such an area. This problem is exacerbated in part by the fact that plowing, fertilizing, or reforestation are not activities subject to authorization, which is why landowners often unintentionally plow or fertilize them or plant on them. To alleviate the problem, an amendment to the Nature Conservation Act has been initiated in 2020, which seeks to prohibit any activity that causes the destruction or damage of semi-natural grassland in the protected area.

Another problem in organizing the restoration and maintenance of semi-natural grassland in protected areas is the provision of Natura 2000 private forest support for semi-natural grassland (approximately 3,000 hectares). As wooded meadows and pastures, and alvars mostly remain on forest land, those habitats that are not reflected in the ER SNC database can apply for Natura 2000 private forest support. The same problem exists today in coastal meadows covered with woody vegetation. These areas need to be reviewed in nature, and management decisions need to be taken.

The geographical data of the semi-natural grassland set as a target in the protected areas have been entered into EELIS. When setting protection objectives for protected areas and compiling management procedures, the nature_habitat database is followed. The basis for organizing practical restoration and maintenance work is the ER_SNC database. The sustainable management and synchronization of the two databases have not been achieved. This has made it difficult to organize protection, and assessments from different databases have made it difficult to set adequate measurable targets. Effective protection is based on high-quality raw data, which means that the data in the various databases need to be organized.

The precondition for the restoration and maintenance of semi-natural grassland is the desire and interest of landowners/land managers. If the landowners are not interested in maintaining the semi-natural grassland or renting the areas, the regulation does not provide for the possibility of acquiring these lands for the state; the organization of works without

the consent of the landowner on the basis of subsection 17 (8) of the Nature Conservation Act is also usually not practical, as it creates opposition to the achievement of nature conservation objectives.

Practical conservation management activities are planned and implemented with this action plan on the basis of the database of semi-natural communities of the environmental register and also on the basis of area-based conservation management plans. All semi-natural grassland that require restoration and maintenance activities must be entered in the database of semi-natural communities of the Environmental Register, comply with the protection procedure, and the activities do not harm the conservation objectives. The role of management plans is primarily to prioritize maintenance and restoration activities based on protected areas. The action plan sets out overall habitat-based spatial objectives, which are set out in Table 7.

Semi-natural grassland can also be found outside protected areas, but there are currently no regulations for the conservation of these communities outside protected natural objects.

3.3.1. Risk factors

Semi-natural grassland are threatened by several risk factors, the main ones being the following.

- Fragmentation and loss of cohesiveness

Fragmentation means shrinking the area of semi-natural grassland and isolating them, the most common cause of which is human activity, such as the construction of roads and buildings and the afforestation of meadows. As a result, instead of the former complete meadow area, several meadow patches separated from each other and smaller than the original ones will be created. The negative effects of the edge effect and the predation pressure increase, and the cohesiveness of the meadow areas decreases. Fragmentation reduces the viability of populations, generally leading to a loss of diversity and an increase in inbreeding. With sufficient landscape cohesion, the spread of specimens and pollen would compensate for the loss of genetic diversity of the populations, but the meadows are often too far apart from each other, and the landscape between them does not encourage the spread of species typical of semi-natural grassland, so genetic material does not spread between meadows. Over time, this changes the species composition and reduces biodiversity.[53] The loss of cohesiveness between communities reduces the viability of populations of species dependent on semi-natural grassland and increases the susceptibility of populations to changes in environmental conditions (incl. climate change, diseases), which is why it has a major impact on the Estonian landscape.

- Lack of maintenance and overgrowth of areas

Lack of maintenance can be due to a number of reasons, such as lack of economic interest, lack of awareness of options and requirements of nature conservation and meadow community maintenance, the low population density of rural areas, complexity, and cost of maintenance (meadows are often in flooded or inaccessible areas), lack of maintenance facilities, lack of options for the use of mowed hay and cost of transport.

Overgrowing threatens all meadow communities that are not maintained. Communities with high species richness where the well-being of several species depends on traditional maintenance are most endangered. For example, not only does the number of plant species decrease in the case of overgrowth of alvars, but the species richness of many other important groups of species also decreases. Overgrown alvars have significantly fewer species of bumblebees and butterflies, as well as ground spiders and Glomeromycota.[54] The overgrowth of wooded meadows destroys macro- and micro-habitats suitable for many species groups. For example, the best-studied flora of vascular plants, which can be estimated at about 600 species, is endangered.[55] As alvars and wooded meadows are very rich in biodiversity for many groups of biota, their overgrowth has a great impact on Estonian biota.

Over the last decade, great efforts have been made to re-use semi-natural grassland, and approximately 38,000 hectares of them are under maintenance. The remaining 39,000 hectares in the environmental register have no maintenance activities and the areas not

[53] Association for the Protection of Semi-Natural Communities & Estonian Center for Applied Research CentAR OÜ, 2019. Poollooduslike koosluste jätkusuutliku majandamise tagamise analüüs.
[54] Helm, A. 2019. Alvars and juniper shrubs
[55] Roosaluste, E. 2019. Maintenance plan of wooded meadows and wooded pastures

managed need to be restored first (removal of shrubs and reeds, reduction of canopy cover of woody vegetation, crushing of turfs, etc.) and, if necessary, access must be established.

- Interruption or termination of maintenance

Continuous maintenance is one of the most important activities for the conservation of species richness. After restoration, the area must be maintained for at least five years after payments of support have been made. There are situations where maintenance is not resumed after a five-year commitment period, and the site is out of service for a short time (up to a few years) or permanently. The latter will again lead to an overgrowth of areas.

According to the analysis of ensuring the sustainable management of semi-natural communities, the following circumstances are cited as the reasons for termination or non-continuation of the maintenance obligation:

• maintenance of the meadow is not cost-effective;
• the natural situation does not allow to continue the care;
• the landowner has not renewed the land lease agreement;
• abandonment of farming or, more specifically, the management of semi-natural grassland.

There are also situations where lease agreements on state lands are terminated due to complicated natural maintenance conditions and deficient infrastructure (for example, approximately 300 hectares of floodplains fell out of the maintenance scheme in 2019).

In 2019, the first five-year maintenance obligation period of the current period was completed, and compared to 2020, the application of the maintenance support for semi-natural habitats was not continued on approximately 600 hectares. More detailed reasons are described in Chapter 3.4. As maintained meadows are carriers of species richness and gene pool, where species-specific to semi-natural communities can survive and spread, the disruption of maintenance of such areas will have a major impact.

- Inappropriate maintenance techniques and insufficient quality of maintenance

Semi-natural grassland are threatened by inappropriate care techniques and insufficient quality of care. Examples of inappropriate maintenance techniques include incorrect maintenance frequency or grazing load, incorrect techniques (e.g., chopping, shredding, mowing with a lawn mower), and failure to harvest hay. In 2019, the Environmental Board conducted on-site inspections in areas where a single area payment is applied for semi-natural grassland and found that approximately 20% of these areas are managed by shredding. Inappropriate maintenance practices lead to a reduction and change in the species composition of the habitat.

The main problem is the low grazing load and the abandonment of mowed hay. Such situations are most often identified by checks on maintenance supports for semi-natural communities. While compliance with the maintenance support requirements for semi-natural habitats was checked in 2015–2020, approximately half of the detected violations were related to under grazing, the area was not mowed, or the mowed hay had not been removed. Excessively frequent mowing or overgrazing occurred less often. Improper maintenance techniques and inadequate maintenance are not major problems, so their impact on meadows is moderate.

- Cultivation, afforestation, and plowing of semi-natural grassland

Cultivation can consist of changing the species composition (sowing hay seeds) as well as fertilizing. Cultivation threatens and has historically affected grasslands on mineral soil in particular. Soviet-era afforestation is a major problem in the coastal meadows, especially in the higher parts of the meadows. The result is narrow strips of the meadow where only the saline part, heavily affected and often flooded by the seawater, has remained. Afforestation is now a problem outside protected areas on alvars and other open meadow patches, where afforestation of such meadows has been started. For example, in 2019, mineralization of the soil was carried out for the purpose of afforestation in Pärnu County on the alvar of Penijõgi cross, which damaged the community that had formerly been in good condition.

In practice, there have also been cases where the semi-natural thread is destroyed by plowing or damaged by inappropriate economic practices (seed sowing). In 2019, in the course of on-site inspections, the Environmental Board identified approximately 30 hectares of meadow areas where as a result of seed sowing it was a cultivated meadow or the area was plowed into arable land, a hedge was planted in the area, or the meadow was turned into a yard area. Although these activities have not been carried out on a large scale, they reduce the area of meadows in the landscape, reduce the cohesiveness of meadows and jeopardize the biodiversity associated with meadows, leading to significant impacts from cultivation, afforestation, and plowing.

- Construction, development, and drainage

Development and construction cause both complete destruction and fragmentation of meadows. Its effects can be significant outside protected areas around densely populated areas and in aesthetically attractive areas such as coastal areas. Drainage is a major threat to wet communities such as coastal meadows, floodplain meadows, and paludified meadows. Meadows can be drained directly (such as many coastal meadows), but draining can also be a side effect of farmland or forest drainage or occur as a result of development. In protected areas, these activities are regulated by the protection procedure, which is why the impact of the activities on Estonian meadows is generally small, but drainage is a major threat to wet meadows. The holiday economy and construction of summer cottages also have a great impact on coastal habitats (for example, tennis courts have been built in areas that have been preserved as open areas with hard soil), and disc golf courses have been set up in Hiiumaa on other habitats in good condition (for example, wooded meadows, grasslands on mineral soil).

A complete list of habitat-based risk factors is provided in the Threats section of the habitat management plans.[56]

3.4. Overview of maintenance and restoration

The goal of the Nature Protection Development Plan until 2020 and action plan for semi-natural communities for the years
2014–2020 was to maintain 45,000 hectares of semi-natural grassland 2020. In 2020, there will be about 38,000 hectares of protected areas under maintenance and about 3,200 hectares of semi-natural grassland under restoration (see Table 3).

The area of maintained semi-natural grassland has increased every year. In 2013, about

[56] https://www.keskkonnaamet.ee/et/eesmargid-tegevused/maahooldus/tegevus-ja-hoolduskavad

27,000 hectares were covered by the maintenance support for semi-natural communities; in 2020, this area is almost 34,100 hectares, so the increase in the area under support for semi-natural communities during the action plan period has been over 7,000 hectares. In addition, the areas maintained through other agricultural supports (single area payment) should be taken into account, amounting to almost 4000 hectares in 2020.

In 2019, the first five-year maintenance obligation period of the current period was completed, and compared to 2020, the application of the maintenance support for semi-natural habitats was not continued on approximately 600 hectares. Thus, as the area under support increases, the area decreases. The Environmental Board mapped the reasons for waiving the support, which are mainly difficult natural maintenance conditions (access, excessive wetness), non-renewal of the lease contract, health reasons, conditions of support. The maintenance of the areas was partially continued with the help of CAP support in the amount of 120 hectares; maintenance was also continued on 60 hectares, however, without applying for support. A significant part (almost 1/3) of the areas dropped out of the maintenance support plan is due to the lack of interest of the landowner or the problems of the lease contract. Therefore, the possibility of further management of these areas is unknown. The remaining dropped-out areas need additional activities to restore them to good condition. For individual areas, consideration should be given to natural development, as maintenance activities have proven to be extremely difficult, and maintenance outcomes cannot be achieved.

Table 3. Status of restoration and maintenance of semi-natural grassland in 2020

Semi-natural meadow	Objective 2020 (ha)	In restoration 2020 (ha)	In maintenance 2020 (ha)		In maintenance, restoration 2020 (ha)
		Restoration	Semi-natural community maintenance support	CAP	
coastal meadow (1630	10800	979	10813	631	12 423.
heath (4030)	290	0	58	1	59
juniper field (5130)	500	105	361	142	608
calcareous grassland (6210*, 6210)	2420	90	2257	229	2 576
non-calcareous or slightly calcareous	1880	53	1214	268	1 535
alvar (6280*)	7700	526	4656	194	5 376
purple moor-grass community	650	38	650	62	750
moisture-loving tall grassland (6430)	370	42	953	220	1 215
floodplain meadow	12200	322	7868	1030	9 220
meadow with meadow foxtail and great burnet	1340	77	1870	726	2 673
wooded meadow	3300	258	911	34	1 203
paludified meadow	1900	476	1518	128	2 122
wooded pasture (9070)	1650	210	967	113	1 290
Total	45,000	3177	34096	3778	41, 051

In addition to the measures described below, management plans based on the habitat or habitat group of semi-natural grassland contribute to the achievement of favorable status in terms of both surface area and habitat. They contain important information on the conservation values and maintenance and restoration techniques for different habitat types.

Researcher-expert working groups have updated their maintenance plans in 2019-2020. The current maintenance plans are available on the website of the Environmental Board [57]and in Annex 4 to the action plan. The following have been prepared:

- maintenance plan for flooded meadows;
- maintenance plan for coastal meadows;
- maintenance plan for alvars and juniper shrubs;
- maintenance plan for wooded meadows and wooded pastures;
- maintenance plan of grasslands on mineral soil and paludified meadows.

3.4.1. Restoration and investment measures

In 2014–2020, both state budget and European Union funds were used for restoration. Nature conservation support was mostly paid from the EIC nature conservation program and since 2019 from the state budget. From the resources of the EU, the means of the Regional Development Fund, the Cohesion Fund, and LIFE have been used for restoration and investment. During the period, 26.3 million euros have been used for renovations and investments (see Table 4).

Table 4. Funds used in 2014-2020

Measure		Infrastructure (EUR million)	Restoration (EUR million)
Nature Conservation Support (EB)		0.4	3.6
Cohesion Fund	EIC	5.3	2.2
	RMK	4.3	3.6
LIFE (EB)		0.26	2.7
EIC Environmental Program			0.3
EIC, RMK			0.4
European Regional Development Fund			0.2
RMK's budget		0.8	2.2
TOTAL:		26.3	

A total of 4 million euros has been paid for nature conservation support[58] from the nature protection program of the Environmental Investment Center and from the state budget in 2014–2019. This support has helped restore 4,275 hectares of semi-natural grassland and build 400 kilometers of pastures.

In 2017, activity-based unit rates for priority habitats were increased by 25% to increase

[57] https://www.keskkonnaamet.ee/et/eesmargid-tegevused/maahooldus/tegevus-ja-hoolduskavad

[58] Regulation No. 62 of the Minister of the Environment of 1 June 2004 "Procedure for Application for Nature Conservation Support, Review of Applications and the Procedure of Payment of Support, Requirements for Payment of Support and Support Rateshttps://www.riigiteataja.ee/akt/121042017012

interest in the restoration of these habitats. Although the fee rate for alvars and wooded meadows is the highest, the volume of restoration applications for these habitats has not increased significantly and is lower than the actual cost of restoration work. The unit rates of activity-based support for restoration range from € 180 to € 885/ha, depending on the type of habitat and the condition of the site. The support for the construction of stock yards in restored areas
is 1 euro per meter. The Environmental Board coordinates the receipt of applications for nature conservation support and the payment of support.

The resources of the Cohesion Fund have been used with the help of the EIC both as a support measure[59] aimed at the public (open round) and allocated to RMK.

Through the open round of the EIC, 2.8 million euros have been used for the restoration of semi-natural grassland from 2014 to 2020, and 5.3 million euros have been allocated through application rounds to support the investments needed for maintenance. As of 31.12.2019, 671 hectares have been restored
through open rounds. Investments have been made to distribute tools for the care of semi-natural communities and to support the acquisition of animals and the infrastructure needed for their care. The infrastructure has also been funded by the EIC Environmental Program.

In addition to the funds of the open round, 3.6 million euros of CF funds have been allocated to RMK for restoration works and 4.3 million euros for the development of infrastructure, to which RMK will add 1.3 million euros as self-financing. In addition, in 2013–2020, RMK has financed restoration works for 1.56 million euros. In the years 2013–2020, a total of 3374 hectares of semi-natural grassland have been restored from RMK's lands, of which, as of 26.10.2020, the restoration of 1597 hectares of semi-natural grassland has been financed from CF funds.

With the support of the European Union's LIFE + Nature program, the project "Restoration of Estonian alvar pastures" was implemented in 2015–2019.[60] The project coordinator was the Environmental Board, and the partners were the University of Tartu, the Estonian University of Life Sciences and the Association for the Protection of Semi-natural Communities. The total cost of the project was 3.7 million euros, of which 75% was the LIFE + Nature program and 25% the contribution of the Estonian state (EIC). Of the total, 2.7 million euros were spent on restoration. During the project, grazing on 2,500 hectares of alvars was restored and resumed. The investment required for maintenance was 261,000 euros. In order to ensure the quality of maintenance, equipment (shelters, water barrels) was purchased, the establishment of gardens and the construction of passages was supported, and the infrastructure necessary for grazing was purchased. In addition, the access roads to the restored pastures were repaired.

The restoration measures in use in Estonia were thoroughly analyzed, and for each measure, an analysis of strengths, weaknesses, opportunities, and threats (SWOT) was prepared in the framework of the analysis of ensuring the sustainable management of semi-natural

[59] Regulation No. 35 of the Minister of the Environment of 13 October 2016 "Conditions for Granting Support in the Case of Open Infrastructure in the Measure "Preservation and Restoration of Protected Species and Habitats" in the framework of the activities "Restoration of protected habitats" and "Investments required for the maintenance of semi-natural communities", https://www.riigiteataja.ee/akt/121122017042?leiaKehtiv
[60] https://life.envir.ee/elualvaritel

communities.[61]

3.4.2. Maintenance measures

Funding for the maintenance of semi-natural grassland began in the early 2000s. Since 2007, the European Agricultural Fund for Rural Development of the EU Common Agricultural Policy has been used to finance the maintenance of semi-natural grassland, paying support for the maintenance of the semi-natural community of the Estonian Rural Development Plan for the maintenance of semi-natural grassland located in protected natural objects[62]. The support measure is administered by the ARIB, the maintainers are advised, the conditions of maintenance are determined and checked by the Environmental Board.

In the years 2014–2020, the support budget was 37.5 million euros. There is a transition period from 2021 to 2022, which means that the measures for the period 2014-2020 will also be implemented for the next two years.

Support for the maintenance of a semi-natural community cannot be applied for land that needs to first be restored. Support for the maintenance of a semi-natural community is granted for four types of communities designated as eligible: wooded meadow, wooded pasture, a meadow with junipers, and another meadow. The unit rates of the support per hectare range from € 85 to € 450, depending on the habitat group and type of management (grazing or mowing). Support for the maintenance of a semi-natural community is paid if the community is properly maintained. The unit rates of support per hectare are as follows:

- mowing of a wooded meadow - €450;
- grazing of a wooded pasture - €250;
- mowing of meadows with junipers - €250;
- grazing of meadows with junipers - €185;
- grazing of other meadows - €150;
- mowing of other meadows - €85;
- compliance with the additional maintenance requirements for semi-natural communities occurring in important coastal protection areas - € 232.

In 2016, one-year supplementary activity support of 232 euros was implemented for important coastal protection areas, the aim of which was to improve the quality of maintenance of coastal areas. As of 2020, 7695 hectares of coastal areas important in terms of species protection have been mapped in the database of semi-natural communities of the Environmental Register.[63]

In 2020, support for the maintenance of semi-natural habitats was applied for a total of 34,096 hectares. Of this, additional support for coastal areas was requested for 2,000 hectares. On 75% of the total area under maintenance, the main method of maintenance is grazing. 48% of the areas under maintenance are
on private land, 49% on state land, and the remaining 3% on land still in state ownership of

[61] Association for the Protection of Semi-Natural Communities & Estonian Center for Applied Research CentAR OÜ, 2019. Analysis of ensuring sustainable management of semi-natural communities, Chapter 7.1.2.
[62] The support is paid on the basis of Regulation No. 38 of the Minister of Rural Affairs of 22 April 2015, "Support for maintenance of semi-natural community".
[63] EELIS, Database of Semi-Natural Communities of the Environmental Register (ER SNC).

unregistered land.[64]

Other area-based subsidies of the Estonian Rural Development Plan cannot be applied for semi-natural grassland where maintenance support for semi-natural communities has been applied for. However, for other meadows and wooded meadows, a single area payment can be applied together with the support for a semi-natural community if the area meets the conditions for this support. Areas with woodland pastures and meadows with junipers are not eligible for CAP support. In 2020, a total of 22,547 hectares (66% of the total area applied for support for the maintenance of semi-natural habitats) were applied for at the same time as both semi-natural habitat maintenance and CAP support. Also, areas with maintenance support cannot apply for nature conservation support or other restoration support at the same time.

According to the ARIB, the largest share of applicants for support for the maintenance of semi-natural communities in 2020 is self-employed persons (32%) and private limited companies (29%), followed by natural persons (27%) and non-profit associations (11%). Other forms of entrepreneurship accounted for a total of 1%. By areas, the highest contribution to the maintenance of semi-natural communities has been made by private limited companies (45%), followed by self-employed persons (26%) and non-profit associations (21%). Private individuals maintain almost 7% of the area of the maintained semi-natural communities. In 2020, the largest number of SNC beneficiaries belonged to the size groups of 10–49.9 hectares and 3–9.9 hectares, respectively, by 32% and 28%, respectively. 10% of the beneficiaries of the SNC belonged to the size groups 100 and more hectares; they managed 59% of the total area supported by the SNC.

In addition to the support for the maintenance of semi-natural habitats, the areas are also maintained with the help of other agricultural support, such as the single area payment; in 2020, this area was 3,778 hectares. In 2020, support for organic farming and Natura field support was applied for 643 hectares and 2003 hectares, respectively.

In 2014–2020, 32.5 million euros were paid out of the budget for support for the maintenance of semi-natural habitats. In addition, CAP support is paid annually to areas of support of the maintenance of semi-natural communities that meet the CAP requirements. Between 2014 and 2020, around € 10.3 million in CAP support has been paid.

3.5. Inventories, monitoring, and surveys

The basis for organizing the protection of semi-natural grassland is the inventory and monitoring data of habitats and species. Monitoring data are collected on the basis of the national environmental monitoring program and compiled into the Environmental Monitoring Information System. Data on habitats and species inventories are compiled in the Estonian Nature Information System. Habitat data are reflected in the database of semi-natural communities of the Natura Habitats, and Environmental Register; data of species sites are reflected in the databases of protected species.

[64] KAUR, analysis, July 2021. The data are based on a comparison of land ownership data with maintenance data.

3.5.1. Inventories

A guide for assessing the condition of habitats has been developed for the identification and inventory of semi-natural grassland under the Habitats Directive.[65] The guide is being updated and will be completed in spring 2021.
In 2015, the principles for ordering inventories were prepared, which need to be updated in the near future.

The Environmental Board generally orders botanical inventories of semi-natural grassland. However, EB specialists also perform habitat inventories. The data in the databases is also supplemented, and the boundaries are specified on the basis of the information collected during the on-site inspections (for example, the boundary of the coastal meadow is specified by GPS).

In 2014–2020, inventories of more than 20,000 hectares of semi-natural grassland had been commissioned in protected areas, and the Cohesion Fund resources have been used for this purpose. In addition, the data have been updated with data from the inventories of habitats commissioned for the preparation of conservation management plans. In 2020, the Environmental Board started updating the status assessments in the areas under maintenance. In areas under long-term maintenance and in the areas where the definition of a habitat type is correct, a habitat inventory is not always required to assess the status. Therefore, when updating status assessments, the last data update date is reflected in the database of semi-natural communities of the Environmental Register, and the original inventory date is stored in EELIS. A summary overview, containing both inventories and updated status information, is provided in Table 5.

The basic data in the databases need to be updated regularly, preferably at intervals of 7 to 10 years. The purpose of inventories of semi-natural grassland is to collect data primarily in those areas where the habitat has been determined on the basis of map material, or the semi-natural meadow has not been mapped, habitat information is incomplete/old (since 2000), or input has been received that the habitat definition or boundaries are incorrect.

Table 5. Age of data in the Environmental Register as of 2021

Year	Surface area (m2)
2020–2013	43 421
2012-2005	19 529
2004 and older and/or date missing	14 562

There is no comprehensive overview of the location and status of semi-natural grassland outside protected areas. Data on mapped sites are outdated and generally date from the establishment of the Natura 2000 network. The mapping of semi-natural grassland outside the protected areas has been started in the course of the project of the Estonian Semi-natural Community Conservation Association, the aim of which is to map wooded meadows and wooded pastures in good status.[66]

[65] ESCCA, 2010, Guidelines for the assessment of the status of semi-natural habitat types in Annex I of the Habitats Directive, https://www.envir.ee/sites/default/files/LKO/taiendustega_natura_abc_22_sept_2011_plk.pdf
[66] ESCCA, Estonian wooded grassland inventory (ongoing project), https: //www.kik.ee/en/projekt/eesti-puisrohumaade-inventory

Updating the data ensures that the necessary information is available for protection planning, setting appropriate objectives, and organizing conservation management activities. Up-to-date and accurate data also provide high-quality input to sectoral analyzes. High-quality data are needed to ensure that the restoration is carried out with the restoration potential and in the right habitat, without compromising other values. In addition, the information obtained from the inventories is the basis for the assessment of the status of the habitat, including the reporting of Article 17 of the Habitats Directive.

3.5.2. Monitoring and surveys

KAUR organizes the sub-program of the national environmental monitoring program "Monitoring of Biodiversity", in the course of which habitats, species, and related communities and landscapes are monitored. During the monitoring of rare and endangered plant communities, the vegetation cover of coastal meadows, alvars, heaths, dry grasslands, wooded meadows, floodplain meadows, and paludified meadows is assessed every year within the entire range. Species monitoring programs, monitoring species of semi-natural communities, such as monitoring of amphibians, monitoring of hatching birds in coastal meadows, monitoring of diurnal butterflies, monitoring of great snipes, monitoring of vascular plants, also provide important input on the status of communities.

Since 2019, the project "Impact of large-scale restoration of alvars on biodiversity, post-restoration status and analysis of restoration activities"[67] is underway, where the success of restoration of alvars is assessed. The work will be completed by mid-2021, but data already collected show that biodiversity will recover faster than previously thought during the restoration of dry meadows. In order to assess the effectiveness of the restoration of semi-natural grassland, a methodology for assessing the effectiveness of the restoration of semi-natural grassland has been prepared in 2019.[68] In the work, proposals are made to supplement the national monitoring, and recommendations are given on how the impact of maintenance activities on the habitat and its species can be assessed. It has been found that any support or investment that supports the restoration or maintenance of open meadow habitats in the landscape has a positive effect on the state of Estonia's biodiversity. The creation of additional disturbances and the improvement of lighting conditions in the meadow habitat support its species diversity, which in turn supports both the favorable status of the semi-natural grassland and the status of the species (including many endangered and protected species) characteristic of these habitats.

Although the purpose of national monitoring is not to monitor the impact of maintenance activities but to identify changes in the number and distribution of species and communities, general conclusions can be drawn from the effects of maintenance activities on species. The conclusions are described in Chapter 3.2.3. In order to provide a more specific assessment of how different management techniques and activities for semi-natural grassland (e.g., grazing vs. mowing, mowing time, unmanaged areas) contribute to the maintenance of the favorable status of habitats and species, it is necessary to analyze and assess the adequacy of monitoring data and the data collected during maintenance measures

[67] UT, Impact of large - scale restoration of alvars on biodiversity, post - restoration status and analysis of restoration activities (ongoing project), https: // www.etis.ee/Portal/Projects/Display/7dbf4841-eebe-4674-b242-7e93e7860198

[68] Kalamees, R. 2019. Development of a methodology for evaluating the results of Measure 8.1: preparation of a methodology for evaluating the effectiveness of the targeted restoration of meadow habitats and a effectiveness monitoring plan. University of Tartu

to analyze them and make assessments of the activities.

Increasing attention must also be paid to how data collected in national monitoring can be used to assess the effectiveness of field-based protection.

In addition to inventories and monitoring, a number of studies and expert assessments have been prepared, which contribute to the development of the field and the planning of objectives. The most important of them are:

- Analysis of ensuring the sustainable management of semi-natural communities, Association for the Protection of Semi-Natural Communities, 2019 [69] ;
- Assessment of the ecological functioning of semi-natural communities, University of Tartu, 2020[70];
- management of alvars and coastal meadows and the state of biota, University of Tartu and Estonian University of Life Sciences, 2015[71];
- preparation of a draft action plan for habitat type 4030 (European dry heaths) - inventory of natural values, analysis of the effectiveness of conservation management and assessment of the need for restoration, University of Tartu, 2018;
- Evaluation of the effectiveness of maintenance support for semi-natural communities on biodiversity on the basis of state environmental monitoring, Riho Marja, Environmental Agency 2019[72].

[69] Association for the Protection of Semi-Natural Communities & Estonian Center for Applied Research CentAR OÜ, 2019. Analysis of ensuring the sustainable management of semi-natural communities, https://kik.ee/sites/default/files/plk_uuringu_aruanne.pdf

[70] https://www.envir.ee/sites/default/files/poollooduslike_koosluste_okoloogilise_toimimise_hinnang_03_2020_tartu_ul._.pdf

[71] https://www.digar.ee/arhiiv/et/raamatud/19743

[72] https://www.keskkonnaagentuur.ee/sites/default/files/plk-de_efektiivsus_aruanne.pdf

3.6. Division of labor between public authorities

In protected areas, the achievement of the objectives of semi-natural grassland, including the organization of maintenance and restoration, is shared between several institutions. The main responsibilities of each institution for semi-natural grassland are described below.

Ministry of the Environment

Organizes the setting of goals for the protection of semi-natural grassland, prepares the relevant legislation, and plans the means to achieve the goals.

Environmental Board

EB is the manager of protected natural objects; it shapes the protection procedure of semi-natural grassland in protected areas and determines the activities necessary for the maintenance or restoration of semi-natural grassland with protection management plans. EB organizes and coordinates activities related to the restoration and maintenance of semi-natural grassland: payment of nature conservation support, updating and managing geo-data of support, setting management conditions, organizing information days and training, consulting land managers, checking restoration and maintenance requirements. EB also advises other state agencies on issues related to semi-natural grassland (incl. assists in the development of legislation, development, and action plans).

The State Forest Management Center

RMK organizes the restoration of the respective areas on the leased meadows and leased state lands. RMK does not organize the maintenance of heritage meadows.[73] RMK develops the infrastructure necessary for the maintenance of meadows located on state lands in protected areas, plans and builds roads, bridges, culverts, and fords. Organizes visits and marking of protected areas, which are sometimes associated with semi-natural grassland.

Ministry of Rural Affairs

Prepares a measure for the maintenance of semi-natural communities in the CAP strategic plan, the corresponding legislation and provides for the implementation of support for the maintenance of semi-natural grassland and technical assistance.

Agricultural Registers and Information Board

Organizes the payment of support for the maintenance of semi-natural communities in cooperation with EB.

Environmental Investment Center

The task of the EIC is to process and finance applications for the restoration of semi-natural grassland and investment support projects.

[73] RMK organizes maintenance in the landscape protection area of the primeval valley of Pirita River, where granting the land into use is difficult due to the exceptionally high land tax, but the public interest in the maintained areas is very high.

Environmental
Agency
KAUR manages the EELIS information system, and the Environmental Register's database of semi-natural communities manages the information. In addition, it organizes monitoring of wildlife.

Information Technology Center of the Ministry of
the Environment
Organizes IT support services and database development for sub-
offices.

OBJECTIVES, ACTIVITIES, AND INDICATORS SET BY THE ACTION PLAN

Objectives of the Semi-natural grassland Action Plan for 2021–2027:

1. increased awareness of the values and maintenance of meadows
2. effective protection and improved cohesion of semi-natural grassland;
3. consistent management and improved quality of maintenance;
4. organized data capture.

4.1. Indicators

The fulfillment of the objectives of the action plan will be assessed using the following indicators.

Indicator	Baseline in 2020	Target in 2027
General assessments and trends of the status of semi-natural grassland	semi-natural areas (Table 1)	report 2025 status of habitats are not deteriorating, and trends are positive
2019 report on maintained area 37,770 ha *		50,000 ha
The area of maintained coastal areas important for the protection of species is 2,000 ha and 4,000 ha		
Number of maintainers	850	950
Habitat database	Two databases (natura_habitat and semi-natural communities in the Environmental Register)	One database that also includes semi-natural grassland

*Also includes areas with single area payment.

In addition, a landscape cohesion index is being considered as a measure, which is being developed in the course of the Mapping and Assessment of Estonian Ecosystems and Related Benefits (ELME) project. The action plan will be updated once the index has been developed.

4.2. Objectives and activities

The most important sectoral activities for 2021–2027 are the continued financing of the maintenance of semi-natural communities, the restoration of new habitats taking into account the cohesiveness and species protection aspect, the establishment of an advisory system, and developments for the renewal and management of various databases. It is also important to raise the awareness of stakeholders, activities to ensure the sustainability of meadows, including investments, improving the quality of maintenance and conducting research, inventories, and evaluating the effectiveness of restoration and maintenance. The mapping of areas and the development of support schemes outside protected areas need to be further pursued.

A summary of the activities required to achieve the planned goals for 2021-2027 is presented in Table 6. A metric has been set to assess the achievement of each objective.

Table 6. Activities and sub-activities, and metrics necessary to achieve the objectives of semi-natural grassland

Objective	Indicator	Activity	Sub-activities
Increased awareness of the values and maintenance of meadows	Number of maintainers	Raising stakeholder awareness	Preparation and implementation of a sectoral communication plan
			Recognition of maintainers of semi-natural grassland
			Training and information days on maintenance and restoration
			Raising awareness among landowners
			Raising awareness in the field of agriculture
		Establishment of a meadow advisory system	Establishment and implementation of a meadow advisory system
Effective protection and improved cohesion of semi-natural grassland	General assessments and trends of the status of semi-natural grassland	Improving cohesion in protected areas	Cohesion of habitats must be taken into account when planning and organizing
			Renewal of restoration measures
			Habitat restoration in protected areas
			Preparation and implementation of additional projects for the maintenance of semi-natural grassland
			Support for the management of small areas and islets
			Mapping of areas that cannot or do not need to be maintained every year
		Improving cohesion outside protected areas	Development of support measures outside protected areas
			Raising awareness of support communities
Consistent management and improved quality of maintenance	Area of managed semi-natural areas	Continuous and sustainable management of sites	Support for the maintenance of semi-natural grassland
			Integration of semi-natural grassland into the agricultural system
			Renewal of support measures
			Mapping the causes of areas dropping out of maintenance and re-allocating
			Upcycling of the products of semi-natural grassland
			Ensuring the possibility of taking state land into maintenance
			Addressing land ownership and land possession issues
			Ensuring the investment needed for sustainable maintenance
	Area of managed coastal areas important for the protection	Improving the quality of maintenance	Improving the quality of maintenance for habitats already in maintenance
			Organization of specific work
Organized data capture	Habitat database	Database development and information updating	Organizing databases
			Developments for updating meadow data and compiling data related to
			Ordering inventories in protected areas
			Update of the status assessment of maintained areas
			Mapping of meadows outside protected areas
		Conducting research and monitoring	Review of monitoring programs
			Conducting research
			Evaluating the effectiveness of restoration

4.2.1. Increased awareness of the values and maintenance of meadows

Raising awareness in order to raise awareness of the importance of semi-natural grassland and cultural heritage is important for landowners, maintainers, farmers, and other stakeholders to ensure the preservation of meadows and increase their area. Greater awareness and personal counseling of landowners is a prerequisite for the growing interest in meadow management.

4.2.1.1. Raising stakeholder awareness

- Preparation and implementation of a sectoral communication plan. A sectoral communication plan helps to map the target groups, their needs, the necessary messages and opportunities, and the best ways to reach the target groups.

- Recognition of maintainers of heritage meadows. Approximately 50% of restorers and more than 30% of maintainers want public recognition of the managers of semi-natural grassland and consider that recognition would significantly motivate them in addition to the support paid[74]. It is, therefore, necessary to recognize and involve maintainers more in sharing their success stories and experiences in restoring and maintaining sites. Exchanging practical experience helps to prevent mistakes and improve the quality of recovery and maintenance, and strengthen the network of maintainers.

- Training and information days on maintenance and restoration measures. More training is needed to clarify both restoration and maintenance requirements so that the result of the work meets the requirements of the habitat. It is important to increase the number of practical restoration training in order to improve the quality of restoration, get acquainted with different technical solutions, and increase interest in the restoration of new areas. The training should preferably be conducted directly in nature and take into account the peculiarities of the habitats of different regions of Estonia. Habitat-based training for land managers is also needed, where the conservation values found in the area, including species, are introduced in more detail. This approach helps to understand the relationship between conservation values and maintenance in the area. In addition, training is needed for other stakeholders, such as consultants of agricultural producers.

- Raising the awareness of landowners helps to find new managers of the semi-natural grassland.

  The low awareness of landowners about the value of meadows and the possibilities of their restoration and maintenance is one of the reasons why there is not enough maintenance of semi-natural grassland in Estonia. In addition to information letters, it is necessary to establish personal contact with landowners, including introducing the importance of semi-natural grassland and the values found in a specific area. More personal information work has been carried out among the landowners of semi-natural grassland mainly in projects implemented with the support of foreign funding, for example, in the course of the Environmental Agency's project “LIFE to alvars”. Experience has shown that personal outreach work is most effective in raising

[74] Association for the Protection of Semi-Natural Communities & Estonian Center for Applied Research CentAR OÜ, 2019. Analysis of ensuring sustainable management of semi-natural communities.

awareness among landowners. This has helped to increase the area of managed semi-natural grassland and to improve the status of the habitat.

- Raising awareness in the field of agriculture. Semi-natural grassland are the core areas for the benefits of biodiversity and nature in agricultural landscapes, helping to ensure the sustainability and environmental friendliness of agriculture. Semi-natural grassland, as habitats for insects and soil biota, are necessary for the functioning of integrated pest management and for ensuring important natural benefits (pollination, natural pest control, preservation of soil fertility) in agricultural landscapes. It is possible to apply for agricultural support for semi-natural communities, which do not set requirements for the preservation of the values of semi-natural communities. It is important to raise awareness of the natural value of semi-natural grassland, the cultural heritage, and the function of these communities in the agricultural landscape. To this end, it is necessary to train agricultural consultants and carry out wider outreach work. It is also important to provide information on the management techniques of semi-natural grassland, both inside and outside protected areas, and to provide information to land managers on the species on their lands and the related management recommendations.

4.2.1.2. Establishment of a meadow advisory system

- The establishment and implementation of a meadow advisory system is necessary to ensure more effective cooperation between different target groups and the dissemination of information, including information on both the values of meadows and support opportunities. A more personal and systematic approach is also needed to inform landowners and find new carers, including bringing together the landowner and the potential maintainer/restorer. Individual communication with both landowners and land managers is necessary in order to provide information on the specifics of the management of a specific area and to reach agreements for the performance of works. When planning the work of the consultants and contacting the landowners, the map layer presented in Annex 3 can be used, where the areas of high restoration value are marked. Before implementing the counseling system, it is necessary to analyze the target groups and prepare an action plan. [75]

4.2.2. Effective protection and improved cohesion of semi-natural grassland

A large part of the semi-natural grassland that were mapped during the process of establishing the Natura 2000 network have been preserved in the protected areas. Currently, support is provided for the restoration and maintenance of semi-natural grassland, especially in protected areas. If the semi-natural grassland are maintained only in protected areas, cohesion between these areas is not guaranteed. If the poor cohesion of the landscape does not continue to support the genetic diversity of fragmented plant and animal populations, populations will enter an extinction vortex, with genetic factors and demographic processes intensifying in each succeeding generation, making populations highly sensitive to environmental factors. This could eventually culminate in local or

[75] The meadow counseling system will be developed during the LIFE IP project "Comprehensive management of forest and farming landscapes to improve the conservation status of Natura 2000 habitats and species".

regional extinction of the species. It is, therefore, crucial to prevent the emergence of such extinction vortexes and to improve the situation by restoring habitats before the negative effects are reflected on species composition and species richness. The landscape between semi-natural grassland must also support the spread of specimens in the form of alternative habitats and distribution corridors.[76]

Given the large loss of areas of semi-natural grassland, it is extremely important that support for the restoration and maintenance of communities in protected areas continues. However, it is not enough for the biodiversity and associated benefits of semi-natural grassland (e.g., pollination) to survive in the long term if we only manage semi-natural grassland in protected areas. Additional opportunities must be found for the protection and management of both semi-natural grassland and support communities outside protected areas.[77] In order to preserve species dependent on semi-natural communities and improve the cohesion of meadows in protected areas, the area of heritage meadows to be maintained by 2027 must be increased to 50,000 hectares.

With limited resources, both restoration and maintenance measures need to focus primarily on improving the status of Priority I and II habitat types.
Priority classes for heritage meadows:

- The priority I habitats are grasslands on mineral soil, alvars, wooded meadows, and coastal areas important for species protection;
- The priority II habitats are wooded pastures, swampy meadows, floodplain meadows, and coastal meadows;
- The priority III habitats are juniper shrubs, meadow foxtail, purple moor-grass communities, and meadows with great burnet and moisture-loving high grasslands.

Due to the work of the University of Tartu "Preparation of a draft action plan for habitat type 4030 (European dry heaths) - inventory of natural values, analysis of the effectiveness of conservation management and assessment of the need for restoration", this action plan does not set a separate target for 4030 habitats. Although the action plan for semi-natural communities
for 2014–2020 provided for the maintenance of 290 hectares of heath meadows in Estonia, the plan was prepared at a time when 4030 habitat types included heath meadows and sandy meadows where heather and other prostate shrubs do not grow. Heath meadows and sandy meadows with grasses and herbs actually belong to habitat type 6270* within the meaning of Annex I of the Habitats Directive (species-rich alvars on lime-poor soils).[78] Thus, 4030 heaths are not dry heaths meadows and sandy meadows on sandy, loamy soils, but 4030 habitats are considered to be heather-rich prostate shrub communities which, when kept open, require, in particular, trampling with machines, removal of trees and shrubs, and controlled burning. In the course of the same work, an inventory was made in

[76] Association for the Protection of Semi-Natural Communities & Estonian Center for Applied Research CentAR OÜ, 2019. Analysis of ensuring sustainable management of semi-natural communities.
https://kik.ee/sites/default/files/plk_uuringu_aruanne.pdf

[77] Association for the Protection of Semi-Natural Communities & Estonian Center for Applied Research CentAR OÜ, 2019. Analysis of ensuring the sustainable management of semi-natural communities, https://kik.ee/sites/default/files/plk_uuringu_aruanne.pdf

[78] preparation of a draft action plan for habitat type 78 (European dry heaths) - inventory of natural values, analysis of the effectiveness of conservation management, and assessment of the need for restoration. 2018. University of Tartu

2018, as a result of which approximately half of the mapped heaths were designated as habitat type 6270.

4.2.2.1. Improving cohesion in protected areas

- Cohesion of habitats when planning and organizing protection must be taken into account. The principles for designing the protection procedure need to be reviewed. When designing the objectives of the protected area, to analyze the cohesion of the habitats in the landscape and based on the need of the species to plan the location of the semi-natural grassland in need of restoration in the landscape.

  When setting the objectives of heritage meadows, the focus layer map layer[79] formed during the preparation of the assessment of the ecological functioning of semi-natural communities, and the focus classes formed on the basis of it can be used to assess important areas of semi-natural grassland that help ensure cohesion. Areas of semi-natural grassland for which Natura 2000 private forest support is applied, must also be taken into account in the planning and setting of protection and in the design of the protection procedure, whether the site has been preserved as a semi-natural meadow with restoration potential and whether it supports landscape cohesion. When designing the protection procedure, semi-natural grassland must also be planned in a zone whose protection procedure allows the management of these areas.

- Renewal of restoration measures. There are several restoration measures in use in Estonia, coordinated by different agencies (EB, EIC, RMK). Restoration is financed both domestically (nature conservation support, RMK) and from external funds (mainly the Cohesion Fund and the LIFE Nature Program). Restoration measures need to be renewed in the future. It is also necessary to update the nature conservation support regulation and its fee rates in the near future.

- Restoration of habitats in protected areas. The goal is to maintain 50,000 hectares of semi-natural grassland by 2027. In addition, 12,230 hectares need to be restored, of which around 3,200 hectares are already in operation. When setting the habitat-based area objectives for semi-natural grassland, the general assessment of the condition of habitats (see Table 1), the objectives set for protected areas, the area currently under maintenance, and previous restoration volumes have been taken into account. All habitats in semi-natural grassland need to be restored, but large-scale restoration is envisaged, especially in habitats whose overall condition is insufficient or poor. These are coastal meadows, alvars, wooded meadows, paludified meadows, swampy and flooded meadows.

Table 7. Targets and restoration needs by habitat type

EU directive code	Habitat type	In maintenance 2020	To be further restored by 2027	Goal 2027
1630*	coastal meadow	11,400	2600	14,000 (incl LORA areas 4000 (ha)
5130	juniper field	500	150	650

[79] Helm, A., Toussaint, A. 2020. Poollooduslike koosluste ökoloogilise toimimise hinnang. University of Tartu, Institute of Ecology and Earth Sciences.

6210*, 6210	calcareous grassland	2500	700	3200
6270*	non-calcareous or	1500	1000	2500
6280*	alvar	4800	3200	8000
6410	purple moor-grass	700	100	800
6430	moisture-loving tall grass	1200	200	1400
6450	floodplain meadow	8900	2000	10,900
6510	meadow with meadow foxtail and	2600	250	2850
6530*	wooded meadow	940	1060	2000
7230	paludified meadow	1650	550	2200
9070	wooded pasture	1080	420	1500
TOTAL:		37,770	12,230	50,000

In particular, the following selection principles must be followed when restoring new areas.

1. The network of areas to be restored must be as close as possible to the historical distribution.
2. Upon restoration, the account must be taken that the area of semi-natural grassland to be maintained should increase, taking into account the typological representativeness and regional overlap.
3. When planning the works, the focus sequence map layer[80] formed during the assessment of the ecological performance of semi-natural communities, and the focus classes formed on the basis of it should be used, which can help to organize the works in the order that most effectively ensures the implementation of conservation objectives. When planning restoration, priority should be given to habitats with a higher focus value and areas that ensure the ecological cohesiveness of habitats.
4. Areas in the immediate vicinity of maintained grassland communities should be restored, such as unmaintained grassland and areas located next to maintained meadows important for the creation of a species distribution corridor.

Considering the above conditions and the management potential of the areas[81], the areas with high restoration value have been mapped in Annex 3 together with the methodology. The most important areas in need of restoration and the best knowledge of where to start the restoration of areas in Estonia so that their ecological efficiency would be the highest have been mapped on the map layer in order to achieve the spatial objectives of the action plan. The number of areas with high restoration value is not a definitive list of restoration areas for the next period. In order to achieve ecologically viable communities and conservation objectives for species in the semi-natural grassland of protected areas, it is necessary to restore any meadow where there is a desire, capacity, and conditions.

The map layer presented in Annex 3 is informative and helps to guide the introduction of priority areas and the contact of landowners when implementing the advisory service. The

[80] Helm, A., Toussaint, A. 2020. Poollooduslike koosluste ökoloogilise toimimise hinnang. University of Tartu, Institute of Ecology and Earth Sciences.

[81] Assessment of the Environmental Board on the management potential of the SNC areas of the Environmental Register.

map layer of areas in need of additional restoration contains areas of high restoration value. It is recommended to use the map layer together with the areas under maintenance so it is possible to spatially understand the formation of the core areas of the semi-natural grassland.

70% of the additional semi-natural communities in need of restoration are located on private land and 30% on state land.

- Preparation and implementation of additional projects for the maintenance of semi-natural grassland. Separate projects and additional funding sources are needed for several topics related to semi-natural grassland. For example, in order to improve the surface area condition and cohesion of wooded meadows, separate restoration projects (e.g., LIFE) need to be prepared, and in addition to restoration activities, the project must make a significant contribution to raising awareness and promoting cultural heritage. Consideration should be given to setting up a LIFE project for islets, which will provide additional funding for the restoration and maintenance of islets. A LIFE, IP project, is being prepared, focusing on, among other things, the future use of hay from flooded meadows[82]. Projects are needed to support innovation and innovative approaches to site restoration and maintenance, such as the use of hay in bioenergy, as well as innovative solutions for restoration and maintenance techniques, such as the use of robotic lawnmowers in the areas.

- Supporting the management of small areas and islets. A significant part of the semi-natural communities entered in the Environmental Register are scattered small preserved habitats that are not economically attractive to maintainers. However, small semi-natural grassland are important because they diversify the landscape and help ensure cohesion between species and the spread of species. At the same time, small semi-natural grassland are more expensive to manage because these areas are located separately, and the cost of maintaining them is higher compared to large areas that are compact.

  Estonia is also rich in many small islands and islets, where there are valuable semi-natural communities. At the same time, the maintenance of the islets is extremely difficult, as transporting animals to the island by sea and ensuring their welfare is many times more expensive and time-consuming than on the mainland. There are generally no landing places/mooring places on small islands. It is often not possible to bring machinery to a small island, so it is often necessary to do a lot of manual work to achieve a good status of an islet, which is much more time-consuming and expensive. There is a need for continued funding for animal transport and for the financing of investments to purchase special-purpose barges/rafts that can accommodate more animals and are suitable for rocky and low water conditions. Therefore, the complexity of the maintenance of small areas and islets must be taken into account when designing support measures in the future, and the conditions of investment measures must be reviewed.

- Mapping of areas that cannot or do not need to be maintained every year. Many areas of semi-natural grassland have been inventoried, but their maintenance is not possible/necessary, or they cannot be maintained every year. For example, there is no

[82] LIFE20 IPC/EE/000005, „Implementation of National Climate Change Adaptation Activities in Estonia" (preliminary application).

access, the areas are fragmented or naturally too wet to maintain. Such areas need to be mapped to help plan alternative maintenance techniques or make conservation management decisions, such as planning work to keep the habitat open every three years. A measure must also be put in place to (partially) maintain them by way of rotation in order to meet the habitat requirements of different species.

4.2.2.2. Improving cohesion outside protected areas

- Development of support measures outside protected areas. Semi-natural grassland are also located outside protected areas, but there is no comprehensive overview of where these areas are and what their status is. It is now possible to deploy more open grasslands in good condition with CAP support, whereas it is allowed to plow them up; however, there are no support measures to support the maintenance of grasslands as natural grasslands, including the use of areas of wooded vegetation such as wooded meadows and alvars, and to ensure a management with proper maintenance techniques. It is therefore important, as a first step, to develop support measures that target areas of high nature value and take into account areas with woody vegetation (wooded meadows, wooded pastures, alvars). It is necessary to map areas of high nature value (incl. semi-natural grassland) and update measures to increase the biodiversity and cohesion of agricultural land and to support valuable grasslands. Consideration should also be given to extending support for the maintenance of semi-natural habitats to semi-natural grassland on protected natural objects outside the protected areas at the local government level.

- Raising awareness of support communities. The biota and cohesion of semi-natural grassland can also be supported by other open communities in the landscape, such as areas under power lines, roadsides, strip elements between fields and at forest edges, green areas of settlements and villages, parks, abandoned farmland, and other places. Areas under power lines and roadsides can be remnants of historic meadows and, with appropriate maintenance, can increase the cohesion of habitat and landscape for some meadow plants and insects dependent on them. Thus, for example, roadsides maintained in a nature-friendly way could add 30,000-40,000 hectares of habitat analogous to Estonian dry meadows (provided that each Estonian state road has properly maintained roadsides at least 3 meters wide).[83] Utilizing the role of support communities and their daily maintenance for the preservation of semi-natural grassland and the corresponding biota requires, as the first step, its introduction to the authorities and wider outreach work, after which more specific activities can be planned to deal with the support communities.

4.2.3. Consistent management and improved quality of maintenance

It is essential to continue the maintenance of areas that are already under maintenance in protected areas, as these areas are carriers of species richness and gene pool, where species-specific to semi-natural communities can survive and spread. It is also important to

[83] Helm, A., Nurme, S., Sõber, V., Meriste, M., Aavik, T. 2020. Maintenance of mowed surfaces and hedges on public roads. Report commissioned by the Road Administration. Nordic Botanical OÜ.

improve the quality of maintenance in areas that are already under maintenance in order to ensure high-quality habitats for species dependent on meadows and thus the survival of species.

As with the management of other agricultural lands, support also contributes to the maintenance of semi-natural grassland. Support for the maintenance of semi-natural communities takes into account more specific requirements for meadows and aims to improve the status of species associated with semi-natural grassland and to preserve and increase biodiversity and landscape diversity. However, in the case of other area payments, it is not obligatory to comply with a number of important requirements for the maintenance of semi-natural communities or restrictions arising from species, such as a ban on shredding or a later date for starting the mowing. Maintenance of species-rich areas at the wrong time or by using incorrect methods (such as shredding) can reduce species richness or destroy habitat. Therefore, an amendment to the Nature Conservation Act is needed so that the necessary conditions are met regardless of the support requested. It is also important that land managers are provided with information on protected species.

The activities required to achieve this goal are as follows.

4.2.3.1. Continuous and sustainable management of sites

- Support for the maintenance of semi-natural grassland. Support for the maintenance of semi-natural grassland began in the early 2000s. Since 2007, the maintenance of semi-natural communities has been financed from the ERDP measure, which has contributed to the annual increase in the areas under maintenance and the growth of the area. The measure takes into account the specificities of the maintenance of meadows (e.g., species requirements). It is still necessary to have a separate measure for the maintenance of semi-natural communities and to finance the maintenance every year. Also important is the support for coastal areas important in terms of, which was developed in the measure for the maintenance of semi-natural communities in order to improve the status of the species associated with these areas. The conditions for applying for support for important coastal areas are set out in Annex 5.

- Integration of semi-natural grassland into the agricultural system. Semi-natural grassland are areas where traditional agricultural activities take place in the form of hay stockpiling and livestock farming, which is why semi-natural grassland play an important role in agricultural production. According to the data of the 2019 survey, on average, 56% of maintainers and 66% of restorers of semi-natural grassland are engaged in other economic activities besides semi-natural community management. The main economic activity is agriculture.[84]

  Semi-natural grassland are the most species-rich communities in the agricultural landscape, supporting the conservation of biodiversity in open landscapes. It is therefore important that we also treat our traditional agricultural land - semi-natural grassland - in the current sense as agricultural land and permanent grassland (for example, all wooded meadows and wooded pastures are eligible regardless of the number of trees, in terms of coastal meadows, wetter areas/ponds are eligible). In

[84] Association for the Protection of Semi-Natural Communities & Estonian Center for Applied Research CentAR OÜ, 2019. Analysis of ensuring sustainable management of semi-natural communities.

order to ensure the sustainable maintenance of semi-natural grassland, these lands must also be able to apply for other agricultural supports, including direct payments. The European Commission has also emphasized the need to ensure the eligibility of all semi-natural grassland in Estonia and also the eligibility to direct payments within the framework of the CAP.[85] The European Court of Auditors also has assessed[86] that Member States must use the CAP framework to protect semi-natural grassland and CAP resources to ensure that they are maintained.

- Renewal of support measures. Diverse and varied management is needed to increase biodiversity. There is also a need for more flexible management options for maintainers of heritage meadows. For example, it is favorable for the biota to start mowing from different places and at different times in different years. To this end, more flexible mowing dates and additional support for manual mowing, leaving of un-mowed spots, support for mixed grazing, support for small islets, and additional support for coastal areas important for the protection of species must be planned for the new financial measure. It is also important to support additional work to improve the status of the habitat (e.g., removal of tree groves and shrubs, control of invasive shrubs, mowing of reeds).

  In addition to reviewing the terms of the support measure, it is important to develop performance-based support. Funding for performance-based support focuses on results/objectives and leaves more flexibility for managers to plan activities. As the concept of performance-based support is new, preliminary work and the creation of questionnaires are required, in the course of which it will be determined what the best option for Estonia to implement performance-based support is. Before paying the nationwide support, it is necessary to implement it to a lesser extent.

- Mapping the causes of areas that have dropped out of maintenance and directing them back to maintenance. At present, no separate accounts are kept if maintenance is interrupted. In the future, a separate overview of the area, status, and reasons for termination of maintenance is required for areas that have dropped out of maintenance. If maintenance is interrupted, a new maintainer must be found, and, if necessary, the landowner must be contacted in person for consent. If several years are left between maintenance and the area starts to overgrow in shrubs or reedbed again, restoration support must be provided to make the area eligible for maintenance again.

- Upcycling of the products of semi-natural grassland. The sustainable management of heritage meadows is ensured by the cooperation of the parties, encouraging the activities of local farmers, and finding marketing opportunities for the environmentally friendly production of semi-natural grassland. Products and services based on the ecosystems of semi-natural grassland need to be further developed and their use promoted (products such as meadow meat, sheepskins, wool, hay, and services such as tourism and nature education). The maintainers of the semi-natural grassland themselves, as well as the institutions engaged in agriculture and tourism, the training of nature guides, and the introduction of the cultural heritage, contribute to the achievement of these goals. An opportunity to improve sustainable management is, for example, the introduction of a system of recognition and training events and the

[85] https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/cap-strategic- plans-c2020-846-swd-ee_en.pdf

[86] Special report of European Court of Auditors: Biodiversity on Farmland: CAP contribution has not halted the decline", https://www.eca.europa.eu/Lists/ECADocuments/SR20_13/SR_Biodiversity_on_farmland_ET.pdf

personal involvement of landowners through a network of the maintainers of semi-natural grassland. In cooperation with universities, there is still a need to find additional opportunities for the use of hay in areas where its surplus is a problem.

- Ensuring the possibilities of taking state lands into maintenance. RMK will continue to lease semi-natural grassland and enter into long-term (ten-year) agreements with tenants. According to the terms of the lease agreement, the restoration will be arranged by RMK or the lessee. RMK also guarantees the necessary investments for state-owned lands. To this end, RMK regularly monitors and maps the infrastructure needs of state-owned lands and supports priority developments. In the event of an interruption in maintenance, it is necessary to find a new tenant as soon as possible. As of 03.11.2020, 23,296 hectares of semi-natural communities have been leased out on state-owned lands. There are 11,500 hectares of unleased areas, of which 4,200 hectares are of high restoration value and are mapped on the map layer in Annex 3.

- Solving issues related to land ownership and land possession. Today, state-owned lands in protected areas are owned by various state agencies, including the Land Board, RMK. This has made it more difficult for maintainers to lease land. It is, therefore, important that the possession and leasing of state land are conducted by a single authority. In order to facilitate the use of semi-natural grassland on such land, protected land that also has semi-natural grassland should be transferred to a single authority.
  It is also necessary to analyze the procedure for acquiring land to the state established on the basis of the Nature Conservation Act and, if possible, to consider granting the ownership of semi-natural grassland to the state at the request of the owner.

- Ensuring the necessary investments for sustainable maintenance. It is necessary to ensure for all maintainers of semi-natural grassland optimal conditions for access to the areas, which is why the construction and improvement of infrastructure (access roads, bridges, culverts) must be continued. As the area of maintained areas increases, it is necessary to continue to support investment in livestock and care products. Animal and hay shelters and stockyards must also be built. It is also necessary to support the purchase of special-purpose tractors and equipment for the maintenance of complex areas (wooded meadows, wet meadows) and the purchase of a raft/barge for the transport of animals and equipment to small islands.

According to the SNC managers, the biggest obstacle to the maintenance of the areas, regardless of the type of meadow, is insufficient maintenance technology. In the 2019 survey, SNC managers have also indicated that they want better and more flexible support/subsidies from the state.

for acquisition of equipment, given that the equipment needed to manage SNCs is degrading faster than it takes to maintain cultivated grasslands.[87]

4.2.3.2. Improving the quality of maintenance

- Improving the quality of maintenance of habitats already in maintenance according to

[87] Association for the Protection of Semi-Natural Communities & Estonian Center for Applied Research CentAR OÜ, 2019. Analysis of ensuring sustainable management of semi-natural communities.

the needs of the species. Many species depend directly on the habitats of semi-natural grassland, but normal maintenance does not always guarantee their survival. There are also areas under maintenance, the quality of which (despite maintenance) does not guarantee the preservation of species-specific to the communities. For example, some coastal meadow massifs are too narrow, fragmented with stands and shrubs or bushes and large reedbeds, too dry (excessively ditched), fragmented with unmaintained areas, etc., making them unsuitable for typical species despite continued maintenance. It is necessary to clear flooded meadows and puddles from vegetation, mow patches that are difficult to maintain within the grazing area, make smaller paddocks, perform additional work to control unwanted vegetation (such as removing trees and shrubs from coastal meadows or their marginal areas) and explain to landowners and caretakers the need to comply with requirements. Additional support measures need to be found to support the mowing of old reeds and batch grazing (including the establishment of additional fences or the seasonal relocation of fences to relocate animals to areas that have been covered in reedbed in the spring). It must also be possible to use the stands on the edge of the meadow as animal shelters and to support the construction of animal shelters on the mainland side edge of the meadow.

- Organization of specific work. A study of the breeding success of meadow birds in recent years shows that 86% of all eggs laid are destroyed in maintained coastal meadows, which does not guarantee the natural reproduction of the species. An estimated 50% of nests should hatch to reproduce.[88] As coastal meadows are often very narrow and/or fragmented with stands and shrubs, and it is relatively easy for predators to access bird nests. It is necessary to expand the meadow areas; for this purpose, the cultivated stands and bushes planted in the former open meadow areas must be removed. Support for the establishment of special (predator-proof) fences may also be considered. In addition, it is very important to find out and implement the feasibility and possibility of predation control (hunting for small predators, if necessary also for ravens, near important coastal areas).

Water regime needs to be restored in the areas where it has been violated. This requires area-based projects that determine which ditches need to be maintained, which ones need to be closed, and how, together with all the necessary hydrological preliminary work and closure solutions. In some cases, it may be necessary to close ditches or partially redesign them into ponds that are suitable for species.

4.2.4. Organized data capture

Data on semi-natural grassland are located in the Estonian Nature Information System. The basis for the payment of support is the database of semi-natural communities of the Environmental Register, and the data set for the purposes of Natura 2000 and protected areas are reflected in the database of Natura habitats.

Different agencies are engaged in restoration, and data are managed in different formats in different databases; maintenance data is stored in the ARIB database. There is currently no central database where restoration and maintenance data is stored and where it is possible to view the current status. The flow of information and the updating of data is largely done manually.

[88] Kaasiku, T., Rannap, R. 2019. Breeding success study of meadow breeding waders.

Up-to-date data on habitats and eligible areas are important for the payment of support for semi-natural communities. It is also necessary to develop a common database of semi-natural grassland, merge different databases, and organize the content of the data and performance of monitoring. Organized data capture is a prerequisite for making the right protection management decisions and implementing protection objectives.

The measures needed to achieve this goal are as follows.

4.2.4.1. Database development and information updating

- Organizing databases. As the data of semi-natural grassland are in different databases (ER_SNC, database of Natura habitats), for example, there are no habitats in the database of ER SNC where Natura 2000 private forest support is taken, it is necessary to organize and combine the data layers. In the future, this will make it possible to use a unified database across institutions, in which all Estonian habitats, including semi-natural grassland, will be mapped. This allows for better planning of goals and making better conservation management decisions.

- Developments for updating meadow data and compiling data related to conservation management works. It is necessary to reorganize the procedure for updating databases, which is outdated, and the entry of data is largely technical and manual. This presupposes developments where the fieldwork data is entered into a database, for example, in the form of a proposal, and the process is automated. In addition, a central database is needed as part of the developments, which will contain information on the areas under restoration and maintenance and the areas where investments have been made. It must be possible to query the database by the cost of work, activity, funder, applicant, etc. An environment is needed for public use, from which it is possible to see information related to semi-natural communities, including the location of semi-natural grassland, which ones of them are in use, and what activities are carried out there.

- Commissioning inventories in protected areas. Inventory is an ongoing process to keep data up to date. The purpose of inventories of semi-natural grassland is to collect data and keep the information in the databases up to date. It is, therefore, necessary to continue regular inventories on a minimum of 3000 hectares per year. The Environmental Board updates the data of areas that have been in maintenance for a long time and in case of which the definition and status of the habitat are not incorrect. A guide to the inventory of semi-natural communities is being updated. The principles of commissioning inventories must also be reviewed and a more detailed inventory plan drawn up.

- Update the status assessment of the maintained areas. Changes will be made to the basic data in accordance with the inventories and the limits measured in the control of support for the maintenance of semi-natural habitats. In maintenance areas, it is necessary to update the assessment of the status of the area, as it is not always necessary to commission a habitat-based inventory (initial data are reliable). Therefore, database improvements are needed to preserve the original inventory information and display the latest status information. In addition to commissioning inventories, the Environmental Board updates the status assessments of the areas under maintenance.

- Mapping of meadows outside protected areas. There are many well-preserved semi-natural grassland outside the protected areas, but there is no complete and up-to-date information on where and in what condition they are. Inventory data of semi-natural grassland outside protected areas are often older than 15 years and come from the period
  of the creation of the Natura 2000 network. The distribution of meadow communities mapped outside the protected areas by counties is also very uneven. The assessment of the actual situation requires an inventory of habitats outside protected areas.
  The mapped data can be used as one input for valuable grassland measures implemented by MoRA (the measure includes other valuable grasslands in addition to semi-natural grassland). It is also a necessary input to RMK in order to prevent afforestation of meadows, plowing, and drainage of meadow areas on state lands and to set maintenance conditions in lease agreements that ensure the preservation of the habitat.

4.2.4.2. Conducting research and monitoring

- Review of monitoring programs. It is necessary to analyze the monitoring data and the data collected during the maintenance measures in order to assess how the maintenance techniques of the semi-natural grassland contribute to the achievement and maintenance of the favorable state of the habitats and species. In order to obtain information on the status of heritage meadows, the monitoring program should be supplemented, if possible, to take greater account of the areas covered by maintenance support. It is also important that on the basis of the data collected during the monitoring of the national habitat, it is possible to supplement the basic data on the status of heritage meadows. To this end, monitoring programs need to be reviewed, and bottlenecks analyzed.

- Conducting research. A number of basic studies are needed depending on the needs of the field (e.g., adaptation to climate change, ecosystem services, socio-economic impacts, sustainable agriculture, biodiversity-friendly landscape, cohesion and area requirements of semi-natural grassland, habitat requirements of species). Also, more extensive applied research, such as the identification of suitable management techniques to achieve the favorable status of species related to semi-natural grassland and the identification of suitable restoration techniques to achieve the favorable status of habitats.

- Assessment of the effectiveness of restoration.
  In order to assess the effectiveness of the restoration of semi-natural grassland, it is necessary to apply an evaluation of the effectiveness of the activities,
  on the basis of which the direct impact of the activities on the status of the communities can be assessed. To do this, methodologies need to be reviewed and implemented.

5. SCHEDULE AND BUDGET

The planned activities are planned to be implemented in the period 2021–2027. The aim is to achieve
the goals set in the Natura 2000 financing plan for semi-natural grassland and thus to improve the nature conservation status of meadow communities.

Funds for these activities are planned from LIFE projects, the state budget, RMK budget, the Cohesion Fund (CF), and the European Agricultural Fund for Rural Development (EAFRD). More specifically, the objectives, activities, sub-activities of the action plan, responsible authorities, and estimated cost of the activities are presented in Table 8.

Table 8. Objectives, activities, sub-activities, responsible authorities, cost of activities (in hundreds of euros), source of funding, and schedule

	Objective	Activity	Sub-activities	Responsible	2021	2022	2023	2024	2025	2026	2027	Total cost	Financing source:
1.	Increased awareness of the values and maintenance of meadows	Raising stakeholder awareness	Preparation and implementation of a sectoral communication plan	EB, MoE	40	200	60	60	60	60	60	540	LIFE, EAFRD, RE
			Recognition of maintainers of semi-natural	EB									
			Maintenance and restoration measures training and information days	EB									
			Raising awareness among landowners	EB									
			Raising awareness in the field of agriculture	EB, MoRA									
		Establishment of a meadow advisory system	Establishment and implementation of a meadow advisory system	EB	300	450	450	450	450	450	450	3 000	LIFE
2.	Effective protection and improved cohesion of semi-natural grassland	Improving cohesion in protected areas	Cohesion of habitats must be taken into account	EB	X	X	X	X	X	X	X		
			Renewal of restoration measures	EB, MoE	X	X				X	X		
			Habitat restoration in protected areas	EB, RMK, EIC	25,000	35,000	35,000	35,000	35,000	30,000	30,000	225,000	LIFE, RE, CF, RMK
			Preparation and implementation of additional projects for the maintenance of semi-natural grassland	EB									
			Support for the management of small areas and islets	EB, MoE ARIB, MoRA	1,000	1,000	1,000	1,000	1,000	1,000	1,000	7,000	RE, EAFRD
			Mapping of areas that cannot or do not need to be maintained	EB			X	X	X	X	X		
		Improving cohesion outside protected areas	Development of support measures outside protected areas	EB, MoE, MoRA	X	X							
			Raising awareness of support communities	EB, MoE MoRA	X	X	X	X	X	X	X		
3.	Consistent management and improved quality of maintenance	Continuous and sustainable management of sites	Support for the maintenance of semi-natural grassland	ARIB, MoRA	62,000	65,000	73,000	80,000	85,000	90,000	95,000	550,000	EAFRD*
			Integration of semi-natural grassland into agricultural system	MoE, MoRA,	X	X	X	X	X	X	X		
			Renewal of support measures	EB, MoE, ARIB, MoRA	200	200				300	300	1,000	LIFE

			Mapping the causes of areas dropping out of maintenance and re-allocating for maintenance	EB	X	X	X	X	X	X	X		
			Upcycling of the products of semi-natural grassland	EB, MoE MoRA	X	800	800	800	800	800	X	4,000	LIFE
			Ensuring the possibility of taking state land into maintenance	RMK	X	X	X	X	X	X	X		
			Addressing land ownership and land	RMK Land Board,	X	X	X	X	X	X	X		
			Ensuring the investment needed for sustainable maintenance	MoE, MoR A,	5,000	15,000	15,000	20,000.	20,000.	15,000	10,000	100,000	LIFE, CF, RMK, EARFD
		Improving the quality of maintenance	Improving the quality of maintenance of habitats already in maintenance according to the needs of the species	EB, MoRA	1,000	1,000	1,000	1,000	1,000	1,000	1,000	7,000	RE, EAFRD
			Organization of specific work	EB, RMK									
4.	Organized data capture	Database development and information updating	Organizing databases	EB, KAUR	250	250						500	CF, RE
			Developments for updating meadow data and compiling data related to conservation management	EB, MoE, KEMIT	Y	Y	Y						CF, LIFE
			Commissioning inventories in protected	EB	400	400	400	400	400	400	400	2,800	CF, RE
			Update of the assessment of the status of the managed areas	EB	X	X	X	X	X	X	X		
			Mapping of meadows outside protected areas	MoE, EB, RMK, MoRA		400	400	300	300	300	300	2,000	RE, EAFRD
		Conducting research and monitoring	Review of monitoring programs	KAUR, EB	X	X	X						
			Conducting research	EB, MoE	700	700	600	500	500	500	500	4,000	RE
			Evaluating the effectiveness of restoration	EB	40	40	40	40	40	40	40	280	RE

X - personnel costs of agencies are not shown separately in the activity accounts
Y - developments for activities related to semi-natural grassland are made within the framework of the EELIS project agreement
* - no direct support included; budgets for measures are indicated in the CAP strategic plan

6. IMPLEMENTATION AND AMENDMENT OF THE ACTION PLAN

The implementation of the action plan is organized and managed by the Environmental Board. In order to assess the implementation of the action plan and the achievement of its objectives, the Environmental Board convenes a steering group of the action plan, the members of which include representatives of other agencies, including responsible authorities, and representatives of organizations belonging to the field, including the managers of semi-natural grassland. The steering group has an advisory role; the task of the steering group is to contribute to the implementation of the action plan for semi-natural grassland.

Tasks of the action plan steering group

1. Annually assesses the fulfillment of the substantive objectives of the plan and identifies obstacles to its fulfillment.
2. Monitors the implementation of the action plan and offers solutions to problems.
3. If necessary, make proposals to achieve the objectives more effectively.
4. If necessary, make proposals to amend the action plan.
5. Makes proposals for the organization of studies and data collection to evaluate the implementation of the action plan.
6. Makes proposals for the development of an action plan for the next period.

Depending on the success of the planned activities and, inter alia, proposals resulting from inventories, monitoring, and research, the planned activities and part of the budget of the action plan will need to be updated on an ongoing basis.

The next action plan is based on the proposals of the steering group and an analysis of the implementation of the plan: an overview of the work carried out under the plan, an evaluation of the indicators, the results of the monitoring carried out during the implementation of the plan and studies.

ANNEXES

ANNEX 1 Descriptions of semi-natural habitats

ANNEX 2 Distribution of semi-natural grassland in protected areas by habitat type and maintained areas

ANNEX 2.1 Distribution of semi-natural grassland in protected areas by habitat type

ANNEX 2.2 Areas under maintenance in protected areas

ANNEX 3 Areas of high restoration value and areas under maintenance in protected areas

ANNEX 3.1 Map layers with areas of high restoration value and areas under maintenance (MapInfo) ANNEX 4. Habitat restoration and maintenance guidelines

ANNEX 4.1 Maintenance plan of grasslands on mineral soil and paludified meadows

ANNEX 4.2 Maintenance plan for alvars and juniper shrubs

ANNEX 4.3 Maintenance plan for floodplain meadows

ANNEX 4.4 Maintenance plan for coastal meadows

ANNEX 4.5 Maintenance plan of wooded meadows and wooded pastures

ANNEX 5 Coastal areas important for species protection