



Key actions for Large Carnivore populations in Europe

SECTION 4: LYNX

DRAFT

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PART I – Eurasian lynx populations in Europe

1.1. Populations

Eurasian lynx are distributed in northern and eastern Europe (Scandinavian and Baltic states) and along forested mountain ranges in south-eastern and central Europe (Carpathian, Balkans, Dinarids, Alps, Jura, Vosges). Lynx are found in 23 countries and (based on a range of criteria, including distribution and other geographic, ecological, political and social factors) can be grouped into 10 populations (Fig. 1). Five of these ten populations are autochthonous (Scandinavian, Karelian, Baltic, Carpathian and Balkan), the other populations – based in central and western Europe – origin from reintroductions in the 1970s and 1980s (Dinaric, Alpine, Jura, Vosges-Palatinian and Bohemian-Bavarian populations). In addition, there are a number of further occurrences of lynx resulting from more recent reintroductions, such as in the Harz Mountains of central Germany.



Figure 1. The 10 lynx populations in Europe.

1.2. Status

The total number of lynx in Europe is 9'000-10'000 individuals (excluding Russia & Belarus). The largest populations are the autochthonous ones in the north and east which have around 2000 individuals each: Scandinavian (~1800-2300), Karelian (Finish part 2500), Baltic (~1600), Carpathian (2300). All the reintroduced populations are of smaller size as they were formed only 40 years ago and with small numbers of founders. The population of greatest conservation concern is the fifth autochthonous one, the Balkan lynx population, which numbers only 40-50 individuals according to recent research.

Population	Population size 2011	Countries (and approx. % share of population)	Trend	Red List assessment
Alpine	130	CH (77%), FR (10%), IT (7%), SI (3%), AT (3%)	Stable	EN (D)
Balkan	40-50	FYROM (85%), AL (15%), RKS (?), ME (?)	Decrease?	CR (C2a(i,ii) D)
Baltic	1600 (without BY and RU)	EE (49%), LV (37%), PL (6%), UA (5%), LT (3%)	Stable	LC
Bohemian-Bavarian	50	CZ (67%), DE (23%), AT (10%)	Stable or decrease	CR (D)
Carpathian	2300-2400	RO (57%), UA (16%), SK (15%), PL (9%), RS (2%), CZ (0.5%), BG (0.5%), HU (<0.05%)	Stable	LC
Dinaric	120-130	BA (53%), HR (39%), SI (8%)	Stable or decrease	EN (D)
Jura	100	FR (70%), CH (30%)	Increase	EN (D)
Karelian	2430-2610 (without RU)	RU, FI (% unknown)	Increase	LC
Scandinavian	1800-2300	SE (81%), NO (19%)	Stable	LC
Vosges-Palatinian	19	FR (100%), DE (currently 0%)	Stable or decrease	CR (C2a(i,ii) D)

1.3. Threats

The most relevant threats to Eurasian lynx in Europe are low acceptance largely due to conflicts with hunters, persecution (i.e. illegal killings which is probably interlinked with the first) and habitat loss due to infrastructure development, poor management structures and accidental mortality.

1.4. Conflicts

Livestock depredation and thus conflict levels are low for most of the populations. There are some damages in the Alpine and Jura populations, however usually less than 100 domestic animals are killed per year in total. The only two populations with major depredation problems are the Nordic ones. About 7000-10'000 sheep and 7000-8000 semi-domestic reindeer are attributed to lynx and compensated in Norway every year, summing up to 5 M€ per year. In 2009 Sweden paid 17'500 € for depredation on sheep and an additional 3'500'000 € as an economic incentive to reindeer herders for the presence of lynx. In 2011 Finland paid 15'600 € for 25 domestic animals and 827'000 € for 554 reindeer.

Considering the most relevant threats to the Eurasian lynx, the major conflicts are not with livestock husbandry, but with ungulate hunting. This conflict has long been neglected. While a range of prevention measures exist to counteract livestock depredation, fruitful ways of conflict management with hunting are yet to be found. Awareness has however increased and in many regions participatory processes for a better collaboration and dialogue between different interest groups have been initiated.

PART II - Objectives

Objectives of this list of actions

- To identify the most critical (*i.e.* important and urgent) actions for the conservation and management of the Eurasian lynx populations in Europe in coexistence with local stakeholders for the next 5 years.
- To provide the authorities responsible for the conservation and management of Eurasian lynx in the Member States and the European Commission a strategic planning tool for relevant future activities in the next 5 years.
- To improve collaboration and relationship amongst relevant stakeholders for Eurasian lynx conservation and management in Europe by integrating them into the process of planning and implementing actions/activities.
- To raise awareness amongst authorities and the public for the most urgent needs for Eurasian lynx conservation and management in Europe.

PART III – Actions for all populations

Note:

Level of urgency:	(scale of 1-5: 1 = high urgency, 3 = medium urgency, 5 = low urgency)
Benefit:	(scale of 1-5 = 0-20, 20-40, 40-60, 60-80, 80-100%; how much this action is expected to improve the level of population conservation and/or coexistence with local stakeholders)
Cost	<100k; 100k–500k; 500k–1000k

ACTION 1	
Title of the Action:	Population-level and national management plans
Objective:	To assist a coherent conservation of lynx populations through (1) the development of transboundary, population-level management plans and (2) national management plans as implementation instruments in a participatory approach involving all relevant stakeholders.
Description of activities:	<p>All lynx populations in Europe are transboundary and many of the best habitats are along international borders. Effective conservation of a population (and often achievement/maintenance of a favourable conservation status) is only possible according to common goals, standards and approaches. Shared principles should be defined in a population-level management plan jointly developed by all countries sharing a population (including non-EU countries where needed). More specific national management plans are then developed as instruments to implement conservation and management actions in each country.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Establish a population-wide working group with representatives from all countries and all relevant national stakeholders; 2. Develop, in a participatory and facilitated approach, goals, standards and common management principles for the entire population; 3. Establish national working groups with representatives from all relevant national and provincial authorities and stakeholder groups; 4. Develop national management plans considering the agreed population-level principles and the national/provincial legislation, practices and particularities; 5. Implement activities on population and national level; 6. Review and revise the management plans in regular intervals or as needed.
Expected results:	<ul style="list-style-type: none"> • Consensus on common goals and approaches at population level; • Transparent, approved, operable and adaptable plans for the implementation of conservation and management measures; • Increased acceptance of lynx through a participatory approach and involvement of stakeholder groups.
Responsibility for implementation:	Authorities in charge at national/provincial level and mandated/involved interest groups or institutes.

Timing of the activities:	2 years for the development of the population-level strategy, 1 year for the development of the national management plans, several workshops for each subsequent revision.
Level of urgency:	1
Cost and potential funding sources:	<100K per population. National authorities (environment, conservation, wildlife management).
Benefit:	5

ACTION 2	
Title of the Action:	Intra- and inter-population connectivity and fragmentation
Objective:	To assess and mitigate the negative effect of habitat fragmentation on the lynx populations and assist the merging/genetic exchange of isolated (sub)populations.
Description of activities:	<p>Lynx has a reduced ecological valency compared to other large carnivores and is therefore more habitat and prey dependent. Many populations are small, divided into several subpopulations and/or isolated from other populations. Limited size and fragmentation impedes the genetic or even demographic viability of (sub)populations. The aim of this Action is to prevent negative impacts of isolation and fragmentation on the viability of the lynx populations.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Assess the status and viability of all lynx populations in regard to their fragmentation into subpopulations and their connectivity to neighbouring populations; 2. Assess the risk of planned infrastructure development (e.g. the Trans-European Transport Network) to further fragment a lynx population and reduce its viability; 3. Promote the merging of subpopulations and maintenance or restoration of habitat corridors between neighbouring populations; 4. Promote the assisted exchange of lynx in situations where natural dispersal is inadequate to maintain the (genetic) viability of a (sub)population.
Expected results:	<ul style="list-style-type: none"> • Enhanced demographic and/or genetic viability of small and isolated subpopulation and populations.
Responsibility for implementation:	National/provincial authorities, scientific experts.
Timing of the activities:	Assessment of population status: 1–3 years; assessment of infrastructure: continuous; implementation of mitigation: many years.
Level of urgency:	2–5 (depending on the size and the level of inbreeding of a population)
Cost and potential funding sources:	<100k for the assessments; 500k–1000k for possible mitigation measures. Funding from national agencies (assessment) and from national/provincial agencies or infrastructure developers (mitigation).
Benefit:	1–5 (depending on the fragmentation and inbreeding status of a population).

ACTION 3	
Title of the Action:	Standardised, robust quantitative monitoring of lynx populations
Objective:	To develop, establish and maintain a standardised, quantitative monitoring system for lynx based on scientifically robust methods in all countries sharing a population allowing the continuous assessment of the population status and the mutual and public information.
Description of activities:	<p>Common conservation/management goals and transboundary cooperation (Action 1) implies a standardised monitoring system to assess distribution, abundance, demographic features and population trends. A conjoint monitoring system for each population should base on a spatial concept (e.g. “stratified monitoring”), scientific robust methods applicable under the respective conditions (e.g. snow tracking in the north, camera trapping in the south) and national wildlife management and hunting system of each country involved, and produce results that are compatible between the countries and allow a continued assessment of the entire population and the information of stakeholders and the general public.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Establish a working group with members from all countries sharing the population to define monitoring standards (spatial concept, field methods, analyses, interpretation and reporting) for monitoring; 2. Establish the network (experts, game wardens, hunters, naturalists, etc.) needed to generate the data; 3. Define monitoring rhythm and common interpretation and publication of findings.
Expected results:	<ul style="list-style-type: none"> • Shared database for the entire population; • Regular reports on the status of the population; • Reliable data on the population allowing to define management measures and assess the effectiveness of implemented measures; • Stakeholder involvement; • Agreed/accepted population data for the discussion of further conservation/management measures with stakeholder groups; • Enhanced public awareness and understanding.
Responsibility for implementation:	National/provincial wildlife conservation authorities; international working group; experts; stakeholder groups participating in the monitoring.
Timing of the activities:	Two meetings of working group/lynx experts in the first year; production of the shared monitoring protocol in the first year; implementation and operation of system: immediately/continuous; common population assessment every 2– 3 years.
Level of urgency:	1 (for population without any monitoring), 3 (for population with a certain monitoring)
Cost and potential funding sources:	<100k for defining the standards and methods; cost for implementation depend on the situation of the individual countries; funding through national/provincial wildlife authorities.
Benefit:	4

ACTION 4	
Title of the Action:	Health monitoring and genetic reinforcement of small, inbred populations
Objective:	To assess the health and genetic status of small and isolated autochthonous or reintroduced lynx (sub)population and implement measures to mitigate inbreeding/health problems wherever needed.
Description of activities:	<p>All reintroduced and some autochthonous populations (Balkan and Baltic, but also populations that went through a severe historic bottleneck) are so small that they suffer effectively or potentially from inbreeding. Inbreeding can lead to increased health problems and eventually an inbreeding depression. In all small populations, a consistent health and genetic monitoring and if required measures to mitigate the inbreeding of the entire population or certain subpopulations are needed.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Establish and apply standardised protocols for veterinary examinations (e.g. necropsies); 2. Establish and apply standardised protocols for genetic monitoring (survey of inbreeding status); 3. Combine findings from health and genetic monitoring and demographic monitoring (Action 3) to assess the need for genetic remedy and define adequate measures (e.g. enhanced natural or assisted exchange of individuals); 4. Implement wherever appropriate measures for genetic/health conservation.
Expected results:	<ul style="list-style-type: none"> • Information on health status and degree of inbreeding per population/subpopulation; • Genetic/health conservation measures implemented; • Improved health status and reduced inbreeding coefficient in the respective populations/subpopulations.
Responsibility for implementation:	Veterinarians/geneticists/population biologists for development and application of protocols and definition of measures; responsible authorities for wildlife conservation in each country for implementation of conservation measures.
Timing of the activities:	1–3 years for screening (depending on the availability of samples); 1–3 years for the implementation of conservation measures.
Level of urgency:	1 (high level of inbreeding) – 2 (unknown level of inbreeding)
Cost and potential funding sources:	<100k for screening; 100k – 500k for implementation of conservation measures per population.
Benefit:	5

ACTION 5	
Title of the Action:	Habitat conservation and environmental impact assessments
Objective:	To review the impact of infrastructure development (roads, reservoirs, wind parks, etc.) on lynx habitat and to develop guidelines for Environmental Impact Assessments (EIA) for new infrastructure in lynx habitat.

Description of activities:	<p>Lynx need dense cover habitats (forest) and are mandatory and specialised hunters of few staple prey species. New (linear) infrastructure cutting through lynx habitat can further fragment a population and have a negative impact on its viability.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Assess the impact of infrastructure development on lynx population viability (literature review, expert model); 2. Develop Guidelines for assessing the impact of new infrastructure on lynx populations in EIAs; 3. Submit these Guidelines to the relevant European institutions and the authorities in charge in the range countries.
Expected results:	<ul style="list-style-type: none"> • Better understanding of the impact of infrastructure development on lynx populations; • Standardised criteria for considering lynx conservation in EIAs in all EU countries; • Enhanced awareness for the potential impact of infrastructure development on lynx populations.
Responsibility for implementation:	Development of Guidelines: Lynx experts, NGOs; application: relevant governmental institutions, infrastructure developers, EIA consultancies.
Timing of the activities:	Development of Guidelines: 1 year; application: continuous.
Level of urgency:	2
Cost and potential funding sources:	<100k; European Commission.
Benefit:	4

ACTION 6	
Title of the Action:	Integrate lynx predation impact into wildlife management practise
Objective:	To study and assess the predation impact of lynx on its main prey species (e.g. roe deer) and the competition between lynx and hunters for game, and make recommendations on how to consider the predation impact by lynx into wildlife management and hunting schemes.
Description of activities:	<p>Perceived or real competition between hunters and lynx, the opposition of hunters to lynx presence or recovery are believed to be the main obstacles to lynx conservation. Mitigation of this conflict implies (1) better understanding and communication of the predation impact and (2) integration of lynx predation into management schemes of small ungulates (e.g. roe deer hunting quotas).</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Review or investigate (where no data are available) lynx predation impact on its main prey species including predator-prey relations and population dynamics (numeric and functional response); 2. Assess of the combined and mutual impact of lynx predation and hunting harvest on the prey population; 3. Investigate the attitudes of hunters towards lynx and their view of its predation impact;

	<p>4. Develop recommendations on how to adapt wildlife management schemes and hunting quotas (e.g. for roe deer) to the presence of lynx and its predation impact;</p> <p>5. Inform wildlife managers and hunters and implement the recommendations in the wildlife management and hunting regime.</p> <p>A general understanding of lynx predation can be achieved by compiling results from across Europe; certain specific data such as monitoring of lynx and prey population dynamics needs to be generated for each population.</p>
Expected results:	<ul style="list-style-type: none"> • Qualitative and quantitative assessment of predation impact of lynx on its main prey species and better understanding of predator-prey relationship; • Integration of lynx predation into wildlife management and hunting schemes and hence reduction of competition between lynx and hunters; • Improved lynx conservation through mitigation of the conflict between hunters and lynx.
Responsibility for implementation:	Wildlife researchers and social scientists for the assessment; working groups with stakeholder participation for the recommendations; national or provincial wildlife management authorities for the implementation.
Timing of the activities:	1 to several years for the assessment (depending on the availability of information); 1 year for the development of recommendations; continuous implementation.
Level of urgency:	2
Cost and potential funding sources:	100k–500k for assessment; <100k for recommendations and implementation.
Benefit:	4

PART IV – Specific actions for each population

4.1. Alpine population

Specific actions:

1. Pan-Alpine and integrated conservation and management of lynx
2. Genetic remedy
3. Assisted merging of sub-populations

ACTION 1	
Title of the Action:	Pan-Alpine and integrated conservation and management of lynx
Objective:	To compile ecological/biological knowledge and sociological/human dimension understanding into a conservation vision and management model for the Alpine lynx population shared by all range countries.
Description of activities:	<p>As a prerequisite for an Alpine lynx management plan (general Action 1), ecological background information and human dimension understanding need to be compiled into conservation needs and management options and agreed by all Alpine countries.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Review biological and ecological features for lynx in the Alps (habitat suitability model, fragmentation, population viability, predation); 2. Review people's attitudes and stakeholder opinions and factors defining the tolerance level towards lynx presence; 3. Identify conservation needs and develop management scenarios for the Alpine lynx population and all Alpine countries; 4. Submit the proposal to the Alpine Convention for discussion and endorsement.
Expected results:	<ul style="list-style-type: none"> • Review and compilation of ecological and sociological knowledge and comprehensive understanding of lynx conservation options; • Pan-Alpine consensus on conservation goals and management options for lynx; • Improved cooperation between the Alpine countries in regard to lynx conservation; • Better involvement of stakeholder groups.
Responsibility for implementation:	Compilation of background information: experts (SCALP, RowAlps project); conservation and management options: WISO Platform Alpine Convention; review and endorsement: Alpine Convention.
Timing of the activities:	Results available by end 2015.
Level of urgency:	1
Cost and potential funding sources:	100k–500 k. Funding source: Private conservation foundation; Alpine countries.
Benefit:	4

ACTION 2	
Title of the Action:	Genetic reinforcement

Objective:	To reinforce the Alpine subpopulation with new lynx from the original source population to mitigate the high inbreeding level and possibly related health problems.
Description of activities:	<p>The genetic variability of the reintroduced lynx population in the Alps is significantly lower than in the source population and continues to decline. Based on the 22 micro-satellites considered so far, the Carpathian population revealed 101 alleles, the Jura 80, the Dinaric 68, and the Alps 64, respectively. Translocating lynx from the Carpathians to the Alps will help the Alpine population to regain lost alleles. A few individuals that successfully reproduce can already significantly support the genetic reinforcement of the Alpine lynx.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Conceptualise the genetic reinforcement within the discussion about the integrated management of the Alpine population (Action 1); 2. Develop a plan (principles, procedures, monitoring) for the genetic remedy; 3. Translocate the agreed number of lynx over the agreed number of years from the Carpathian source population to the Alps in accordance with the relevant IUCN guidelines.
Expected results:	<ul style="list-style-type: none"> • Better understanding and consensus of the genetic management of small/reintroduced populations; • Genetic rehabilitation of the Alpine lynx.
Responsibility for implementation:	National wildlife conservation authorities (decision, permissions); expert groups: SCALP, genetic and lynx experts (concepts, monitoring); National/provincial authorities (implementation).
Timing of the activities:	Within the next 2–4 years
Level of urgency:	1
Cost and potential funding sources:	100k–500k
Benefit:	5

ACTION 3	
Title of the Action:	Assisted merging of subpopulations
Objective:	To facilitate the merging of Alpine subpopulations and of the Alpine and the Dinaric population in order to increase the viability of the population(s).
Description of activities:	<p>Lynx populations spread very slowly and often not across habitat barriers such as high Alpine ridges or densely settled valleys. Maintaining the genetic viability of isolated subpopulations however requires merging them into a large metapopulation. Stepping stones need to be created through translocations to spread and merge existing nuclei of lynx in the Alps. Release sites need to be chosen based on the expansion model and based on the Pan-Alpine conservation plan (general Action 1 and specific Action 1).</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Develop a plan for the merging according to general Alpine lynx

	<p>conservation and management principles;</p> <p>2. Assess public attitudes and gain public support;</p> <p>3. Create the stepping-stones needed through translocation/local reintroduction or reinforcement (e.g. isolated lynx).</p>
Expected results:	<ul style="list-style-type: none"> • Wider distribution of lynx in the Alps; • Gene flow between subpopulations and enhanced genetic viability.
Responsibility for implementation:	<p>Assessment, planning: experts (e.g. SCALP group); permissions, implementation: national/provincial authorities.</p>
Timing of the activities:	1–10 years
Level of urgency:	2
Cost and potential funding sources:	100k–500k
Benefit:	5

4.2. Balkan population

Specific actions:

1. Increase capacity in wildlife management and improve wildlife management practices
2. Balkan lynx conservation part of a broader national and regional strategy and the EU integration processes

ACTION 1	
Title of the Action:	Increase capacity in wildlife management and improve wildlife management practices
Objective:	To create the required capacities within institutions responsible for wildlife conservation and management and to improve wildlife management practices in the range countries.
Description of activities:	<p>The Balkan lynx suffers from high habitat fragmentation (general Action 2) and from infrastructure development (general Action 5), but also from insufficient wildlife (prey) conservation and management. The state authorities and other institutions involved in the range countries do not have the capacity for an adequate wildlife conservation and management and existing laws are poorly implemented or enforced.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Review the existing wildlife management structures and capacities in all range countries; 2. Launch an awareness and capacity building/training programme for wildlife management and law enforcement; 3. Cooperate with scientific institutions in order to establish a curriculum for wildlife research and conservation; 4. Facilitate close cooperation with hunters in the region through a series of workshops for awareness rising; 5. Support the integration of hunters into wildlife monitoring and management.
Expected results:	<ul style="list-style-type: none"> • Review of the legal situation and institutional structures of wildlife management in the range countries; • Improved awareness and professional skills of wildlife management authorities and institutions; • Improved integration of and cooperation with hunters.
Responsibility for implementation:	Specialised conservation and wildlife research institutions (NGOs), national wildlife conservation authorities, national and international scientific institutions, hunters' associations.
Timing of the activities:	5 years
Level of urgency:	2
Cost and potential funding sources:	<100k
Benefit:	4

ACTION 2	
Title of the Action:	Balkan lynx conservation part of a broader national and regional strategy and the EU integration processes
Objective:	To achieve cross-sectoral integration of lynx conservation matters in strategic development documents in each of the range countries, as well as evaluating and predicting current and future EU integration process influences on lynx conservation issues.
Description of activities:	<p>The action aims to create a working group for the evaluation of all existing and proposed legal documents relevant for lynx conservation and coordinate activities among different departments within institutions in the range countries. In addition, the implementation of existing frameworks and action plans (such as the range-wide Balkan Lynx Conservation Strategy and the National Action Plans for Albania and the Former Yugoslav Republic of Macedonia) will be promoted.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Review the goals/objectives of the Balkan Lynx Conservation Strategy regarding its compatibility or conflicts with the existing legal framework and development plans; 2. Establish a task force to write a document that explores the issues associated with EU harmonisation and evaluates the potential ways in which EU harmonisation processes can influence lynx conservation using a scenario process.
Expected results:	<ul style="list-style-type: none"> • Working group for integration of lynx conservation issues in strategic approaches; • Implementation of range-wide Conservation Strategy and National Action Plans; • Task force for exploring EU harmonisation processes; • Studies on EU integration effects on lynx conservation.
Responsibility for implementation:	International and national (conservation) NGOs, national authorities for wildlife management, ecological/environmental faculties of (national) universities.
Timing of the activities:	3 years
Level of urgency:	3
Cost and potential funding sources:	<100k
Benefit:	4

4.3. Baltic population

Specific actions:

1. Working group for transboundary cooperation
2. Trade surveillance

ACTION 1	
Title of the Action:	Working group for transboundary cooperation
Objective:	To establish an international Baltic lynx population (BLP) working group cooperating on population level comprised of lynx experts and management officials from all countries which share the BLP.
Description of activities:	<p>Importance of the action is raised beyond general Action 1 because the region is extremely diverse considering political, economic and legislative systems. Formal co-operation among national administrations is not sufficient to ensure specific character of adaptive management required in LC conservation. A regional network of lynx experts has to work regularly on population level issues in order to engage in national conservation policies and decision making processes. The core group of the Baltic Large Carnivore Initiative (BLCI) established in 2000 must be enlarged through the involvement of researchers, conservationists from NGOs and relevant administrators from all countries within the population range. Network members will be suggested and invited by the core group presently acting in Estonia, Latvia and Lithuania.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Establish BLP working group with each country represented by at least one researcher and one specialist from the decision making authority; 2. Organise regular meetings/contacts of working group to share actual information on management decisions and to tackle all questions of population level consequence and to create a improved transparency; 3. Discuss all general and specific Action affecting the Baltic lynx population within the working group and make recommendations to the national decision making authorities.
Expected results:	<ul style="list-style-type: none"> • Increased transparency and mutual understanding of national management and conservation issues; • Ground prepared for improved conservation and shared conservation of the population (general Action 1).
Responsibility for implementation:	BLCI core group, namely large carnivore researchers from Estonia, Latvia, Lithuania, and Poland.
Timing of the activities:	1–2 years, continued
Level of urgency:	1
Cost and potential funding sources:	<100k; nature conservation agency of host country.
Benefit:	5

ACTION 2	
Title of the Action:	Trade surveillance
Objective:	To ensure the highest level expertise support to authorities and custom service dealing with surveillance of trade with fur and fur products.
Description of activities:	<p>A consolidated surveillance system required by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Organise workshops, trainings, reference collections, awareness campaigns; 2. Ensure case-to-case consultations of authorities with experts enabling inerrable identification of Eurasian lynx fur and skulls; 3. Ensure turn-over of hunting trophies to be monitored in accordance with issued hunting quotas and permits.
Expected results:	<ul style="list-style-type: none"> • Effective law enforcement network where inspectors and custom service can promptly intercommunicate with zoologists and fur experts; • Origin of legally obtained hunting trophies easily traceable and provable by surveillance authorities.
Responsibility for implementation:	Responsible agencies for CITES in all countries.
Timing of the activities:	1 year to establish, continued
Level of urgency:	3
Cost and potential funding sources:	<100k, certain amount per year in each national budget required.
Benefit:	2–3 depending on species status (protected or game)

4.4. Bohemian-Bavarian population

(Remark of the contributors: the population has expanded into the Austrian Bundesländer north of the Danube river and should be named the “Bohemian-Bavarian-Austrian population” in future.)

Specific actions:

1. Apply active population reinforcement
2. Damage prevention and compensation
3. Public relation work

ACTION 1	
Title of the Action:	Apply active population reinforcement
Objective:	To create and foster stepping stones to neighbouring populations (foremost the Carpathian population) in order to prevent inbreeding of the small and isolated population.
Description of activities:	The Bohemian-Bavarian population is still small and isolated, has however the potential to be connected to the large source population of the Carpathians. Activities: <ol style="list-style-type: none"> 1. Replenish documented illegal killings by animals from genetically suitable populations. 2. Nurse and release orphaned animals by translocation into suitable stepping stone sites.
Expected results:	<ul style="list-style-type: none"> • Counteract possible inbreeding in the population; • Create and foster possible stepping stones to support spreading of population and linkage to other lynx occurrences (esp. Carpathian population).
Responsibility for implementation:	Bavarian Environmental Agency, Czech Ministry of Environment
Timing of the activities:	1–2 years, ongoing
Level of urgency:	3
Cost and potential funding sources:	<100k
Benefit:	4

ACTION 2	
Title of the Action:	Damage prevention and compensation
Objective:	To support prevention measures against lynx attacks on livestock and compensate damages caused by lynx in secured herds or game enclosures.
Description of activities:	In the Czech Republic no prevention measures against large carnivore attacks are supported on country or regional level. Activities:

	<ol style="list-style-type: none"> 1. Apply EU agricultural or national subsidies for electric fences or shepherd guarding dogs to be supported as preventive measures against lynx attacks on livestock; 2. Improve documentation of attacked livestock and create a central database of reported/compensated cases in order to compare losses on livestock and successful approaches in herd protection. 3. Specific tasks to be solved in each country (e.g. in CZ damages in game enclosures are not compensated and thus creating a conflict between interest groups).
Expected results:	<ul style="list-style-type: none"> • Professional documentation of possible lynx depredation on livestock; • Comparable procedures across population; • Smooth coverage of documented attacks; • Increased tolerance of lynx among sheep breeders and hunters.
Responsibility for implementation:	Implementation: Bavarian Environmental Agency Funds: private associations (hunting, nature protection) combined with governmental aid.
Timing of the activities:	1, ongoing.
Level of urgency:	5
Cost and potential funding sources:	<100k; partly covered until mid-2015
Benefit:	2

ACTION 3	
Title of the Action:	Public relation work
Objective:	To develop and implement consistent and target-specific PR concepts and educational programmes together with interest groups such as hunters, livestock owners and foresters.
Description of activities:	<p>A much broader public relation campaign and cooperation with stakeholder groups is needed to improve the acceptance of lynx.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Work with media, social networks and web-based applications as well as with local opinion makers and politicians in order to get objective information from scientists to the public. 2. Authentic pictures and videos from camera traps are promising material in terms of lynx education and public awareness work. 3. Involve local people, tourists, volunteers and interest groups in data collection through field seminars and online map applications. 4. Develop an educational programme and field trips for schools and nature enthusiasts. 5. Develop printed materials (educational and PR) for the interest groups - hunters, livestock owners, foresters - and distribute them in on-site meetings. 6. Include lectures on lynx impact on game into the system of hunters' education.
Expected results:	<ul style="list-style-type: none"> • Better informed and motivated interest groups; • Increased tolerance for lynx among general public and interest

	<p>groups;</p> <ul style="list-style-type: none"> • Involvement of public in data collection (monitoring).
Responsibility for implementation:	Conservation NGOs, stakeholder groups, media people.
Timing of the activities:	1 year, continued
Level of urgency:	3
Cost and potential funding sources:	<100k
Benefit:	4

4.5. Carpathian population

Specific actions:

1. Public awareness and education
2. Reduction of feral and free-ranging dogs and cats in the wild

ACTION 1	
Title of the Action:	Public awareness and education
Objective:	To develop and implement consistent and target specific public relation concepts and education programmes together with interest groups such as hunters, livestock owners and foresters.
Description of activities:	<p>Lynx conservation in the Carpathians is in need of a much broader support from interest groups and the general public, which will be reached through a public awareness and education campaign.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Work with media, social networks, local opinion makers and politicians in order to get objective information from scientists to public; 2. Develop printed materials (educational and PR) for the interest groups – hunters, livestock owners, foresters – and distribute them in on-site meetings; 3. Include lectures on lynx impact to game into the system of hunters' education; 4. Involve local people and interest groups in data collection. 5. Develop an educational programme for schools as well as for the general public; 6. Develop PR lynx conservation websites with online-based platforms to collect data for lynx observation and discussion corners as part of a PR campaign.
Expected results:	<ul style="list-style-type: none"> • Better informed interest groups concerning lynx role in ecosystems and its conservation • Active involvement of the interest groups and the general public in the issues of lynx conservation • Better acceptance of the species by interest groups like livestock owners, hunters and foresters
Responsibility for implementation:	NGOs involved in large carnivore conservation (BG: Balkani Wildlife Society, CZ: Friends of the Earth CZ, PL: Association for Nature Wolf, SK: Slovak Wildlife Society), national interest groups, media people.
Timing of the activities:	1 year for preparation, continuous.
Level of urgency:	2
Cost and potential funding sources:	<100k
Benefit:	4

ACTION 2	
Title of the Action:	Reduction of feral and free-ranging dogs and cats in the wild
Objective:	To develop and implement effective measures to reduce feral dogs and cats in order to mitigate transmission of diseases to lynx and to reduce competition for wild prey.
Description of activities:	<p>High number of feral and free-ranging dogs and cats in the wild are a source of transmissions of parasites and diseases to lynx population, a possible mortality factor of lynx kittens and they are competitors for food (wild ungulates). Implementation of measures to prevent the spread of diseases, including rabies, among wildlife and domestic animal populations is important. This problem is especially pronounced in countries like Romania and Bulgaria.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Identify areas with concentration of stray dogs, which might have a significant impact on the lynx and wild ungulate population; 2. Develop and implement solutions to reduce their numbers, i.e. through removal or sterilisation of stray dogs from/in lynx territories; 3. Review and improve legal systems regarding pets and feral domestic animals in countries sharing the Carpathian lynx population; 4. Increase responsibility of pet owners for deworming, vaccination and diseases prevention in dogs and cats, but also for damage caused by dogs to livestock and wildlife.
Expected results:	<ul style="list-style-type: none"> • Increased awareness of dog and cat owners about impact of their pets on wildlife and responsibility of owners for damage to livestock and wildlife; • Reduced transmission of parasites and diseases to lynx population; • Solutions for the effective reduction of feral and free-ranging dog populations; • Reduced mortality of wild ungulates and better food basis for lynx.
Responsibility for implementation:	National and regional authorities responsible for lynx conservation in close collaboration with institutions/organisations dealing with feral dog population control and management (e.g. hunting associations), veterinary services, nature conservation and animal welfare organisations.
Timing of the activities:	1–2 years for assessment and developing concepts, continuous implementation.
Level of urgency:	2
Cost and potential funding sources:	100–500k
Benefit:	5

4.6. Dinaric population

Specific actions:

1. Reinforcement of the population in Croatia and Slovenia
2. Capacity building for lynx management (including large carnivore emergency teams)

ACTION 1	
Title of the Action:	Reinforcement of the population in Croatia and Slovenia
Objective (what the Action aims to obtain):	To introduce new genes into the heavily inbred Dinaric lynx population.
Description of activities:	The reintroduced Dinaric population needs genetic remedy. Activities: <ol style="list-style-type: none"> 1. Obtaining all necessary permits and agreements. 2. Selection of country within the Carpathian lynx population range for a source. 3. Solving of logistics of lynx capturing, quarantine, transfer and release. 4. Monitoring the post release life of transferred animals, their effect on population size and genetic situation.
Expected results:	<ul style="list-style-type: none"> • Transferred lynx produce offspring with resident ones; • Genetic diversity is improved.
Responsibility for implementation:	Lynx researchers, relevant Government bodies, international partners
Timing of the activities:	2 years for translocations, 4+ years monitoring
Level of urgency:	1
Cost and potential funding sources:	500k–1000k
Benefit:	4

ACTION 2	
Title of the Action:	Capacity building for lynx management (including large carnivore emergency teams)
Objective (what the Action aims to obtain):	To train and equip a group of local professionals to act properly in any event related to lynx and covering the entire lynx range in the countries. (Can be the same group trained for wolf emergency actions.)
Description of activities:	Activities: <ol style="list-style-type: none"> 1. Invite the representatives from regions with lynx presence of the range countries for a two-day workshop to train them to act properly in any unusual lynx related event. 2. Review theoretical sessions systematically under the scope and importance of situations as: inspection of lynx damages, survey of protective measures applied, evaluation of risk for safety of human property and expertise on eventual need for lethal removal of lynx. 3. Given special attention to manage the case of orphaned lynx cubs. Practical training includes the work on the bodies of dead lynx and on handling

	the immobilized ones, on how to do the measurements and take samples.
Expected results:	<p>Trainees will acquire the legal status of a Team member with signed contract with the government body. Team members will officially inspect the site of each lynx related problem situation and act accordingly:</p> <ul style="list-style-type: none"> • Urgently if case requires, or prepare report and propose next steps; • Advise on prevention of problem with lynx; • Advise on eventual need for lethal removal of lynx (e.g. rabies); • Know how to properly take samples of dead lynx; • Know how to properly take measurements of lynx body.
Responsibility for implementation:	Lynx experts (training), relevant governmental agency (organisation and contracting trainees)
Timing of the activities:	1–3 years (several training workshops)
Level of urgency:	2
Cost and potential funding sources:	<100k
Benefit:	4

4.7. Jura population

Specific actions:

1. Review and harmonise measures against predator attacks on livestock
2. Information programme for hunters

ACTION 1	
Title of the Action:	Review and harmonise measures against predator attacks on livestock
Objective:	To review the necessity for and the possibilities to apply measures to protect livestock (sheep flocks) against predator attacks (lynx, but also dog and wolf) in France and Switzerland countries.
Description of activities:	<p>On average over the past 10 years there were 75 attacks of lynx on sheep in the French Jura Mts. In Switzerland, there are only a few single cases per year. In the light of the current expansion of wolves from the Alps towards the secondary mountain chains, the existing prevention measures to protect livestock need to be reviewed.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Review and compare experiences in both countries regarding lynx damage prevention; 2. Make recommendation on how to improve the prevention (considering the challenge of the arrival of wolves); 3. Implement the improved prevention measures.
Expected results:	<ul style="list-style-type: none"> • Evaluation of livestock husbandry and existing damage prevention measures in the light of expanding large carnivore populations; • Proposal for amendments where needed in improved system implemented where possible.
Responsibility for implementation:	France: ONCFS, livestock breeding associations; Switzerland: AGRIDEA, FOEN & cantonal authorities, livestock breeding associations
Timing of the activities:	1 year for assessment, 1–3 years for implementation
Level of urgency:	3
Cost and potential funding sources:	<100k for assessment, 500k–1000k for implementation
Benefit:	4

ACTION 2	
Title of the Action:	Information programme for hunters
Objective:	To increase the awareness and improve the information of and cooperation with hunters regarding lynx and predation.
Description of activities:	<p>Beyond general Activity 6, a specific programme for the cooperation with hunting associations and hunters in the Jura is proposed.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Involvement of hunters into monitoring and research activities. 2. Translation of scientific results into popular articles and presentations, publication in hunting magazines.

	3. Workshop for hunters to exchange information and improve dialogue.
Expected results:	<ul style="list-style-type: none"> • Active involvement of hunters through Action 4 • Popular articles and presentations • Improved understanding, relationships and dialogue
Responsibility for implementation:	Wildlife researchers and wildlife management authorities in collaboration with hunting associations with the support of human dimensions scientists.
Timing of the activities:	1 – 3 years, continuous
Level of urgency:	2
Cost and potential funding sources:	<100k; national wildlife authorities MEED, FOEN, cantons
Benefit:	5

4.8. Karelian population

Specific actions:

1. Evaluate smaller management zones for lynx in Finland
2. Test sustainable harvest models

ACTION 1	
Title of the Action:	Evaluate smaller management zones for lynx in Finland
Objective:	To assess the zoning for lynx in Finland for best practice management
Description of activities:	Finland is presently divided into two lynx management zones: (1) the area of reindeer management in the north and (2) the rest of Finland. For future management planning, these zones need to be reconsidered according to ecological features (especially staple prey). Activities: <ol style="list-style-type: none"> 1. Consider/assess a division of Finland – especially the area south of the reindeer zone – into two zones, one where mountain hares (showing pronounced population fluctuations) are the primary prey of lynx, and another one where the primary prey are deer.
Expected results:	<ul style="list-style-type: none"> • Improved and more adaptive lynx management.
Responsibility for implementation:	Finnish Game and Fisheries Research Institute.
Timing of the activities:	1 year
Level of urgency:	3
Cost and potential funding sources:	<100k
Benefit:	3

ACTION 2	
Title of the Action:	Test sustainable harvest models
Objective:	To build harvest scenarios that are based on population models and implement evaluations/tests on how good these models are working.
Description of activities:	Scenarios based on differential harvest rates based on Bayesian approach have been constructed for the Finnish lynx population in 2012-2013. Activities: <ol style="list-style-type: none"> 1. Construct scenarios at an annual basis; 2. Empirically test the model by monitoring the response/trend of the lynx population.
Expected results:	<ul style="list-style-type: none"> • Sustainable harvest; • Improved predictability of effect of harvest on population.
Responsibility for implementation:	Finnish Game and Fisheries Research Institute.
Timing of the activities:	1 year, continuous
Level of urgency:	3
Cost and potential funding sources:	<100k
Benefit:	4

4.9. Scandinavian population

Specific actions:

1. Coordinate management plans for lynx with wolf, bear and wolverine
2. Introduce robust population models for managing harvest quota setting
3. Preventative measures for sheep and reindeer and improved compensation system

ACTION 1	
Title of the Action:	Coordinate management plans for lynx with wolf, bear and wolverine
Objective:	To better take into account both ecological interactions and cumulative aspects of conflict associated with having multiple large carnivore species in the same region.
Description of activities:	<p>Lynx are found in regions with several other large carnivore species. The tolerance level for lynx depends on both the abundance of lynx and on the abundance of other large carnivores. Good estimates of the cumulative losses of domestic animals to all large carnivores species are often more important for the reindeer herders and sheep farmers than the species-specific losses. The conservation value for an area can be higher when several large carnivore species co-exists.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Estimate the interactions between different large carnivore species and the cumulative losses of domestic prey; 2. Integrate these findings into the respective management plans and coordinate the plans among each other accordingly.
Expected results:	<ul style="list-style-type: none"> • Estimates of the ecological interaction of multiple large carnivore species in the same region. There are both negative interactions (e.g. intraguild predation) and positive interactions (e.g. scavenging opportunities). • Estimates of the cumulative impact of multiple large carnivore species in the same region on the total losses of domestic animals (reindeer and sheep) to large carnivores.
Responsibility for implementation:	National wildlife management agencies in Sweden and Norway Regional wildlife management agencies in Sweden and Norway Wildlife research institutions and universities
Timing of the activities:	3 years; operating of system: Continuously as part of the management plans
Level of urgency:	1
Cost and potential funding sources:	500k–1000k
Benefit:	4

ACTION 2	
Title of the Action:	Introduce robust population models for managing harvest quota setting
Objective:	To develop robust population models based on existing monitoring data to set harvest quotas for lynx

Description of activities:	<p>Robust population models and decision theory can help wildlife managers to use monitoring data and to set harvest quotas that minimise risks of unintended consequences and promote transparency in the process.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Use existing monitoring data, harvest data and other relevant population dynamics data to develop robust population models for forecasting the effect of different harvest levels on the lynx population size at different spatial scales (e.g. regional, national and population levels). Use the experience from other similar population models. 2. Annual update of the models based on the most recent monitoring results and harvest. 3. Include the evaluations and forecasts into the annual monitoring. 4. Evaluate the observed effects of harvest with the predicted effects within an adaptive management framework.
Expected results:	<ul style="list-style-type: none"> • Produce robust population models using monitoring data and other relevant population dynamic data for setting harvest quotas; • Evaluate the observed effects of the harvest on the population size with the forecasted effects; • Compliment annual monitoring reports with an evaluation of the most recent harvest by comparing the forecast and results from the monitoring; • Compliment annual monitoring reports with a forecast of different harvest levels on future population size (see Action 4) .
Responsibility for implementation:	<p>National management agencies in Sweden and Norway Regional management agencies in Sweden and Norway Wildlife research institutions and universities</p>
Timing of the activities:	1–2 years (development of system); operating of system continuous
Level of urgency:	2
Cost and potential funding sources:	100k–500k
Benefit:	3

ACTION 3	
Title of the Action:	Preventative measures for sheep and reindeer and improved compensation system
Objective:	<p>To promote the introduction and upgrading of preventative measures to minimise lynx depredation on sheep and reindeer improve compensation system in order to provide a positive incentive for lynx conservation.</p> <p>Test and evaluate lethal and non-lethal preventive measures to reduce depredation on sheep in close co-operation with stakeholders.</p>
Description of activities:	Preventive measures against depredation and compensation of losses should have a positive effect on (the acceptance of) lynx conservation. There are several different methods to compensate the losses of

	<p>domestic animals, from paying incentives for large carnivore presence to those that pay compensation for documented and estimated losses. One important aspect is how different compensation systems can improve the coexistence of large carnivores with local stakeholders. The system needs to be re-evaluated and adopted accordingly. Costs and benefits of various preventative measures should be viewed within the wider contexts of agricultural economics.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Test and evaluate different potential preventive measures (both lethal and non-lethal) to reduce depredation on sheep and on reindeer; 2. Consider lynx harvest as one preventive measure to reduce depredation and evaluate it within an adaptive management framework; 3. Perform tests in very close co-operation with sheep farmers and reindeer herders; 4. Assess cumulative effects of multiple large carnivore species for cost effective preventive measures; 5. Review different compensation systems (e.g. risk-based a prior compensation and ex-post facto documented losses) in Europe for large carnivores and the pros and cons of different compensation systems under different circumstances; 6. Adapt the system in Scandinavia in order to maximise the conservation effect of prevention and compensation.
Expected results:	<ul style="list-style-type: none"> • Estimation of the effect, costs and benefits of different non-lethal preventive measures to reduce lynx depredation on reindeer and sheep; • Evaluate lethal control as a measure to reduce depredation within an adaptive management framework; • Review of different compensation systems in Europe; • Improved prevention and compensation system promoting lynx conservation.
Responsibility for implementation:	National wildlife management agencies in Sweden and Norway, Regional wildlife management agencies in Sweden and Norway, National reindeer management agencies in Sweden and Norway, Regional reindeer management agencies in Sweden and Norway, Stakeholders (reindeer herders and sheep farmers) in Sweden and Norway, Research institutions and universities
Timing of the activities:	3 years
Level of urgency:	1
Cost and potential funding sources:	500k–1000k
Benefit:	4

4.10. Vosges-Palatinian population

Specific actions:

1. Sociological study and education and awareness raising campaign
2. Harmonization of mitigation systems between France and Germany

ACTION 1	
Title of the Action:	Sociological study and education and awareness raising campaign
Objective:	To investigate human attitudes and to prepare the ground for the potential enhancement of the population by improving the awareness on the critical status of the population on local, national and international level and for different stakeholders.
Description of activities:	<p>The status of the population on the French side (Vosges Mountains) is critical, and reinforcement is planned on the German side (Palatinian Forest). Both situations need a higher awareness of the public and the support or tolerance of stakeholders.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Conduct human attitude studies in order to establish methods to enter into dialogue with different interest groups, particularly hunters and livestock owners. 2. Informing the public and particular interest groups about results from this study by means of different media. 3. Communicate in particular the critical status of the population in order to increase of the awareness on and the support of conservation measures required for its safeguarding and the population.
Expected results:	<ul style="list-style-type: none"> • Improved understanding on attitudes and conflicts; • Entering a dialogue with interest groups; • Material for popular articles, conferences, exhibitions, excursions, presentations at schools; • Awareness raised amongst the public and particular interest groups (like hunters and livestock owners); • Better public support for conservation measures.
Responsibility for implementation:	ONCFS, protected areas, NGOs (e.g. Luchs-Projekt Pfälzerwald / Vosges du Nord), national monitoring networks, hunters associations.
Timing of the activities:	1– 3 years, continuous.
Level of urgency:	1
Cost and potential funding sources:	<100k
Benefit:	5

ACTION 2	
Title of the Action:	Harmonisation of mitigation systems between France and Germany
Objective:	To harmonise prevention measures in France and Germany in order to mitigate lynx-sheep interactions.

Description of activities:	<p>Damage on livestock has so far been comparatively low and prevention measures are currently not established yet. For the recovery of the lynx population and also in the light of the recent expansion of wolf into the area (2013 first reproduction in the Vosges Mts.), the establishment of similar mitigation systems across the entire massif are needed.</p> <p>Activities:</p> <ol style="list-style-type: none"> 1. Review the (experience with) preventive measures in France and Germany; 2. Make recommendations for improvement and harmonise the prevention in the two countries for the shared population.
Expected results:	<ul style="list-style-type: none"> • Revision and evaluation of the situation and the preventive systems; • Recommendations for amendments; • Consultation and cooperation of/with livestock owners, implementation of measures (inclusive securing funding).
Responsibility for implementation:	National wildlife authorities, livestock breeders' associations, local livestock breeders, NGOs and experts
Timing of the activities:	2 years
Level of urgency:	2
Cost and potential funding sources:	<100k; national/provincial wildlife authorities, lynx projects, private organisations.
Benefit:	4