

HOW WELL ARE PROTECTED FORESTS OF HIGH CONSERVATION VALUE CARED FOR?

Changes in logging pressure and restrictions
of protected forest habitats within
the Natura 2000 network in Estonia

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Estonian Fund for Nature (ELF) is a non-governmental organisation dedicated to preserving endangered species and their habitats, natural landscapes and natural associations typical of Estonia. ELF promotes the sustainable use of natural resources, raises environmental awareness and seeks solutions for preserving a clean environment for future generations.

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Executive summary

Context

Natura 2000 is an ecological network spanning European Union countries where the Member States are required to ensure or restore the favourable status of high conservation value species and habitats in their natural range. One of the two legal instruments governing the protection of the network is the Habitats Directive (HD), which, *inter alia*, aims to protect forest habitats¹.

Out of the 11 HD forest habitat types present in Estonia, most are in an inadequate state. The poor situation is amplified by the logging pressures arising from the increasing demand for biomass, which, among other things, suggests contradictions between the European Union's climate, energy and nature conservation policies. Although the proportion of forests under strict protection in Estonia has increased over the years, the poor state of and logging activity in the forest habitats indicate that the current protection procedure may not be sufficient to protect these habitats.

Objective and methodology

This study has three objectives:

1. **Assess the logging pressure in Estonia's forest habitats in protected areas, i.e. forest habitats that are part of protected areas or protected as a species' protection site or a conservation area.** For this purpose, data from the Environment Agency has been used to observe forest loss area and the regeneration cutting and deforestation notices issued during the period 2008–2018, both for protected zones and for forest habitats.
2. **Highlight the extent to which forest habitats belonging to the Estonian**

Natura 2000 network have been inventoried.

3. **Map changes in logging restrictions in protected areas with forest habitats during 2011–2020, i.e., after 2010 by which most of the Natura 2000 network had been compiled.** To this end, first, those protected areas (i.e. national parks, nature and landscape conservation areas) have been identified, which consist of areas with forest habitats protected within the framework of Natura 2000 network HD, i.e. special area of conservation (further: SAC). Second, the logging restrictions stipulated in the protection rules for these areas have been compared to those in the earlier versions of the same rules. In case the protection rule had first entered into force after 2010, it has been compared with the most common logging restriction applied in restricted zones in the protection rules in force in 2010, i.e. the so-called standard restriction.

Results

The results of the three sub-objectives described above are as follows:

1. **The logging pressure on protected forest habitats is widespread and has increased significantly since 2015.** During the period 2008–2018, the loss of such forest habitats amounted to 1663 hectares and notices of regeneration cutting and deforestation were issued for 5575 hectares. In the observed period, more than half of the forest loss took place and almost 80% of all notices were issued in 2015–2018. Out of the areas under protection, the logging pressure was highest in the limited management zones of protected areas (45% of forest loss and 59%

¹ In this study, forest habitat refers to an area corresponding to the forest habitat type characteristics listed in Annex I to the HD, which has been mapped in nature

and the location of which has been entered in the national database.

of the notices during the period), and out of the forest habitats, it was highest in the habitat type Western Taiga (9010*) (48% of forest loss and 44% of notices).

2. **49% of the forest area of the Natura 2000 network is not covered by the forest habitat inventory. This suggests that the calculations of forest losses based on the habitat inventory have been underestimated and that forest habitats have probably been destroyed on a much larger scale.**
3. **The logging restrictions for protected areas with forest habitats have been significantly more relaxed than tightened in the past ten years.** There are 248 such Natura 2000 SACs in Estonia where at least one HD forest habitat type is protected and whose protection procedure is determined by the protection rules as a result of being part of a protected area. Of these, 104 have either had their protection rules amended or adopted for the first time after 2010. Out of the protection rules of these 104 SACs, the logging restrictions have been relaxed in 58 cases; in other words, logging in those areas became easier in the period 2011–2020 compared to the previous protection procedures or, in the case of new rules, compared to the standard restrictions of 2010. Logging restrictions were tightened in 12 and remained largely the same in 34 cases. **The impact of changes in logging restrictions on logging pressure is also illustrated by more specific cases**, such as in Lahemaa National Park – the biggest national park in Estonia that regulates the protection of Lahemaa SAC. While 79 clear cutting notices were issued in the national park in 2011–2014, then after relaxing the logging regulations in 2015, there were already 667 clear cutting notices issued in 2015–2018.

Conclusions and Recommendations

The protection of the protected forest habitats within the Natura 2000 network in Estonia has been weakened under the increased logging pressure during the past 10 years. This is shown by the loosening logging restrictions in protected forest habitats, increased forest loss, and notices of regeneration cutting and deforestation issued to these habitats. Based on the study, ensuring and restoring the favourable condition of the forest habitats requires:

1. Completing the inventory of forest land belonging to the Natura 2000 network as soon as possible, and also mapping HD forest habitat types outside the Natura 2000 network;
2. Updating the existing protection rules and establishing new protected areas so that the logging restrictions in the Natura 2000 network forest habitats would not be loosened and that regeneration cutting in these areas would be forbidden without exception;
3. Ensuring that the energy and climate policies of the European Union lower logging pressure by removing forest biomass from the incentives within the Renewable Energy Directive. In addition, as part of the implementation of the Habitats Directive, the EU should require that Estonia compensates for the damage that is already caused, e.g., allocating new areas to the Natura 2000 network.

Use of the report

The report is intended primarily for public institutions at the Estonian and European Union level involved in monitoring, legislation and policy-making related to nature conservation, forest management, and bio-energy. The results are also important for environmental associations and citizens in general to raise awareness of the conservation arrangements for forest habitats and to increase public interest in the subject.

1. Introduction

1.1. Natura 2000 network

Natura 2000 is an ecological network spanning European Union (EU) countries, which includes natural habitats and habitats of species of high conservation value. The aim of the network is to ensure or restore the favourable status of species and habitats of pan-European importance in their natural range. All Member States of the EU are obliged to contribute to the achievement of this objective². The network has been established on the basis of the EU Birds Directive and the Habitats Directive – cornerstones of the EU's nature conservation policy, which govern the protection of species and habitats that are important to the EU³. In Estonia, the terms for the protection and management of Natura 2000 network sites are governed by the Nature Conservation Act⁴.

In Estonia, the creation of the Natura 2000 network began in 2000 and most of the network was compiled by 2010⁵. In the EU, the network covers 18% of the total land area and 9% of the sea area⁶. In Estonia, the total area of the network is 14,859 km², of which 7,242 km² is located on land and 7,617 km² is located on water³.

In the EU as a whole, the sites of the Natura 2000 network are in a poor state. For example, more than half of the species and habitats covered in the Habitats Directive are

in an unfavourable state⁷, indicating that the network has not been efficient enough to meet its objectives.

1.2. Forest habitats of the Habitats Directive in Estonia

Alongside the Birds Directive, the Habitats Directive (further also HD) is one of the two most important EU legislation on the protection of nature. The main aim of the directive is to ensure the protection of natural species and habitats of relevance to the EU². An area protected within the framework of the HD is called a **special area of conservation** (further also **SAC**)⁸.

In addition to other habitats, the HD defines **forest habitats, 11 types of which are present in Estonia**, which are listed in Table 1 below, accompanied with the code corresponding to the habitat⁹. The EU directive also distinguishes **priority habitat types, or natural habitat types in danger of being lost**, which the Member States have a particular responsibility to protect (indicated in the table next to the code by an asterisk (*)).

Similar to the state of the Natura 2000 sites in the EU as a whole, the state of forest habitats in Estonia is inadequate. The following table provides an assessment of the state of the Estonian forest habitats according to the analysis of the Estonian national report on the Habitats Directive¹⁰ and the analysis by the Environment Agency based on the data

² European Council, 1992, Council Directive 92/43/EEC, 21 May 1992, on the conservation of natural habitats and of wild fauna and flora, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31992L0043&from=ET>

³ Roasto, R., Tampere, U. (editor), 2020, Eesti looduse kaitse aastal 2020. Keskkonnaagentuur, Tallinn, https://www.keskkonnaagentuur.ee/sites/default/files/elk_2020_est.pdf

⁴ Riigi Teataja, 2021, Nature Conservation Act. <https://www.riigiteataja.ee/akt/110072020057>

⁵ Estonian Ministry of the Environment, 2021, Natura 2000. <https://www.envir.ee/et/natura-2000>

⁶ European Environment Agency, 2019, The European environment - state and outlook 2020, <https://www.eea.europa.eu/publications/soer-2020>

⁷ European Environment Agency, 2019, Conservation status and trends of habitats and species, <https://www.eea.europa.eu/themes/biodiversity/state-of-nature-in-the-eu/article-17-national-summary-dashboards/conservation-status-and-trends>

⁸ Säästva Eesti Instituut, 2021, Säästva arengu sõnaseletusi: loodusala. www.seit.ee/sass/?ID=1&L_ID=545

⁹ Palo, A., 2018, Loodusdirektiivi metsaelupaikade inventeerimise juhend, https://www.envir.ee/sites/default/files/metsainventeerimine_juhend_2018.pdf

¹⁰ Estonian Ministry of the Environment, Prioritised Action Framework (PAF) for Natura 2000 in Estonia, p 25, https://www.envir.ee/sites/default/files/paf_estonia_2021_2027.pdf

obtained by habitat inventory¹¹. The table shows that only a few forest habitats have a favourable status.

Table 1. 11 types of forest habitat types present in Estonia and their state

Type of forest habitat	Code	State: HD report 2019	State: KAUR analysis 2019
Western Taiga	9010*	Bad	Bad
Fennoscandian hemiboreal natural old broad-leaved deciduous forests (Quercus, Tilia, Acer, Fraxinus or Ulmus) rich in epiphytes	9020*	Inadequate	Inadequate
Fennoscandian herb-rich forests with Picea abies	9050	Inadequate	Bad
Coniferous forests on, or connected to, glaciofluvial eskers	9060	Inadequate	Inadequate
Fennoscandian wooded pastures	9070	Inadequate	Bad
Fennoscandian deciduous swamp woods	9080*	Bad	Inadequate
Tilio-Acerion forests of slopes, screes and ravines	9180*	Favourable	Inadequate
Bog woodland	91D0*	Inadequate	Inadequate
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	91E0*	Inadequate	Favourable
Riparian mixed forests of Quercus robur, Ulmus laevis and Ulmus minor, Fraxinus excelsior or Fraxinus angustifolia, along the great rivers (Ulmenion minoris)	91F0	Inadequate	Inadequate
Wooded dunes of the Atlantic, Continental & Boreal region	2180	Favourable	Bad

Even though there is no entirely precise data for the area of forest habitats, it is estimated that Western Taiga (9010*) constitutes the largest area (approximately 85–95 thousand hectares), followed by bog woodland (91D0*) (51–64 thousand hectares) and Fennoscandian deciduous swamp woods (9080*) (35–53 thousand hectares). The area of other forest habitats is estimated to be less than 10 thousand hectares¹¹.

As with other Natura 2000 habitats, the protection of forest habitats is governed in Estonia by the Nature Conservation Act, and forest habitats may be located in a protected

area or be protected as a species' protection site or limited-conservation area as described in Table 2 below (further **protected forest habitats**)⁴. Protection of protected areas and species' protection sites is governed by protection rules approved by the national government or the Minister of Environment and published in Riigi Teataja, the official journal of the state. Protection rules define the conservation objectives, the manager,

¹¹ Estonian Environmental Agency, 2019, Ülevaade Loodusdirektiivi metsaelupaikade seisundist (2013-2018) elupaigainventuuride ja seireandmete põhjal,

<https://www.keskkonnaagentuur.ee/sites/default/files/ulevaade-metsaelupaikade-seisunidst-2019.pdf>

and the borders of the area, as well as the authorised, prohibited, and necessary activities in the protected area¹².

Table 2. Organisation of protection of protected forest habitats in the Estonian law⁴

Form of protection of protected forest habitats	Description
Protected area (national park, nature conservation area, landscape conservation area)	Protected areas are areas maintained in a state unaltered by human activity or used subject to special requirements where the natural environment is preserved, protected, restored, researched or introduced. Protection procedures are described in the protection rules. Within protected areas, forests belong to one of the three zones: <ol style="list-style-type: none"> 1. strict nature reserve, which is under strict protection and is kept unaffected by direct human activity; 2. conservation zone, the goal of which is preservation of natural and semi-natural biotic communities established or to be developed therein, and where management activity or exploitation of natural resources is forbidden unless the protection rules state otherwise; 3. limited management zone – the zone with the most lenient protection rules where management activity, including forest management, is allowed as per the terms stipulated in the protection rules.
Species' protection site	An area of high conservation value outside protected areas, e.g. the breeding site of a protected species. The protection procedures are described in the protection rules. Similar to protected areas, a species' protection site includes a limited management zone and a conservation zone.
Limited conservation area	Areas in the Natura 2000 network designated for the conservation of habitats, for the preservation of which the impact of planned activities is estimated and activities liable to damage the favourable conservation status of the habitats are prohibited. These areas do not have protection rules.

For the identification of forest habitats, the assessment of their status, and other purposes, the respective experts carry out forest habitat inventories for which a guide for the inventory of forest habitats within the

Natura 2000 network has been drawn up in accordance with the conditions in Estonia¹³.

¹² Estonian Ministry of the Environment, 2021, Kaitse-eeskirjad. <https://www.keskkonnaamet.ee/et/eesmargid-tegevused/kaitse-planeerimine/kaitse-eeskirjad>

¹³ Palo, A., 2018, Loodusdirektiivi metsaelupaikade inventeerimise juhend, https://www.envir.ee/sites/default/files/metsainventeerimine_juhend_2018.pdf

1.3. Estonian forests, logging, and use of wood

1.3.1. Estonian forests and their management

Nearly half of Estonia's area is forest land, which includes both lands with and without wood. Approximately half of the forest land is privately owned and half is owned by the state. The forest belonging to the state is managed by the State Forest Management Centre (RMK).

Almost all forests in Estonia (estimated at 98%) are semi-natural, meaning that they have the characteristics of a natural forest ecosystem, but have developed in the conditions of human impact¹⁶. Of all forests, 14.1% are strictly protected, 11.5% are subject to partial felling restrictions, and 74.4% are production forests, i.e., managed mainly for timber production. As illustrated in Figure 1, the area of strictly protected forests and production forests have increased between 2006 and 2019, while the area of forests with partial felling restrictions have decreased significantly. Strictly protected forests are young – it is estimated that it will take another 20 years for just a half of the strictly protected forest network to be mature enough to fulfil its ecological function, mainly the protection of old-forest species¹⁷.

Logging volume has increased nearly three times in Estonia over the years, rising from 4.6 million cubic metres in 2008 to 12.7 million cubic metres in 2018. A study published in 2020 in the scientific journal *Nature* shows that the increase in the logging volume is not due to the increase in the volume of mature forests, but is driven by increasing demand mainly from the international woody biomass market¹⁸ (more on this in subchapter 1.3.4).

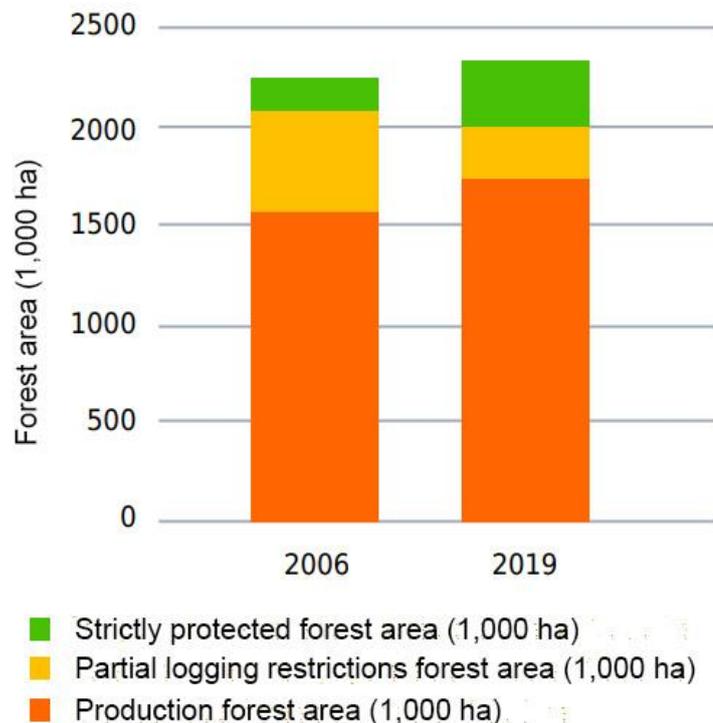


Figure 1. Changes in the area of forests with different protection procedures between 2006¹⁴–2019¹⁵.

¹⁴ Centre of Forest Protection and Silviculture, 2006, Aastaraamat mets 2006. <https://www.keskkonnaagentuur.ee/et/mets2006>

¹⁵ Estonian Environmental Agency, 2019, Aastaraamat mets 2019. <https://www.keskkonnaagentuur.ee/et/aastaraamat-mets-2019>

¹⁶ Runnel, A., 2018, Metsade maastikulise struktuuri ja järjepidevuse mõju elurikkusele. Tartu University. https://dspace.ut.ee/bitstream/handle/10062/61282/Runnel_Annabel.pdf?sequence=1&isAllowed=y

¹⁷ Lõhmus, A., 2016. Eesti rangelt kaitstavate metsade tüpoloogiline analüüs. https://www.envir.ee/sites/default/files/metsade_range_kaitse_2016_alohmus.pdf

¹⁸ Ceccherini, G., Duveiller, G., Grassi, G. et al., 2020, Abrupt increase in harvested forest area over Europe after 2015. *Nature* 583, 72–77. <https://www.nature.com/articles/s41586-020-2438-y>

1.3.2. Types of cutting

Types of cutting described in the Forest Act are regeneration cutting, improvement cutting, selective cutting, formative cutting, deforestation, and track cutting. Types of cutting are described in Table 3

Table 3. Types of cutting¹⁹

Types of cutting	Submethods and descriptions
Regeneration cutting (clear cutting and shelterwood cutting)	<p>In the course of clear cutting, all trees other than seed and crop trees and viable aftergrowth are harvested from the felling establishment within one year from the beginning of the cutting. Shelterwood cutting is divided into three submethods:</p> <ul style="list-style-type: none"> A. In the event of shelterwood compartment cutting, dispersed trees are cut in the forest subject to reforestation in two or more cutting stages; B. In the event of group selective cutting, the forest subject to reforestation will be cut by groups in several cutting stages, whereas in the course of the first stage a maximum of five groups per hectare may be cut and the diameter of the group must not exceed 40 metres; A. In the event of shelterwood strip cutting, trees will be cut from the edges of the cutting area by way of clear cutting at a width that does not exceed the height of the stand. A clear-cut area may be expanded after the regeneration of the part of the forest that was clear-cut at the previous cutting stage.
Improvement cutting	<p>Improvement cutting is divided into three submethods:</p> <ul style="list-style-type: none"> A. thinning is carried out in stands with an average diameter of more than eight centimetres; B. cleaning is carried out in stands with an average diameter of up to eight centimetres, and no coordination with the Environmental Board is necessary; A. sanitary cutting is carried out for the removal of trees that are a source of infection or promote the reproduction of pests from a forest, as well as the dying or dead trees that are not a source of danger and the seed trees that have fulfilled their function.
Selective cutting	<p>Selective cutting is carried out for the purpose of management as a selection forest in a forest stand that has attained the rotation age by cutting out single trees and minor groups with a diameter of up to 20 metres. In the course of selective cutting, old crop trees are preserved.</p>
Formative cutting	<p>Formative cutting is carried out at a protected natural object in order to attain the protection goal.</p>
Deforestation	<p>Deforestation means the cutting that is done in order to enable the use of land for purposes other than silviculture.</p>
Track cutting	<p>Track cutting is carried out in order to clean a ride, road shoulder, or ditch bank from trees.</p>

¹⁹ Riigi Teataja, 2021, Forest Act. <https://www.riigiteataja.ee/akt/110072020075>

1.3.3. Impact of forest management on ecosystems and climate

The main types of cutting that can cause forest loss, i.e., the transformation of areas from forest to non-forest, are deforestation, clear cutting and the final stages of shelterwood strip, group selective and shelterwood compartment cutting. Estonian forestry is geared towards clear cutting, which accounts for 95% of the so-called final cuttings. The preference for clear cutting is predominantly due to economic considerations, taking less account of the ecological, climatic or cultural factors associated with the forest²⁰.

A combination of record-breaking logging volumes and clearing as the main method of cutting has damaged the state of forest ecosystems. This is illustrated, for example, by the declining woodland bird population by an estimated 50,000 pairs annually in the past decades²¹.

In addition, the increasingly intensive cutting in recent years (see sub-chapter 1.3.4) undermines the potential of Estonian forests to store carbon dioxide. Namely, Estonia's national greenhouse gas reduction report confirms that under the current policy, the carbon storing capacity of the country's land use, land use change, and forestry sector (LULUCF) would be reduced so that as of

2030, the volume of greenhouse gases emitted by the sector will exceed the stored volume²².

1.3.4. Use of wood

According to the wood balance, in 2017 approximately 50% of wood originating in Estonia was used for the production of energy or energy products either domestically or for export²³. Thus, wood is used in energy as much as in sawmill, furniture, pulp and paper and other industries combined. The wood used in energy comes either directly from harvested trees in the form of "stem wood" or, more indirectly, from residues from the forest and wood industries, for example.

Based on the data from Statistics Estonia, as shown in Figure 2 below, the amount of wood used to produce biomass for both domestic consumption and exports exceeded two-thirds of the logging volume of the respective years in 2015–2018²⁴. In 2012, the same indicator was 55%, which shows the increasing share of wood used in energy.

The growing demand for biomass arises primarily from pellet production and exports. For example, while in 2008–2012, the wood needed to produce pellets for export accounted for about 15% of the total wood used in bioenergy, then by 2018, this number had more than doubled, reaching 33%.

²⁰ Estonian University of Life Sciences, University of Tartu, 2018, Eesti metsanduse arengukava aastani 2030: alusuuringu aruanne. <https://dspace.emu.ee/xmlui/handle/10492/4578>

²¹ Nellis, R. & Volke, V., 2019, Changes in abundances of forest birds during the period of 1983 to 2018, eoy.ee/hiirundo/files/Nellisi_Volke_2019-1.pdf

²² Estonian Ministry of the Environment, 2021, Estonian national GHG inventory report 2019, https://www.evir.ee/sites/default/files/Kliima/nir_est_1990-2019_15.03.2021.pdf

²³ Environmental Agency, 2017, Puidubilanss. https://www.keskkonnaagentuur.ee/sites/default/files/elfinder/article_files/puidubilanss_2017_0.pdf

²⁴ The biomass demand is calculated as the sum of gross inland consumption and exports of woody biofuels (firewood, wood chips, wood waste, briquette, pellets), using Statistics Estonia dataset KE023: Energy balance sheet by type of fuel or energy. The original measure of briquette and pellets - tons - is converted to m3 solid volume, estimating that briquette is 1.96 and pellets 2.24 solid wood m3 per ton, the median values for the same measure in Europe (FAO, ITTO & UN, 2020, Forest product conversion factors, p. 49, <https://doi.org/10.4060/ca7952en>).

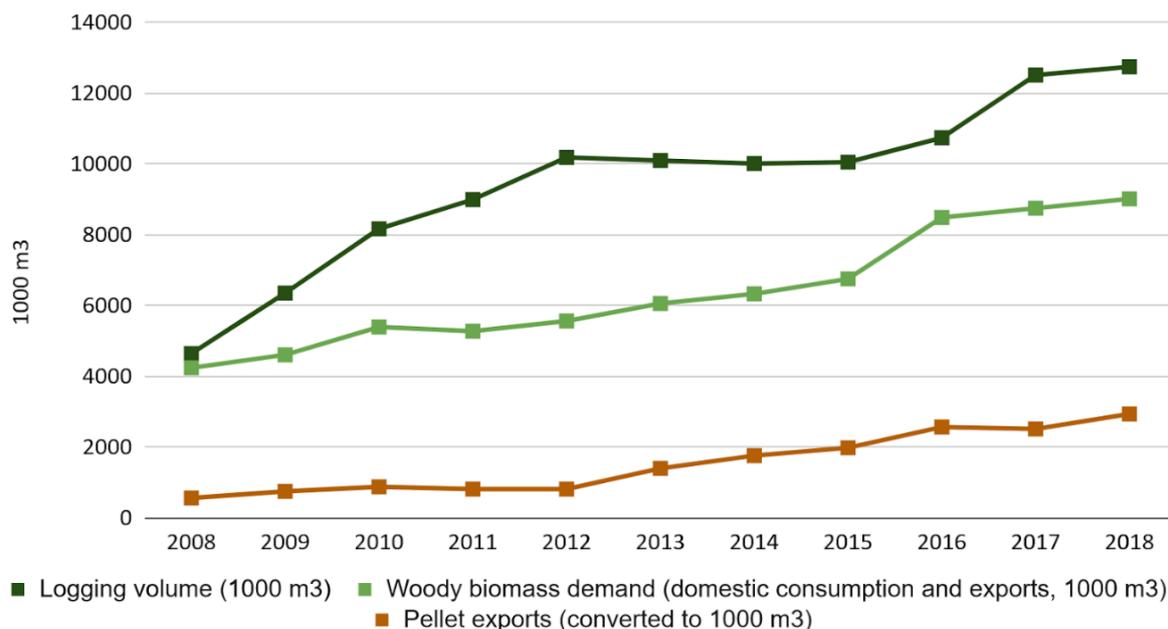


Figure 2. Comparison of logging volumes, woody biomass demand, and pellet exports in the period 2008–2018

The above confirms the conclusions of the 2020 article published in Nature, namely that the increase in logging intensity in Estonian forests, including in protected areas, is mainly facilitated by the growing international demand for woody biomass and bioenergy¹⁸. Demand, in turn, is fuelled by the EU’s policies that encourage the use of subsidised woody biomass in order to achieve renewable energy targets, and by the regulations that allow burning wood from any forest for energy, regardless of its natural value.

1.4. Purpose of the study

Despite the high conservation value of forest habitats belonging to the Natura 2000 network, surveys compiled by the state show that the status of most forest habitat types in Estonia is either inadequate or bad¹⁰. Wood originating from Estonia is largely used in the energy sector, with the use of wood for energy production having significantly increased over the past decade. In light of this, it is important to analyse logging pressures

on forest habitats and the regulations affecting logging pressures in order to better understand whether and to what extent the EU’s policies on nature conservation and energy contradict each other.

This study aims to get an overview of the extent of logging activities in protected forest habitats over the past decade, and changes in the legislative provisions in the protection rules that permit logging in the protected areas created for the protection of these habitats. The study seeks answers to the following questions:

1. **What is the level of logging pressure in the Estonian protected forest habitats within the Natura 2000 network**, i.e., the area of forest loss and regeneration cutting and deforestation notices issued in the period 2008–2018 both for protected zones and for forest habitats?
2. **To what extent are forest habitats mapped**, i.e., to what extent Estonia’s Natura 2000 network lacks information on the presence, state, and conservation status of forest habitats?

3. How have logging restrictions been changed in the protection rules of protected areas with forest habitats within the Natura 2000 network in the period 2011–2020, i.e., after 2010 by which most of the Natura 2000 network had been compiled?

The report consists of three parts. **First**, an overview of the methodology and the bottlenecks related to the study are provided. **Second**, based on the data on forest loss and logging notices issued, the logging pressure on protected forest habitats are analysed. Also, based on an analysis of the protection rules, changes to the logging restrictions in the protection rules of protected areas with forest habitats are considered. **Third**, conclusions and proposals will be drawn on how to ensure better protection of Natura 2000 forest habitats in Estonia.

2. Methodology

2.1. Study process, data collection and data analysis

The study process comprises four parts: **1.** analysis of forest loss and regeneration cutting and deforestation notices issued for protected forest habitats; **2.** determining the proportion of forests in the Natura 2000 network that have been inventoried; **3.** analysis of the changes in logging restrictions of the protected areas with forest habitats; and **4.** providing examples of the impact of changes in logging restrictions on the issuing of regeneration cutting and deforestation notices. All parts are described in more detail below.

2.1.1 Analysis of forest loss and regeneration cutting and deforestation notices

In order to determine whether and how forest management has had an impact on forest habitats and how many protected forest habitats have been destroyed due to logging, data on forest loss and regeneration cutting and deforestation notices issued was used. The analysis of the forest loss of protected forest habitats was based on the following information obtained through an information request from the Environment Agency²⁵:

1. The area of forest loss by forest habitat type for each year for the period 2005–2018 and the indication of whether it is a limited management zone, natural conservation zone, or managed conservation zone, a limited-conservation zone or a limited management zone of protected natural objects.
2. Approved regenerative cutting and deforestation notices applying to forest habitats for the period 2005–2018.

The information requests were based on the Environment Agency's 2019 analysis "Overview of the state of the forest habitats of the Habitats Directive (2013–2018) based on habitat inventories and monitoring data"¹¹. In its analysis of forest loss, the Environment Agency relies on the Global Forest Change database, which defines forest loss as areas identified from Landsat satellite imagery that have changed from forests to non-forest²⁶. According to this methodology, the changed areas are calculated as pixels with a side length of 30 meters, and the forest is considered to be an area with three height of more than 5 meters.

²⁵ Response nr 2-10/20/321-2 by the Estonian Environmental Board to a request for information.

²⁶ Hansen, M. C., P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L.

Chini, C. O. Justice, and J. R. G. Townshend, 2013, "High-Resolution Global Maps of 21st-Century Forest Cover Change." *Science* 342 (15 November): 850–53. <http://earthenginepartners.appspot.com/science-2013-global-forest>.

Data on forest loss and regenerative cutting and deforestation notices were broken down by different protection zones and forest habitat types. On the basis of the results, charts were compiled describing the time series for forest loss and the trends related to the issuing of notices.

2.1.2 Determining the proportion of inventoried forest in the Natura 2000 network

An information request was sent to the Environmental Board in order to identify the extent to which forest habitats belonging to the Natura 2000 network have been inventoried²⁷. The request asked for the share of forests belonging to the Natura 2000 network and mapped during the inventory of forest habitats, and the share of non-inventoried areas from the total forest area in Estonia belonging to the network.

2.1.3 Analysis of changes to cutting restrictions in the protection rules

To understand how well forest habitats have been protected in the Natura 2000 network, the analysis assessed the changes in the logging restrictions in the protection rules of protected areas with forest habitats of the Natura 2000 network in the period 2011–2020, i.e., after 2010 by which most of the network had been compiled. These changes to the logging restrictions were analysed in four stages:

1. Identification of special areas of conservation (SACs) with forest habitats

²⁷ Response nr 2-10/20/338-2 by the Environmental Agency to a request for information.

²⁸ Estonian Government, 2017, The list of Natura 2000 network sites sent to the European Commission. <https://www.riigiteataja.ee/akt/790098?leiaKehtiv>

²⁹ Legislation describing the conservation values of a protected area, indicating its boundaries and listing the activities that are prohibited, permitted or necessary to be carried out to achieve the conservation objectives.

In the first phase of analysing the protection rules, first of all, those SACs in Estonia where forest habitats are present were identified in the list of Natura 2000 network sites submitted by Estonia to the European Commission²⁸. A more precise criterion was that at least one in eleven forest habitat types present in Estonia must be included among the protected habitats of the SAC (see Chapter 1.2 of the Introduction). A list of SACs with forest habitats was then drawn up, with specific protected habitat types listed for each area.

2. Identification of SACs with forest habitats within protected areas

The aim of the second phase of the analysis was to find which SACs with forest habitats identified in the first phase are located in Estonian protected areas (landscape conservation areas, nature conservation areas or national parks), and whose protection is thus governed by protection rules²⁹. A list of the existing protection rules published in Riigi Teataja³⁰ and the Estonian Nature Information System³¹ helped establish whether the SACs with forest habitats are located within protected areas (landscape conservation areas, nature conservation areas or national parks), or whether they are limited-conservation areas or species' protection sites. Limited-conservation areas were excluded from the sample because their protection procedures are not established by the protection rules; similarly, species' protection sites were excluded because they are formed for the purpose of species' protection and not for the protection of forest habitats in particular. In the case of SACs on protected areas for which protection is provided

<https://www.keskkonnaamet.ee/et/eesmargid-tegevused/kaitse-planeerimine/kaitse-eeskirjad>

³⁰ Riigi Teataja, 2021, Otsing. https://www.riigiteataja.ee/tervikeksti_tulemused.html?kehtivusKuupaev=04.04.2019&nrOtsing=tapne&pealkiri=kaitse-eeskiri&riigikoguOtsused=false&valislepingud=false&valitsuseKorraldused=false&sakk=kehtivad_kehtetuteta&leht=0&kuvaKoik=true&sorteer=&kasvav=true

³¹ <https://www.eelis.ee/>

by the protection rules, both the protection rules in force and, where applicable, the previously applicable rules was chosen from Riigi Teataja to allow for a comparison in the third phase of the analysis of the changes in the logging restrictions in the protection rules for the period 2011-2020.

The number of SACs located in protected areas and protected by a protection rule may not correspond directly to the number of protection rules. This can be due to the existence of protected areas and protection rules, which regulate the protection procedures of several different SACs at the same time, and also as there are cases where one SAC is located in several protected areas and is therefore protected by several protection rules.

3. Analysis of changes to logging restrictions in protection rules

The third phase of the analysis consisted of two sub-parts. **First**, the information contained in the protection rules related to logging restrictions in protected areas was identified. Information related to logging activities is predominantly reported in sections “Allowed activities” and “Forbidden activities” of the protection rules, but there were also rules for larger protected areas where information related to forest management was presented in a separate section.

Second, the changes to the logging restrictions in the protection rules over the last ten years were assessed. To this end, the existing logging restrictions in the protected area were compared with the previous ones:

- If a rule had been updated in the period 2011–2020, i.e., after 2010 when most of the Natura 2000 network had been compiled, the logging restrictions present in the rule in force were compared to the restrictions set out in the previous version.

- If a rule was first adopted after 2010, the rule was compared with the logging restriction of the most common restriction in limited management zones stipulated in the 2010 protection rules (further referred to as the **standard restriction**): **“Regeneration cutting shall be prohibited, except for shelterwood cutting, in which case the diversity of the species and age of the biotic community shall be maintained”**³². For comparison, the analysis used provisions of the limited management zone where the logging restrictions are generally changed.

The standard restriction occurs in the vast majority (nearly 57% of the rules in which the limited management zone occurs) of the rules adopted in 2010 or earlier and in force to this day. The use of the standard restriction also allowed an assessment of the rules which had been adopted for the first time during the observed period and which could therefore not be compared with the previous rule in the same area.

An assessment of possible changes to logging restrictions in the protection rules was given at the end of December 2020, i.e. changes to the protection rules from 01.01.2021 have not been considered. As the rules that have not been updated since 2010 have remained the same for the period 2011–2020, they were not analysed further.

Changes in logging restrictions were assessed and grouped into three categories: “no change”, “more stringent” and “loosening of restrictions”, as described in Table 4 below. More specific examples are given in the results’ sub-chapter 3.2.2.

The results were presented in ratios, e.g., how many percent of the changed protection rules had the logging restrictions relaxed.

³² Similar wordings have also been considered.

Table 4. Assessment of changes in logging restrictions in protection rules of limited management zones

Assessment of logging restrictions	Description
No change	<p>Logging restrictions have remained essentially the same in the protection rule revised in the period 2011–2020 as compared to the previous protection rule.</p> <p>Logging restrictions in the protection rule first adopted in the period 2011–2020 are similar to the standard restriction, i.e., as stipulated in most of the protection rules that were adopted in 2010 and that are still in force.</p>
More stringent	<p>Logging restrictions are stricter in the protection rule revised in the period 2011–2020 as compared to the previous protection rule.</p> <p>Logging restrictions in the protection rule first adopted in the period 2011–2020 are stricter than the standard restriction.</p>
Loosening of restrictions	<p>Logging restrictions are looser in the protection rule revised in the period 2011–2020 as compared to the previous protection rule.</p> <p>Logging restrictions in the protection rule first adopted in the period 2011–2020 are looser than the standard restriction.</p>

4. Providing examples of the impact of changes made in logging restrictions on the issuing of regeneration cutting and deforestation notices

In order to provide examples, the analysis used data obtained from the Environmental Board in response to an information request by the Estonian Fund for Nature about forest notifications issued 2008–2018 pertaining Natura sites³³. Out of the notifications, notices of regeneration cutting (using the following codes: LR – clear cutting; VE – shelterwood strip cutting; HL – group selective cutting; AR – shelterwood compartment cutting) and deforestation (using the code RD) were chosen. From these notifications, periods of equal length before and after the change of the logging regulations were selected according to the dates of issue (see

Results sub-section 3.2.3). The number and area of notifications were added together and the different periods were compared.

2.2. Limitations

2.2.1 The use of the inventory of forest losses and notifications

Error rate for loss of forest data

According to the Environment Agency, the data about forest losses made available in response to the information request must be treated with some reservation as it is obtained by bitmap data (Global Forest Change (GFC) satellite data) and vector data (habitats of the Habitats Directive) overlay. In the report about key biotopes published in

³³ Information of notifications originates from the response nr 2-6/19/5-3 of Environmental Board to a request for information

February 2021, The Estonian Fund for Nature has estimated a possible GFC error of 3.6%³⁴, from which it can be concluded that the estimate of forest loss is generally accurate. The error rate is caused by the partial cutting and division of the stand compartments and by the fact that narrow stand compartments cause the pixels of the adjacent area to overlap.

Share of natural disturbances in forest loss data

Global Forest Change forest loss data include forest loss due to natural disturbances (wind breakage, fires, etc.) in addition to cutting. Also, part of the forest loss may be the result of formative cutting to restore the biotic communities. In the preparation of the report published by the Estonian Fund for Nature in 2021, 300 forest loss stand allocations were verified from orthophoto and no natural disturbances were found in the inspected areas³⁴. This confirms the assessment by the Environment Agency that the vast majority of forest losses is caused by cutting and that the share of natural disturbances in total forest losses is low¹¹. In the case of forest loss in the habitat type of the wooded pasture, it is presumably mainly due to restoration works.

Realisation of regeneration cutting and deforestation notices

When interpreting information on regeneration cutting and deforestation notices, it should be noted that not all notices are realised and that the issuance of the notification may not be automatically followed by loss of habitat in the wild. According to the Environment Agency, approximately 70% of forest notices (including regeneration cutting, improvement cutting, selection cutting etc.) are realised¹¹. Even though not all of the notices

are not realised, the issuance of these and in particular of regeneration cutting and deforestation notices to protected forest habitats illustrates the potential inadequacy of existing protection regulation.

Share of inventoried forest land in the Natura 2000 network

The potential forest loss in uninventoried habitats has not been assessed in the study, therefore the results and conclusions presented in the study only apply to known forest habitats.

2.2.2 Analysing the changes to the protection rules

Exception in data analysis in regard to protection rules adopted in the period 2011–2020

In regard to protection rules first adopted in the period 2011–2020 and not updated since, it was not possible to estimate the change in the logging restrictions as compared to the previous rules of the same protected area. Therefore, the comparison was mostly based on the logging restrictions applying to limited management zones present in the rules adopted in 2010, which were used as the standard restriction.

Changes in forestry regulations complicate interpreting changes to protection rules

The interpretation of changes to logging restrictions in the protection rules is hindered by the fact that the rules on forest management have been constantly relaxed over time³⁵. For example, in 2007 there were significantly longer periods for shelterwood cutting than in the current Forest Act. At the time, shelterwood compartment cuttings had to be carried out with a period 10–20

³⁴ Estonian Fund for Nature, 2021, Kuhu kaovad meie vanad elurikkad metsad? Kaardistamata vääriselupaikade hävimine riigimetsas 2010-2019. <https://media.voog.com/0000/0037/1265/files/VEP%20raport%20ELF%2016.02.21.pdf>

³⁵ Estonian Environmental Law Center, 2013, Metsamajandamise piirangud. Õiguslik analüüs Metsaseaduses sätestatud piirangutest aastatel 1998-2013. https://media.voog.com/0000/0037/1265/files/Metsamajanduse_piirangute_analyys_K6K_2013.pdf

years, group selective cuttings and shelterwood strip cuttings with a period 20-40 years, whereas the current forest law requires a minimum period of 5 years. This change has had a significant impact on forest management rules in protected areas, without any changes to the conservation rules. Such easing of restrictions has not been addressed in this analysis.

Rezoning of protected areas

The analysis of the protection rules does not take into account any additional restrictions or easing resulting from the rezoning of protected areas. It does not consider how many changes have occurred in the areas of the different zones.

3. Results

The results are divided into two broad sections: forest loss and cutting notices in protected forest habitats, and changes to logging restrictions in the protection rules governing protected areas with forest habitats.

3.1 Forest loss and cutting notices in protected forest habitats

According to data from the Environment Agency, the total loss of inventoried protected forest habitats between 2008 and 2018 amounted to 1663.3 hectares, from which more than half was logged in the period 2015–2018. Between 2008 and 2018, regeneration cutting and deforestation notices were

issued to a total of 5574.9 hectares, from which nearly 80% were issued in the period 2015–2018. **Even though not all of the notices are realised, the fact that the notices to protected habitats are issued to such an extensive degree indicates that regulations do not guarantee the preservation of natural values.**

The protected areas and the types of forest habitats where the logging pressure is highest are described below, followed by an assessment regarding changes in the logging pressure over the years for the period 2008–2018.

3.1.1. Logging pressure on protected forest habitats by protected areas

Figure 3 provides separately the total area of forest loss area in forest habitats and the total area of regeneration cutting and deforestation notices issued, broken down by the type of protected zone for the period 2008–2018. This graph illustrates that **logging pressure is highest in the limited management zones of protected areas**, which have had cutting notices issued for 3307.3 hectares (59% of all observed notifications of regeneration cutting and deforestation) and where forest loss has been 740.9 hectares (45% of all identified forest loss). In addition, protected areas in maintained conservation zones, limited conservation areas and species' protection sites in limited management zones are under the highest logging pressure in terms of both notices issued and forest loss.

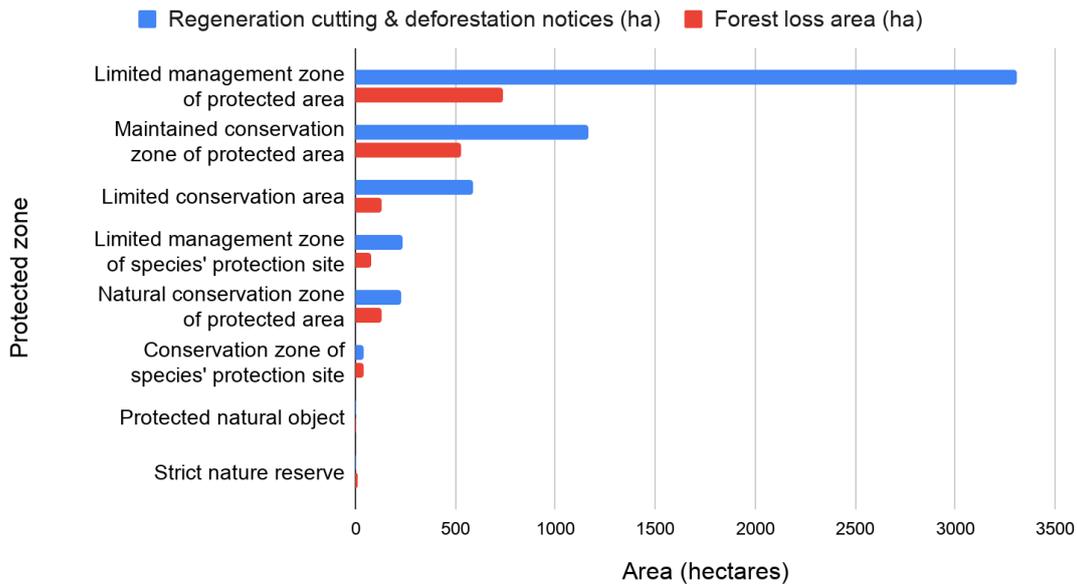


Figure 3. Total area (in hectares) of forest loss and issued regeneration cutting and deforestation notices to protected forest habitats, broken down by protected zones during the period 2008–2018

Figure 4 shows forest loss in protected forest habitats broken down by **protected areas and by year** for the period 2008–2018. The figure illustrates the significant increase in forest loss after 2015. Proportionally, the logging volume has increased the most in the limited management zones of the protected areas. The loss of protected forest habitats in

the limited management zones of the protected areas represented 49% to 66% of the total identified forest loss during the period of 2015–2018, depending on the year, which is a sharp increase from the period of 2008–2014, when the loss in the limited management zones represented 21% to 43% of the total identified forest loss.

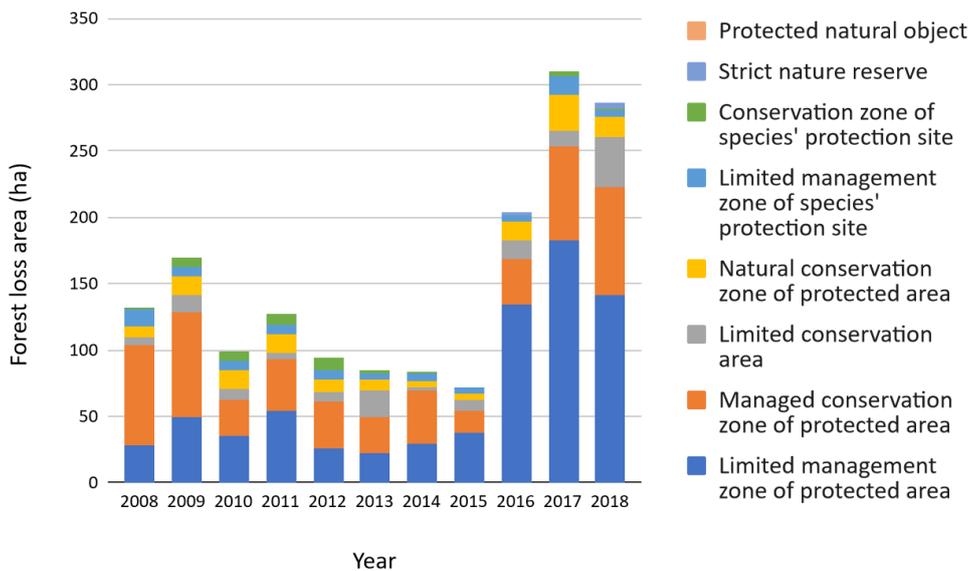


Figure 4. Annual forest loss area (in hectares) in protected forest habitats in the period 2008–2018, broken down by protected areas

3.1.2. Logging pressure on protected forest habitats by type

Figure 5 summarises the total area of identified forest loss and issued regeneration cutting and deforestation notices in protected forest habitats for the period 2008–2018, broken down by forest habitat type. This figure shows that logging pressure was **highest in the forest habitat Western Taiga (9010*)**, a priority habitat that the Member

States of the European Union have a special responsibility to care for. During the period observed, 2437.4 hectares of logging notices were issued for this habitat (44% of all observed notices of regeneration cutting and deforestation) and the forest loss in these areas amounted to 804.3 hectares (48% of total observed forest loss). Forest habitat types 91D0*, 9080* and 9050 (see Table 1 in Introduction) are also under considerable logging pressures in terms of both notices and forest loss.

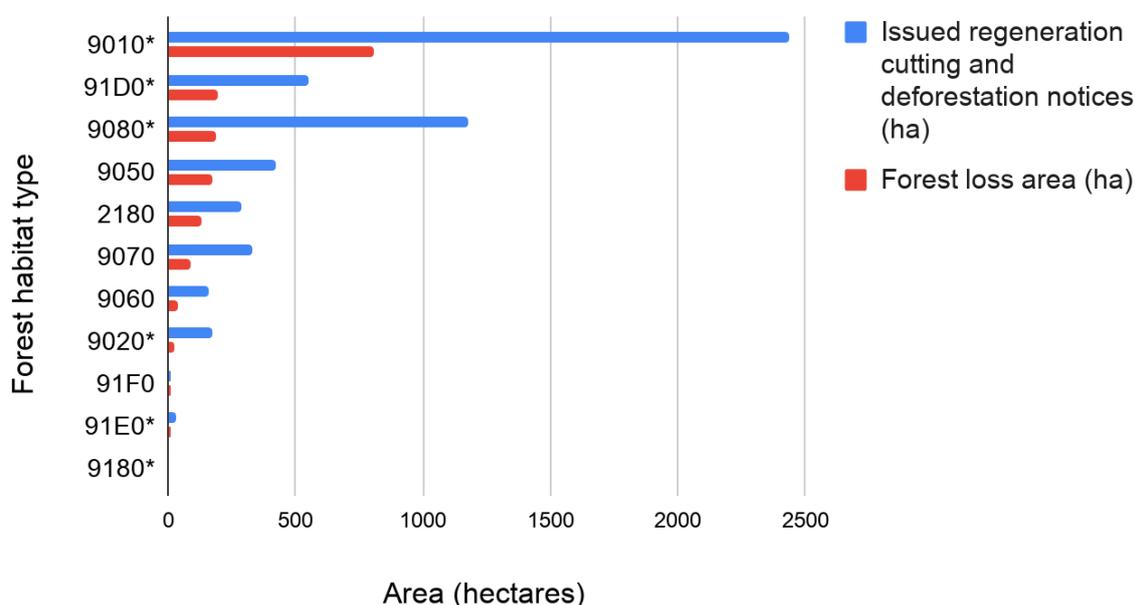


Figure 5. Total area (in hectares) of forest loss and issued regeneration cutting and deforestation notices in protected forest habitats broken down by forest habitat type for the period 2008–2018.

Figure 6 shows the area of forest loss identified in protected forest habitats **broken down by types of forest habitat types and years** for the period 2008–2018. The figure shows a significant increase in forest loss in

forest habitats after 2015, mostly in the Western Taiga (9010*), bog woodland (91D0*), and Fennoscandian deciduous swamp woods (9080*).

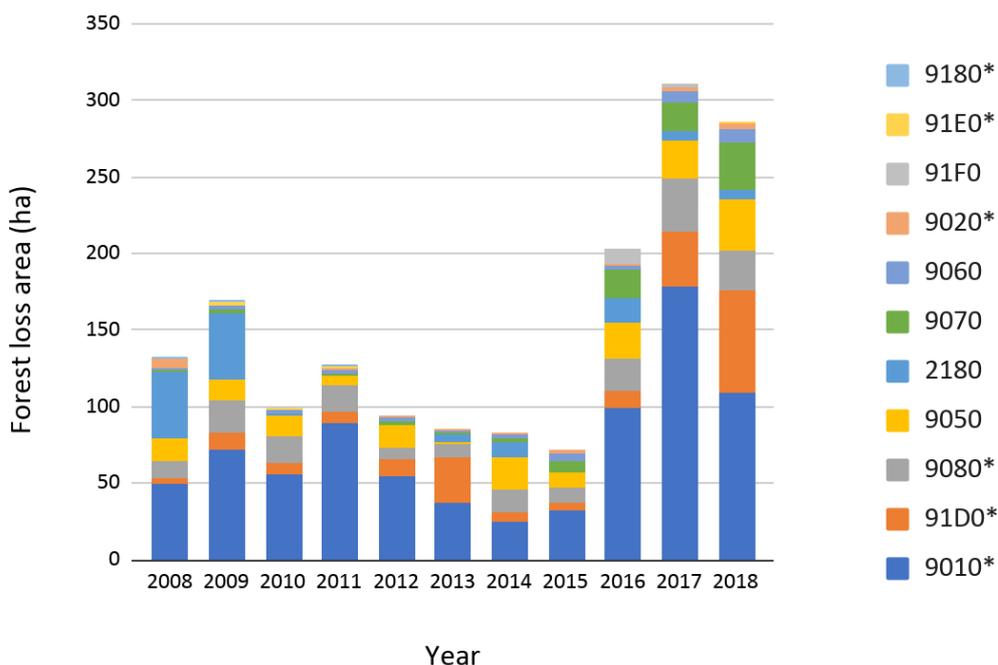


Figure 6. Annual forest loss area (in hectares) in protected forest habitats for the period 2008–2018 broken down by forest habitat types

3.2 Changes to logging restrictions of protected areas with forest habitats

This sub-chapter is divided into five: **1.** The extent of forest habitat inventory; **2.** Natura 2000 SACs within protected areas in Estonia; **3.** changes to logging restrictions in the protection rules of protected areas with forest habitats; **4.** examples of the impact of changes to logging restrictions in the protection rules on the issuing of regeneration cutting and deforestation notices; **5.** authorisation of regeneration cutting in the protection rules of protected areas with forest habitats.

3.2.1 Inventory of forest habitats

According to the Environment Agency, the total area of Natura 2000 sites in Estonia is 1,485,926 hectares, of which 373,520 hectares are forest land²⁷. The inventory of HD habitats has been carried out on 191,607 hectares

(51%) of forest land, while 181,913 hectares (49%) have not been inventoried.

The fact that Estonia does not have a national overview of nearly half of the forest areas within the Natura 2000 network shows that a significant proportion of forests with high conservation value are unprotected. In the absence of inventory data, it is difficult to zone forest habitats with an appropriate protection regime and protect them in limited conservation areas, making it possible to assign habitats of high conservation value to cutting.

In the context of this study, the lacking inventory data means that forest loss analysed in Chapter 3.1, based on habitat inventory data, is likely to be underestimated. This also means that the protection rules analysed in the following sub-chapters may not impose a protection regime which considers the threat to and status of the conservation value of a significant portion of the forest habitats belonging to the Estonian Natura 2000 network.

3.2.2 Special areas of conservation (SACs) within protected areas in Estonia

The list of Natura 2000 network sites submitted by Estonia to the European Commission contains a total of 542 special areas of conservation (SACs), i.e., areas whose conservation obligation derives from the Habitats Directive. Among these 542 SACs are 393 areas with at least one out of eleven forest habitat types present in Estonia.

Of the 393 SACs protecting at least one forest habitat type, 248 sites are located in a limited management zone, conservation zone, or a strict nature reserve of landscape conservation areas, nature conservation areas, or national parks, for which forest management restrictions are laid down in the protection rules. The remaining 145 areas are protected as species' protection sites or limited-conservation areas not covered by this analysis (see sub-chapter 2.1.3 in Methodology). The breakdowns are detailed in Figure 7.

Special areas of conservation (SACs) within Estonian Natura 2000 network (n=542)		
SACs with forest habitats (n=393)		SACs without forest habitats (n=149)
SACs with forest habitats located in landscape conservation areas, nature conservation areas, or national parks and whose logging restrictions are therefore stipulated in protection rules (n=248)	SACs with forest habitats registered as species' protection sites or limited conservation areas; not included in the analysis (n=145)	SACs without forest habitats; not included in the analysis (n=149)

Figure 7. Breakdown of Natura 2000 special areas of conservation in Estonia by the presence of forest habitats and protected zones.

3.2.3 Changes to logging restrictions in protected areas with forest habitats

Of all SACs with forest habitats located in the 248 protected areas, 144 are located in protected areas whose protection rules, and hence logging restrictions, have not been changed in the period 2011–2020, i.e. after 2010, when the majority of the Natura 2000 network had been established. 104 SACs are located in protected areas whose protection rules have last been changed or first adopted after 2010. In Figure 8 below, three categories indicate whether and how the logging restrictions have changed in the protection rules of the 104 SACs. Logging restrictions have:

1. **Become less stringent in the protection rules of 58 areas, i.e. logging became easier in these areas during the period 2011–2020 compared to the previous protection procedures or the 2010 standard restrictions.** More specifically, the restrictions have been relaxed in 39 areas where protection rules have been updated after 2010 (71 in total), and in 19 areas where rules were adopted for the first time after 2010 (33 in total) and whose logging restrictions in the limited management zone have been compared to the standard restrictions of 2010.
2. **Become more stringent the protection rules of 12 areas, i.e. logging in these areas became more difficult.** The restrictions have become more stringent

in 10 areas where rules have been updated after 2010 (71 in total) and in two areas where rules were adopted for the first time after 2010 (33 in total) and whose logging restrictions in the limited management zone have been compared to the standard restrictions of 2010.

3. **Remained largely the same in the protection rules of 34 areas**, i.e. in 22 areas where rules have been changed after 2010, and in 12 areas where rules were adopted for the first time after 2010 and whose logging restrictions in the limited management zone have been compared to the standard restrictions of 2010.

In most of the protection rules that were changed or adopted for the first time during the observed period 2011–2020, the logging restrictions in which have been

left largely unchanged, the only protected zone listed is the conservation zone (13 cases out of 22 and 11 cases out of 12, respectively) where natural resources present are not deemed to be resources intended for exploitation⁴, thus rendering the existence of more stringent logging restrictions self-evident.

Taking into account only those protection rules where logging restrictions were changed (70 in total), the restrictions have been relaxed in 83% and made more stringent in 17% of the protection rules of the areas. The loosening of logging restrictions was mainly due to changes in the limited management zone.

Table 5 shows more specific examples of changes in logging restrictions in selected protected areas.

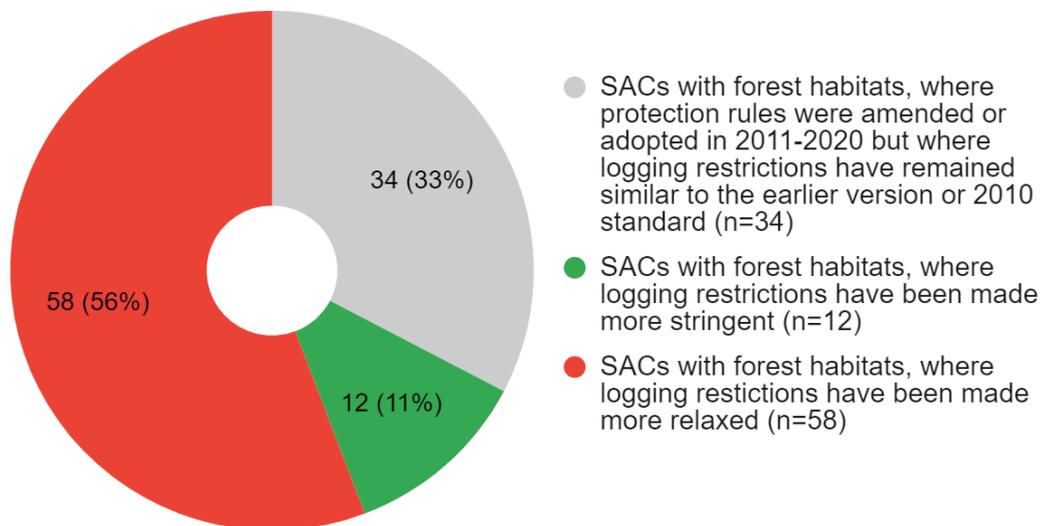


Figure 8. Changes to logging restrictions in such protection rules governing SACs with forest habitats, which have either been amended or first adopted in the period 2011–2020 (n=104)

Table 5. Examples of assessment of changes to logging restrictions in limited management zones of protected areas with forest habitats.

Protected area (SAC)	Forest habitats	Previous cutting restriction	New logging restriction	Assessment
Lahemaa national park (Lahemaa SAC)	2180, *9010, *9020, 9050, 9060, 9070, *9080, *9180, *91D0, *91E0	Rule adopted in 2014: clear cutting as final cutting is prohibited, except for shelterwood cutting and in case of forest damage.	Rule changed in 2015: shelterwood cutting is permitted on cutting areas of up to 20 hectares, clear cutting is permitted in spruce forests on cutting areas of up to 0.5 hectares and in grey alder forests on cutting areas of up to 1 hectare (cutting is forbidden in the Läänemere rand limited management zone and Mõisapargi limited management zone).	Less stringent , because in addition to shelterwood cutting, the new rules also permit clear cutting in alder forests and spruce forests (even though the forest habitat type 9050 aimed to protect spruces is one of the protected habitats).
Karula Pikkjärve landscape conservation area (Karula Pikkjärve SAC)	*9010, 9050, *9080, *91D0	Rule adopted in 2010: regeneration cutting is prohibited, except for shelterwood cutting, while maintaining the diversity of the species and age structure of the biotic community.	Rule changed in 2015: clear cutting is permitted on cutting areas of up to 1 hectare and shelterwood cutting is permitted on cutting areas of up to 5 hectares, whereas regeneration cutting is only permitted in pine forests older than 100 years, spruce forests older than 90 years, birch forests older than 70 years, and aspen forests older than 70 years.	Less stringent , because the new rules permit clear cutting in addition to shelterwood cutting.
Ohepalu nature conservation area (Ohepalu SAC)	9010, 9050, 9060, *9080, *9180, *91D0, *91E0	Rule adopted in 2006: clear cutting as final cutting is prohibited, except for shelterwood cutting and in case of forest damage.	Rule adopted in 2014: with the consent of the manager of the protected area, shelterwood cutting with a cutting area of up to 2 hectares is permitted, clear cutting in spruce forests with a cutting area of up to 0.5 hectares and in grey alder forests with a cutting area of up to 1 hectare, while maintaining the diversity of the species and age structure of the biotic community.	Less stringent , since in the past clear cutting was allowed only in the case of forest damage. The new rule permits clear cutting in grey alder forests and spruce forests, while the purpose of the SAC is protection of the habitat type 9050 aimed to protect forests.
Kõnnumaa landscape conservation area (Kõnnumaa SAC)	*9010, *9020, 9050, 9060, 9070, *91D0	Rule adopted in 2009: regeneration cutting is prohibited, except for shelterwood cutting with a period of at least 40 years.	Rule changed in 2019: shelterwood cutting is permitted on cutting areas of up to 2 hectares, clear cutting is permitted in grey alder forests on cutting areas of up to 1 hectare.	Less stringent , since the abolition of shelterwood cutting period from cutting restrictions allows for deforestation over the period of 6–12 years depending on its crop density. Also, the rule permits clear cutting in alder forests.
Elva landscape conservation area (Elva SAC)	*9010, *9050, *9080, *91D0	Standard restriction of 2010: regeneration cutting is prohibited, except for shelterwood cutting, while maintaining the diversity of the species and age structure of the biotic community.	Rule adopted in 2016: shelterwood cutting is permitted in spruce forests on cutting areas of up to 5 hectares, clear cutting is permitted in spruce and alder forests on cutting areas of up to 1 hectare while maintaining the diversity of the species and age structure of the biotic community.	Less stringent , because clear cutting is permitted, including in spruce forests, even though the Fennoscandian herb-rich forests with <i>Picea abies</i> is one of the protected habitats.
Abruka nature conservation area (Abruka SAC)	*9010, *9020, *9080	Rule adopted in 2010: regeneration cutting is prohibited, except for shelterwood cutting with a period of at least 40 years.	Rule changed in 2020: The SAC was set up in a conservation zone where management activity is forbidden.	More stringent , because unlike before, management activity is no longer allowed.
Suurekivi nature conservation area (Suurekivi SAC)	9050	Standard restriction of 2010: regeneration cutting is prohibited, except for shelterwood cutting, while maintaining the diversity of the species and age structure of the biotic community.	Rule adopted in 2019: regeneration cutting forbidden.	More stringent , because regeneration cutting is forbidden without exceptions.
Viitna landscape conservation area (Viitna SAC)	9060, *9080, *91D0	Rule adopted in 2006: final cutting is prohibited, except for shelterwood cutting.	Rule adopted in 2014: shelterwood cutting is permitted on cutting areas of up to 2 hectares.	More stringent , because a 2 hectare limit has been imposed on shelterwood cutting.

3.2.4 Examples on the impact of changes to logging restrictions on issuing notices

Below are three examples of how changes to logging restrictions have affected logging pressures, comparing the amount and size of the issued regeneration cutting and deforestation notifications before and after changes to logging restrictions.

1. Lahemaa special area of conservation (SAC)

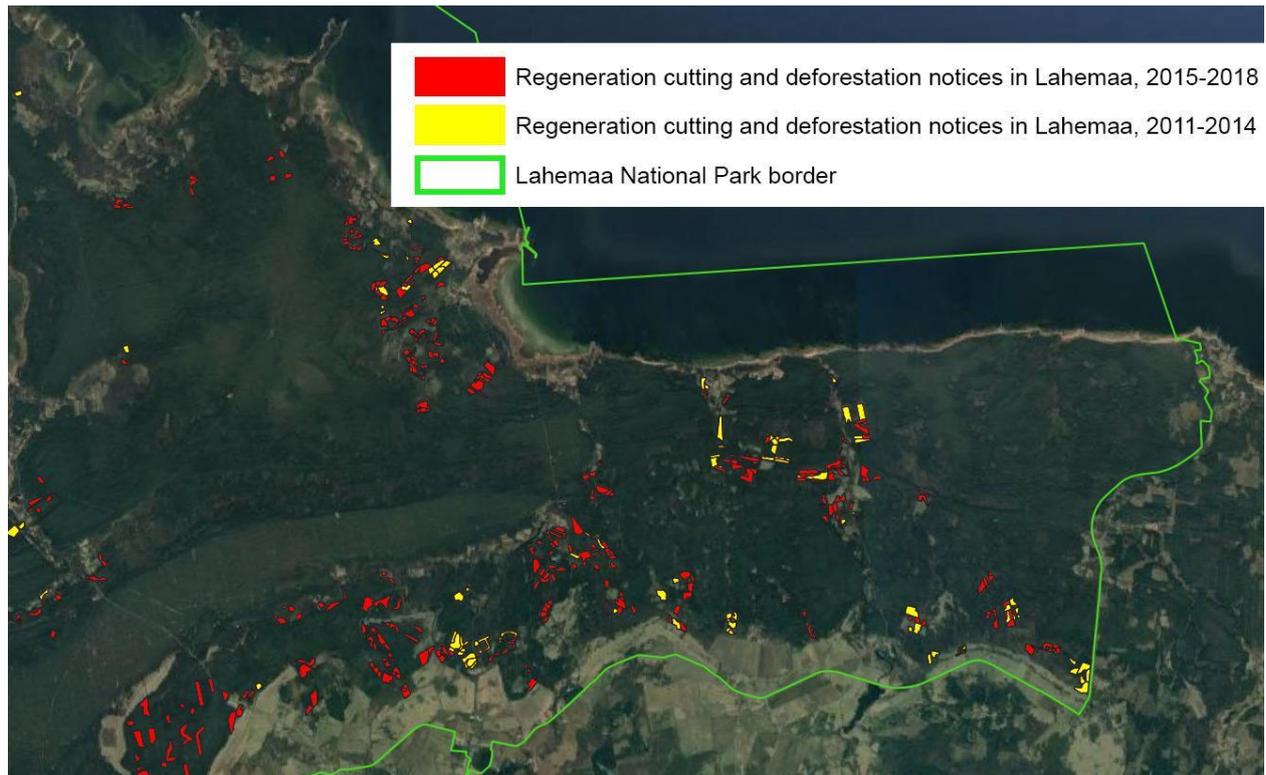


Figure 9. Regeneration cutting and deforestation notices issued in the Lahemaa National Park before and after the relaxing of logging restrictions in the protection rule³³

As described in the table above, in 2015, logging restrictions were relaxed in the Lahemaa National Park protection rule governing the protection of the Lahemaa SAC. This amendment significantly increased the number of regeneration cutting and deforestation notices issued in the Lahemaa National Park: while 1140 notices were issued in the period 2011–2014 to an area of

1051 hectares, then 2056 notices were issued in the period 2015–2018 to 1284 hectares. More specifically, the number of clear cutting notices issued in the national park increased from 79 to 667 in the compared periods. Figure 9 gives an overview of stand compartments for which notices were issued during these periods.

2. Karula-Pikkjärve special area of conservation (SAC)

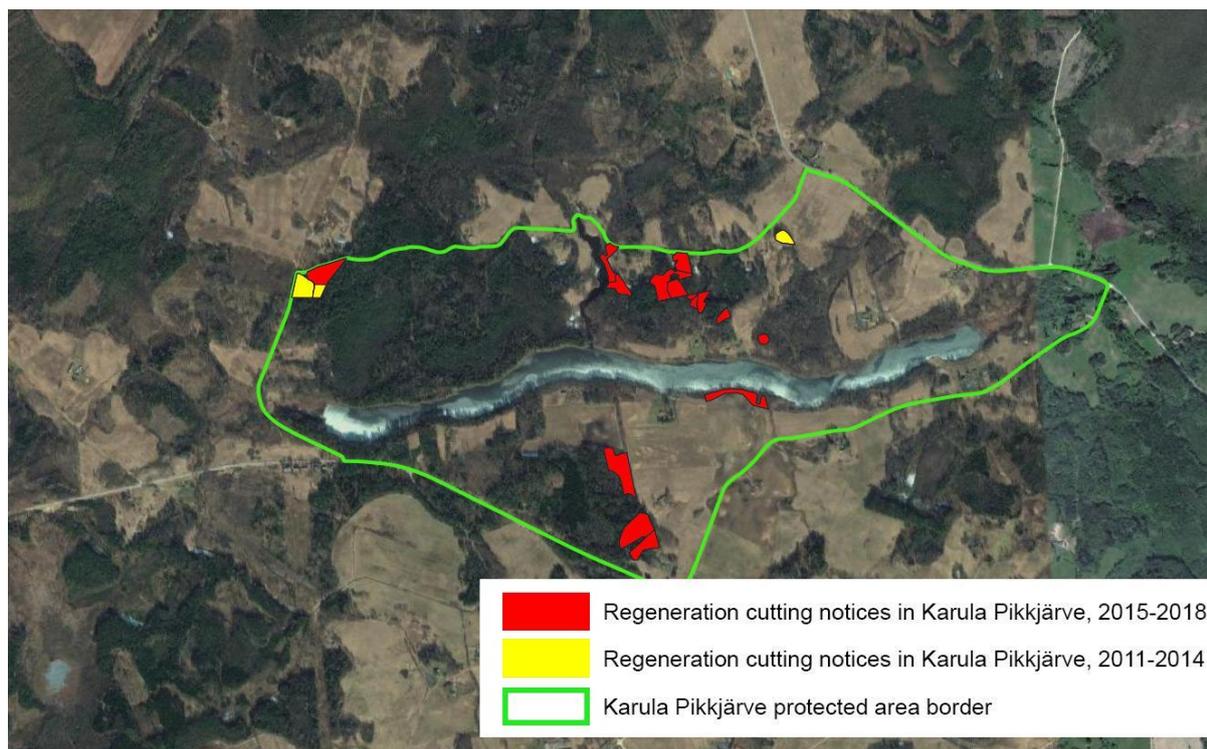


Figure 10. Regeneration cutting notices issued in the Karula-Pikkjärve landscape protection area before and after the relaxing of logging restrictions in the protection rule³³

Logging restrictions were also relaxed in 2015 in the Karula-Pikkjärve landscape conservation area (total area 360 hectares), which regulates the protection of SAC of the same name. The relaxation of the restrictions significantly increased the number and size of regeneration cutting notices issued to the area: when in the period 2011–2014, 4 regeneration cutting notices were issued with a total area of 3.8 hectares, in the

period 2015–2018 a total of 18 notifications were issued with an area of 9.9 hectares. When before the relaxation of the logging regulations, no clear cutting notices were issued in the period 2011–2014, then after the relaxation, 11 clear cutting notices were issued in the period 2015–2018. Figure 10 gives an overview of stand compartments for which notices were issued during these periods.

3. Ohepalu special area of conservation (SAC)

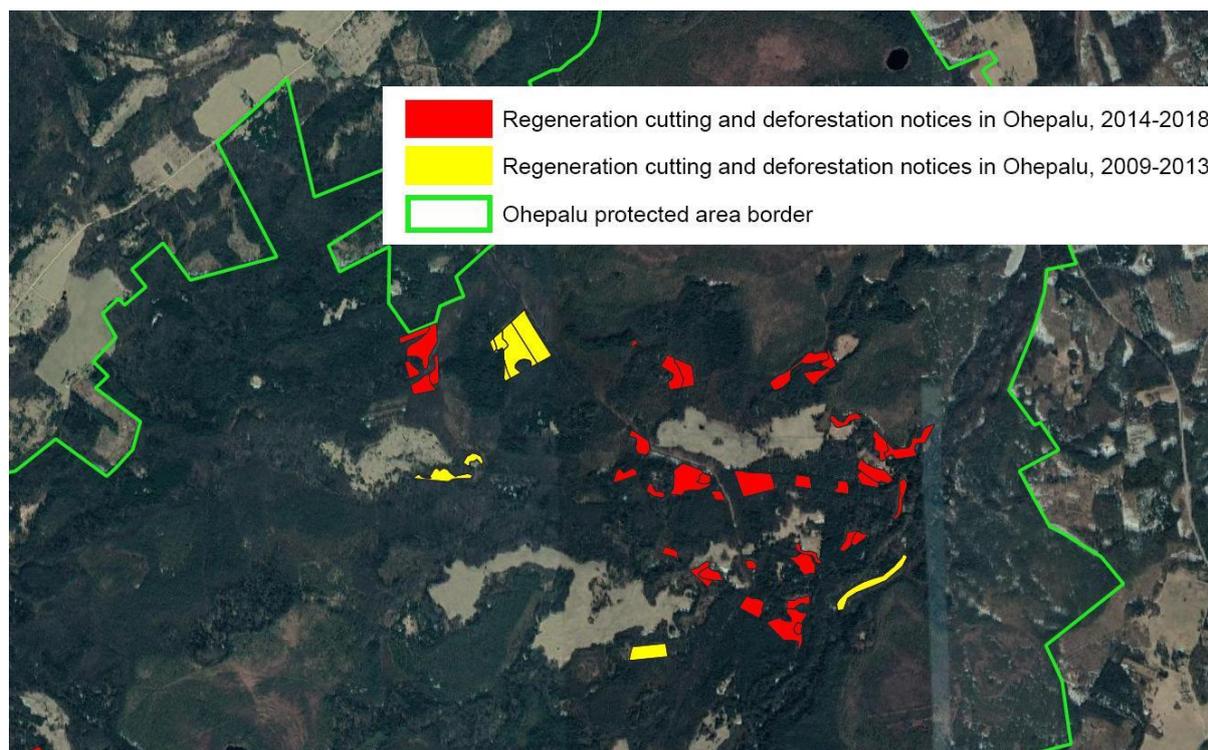


Figure 11. Regeneration cutting and deforestation notices issued in the Ohepalu nature conservation area before and after the relaxing of logging restrictions in the protection rule³³

In 2014, logging restrictions were loosened in the Ohepalu nature conservation area, which regulates the conservation of the Ohepalu SAC. Comparing the periods 2009–2013 and 2014–2018, i.e. 4 years before and after the loosening of logging restrictions, the loosening of the restrictions has significantly increased the number and area of notices issued in the Ohepalu nature conservation area. During the period 2009–2013, 30

notifications of regeneration cutting and deforestation were issued with an area of 43.9 hectares, while during the period 2014–2018, 86 notifications of regeneration cutting and deforestation (a threefold increase) were issued with an area of 50 hectares (14% increase). The number of clear cutting notices issued was 7 notices prior to the relaxation of the logging restrictions and 35 notices after the relaxation. The issued notices are shown in Figure 11.

3.2.5. Permitting of regeneration cutting in protected areas with forest habitats

As stipulated in Paragraph 31 (2) (5) of the Nature Conservation Act, regeneration cutting in the limited management zones of protected areas is prohibited unless otherwise detailed by the protection rule. The

study has looked at the protection rules governing the protection of all 248 SACs with protected forest habitats. Of these rules, 153 allow for some degree of regeneration cutting (62% in total) and for 95 no regeneration logging is permitted (38%). However, in the case of 80 forbidding regeneration logging, the protected area only includes a conservation zone where the natural resources present are not intended for exploitation.

Thus, the total number of rules that prohibit regeneration cutting in the limited management zone was 15 (6% in total). This shows that the prohibition on the regeneration cutting in the limited management zones of protected areas laid down in the Nature Conservation Act only applies in very rare cases.

4. Conclusions and recommendations

1. Logging pressure on forest habitats protected in the Estonian Natura 2000 network has increased.

Logging pressure on protected forest habitats is widespread and has increased dramatically since 2015. Therefore, the conservation arrangements in place at forest habitats within the Natura 2000 network are not effective enough to ensure the protection of forest habitats and fulfil the objective of the Natura 2000 network.

In the period 2008–2018, the loss of inventoried forest habitats was 1,663 hectares and regeneration cutting and deforestation notices were issued for 5,575 hectares. In this period, more than half of the observed forest loss took place and nearly 80% of the notices were issued between 2015 and 2018. Of all the zones of protected areas, logging pressure was highest in limited management zones (45% of forest losses in the same period and 59% of notices), and of forest habitats, logging pressure was highest in the Western Taiga (9010*) (48% of forest losses and 44% of notices). Since 2015, the area of forest loss increased most in the limited management zones of protected areas and in the Western Taiga (9010*), which, as a priority habitat, is of critical importance.

The logging of the Western Taiga and other forests of European importance is in sharp contrast to the EU biodiversity strategy, which provides for the identification, mapping, monitoring, and rigorous protection of all primaeval and natural forests³⁶.

2. Forest land belonging to the Natura 2000 network must be inventoried as soon as possible.

Due to the lack of inventory data for almost half of the forest in Estonia's Natura 2000 network, it is important to increase the volume of inventory of forests in order to create the prerequisites for the protection of forests with high conservation value. A habitat inventory has been carried out for 51% of the forest land of Estonian Natura 2000 sites, so 49% is still uninventoried. The missing information on nearly half of the forest area in Estonia belonging to the Natura 2000 network means that a large part of the protected forests with potentially high conservation value may not be adequately zoned and therefore protected by a protection regime corresponding to its protection value.

3. Existing protection rules should be updated and new protected areas should be established in such a way that logging restrictions in protected areas within the Natura 2000 are not loosened.

The logging restrictions of the protection rules for protected areas with forest habitats have been significantly more relaxed than tightened during the period 2011–2020, which may explain some of the increase in forest habitat loss in limited management zones since 2015.

According to the Habitats Directive, Member States must take the necessary measures to prevent the deterioration of

³⁶ European Commission, 2020, EU's biodiversity strategy for 2030. https://eur-lex.europa.eu/re-source.html?uri=cellar:a3c806a6-9ab3-11ea-9d2d-01aa75ed71a1.0012.02/DOC_1&format=PDF

habitats in special areas of conservation (SACs). It is therefore important to update the existing protection rules and to set up new protected areas in such a way that logging restrictions in protected areas within the Natura 2000 are not loosened.

In Estonia, there are 248 such SACs within the framework of the Habitats Directive where at least one forest habitat is protected and whose protection procedure is stipulated by the protection rule as a result of being part of a protected area. Of these, the protection rules governing the protection of 104 SACs have been amended or adopted for the first time after 2010. In the protection rules of 58 SACs, logging restrictions were loosened, meaning that logging became easier in those areas during the period 2011–2020 compared to the previous protection procedure or the 2010 standard restrictions. Logging restrictions were made more stringent in 12 and remained largely the same in 34 cases.

The impact of changes in logging restrictions on logging pressure is also illustrated by more specific cases, such as in Lahemaa National Park – the biggest national park in Estonia that regulates the protection of Lahemaa SAC. While 79 clear cutting notices were issued in the national park in 2011–2014, then after relaxing the logging regulations in 2015, there were already 667 clear cutting notices issued in 2015–2018.

The analysis also shows that of all 248 SACs with protected forest habitats, the protection rules of 153 areas permit a certain degree of regeneration cutting of the limited management zone (62% in total). It can therefore be concluded that **the general prohibition on**

regeneration cutting in limited management zones in protected areas stipulated in the Nature Conservation Act does not ensure adequate protection for forest habitats belonging to the Natura 2000 network, as most of the protection rules for forest habitats grant exceptions that permit regeneration cutting.

4. The energy and climate policies of the European Union must lower logging pressure by removing forest biomass from the incentives within the Renewable Energy Directive. In addition, as part of the implementation of the Habitats Directive, the EU should require that Estonia compensates for the damage that is already caused, e.g., allocating new areas to the Natura 2000 network.

The growing logging pressure on protected forest habitats is partly due to the growing demand for bioenergy in Estonia and the European Union, which suggests that the European Union’s energy and climate policy undermines the objectives of its nature conservation policy. Meeting the renewable energy targets predominantly through bioenergy will inevitably mean that as existing protection procedures and regulations remain in force, an increasing proportion of wood will come from forest habitats within the Natura 2000 network and other bio-diverse forests. **In order to ensure and restore the favourable status of forest habitats, it is necessary for the European Union’s energy and climate policy to consider and to help avoid potential damage to the Natura 2000 network and forest habitats. It is crucial to lower logging pressure and compensate for the damage that is already caused, for instance, in the form of new areas.**