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Management Plan for the Lynx Population in Finland

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Management Plan for the Lynx Population in Finland

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Abstract

The main objective of the Management Plan for the Lynx Population in Finland is to retain a favourable conservation status of the lynx. The management plan aims to reconcile the needs of citizens living and working in lynx habitats with the conservation requirements of the lynx population.

The retention of a favourable conservation status of the lynx refers to safeguarding the vitality of the lynx population while taking into account social sustainability and the different needs and views of citizens living in lynx habitats. The Management Plan for the Lynx Population in Finland describes the key measures aimed at securing a viable lynx population as part of Finnish nature and ecosystems, enabling sustainable management-based hunting of the lynx population and addressing the financial and social challenges posed by the lynx, such as damage to reindeer and domestic animals. The plan also responds to Finland's international obligations.

Preparation of the lynx population management plan was started in 2016 by the Finnish Wildlife Agency. The preparations included an online survey to determine public opinion regarding the lynx, a questionnaire for persons applying for management-based derogations, consulting regional wildlife councils on specific lynx population management issues, as well as an online discussion forum and workshops.

In addition to the lynx population management plan, a background document for the management plan was prepared in cooperation by the Finnish Wildlife Agency and Natural Resources Institute Finland. The draft management plan was circulated for comments at the turn of 2017–2018, and the actual management plan and the background document were finalised as part of the official duties of the Ministry of Agriculture and Forestry. Stakeholders were also consulted during the finalisation process.

Keywords lynx, carnivores, game, game management, large carnivores

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Suomen ilveskannan hoitosuunnitelma

Maa- ja metsätalousministeriön julkaisuja 2021:24

Julkaisija	Maa- ja metsätalousministeriö		
Kieli	Englanti	**Sivumäärä**	47

Tiivistelmä

Suomen ilveskannan hoitosuunnitelman päätavoitteena on ilveksen suotuisan suojelutason säilyttäminen. Hoitosuunnitelmalla pyritään sovittamaan yhteen yhtäältä ilvesten elinalueilla asuvien ja toimivien kansalaisten tarpeet sekä toisaalta ilveskannan suojelun tarpeet.

Ilveskannan suotuisan suojelutason säilyttämisessä kyse on ilveskannan elinvoimaisuuden turvaamisesta ja samalla siitä, että ilvesten elinalueilla asuvien kansalaisten eri tarpeet ja näkemykset ja sosiaalinen kestävyys huomioidaan. Ilveskannan hoitosuunnitelmassa kuvataan keskeiset toimenpiteet, joiden tavoitteena on turvata elinvoimainen ilveskanta osana suomalaista luontoa ja ekosysteemeitä, mahdollistaa ilveskannan kestävä kannanhoidollinen metsästys sekä vastata ilvesten aiheuttamiin taloudellisiin ja sosiaalisiin haasteisiin kuten poro- ja kotieläinvahinkoihin. Suunnitelmalla vastataan myös Suomea koskeviin kansainvälisiin velvoitteisiin.

Ilveskannan hoitosuunnitelman päivityksen valmistelu aloitettiin vuonna 2016 Suomen riistakeskuksen toimesta. Osana valmistelua esimerkiksi selvitettiin verkkokyselyllä ilvesmielipiteitä, laadittiin kysely kannanhoidollisten poikkeuslupien hakijoille, kuultiin alueellisia riistaneuvostoja ilveskannan hoidon erityiskysymyksistä, järjestettiin keskustelufoorumi verkossa ja pidettiin työpajoja.

Ilveskannan hoitosuunnitelman lisäksi samassa yhteydessä valmisteltiin riistakeskuksen ja Luonnonvarakeskuksen yhteistyönä hoitosuunnitelman taustaosio. Hoitosuunnitelmaluonnos oli lausunnoilla vuoden vaihteessa 2017–2018 ja varsinainen hoitosuunnitelma sekä taustaosio viimeisteltiin virkatyönä maa- ja metsätalousministeriössä. Viimeistelyssä kuultiin myös sidosryhmiä.

Asiasanat ilves, riista, petoeläimet, riistanhoito, suurpedot

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Presentationsblad

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Förvaltningsplan för lodjursstammen i Finland

Jord- och skogsbruksministeriets publikationer 2021:24

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Referat

Huvudmålet för förvaltningsplanen är att bibehålla en gynnsam bevarandestatus för lodjursstammen i Finland. Planens syfte är att samordna behoven hos de människor som bor och arbetar i lodjursrevir och lodjursstammens skyddsbehov.

För att bibehålla en gynnsam skyddsnivå för lodjur gäller det att trygga lodjursstammens livskraft och samtidigt beakta den sociala hållbarheten samt de olika behoven och åsikterna hos dem som bor i områden med lodjur. Förvaltningsplanen innehåller en beskrivning av de viktigaste åtgärderna som syftar till att trygga en livskraftig lodjursstam som en del av den finländska naturen och ekosystemet, möjliggöra hållbar stamvårdande jakt på lodjur samt åtgärda de ekonomiska och sociala skador som orsakas av lodjur, såsom ren- och husdjursskador. Planen är också ett svar på de internationella åtaganden som gäller Finland.

Beredningen av uppdateringen av förvaltningsplanen för lodjursstammen inleddes av Finlands viltcentral 2016. Som ett led i beredningen utreddes till exempel genom en webbenkät åsikterna om lodjur, utarbetades en enkät till dem som ansöker om stamvårdande dispens, hördes de regionala viltvårdsråden om särskilda frågor som rör förvaltningen av lodjursstammen, ordnades ett diskussionsforum på webben och ordnades workshoppar.

Utöver förvaltningsplanen för lodjursstammen bereddes samtidigt en redogörelse för bakgrunden till förvaltningsplanen av Finlands viltcentral i samarbete med Naturresursinstitutet. Utkastet till förvaltningsplan var på remiss vid årsskiftet 2017–2018, och den egentliga förvaltningsplanen och bakgrundsavsnittet färdigställdes som tjänsteuppdrag vid jord- och skogsbruksministeriet. Vid färdigställandet hördes också intressegrupper.

Nyckelord lodjur, rovdjur, vilt, viltvård, stora rovdjur

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Contents

INTRODUCTION

The main objective of the Management Plan for the Lynx Population in Finland is to maintain a favourable conservation status of the lynx. The management plan aims to reconcile the needs of citizens living and working in lynx habitats with the conservation requirements of the lynx population. The sets of measures in the lynx population management plan, or 1) profound knowledge on the lynx population, 2) management-based measures and 3) acceptability of lynx and its population management, support the achievement of the objective, i.e. maintaining a favourable conservation status of the lynx.

The management of the lynx population, like that of other large carnivores and game species, must take into account the interaction of these wild animals with humans and more broadly, human activities. That is why the lynx population management plan describes the various effects and interdependencies between the lynx population and human activities, and vice versa. A new approach introduced to the plan is the multi-species approach, i.e. interaction between different species in relation to each other. Maintaining a favourable conservation status of the lynx therefore refers to the safeguarding of the vitality of the lynx population while taking into account the different needs and views of citizens living in lynx habitats and social sustainability. The measures according to the Habitats Directive to be carried out will take into consideration financial, social and educational demands, as well as special regional and local features. The Management Plan for the Lynx Population in Finland describes the key measures aimed at securing a viable lynx population as part of Finnish nature and ecosystems, enabling sustainable hunting of the lynx for population management purposes and addressing the financial and social challenges posed by the lynx, such as damage to reindeer and domestic animals. The plan also responds to Finland's international obligations.

As a general observation, it can be stated that the lynx is a highly valued game species and, together with the bear, the most abundant large carnivore in Finland. However, it is not the worst large predator in terms of damage caused: the lynx has caused relatively little compensable damage other than to reindeer herding. Furthermore, according to the survey, many Finns are pleased when encountering lynx tracks or a lynx. Encounters with lynx are relatively rare, though. According to the survey, what people wanted was more research information, especially on the movements of lynx, the size of lynx habitats and the behaviour of lynx around humans. (Taloustutkimus 2016)

Update of the Management Plan for the Lynx Population in Finland

The Finnish Wildlife Agency updated the Management Plan for the Lynx Population in Finland in 2016–2017. The management plan is based on up-to-date information on the biology and ecological needs of the lynx. The sections on lynx biology, the status of the lynx population and sections involving development in the background document (Chapters 2 and 3) were prepared by Natural Resources Institute Finland.

The draft management plan and its background document were circulated for comments at the turn of 2017–2018. After the circulation for comments, the draft management plan was finalised as part of the official duties of the Ministry of Agriculture and Forestry. All received comments and updated information regarding matters such as the lynx population and the threatened species classification of the lynx were taken into account during the finalisation of the plan. A preliminary ruling of the European Court of Justice on wolf hunting for population management purposes was also taken into account, and the structure of the measures document was clarified. The changes were further discussed at a meeting with stakeholders in September 2021.

The first Management Plan for the Lynx Population in Finland was adopted in 2006. At that time, the draft management plan was prepared for the Ministry of Agriculture and Forestry by the University of Helsinki Ruralia Institute. The 2006 management plan states: "In the next few years, the management policy must take into account the population management measures that have actually been implemented and how successful they have been." It can be said that the game management sector has been successful in the management of the lynx population: the population has reached a favourable conservation status and, according to the assessment of the Red List of Finnish species using the the categories and criteria established by the International Union for Conservation of Nature IUCN, it is viable. From this perspective, the Management Plan for the Lynx Population in Finland is also an effective tool for the management of the lynx population and for taking into account the sometimes conflicting aspects of lynx management.

The key themes of the updated Management Plan for the Lynx Population in Finland stem to a great extent from an evaluation of the Finnish large carnivore policy carried out in 2014. The current set of measures takes into account changes that have taken place in the management bodies and the related benefits in terms of the development of expertise within the game management sector. The measures also seek to harness the willingness of the hunting community to work on a voluntary basis and link this to the rapidly developing game management data systems.

Furthermore, the lynx population has grown since 2006, when the previous management plan was adopted. The minimum lynx population estimate for 2005 was 1,100–1,200 individuals (Kojola et al. 2006). According to the population estimate published in 2021,

before the 2021/2022 hunting season, there were 2,155-2,280 lynx over the age of one year in Finland (Holmala et al. 2021).

When the work on updating the lynx population management plan was started, the strong growth of the lynx population, especially in the habitats of small cervids, was the subject of lively discussion. Some were of the opinion that the increased number of lynx benefited nature through, for instance, the lynx praying on raccoon dogs, while others felt that the game management efforts were being wasted as lynx prayed heavily on roe deer, among other species. (Toivola 2016.) The debate has subsequently died down, and the changed situation has also been taken into account in the finalisation of the lynx management plan. For example, the importance of lynx as a predator has been recognised in areas with dense white-tailed deer and deer populations, and the need for more research on the subject has also been acknowledged. Therefore, a new theme in the lynx population management plan is a *multispecies approach*, which in the case of large carnivores means taking into account interaction between large carnivores and their prey in population management and related planning efforts. The approach also emphasises the fact that issues pertaining to lynx management cannot be considered separate from other large carnivores. The multispecies approach to population management has existed for some time, but the interest and efforts of game management and research on the approach have become more concrete in recent years.

Another objective of the management plan update has been to use the accumulated research data to clarify the impact of lynx, taking into account the specific characteristics of habitats, as well as to make this information available to the general public. During the update, it was also studied how the increased wealth of knowledge could be used in the planning of lynx hunting through the Oma riista service, for example. Another objective of the management plan update was to look for alternatives to regional censuses in the development of lynx population assessments. Furthermore, the management plan update aimed at making people see the species as a valuable part of Finnish nature, as well as a more interesting game animal. (Toivola 2016.)

The updated management plan therefore takes into account changes both in scientific knowledge about the lynx and in the development of population assessment methods since the previous management plan. For example, the opportunity to use camera trap images and smartphone applications in population assessments has been highlighted. Increased cooperation with the Swedish and Norwegian authorities responsible for large carnivore matters has also been taken into account by highlighting the related cooperation and the need for research on the genetic relationships between the Finnish and Scandinavian lynx populations.

Structure of the management plan

In the updated management plan, background information and management measures are presented in separate sections. The section setting out the measures, that is, the actual management plan, is an independent document, and while it provides some background information, it also frequently refers to various sections of the background document in which the topics are discussed in greater detail. The background document describes matters such as the biology of the lynx, the development of the lynx population in Finland, key national and international legislation related to the lynx, population management, stakeholder cooperation, communication and the process of preparing the management plan in more detail.

The first chapter of the management plan describes the criteria for a favourable conservation status and the associated regulation. Chapter 2 describes three key sets of measures (Sections 2.1, 2.2 and 2.3) that support the main objective of the management plan, i.e. maintaining a favourable conservation status. The subsections on the measures describe the measures in more detail. Here, Section 2.1, Profound and expanding knowledge on the lynx population, is used as an example, which consists of the following sections: 2.1.1, Safeguarding and developing the monitoring of the lynx population; 2.1.2, Large carnivore contact person network; and 2.1.3, Regional censuses. The individual measures are placed in a box at the beginning of each subsection, and the text of the subsections describes the measures in more detail, including their background, requirements and implementation.

Chapter 3 describes the management plan's "Other measures", which support the objectives of the management plan and the other sets of measures. The other measures include 1) Communication on Finnish lynx data, 2) Oversight of hunting and executive assistance in large game matters, 3) Translocations of the lynx (please note that this measure only consists of a note that no translocations will take place) and 4) International cooperation.

Chapter 4 describes the implementation of the management plan. The sources used for the measures document are listed at the end of the document.

1 Objective of the lynx population management plan: maintaining a favourable conservation status for the lynx population

Measures:

The Ministry of Agriculture and Forestry will ensure that the Finnish lynx population remains at a favourable conservation level.

The Ministry of Agriculture and Forestry will assess, together with Natural Resources Institute Finland, the need to define a reference value for a favourable conservation status of the lynx population.

The lynx is a species listed in Annex IV of the Habitats Directive, which means that the management plan considers the favourable conservation status based on the requirements of the Habitats Directive. The favourable conservation status of a species is assessed in connection with the reporting on the implementation of the Habitats Directive following the procedure referred to in Article 17 once every six years. The criteria to be used are: 1. distribution, 2. range, 3. structure and function, and 4. expected evolution of conservation status. The conservation status is assessed by species for the different biogeographic regions. In Finland, assessments are prepared for the boreal and Alpine regions. When interpreting the assessments, it should be noted that the boreal region covers Finland in almost its entirety.

The conservation status of a species is considered favourable when:

1. Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
2. the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and

3. there is, and will probably continue to be, a sufficiently large habitat to maintain the species' populations on a long-term basis.

All of the criteria listed above must be met for the conservation status of a species to be considered favourable. Population size alone is not a sufficient indicator to determine a favourable conservation status.

The conservation status of the Finnish lynx population is favourable, and this has been the case since the 2007–2012 reporting period. The most recent estimate is from 2019 (for the reporting period 2013–2018). The conservation status of lynx as a species was estimated to be favourable in both regions.

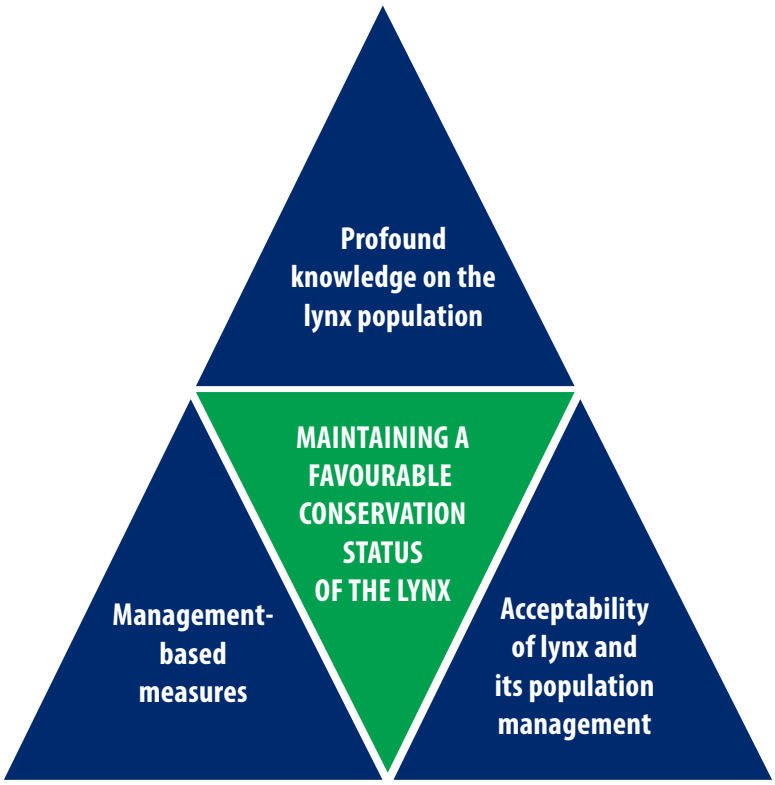
According to a population estimate completed in 2021, there were approximately 2,155-2,280 lynx over the age of one year in Finland before the 2021/2022 hunting season (Holmala et al. 2021).

There are few threats to the favourable conservation status of the lynx in Finland. Hunting as a threat to its conservation status has been assessed to be of low significance. Mortality caused by hunting will be controlled by continuous population monitoring, annual planning based on information gathered on the impact of hunting and derogations issued based on decisions of the relevant authorities. Continuous population monitoring will also ensure that up-to-date data is always available on the lynx population to underpin decision-making.

The viability of the lynx population is also assessed through the IUCN Red List of Threatened Species. In the 2019 assessment, the lynx was removed from the Red List and assessed as a species of Least Concern (LC).

There is no need to set a minimum viable population target for the lynx population. However, based on the increasingly comprehensive data on the lynx population over the last few years, it would be possible to define a number for a favourable reference population (or reference point), following the Swedish example (Naturvårdsverket 2016). The reference point means the number of individuals at which a favourable conservation status can be considered as achieved. The results of the favourable conservation status reporting will be taken into account when assessing the need to establish a reference point for the favourable conservation status of the lynx population.

2 Key sets of measures in the lynx population management plan



The sets of measures in the lynx population management plan are 1) profound knowledge on the lynx population, 2) management-based measures and 3) acceptability of lynx and its population management. The sets of measures support the achievement of the main objective, i.e. maintaining a favourable conservation status.

2.1 Profound and expanding knowledge on the lynx population

2.1.1 Safeguarding and developing the monitoring of the lynx population

Measures:

General development of the population assessment (population model and predictive model) of the lynx will be continued by Natural Resources Institute Finland.

Natural Resources Institute Finland and the Finnish Wildlife Agency will explore the opportunity of more extensive utilising observations made by citizens to support the work of large carnivore contact persons and the monitoring of the lynx population.

Border guards will record sightings of large carnivores in the TASSU system in accordance with a procedure agreed with Natural Resources Institute Finland.

Natural Resources Institute Finland and the Finnish Wildlife Agency will activate the delivery of camera trap images for research purposes through existing channels.

Integration of camera trap images to the existing large carnivore observation system will be made as easy as possible for the large carnivore contact person utilising the system.

Depending on the available resources and the results of the means tests, genetic research by Natural Resources Institute Finland on the lynx will continue by, for instance, studying the kinship of lynx and the links between the lynx population and the populations in the neighbouring countries.

Dialogue between research, administration and the field on the results of large carnivore studies will be developed.

The lynx population assessment is completed annually between May and July. In the Finnish method, the lynx population estimate is based on observations regarding lynx litters made by the large carnivore contact persons, catch monitoring data from Natural Resources Institute Finland and the Finnish Wildlife Agency based on hunting catches, other mortality statistics, the results of Nordic lynx research on the size of lynx habitats, a scientifically published Nordic method of using female lynx with litters as the basis for population assessments, as well as Finnish telemetry data and expert judgements, where the average lynx range size and survey-based mobility data play a significant role in the definition of separate litters (Chapter 3 of the background document).

In recent years, a number of measures have been completed to improve the methods for producing population estimates and the data on which the population estimates are based. A particular effort was made to carry out regional censuses in the winters of 2011–2018. The censuses made it possible to gather more accurate data on different litters and the share of individuals outside litters. The data on the different regions and areas obtained through the regional censuses will become outdated over time, however. Lynx observations reported by the large carnivore contact persons therefore provide the most important background data for the population estimate. Consequently, continuous training has been provided for the network of large carnivore contact persons, and the efficiency of the training activities has been improved as indicated by the measures included in the lynx population management plan.

To allow for predictions on the development of the lynx population, the Finnish Game and Fisheries Research Institute (which has been part of Natural Resources Institute Finland since 1 January 2015) developed a population model for the lynx in 2012. The model provides basic information about the lynx population, such as growth rates for different years. The four-year forecasting model starts from the litter estimate for the starting year. The model is updated as necessary. The population model has enabled the Ministry of Agriculture and Forestry to assess the target lynx population size and the bag limits that will result in the target size.

Further development is required, however, to produce more accurate population estimates. This is necessary not only to secure the availability of high-quality observation data with a wide coverage but also to guarantee that the method for producing the actual population estimate is high in quality and up to date. The observation data is collected by the network of large carnivore contact persons coordinated by the Finnish Wildlife Agency, and the training for the network is provided by Natural Resources Institute Finland and the Finnish Wildlife Agency.

Sweden and Norway have introduced a joint mobile application (Skandobs) which can be used by citizens to report observations of large carnivores. The track scene inspectors of

Sweden's county councils receive notifications through their own system, and they can then visit the scene to verify the observation. Citizens can also share images of potential large carnivores via Skandobs. Natural Resources Institute Finland and the Finnish Wildlife Agency will investigate the possibility of introducing this system in Finland. Alternatively, the institute and the agency will investigate the possibility of developing a comparable system in order to better utilise citizens' observations to support the large carnivore contact persons and the monitoring of the lynx population.

In restricted lynx ranges in areas such as the Swiss mountains (e.g. Kunz F et al. 2016), it has been possible to produce population estimates relying on camera trap images. In Finland, the lynx ranges are so extensive and the lynx population as a whole is so large that the observation data produced by the network of large carnivore contact persons cannot be replaced with camera traps. However, images from camera traps can be used to improve the accuracy of the population estimate.

The use of camera traps is relatively free in Finland: the landowner's permission is required to set up a camera in the forest and a notification about the camera should be posted in the area. The camera cannot cover a road that could be used by vehicles or people. A great number of camera trap images of lynx are thus obtained every year. In some circumstances, high-quality images could be utilised when preparing the population estimate. Images of female lynx and their litters could be particularly valuable. Particular challenges for the use of camera trap images include the low image quality and the fact that a large volume of footage produced by the camera network would be required and the camera network would have to be of a relatively high density if the footage were to be used to estimate the size of the regional lynx population. In the densest lynx ranges, images that allow the identification of different female individuals would be valuable for methodological development work that would benefit the population assessment. It is currently possible to submit images for research purposes via an online service (link to an external page). However, very few lynx images are submitted annually. The submission of high-quality camera trap images for research purposes should be activated.

Genetic methods can be used in the monitoring of lynx populations to answer many questions about the status of the population. These methods are not suitable for annual population size estimates based on DNA samples due to the large number of litters and the wide distribution of the species, however. Furthermore, due to challenges inherent to the collection of non-invasive samples (faeces, urine, hair), the current genetic methods are not suitable for the annual lynx population estimates. Genetic methods can provide information about matters such as the social structure of the species, the development of populations, population changes and the impact of hunting, though. The method also makes it possible to monitor the status of genetic diversity. Genetic research can

also provide additional information about the current links between the Finnish lynx population and the populations in Russian Karelia and the other Nordic countries.

Studies on how kinship affects the overlap of lynx habitats, among other factors, have been initiated for the Finnish lynx population. Genetic methods can be used to investigate aspects of local population formation, such as the possible impact of female kinship on the density of the lynx population. No association was detected between kinship and habitat overlap in a study covering a restricted area in Poland (Schmidt et al. 2016). An ongoing research project at Natural Resources Institute Finland, which is based on Finnish data, has already revealed that the cores of local populations in established lynx ranges seem to consist of related females. As there may be a link between kinship and the lynx population density, completing the study is important for the development of the population assessment.

Genetic monitoring of lynx in the reindeer herding area and links to the Scandinavian lynx population

Research data on the genetics of the lynx population is not as extensive as that of the wolf. It is known, however, that the populations in Sweden and Norway (the Scandinavian population) have been isolated from the large eastern population for an extended period, unlike lynx populations such as that of Finland (Naturvårdsverket 2013). The lynx population in the reindeer herding area and individuals that join the Scandinavian population using this route are thus significant for the vitality of the lynx population in Sweden and Norway.

The management plan for the lynx population in Sweden (Naturvårdsverket 2016) notes that the populations in Norway, Sweden and Finland expanded northwards and are now in limited contact with each other. There is no high-quality information on the extent of the exchange, however. According to studies, the Scandinavian lynx population has less genetic variation than the Finnish one. Genetic studies on the Swedish lynx population have not found any evidence of the population suffering from genetic problems, though. Analyses of samples collected during the monitoring of lynx in northern Sweden have revealed the presence of lynx from the east. There appear to be only a small number of such individuals, however (Naturvårdsverket 2016, Flagstad 2018).

Depending on the available resources, Natural Resources Institute Finland will continue with the genetic research on the lynx by, for instance, studying the kinship of lynx and the links between the lynx population in the reindeer herding area and the populations in the neighbouring countries, Sweden and Norway.

2.1.2 Network of large carnivore contact persons

Measures:

The network of large carnivore contact persons will be developed and its operations will be regularly monitored. The Finnish Wildlife Agency will organise training in observation and recording for all new large carnivore contact persons. The Finnish Wildlife Agency and Natural Resources Institute Finland will organise annual further education and development events for the responsible contact persons.

The Finnish Wildlife Agency and Natural Resources Institute Finland will determine whether professionals who are active in the field would be willing to act as large carnivore contact persons and make lynx observations. The measures will be targeted at northern Finland by means of cooperation in the development of an observation network with regional actors, such as the Reindeer Herders' Association.

A great number of lynx observations are made by the large carnivore contact persons in areas outside the reindeer herding area in Finland (Section 3.3.1. of the background document). In most areas, hunters routinely come across lynx tracks, and general frustration related to the reporting of lynx observations is considered a problem. As lynx have become more widespread, the large carnivore contact persons have noticed that people are no longer motivated to report their observations. This issue was also highlighted in a survey addressed to persons issued with management-based derogations (Laitinen, 2015), in which 21% of the respondents (24/124) expressed their general frustration related to the observation of lynx.

To maintain the reporting of observations at a good level, identifying the areas from which lynx observations are no longer being received would be important. The development of electronic systems will offer better possibilities for identifying these areas and improving the rate of reporting observations. The Skandobs mobile app or a corresponding electronic program to support observations made by citizens could be used to expand the number of persons making observations and thus facilitate the work of the large carnivore contact persons.

When developing the network of large carnivore contact persons, the possibility of using large carnivore observations by persons whose work involves spending a great deal of time in the wild should also be taken into account. Such persons include, in particular,

officials and public servants of the Finnish Forest Centre, forest management associations, Metsähallitus and the Reindeer Herders' Association, reindeer herders in the different reindeer herding cooperatives, rural affairs officers in municipalities and officials and public servants of the Finnish Border Guard. In northern Finland, the development of a network of large carnivore contact persons will be tested by having experienced large carnivore contact persons, trained by the Finnish Wildlife Agency, take responsibility for the observation and recording training of new large carnivore contact persons and the monitoring of observation activity in their area.

2.1.3 Separate regional censuses

Measures:

As a general rule, regional censuses are only carried out in exceptional cases.

Together with the regional branch of the Finnish Wildlife Agency, the regional wildlife council can take the initiative for a regional lynx census for a justified reason. The initiative must be taken no later than the winter preceding the census. Before the initiative is taken, motivation of the regional game management associations and volunteers to carry out the census must be ascertained.

The decision to carry out a regional census will be made by the sustainable game management process of the Finnish Wildlife Agency and the large carnivore research function of Natural Resources Institute Finland.

Regional censuses of lynx snow tracks in the wild have laid a good foundation for the development of the lynx population estimates. The censuses have produced a clearer picture of lynx population structures in different regions and the number of individuals. In total, the lynx litters in ten different Finnish Wildlife Agency regions were counted for the first time during the census projects (large carnivore snow track census 2011–2012, large carnivore snow track census 2013–2014 and new censuses of specific areas in 2015–2018). In eight regions, the estimate of litter numbers based on a snow track census was higher than the estimate produced on the basis of observations made by the large carnivore contact person network during the previous year in these regions. Subsequently, the data gathered in these projects was used as the basis for a lynx population estimate and the development of the observation system in the large carnivore contact person network.

The censuses have attracted strong interest in the status of lynx populations, especially among hunters, and have also improved the effectiveness of the observation system.

However, the practical realisation of censuses is labour-intensive and ties up a large amount of resources both in administration and in the census organisation, which is based on voluntary work. Furthermore, optimal weather conditions are required for the censuses, and when the winters are predominantly mild, censuses cannot be carried out despite the best efforts. This was particularly obvious in winter 2013–2014 when only one out of five censuses planned in different Finnish Wildlife Agency regions could be realised.

Due to the existing resource situation and uncertainty as to whether or not the weather conditions will permit the census, it is clear that continued censuses on the same scale as in 2011–2014 will not be possible. Regional censuses may have their place in the range of methods used to estimate the lynx population, but they must be reserved for exceptional cases where there is a particular justification for investigating the regional lynx population.

As the implementation of the regional censuses is an operational activity of the Finnish Wildlife Agency, the decision to carry out censuses must be clearly made as part of the operational planning of the sustainable game management process in cooperation with the large carnivore research function of Natural Resources Institute Finland and based on aspects such as the available resources and needs tests. The organisation of the censuses is the responsibility of the Finnish Wildlife Agency, in collaboration with Natural Resources Institute Finland.

2.2 Management-based measures

2.2.1 Population management areas

Measures:

The management areas for the Finnish lynx population are the reindeer herding area and the rest of Finland.

If necessary, a decree of the Ministry of Agriculture and Forestry on lynx hunting with management-based derogations may be used to change the area allocation when determining the lynx hunting quota, should this be deemed necessary for the management of the lynx population.

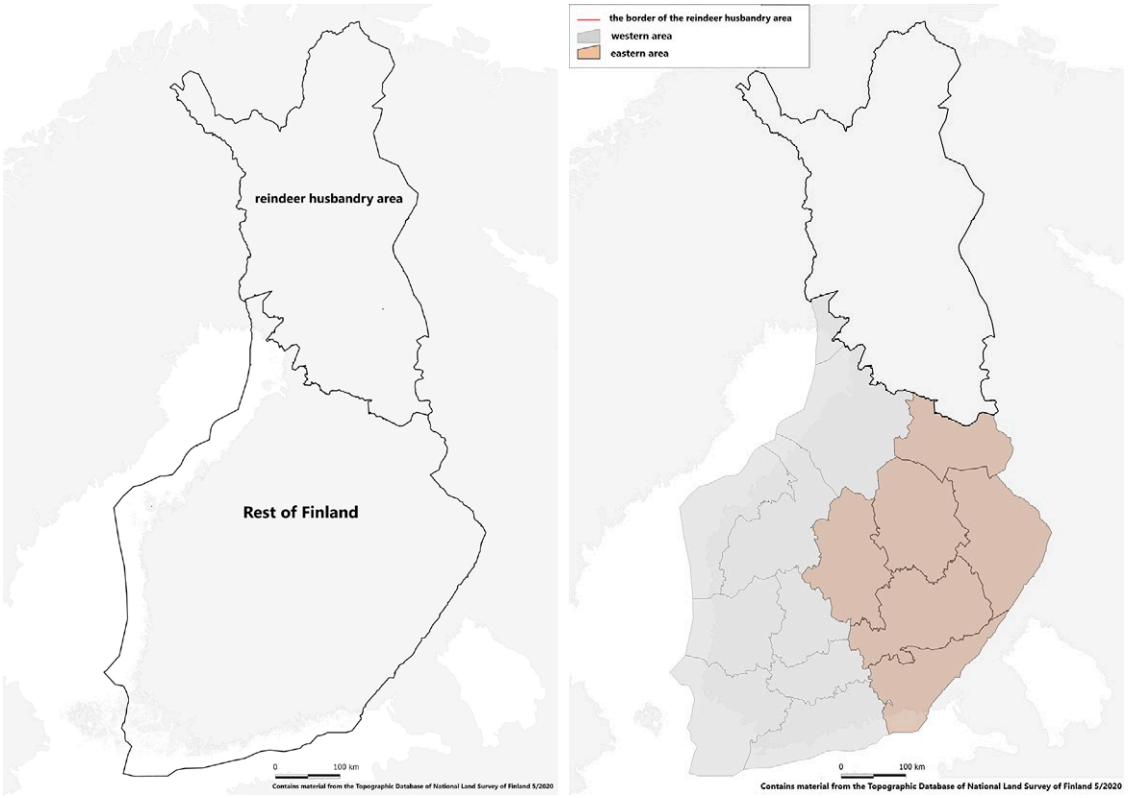
In terms of the lynx population size, Finland can currently be divided into two separate areas: the reindeer herding area with relatively low numbers of lynx, and the remaining areas, in which lynx numbers are high. These areas differ from each other in many respects. The ecological aspects of the lynx population, accuracy of the population estimate, damage caused by the lynx and principal methods of population management are different in these two main areas.

The lynx may cause considerable damage in the reindeer herding area, and reindeer husbandry as an industry thus limits the proliferation of the lynx population in this area. No similar restrictions apply outside the reindeer herding area, where the lynx causes little financial damage. Most citizens find the lynx the most harmless of the large carnivores, and their attitude towards the traces lynx leave in the wild is mainly positive (Section 11.1 of the background document). On the other hand, where lynx are numerous, social problems arise due to incidents such as large carnivores coming close to human settlements. Even though lynx mainly avoid humans, some individuals may be fearless and prey close to human settlements.

In the Management Plan for the Lynx Population in Finland that was adopted in 2006, Finland was divided into two population management areas: the reindeer herding area and the rest of Finland.

For reasons related to the population history determined by the Finnish Game and Fisheries Research Institute and biogeography, the territory outside the reindeer herding area was divided into Eastern and Western Finland in the culling plans (Figure 1). A decision to amend the grounds on which quotas for lynx hunting are granted was contained in the Ministry of Agriculture and Forestry decree on lynx hunting under derogations for the hunting season of 2014 (record no. 1498/13/2014). Such a division has no longer been made since the 2017–2018 hunting season, however, as there is no longer any discernible difference in the growth potential between the eastern and western areas. (record no. 1454/01.03/2017) There are research indications (Kojola & Holmala 2009) that the conditions are best for lynx in areas where small cervids are abundant. However, as the predatory behaviour of the lynx is a complex combination of many different factors, defining the population management areas based on the diet of the lynx is not justified.

Figure 1. Lynx population management areas in the 2006 management plan (map on left) and the change for the 2014–2015 hunting season (map on right). As of the 2017–2018 hunting season, the division into western and eastern areas, as shown in the figure on the right, has no longer been made for the rest of Finland.



Reindeer herding area

Measures:

In the reindeer herding area, the objective is to reduce damage to reindeer caused by the lynx through damage-based and management-based derogations.

The development of damage caused by lynx will be monitored when quantifying the hunting quotas for the reindeer herding area, as the lynx population estimate in the reindeer herding area is subject to more uncertainties than in the rest of the country.

The derogation practices and lynx hunting in the reindeer herding area will also be developed in the future in a manner that allows for flexible approaches to the elimination of individuals that cause damage.

Reindeer husbandry is a vital industry in the reindeer herding area. Most of the compensation costs for damage caused by the lynx apply to reindeer husbandry. More factors of uncertainty are associated with the lynx population estimate in the reindeer herding area than in the rest of the country, and the trends in damage caused by the lynx are monitored to quantify hunting quotas in the reindeer herding area. In the future, the uncertainty related to the lynx population estimate in the reindeer herding area will be reduced by measures aimed at developing the network of large carnivore contact persons.

The lynx population in the reindeer herding area has grown since the previous management plan was adopted in 2006. The highest lynx numbers are found in Meri-Lappi, Kainuu and the southern parts of the reindeer herding area in general. On the other hand, reindeer killed by lynx can also be found in the northern parts of the reindeer herding area, as far north as Inari and even Kittilä. Lynx litter observations are, however, almost exclusively made in the southern parts of the area.

At present, lynx hunting in the reindeer herding area takes place under both damage-based and management-based derogations. As a strong population of the species in the relevant area is a prerequisite for the granting of management-based derogations, management-based derogations have been issued for the southern parts of the reindeer herding area, where observations of lynx litters have been made. Most of the individuals hunted under derogations have been bagged in areas with the highest volume of damage to reindeer.

A Government decree on derogations laid down in the Hunting Act (asetus metsästyslaissa säädetyistä poikkeusluvista, 452/2013) extended the hunting season of lynx for population management purposes. As of the 2013–2014 hunting season, it has been possible to hunt lynx under management-based derogations in the reindeer herding area from 1 October until the end of February. In addition, the previously used quotas for the lynx were dropped in the reindeer herding area starting from the 2014–2015 hunting season (Ministry of Agriculture and Forestry memorandum, record no. 1498/13/2014). These amendments represent an effort to facilitate hunting of individual lynx which cause damage in the reindeer herding area. Lynx hunting could be developed further, thus improving the possibilities of successfully eliminating those individuals that cause damage. In the efforts to develop hunting, the full selection of means permitted under the Hunting Act should thus be taken into consideration.

The lynx population estimate for the reindeer herding area is subject to more uncertainty than the estimate for the rest of the country, which is why it is not possible to set a population target at the level of individuals for the reindeer herding area.

Rest of Finland

Measures:

The size of the lynx population will be preserved at a level that protects a favourable conservation status and enables hunting of lynx to manage the population in the entire area of the rest of Finland.

Annual fluctuations in lynx population densities will be described illustratively in the population estimate, and hunting will be targeted at areas with denser populations.

Damage and fluctuations in local game populations will be taken into account in regional population management.

In areas with highly suitable lynx habitats but a low number of lynx, a moderate increase in lynx numbers will be allowed.

The public attitude towards the lynx is mainly positive. Even if prolific, the lynx population does not have a similar negative impact on people's livelihoods in the rest of Finland as it does in the reindeer herding area. Any problems caused by the lynx population are mainly associated with higher regional population densities, which increasingly lead to situations where lynx approach human settlements and hunt in their vicinity.

In the population management area of the rest of Finland, the lynx population is relatively prolific and evenly spread. The trends in the areas of the eastern and the western population have also started to even out. As a predictive model for estimating the lynx population was introduced in 2012 (statement of Natural Resources Institute Finland 1350/0004 05/2016, pp. 5–10), a situation was reached where the population growth that had continued for a number of years curbed and the total culling rate of the lynx population was reduced. Until the 2016–2017 hunting season, the objective of lynx population management in the rest of Finland was to slow down population growth and decrease the lynx population in areas where it was denser. As the lynx population has started to decrease, the primary target of population management is to find bag limits that will even out the population decline and establish a lynx population level at which the problems caused by the lynx do not exceed the local communities' tolerance.

The low number of lynx caught in the 2019–2020 hunting season led to the desired reversal of the population growth. During the 2020–2021 hunting season, the culling

rate was slightly increased in order to reduce the populations in the denser areas and, in particular, to reduce predation of wild forest reindeer and reindeer. (Ministry of Agriculture and Forestry memorandum, record no. VN/20171/2020.)

The long-term objective is to find an overall balance between ecological, financial and social factors, so that lynx hunting will be possible in the rest of Finland.

When compared to other European countries, Finland has a prolific lynx population, and its regional distribution gives citizens exceptionally good opportunities to observe lynx in their natural habitat. Management-based hunting where derogations can be issued across the whole area will foster the development of local ownership and enable the preservation of the hunting value of the lynx without compromising the favourable conservation status. The public acceptance of the lynx and the strong increase in the populations of small cervids can also be taken into account in the management of the lynx population in the rest of Finland.

Setting population targets at the level of individuals for the rest of Finland is not appropriate, as the objective of lynx population management is to determine the population size by finding an overall balance between ecological, financial and social factors.

2.2.2 Hunting for population management purposes

Objective of hunting for population management purposes:

The objectives are to maintain the viability and favourable conservation status of the lynx population on a national scale, to minimise the disadvantages caused by the presence of lynx and to keep the lynx population shy of human beings. The hunting of lynx to manage the population will aim to maintain the population at its current level in the rest of Finland. This means that bag limits will be established to maintain a stable population that is evenly divided between the different areas while mitigating social disadvantages caused by any increase in density. The hunting of females of breeding age will be kept at a moderate level.

Relevant legal praxis

According to the legal praxis (KHO: 2014:125), when deciding on an application for a management-based derogation granted on the basis of section 41a, subsection 3 of the Hunting Act, the existence of another satisfactory solution, as provided for section 41a, subsection 1 of the Hunting Act, and the impact of the decision on the maintenance of

the favourable conservation status of the species in its natural range must also be taken into account. According to a judgment of the Court of Justice of the European Union (10 October 2019 in case C-674/17, paragraphs 41, 51, 54 and 62), the objectives relied upon in support of a derogation must be defined in a clear and precise manner and with supporting evidence in the decision. A derogation must be applied appropriately in order to deal with precise requirements and specific situations.

The judgment of the Court of Justice of the European Union (C-674/17) concerns management-based hunting of the wolf, which is critically endangered, with the primary objective being the elimination of poaching. Lynx hunting for population management purposes, on the other hand, concerns a species with a favourable conservation status in accordance with the targets of the Habitats Directive, the hunting of which has never been specifically based on the elimination of poaching, as the lynx is highly valued as a game animal and the damage it causes is limited, except in the reindeer herding area. The hunting of the lynx is based on population management considerations, such as the dispersal of population concentrations and limiting of the population growth when studies indicate that the population is growing. If there was zero mortality in the strongly growing lynx population, the population would increase by 20% per year. Judgment C-674/17 cannot therefore be regarded as an obstacle to the granting of management-based derogations for the lynx, but the considerations specified in the grounds of the judgment must still be taken into account when assessing whether the prerequisites for a lynx derogation are met.

The benefits of large carnivore hunting have been highlighted in a report commissioned by the European Commission (2008) from the Large Carnivore Initiative for Europe (LCIE). The report presents best practices for large carnivore population management. The Commission has recommended the guidelines contained in the report to the member states.

Based on the report, at least the following benefits of hunting lynx to manage the population have been identified:

- Management-based hunting increases hunters' tolerance of the presence of lynx, as they can regard the lynx as a valued game animal rather than a competitor.
- Management-based hunting increases the opportunities to have a say among the local people, who have to live in the same areas as the lynx.
- Management-based hunting retains lynx densities at levels that will keep the damage to farm animals and wild game at an acceptable level.
- Management-based hunting assists in maintaining the lynx shy of human beings, which reduces potential conflicts.

- In areas to which lynx are just returning, management-based hunting can increase long-term acceptance if the population growth rate slows down.
- In addition, local residents will feel that they are involved in the process of managing the species.
- Achieving a population that enables hunting is a benchmark for the success of the conservation efforts and also demonstrates the flexibility of the lynx management plan for the different stakeholders.

Hunting for population management purposes aims to achieve several of the benefits mentioned above by reducing the pressure caused by the lynx population and by equally taking into account ecological, financial and social factors in both target setting and the actual operations. These aspects are interdependent, which is why their effects as a whole must be considered. Furthermore, hunting for population management purposes aims to stabilise the population levels by adjusting the bag limits based on the development of the population. Management-based hunting can facilitate the allocation of hunting permits, particularly in the "denser areas". It can also be used to reduce reindeer damage by targeting derogations to the southern part of the reindeer herding area, thereby reducing the movement of young individuals into the reindeer herding area. More detailed grounds for hunting lynx to manage the population are described in the Ministry of Agriculture and Forestry Decree and the background memorandum.

In paragraphs 71–74 of the judgment for a preliminary ruling (C-674/17), it is stated that the number of animals taken by way of derogation depends in each case on the size of the population, the species' level of protection and its biological characteristics.

The management plan and the maximum number of individuals to be hunted, which is annually set by a decree of the Ministry of Agriculture and Forestry, can be used to ensure that the combined annual effect of the individual derogations will not undermine the maintenance of a favourable conservation status of the species in its natural range. The maximum number of individuals that may be hunted through management-based hunting is based on up-to-date scientific studies and population model calculations. The population model prepared by Natural Resources Institute Finland specifically provides a forecast of the development of the lynx population based on observed development trends and bag limits. The model used has provided a good basis for analysing the development of the Finnish lynx population over the last fifteen years.

Key factors that play a role in the regulation of hunting are the size and trends of the lynx population. Natural Resources Institute Finland produces lynx population data that is as up to date as possible to support decision-making on hunting regulation, and on this basis, the Ministry of Agriculture and Forestry issues decrees on lynx hunting. The

Finnish Wildlife Agency sets national and regional bag limits and issues derogations on application as part of its public administration duties.

The introduction of a predictive model developed by the Finnish Game and Fisheries Research Institute, which replaces estimates summing up the level of sustainable hunting in a single figure, was an important step forward in the development of lynx hunting. While there are uncertainties associated with the prediction of lynx population trends, the model has enabled the justified choice of bag limits. Furthermore, based on the lynx population trends, it would appear that the model's predictions on the impact of an increase of the bag limit by 16% on the lynx population is within the correct range. In the future, the focus should be on using the experiences gained from the model and developing the model further into a more effective tool for managing the size of the lynx population. Communication on the experiences gained from using the model to stakeholders in the field is especially important.

The establishment of a bag limit working group in the Finnish Wildlife Agency marked another important improvement in the planning of lynx hunting. The working group draws on its collective expertise and best available data on the culling of the lynx population, and it also strives to use the opinions of the regional wildlife councils on regional lynx statuses in its work. The objective of the working group has been to objectively assess criteria related to bag limits (such as litter numbers and population densities) and to work for a more consistent assessment of bag limits at the national level. The required calculations are currently produced manually on the basis of data picked from different sources. With the development of electronic tools, data should be produced in the future to support the regulation of lynx hunting similar to how it is now produced for the elk bag limits. The working group should also have access to research-based data on changes in the lynx population density from year to year, and more detailed information on the population trends of the most important prey animals of the lynx in different areas.

The values associated with the lynx in Finnish society include the lynx as a positive nature experience and the value of the lynx as a game animal. The lynx is also an important predator that has a direct or indirect impact on the populations of various species. The effects of the lynx on its prey animals are complex.

The predatory effect of the species is taken into account when planning the bag limits. Sustainable management-based hunting, which is practised on a large scale throughout the rest of Finland, is a key factor for improved acceptance of the local lynx population and the development of local ownership.

The regional wildlife councils aim to promote a constructive discussion on lynx population management based on high-quality game data. The resulting view on the success of regional lynx management will be disseminated to the field through timely communications.

2.2.3 Multi-species approach

Measures:

Natural Resources Institute Finland will produce data for multi-species population management purposes, especially with regard to interactions between and within large carnivore populations and cervid populations, as well as other population-regulating factors.

Natural Resources Institute Finland will provide information on the pressure caused by predation on the wild forest reindeer.

The current status of the wild forest reindeer population will be taken into account in the allocation of derogations for large carnivores – the bear and the lynx, in particular – especially in areas where both forest reindeer and a wolf pack are present.

The lynx preys on a large variety of different animals. The most common prey animals are small cervids, rabbits and hares. The lynx also preys on birds and voles, and occasionally also kills small predators, such as foxes and raccoon dogs. In many European countries, the diet of the lynx is mainly based on roe deer. The roe deer densities are considerably lower in Finland than in other European countries, and while there are also white-tailed deer in Finland, there is little to no research data on their practical significance for the lynx. In the reindeer herding area, the reindeer has a large role as a prey animal for the lynx and the lynx causes considerable damage to the reindeer population (Chapter 2 and 4.1. of the background document). Studies on the diet of the lynx are almost exclusively limited to winters.

When considering the impact of lynx on its prey species, several factors that affect both the predator (lynx) and the prey species must be considered, such as the landscape structure, the weather and the structure of the prey community. Game feeding by humans plays a role in the predation of the lynx. It should also be noted that there are differences

in the diets of male and female lynx. Even though lynx kill a large number of small cervids, they may not be able to regulate the populations of the species they prey on. Therefore, a clear distinction must be made between the impact of the lynx on the utilisation of game and the potential impact of the lynx on the regulation of its prey species.

Small cervids

During the update of the management plan, population, prey and weather data on the lynx and small cervids was collected from various statistics. In most of the population management area of the rest of Finland, the lynx population is relatively abundant in areas where small cervids are caught in low numbers. In southwestern Finland, however, the densities of small cervids are several times higher than in the rest of Finland. It has been noted in the rest of Europe that the lynx can have a strong impact on the population of species such as the roe deer (Andrén 2015). No research on this matter has been carried out in Finland.

The predatory effect of the lynx in its range varies under different cervid densities and depending on factors such as the prey species available to the lynx (Section 2.3.5 of the background document). Obtaining more research data on the effects of the lynx on small cervids in Finland would thus be important. To this end, a project should be launched to investigate the diet of the lynx in areas where small cervids occur at different densities. Various studies have shown that the lynx also preys on other small carnivores (see for example Elmhagen 2012, Pasanen-Mortensen 2013 and Heldin 2006). In Finland, lynx preying on foxes and raccoon dogs is of particular interest. Through the predation of these species, the lynx may have an indirect positive impact on the fowl, rabbit and roe deer populations.

The diet of the lynx and more detailed research results related to this matter play a key role when studying the population management of the lynx, other large carnivores and cervids based on the multi-species approach. A significant volume of research data has been gathered by the stakeholders responsible for game research, but information on the diet can mainly be found in theses. Consequently, there is a particular need for published information on the lynx's diet in Finland, both in summer and winter.

There is no published research data on the impact of the predation of the lynx on the wild forest reindeer. Based on unpublished tracking collar data on the forest reindeer and the monitoring of fawns, there are indications that in addition to the main predators, the wolf and the bear, the wolverine and the lynx also prey on forest reindeer calves. Lynx also kill individual adult forest reindeer every year (Antti Paasivaara, communication 27 August 2020). Development of the forest reindeer population is monitored by Natural Resources Institute Finland. Reintroduction and restocking of the species have also been realised in southern Ostrobothnia, Pirkanmaa and the border regions in Satakunta, as well as in western Central Finland, in connection with a project called WildForestReindeerLIFE

(2016–2023). The reintroductions must be taken into account in the regulation of the lynx populations in these areas.

In addition to research on the multispecies approach to population management, a multispecies model would be required to dimension the bag limits for small cervids in a manner that also takes into account the impact of the lynx.

2.2.4 Developing selective and ethical hunting of lynx

Measures:

The Finnish Wildlife Agency will regularly provide training to designated hunt leaders for lynx hunting for population management purposes. The training will focus on the ethics and responsibility of hunting.

The Finnish Wildlife Agency and game management associations will regularly arrange training for lynx hunters to promote selective and sustainable hunting, among other matters.

The Finnish Wildlife Agency will produce training materials to support lynx hunting.

Lynx hunting shares some of the characteristics of elk and bear hunting under a joint permit. Almost without exception, other hunters besides the person to whom the derogation was issued take part in a lynx hunt. A survey conducted by Laitinen (2015) indicates that most lynx hunting parties consist of 11–25 persons (46% of persons issued with a derogation who responded to the survey), while hunts are also organised with larger parties (30%) and, on the other hand, smaller parties of no more than 10 hunters (24%). The number of hunters depends on factors such as differences in hunting methods and traditions. Different techniques are used for lynx hunting. While there have been no major problems with the implementation of hunting, the choice of the hunting technique has a major impact on issues such as prey selection and the extent to which the hunt produces additional information on the lynx population in the area.

Competition for game on state-owned land does not occur to the same extent as in the case of bear hunting. The lynx is a less desirable target than the bear. A shotgun is

typically used for lynx hunting, which means that no safety problems caused by bullet firearms are associated with the hunt, as is the case during elk and bear hunting. No major shortcomings related to safety arose during a survey of persons issued with derogations conducted in connection with the management plan update, either. Consequently, passing any other safety-related provisions than those already laid down for lynx hunting would not be justified.

A female lynx with a cub from the same year is protected. In the interest of compliance with this rule, selectiveness of the hunt is vital. The best possibilities for selective hunting exist when there is snow on the ground, as the animal being tracked can be identified and targeted. When a hunt is not a so-called dedicated hunt, where the hunters set out specifically to hunt a specific lynx, the risk of shooting an inappropriately chosen individual is greater. This risk also rises when the hunters target a group consisting of several lynx. To ensure proper target selection and ethical hunting, dedicated hunts that target an identified individual are recommended. If different joint permit holders in a large joint permit area carry out their hunt at the same time, this will also produce a better picture of the lynx status for the large carnivore contact persons responsible for lynx in the area and the permit applicant than hunting in different areas at random times.

Hunting under a joint permit can be carried out in many different ways. Typically, bagging a lynx is more likely in certain areas where the habitat is the most favourable for lynx. Hunters operating in these areas will also develop better hunting skills, which further increases the probability of killing a lynx. In terms of game management, an agreement on hunting practices and fair implementation of the hunt in the entire area covered by a joint permit have a great significance for the game management benefits derived from lynx hunting.

According to section 30 of the Hunting Act, a hunting leader is mandatory in lynx hunting. The appointment of a hunting leader and their deputies is a comprehensive way of reaching the people who control lynx hunting. The communication functions being developed for the Oma riista service will make it possible to reach groups of lynx hunters working under the management of permit holders and hunting leaders, and to disseminate information on the selectivity and ethics of hunting in real time.

When updating the management plan, a survey was addressed to persons issued with management-based derogations to hunt lynx (Section 11.2 of the background document). The respondents felt that there was a need to develop the training of lynx hunters to include topics such as legislation, safety, selectivity, population management and leadership. Training related to legislation would make the hunters more aware of the many provisions that regulate lynx hunting. In terms of selectivity, particular attention should be paid to techniques for avoiding a situation where a female with cubs is targeted and,

on the other hand, for targeting individuals that cause the most damage (taking the game management perspective into account).

Attention should also be paid to the use of dogs in lynx hunting. Good hunting dogs are a prerequisite for effective lynx hunting. Physical contact between a dog and a lynx in the context of hunting is not particularly common (Laitinen 2015). However, sustained chases using dogs and taking turns with several dogs may be harmful for the targeted individual. Sufficient criteria for hunting dog use should be preserved when drafting future legislation in order to ensure that lynx hunting is ethically sustainable.

2.3 Acceptability of lynx and its population management

2.3.1 Prevention of and compensation for damage

Measures:

Where appropriate, the practices outlined in the bear and wolf population management plans will be taken into account in measures aiming at the prevention of large carnivore damage.

The species-specific characteristics of the lynx will be taken into account when considering measures to protect sites from damage caused by large carnivores (e.g. the characteristics of fence structures).

The Finnish Wildlife Agency will ensure that sufficient supplies of protective materials are available to prevent damage caused by the lynx.

International experience (other countries and Sweden) will be taken into account in the prevention of damage caused by the lynx and other large carnivores.

Preventing damage caused by the lynx

With the exception of reindeer husbandry, lynx cause little damage that is eligible for compensation. According to the game animal damages register, in 2019 the value of damage to reindeer caused by lynx was around €0.8 million and in 2020 this was €1.22 million. Compensated reindeer damage cases caused by the lynx have averaged at around

600 per year between 2015 and 2020. In the case of free-grazing reindeer, preventing damage is almost impossible and pilot projects have not found effective ways to protect free-grazing reindeer from predation by large carnivores. Other damage caused by the lynx mainly applies to sheep and dogs. Sheep can be protected by electric fences in some cases. In the case of damage to dogs, prevention is difficult due to the random nature of the damage.

Management Plan for the Wolf Population in Finland includes a project called Riistavahinkokeskus ("Game Damage Centre"), which aims to set up an online service to make information on game damage available in a single place. The goal with the service is to provide citizens with high-quality information on damage caused by game animals, its prevention and measures to be taken in the event of damage. The service will also provide information on damage caused by large carnivores, such as the lynx, and on how to prevent it. The service would also support the objective of the lynx population management plan to prevent damage caused by the lynx.

The main method for reducing damage to reindeer caused by the lynx is the regulation of the lynx population by means of hunting and damage-based elimination of individual lynx that repeatedly cause significant damage to reindeer. If any effective prevention methods are found, they should be taken into use, as lynx cause extensive damage to reindeer. Of the large carnivores, the wolverine causes the most damage to reindeer.

The wolf and the bear are far more significant causes of damage to domestic animals than the lynx. Consequently, electric fences are seldom erected to protect grazing animals solely on the basis of the risk posed by the lynx. The Finnish Wildlife Agency uses case-by-case discretion when it comes to the costs incurred by the state from protecting a site, comparing them to the value of the interest to be protected. When sites are protected with electric fences, in areas where the risk caused by the lynx to farm animals is considerable, the better ability of the lynx to jump and climb when compared to the wolf and the bear should be accounted for when choosing the fence structures to be used. The height of electric fences built in Finland has been designed taking into account the ability of the lynx to jump high.

Damage to domestic animals caused by the lynx mainly affects sheep. Some cases of lynx causing damage to dogs and individual cases of damage to horses have also been reported each year. Between 2015 and 2019, the average number of cases where damage to domestic animals caused by the lynx was compensated was around 40, and the compensated damage per year totalled around €20,000. According to the game animal damages register, in 2020 damages caused by lynx to domestic animals (including damages to dogs) amounted to approximately €32 000.

Compensation for damage

Provisions on damage caused by game animals are laid down in the Game Animal Damages Act. The Game Animal Damages Act was amended in 2019 to state that if the compensation has to be cut due to reindeer damage, the cuts will apply to the damage caused to reindeer. From the beginning of 2020, damage to domestic animals caused by large carnivores such as the lynx has been paid in full, immediately after the claim has been approved.

According to a citizen survey conducted as part of the management plan update, 10% of the respondents felt that no central government funding should be spent on compensation for lynx damage to anyone, in any way. A clear majority (67%) felt that compensation for damage should be paid to those who have taken reasonable measures to prevent the damage. On the other hand, only 9% felt that no compensation at all should be paid. In the light of the public opinion, maintaining an active approach to preventing damage is justified.

2.3.2 Wildlife councils and stakeholder cooperation

Measures:

The regional wildlife councils will annually assess, after having consulted stakeholders, the achievement of the objectives and measures of the lynx management plan in their areas and assess the functionality of the bag limit planning system for lynx.

The National Wildlife Council will annually assess the achievement of the objectives and measures of the lynx population management plan throughout Finland.

Stakeholder events relevant to large carnivores organised by regional wildlife councils should be developed further. Broad-based representation of the stakeholders can assist in highlighting local and regional points of conflict in large carnivore questions. Stakeholders relevant to large carnivores, in particular, have found these events important. Using modern electronic tools, a survey format could be developed to complement the physical stakeholder events that could elicit the opinions of a larger group of regional stakeholders on lynx population management. The information produced by such a survey could be used as an independent result or utilised further as material for physical stakeholder events.

The wildlife councils expressing their opinions on the previous year's activities related to lynx population management would be compatible with the strategic role of the wildlife councils. This opinion could cover all areas of the current system for setting the bag limits for large carnivores, in which case it would cover Natural Resources Institute Finland, the Ministry of Agriculture and Forestry and the Finnish Wildlife Agency together with its councils and stakeholders. Implementation of the objectives and measures of the large carnivore management plans in the areas should be taken into account in this opinion. The regional wildlife councils' opinions will be submitted to the National Wildlife Council, allowing the national body to prepare its own opinion before the decrees for the following hunting season are drafted. In the case of lynx, the opinion should mainly be based on the bigger picture of game management.

The opinion of the wildlife councils should be based on an overall view of game management, considering the strategic role of the wildlife councils and the independence of public administration in making permit decisions. Decisions on derogations are made as a public administration task performed independently under the Director of Public Administration Tasks. However, the role of the public administration tasks, or other actors for that matter, cannot preclude the possibility of developing the activities based on justified opinions. It is therefore justified to provide the regional wildlife council with an opportunity to present its opinion on the targeting of derogations from the perspective of regional game management. The idea of giving the stakeholders a possibility to issue opinions is supported by both an evaluation of the large carnivore policy and an evaluation of the wildlife councils' work (2016).

In connection with the survey addressed to persons issued with management-based derogations (Section 11.2 of the background document), it came to light that the regional wildlife councils' role in managing large carnivore populations in the regions was not well known, at least not among hunters. The regional wildlife council can clarify its role in the strategic planning of regional large carnivore matters by means of more effective communication.

The regional wildlife council must formulate an opinion on the success of the lynx population management and the bag limits by reviewing regional game management as a whole and the impact of the lynx on this whole. The overall opinion should be primarily based on the high-quality game data provided by game research.

The perceived impact of the lynx is also strongly linked to social factors and the focus areas in regional game policy. The work of the councils is based on game data from the region, such as information about the local lynx and ungulate populations. Furthermore, care must be taken to ensure that, in addition to their duties and responsibilities, the regional wildlife councils will also have rights in relation to the regional lynx population.

2.3.3 The lynx and society

Measures:

Natural Resources Institute Finland will participate in multidisciplinary research projects on topics relating to large carnivores (including the lynx) and their social dimension. Natural Resources Institute Finland will take a multidisciplinary approach to studying the effects of human activities, such as hunting, on the lynx and vice versa.

The research results will be actively communicated to the general public.

The extent to which citizens accept the goals and methods of lynx population management and the type of conflicts arising from related issues depend on a variety of factors. One common background factor is the worry or fear elicited by large carnivores. In Finland, the lynx is feared considerably less than the wolf or the bear, and there are only a few people with a strong fear of the lynx. Even a prolific lynx population does not appear to elicit any concern regarding damage, and the acceptance of population management that supports proliferation does not seem to meet similar opposition as in the case of the wolf, for example (see Management Plan for the Wolf Population in Finland, 2019).

Ultimately, it is the local people who interact with lynx as part of their daily activities in the natural environment surrounding them, whether we are talking about local people having an impact on the nutritional resources of the lynx, their living environment or population management. Official efforts to direct population management target these interactions and strive to support means for enhancing the positive effects while controlling the negative ones. As the basis for their activities, the authorities require information on how people think and act, what kinds of problems they perceive and what type of steering is compatible considering the extent of any problems. At the EU level, this viewpoint is manifested by calls for analysing the human-induced factors that cause conflicts in terms of the lynx conservation objectives and their attainment, for example (Boitani et al., 2015).

Previously, it has frequently been suggested (e.g. Ruralia Institute 2006) that human-induced factors have a great impact on how the population status of a large carnivore species develops in an area. One of the perceived challenges in the past was the lynx preying on small cervids in regions where the species occur in the same areas.

According to a study conducted by Taloustutkimus in 2016, some 20% of citizens find the predation on small cervids useful to some extent, while 35% are of the opposite opinion. While the backdrop to these results partly consists of problems in the management of small cervid populations that are unrelated to the lynx, the fact remains that some of the hunters feel that they are competing for game with the lynx. As the white-tailed deer population has grown, the issue has no longer been as prominent or has not been perceived as a problem. The significance of the lynx as a predator of small cervids has been discussed.

The role of the lynx in nature and in the prey community and the benefits it offers from a human perspective deserve further attention. These may not be understood in light of research on the lynx diet alone, however. The research needs to be supported by a more complex ecological research approach which also takes into account the predation pressure of lynx on other predators and on the local rabbit and roe deer populations. However, the discussion on the full range of the indirect effects of the lynx on humans has been unstructured, and in addition to the data collected during the preparation of this management plan, it would be necessary to examine the effects of the lynx also from a socio-economic perspective.

3 Other measures

The other measures related to the management of the lynx population (excluding Section 3.1) will mostly be realised through the implementation of the population management plans for the wolf and the bear. As a species, the lynx is not associated with damage to the same extent as the wolf with respect to damage to dogs or the bear with respect to damage to bees. Furthermore, a wounded lynx is not as dangerous as a wounded bear, and executive assistance missions related to the lynx do not have the same special characteristics. There are also clear-cut research results which indicate that the lynx cannot be considered a significant agent for spreading diseases (Section 2.3.7 of the background document).

3.1 Communication on Finnish lynx data

Measures:

The accessibility of data on large carnivores produced by different parties active in the Finnish Wildlife Consortium will be improved and it will be ensured that the data is up to date.

The Ministry of Agriculture and Forestry will convene a meeting of those responsible for communication on large carnivores in the Finnish Wildlife Consortium. The communicators will deal with communication related to the wolf and other large carnivores. Communication cooperation with stakeholders will be developed.

During the update of the lynx population management plan, it was noted that the key results of Finnish lynx research should be made more readily available to the general public. The citizen survey conducted as part of the management plan update indicates that most people would appreciate more information about the behaviour of the lynx when encountering humans (56% of the respondents) and the movements and range size of the lynx (55%). The lynx's diet and lynx numbers were considered less important

themes in terms of information needs. Measures aiming to offer the general public access to information pertaining to large carnivores were already launched on the basis of the evaluation of the national large carnivore policy, which identified problems with the fragmented nature of information and errors in some pieces of information.

Information on lynx numbers, the population estimate and range use is thus now easier to find at riistahavainnot.fi. The site also contains plenty of illustrative maps. General information on the lynx can be found at largecarnivores.fi, which covers almost all viewpoints relevant to the lynx. Riistainfo.fi, managed by the Finnish Wildlife Agency, contains information and educational materials on the lynx and other large carnivores. When looking at the survey carried out in connection with the update of the management plan and the type of information the general public would like to obtain about the lynx, it is clear that the information on the relationship between the lynx and humans is presented at a very general level. Given the information needs of the general public, it would be important to provide more detailed information on the relationship between the lynx and humans, such as information on the movements of the lynx in its habitat in relation to human settlements. Communication on the lynx and other large carnivores from a multispecies perspective is also required. This refers to, for example, communication on the lynx that highlights interaction of the lynx with other large carnivores and prey animals.

The lynx, as species, draws less attention than wolf and the public interest towards the species hasn't increased despite the fact that the lynx population has doubled in the past ten years. The objective of public communication on the lynx is to provide information on the status and management of the lynx population in line with the rhythm of the annual population management measures. There is no need to change the current approach in this respect. Parties responsible for the communication on the lynx are the different bodies within the Finnish Wildlife Consortium: the Ministry of Agriculture and Forestry, Natural Resources Institute Finland, the Finnish Wildlife Agency, game management associations, Metsähallitus and the Finnish Food Authority. The police also communicate about lynxrelated issues as part of their work. The role of stakeholders in communication on the lynx is also important. Communication responsibilities are set out in Chapter 12 of the lynx population management plan background document. Coordination and cooperation on communication about the lynx, as well as dialogue within the Finnish Wildlife Consortium and with stakeholders can be developed through joint meetings of responsible parties in the Finnish Wildlife Consortium.

The need for more dialogue between research and the field was raised during the preparation of the management plan. Direct communication with large carnivore contact persons and holders of management-based derogations concerning to hunt lynx through the Oma riista service can open up new opportunities for this in the future.

3.2 Oversight of hunting and executive assistance in large game matters

Measures:

The powers of game wardens in Metsähallitus will be expanded to cover the investigation of suspected aggravated hunting offences on private lands.

Each police department will appoint a wildlife contact person to coordinate oversight planning and implementation in the police department's area.

Oversight of hunting

Around one to three cases of illegal lynx hunting are revealed each year. The risk of being caught is low, however, and illegal hunting may actually be more commonplace than these figures indicate. Nevertheless, illegal hunting has not had a significant impact as a whole, at least in terms of lynx population trends.

Several measures are proposed in the Management Plan for the Wolf Population that will also improve the preconditions for overseeing illegal lynx hunting. The management plan has highlighted for example the appointment of wildlife contact persons in police departments to plan and coordinate the oversight measures. At the moment, a wildlife contact person, who is an officer, has been named in each police department, and all the departments also have police officers trained in hunting supervision, who carry out hunting supervision duties and tasks linked to large carnivores, among other tasks, in cooperation with other authorities. Coordination of the hunting supervision and large carnivore activities of the police is managed by the National Police Board of Finland, with regional liaison officers managing the planning and coordination of activities at their respective police departments.

The extension of the powers of game wardens to cover the investigation of suspected aggravated hunting offences on private lands has also been considered an important measure. The implementation of these and other measures listed in the Management Plan for the Wolf Population in Finland would also increase the prevention and supervision of illegal hunting targeted to lynx.

The obligation laid down in the Hunting Act (section 30 of the Hunting Act) to appoint a hunt leader when hunting for large carnivores can ensure that the parties exercising the

oversight of lynx hunting have a better awareness of who is responsible for lynx hunting. If necessary, the Oma riista service can be used to distribute information about the lynx and its hunting to these persons, thus improving the preconditions for legal and ethically acceptable hunting.

Executive assistance in large game matters

Executive assistance missions targeting bears, in particular, are demanding, because they mainly take place during the snow-free season and injured bears can be dangerous. Missions targeting wolves may also be challenging at times, especially when they take place in urban environments. These missions always require many specialised skills and equipment, and – especially when the target is a bear – also dogs particularly well suited for such tasks. A similar threat to humans is not associated with missions targeting the lynx (chapter 2, section 16 of the Police Act). Missions targeting the species often tend to involve putting down suffering animals rather than putting down large carnivores causing potential danger. Consequently, there are no special needs to develop the executive assistance missions related to the lynx that could not be managed on the basis of the procedures already developed for the wolf and bear. In 2020 the National Police Board of Finland approved new guidelines concerning the powers and actions of police in incidents involving large carnivores, including lynx.

3.3 Translocations of the lynx

Measure:

No translocations of lynx will be carried out in Finland.

Lynx occur throughout the Finnish territory. Based on preliminary Finnish research results, the natural migrations of a lynx looking for a new range extend from 40 to 800 km (Section 2.3.3 of the background document). This guarantees the natural expansion of the lynx range in Finland, eliminating any need for translocations.

3.4 International cooperation

Measures:

In cooperation with research institutes and the game administration, the Ministry of Agriculture and Forestry will continue to arrange regular meetings with the authorities, population management agencies and research institutes responsible for large carnivores in Norway and Sweden to exchange information and experiences.

Matters pertaining to the lynx will also be discussed at meetings of a game policy working group between Finland and Russia.

For further information on international cooperation related to lynx population management, please see Chapter 9 of the background document. In recent years, the focal point of this cooperation has been on collaboration between the EU member states.

The management of the lynx population in Finland has the strongest links with population management efforts in Sweden and Norway. On the other hand, the closest genetic connections of the Finnish lynx population are with the Russian lynx population.

Together with the Finnish Wildlife Agency and Natural Resources Institute Finland, the Ministry of Agriculture and Forestry has regularly arranged joint meetings with the authorities and research institutes responsible for large carnivores in Sweden and Norway. The meetings have covered all matters pertaining to large carnivores. The Ministry of Agriculture and Forestry signed a framework document concerning the wolf with the Swedish Environmental Protection Agency and Norwegian Environment Agency in 2020.

The Ministry of Agriculture and Forestry and the Russian Ministry of Natural Resources and Environment have agreed on expanding the cooperation to game management. The responsible ministers signed a declaration on the expansion in early 2021. The ministries' game management working group may also discuss matters pertaining to the lynx.

4 Management plan implementation

Measure:

The implementation of the lynx population management plan will be coordinated and monitored by a person appointed at the Finnish Wildlife Agency (person responsible for the management plan).

The key actors in terms of the implementation of the management plan are the Ministry of Agriculture and Forestry, the Finnish Wildlife Agency and Natural Resources Institute Finland. The Ministry of Agriculture and Forestry influences the objectives of the other Wildlife Consortium stakeholders by setting performance targets for them. Practical coordination and monitoring of the management plan implementation has been assigned to the Finnish Wildlife Agency, while Natural Resources Institute Finland is responsible for many measures that play a key role for the management plan's impact related to developing the population estimate.

The Management Plan for the Lynx Population in Finland contains 45 measures in total. In practice, the implementation of the plan is coordinated by the Finnish Wildlife Agency, which appoints a person to assume responsibility for the lynx population management plan. This person's task is to monitor and promote the implementation of the measures. The majority of the measures can be implemented by modifying existing practices. Measures related to lynx censuses in the field are an example of this, the initiation of which must be coordinated better than before on the basis of the overall outlook for game management in the region and the motivation of the field. New materials may also have to be created to implement some of the measures, such as the survey addressed to regional large carnivore stakeholders proposed in Section 2.3.2. The implementation of measures of this type may be promoted through cooperation between the employees and public servants in the Finnish Wildlife Consortium.

It should be noted, however, that not all the measures can be promoted by cooperation alone: decisions on resources will also be required to achieve the targets of the lynx population management plan. These include, in particular, the launching of large

carnivore research projects (including the measures referred to in Section 2.2.3) and measures that involve increasing personnel resources (in Section 2.1). The allocation of resources may be based on project-specific performance management or on the possibility of financing projects related to the implementation of the management plan through specific funding, for example. In general, it would be necessary to review the measures requiring resources proposed in the management plans for large carnivores at regular intervals in the steering group of the Finnish Wildlife Consortium. The review by the steering group would also provide the performance management function of the Ministry of Agriculture and Forestry with a better view of the progress of the key large carnivore population management objectives.

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24. Management Plan for the Lynx Population in Finland

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