



## **Key actions for Large Carnivore populations in Europe**

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**Subject: Key actions for Large Carnivore Populations**

With this note I bring to your attention the attached technical report on the most urgent actions necessary at the population level for four species of large carnivores protected under the EU's Habitats Directive.

The recommendations contained in this document are addressed to national, regional or local authorities, and to all the stakeholders who have an interest and the capacity to act for the conservation and sustainable management of large carnivore population in the European Union.

This work links the approach proposed by the 2008 guidance document on population-level management of large carnivores and the various action plans on large carnivore species of the Bern Convention of the Council of Europe. The most urgently needed population-level actions for each species are identified in addition to general actions relevant at the species level, or for all the large carnivore species. I hope that you and your organization will find these actions useful to guide your own activities. I would also appreciate your feed-back to DG Environment if any of the proposed actions are implemented by your organization.

This document is the product of the knowledge and the efforts of a large team of experts. Earlier drafts were consulted with a large number of stakeholders and the Member State national authorities. I wish to thank all those who contributed to this exercise.

Yours sincerely

  
Pia Bucella

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**Istituto di Ecologia Applicata  
Via B. Eustachio 10 – IT 00161 Rome  
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Coordination: Luigi Boitani

Sections coordinated by: Henrik Andren (5), Luigi Boitani (3), Djuro Huber (2), John Linnell (1), Urs Breitenmoser and Manuela Von Arx (4).

Contributions by: Francisco Alvarez, Ole Anders, Henrik Andren, Elisa Avanzinelli, Vaidas Balys, Juan Carlos Blanco, Luigi Boitani, Urs Breitenmoser, Guillaume Chapron, Paolo Ciucci, Aleksander Dutsov, Claudio Groff, Djuro Huber, Ovidiu Ionescu, Felix Knauer, Ilpo Kojola, Jakub Kubala, Miroslav Kutal, John Linnell, Aleksandra Majic, Peep Mannil, Ralph Manz, Francesca Marucco, Dime Melovski, Anja Molinari, Harri Norberg, Sabina Nowak, Janis Ozolins, Santiago Palazon, Hubert Potocnik, Pierre-Yves Quenette, Ilka Reinhardt, Robin Rigg, Nuria Selva, Agnieszka Sergiel, Maryna Shkvyrina, Jon Swenson, Aleksander Trajce, Manuela Von Arx, Manfred Wolf, Ulrich Wotschikowsky, Diana Zlatanova.

Contract management in DG Environment: András Demeter and Marco Cipriani

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*Cover: Photo composition by Alessandro Montemaggiori*

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# SECTION 1: BACKGROUND AND CROSS-CUTTING ACTIONS

## 1. Background

Large carnivores (bears, wolves, lynx and wolverines) are among the most challenging group of species to reintegrate back into the European landscape. After centuries of persecution they are now recovering across many areas of Europe due to favourable legislation, although some small populations remain critically endangered. Accordingly, a wide range of conflicts have reappeared and intensified, including the economically costly depredation on livestock and pets. Hunters perceive carnivores as competitors for shared prey species and in some events, predation can sustainably influence traditional game harvests. There are also a wide range of other social clashes where carnivores become symbols for conflicts associated with urban-rural and traditional-modern interfaces. In some exceptional cases, large carnivores (mainly bears) can be a risk for human safety, and fear of both bears and wolves is often expressed by rural residents. These conflicts can escalate to very high levels and can dominate political discourses in some countries.

In many cases reintegrating large carnivores into the fabric of the European countryside requires making a number of adjustments to the practices of many sectors, including agriculture, forestry, hunting, transport, refuse treatment as well as dealing with the general concerns of many rural residents. There is a real need for the regional authorities to make the right adjustments, using the measures that have been proven to work. Many measures may be highly controversial and / or expensive, so it is crucial that their adoption can be justified and that as much experience can be transferred between areas to minimize the need to reinvent the wheel in different areas. From across Europe there is a wide range of experience from many different circumstances and situations. This experience ranges from knowledge of traditional animal husbandry and hunting practices, to the latest in hi-tech research and mitigation measures, and in large part stems from projects applied locally and co-funded by the European Commission under the LIFE programme.

Europe is a very diverse continent in terms of geographical, environmental and socio-economic factors and there are no solutions that work in all contexts. It is therefore necessary to identify the range of potential solutions and then pick the combination of measures which work best in different local contexts. Building on this experience, it is imperative that the EC plans in a strategic way how to coexist with large carnivores in a crowded and increasingly urbanised continent. In 2012 the Directorate General for the Environment of the European Commission (DG ENV) launched an initiative for the conservation and sustainable management of large carnivore species, based on dialogue with, and involvement of, relevant stakeholders, with a view to ensuring their commitment to the long-term conservation of large carnivores in coexistence with humans in Europe<sup>1</sup>. The vision of the Directorate-General for the Environment of the European Commission (DG ENV) is to manage the recovery of LC populations while

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<sup>1</sup> [http://ec.europa.eu/environment/nature/conservation/species/carnivores/index\\_en.htm](http://ec.europa.eu/environment/nature/conservation/species/carnivores/index_en.htm)



the concerns of stakeholder such as hunters, farmers and livestock and reindeer producers, local communities as well as environmentalists are fully considered in the process. The key goal of the renewed effort by the Commission is to engage all stakeholders in finding solutions that are beneficial for large carnivore conservation whilst ensuring coexistence with human populations. The work needs to be taken forward, with demonstrating actions and active and intense communication.

For this reason, DG ENV contracted the Istituto di Ecologia Applicata to develop a set of supporting documents that will serve as the basis for improving the implementation of EU policy on large carnivore conservation under the Habitats Directive (43/92/EEC) through, amongst several tasks, the identification of key management actions. Members of the Large Carnivore Initiative for Europe ([www.lcie.org](http://www.lcie.org)) contributed to this work.

## **2. EU-level LC species action plans with a population-based approach**

The initial plan to produce four new action plans at EU level for the four large carnivore species (the single population of the highly threatened Iberian lynx is not part of this exercise), focused on populations, was modified in agreement with the Commission, and in consideration of the fact that population action plans need a participatory approach to be developed among the member States which share each population. After a first draft that included 330 actions for the four species, a decision was taken to modify the action plans into a list of up to 10 priority actions for each population of the four species, including a series of cross-cutting horizontal actions that could be relevant for all the four species and for most of their populations.

The process included the involvement of over 40 experts from 23 countries that contributed in different measures to the development of each action. The list of actions was preliminarily submitted to the Commission for comments, and then sent to the EU LC expert group and the stakeholders invited to attend the workshop held on the 5<sup>th</sup> of December 2013 in Brussels. Comments received revealed the lack of cross-cutting issues that could be grouped and the need to convert the actions into broad suggestions of initiatives to be taken at population level.

The IEA has supported the DG ENV in the organization of a stakeholder workshop held in Brussels on the 5<sup>th</sup> of December 2013. Over 90 participants took part in the workshop, coming from different countries and representing a number of interest groups. The workshop's main discussion topic was the establishment of an EU Platform on Large Carnivores and their eventual participation, and the comments to the draft priority actions for large carnivore populations.

The discussion, organised into geographical clusters, revealed that further work was needed on the priority actions, which were found to be too focused on the biology of the species and requirement of further studies. There was a call for a stronger focus on the management and socio-economic dimensions of large-carnivore conservation, including cultural aspects<sup>2</sup>.

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<sup>2</sup> [http://ec.europa.eu/environment/nature/conservation/species/carnivores/pdf/summary\\_2nd\\_LC\\_workshop.pdf](http://ec.europa.eu/environment/nature/conservation/species/carnivores/pdf/summary_2nd_LC_workshop.pdf)

A revised draft of this document was submitted to the Habitats Committee (Agenda item 5.b – 29 April, 2014) and Member States were invited to make subsequent comments. Significant inputs from several Member States contributed to this final document.

The following chapters and sections cover the cross-cutting actions and the key actions for each species and population.

### **3. Pan-European and cross-species priority actions**

Despite the diversity of situations that brown bears, wolves, Eurasian lynx and wolverines occur in across Europe, it has been possible to identify a set of actions that are of general importance for large carnivore conservation in Europe. Although there may be some regional variation in priority and in the exact way in which these actions should be implemented, there is a clear value in identifying these broad areas where action will have a general effect. Because of their over-arching importance, these are almost automatically actions where there will be a need for pan-European and national level institutions to get involved. They also underline the need for cross-sectorial cooperation between different ministries, directorates and agencies.

In Sections 2-5 of this document, the key priority actions for each carnivore species are presented in two separate lists: the first includes all actions applicable to the majority of European populations of that species (not necessarily or equally to all), the second includes 2-3 specific priority actions for each population. It should be noted that some of the common actions for a species may not be equally relevant for all populations of that species. Moreover, there is no suggested priority between the common and the specific actions for any species.

### **4. Objectives of the lists of actions**

The attached documents contain proposals for sets of key actions which constitute a voluntary agenda for the most needed actions to be considered by not only the national authorities responsible for implementing the Habitats Directive, but also by a range of stakeholders who might take an interest in, and have the resources to implement, some of the proposed measures. These recommendations can also serve as guidance to what needs to be done and where, for any of the stakeholders wishing to apply for project financing from any source of funding, including EU funds such as the LIFE programme. It is recommended, however, to establish an effective dialogue and appropriate consultations with the relevant authorities at national and regional level before implementation of any of these actions to ensure coordination of actions and an effective use of resources.

The specific objectives of these lists of actions are:

- To identify the most critical (*i.e.* important and urgent) actions that will improve the conservation and management of the populations of brown bears, wolves, Eurasian lynx and wolverines in Europe, and their coexistence with local stakeholders for the next 5 years;
- To provide the authorities responsible for the conservation and management of the large carnivore species in the Member States of the EU with a strategic planning tool for relevant future activities in the next 5 years;
- To improve collaboration and relationship amongst relevant stakeholders for large-carnivore 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 of the most urgent needs for large-carnivore conservation and management in Europe.

## 5. Cross cutting actions – across species and populations

<b>ACTION 1</b>	
Title of action:	<b>Preventing fragmentation of habitat and reducing disturbance associated with infrastructure development</b>
The issue:	There is a large degree of infrastructure construction across Europe, related to transport (road and rail), energy production (roads, windmills, hydropower schemes) and some types of recreational development (especially ski slopes). These linear features threaten to fragment habitat and reduce connectivity within and between large carnivore populations, increase mortality of carnivores, and increase human access to previously undisturbed habitats. The issue is especially important in eastern and southern Europe where development is rapid.
The need:	To improve the consideration for wildlife connectivity in development planning so as to minimise impacts, and where development is unavoidable there should be an increased focus on the need to mitigate negative impacts, for examples using crossing structures (e.g. green bridges, underpasses), and limitations on access to new road networks (e.g. those linked to energy development). Critical areas for population connectivity need to be identified and given special consideration in development planning.
Desired goal:	Higher standards of environmental impact assessments that specifically consider mobile wildlife species, explicitly deal with cumulative impacts, and mandating stronger requirements for the incorporation of mitigation measures into all development.

<b>ACTION 2</b>	
Title of action:	<b>Reducing large carnivore depredation on livestock</b>
The issue:	Wherever large carnivores occur in areas with livestock, especially small stock (sheep and goats) and semi-domestic reindeer, there is a constant risk of depredation, which is both a source of economic loss for producers and a threat

	to traditional rural lifestyles. The problem is especially acute in areas where large carnivores return after prolonged absence.
The need:	There is a great deal of technical knowledge and practical experience on ways to reduce depredation that needs to be communicated to livestock producers. There needs to be effective outreach by agricultural advisors about how to adapt husbandry as well as how to access the necessary economic and technical assistance. Finally, there is a need for agricultural policy at all levels to recognise the potential presence of large carnivores and the constraints that they represent for livestock production.
Desired goal:	Widespread improvement in access to technical and economic assistance concerning depredation reduction methods for livestock producers across large carnivore range. There also needs to be a greater awareness of potential conflicts with large carnivores when planning the spatial distribution of agricultural subsidy and incentives to prevent an increase in conflicts.

<b>ACTION 3</b>	
Title of action:	<b>Integrating large carnivore management needs into wildlife and forest management structures</b>
The issue:	Large carnivores are directly and indirectly affected by, and in turn influence, the management of large herbivores and forests. Carnivores can influence hunting practices and the density of prey, as well as being influenced in turn by prey management. In some areas, carnivore presence may require a reduction in hunting quotas for ungulates, in other areas carnivore conservation may require the restoration of prey populations. Bears especially are dependent on forest management considering their nutritional needs.
The need:	There is a need to adopt ecosystem level management practices that simultaneously considers large carnivores, large herbivores, and forests.
Desired goal:	More coordinated management of predators, prey and habitat.

<b>ACTION 4</b>	
Title of action:	<b>Evaluating social and economic impacts of large carnivores</b>
The issue:	The impact of the conservation of large carnivores is controversial, with various stakeholders focusing on either the costs or the benefits of their presence. The extent of their impact is contested. It is a further challenge that both costs and benefits include both monetary and non-monetary elements, as issues like tradition, culture, ethics and intrinsic value are central values.
The need:	To clarify the full range of ecological, social and economic impacts and benefits associated with large carnivore conservation, as well as a mapping of attitudes among rural people towards these costs and benefits.
Desired goal:	Improved understanding of the impact of large carnivore conservation on ecosystems and human societies, as well as the extent of support among key stakeholders and the public for the various trade-offs that their conservation may imply. This should provide a better foundation for informed decision making that underlies the democratic process.

<b>ACTION 5</b>	
Title of action:	<b>Improved transboundary coordination of large carnivore management</b>
The issue:	Large carnivore conservation requires coordination across large areas – both within and between populations. There is a need to coordinate management between the different administrative units that share a population and ensure that connectivity between populations is enhanced. The need for this coordination has been identified within pan-European policy, but progress towards achieving it has been slow. It is also important that these structures include arenas for communication and dialogue with stakeholders.
The need:	(1) Population level management plans (2) Regional stakeholder dialogue forums (3) Coordination and information exchange between EU Member States and their non-EU neighbours.
Desired goal:	Improved coordination of large carnivore management, enhanced stakeholder dialogue, and better communication across borders.

<b>ACTION 6</b>	
Title of action:	<b>Standardisation of monitoring procedures</b>
The issue:	Monitoring is central to large carnivore conservation, both as a foundation for robust adaptive management procedures and to address the widespread conflicts caused by disagreement over population status. Current monitoring practices are diverse, varying in methods used, transparency and quality. This creates much uncertainty about the current state and trend of populations.
The need:	To standardise methods for species within populations to the greatest extent possible (taking into account local conditions – such as presence of snow etc.). There should also be an increase in transparency in how data is acquired and interpreted as well as a greater involvement of stakeholders and the wider public in monitoring (e.g. using citizen science approaches).
Desired goal:	Better data and less controversy about the state of large carnivore populations.

<b>ACTION 7</b>	
Title of action:	<b>Managing free-ranging and feral dogs to reduce hybridisation with wolves and other conflicts</b>
The issue:	Free-ranging and feral dogs are widespread in southern and parts of eastern Europe. They threaten large carnivore conservation by hybridising with wolves and causing conflicts through their predation on livestock and game.
The need:	There needs to be a massive scale improvement in dog management, especially in southern Europe, reducing populations of feral and free-ranging dogs and leading to an improvement in dog management.
Desired goal:	A reduction in the numbers of feral and free-ranging dogs.

<b>ACTION 8</b>	
Title of action:	<b>Law enforcement with respect to illegal killing of large carnivores</b>
The issue:	Illegal killing of large carnivores is widespread across Europe, significant resources are rarely invested in police investigations, and very few cases are successfully prosecuted. Killing is both by shooting (where large carnivores are directly targeted) and poisoning (where large carnivores may not always be primary target). Motivation for illegal killing seems to be linked to low tolerance and social protest rather than for economic gain.
The need:	To raise awareness of the extent of the problem among law enforcement agencies, to encourage a greater investment of resources into investigation, and to exchange best practices in investigation techniques.
Desired goal:	A signal effect that illegal killing of large carnivores is a serious crime and that society expects its laws to be upheld such that political disagreements about large carnivore management and conservation are conducted through legal channels.

<b>ACTION 9</b>	
Title of action:	<b>Genetic reinforcement of small populations of lynx and bears</b>
The issue:	Some populations of Eurasian lynx and brown bears are very small (<200 individuals) in central and southern Europe. This is especially true for the reintroduced populations. Their conservation will depend on increasing their genetic diversity. Because these populations are too isolated to expect any inter-population contact in the short term, it is important to begin planning translocations.
The need:	To increase genetic diversity of isolated populations through carefully planned translocations of individuals from a suitable source population.
Desired goal:	Increased genetic diversity to foster population growth and provide a better genetic platform for long term viability.

<b>ACTION 10</b>	
Title of action:	<b>Institutional capacity-building in wildlife management agencies</b>
The issue:	Many of the responsible authorities in parts of Europe lack the economic resources and human capacity to conduct all the tasks that are necessary for effective large carnivore management.
The need:	Increase resource availability and technical capacity for responsible authorities to conduct large carnivore related activities such as law enforcement, population monitoring, stakeholder dialogue and communication.
Desired goal:	More effective institutions that can work proactively to reduce conflicts and ensure the viability of species under their jurisdiction.

<b>ACTION 11</b>	
Title of action:	<b>Developing best practice for large carnivore based ecotourism</b>
The issue:	There is an increase in ecotourism operations that are based around large carnivores. It is important that these are conducted in a manner that minimises disturbance and prevents any form of food conditioning. There is special concern about operators that use bait to increase viewing chances. Currently there are no clear guidelines about how to best conduct large carnivore centered tourism operations.
The need:	Produce a set of guidelines on how to operate large-carnivore centric ecotourism
Desired goal:	Create opportunities for public viewing and economic use of large carnivores that do not interfere with their individual behaviour or population viability, and prevent the emergence of unwanted or conflictual situations.

## SECTION 2: BEARS

### PART I

#### 1.1. Bear Populations in Europe

In Europe, brown bears occur in 22 countries. Based on the existing distribution data and a range of geographic, ecological, social and political factors European bears have been clustered into 10 populations: Scandinavian, Karelian, Baltic, Carpathian, Dinaric-Pindos, Eastern Balkan, Alpine, Apennine, Cantabrian, and Pyrenean.



**Figure 1.** The 10 bear populations of Europe



## 1.2 Status

The estimated total number of brown bears in Europe is about 18,000 individuals. Based on reported and updated census data, the largest population is the Carpathian population (> 7,000 bears), followed by the Scandinavian and Dinaric-Pindos populations (> 3400 and 3040 bears, respectively). The other populations are much smaller, ranging from several hundred (e.g. Baltic ~700, Cantabrian ~200) to less than a hundred (e.g. Alps ~50 bears). Compared to the 2005 survey (Bear Online Information System for Europe, BOIS), the Scandinavian, Dinaric-Pindos, Cantabrian, and Pyrenean populations have all recorded a clear increase. The other populations remained stable. The decrease of the Eastern Balkan population is likely due to new and improved survey techniques. All population ranges remained relatively stable or expanded slightly. In the Alpine population, the loss of the central Austrian segment was counterbalanced by the expansion of the north Italian segment in Trentino.

In many countries/populations, monitoring is based on genetic methods that use non-invasively collected DNA (from scats or hairs): e.g. Scandinavia, Italy, Austria, Spain, France, Greece, and Slovenia. In other countries these genetic methods are used to complement other traditional methods (e.g. Croatia, Slovakia, Poland) such as counts at feeding sites, snow tracking, and telemetry. In the countries where genetics and radio-telemetry are not used, absolute estimates are necessarily based on weaker grounds. The small populations are generally subject to more intense and costly monitoring methods trying to count all individuals, although the most closely monitored large population is in Scandinavia. In hunted populations, harvest data is used to help interpret population trends.

Name of population	Most recent size estimate (2010, 2011 or 2012)	Trend 2006-2011	IUCN Red List assessment
<b>Scandinavia</b>	<u>Norway</u> : 105+ <u>Sweden</u> : 3300 <b>TOTAL: 3405</b>	Increase	Least concern
<b>Karelian</b>  (not including Russia west of 35°E)	<u>Norway</u> : 46 <u>Finland</u> : 1900	Increase	Least concern (in connection with Russia west of 35°E)
<b>Baltic</b>  (not including Belarus and the Russian oblasts of Leningrad,. Novgorod, Pskov, Tver, Smolensk, Bryansk, Moscow, Kalinigrad, Kaluzh, Tula, Kursk, Belgorod & Ore)	<u>Estonia</u> : 700 <u>Latvia</u> : 12	Increase	Least concern (in connection with the Russian oblasts of Leningrad, Novgorod, Pskov, Tver, Smolensk, Bryansk, Moscow, Kalinigrad, Kaluzh, Tula, Kursk, Belgorod & Ore)

<b>Carpathian</b> (not including Ukraine)	<u>Romania</u> : 6000 <u>Poland</u> : 147 <u>Serbia North</u> : 8 <u>Slovakia</u> : 700-900 (art. 17) <b>TOTAL: ~ 7000</b>	Stable	Near threatened (including and not including Ukraine)
<b>Dinaric-Pindos</b>	<u>Slovenia</u> : 450 <u>Croatia</u> : 1000 <u>Bosnia &amp; Herzegovina</u> : 550 <u>Montenegro</u> : 270 "The Former Yugoslav Republic of Macedonia": 180 <u>Albania</u> : 180 <u>Serbia</u> : 60 <u>Greece</u> : 350-400 <b>TOTAL: 3040</b>	Increase	Vulnerable
<b>Alpine</b>	<u>Italy (Trentino)</u> : 43-48 <u>Italy (Friuli)</u> : <12 <u>Switzerland</u> : 1 <u>Austria</u> : ~5 <u>Slovenia</u> : 5-10 <b>TOTAL: 45-50</b>	Stable	Critically endangered
<b>Eastern Balkans</b>	<u>Bulgaria</u> : 550+ <u>Greece</u> : ~50 <u>Serbia</u> : 8 <b>TOTAL: ~600</b>	Stable or decrease?	Vulnerable
<b>Apennine</b>	<b>TOTAL: 37-52</b>	Stable	Critically endangered
<b>Cantabrian</b>	<b>TOTAL: 200</b>	Increase	Critically endangered
<b>Pyrenean</b>	<u>Spain</u> : 25 <u>France</u> : 19 <b>TOTAL: 25</b> (taking into account double counting)	Increase	Critically endangered

### 1.3 Legal status and management

Most of the European bear populations are strictly protected. The parts of the populations that fall within EU countries are strictly protected under the Habitats Directive, with all populations being listed in Annex IV. Sweden, Finland, Romania, Estonia, Bulgaria, Slovenia and Slovakia currently use derogations under Article 16 of the Directive to allow a limited cull of bears by hunters. Croatia, Bosnia and Herzegovina and Norway manage bears as a game species with annual quotas as only the Bern Convention binds them. In Croatia, regular bear hunting ended in 2013 when Croatia joined the EU and had to adapt to EU laws. Nearly all countries have some kind of bear management plan, action plan or bear management strategy. However, in several countries these documents are still waiting to be implemented effectively.

## 1.4 Threats

The smallest bear populations are Critically Endangered. However, the current prevailing public interest, most management actions, and financial backup, should secure their short to mid-term survival. Almost half of the populations are currently growing in number, but to guarantee long-term survival, all present and potential future threats have to be taken in account.

The most relevant threats are: habitat loss due to infrastructure development, disturbance, low acceptance by some segments of the rural public, low capacity of management institutions, intrinsic bio-ecological factors (such as small population size), accidental mortality, and illegal persecution. Most of these threats are expected to become slightly more important in the future.

## 1.5 Conflicts and conflict management

Bears are large, opportunistic and omnivorous carnivores with a wide range of biological needs during their life cycle, which may bring them into conflict with humans. Some conflict types threaten human interests (e.g. property loss like livestock depredation or attacks on humans), some threaten bears (e.g. habitat fragmentation and den disturbance) and some are mutually problematic (e.g. traffic accidents).

Most countries pay damage compensation either from the state budget or from funds contributed by interest groups, such as hunters. The rough economic cost (based on reported compensation only) is in the magnitude of 2.5-3.0 million € per year. Livestock losses are the most important damage type, but the variety of damages are much wider than for wolverines, lynx, and wolves and include damage to beehives, orchards, crops, trees, and even vehicles and buildings. More than half of all the money is paid for compensations in Norway (1.5 M€), followed by 321,000 € in the Cantabrian Mountains, and 252,000 € in Slovenia. Other countries pay between 6000 € (Croatia) and 141,000 € (Greece) annually. The amounts paid are not at all proportional to the number of bears in the population. Costs per bear/year are generally higher in smaller populations than in larger ones: e.g. 12,666 € in Norway, 6114 € in the Pyrenees, 3445 € in Abruzzo, 1605 € in the Cantabrian Mountains, 1371 € in the Italian Alps, 555 € in Slovenia, 511 € in Greece, 102 € in Poland, 45 € in Bulgaria, 15 € in Estonia & Latvia, 79 € in Slovakia, 6.0 € in Croatia, and 3.6 € in Sweden. It should be noted that there are no data to show that countries that pay more have better public acceptance of their bears.

## PART II – Actions relevant for all bear populations

*Note:*

<i>Level of urgency:</i>	<i>(scale of 1-5: 1 = high urgency, 3 = medium urgency, 5 = low urgency)</i>
<i>Benefit:</i>	<i>(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)</i>

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Protection of bear habitat and enhancement of connectivity within each population and between populations</b>
<b>Objective:</b>	<p>The overall objective is securing the living space for bears on the population level and securing the mobility of individuals between populations to keep the minimum necessary gene flow.</p> <ol style="list-style-type: none"> <li>a) Ensure that bear habitat in the currently used bear range will not get smaller and will not lose quality;</li> <li>b) The connectivity of bear habitat within each population and among populations should be maintained, and where necessary enhanced, through mitigation measures;</li> </ol> <p>The action is necessary for all 10 bear populations and each of 22 countries that host part of any population.</p>
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) Guidelines for ensuring bears connectivity will be prepared based on existing knowledge of the biological and ecological needs of bears;</li> <li>2) Maps showing the importance or sensitivity of sites (pixel size 250x250 m) will be produced based on unbiased known locations of animal use of the areas (telemetry points);</li> <li>3) Guidelines for Environmental Impact Assessment on Bears will be used to assess the impacts of: <ol style="list-style-type: none"> <li>a) new construction (including roads, highways, railroads, pipelines, power lines, wind parks, solar energy installations, hotels, ski slopes, golf courses and other sport fields etc.);</li> <li>b) new habitat uses like forestry, hunting;</li> <li>c) human activity like hiking, camping etc. in bear habitat.</li> </ol> </li> </ol> <p>Application of the EIA Guidelines will require additional specific study for each disputed site following the pre-described methodology. Special attention will be given to the cumulative effect of multiple human influences. Mitigation measures will be proposed for each case.</p>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Guidelines for the Environmental Impact Assessment on Bears</li> <li>• Guidelines accepted as a mandatory document by planning agencies;</li> <li>• “sensitivity maps” produced for various habitat variables;</li> <li>• Standardized method used in each EIA considering bears (and other LCs);</li> <li>• Potential application of the Guidelines to all large carnivore species;</li> <li>• Specific criteria defined for NATURA 2000 sites with large carnivores (e.g. total maximum percent of area that may be affected by certain human interventions);</li> <li>• List of available mitigation measures and the criteria for apply them;</li> <li>• Some planned construction/activities halted or re-routed following EIA;</li> <li>• Specific mitigation measures implemented at sites where they are needed (e.g. green bridge over a highway);</li> <li>• All populations where it is feasible will have possibility for inter-population movements of individuals (exceptions for bears are Apennine, Cantabrian and Pyrenean populations).</li> </ul>
<b>Principal responsibility</b>	International group of experts writes Guidelines for the Environmental

<b>for implementation:</b>	Impact Assessment on Bears; European Commission endorses Guidelines as a “working tool”; Responsible ministry in each country accepts and implements the use of guidelines; Responsible government body controls the implementation-
<b>Timing of the activities:</b>	1 year to prepare the Guidelines; 1 year to implement the use of Guidelines; 1-3 years to see some mitigation measures applied.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	5

ACTION 2	
<b>Title of the Action:</b>	<b>Economic use of the intrinsic (inherent) and extrinsic (utilitarian) value of bears</b>
<b>Objective:</b>	The action aims to define the value of bears at local and national levels. Areas inhabited by bears will have an added value to counter-balance the problems (damages) caused by living with large carnivores. The potential of “eco-tourism” in bear country is exploited. Some bear populations can be used for hunting tourism and produce profit from selling valuable trophies and meat from hunted animals.
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) Preparing a “best practice manual” for “bear tourism”;</li> <li>2) Finding and encouraging tourist operators and the offices of national parks and other protected areas in bear range to include such programmes in their offer;</li> <li>3) Hunting organizations are encouraged to offer bear viewing and photographing on the top of their hunting programs;</li> <li>4) Governments should subsidize such programs by (e.g.) waiving or lowering taxes for the first initial years;</li> <li>5) Bear experts are involved in writing programs, in training persons to become “bear educators” or “bear interpreters”, and occasional lectures for selected groups;</li> <li>6) Local people are involved in interpretation, guiding and providing accommodations for bear tourism visitors;</li> <li>7) Local products are sold with “bear friendly” labels indicating production systems harmless for bears, thus having additional value because of their origin from bear country.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• The “best practice manual” for “bear tourism” is prepared and available for all potential users;</li> <li>• At least one tourist operator and one national park office per country/population includes and advertises such a programme;</li> <li>• At least one hunting unit per country/population offers and advertises bear viewing and photographing;</li> <li>• Government subsidizes or waives taxes to profit from bear tourism programs;</li> <li>• Bear experts train bear educators (interpreters);</li> <li>• “Bear friendly labels” are used on local products;</li> </ul>

	<ul style="list-style-type: none"> <li>• Hunting programs are fully organized to service all needs of hunters including processing and delivery of trophies;</li> <li>• Total financial benefit of use of bears is equal or larger than the total amount paid for damages (in the region).</li> </ul>
<b>Principal responsibility for implementation:</b>	Bear experts and stakeholder representatives write the «manual». Relevant government body supports the action. Tourist operators, national parks and hunting organizations execute (and advertise) the programs.
<b>Timing of the activities:</b>	6 months to prepare, adapt and advertise the “manual”. 1 year to start with programs.
<b>Level of urgency:</b>	3
<b>Benefit:</b>	4

ACTION 3	
<b>Title of the Action:</b>	<b>Managing bear populations based on monitoring trends, sizes and total mortality</b>
<b>Objective:</b>	<p>All management decisions are based on sound data collected in a standardised way.</p> <p>Standardized monitoring protocols for bear population are developed and implemented. This should include records of bear presence, bear mortality, and incidents involving bear human conflicts. Each record is defined by date and time, GPS location, observer and description. Certain events include taking the sample(s), measurements and/or photographing.</p> <p>Systematically collected data will reveal trends of bear population size and range.</p>
<b>Description of activities:</b>	<p>1) Preparation and legal approval of all monitoring protocols;</p> <p>2) Training of the monitoring team;</p> <p>3) The examples of events to be recorded are:</p> <ol style="list-style-type: none"> <li>a) signs of animal presence (like footprints, scats, markings) which may be decided to be fully recorded only for small populations, for other ones only on the range edges, or only in some seasons and in the areas of interest such as those close to people;</li> <li>b) photo-trapped animals – useful when trap cameras are set systematically;</li> <li>c) confirmed sighting – very important for family groups;</li> <li>d) live captured animals – handling (measuring, sampling and marking) has to follow the protocol;</li> <li>e) problem bears – the whole history, actions undertaken and the final outcome;</li> <li>f) dead bears – from traffic, poaching, natural causes or legal hunting – standard necropsy with measurements and samples.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Numerical data on each event type known;</li> <li>• Trend of the population size and range size;</li> <li>• Absolute population size may be calculated;</li> <li>• All mortality causes are known;</li> </ul>

	<ul style="list-style-type: none"> <li>• Collected samples enable additional data on genetics, pathology, parasitology, various pollutants;</li> <li>• GIS map for spatial distribution of events;</li> <li>• Management decisions have firm base.</li> </ul>
<b>Principal responsibility for implementation:</b>	Governmental body responsible for bear management.
<b>Timing of the activities:</b>	<ul style="list-style-type: none"> <li>- 6 months to prepare all the protocols;</li> <li>- 12 months for training the team and implementation;</li> <li>- Continuous after that.</li> </ul>
<b>Level of urgency:</b>	1
<b>Benefit:</b>	4

<b>ACTION 4</b>	
<b>Title of the Action:</b>	<b>Implement sound protective measures to prevent damage by bears</b>
<b>Objective:</b>	<p>Prevention measures are implemented in a standardized way.</p> <p>The right for damage compensations is to be tied to the use of protective measures.</p> <p>The acceptance of alternative activities by local people, which have to be “bear friendly”, is subsidized.</p>
<b>Description of activities:</b>	<p>Damages by bears can be significantly decreased in the areas where properly implemented. Large parts of bear damages can be eliminated by avoiding certain human activities in some areas (like sheep husbandry in forested bear range).</p> <ol style="list-style-type: none"> <li>1) Preparation of a manual of internationally accepted and proven protective measures with specification for use;</li> <li>2) Education and control of users of protective measures;</li> <li>3) Stimulating studies for innovative protective solutions;</li> <li>4) Subsidize the abandonment of human activities that are known to result in bear damages and replacing with bear-friendly ones. Target issues: livestock depredation, beehives, orchards.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Manual on standard protective measures prepared and endorsed;</li> <li>• No damages in the areas where certain human activity were abandoned;</li> <li>• Decrease of damages by 50% at the sites where the prescribed measures were properly applied;</li> <li>• Local people are fully informed about available protective measures</li> <li>• Specific measures to protect orchards, crops on fields, beehives, livestock, reindeer, and food stores are prepared locally.</li> </ul>
<b>Principal responsibility for implementation:</b>	<p>Government body is responsible for preparation and distribution of manuals, for «avoidance» subsidies and for paying compensation (tied to the use of protective measures);</p> <p>Local administration, NGOs and personal funds for the cost of property protection;</p> <p>International projects (EU and other) to search for innovative solutions.</p>
<b>Timing of the activities:</b>	12 months for all preparatory actions and education of users of

	protective measures; 12 months (4 seasons) for each pilot action.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	5

ACTION 5	
<b>Title of the Action:</b>	<b>Preparation and implementation of a management strategy (plan) for each trans-boundary bear population</b>
<b>Objective:</b>	All countries without a bear management plan will produce one. All new and existing plans consider that the bears in their country are a segment of larger populations shared by several neighbouring countries. The level and style of coordination of country management plans follows the document " <i>Guidelines for population level management plans for large carnivores in Europe</i> " (Linnell <i>et al.</i> 2008). All countries sharing a bear population prepare a joint management strategy.
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) Countries work on their own bear management plans through workshops with all interest groups;</li> <li>2) International meetings of experts and at governmental level;</li> <li>3) Coordination and endorsement of bear management plans of all countries to fit the "<i>Guidelines for population level management plans for large carnivores in Europe</i>";</li> <li>4) Implementation of plans.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Each country has its own bear management plan;</li> <li>• Bear management plans of all countries are coordinated with all neighbouring countries sharing the same bear population;</li> <li>• Population level plans are written, agreed and endorsed;</li> <li>• The plans are implemented.</li> </ul>
<b>Principal responsibility for implementation:</b>	National governments encouraged by European Commission.
<b>Timing of the activities:</b>	3 years until the implementation which is to be continuous thereafter.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	4

ACTION 6	
<b>Title of the Action:</b>	<b>Reduce conflicts over the size of populations by providing genetically determined population size estimates using data collected with public participation</b>
<b>Objective:</b>	Reduce conflicts over the size of populations by providing genetically determined population size estimates using data collected with public participation
<b>Description of activities:</b>	The disputes about various estimates of local bear population size lead



	<p>to difficulties in executions of management actions. Even scientifically based estimates are not accepted if local inhabitants and interest groups are not involved in the process. Today's genetic methodology allows very precise estimates but requires large numbers of biological samples. Experience has shown that if samples are collected with local help and if the methodology is transparently described the results will be trusted and all resulting management decisions will be easier to implement. Activities:</p> <ol style="list-style-type: none"> <li>1) Involve local hunters, hikers, forest and game wardens, and volunteers in the sample collection, which are typically faecal samples stored in alcohol. Samples sizes should be roughly 3 times larger than the expected population size;</li> <li>2) Laboratory analyses produce estimates of population size, range size, trend, genetic structure and gene flow (heterozygosity, effective population size).</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Size of the population is known;</li> <li>• Status of threat facing the population;</li> <li>• Information on gene flow and effective population size;</li> <li>• Agreement of all interest groups about the results;</li> <li>• Proper management measures implemented.</li> </ul>
<b>Principal responsibility for implementation:</b>	Bear experts supported by government bodies.
<b>Timing of the activities:</b>	1 year for collecting of samples and 1,5 years of laboratory work.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	3

ACTION 7	
<b>Title of the Action:</b>	<b>Establishment and training of bear management bodies: A bear management committee and bear emergency team in each county with bears</b>
<b>Objective:</b>	<p>Establish official bodies of experts and governmental officers in each country with bears. Protocols for their work are written and approved. The Bear management committee (BMC) will meet regularly to advise the relevant ministry on needed and appropriate actions relevant for bear management.</p> <p>The Bear emergency team (BET) will train its members to intervene in each bear related incident (orphan bears, problem bears, unusual damage cases, traffic accidents, bears in trouble, dead bears). Both bodies will ensure that proper decisions are taken, the population surveys are completed, and that conflicts are prevented or mitigated.</p>
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) The group of 5 to 15 experts will be appointed along with representatives of relevant ministries. They form the BMC and receive an official mandate signed by the minister. Members of certain interest groups may be invited to relevant meetings;</li> <li>2) The BMC prepares the protocol for their work, which is eventually endorsed by the minister;</li> </ol>

	<ol style="list-style-type: none"> <li>3) The BMC prepares regular national bear action plans;</li> <li>4) Once a year a workshop with presentation on the state of the bear population is organized by BMC for all interest groups where they can express their concerns to be considered in bear management;</li> <li>5) People working with bears and living in or near bear country are appointed to the BET. The goal is to have one or two people in each district to cover the entire bear range;</li> <li>6) The working protocol for BET is prepared. It explains that BET members respond to each bear related emergency and report to BMC with his/her own opinion on what to do. The BMC decides and the responsible person in the ministry approves the action (including shooting the problem bear when no other option works);</li> <li>7) All BET members are invited to workshops and training courses. These meetings are held to standardise their response in various bear incidents. The training includes target shooting with rubber bullets, handling of an immobilized bear, measurement and sampling of a dead bear, solving the situation of a bear on the highway, bear in a trap, etc. BET members are paid for travel cost and time used.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• BMC and BET are established and operational with approved working protocols;</li> <li>• Suitable expertise is involved in all decision making processes;</li> <li>• The system ensures predictability in the way that incidents are addressed;</li> <li>• The number and impacts of incidents is reduced;</li> <li>• The database on the bear population grows and allows increasingly better management decisions.</li> </ul>
<b>Principal responsibility for implementation:</b>	Responsible government office with the help of bear experts.
<b>Timing of the activities:</b>	One year to establish BMC and two years to establish and get operational BET.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	4

<b>ACTION 8</b>	
<b>Title of the Action:</b>	<b>Prevention of bear access to garbage and anthropogenic food</b>
<b>Objective:</b>	Reduce accessibility to anthropogenic food by bears within and close to human settlements, by 80% in the core and 50% in the peripheral range, compared to current levels within the next 3 years. Organic waste that attracts bears is disposed of in ways that bears cannot access it. Action is taken in each country sharing the bear range. Logistically, it is organized at a local level but with strong governmental support.
<b>Description of activities:</b>	1) A team of bear and sanitation experts prepare technical guidelines to reduce the accessibility of anthropogenic foods in bear range, to be formally submitted for approval to independent experts and the environmental authorities. Initial surveys provide lists of facilities

	<p>that need to be mitigated. All anthropogenic foods potentially accessible to bears within human settlements, both in the core and peripheral range, are surveyed and inventoried by trained personnel;</p> <ol style="list-style-type: none"> <li>2) Bear proof bins and containers are professionally constructed. This includes: bear proof bins in natural surroundings and household bins, municipal containers and garbage dumps;</li> <li>3) Garbage dumps are moved from the bear range or fenced with conventional wire mesh and electric fencing. Illegal dumps are cleaned and closed;</li> <li>4) Local inhabitants are obliged to keep the household waste out of reach of bears;</li> <li>5) Presentations on the importance of the issue and the methods to mitigate the problem are held in each local community;</li> <li>6) Educational materials will be produced and public meetings will be held in relevant settlements to facilitate implementation of sanitation measures in private households;</li> <li>7) Sanitation management will be monitored for 2 years to assess its effectiveness and allow adaptive improvements.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Technical guidelines for sanitation in bear range are produced by a team of experts;</li> <li>• Inventory of all potential anthropogenic food sources in human settlements within the bear range;</li> <li>• Public awareness on management of habituated and/or food conditioned bears is enhanced, as well as people's willingness to reduce the accessibility of anthropogenic food sources;</li> <li>• All household garbage from local people is kept indoors or in bear-proof containers until collection by municipal services;</li> <li>• Garbage bins are all bear proof and always closed;</li> <li>• Open garbage dumps are removed from bear range;</li> <li>• Remaining garbage dumps are fenced to be bear safe;</li> <li>• Municipal regulations oblige locals to keep household waste out of bear reach;</li> <li>• Each national park and stakeholder organization involved in outdoor activity in bear range educates visitors not to leave edible waste in nature;</li> <li>• People do not encounter bears close to settlements so frequently anymore and the acceptance of bears is improved.</li> </ul>
<b>Principal responsibility for implementation:</b>	Bear experts, environmental authorities, regional and provincial governments, protected area authorities, local municipal organization, all people in the bear range.
<b>Timing of the activities:</b>	Six months for survey and preparations. Nine months from spring to fall in one year per single operation.
<b>Level of urgency:</b>	5
<b>Benefit:</b>	5

## PART III - SPECIFIC ACTIONS FOR EACH BEAR POPULATION

### 1. Alpine population

Specific actions:

1. Make problem bear management in the Italian Alps more effective by updating protocols and tools
2. Mitigation measures to reduce bear fatalities caused by vehicle collisions
3. Help connection between central Alps and Dinaric nucleus by releasing at least four female bears in the triangle area where Italy - Slovenia – Austria meet

ACTION 1	
<b>Title of the Action:</b>	<b>Make problem bear management in the Italian Alps more effective by updating protocols and tools</b>
<b>Objective:</b>	Reduce heavy negative effects of problem bears on both human properties and human attitudes. Improve acceptance and consequently reduce the risk of poaching.
<b>Description of activities:</b>	Revision and updating of action plans for bear management: 1) Adding “damage causing bears” to the list of “problem bears” that can be removed when damages are too high despite application of all potential aversive and prevention activities; 2) Allowing faster decisions in the frame of simplified procedures involving both central (Ministry) and local (Regions) authorities, while ensuring compatibility with EU regulations.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Reduce damages;</li> <li>• Reduce negative human attitudes;</li> <li>• Reduce poaching;</li> <li>• Medium and long term benefits on the bear population;</li> <li>• Development of effective common management tools.</li> </ul>
<b>Principal responsibility for implementation:</b>	Provincia Autonoma di Trento, Provincia Autonoma di Bolzano, Regione Lombardia, Regione Veneto, Regione Autonoma Friuli Venezia Giulia, Ministero dell’Ambiente, Istituto Superiore per la Protezione e la Ricerca Ambientale.
<b>Timing of the activities:</b>	2014-2015
<b>Level of urgency:</b>	1
<b>Benefit:</b>	5

ACTION 2	
<b>Title of the Action:</b>	<b>Mitigation measures to reduce bear-car accident fatalities</b>
<b>Objective:</b>	Reduce bear mortality, considering the small number of bears roaming in the Alps and the high accident rate recorded so far.

	Such actions will then ensure a higher human safety, not just against bear accidents, but from all wildlife (including wild ungulates)
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1. Public awareness campaign;</li> <li>2. Data base implementation;</li> <li>3. Placement of ad hoc signs in the hot spots;</li> <li>4. Evaluate possible operations aimed to create underpasses or green bridges.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Lower bear mortality rates;</li> <li>• Higher human tolerance with bears;</li> <li>• Higher road safety.</li> </ul>
<b>Principal responsibility for implementation:</b>	All GOs responsible for bear management.
<b>Timing of the activities:</b>	No imminent urgency but more so in the mid-long term when more bears could be roaming the Alps.
<b>Level of urgency:</b>	3
<b>Benefit:</b>	3

<b>ACTION 3</b>	
<b>Title of the Action:</b>	<b>Help connection between central Alps and Dinaric nucleus by releasing at least 4 female bears in the triangle area Italy - Slovenia - Austria</b>
<b>Objective:</b>	<ul style="list-style-type: none"> <li>- Improve connectivity between the two populations</li> <li>- Improve genetic fitness of central Alps population</li> </ul>
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1. Monitoring of the triangle area (IT, SL, AT) to spot possible presence of females with cubs in the next five years (2014-2018);</li> <li>2. Development of an ad-hoc communication campaign;</li> <li>3. Survey to investigate public attitude towards the idea of releasing a few females; to be done before the beginning of the project;</li> <li>4. Release of at least 4 young females if the monitoring above mentioned will show no evidences of females in the target area in the period 2014-2018.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Improved connectivity between the two populations;</li> <li>• Improved genetic fitness;</li> <li>• A further step toward bear re-colonisation of the eastern-central Alps.</li> </ul>
<b>Principal responsibility for implementation:</b>	All governmental offices responsible for bear management in that area.
<b>Timing of the activities:</b>	Five years of strict (genetic) monitoring of the area (2014-2018); Releases of the female bears starting from 2019.
<b>Level of urgency:</b>	3
<b>Benefit:</b>	5

## 2. Apennine population

Specific actions:

1. Effective control program of free-ranging dogs in protected areas within current and potential bear range
2. Conservation priority given to critical bear habitats instead of multiple uses (livestock grazing, hunting, tourism, etc.) in protected areas

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Effective control program of free-ranging dogs in protected areas within current and potential bear range</b>
<b>Objective:</b>	To reduce by at least 80% of the current levels the number of owned free-ranging and stray dogs within protected areas (i.e., regional and national parks) in the bear range, through enhanced implementation of the existing law (L.N. 282/91), within the next 2 years.
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) A group of experts assists park authorities to develop <i>ad hoc</i> regulations to be adopted by all regional and national parks to strictly regulate use and ownership of all forms of dogs (e.g., working dogs, hunting dogs, truffle dogs, pets, etc.);</li> <li>2) Part-time contracts with private veterinarians are annually renewed to tattoo and PIT-mark all owned dogs by seasonal or annual residents within protected areas;</li> <li>3) Specific arrangements are made with local veterinary services to capture free-ranging dogs and with humane-societies to host or arrange for the adoption of captured, not-owned dogs.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• A group of experts is nominated by the Ministry of the Environment and the Ministry of Health, with contributions from accredited biologists, veterinarians and managers from protected areas;</li> <li>• <i>Ad hoc</i> regulations are drafted by the experts, discussed and approved in their final version by park authorities, including their official approval by individual municipal administrations;</li> <li>• Approved <i>ad hoc</i> regulations are publicly disseminated and strictly implemented by park authorities;</li> <li>• Tattooing and PIT-marking service are made available for free to resident dog owners in each protected area;</li> <li>• Specific arrangements are signed with local veterinary service for the periodic capture of free-ranging dogs;</li> <li>• Specific arrangements are made with humane-societies for the adoption of captured dogs without owner;</li> <li>• The number of free-ranging dogs is permanently reduced by at least 80%.</li> </ul>
<b>Principal responsibility for implementation:</b>	Ministry of the Environment, Ministry of Health, Regional and National Park authorities.
<b>Timing of the activities:</b>	Months 1-6: group of experts is assigned, <i>ad hoc</i> regulations are drafted; Months 7-12: regulations are discussed and approved by park authorities; contacts with private vets, public veterinary services and

	humane societies are initiated; Months 13-14: regulations are publicly disseminated and contracts with private vets are signed by park authorities; Months 15-24: specific arrangements are signed with veterinary services and humane societies and free-ranging dog monitoring is established as a routine activity.
<b>Level of urgency:</b>	3
<b>Benefit:</b>	2

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Conservation priority given to critical bear habitats over multiple uses (livestock grazing, hunting, tourism, etc.) in protected areas</b>
<b>Objective:</b>	Seasonally critical bear habitats (i.e., comprising seasonal key resources) are identified within protected areas, in both the core and peripheral bear range, and appropriate management plans are approved by relevant authorities to ensure priority is given to bear conservation needs over human activities.
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) Using available data on resource use by bears, the seasonal foraging and denning areas are identified and mapped through GIS modelling within the core and peripheral bear range;</li> <li>2) Such areas within protected areas are considered as conservation priority areas over multiple uses, and a management plan is accordingly drafted by park authorities to be discussed and approved by all relevant authorities (ministry of environment, regional and provincial governments, municipalities);</li> <li>3) Indications by the management plan are implemented through active management and control of human activities such as livestock grazing, hunting and related activities, tourism, resource extraction, recreation).</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Map of most critical feeding areas in spring, summer and fall;</li> <li>• Map of denning areas;</li> <li>• Management plan ensuring conservation priority is given to critical habitats over multiple uses in a seasonal basis;</li> <li>• Approval and implementation of management plan for critical habitats by relevant authorities.</li> </ul>
<b>Principal responsibility for implementation:</b>	Research Institutions (GIS modelling), Protected area authorities, Ministry of the Environment, Regional and Provincial Governments, local municipalities.
<b>Timing of the activities:</b>	Months 1-6: development of GIS models; Months 7-12: development of the management plan for critical habitats; Months 13-18: discussion and approval of the management plan for critical habitats; Months: 19-24: implementation of the management plan.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	4

### 3. East Balkan population

Specific actions:

1. Evaluate and control the effects of artificial feeding on bears
2. Identify and protect priority conservation areas of critical bear habitats from incompatible human uses, with special attention on the functional connectivity between population fragments of Stara Planina and Rilo-Rhodopean segment, as well as Eastern Serbia – northwest Bulgaria

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Evaluate and control the effects of artificial feeding on bears</b>
<b>Objective:</b>	Identification of the effect of supplementary game feeding on bears and to implement measures for decreasing the likelihood that it leads to bears becoming food conditioned.
<b>Description of activities:</b>	This problem is of high importance for almost all of the East Balkan Bear population range, where regular supplementary feeding of game (wild boar, red and roe deer) is in place. Main activities would focus on the assessment of the level of importance of artificial feeding for bears through telemetry study and subsequent activities aiming to find solutions for decreasing its effect for the habituation of bears (e.g. replacement of corn feeding with planted game fields, planted fruit trees, etc.).
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Fewer bears close to human settlements;</li> <li>• Fewer habituated/problem bears.</li> </ul>
<b>Principal responsibility for implementation:</b>	Forestry units, hunters' associations, government bodies.
<b>Timing of the activities:</b>	Continuous
<b>Level of urgency:</b>	2
<b>Benefit:</b>	4

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Identify and protect priority conservation areas of critical bear habitats from incompatible human uses with special attention on the functional connectivity between population fragments of Stara Planina and Rilo-Rhodopean segment, as well as Eastern Serbia – northwest Bulgaria</b>
<b>Objective:</b>	Proactive habitat assessment and management actions to ensure long-term availability of undisturbed areas and natural key foods for bears within critical areas.
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1. Identify, assess and conserve priority areas of critical bear habitats;</li> <li>2. Enhancement of functional connectivity between protected areas within the core and the peripheral bear range through special conservation measures with special attention on the functional connectivity between population fragments of Stara Planina and Rilo-</li> </ol>



	Rhodopean, as well as Eastern Serbia – northwest Bulgaria.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Critical bear habitats effectively protected;</li> <li>• Functional connectivity between population fragments maintained.</li> </ul>
<b>Principal responsibility for implementation:</b>	Relevant GOs and wildlife agencies.
<b>Timing of the activities:</b>	Continuous.
<b>Level of urgency:</b>	3
<b>Benefit:</b>	5

#### 4. Baltic population

Specific actions:

1. Establish and implement measures to facilitate the expansion of the population range to the south
2. Bear occurrence outside permanent range: GIS data base, suitability of possible range

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Establish and implement measures to facilitate the expansion of the population range to the south</b>
<b>Objective:</b>	Habitat suitability analyses to assess the potential range and population size of bears within Estonia and Latvia, identify potential movement corridors and factors limiting expansion. Implement measures to facilitate bear expansion southwards.
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) Initiate, develop, finance and conduct a habitat suitability analyse covering the whole mainland area of Estonia and Latvia;</li> <li>2) Encourage mammal experts in Lithuania to consider the feasibility of natural bear range recovering in their country;</li> <li>3) Implement stricter harvest limits at the southern edge of bear range (southern part of Estonia) and achieve higher tolerance towards bear conflicts, e.g. introduce a more effective compensation system in this region compared to that in core areas of bear range. The key question is to protect the few reproductive and/or potential females in the area.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Map of current and potential range of bear in Estonia and Latvia;</li> <li>• Current and potential population size estimates;</li> <li>• Map of suitable dispersal paths southwards;</li> <li>• List of potential limiting factors;</li> <li>• List of measures to facilitate the expansion;</li> <li>• Continuous bear expansion southwards.</li> </ul>
<b>Principal responsibility for implementation:</b>	Bear researchers and responsible state agencies.
<b>Timing of the activities:</b>	One year for preparatory work and one year for implementation.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	3

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Bear occurrence outside permanent range: GIS data base, suitability of possible range</b>
<b>Objective:</b>	Monitor the trend of occasional bear occurrences and range expansion in space and time
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) Develop a new, or improve an existing, nature conservation /forest GIS database;</li> <li>2) Make the information system easily accessible for the public to input data and at the same time functioning as a tool for responsible state agencies to control and analyse the data and demonstrate the results;</li> <li>3) Develop the system in close cooperation with GIS and wildlife monitoring experts.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Functioning GIS database to gather, store and analyse bear observations;</li> <li>• Public online access to the system to input observations and view the results;</li> <li>• Bear population trends are adequately monitored.</li> </ul>
<b>Principal responsibility for implementation:</b>	Responsible state agency in partnership with interested NGO-s and research programs.
<b>Timing of the activities:</b>	Two years.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	2

## 5. Cantabrian population

Specific actions:

1. Resolve the issue of the San Glorio ski resort. Identify and implement rural development measures compatible with Natura 2000 sites in exchange for abandoning the project of construction of the ski resort
2. Implement actions to facilitate the re-colonization of bears in expansion areas, mainly (but not only) in the eastern population segment, removing the social and ecological constraints that hinder this re-colonization

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Resolve the issue of the San Glorio ski resort. Identify and implement rural development measures compatible with Natura 2000 sites in exchange for abandoning the project of construction of the ski resort</b>
<b>Objective:</b>	To develop rural economy initiatives compatible with bear conservation in the eastern population area, where bears are Critically Endangered. Abandon the San Glorio ski resort project, incompatible with bear conservation

<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) A group of experts on rural development with a good knowledge of the economic, social, cultural and natural characteristics of the area of eastern León and western Palencia provinces prepares a plan of rural development in the area. The activities of the plan must be compatible with the conservation of this Critically Endangered bear population, with the requirements of Natura 2000 sites, and with the national and regional laws on endangered species and protected areas;</li> <li>2) The plan is reviewed by the relevant government agency;</li> <li>3) The plan is officially adopted and the San Glorio ski resort project is officially abandoned.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Actions for rural development compatible with bear conservation are proposed and implemented;</li> <li>• The San Glorio ski resort project is definitively abandoned;</li> <li>• Rural development in the region is realigned to make it compatible with bear conservation;</li> <li>• Rural people and bears can coexist in the area.</li> </ul>
<b>Principal responsibility for implementation:</b>	Regional government of Castilla y León. Rural development experts.
<b>Timing of the activities:</b>	Six months for preparing the first draft. Three months for revision of official adoption of the plan.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	5

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Implement actions to facilitate the re-colonization of bears in expansion areas, mainly (but not only) in the eastern population segment, removing the social and ecological constraints that hinder this re-colonization.</b>
<b>Objective:</b>	To improve the conditions of the areas of expansion, mainly in the east of León province, which is crucial to recover the eastern population segment and to restore connection with the western population segment
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) To develop a detailed list of the areas where the bears are expanding, mainly in the east of León province, but also in other areas relevant for the recovery of the population;</li> <li>2) To obtain a deeper knowledge of the actual and potential ecological and social problems that can prevent or delay bear recovery;</li> <li>3) To work for the conservation of the most relevant forests that provide food, refuge and hibernation habitats for bears in these areas;</li> <li>4) To work with hunter associations in order to foster bear-friendly hunting activities in the most important areas for bear re-colonization;</li> <li>5) Actions to avoid damages to beehives and livestock if it is necessary;</li> <li>6) Close monitoring of the areas in order to avoid other impacts, such as</li> </ol>

	infrastructure development, incompatible tourism activities, etc.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• One person is hired to work in close contact with stakeholders, wardens and managers in the areas where the re-colonization is happening;</li> <li>• A ranked list of the best forests for short-term bear expansion;</li> <li>• A list of forestry impacts and solutions;</li> <li>• Meetings with hunter associations in order to agree on hunting activities that are least disturbing to bears;</li> <li>• Electric fences to protect beehives are donated to the producers and training to use and maintain them is offered in the best expansion areas;</li> <li>• A list of other impacts and solutions are provided to the regional governments and managers of protected areas in bear expansion areas.</li> </ul>
<b>Principal responsibility for implementation:</b>	Regional governments, mainly of Castilla y León but also those of Asturias, Cantabria and Galicia. Bear experts.
<b>Timing of the activities:</b>	Continuous.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	4

## 6. Carpathian population

Specific actions:

1. Promote naturalness of bear feeding habits and provide guidelines for supplementary feeding practices
2. Implement effective programs to reduce the number of stray dogs and enforce the law regarding the use of livestock guarding dogs
3. Integrating Ukraine into management planning activities to ensure continuity of the bear population throughout the Carpathians

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Promote naturalness of bear feeding habits and provide guidelines for supplementary feeding practices</b>
<b>Objective:</b>	<ol style="list-style-type: none"> <li>1. Assess the magnitude and trend of supplementary feeding practices for each country, including intentional bear feeding, ungulate baiting and creation of orchards for wildlife feeding;</li> <li>2. Assess the contribution of human-provided food to bear diet in different Carpathian regions;</li> <li>3. Identify main natural bear foods and main threats to important foraging habitats;</li> <li>4. Document the relationship between supplementary feeding and occurrence of problem bears in Poland;</li> <li>5. Workshops in each country organised to increase public awareness on the effects of wildlife feeding;</li> <li>6. Provide guidelines for best supplementary feeding practices.</li> </ol>

<b>Description of activities:</b>	<p>This Action is partly based on and complements the output of a recent scientific project in Poland about the effects of ungulate supplementary feeding on bears, and on the negative experience of supplementary feeding in Slovakia.</p> <ol style="list-style-type: none"> <li>1) Data on the amount of artificial food supplied from different feeding practices, as well as the regions where they occur, is gathered for each country for recent years;</li> <li>2) Diet analyses are conducted in regions where no information on bear diet is available to assess the relative contribution of human-provided vs natural foods;</li> <li>3) Stable isotope analysis of tissues (mainly hair) from problem and non-problem bears in Poland will reveal potential differences in the contribution of supplemental food to their diets. Results useable for other countries;</li> <li>4) The whole output, together with existing findings on the effects of artificial feeding on wildlife, is presented at two-day workshops in each country. The recommendation of not to increase the current levels of supplemental feeding is discussed and agreed by national stakeholders;</li> <li>5) A draft of the guidelines for best feeding practices is produced from each national workshop and summarized in a general document for the whole Carpathian population;</li> <li>6) The final guidelines are translated into national languages, printed and distributed among national stakeholders.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Amounts of human-provided food to bears and the trend is known;</li> <li>• Bear use and dependency on human-provided food is assessed;</li> <li>• Key natural bear foods, important foraging habitats, and main threats are identified;</li> <li>• The relationship between human-provided food and the occurrence of problem bears is investigated and documented;</li> <li>• Recommendations for best practice regarding ungulate baiting, bear intentional feeding and non-natural food plantations (e.g. maize crops, fruit trees) are produced;</li> <li>• Best feeding practices and the importance to protect habitats providing bear natural foods are disseminated to stakeholders, the media and the public.</li> </ul>
<b>Principal responsibility for implementation:</b>	Bear experts, hunting organizations, forest administrations, NGOs and governmental bodies responsible for nature conservation and management
<b>Timing of the activities:</b>	Two years; first year for data gathering, second year for workshops and guidelines preparation
<b>Level of urgency:</b>	3
<b>Benefit:</b>	4

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Implement effective programs to reduce the number of stray dogs and enforce the law regarding livestock guarding dogs.</b>
<b>Objective:</b>	Deploy effective measures, aimed to reduce the number of stray dogs and enforce the wildlife conservation law regarding stray dogs in hunting areas.
<b>Description of activities:</b>	Remove and sterilize the stray dogs from bears territories.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Reduction of cub mortality due caused by diseases spread from stray dogs;</li> <li>• Reduction of bear cubs killed or orphaned by packs of stray dogs;</li> <li>• Reduction of general bear disturbance.</li> </ul>
<b>Principal responsibility for implementation:</b>	GOs and hunting organisations.
<b>Timing of the activities:</b>	Permanent.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	5

<b>ACTION 3</b>	
<b>Title of the Action:</b>	Integrating Ukraine into management planning activities to ensure continuity of the bear population throughout the Carpathians
<b>Objective:</b>	Map current bear range in the Ukrainian part of the Carpathians, estimate bear numbers and identify potential threats for connectivity from Romania to Slovakia and Poland. Need for more detailed map of individual habitat patches. DNA studies to estimate proportion of transboundary bears along borders with EU countries. Estimation of illegal hunting on bear.
<b>Description of activities:</b>	Field surveys for bears and mapping of habitat. Law enforcement in Ukraine in order to reduce poaching of bears; When radio-collared bears are crossing the border, Ukrainian cooperation partners will be informed in order to monitor eventual mortality causes.
<b>Expected results:</b>	Better survival rates and better connectivity between bear populations from Romania to Slovakia and Poland through Ukraine.
<b>Principal responsibility for implementation:</b>	Ukrainian GOs.
<b>Timing of the activities:</b>	Permanent.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	5

## 7. Dinaric-Pindos population

Specific actions:

1. Facilitated workshops with stakeholders on bear management for the production and implementation of management plans (considering trans-boundary character of population)
2. Effect of supplementary feeding on bears (in Croatia and Slovenia)

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Facilitated workshops with stakeholders on bear management for production and implementation of management plans (considering trans-boundary character of population)</b>
<b>Objective:</b>	To reach the highest possible degree of consensus on key management principles, responsibilities and mechanisms for implementation.
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) Invite the representatives of all stakeholders to a non-governmental venue for a series of two-day workshops facilitated by a neutral and professional facilitator. Work includes presentations of available factual data from research and monitoring, plenary discussions that raise all relevant issues and have debates in small groups;</li> <li>2) Between two workshops, all results are written down and sent to participants;</li> <li>3) Representatives of interest groups discuss the issues with their stakeholders between the workshops;</li> <li>4) Priority is given to the countries that have no bear management plan yet and no efficient governmental structure.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Reaching consensus on key management actions such as:               <ul style="list-style-type: none"> <li>○ system of damage compensations;</li> <li>○ conditions for lethal removal of problem bears;</li> <li>○ conditions for regulated quota trophy hunting;</li> <li>○ participation in continuous and standardised monitoring;</li> <li>○ prevention of illegal killing;</li> </ul> </li> <li>• A knowledge base for writing (or revising) the bear management plan;</li> <li>• Each country has a Bear Management Plan;</li> <li>• the Plan is accepted by all stakeholders as they participated in its production;</li> <li>• trans-boundary cooperation in bear conservation and management.</li> </ul>
<b>Principal responsibility for implementation:</b>	Governmental body for nature conservation
<b>Timing of the activities:</b>	Three two-day workshops held over the period of 6 months.
<b>Level of urgency:</b>	4
<b>Benefit:</b>	4

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Effect of supplementary feeding on bears (in Croatia and Slovenia)</b>
<b>Objective:</b>	The objective description of positive, negative and neutral effects of giving food to bears at feeding sites. The long-term effect of supplementary feeding can be predicted and sound recommendations for feeding management provided.
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) All feeding sites in a target area are mapped and the amounts and types of food recorded;</li> <li>2) The amounts eaten by bears, by other animal species or not eaten are estimated;</li> <li>3) The behaviour of bears approaching feeding site is monitored by time of the day, sex and age class of bear;</li> <li>4) The amount of stress at feeding sites is measured by steroid hormones in bear scats (short-term) and in hair (long-term stress).</li> <li>5) Stable isotopes will be measured in muscle tissues of shot bears to determine the proportion of human provided food incorporated into their body mass.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Knowledge of the amounts of human provided food offered to bears;</li> <li>• Determination of the incorporation of artificial food into bear bodies;</li> <li>• An understanding of the exposure to stress of bears at feeding sites;</li> <li>• Information on the degree of dependency to artificial food sources;</li> <li>• Estimation of the degree of habituation to humans at feeding sites;</li> <li>• The results will be useable in various countries.</li> </ul>
<b>Principal responsibility for implementation:</b>	Bear experts and hunting organizations.
<b>Timing of the activities:</b>	Two calendar years with focus on springs and autumns.
<b>Level of urgency:</b>	3
<b>Benefit:</b>	4

## 8. Finnish-Karelian population

Specific actions:

1. Guidelines for bear feeding to reduce risk of human habituated bears
2. Flexible zoning in bear harvest to mitigate human - bear conflicts

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Guidelines for bear feeding to reduce risk of human habituated bears</b>
<b>Objective:</b>	To reduce the risks of bear-human conflict associated with bear feeding
<b>Description of activities:</b>	Feeding bears for tourism purposes is a common practice in eastern Finland. Feeding bears may bring about a risk of bears becoming unwary of people. Presently Finnish legislation does not control this activity



	properly. Based on available information of bears' behaviour toward humans, including risk assessment, rules and guidelines for feeding bears will be created.
<b>Expected results:</b>	Decrease the risk to human safety that is potentially associated with bear feeding.
<b>Principal responsibility for implementation:</b>	Ministry of Agriculture and Forestry, Finnish Wildlife Agency.
<b>Timing of the activities:</b>	2014-2015.
<b>Level of urgency:</b>	3
<b>Benefit:</b>	3

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Flexible zoning in bear harvest to mitigate human - bear conflicts</b>
<b>Objective:</b>	Adaptive management of the bear population
<b>Description of activities:</b>	Based on regional distribution of bears, regional trends in bear density and damages cause by bears, flexible zoning in bear management will be studied and implemented.
<b>Expected results:</b>	Higher reactivity to changing situation.
<b>Principal responsibility for implementation:</b>	Finnish Game and Fisheries Research Institute.
<b>Timing of the activities:</b>	2015-
<b>Level of urgency:</b>	5
<b>Benefit:</b>	3

## 9. Pyrenees Mountains population

Specific actions:

- 1a. Augment bears in the central Pyrenees
- 1b. Augment bears in the western Pyrenees
2. Promote hunting and forestry activities least disturbing to bears

<b>ACTION 1a</b>	
<b>Title of the Action:</b>	<b>Augment bears in the central Pyrenees</b>
<b>Objective:</b>	Increase the demographic and genetic viability of the population.
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) Release two adult females and one male in the core bear area of the central Pyrenees, where at least 20 individuals were detected in 2012;</li> <li>2) Identify a source population of brown bear for the translocation according to logistical, ecological and genetic criteria, and plan the</li> </ol>

	operation with the authorities of the source country (period of capture, administrative and sanitary requirements); 3) Monitor the reintroduced individuals (fitting collar with GPS transmitter, schedule for locations) and develop plans to manage dispersing individuals.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Spatial settlement of the females in the central Pyrenees following initial post-release movements;</li> <li>• The females will contribute to the demography of the population, with the possibility of births in the first year after release if females were pregnant at capture;</li> <li>• Increase the genetic variability of the population.</li> </ul>
<b>Principal responsibility for implementation:</b>	Government of Catalonia. Collaboration of France who managed several translocations during 1996-2006.
<b>Timing of the activities:</b>	One year to prepare the operation, and translocation of the bears the following year.
<b>Level of urgency:</b>	3
<b>Benefit:</b>	5

ACTION 1b	
<b>Title of the Action:</b>	<b>Augment bears in the western Pyrenees</b>
<b>Objective:</b>	Restore a functional population and establish a meta-population at the Pyrenean level with the central one.
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) A minimum of two adult females will be released in the western Pyrenees where only two adult males are currently present;</li> <li>2) Determination of source brown bear population (see action 3) for the translocation according to logistical, ecological and genetic criteria and preparation of the operation with the authorities of the source country (period of capture, administrative and sanitary requirements);</li> <li>3) Define a specific monitoring program for the reintroduced individuals (fitting collar with GPS transmitter, schedule for locations) and determine what to do if females disperse outside the bear area.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Initiation of a new population segment thanks to reproduction with resident males;</li> <li>• Possibility of exchange of individuals between western and central population segments (rescue effect in a model of meta-population);</li> <li>• Increase the viability of the meta-population in the Pyrenees.</li> </ul>
<b>Principal responsibility for implementation:</b>	Governments of Aragon and Navarra; Collaboration with France who managed several translocations during 1996-2006.
<b>Timing of the activities:</b>	One year to prepare the operation, and translocation of the bears the following year.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	5

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Promote hunting and forestry activities least disturbing to bears</b>
<b>Objective:</b>	Hunting and forestry activities will consider the distribution of brown bears, although bear presence must not prevent the continuation of both activities.
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) Producing printed materials and audio-visual aids to hunters and forest owners showing how to avoid an encounter with a bear and how to act correctly in case of bear encounters;</li> <li>2) Meetings with local hunters and forest owners;</li> <li>3) Conduct an impact study of the effect of forestry activities (roads, forest trails, etc.) on bear habitat (denning and refuge sites, food and reproduction areas).</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Distribution of leaflets and audio-visual materials about hunting in bear area;</li> <li>• Meetings with local hunters;</li> <li>• Avoid bear death because of inappropriate hunting practices;</li> <li>• Avoid bear attack on hunters because of inappropriate hunting practices;</li> <li>• Avoid the perturbations of hunters and forestry activities on specific areas used by females with cubs;</li> <li>• Guidelines for forest management should be compatible with bear presence (avoid the destruction of bear habitats, limit the building of roads or control the access, promote food availability).</li> </ul>
<b>Principal responsibility for implementation:</b>	France: ONCFS. National Hunting and Wildlife Agency; Spain: Governments of Aragon, Catalonia and Navarre; Bear experts, National and Natural Parks, hunting organizations, forest owner.
<b>Timing of the activities:</b>	Two calendar years. After that should be spontaneously continuous.
<b>Level of urgency:</b>	3
<b>Benefit:</b>	4

## 10. Scandinavian population

Specific actions:

1. Improve the understanding of the effect of forestry on bear population viability and ecology.
2. Brown bear predation on semi-domestic reindeer

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Document the effects of forest management on brown bear habitat quality.</b>
<b>Objective:</b>	Improve the understanding of the effect of forestry on bear population

	viability and ecology.
<b>Description of activities:</b>	Forestry is the dominant land use in bear habitats in Scandinavia, but its effects on the habitat use and population ecology of bears is very poorly known. However, the Scandinavian brown bear is much more productive than the North American brown bear, where negative effects of clear-cut forestry management are well documented. Main activity will focus on the study of the habitat use of GPS-collared bears in a forested landscape dominated by clear-cut forestry, looking at how bears react when a part of their home range has been cut, how they select or avoid forest types and ages, the importance of forest management for bear foods (especially berries, ants, and moose calves), and the effect of the size of cutting blocks. This will require advanced spatial analyses of existing data.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• A documentation of the aspects of modern forestry that are positive and negative for bears;</li> <li>• Information that can be useful for forest owners who want to give consideration to bears (and revenues from leasing bear hunting) when they plan forestry management activities;</li> <li>• Forest owners might want to document the effects of forest management when selling their forest products to environmentally aware consumers;</li> <li>• This would also help managers when coordinating the management of bears and moose in managed forests.</li> </ul>
<b>Principal responsibility for implementation:</b>	The Scandinavian Brown Bear Research Project.
<b>Timing of the activities:</b>	This project could use existing data (GPS data from bears, forestry data from forest owners). It would probably take 2 years.
<b>Level of urgency:</b>	5
<b>Benefit:</b>	3 (if it results in better bear habitat)

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Brown bear predation on semi-domestic reindeer</b>
<b>Objective:</b>	Scientific assessment of the pattern and processes of bear depredation on semi-domestic reindeer
<b>Description of activities:</b>	Studies have documented that brown bears kill a considerable number of privately owned semi-domestic reindeer calves during the spring, at least in forested reindeer husbandry areas. Some stakeholders are calling for a reduction in the bear population to reduce this loss of reindeer. Data and information will be collected on whether this is also a problem in mountain reindeer husbandry areas and the effectiveness of measures to prevent or reduce predation.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Provide reindeer owners with guidelines regarding measures to reduce or prevent bear predation on reindeer;</li> <li>• A documentation of the effect of bears on the reindeer industry throughout the reindeer husbandry area, which would be useful to managers when setting population goals for bears;</li> </ul>

	<ul style="list-style-type: none"> <li>• Better knowledge about predation rates, which will assist the authorities when deciding fair compensation payments for bear predation on reindeer.</li> </ul>
<b>Principal responsibility for implementation:</b>	The Scandinavian Brown Bear Research Project, Swedish Wildlife Damage Center.
<b>Timing of the activities:</b>	This project would require the marking of many bears with GPS-collars, pregnant female reindeer with transponders, and intensive fieldwork during both the research phase and the testing of preventative methods phase. It would require 3-4 years.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	5

# SECTION 3: WOLVES

## PART I

### 1.1 Populations

In Europe, wolves occur in all countries except in the island states (Ireland, Iceland, United Kingdom, Cyprus, Malta) and the Benelux countries, Denmark and Hungary (in these countries a number of dispersing individuals have been reported). Based on a combination of distribution and social, ecological and political factors wolves are categorized into 10 populations (Fig.1): North Western Iberian, Sierra Morena, Alpine, Italian Peninsula, Carpathian, Dinaric-Balkan, Baltic, Karelian, Scandinavian and Central European Lowlands. All populations are the results of natural dynamics as no wolf reintroduction has ever been carried out in Europe.

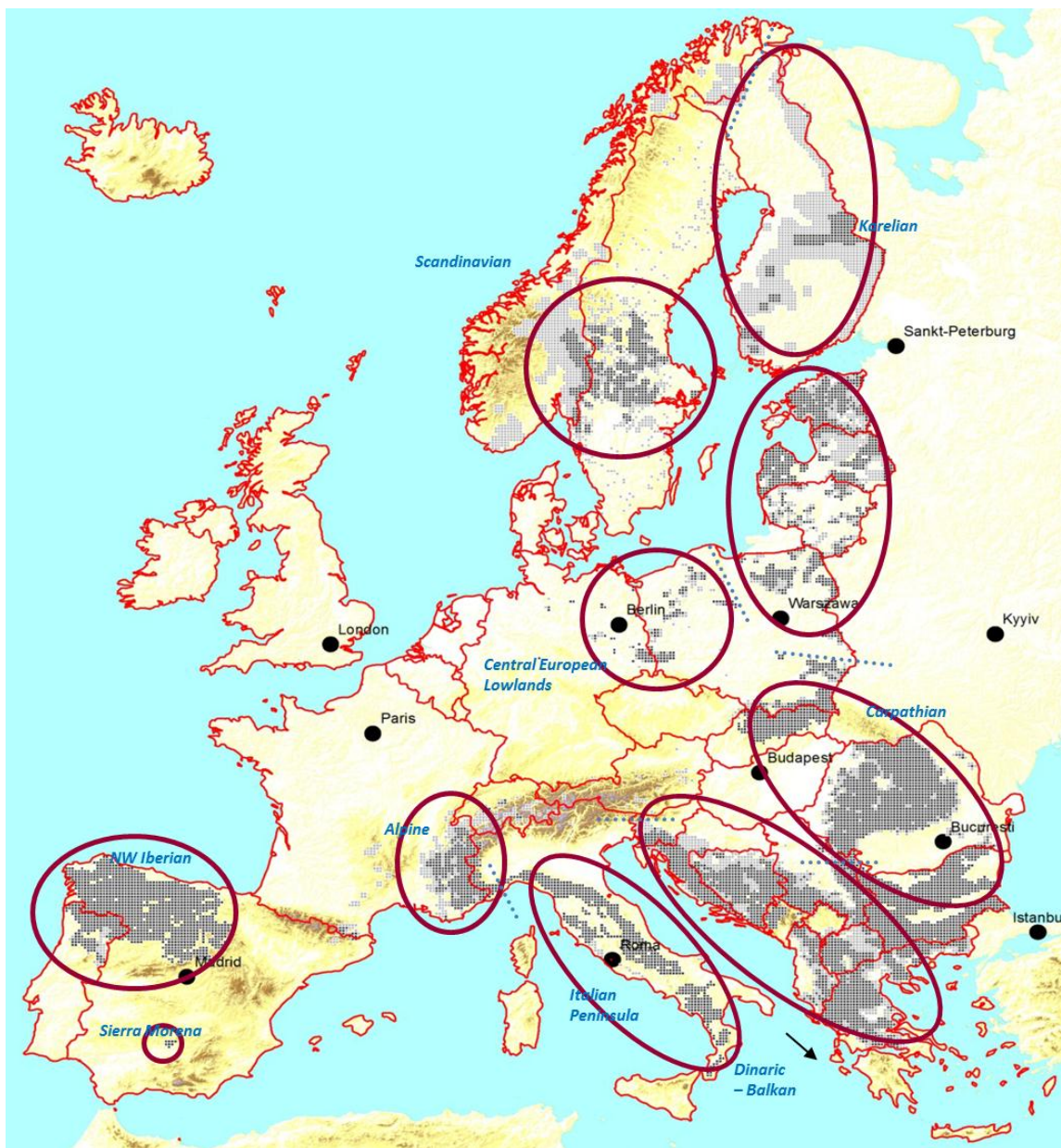


Figure 1. The 10 wolf populations of Europe

## 1.2 Status

The estimated total number of wolves in Europe is larger than 10,000 individuals (excluding Russia and Belarus). Based on reported and updated census data, the largest populations are the Carpathian population and the Dinaric-Balkan population (> 3,000 wolves), followed by the Baltic population (>1,000 wolves). Other populations are an order of magnitude smaller (Italian Peninsula ~800 wolves, Scandinavian ~ 300 wolves, Central European Lowlands ~ 200 wolves, Alpine ~ 160 wolves, Karelian > 165 wolves). The Sierra Morena population in southern Spain is the only one on the brink of extinction with only one pack detected in 2012. For the North Western Iberian population, there is no updated data but the population is believed to have remained stable (~ 2,200-2,500 wolves).

Most populations have been increasing or stable since 2005. All population ranges have been either increasing or stable except the Finnish part of the Karelian population and the Sierra Morena population in southern Spain.

Monitoring is based on a variety of methods, often combined depending on local ecological contexts, institutional support and technical capability: snow tracking, genetics, telemetry, harvest data, damage statistics, wolf howling, camera trapping, interviews with local people and expert assessments. Overall, the small populations are subject to more intense and costly monitoring methods aimed at accurately counting individual packs (Scandinavian, Alpine, Central European Lowlands) than the larger populations where monitoring largely attempts to document wolf presence or relative densities.

Population	Population size 2011	Countries (and approx. % share of population)	Trend	Red List assessment
Scandinavian	250-300	SE (90%), NO (10%)	Increase	EN
Karelian	150+	FI (100%)	Decrease?	EN
Baltic	~ 900-1400 (5000 with BY and RU)	EE (20%), LV (20%), PL (30%), LT (30%)	Stable	LC
Central European Lowlands	~ 300	DE (40%), PL (60%)	Increase	EN
Carpathians	~ 3500	RO (70%), SK (13%), PL (10%), CZ (0.1%)	Stable	LC
Dinaric-Balkan	4-5000	BG (30%), BO (20%), FYROM (5%), HR (15%), SL (2%), AL (5%), GR (3%), SRB (20%)	Stable	LC
Italian Peninsula	~ 800	IT (100%),	Stable	VU
Alpine	32 packs (> 160)	FR (47%), IT (45%), CH (5%), AT (3%)	Increase	EN
NW Iberia	~ 2500	SP (90%), PO (10%)	Stable	NT
Sierra Morena	1 pack	SP (100%)	Decrease	CR

### 1.3 Legal status and management

The legal status of wolves in the European Union countries is specified in the Habitats Directive (92/43/EEC). By default wolf populations are listed under Annexes II (requiring the establishment of Natura 2000 sites for the species) and IV (requiring strict protection but with derogations still possible under Article 16). However, there are some notable exceptions (Bulgaria (Annex V), Estonia (only in Annex V, not in II or IV), Finland (not in Annex II; wolves in reindeer husbandry zones in Annex V instead of IV), Greece (wolves north of 39th parallel only in Annex V, not in II or IV), Latvia (wolf only in Annex V, not in II or IV), Lithuania (wolf only in Annex V, not in II or IV), Poland and Slovakia (wolf in Annex V instead of IV), Spain (wolf north of river Duero in Annex V instead of IV). As non-EU countries, Norway and Switzerland are only signatories of the Bern Convention. A growing number of countries have a management plan or are in the process of endorsing one. Management can be centralized (e.g. France, Sweden) or decentralized (e.g. Spain, Germany) leading to the same population facing different management regimes within a country as well as among countries.

Quite a few advances in population level management have been reported in many transboundary populations. Agreements between countries include some degree of coordinated management (Slovenia-Croatia, Slovakia-Poland), sharing information (e.g. Italy-France-Switzerland, Germany-Poland, Sweden-Norway-Finland), or most commonly working groups between scientists or managers. For some populations however, little or no progress has been made, either between countries (Karelian, Carpathian) or within the same country (North Western Iberian). In no cases are there yet any formally binding population management plans between different countries.

### 1.4 Threats

The most relevant threats (grouped in 19 main categories) for wolves in Europe are: low acceptance, habitat loss due to infrastructure development, persecution, Hybridization with dogs, poor management structures and accidental mortality. Most threats were expected to become slightly more important in the future.

### 1.5 Conflicts and conflict management

Wolves and livestock are associated with conflicts over the whole species range. The rough economic cost (based on reported compensation only, i.e. excluding countries where no data were available) can be estimated at reaching >8 M€ per year resulting from at least 20,000 domestic animals being predated. Sheep account for the vast majority of livestock deaths, but some populations have particular depredation issues (e.g. reindeer in the Scandinavian and Karelian populations). However, in countries where the absence of wolves has resulted in extensive sheep grazing with minimal supervision, re-establishing former mitigation measures (e.g. shepherding, livestock guarding dogs) or establishing new measures (e.g. electric fences) can cost many times the amount spend on compensation, e.g. in France compensation in 2011 amounted for ~1 M€, whereas mitigation amounted for ~7 M€.

The acuteness of the resulting social conflict is not necessarily always directly proportional to the number of animals lost as illustrated by the Scandinavian case, where an annual loss of ~20 hunting dogs is a major driver of a low acceptance of the wolf in rural communities. An increasing number of countries offer a compensation system (with the exception of Albania, the Former Yugoslav Republic of Macedonia and Latvia), although who pays the compensation, and under what conditions, varies greatly.



## PART II – Actions for all populations

Note :

<i>Level of urgency:</i>	<i>(scale of 1-5: 1 = high urgency, 3 = medium urgency, 5 = low urgency)</i>
<i>Benefit:</i>	<i>(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)</i>

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Standardised census and monitoring of wolf population</b>
<b>Objective:</b>	Establish a standardised set of techniques to survey, census and monitor wolf distribution, numbers, demography, and genetic status, based on shared protocols to merge transboundary information and optimize effort.
<b>Description of activities:</b>	<p>Census methods used differ very much, from genetic monitoring, simultaneous, coordinated snow-tracking, year round collection of wolf presence signs in order to distinguish between packs and count wolves in packs to simple summing of rough estimates in hunting grounds, which may multiply the wolf number in the country. It makes it impossible to get estimations of population numbers and trends for entire populations or to assess the impact of different management systems. Thus establishing a common transboundary monitoring system for at least the most similar wolf populations, using the same or comparable standards synchronised in time within all countries sharing the population is very urgent. Sound conservation of the wolf requires first of all a detailed evaluation of the state of the population.</p> <p>Activities:</p> <ol style="list-style-type: none"> <li>1) Review and compare present national monitoring systems, identify differences and gaps, assess possibilities for alignment and national capacity for improvement;</li> <li>2) Define a shared protocol for the transboundary survey and monitoring of the distribution, demography, and genetic status of the wolf population, considering wolf packs as sampling units. Establish transboundary, population wide, standardized monitoring system, based on each national/regional on going monitoring system and including estimate of the number of wolves using DNA extracted from non-invasive samples (scats);</li> <li>3) Approve guidelines on the preferred field techniques and analytical approaches and provide an annotated list of reference for comparing experience across Europe and for further technical discussion;</li> <li>4) Update national monitoring schemes and facilitate a regular exchange of monitoring data between States to allow for a</li> </ol>

	population level assessment every 2 years.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Transboundary monitoring protocol agreed at least at population level;</li> <li>• A national technical guideline published on techniques to survey and monitor trends in wolf numbers and distribution;</li> <li>• Size of wolf populations are known;</li> <li>• Population level assessment every 2 years;</li> <li>• Trends are known;</li> <li>• Requirements for reporting to the EU every 6 years fulfilled.</li> </ul>
<b>Principal responsibility for implementation:</b>	Governmental bodies responsible for environment and nature conservation of the relevant countries sharing the wolf populations in cooperation with research institutes and organisations. National wildlife institutes, national/regional wolf monitoring networks
<b>Timing of the activities:</b>	Two meetings of wolf experts in the first year. Production of the shared monitoring protocol in the first year. Operating of system: continuous. Population level assessment every 2 years.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	4

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Transboundary cooperation and population-level management plan</b>
<b>Objective:</b>	To develop effective cooperation and transboundary management of wolf populations. To produce population level wolf management plans based on technical and scientific guidelines and on results from facilitated workshops with stakeholders. To reach highest possible degree of consensus on key management principles, responsibilities and mechanisms for implementation
<b>Description of activities:</b>	<p>Almost all wolf populations are shared by several Member States and many wolf packs have trans-border territories. Management decisions not based on population-level approach may seriously hinder the progress towards national population goals and impede to achieve the species favourable conservations status. These problems can be recognised and resolved only within transboundary cooperation framework. Therefore, formal a Transboundary Wolf Committee should be set up to coordinate and oversee population-level conservation and management activities, composed of two bodies: a technical (scientific) committee tasked to provide scientific and technical support by wolf experts, and a policy committee composed of regional and national authorities to ensure an exchange of information, and provide a platform to discuss management decisions.</p> <p>Activities:</p> <ol style="list-style-type: none"> <li>1) Establish population-level working groups;</li> <li>2) Identify and invite the relevant stakeholders in each country that may act as national management boards. These groups should be</li> </ol>

	<p>consulted in the international process and work out the more detailed / concrete national management strategies;</p> <p>3) Develop population based management plans considering “The guidelines for population level management plans for large carnivores in Europe” in order to a) define the transboundary cooperation for wolf conservation and b) provide guidance and a framework for the national management plans;</p> <p>The population-level strategy should state the population goal, measurable objectives, and actions to be taken;</p> <p>4) Launch a consultation, review and endorsement process;</p> <p>5) Implement the plan through national management plans/ strategies;</p> <p>6) Review and revise the plan e.g. every 6 years.</p>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• A transboundary management plan for each population defining the goal, measurable objectives, and actions to be taken;</li> <li>• A common, regularly updated document defining the transboundary cooperation and guiding the national management approaches endorsed by the national management authorities and the local stakeholders.</li> </ul>
<b>Principal responsibility for implementation:</b>	Ministries of environment, nature conservation agencies and local stakeholder groups.
<b>Timing of the activities:</b>	2 years for the development of the strategy; 1 – 3 workshops for the subsequent updates.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	5

<b>ACTION 3</b>	
<b>Title of the Action:</b>	<b>Prevention and compensation measures to reduce livestock depredation</b>
<b>Objective:</b>	Prevention measures are effectively adopted by all livestock breeders who suffer a disproportionate amount of losses from wolves. Programmes for livestock depredation prevention and compensation are implemented. Livestock farmers are informed about the best practices for each local context focused on damage reduction/prevention. Methods for estimating and verifying damage level in different regions are improved.
<b>Description of activities:</b>	<p>Unmitigated wolf-human conflicts, particularly damage to livestock, can have a significant negative influence on levels of public tolerance and acceptance of wolves, with important implications for species conservation. Measures are available which have proven effective in reducing such conflicts, including electric fencing and livestock guarding dogs, and damage compensation. Killing depredating wolves may prevent further damage for a short period but is not effective in the longer term as the area can be repopulated by wolves within two-three years or even earlier.</p> <p>Activities:</p> <p>1) Set up a platform for livestock owners and technicians to exchange information on effective depredation preventive strategies;</p>

	<p>2) Organize workshops within the platform to define balanced (i.e. financially, technically, and sustainable) preventing measures differentiating between a first recolonizing phase and the long term strategies in stable wolf areas;</p> <p>3) Evaluate the case of “un-protectable” husbandry methods;</p> <p>4) Produce guidelines for breeding, training, use, and husbandry of livestock guarding dogs and integrate it with the adoption of other preventive measures, favouring a system of self-supporting exchange of LGD among livestock owners.</p> <p>5) Establish an optimal composite system of depredation prevention and damages mitigation using economic incentives, including EU subsidies and insurance for livestock farms supporting coexistence with predators.</p> <p>6) Share and disseminate the best animal husbandry practices and the optimal preventive strategies defined by the platform through workshops with livestock owners.</p> <p>7) The breeders suffering the most significant losses (above average) will receive priority attention for the deployment of prevention measures: guarding dogs, electric fences, extra shepherd salary, and other measures will be implemented depending on the local ecological and socio-economic contexts. Distribution of prevention aids will then be extended to all livestock breeders who lost heads to wolf attacks. All distributed measures will be followed up by a monitoring plan aimed at controlling their effective utilization and the outcome on loss prevention.</p>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• All livestock breeders suffering above average losses will receive aids in implementing prevention measures;</li> <li>• Effectiveness of the program closely monitored for outcome in terms of loss reduction;</li> <li>• The amount of damages is decreased by at least 30%;</li> <li>• The decrease of amount paid for damage compensations is bigger than the cost of protective measures applied;</li> <li>• People have less negative attitude towards wolves.</li> </ul>
<b>Principal responsibility for implementation:</b>	Governmental bodies responsible for environment and nature conservation in cooperation with local authorities and NGOs and management units such as national parks or forestry districts.
<b>Timing of the activities:</b>	Workshops and development of guidelines: in 2 years; Establishing measures: 3 - 5 years. Operation: continuous.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	5

ACTION 4	
<b>Title of the Action:</b>	<b>Measures against illegal killing and control of poison baits</b>
<b>Objective:</b>	To develop actions to detect and reduce the illegal mortality of wolves. To establish a national system to compile records of dead wolves, determine death causes, conduct efforts to prevent and penalize the illegal killing of wolves caused by snaring, trapping and poisoning, increase the surveillance and implement education campaigns.

<b>Description of activities:</b>	<p>Illegal killing of wolves can have serious impacts on wild populations disrupting the natural dynamics of production, dispersal of the youngs and pack formation. Illegal killing is one of the main obstacles to planning a coherent strategy of population management that include protection and legal hunting.</p> <p>Activities:</p> <ol style="list-style-type: none"> <li>1) A renewed effort to control all abuses of the current rules of protection and legal hunting;</li> <li>2) In the relevant countries (and especially in southern Europe), a national strategy to end the illegal use of poison baits is launched under the national umbrella of the ministry of environment and with support from the regional governments. The strategy will include a revision of the current rules on the use of herbicides and pesticides in agriculture;</li> <li>3) In well-known areas affected by illegal poisoning, conduct field surveys among local hunters and livestock farmers in order to better understand the causes, frequency and consequences of illegal use of poison baits;</li> <li>4) Promote a workshop in close cooperation between forest rangers, the nature protection inspectors and the national or regional authorities in order to collect and compile information on the use of poison, snares and other traps, as well as discuss actions to remove poaching tools (snares, leghold traps, etc.) from the wild;</li> <li>5) Establish several team of dogs (at least 2 in each country) trained to find poison baits in order to operate throughout wolf range and mainly in wolf core areas chronically affected by illegal poisoning;</li> <li>6) Promote workshops for a close cooperation between nature conservation authorities and jurisdictional authorities in order to increase intelligence services to counteract illegal actions against wolves and deliberate them as criminal lawsuits;</li> <li>7) Promote a wide and impactful national campaign in media for public awareness against illegal poisoning, snaring and other illegal methods focusing not only on the impact on wolves but also on all species and public health.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Increase of knowledge on the causes and frequency of illegal use of poison baits and other illegal killing methods;</li> <li>• Early detection of poison by the trained dogs and increase intelligence services to counteract illegal actions discourages local people to use poison;</li> <li>• Increased cooperation and awareness of jurisdictional authorities towards illegal killing and other topics related to nature conservation;</li> <li>• Database of known dead wolves;</li> <li>• Stronger awareness concerning the penalties and legal consequences for killing illegally a wolf.</li> </ul>
<b>Principal responsibility for implementation:</b>	National or regional nature conservation agencies. Wolf researchers. Nature conservation inspectors.
<b>Timing of the activities:</b>	<i>Establishment of system:</i> 1 year; <i>Operation of system:</i> continuous.

<b>Level of urgency:</b>	2
<b>Benefit:</b>	4

<b>ACTION 5</b>	
<b>Title of the Action:</b>	<b>Control of free-ranging dogs and wolf-dog hybridization</b>
<b>Objective:</b>	<p>To reduce by at least 80% of the current levels the number of owned free-ranging and stray dogs in the wolf range.</p> <p>To approve at national level policy and technical guidelines for the management of the hybridization between dogs and wolves.</p> <p>To prevent and reduce the frequency of hybridization.</p>
<b>Description of activities:</b>	<p>Free-ranging and feral dogs and wolf-dog hybridization are frequent threats to wolf populations, especially (but not exclusively) to populations of southern and eastern Europe. The direct threats are: wolf-dog hybridization and transmission of parasites and other diseases to wolf population, but there are also indirect ones like attacks of dogs on livestock for which wolves are mostly blamed and what increases the compensation amount, or killing of wild ungulates which may cause a shortage in the wolf prey base. Removal of free-ranging dogs can be complicated by their legal status (in some countries very protective) and procedures that exclude lethal methods. Dogs' hybridization with wolves is a major threat to wolf conservation. However, lack of appropriate legislation, conflicts among different offices, opposition by animal rights groups and a general indifference on the problem have so far prevented the production of a coherent guideline for management of all aspects of the problem. A renewed effort is necessary to reduce the number of free-ranging dogs in wolf areas.</p> <p>Activities:</p> <ol style="list-style-type: none"> <li>1) Free ranging dogs can be feral, stray or owned by someone who let them free to roam. Each of the three categories requires an appropriate method to reduce its numbers. Feral and stray dogs will be captured and brought to captivity where they will be neutered and possibly given in adoption to volunteers. A national effort needs to be launched to eradicate the free ranging dogs in a concerted program at national scale. Owned dogs will be the subject of an intensive campaign of permanent marking and control; their owners will be targeted with information material on the potential impact of free ranging dogs.</li> <li>2) A set of policy guidance for actions on hybrids will be approved by the relevant governmental offices. The guidelines will include provisions on studying and monitoring the spread and prevalence of hybridization and dog introgression into the wolf population, removal of hybrids, control of free-ranging dogs, and control of wolf-like dog breeds. The guidelines will be given legal strength through the longer process of approval of a dedicated law.</li> <li>3) Set up emergency teams responsible for dogs and wolf-dogs hybrids removal from the wild.</li> <li>4) Develop the procedures for a standardized genetic sampling (from dead and alive animals) and analyses (e.g. molecular markers) in</li> </ol>

	<p>order to monitor the incidence of hybrids in both wolf and dog populations and evaluate the effects of hybridization in the wolf genetic pool and demography. Define the research institutes responsible for the genetic analyses, and establish a common database and cross validation system for agreement on a common interpretation of the data in each laboratory and on threshold values for considering a hybrid individual.</p> <p>5) Establish awareness campaigns and legal support to control the number of feral and free-ranging dogs in wolf range, to decrease the risk of hybridization (among other negative effects to wolf conservation).</p>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Better scientific knowledge of the incidence and effects of hybridization in wolf populations to support efficient management actions;</li> <li>• A set of national policy guidelines produced on the issue of hybridization;</li> <li>• Guidance to veterinary services, forestry personnel, protected areas, agricultural organizations, Regional governments on the management of wolf-dog hybrids;</li> <li>• Technical guidance on capturing, handling and captivity of hybrids;</li> <li>• Decrease in the number of free-ranging dogs in wolf range.</li> </ul>
<b>Principal responsibility for implementation:</b>	Ministry of Health (Veterinary Service) and Ministry of Environment for the national guidance and coordination.
<b>Timing of the activities:</b>	The objectives could be reached in three years.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	4

ACTION 6	
<b>Title of the Action:</b>	<b>Habitat fragmentation and connectivity</b>
<b>Objective:</b>	Identify and map priority connectivity areas for wolf populations in order to avoid habitat fragmentation. Population-wide map of the most important ecological corridors, dispersal barriers, high-mortality road sections, and other important landscape features pertaining to fragmented nature of wolf distribution. Guidelines and recommendations for mitigation actions published.
<b>Description of activities:</b>	<p>In most countries, the development of new infrastructure within or intersecting wolf habitat (transport routes, residential and industrial buildings, recreation areas such as ski resorts) or local husbandry systems (e.g. reindeer) are impeding the natural movements of wolves across regions.</p> <p>There is an important need for common Guidelines for Environmental Impact Assessments (EIA) in order to properly assess and mitigate the impact of these new infrastructures on the wolf population in each country. There is a need for immediate mitigation measures to facilitate connectivity.</p> <p>Activities:</p>

	<ol style="list-style-type: none"> <li>1) Identify potential areas for expansion of wolf populations by spatial-explicit modelling using both ecological and social factors to predict future areas for natural recolonization and forecast the level of conflict that may arise;</li> <li>2) Implement measures to improve social acceptance of wolves in the best selected areas for wolf expansion, by implementing damage prevention measures and education campaigns;</li> <li>3) Promote habitat restoration (e.g. defragmentation of infrastructure) and higher levels of social acceptance in areas identified as potential corridors. Particular focus should be given to finding possible ways for coexistence between extensive reindeer herding and wolves. These activities should be conducted in a participatory process with facilitated workshops to aim for highest possible agreement with Sámi villages regarding tolerance levels and compensation measures;</li> <li>4) Evaluate the relevance for wolf translocations whenever potential corridors for natural expansion are lacking, and always considering genetic, ecological and social concerns;</li> <li>5) Prepare recommendations and guidelines for land use activities, infrastructure development, and wildlife management to allow wolf dispersal and to mitigate human-caused mortality;</li> <li>6) Demand to introduce population distribution and habitat fragmentation concerns and recommendations for mitigation measures as an obligatory part of environmental impact assessment (EIA) of the major transport infrastructure development.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• An accurate and up-dated knowledge on wolf natural expansion patterns, in both a temporal and spatial scale;</li> <li>• Recommendations to support decision-making for wolf management, by selecting the best areas for wolf expansion;</li> <li>• Achieve a lower level of conflict in future areas of wolf occurrence;</li> <li>• Improved knowledge of the degree of connectivity between different portions of wolf populations;</li> <li>• Restore the connectivity between wolf population segments;</li> <li>• Assessment of the impact of infrastructure buildings and locations on wolf population. Evaluation of movement corridors, landscape and population connectivity;</li> <li>• Evaluation of fragmentation effects on loss of habitat for reproductive sites.</li> </ul>
<b>Principal responsibility for implementation:</b>	GOs, NGOs, experts - scientist, wildlife and park managers, foresters and hunting associations in cooperation with highways authorities, local authorities etc.
<b>Timing of the activities:</b>	2-3 years.
<b>Level of urgency:</b>	4
<b>Benefit:</b>	2



ACTION 7	
<b>Title of the Action:</b>	<b>Education, information and data accessibility</b>
<b>Objective:</b>	<p>To improve public knowledge of wolves, their needs and behaviour - with particular attention paid to hunters and livestock breeders.</p> <p>To improve understanding of wolf predation on wild ungulates and livestock.</p> <p>To challenge positive attitudes to poaching of wolves.</p> <p>To provide public database on wolf packs and breeding pairs, dispersal, monitoring methods, genetics, legal and illegal killing, traffic accidents, depredation on livestock and attacks on domestic dogs The objective is to improve public outreach.</p>
<b>Description of activities:</b>	<p>Human attitude towards wolves is highly influenced by the knowledge about various aspects related to wolf presence or absence in the ecosystems. The main sources of knowledge about this species for wide public are stories, anecdotes, gossips or information published in popular magazines, not always professional. Therefore, a program for education about wolf ecology, impact of wolves on ecosystem, benefits connected with wolf presence, problems connected with wolf presence and possible mitigation measures has to be implemented.</p> <p>Activities:</p> <ol style="list-style-type: none"> <li>1) Carry out public attitude and quantitative opinion surveys in each country among the general public, interests groups, and journalists using a semi-structured questionnaire with multiple choices and categorical scales of responses. This allows understanding factors influencing tolerance of people, to determine what represents a conflict, and the large-scale mechanisms behind this;</li> <li>2) Develop a shared communication strategy, based on results from the opinion surveys, among local authorities to spread correct information through the Media on wolf-human interactions;</li> <li>3) Develop educational materials suited for the selected media, social networks, local opinion makers and politicians in order to get objective information from scientists to public;</li> <li>4) Spread and share the knowledge through different means like websites, lectures, workshops, training, personal contacts, which are the most suitable for the key groups;</li> <li>5) Monitor success (questionnaires before and after, etc.). Work with media, social networks, local opinion makers and politicians in order to get objective information from scientists to public;</li> <li>6) Preparation of a system of education programs and field trips in schools, guidelines for teachers;</li> <li>7) Promotion of eco-tourism related to wolves, which brings income to local societies;</li> <li>8) Include lectures on large carnivores into the system of hunters' education. Talks will be conducted by wolf experts at least in areas of known wolf presence. Prepare a variety of talks, seminars and events with stakeholders among the community of hunters.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Educational and informational material;</li> <li>• Ongoing educational programs;</li> <li>• Improved public knowledge about wolves;</li> </ul>

	<ul style="list-style-type: none"> <li>• Channels for society to express their concerns, fears and problems;</li> <li>• Improved wolf acceptance within certain groups. Enhancement of acceptance for wolves among society.</li> </ul>
<b>Principal responsibility for implementation:</b>	NGOs, National authorities on Environmental Protection, regional directorates for environmental protection, education centres in national parks and research institutes.
<b>Timing of the activities:</b>	Ongoing.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	3

### PART III - SPECIFIC ACTIONS FOR EACH POPULATION

#### 1. Alpine population

Specific actions:

1. International Alpine Wolf Committee
2. Spatial models for managing the wolf population above the Favourable Conservation Status (FCS)
3. Quality improvement and correct use of livestock guarding dogs (LGD)

ACTION 1:	
<b>Title of the Action:</b>	<b>International Alpine Wolf Committee</b>
<b>Objective:</b>	Set up an International Alpine Wolf Committee composed of two bodies: <u>a technical- scientific committee</u> and <u>a policy committee</u> to provide a platform to discuss management approaches at the population scale.
<b>Description of activities:</b>	Set up the International Wolf Alpine Committee composed of two bodies: <u>a technical- scientific committee</u> tasked to provide unbiased scientific and technical support, <u>a policy committee</u> composed of national/regional authorities. Organize regular meetings together with thematic workshops, alternating each Country in the organization, to ensure an exchange of information, and provide a platform to discuss management approaches at the population scale. The already existing WISO Platform remains the venue for discussions on horizontal issues across all carnivore and ungulate species, while the complexity of wolf issues deserve a dedicated committee.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• “Transboundary” dialogue about wolf conservation issues, both between national/regional authorities as well as scientists;</li> <li>• Shared decisions among authorities, based on scientific inputs, regarding objectives of wolf conservation;</li> <li>• Agreement on management principles;</li> <li>• Regular exchange of information.</li> </ul>
<b>Principal responsibility</b>	Technical- scientific committee: wolf experts (the already existing Wolf

<b>for implementation:</b>	Alpine Group could be involved); Policy committee: national and regional authorities.
<b>Timing of the activities:</b>	One meeting every 1-2 year.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	4

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Spatial models for managing the wolf population above the Favourable Conservation Status (FCS)</b>
<b>Objective:</b>	Model spatially explicit scenarios to manage the population at and above the FCS level, explicitly addressing distribution among the Alpine countries.
<b>Description of activities:</b>	Evaluate the FCS, with detailed spatial analysis that take into consideration the Favourable Reference Range and demographic parameters. Use a multi-model approach that accounts for uncertainty of model structure to predict the spatial and temporal development of the Alpine wolf population and to identify, under different management scenarios, the role of each country and define priority areas for wolf conservation in the Alps where resources should be concentrated to maintain the wolf source areas, restore sink areas, favouring the connectivity with neighbouring populations (i.e. Apennine and Dinaric).
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• A multi-model analysis of the spatial, demographic, and genetic wolf population development under different scenarios;</li> <li>• Map of priority connectivity areas for wolf populations;</li> <li>• Assessment of the impact of dissimilar management regimes in different wolf population areas in terms of viability, genetic diversity, main directions of dispersal, locations of source populations and possible sinks.</li> </ul>
<b>Principal responsibility for implementation:</b>	National and international scientific teams.
<b>Timing of the activities:</b>	Models and reports developed in <2 years.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	4

<b>ACTION 3</b>	
<b>Title of the Action:</b>	<b>Quality improvement and correct use of livestock guarding dogs (LGD)</b>
<b>Objective:</b>	Evaluation of quality and acceptance of LGD concerning breed, effectiveness and conflict potential. Review, adapt and standardise requirements and protocols for breeding, training, use, and husbandry of LGD.
<b>Description of activities:</b>	Coordination/exchange among different organisations which take care of the cynology of working LGD for the development of a shared

	<p>protocol for breeding, training, use, and husbandry of LGD (F:Pastorale Pyrénéene, Société centrale canine, CH: HSH-CH, I:MO.TU.CI.P.A, Centro Alpi Cozie);</p> <p>Establishment of a protocol for monitoring incidents with LDG;</p> <p>Identification of requirements for the breeding, training, husbandry and the use of livestock guarding dogs in all participating Alpine countries;</p> <p>Creation of a recognized label breed of LGD working lines according to specified minimal standards;</p> <p>Definition of one or more requirement profiles for future livestock guarding dog generations;</p> <p>Maintenance of a stud book for the pure breeding of working lines of different LGD breeds;</p> <p>Implementation of the breeding standards in the different Alpine countries;</p> <p>Raise awareness of the best approaches to breed and train LGD among livestock owners;</p> <p>Informing tourists via national, regional and local tourism organisations about appropriate behaviour in regions with livestock guarding dogs.</p>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Shared protocol for breeding, training, use, and husbandry of LGD and for monitoring incidents with LGD;</li> <li>• Increase correct use of livestock guarding dogs;</li> <li>• Standardisation of a high breeding standard of LGD in the Alps;</li> <li>• Appropriate conflict management among livestock owners, LDG and tourism.</li> </ul>
<b>Principal responsibility for implementation:</b>	Livestock guarding dogs centres and livestock organizations; Organisations which take care of the cynology of working LGD (F:Pastorale Pyrénéene, Société centrale canine, CH: HSH-CH, I:MO.TU.CI.P.A, Centro Alpi Cozie).
<b>Timing of the activities:</b>	Start <i>soon</i> .
<b>Level of urgency:</b>	1
<b>Benefit:</b>	4

## 2. Baltic population

Specific actions:

1. Establishing an International Baltic wolf population Working Group
2. Comparing impact of different wolf management regimes in countries sharing the population

ACTION 1	
<b>Title of the Action:</b>	<b>Establish an International Baltic wolf population (BWP) working group (BWP-WG).</b>
<b>Objective:</b>	In one year, the Baltic wolf population working group is fully functional: representatives from 4 EU states formally nominated, the Core Group designated, and the working principles and long term goals agreed on.
<b>Description of</b>	The Baltic wolf population is shared by 4 EU states (Estonia, Latvia,

<b>activities:</b>	<p>Lithuania, and Poland) and 3 non-EU countries (Russia, Belarus, Ukraine). Uncoordinated management decisions in neighbouring countries may seriously impede the progress towards national population goals. The population-level goals may be recognised and achieved only within transboundary cooperation framework. Therefore, the International Baltic wolf population working group (BWP-WG) will be established to coordinate and oversee population-level management activities.</p> <p>Activities:</p> <ol style="list-style-type: none"> <li>1) Expand the already existing Baltic Large Carnivore Initiative (BLCI) to include wolf experts (researchers, NGO representatives) and management authorities from all 4 EU countries;</li> <li>2) Establish BWP-WG in a dedicated BLCI meeting;</li> <li>3) Discuss and agree on the working scheme, main principles, and long term goals for BWP-WG;</li> <li>4) Designate the Core Group of 3-5 experts to coordinate agenda, activities, reporting, etc.;</li> <li>5) Claim for the formal acknowledgement of BWP-WG as authoritative technical body from national management authorities;</li> <li>6) Attempt to include representatives from non-EU countries.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Established working group of experts from EU states sharing BWP;</li> <li>• Platform and process for sharing data and knowledge;</li> <li>• Framework to address population-level management issues;</li> <li>• Technical guidance and expertise for national management authorities;</li> <li>• Improved the transboundary cooperation;</li> <li>• Body responsible for population-level activities, including all actions listed in this document.</li> </ul>
<b>Principal responsibility for implementation:</b>	Baltic Large Carnivores Initiative (BLCI).
<b>Timing of the activities:</b>	Establishment of BWP-WG (steps 1–4): 1 year, starting from 2014. Operating of the group: continuous.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	5

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Assess the impact of different management regimes in countries sharing the population</b>
<b>Objective:</b>	Comprehensive scientific report on management regimes, their differences, and impact of these differences is published.
<b>Description of activities:</b>	The management approaches in each of 7 countries that share BWP are vastly different, ranging from strict protection to intensive exploitation, without gradual transitions or buffer zones between closely located distinct management units. There has been virtually no assessment of the impact of this management diversity on the population, namely its

	<p>viability, age and sex structure, genetic diversity, main directions of dispersal, locations of source populations and possible sinks. Such impact assessment has to be carried out. Activities:</p> <ol style="list-style-type: none"> <li>1) Review of management practices (legal status and law enforcement, regulation of use, harvest statistics, other mortalities, conservation actions, status of prey species populations, important habitat characteristics, main threats, etc.);</li> <li>2) Collect and compile available data on population status (abundance, distribution) in each country for the last 3-5 years;</li> <li>3) Review scientific research in the BWP sharing countries pertaining to the management and its impact on the population;</li> <li>4) Identify gaps in data and research, prepare a preliminary research plan to fill them (the research is outside the scope of this Action);</li> <li>5) Prepare recommendations for amendments to national management approaches;</li> <li>6) Update the assessment regularly (each 3-5 years).</li> </ol> <p>The assessment must cover all 4 EU states and should attempt to cover 3 non-EU countries as much as possible.</p>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Comprehensive knowledge base on the national management systems of BWP sharing countries;</li> <li>• Knowledge on the impact of fragmented management on the BWP, especially – risk and problem areas;</li> <li>• Background information for planning research and conservation projects;</li> <li>• Conclusive arguments to negotiate changes in national policies.</li> </ul>
<b>Principal responsibility for implementation:</b>	BWP-WG
<b>Timing of the activities:</b>	2 years, starting from 2014-2015.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	4

### 3. Carpathian population

Specific actions:

1. Sanitary veterinary monitoring of the wolf population
2. Improving the prey base for wolf population

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Sanitary veterinary monitoring of the wolf population</b>
<b>Objective:</b>	Establish a common protocol for identification of the mortality causes / veterinary screening of the wolf population to the Carpathian level.
<b>Description of activities:</b>	Collection of all carcasses and identification of the sanitary veterinary causes of mortality. Identification of exposure to Care and distemper disease. Identification of internal and external parasites. Identification of impact of anti-rabies vaccination campaign.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Identification of the sanitary veterinary status of the wolf</li> </ul>

	<p>population and mortality causes;</p> <ul style="list-style-type: none"> <li>• Identification of measures to be taken in order to reduce mortality due to exposure to diseases (for example distemper is carried in the forest by the stray dogs and affects wolf pups).</li> </ul>
<b>Principal responsibility for implementation:</b>	Sanitary Veterinary authorities at the regional level.
<b>Timing of the activities:</b>	Permanent.
<b>Level of urgency:</b>	3
<b>Benefit:</b>	3

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Improving the prey base for wolf population</b>
<b>Objective:</b>	Ensure, through game management objectives, that wolf population has enough natural food.
<b>Description of activities:</b>	<p>Increase or maintain optimum ungulate number from ecological, economic and social point of view. Wild ungulates populations in the wolf territories are essential food base and reduce the pressure of wolf on livestock.</p> <p>Cooperation with hunting organisations in order to reduce ungulates mortality (better survival rates in winter, poaching reduction, stray dog reduction Action 7 etc.).</p>
<b>Expected results:</b>	Natural food basis for wolfs exist in order to reduce the conflicts with livestock and to allow existence of a viable wolf population
<b>Principal responsibility for implementation:</b>	Governments, national and regional authorities in charge of protection and management of forests, NGOs, hunting organizations, etc.).
<b>Timing of the activities:</b>	Permanent.
<b>Level of urgency:</b>	3
<b>Benefit:</b>	3

#### 4. Central European lowlands population

Specific actions:

1. Information platform for livestock owners
2. Knowledge transfer to hunters

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Information platform for livestock owners</b>
<b>Objective:</b>	Ensure information exchange between livestock owners in areas with long term wolf experience and newly colonized wolf areas (wolf expectation areas) on best practice husbandry techniques and effective prevention measures.

	<i>Self-help approach / helping livestock owners to help themselves</i>
<b>Description of activities:</b>	<p>Set up an information platform for livestock owners in order to provide knowledge and exchange information of best practice husbandry techniques and effective prevention measures in wolf areas in order to reduce wolf – livestock conflicts especially in areas newly colonized by wolves. Steps:</p> <ul style="list-style-type: none"> <li>• Identify relevant and interested target groups (e.g. owners of sheep, cattle, and game enclosures);</li> <li>• Establish an information platform and organize an appropriate way of information exchange. This could be a special forum of the population level management strategy.</li> </ul>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• decreased level of damage on livestock caused by wolves especially in areas newly colonized by wolves;</li> <li>• Increased tolerance towards wolves by livestock owners;</li> <li>• Lowered costs of maintaining the CEWP.</li> </ul>
<b>Principal responsibility for implementation:</b>	<p>DE, PL, CZ, NL, DK: Sheep breeder association, cattle breeder association, game keeper associations and other involved groups of livestock keepers.</p> <p>PL: General Directorate for Environmental Protection, regional directorates for environmental protection, NGOs</p>
<b>Timing of the activities:</b>	As soon as possible. Parallel to action 2
<b>Level of urgency:</b>	3
<b>Benefit:</b>	3

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Knowledge transfer to hunters</b>
<b>Objective:</b>	Improved understanding and tolerance of wolves among the community of hunters. Decreasing of illegal killing of wolves.
<b>Description of activities:</b>	Include lectures on large carnivores into the system of hunters' education. Prepare a variety of talks, seminars and events with stakeholders among the community of hunters.
<b>Expected results:</b>	<p>Hunters</p> <ul style="list-style-type: none"> <li>• understand the ecological function of wolves;</li> <li>• appreciate the role of wolves as part of the ecosystem and of the evolution of wild ungulates;</li> <li>• take part in the monitoring of wolves,</li> <li>• adapt their game management to the presence of wolves,</li> <li>• tolerate wolves as exploiters of the same group of game animals,</li> <li>• cease illegal killing of wolves.</li> </ul>
<b>Principal responsibility for implementation:</b>	<p>DE: Hunters' associations together with WWF and private agencies.</p> <p>PL: Regional directorates for environmental protection, State Forest Service, NGOs, Polish hunting association.</p>



	CZ: Czech-Moravian Hunter Association, NGOs.
<b>Timing of the activities:</b>	As soon as possible.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	3

## 5. Dinara-Balkan population

Specific actions:

1. Training and establishment of Wolf emergency team and damage inspectors in all 10 countries sharing Dinara-Balkan wolf population
2. Systematic wolf mortality monitoring (natural and human caused)
3. Health status of wolves (including zoonotic agents)

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Training and establishment of Wolf emergency team and damage inspectors in all 10 countries sharing Dinara-Balkan wolf population</b>
<b>Objective:</b>	Train and equip a group of local professionals and/or experts to act properly in any event related to wolves and covering the entire wolf range in the country. Any country with a wolf population needs its own Wolf Emergency Team (WET).
<b>Description of activities:</b>	Inviting the representatives from wolf occupied regions of the country for a two-day workshop to train them to act properly in any unusual wolf related event. Theoretical sessions systematically review the scope and importance of situations as: inspection of wolf damages, survey of protective measures applied, evaluation of risk for human safety and expertise on eventual need for lethal removal. Practical training includes the work on the bodies of dead wolves and on handling the immobilized ones on how to do the measurements and take samples.
<b>Expected results:</b>	<p>Trainees will:</p> <ul style="list-style-type: none"> <li>• acquire the legal status of Team member with signed contract with the government body;</li> <li>• Team members will officially inspect the site of each wolf related problem situation, act accordingly: urgently if case requires or prepare the report and propose next steps;</li> <li>• advise on prevention of problem with wolves;</li> <li>• advise on eventual need for lethal removal of certain wolf;</li> <li>• know how to properly take samples of dead wolves;</li> <li>• know how to properly take measurements of wolf body.</li> </ul>
<b>Principal responsibility for implementation:</b>	Wolf experts for training and relevant governmental agency for organizing and contracting trainees.
<b>Timing of the activities:</b>	Two-day workshops once per year.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	4

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Systematic wolf mortality monitoring (natural and human caused)</b>
<b>Objective:</b>	Full information of all dead wolves in a country with data on location, dates and causes of death. Special efforts to track illegally killed animals.
<b>Description of activities:</b>	With the help of Wolf emergency team and all other sources of information (traffic service, farmers, hunters, and opportunistic findings) the hard data on each dead wolf is recorded. When possible, the body is retrieved to the veterinary service for necropsy. Nature protection inspectors and hunting inspectors are promptly informed about each suspected case of illegal wolf killing and requested the information on findings.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• list of all dead wolves in a country in the given year;</li> <li>• known distribution of causes of deaths;</li> <li>• modelling for calculations on real rate of illegal killing;</li> <li>• known trends in the total mortality;</li> <li>• orientation in estimating the population size;</li> <li>• base for deciding on hunting quota on wolves;</li> <li>• sex ratio and age (from tooth sections from dead wolves) of population known.</li> </ul>
<b>Principal responsibility for implementation:</b>	Wolf researchers, inspectors and responsible government agency.
<b>Timing of the activities:</b>	Continuous.
<b>Level of urgency:</b>	5
<b>Benefit:</b>	4

<b>ACTION 3</b>	
<b>Title of the Action:</b>	<b>Health status of wolves (including zoonotic agents)</b>
<b>Objective:</b>	Reliable insight into disease agents circulating within the wolf population: viral, bacterial and parasitic, as well as other potential disorders. Special attention to agents that may affect humans and domestic animals.
<b>Description of activities:</b>	The bodies of all dead wolves that died from other reasons than hunting are retrieved for the necropsy. Hunted wolves are inspected briefly and necropsy is performed when something unusual is seen. The live-captured wolves are blood sampled for immunological tests. Scat samples are analyzed for parasites.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• list of microbial agents (viruses, bacteria);</li> <li>• list of parasites (internal and external);</li> <li>• list of diseases that caused eventual wolf death;</li> <li>• list of zoonosis confirmed (like rabies and trichinellosis cases);</li> <li>• management recommendations to mitigate certain diseases.</li> </ul>
<b>Principal responsibility for implementation:</b>	Wolf researchers, veterinary specialists and responsible government agency.

<b>Timing of the activities:</b>	Continuous retrieval of dead wolves and collection of other diagnostic materials. Work on diagnosis (identification of pathogens) 1 month per year.
<b>Level of urgency:</b>	3
<b>Benefit:</b>	3

## 6. Italian Peninsula population

Specific actions:

1. Identify and map priority areas and their functional connectivity for wolf conservation where management actions and resources should be concentrated
2. Implement a national database (linked to the Alpine wolf population) to organize, store and make public all data on wolf populations (distribution, genetics, census, monitoring, etc.), illegal and accidental killings, depredation on livestock, compensation paid
3. Approve a national guideline to reduce the diversity of damage verification and compensation protocols and provide a protocol to monitor the efficacy of mitigation policies

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Identify and map priority areas and their functional connectivity for wolf conservation where management actions and resources should be concentrated</b>
<b>Objective:</b>	In one year, a map of priority wolf areas is drafted accounting also for functional connectivity, and key management issues defined for each area.
<b>Description of activities:</b>	The wolf population in the Italian Peninsula has grown to occupy most of its former and suitable range. A more articulated management regime is necessary, beyond the full protection over the entire range. The current wolf range in Italy will be examined using a range of variables such as habitat suitability maps, distribution of various livestock and husbandry types, economic and social conflicts, prey availability, connectivity across the range, evidence of wolf-dog hybridization, etc.; large areas of similar value for wolf management will be defined and qualified for the used variables. In particular, the key areas where most urgent is the implementation of management actions (prevention of conflict, control of hybridization, damage compensation, wolf population management, etc.) will be identified in a prioritization rank to be used in a revised version of the National Wolf Action Plan. The aim of this exercise is to provide a basis for an informed discussion between the national and Regional governments on differential management across the wolf range. It will also allow more appropriate management responses at local scale.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• A map of key areas is identified and draft on a GIS support;</li> <li>• Each area qualified for the key issue(s) to be addressed;</li> <li>• Large consensus of wolf experts is obtained on the draft;</li> </ul>

	<ul style="list-style-type: none"> <li>The map is the basis for a revised wolf action plan at national scale.</li> </ul>
<b>Principal responsibility for implementation:</b>	ISPRA (Istituto Superiore Ricerca Ambientale) supported by a team of external experts.
<b>Timing of the activities:</b>	One year, starting as soon as possible.
<b>Level of urgency:</b>	3
<b>Benefit:</b>	4

ACTION 2	
<b>Title of the Action:</b>	<b>Implement a national database (linked to the Alpine wolf population) to organize, store and make public all data on wolf populations (distribution, genetics, census, monitoring, etc.), illegal and accidental killings, depredation on livestock, compensation paid.</b>
<b>Objective:</b>	A comprehensive national database is built to accommodate all data related to wolf numbers, ranges, trends, damages, genetics in Italy, and data are continuously flowing from Regional governments and research centers.
<b>Description of activities:</b>	There is no central office in Italy that regularly collects and organizes all existing data on wolf population status, trends and conflicts in the 20+ Regional governments. Data quantity and quality varies greatly among Regions but no effort has ever been made to bring this vast information to a unifying system. Data at national scale is necessary as the spatio-temporal dynamics of wolf populations require large scales and because any report to the EU is made at national level. Also, any derogations from the Habitats Directive requires robust data at national level. A database will be structured to organize all sorts of data relative to wolf numbers and areas, genetic analyses done by several labs, conflicts compensated by the Regional governments, etc. The database will be operational at ISPRA as the key scientific and technical support of the Ministry of Environment, and will be continuously updated with data flowing from the variety of peripheral sources.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>Database built and operational;</li> <li>All existing data entered;</li> <li>A system of contacts in place for the continuous gathering of data from Regional offices and research centers;</li> <li>A yearly or ad-hoc newsletter synthesize the data.</li> </ul>
<b>Principal responsibility for implementation:</b>	ISPRA (Istituto Superiore Ricerca Ambientale) with support from external consultant.
<b>Timing of the activities:</b>	Starting as soon as possible; database structure completed in 4 months; database populated ongoing.
<b>Level of urgency:</b>	3
<b>Benefit:</b>	2

<b>ACTION 3</b>	
<b>Title of the Action:</b>	<b>Approve a national guideline to reduce the diversity of damage verification and compensation protocols and provide a protocol to monitor the efficacy of mitigation policies</b>
<b>Objective:</b>	Within two years, all Regions will align their damage compensation policies to a nationally adopted guideline.
<b>Description of activities:</b>	<p>Damages by wolves to livestock are verified and compensated in a variety of approaches by the 18 Regions that currently host part of the wolf range. There is no unifying approach and the national Ministry has never attempted to provide a national guidance to the Regional authorities. This action will be mastered by the Ministry of Environment and will bring all Regional authorities dealing with damage compensation to confront their different approaches and discuss ways to minimize them and possibly adopt one approach common to all. The Ministry will provide support in terms of a background paper describing the differences, explaining the legal and financial opportunities (also offered by the new EU Common Agricultural Policy) and indicating a potential unifying approach.</p> <p>The Regional authorities will discuss and adopt the common approach and will then accordingly modify their regional norms.</p>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• The Ministry of Environment convenes a meeting of all Regional Governments to coordinate the approval of a common policy on damage compensation;</li> <li>• All Regional governments adopt the common policy and accordingly modify their current policies.</li> </ul>
<b>Principal responsibility for implementation:</b>	Ministry of Environment with support from ISPRA and external consultants.
<b>Timing of the activities:</b>	<p>In the first year, the Ministry of Environment will prepare a background paper that will report on the variety of regional policies, and will convene a first meeting of all Regional authorities to prepare the process toward a consensus on a common national policy;</p> <p>The second year will be used to convene a series of meetings to reach the consensus and agree on a common policy to be implemented at regional scale.</p>
<b>Level of urgency:</b>	3
<b>Benefit:</b>	3

## 7. Finnish-Karelian population

Specific actions:

1. Risk-mapping: A basis for fine-grained regional management
2. Incentives for improved coexistence
3. Survey of human attitudes

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Risk-mapping: A basis for fine-grained regional management</b>
<b>Objective:</b>	Management planning in which human densities, landscape structures, livestock herding and other relevant human activities and wild ungulate populations are taken into account.
<b>Description of activities:</b>	Data collection and spatial analysis of risks on wolf territories in Finland.
<b>Expected results:</b>	Improved targeting of the mitigation and compensation measures.
<b>Principal responsibility for implementation:</b>	Finnish Game and Fisheries Research Institute, Finnish Wildlife Agency, Academy of Finland.
<b>Timing of the activities:</b>	2014
<b>Level of urgency:</b>	1
<b>Benefit:</b>	5

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Incentives for improved coexistence</b>
<b>Objective:</b>	Identify the limits and possibilities of compensation schemes, tolerance payments and novel institutional adjustments for the improved coexistence.
<b>Description of activities:</b>	Critical evaluation of current compensation schemes; identify the essential conditions for the tolerance payment; establish the collaborative arenas for identification and design of incentives, i.e. ways to modify the social-ecological features of wolf territories for better coexistence. These entail explorations, discussions and collaboration of local actors, experts and authorities.
<b>Expected results:</b>	New means to reduce the concern, harm and risk imposed by the presence of the wolf; reduced conflict with wolves.
<b>Principal responsibility for implementation:</b>	Finnish Wildlife Agency, Finnish Game and Fisheries Research Institute.
<b>Timing of the activities:</b>	2014 – 2015
<b>Level of urgency:</b>	1
<b>Benefit:</b>	4

<b>ACTION 3</b>	
<b>Title of the Action:</b>	<b>Survey of human attitudes</b>
<b>Objective:</b>	The public survey on general attitudes, values, beliefs and norms on the presence of the wolf and the conditions of coexistence in Finland
<b>Description of activities:</b>	Designing and carrying out a mail survey to inquire the general attitudes, values, beliefs and norms on the presence of the wolf and alternatives for future actions.
<b>Expected results:</b>	Improved understanding about general habits of thought and action.

<b>Principal responsibility for implementation:</b>	Finnish Wildlife Agency, Finnish Game and Fisheries Research Institute, international research institutes.
<b>Timing of the activities:</b>	2013 -2014
<b>Level of urgency:</b>	1
<b>Benefit:</b>	4

## 8. North-Western Iberia Population

Specific actions :

1. Promote regular and alternative food resources for wolves in agriculture-dominated areas
2. Use the wolf image to promote economic benefits with ecotourism
3. Quality improvement and correct use of livestock guarding dogs (LGD)
4. Improving ecological and social conditions for the expansion of the NW wolf population
5. Establish an International North Western Iberia Wolf Population Committee

ACTION 1	
<b>Title of the Action:</b>	<b>Promote regular and alternative food resources for wolves in agriculture-dominated areas</b>
<b>Objective:</b>	Promote wild prey populations and assess the viability and legal support to recover the traditional management of livestock carcasses in areas with very low abundance of wild prey, subject to recent European Union regulations.
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) In areas where wild prey are almost absent or at very low abundance, promote the increasing range and density of their populations through habitat improvement and reintroduction, and focused mainly in ungulate species with lower levels of conflict with agricultural and forestry interests (e.g. selecting roe deer instead of red deer);</li> <li>2) Promote a population monitoring programme of wild ungulates across wolf range (namely in protected areas or core-areas for wolf conservation) and define potential reintroduction sites for wild ungulates by spatial-explicit modelling;</li> <li>3) Promote vigilance efforts and public awareness to reduce poaching on wild ungulates;</li> <li>4) Activate the legal and logistic mechanisms to restore the traditional disposal of carrion or livestock products in certain agricultural areas where wild prey are almost absent or at very low abundance. This action should be based on the recent European Union regulation EC 1069/2009 in Portugal and for wolf populations South of Duero River in Spain (in both cases the species is listed in Annex II of EU Habitats Directive). However, for Spanish wolf populations North of Duero River (Annex V) it should be recommended to assess the legal mechanisms and viability to extend this regulation where necessary;</li> <li>5) In Spain, where feasible, consider the reinforcement of the Galician horse as an alternative or a complementary measure to the promotion of wild ungulates. While deer reintroduction can generate conflict with the hunting sector, the Galician mountain ponies are</li> </ol>

	easier to manage, more rustic, in terms of ecological requirements, and do not generate conflict with the hunting sector. They are positively selected by wolf according to the studies carried in Galicia and their progressive disappearance can be a threat to wolf conservation by decreasing food availability. Therefore, the promotion of Galician mountain ponies should be considered an appropriate alternative to domestic livestock prey.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Higher densities of wild prey allowing a regular food resource for wolves and, indirectly, the promotion of hunting of ungulates;</li> <li>• Decrease the current trophic dependence of some Iberian wolf populations on livestock, thus attenuating the need for livestock depredations and, therefore, the human-wolf conflict;</li> <li>• Preserve the traditional cultural service provided by rural people in Iberia to wildlife allowing the availability of carrion and livestock products on certain wolf populations that are highly dependent on this food resource.</li> </ul>
<b>Principal responsibility for implementation:</b>	National and Regional Governments. Local wildlife and hunting authorities.
<b>Timing of the activities:</b>	<i>Establishment of system: 1 year. Operation of system: continuous.</i>
<b>Level of urgency:</b>	2
<b>Benefit:</b>	5

ACTION 2	
<b>Title of the Action:</b>	<b>Use the wolf image to promote economic benefits with ecotourism</b>
<b>Objective:</b>	To promote eco-tourism business and activities related to wolves and establish best practices guidelines on wolf tourism in order to maximize income to rural economy and minimize impact on wolf disturbance.
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) Review the literature and the current tourism activities related to wolves in the Iberian Peninsula to prepare a technical document with guidelines and best practices on compatible wolf tourism in human-dominated landscapes, in order to maximize income to rural economy and minimize disturbance to wolves, especially during the breeding season.</li> <li>2) Promote the high potential for touristic use of the ethnographic heritage related to wolves in Iberian Peninsula, by considering the full structural reconstruction of the architectural legacy (e.g. traditional structures for livestock protection, stone-made wolf traps) and the recompilation of local beliefs and practices;</li> <li>3) Conduct awareness campaigns to general public and to local inhabitants and tourist operators for showing the potential of wolves and their cultural heritage to attract tourism, generate economic income and promote rural development;</li> <li>4) Develop sustainable activities in wolf range including wolf educational trails and interpretation centres, wolf observation and wolf friendly products;</li> </ol>



	5) Encouraging tourist operators and protected areas services to incorporate wolves in their programs.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Establish the wolf image as an important element in the cultural identity of rural communities and as a promoter for economic income and rural development;</li> <li>• Prompt the economic value of wolves, improve tolerance towards the species, and attenuate the conflict with rural people;</li> <li>• Regulate wolf based tourism activities related to watching and photographing wild wolves, in order to minimize impacts on wolves and potential conflicts with local people.</li> </ul>
<b>Principal responsibility for implementation:</b>	National and Regional Governments, managers of protected areas, Ministry of the Environment, wolf experts, nature conservation and tourism agencies and local inhabitants.
<b>Timing of the activities:</b>	<i>Establishment of system</i> (guidelines with best practices): 6 months. <i>Operation of system</i> : continuous.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	4

ACTION 3	
<b>Title of the Action:</b>	<b>Quality improvement and correct use of livestock guarding dogs (LGD)</b>
<b>Objective:</b>	Evaluation of quality and acceptance of LGD concerning breed, effectiveness and conflict potential. Review, adapt and standardise requirements and protocols for breeding, training, use, and husbandry of LGD.
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) Coordination/exchange among different organisations which take care of the cynology of working LGD for the development of a shared protocol for breeding, training, use, and husbandry of LGD;</li> <li>2) Establishment of a protocol for monitoring incidents with LDG;</li> <li>3) Identification of requirements for the breeding, training, husbandry and the use of livestock guarding dogs in Spain and Portugal;</li> <li>4) Creation of a recognized label breed of LGD working lines according to specified minimal standards;</li> <li>5) Definition of one or more requirement profiles for future livestock guarding dog generations;</li> <li>6) Maintenance of a stud book for the pure breeding of working lines of different LGD breeds;</li> <li>7) Implementation of the breeding standards in the different countries;</li> <li>8) Raise awareness of the best approaches to breed and train LGD among livestock owners;</li> <li>9) Informing tourists via national, regional and local tourism organisations about appropriate behaviour in regions with livestock guarding dogs.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Shared protocol for breeding, training, use, and husbandry of LGD and for monitoring incidents with LGD;</li> <li>• Increase correct use of livestock guarding dogs;</li> <li>• Standardisation of a high breeding standard of LGD in Iberia;</li> </ul>

	<ul style="list-style-type: none"> <li>• Appropriate conflict management among livestock owners, LDG and tourism.</li> </ul>
<b>Principal responsibility for implementation:</b>	Livestock guarding dogs centres and livestock organizations; Organisations which take care of the cynology of working LGD.
<b>Timing of the activities:</b>	Start <i>soon</i> .
<b>Level of urgency:</b>	1
<b>Benefit:</b>	4

ACTION 4	
<b>Title of the Action:</b>	<b>Improving ecological and social conditions for the <u>expansion of the NW wolf population</u>.</b>
<b>Objective:</b>	To identify, at a population level, areas for wolf natural recolonization according to landscape attributes and ecological, social and economic factors and improve social conditions in such areas by implementing specific damage prevention measures and education campaigns in order to prevent future conflicts.
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) Identify accurately the current areas in both countries where wolves are expanding by compiling records of presence and breeding packs in the last years.</li> <li>2) Identify potential areas for expansion of wolf populations by spatial-explicit modelling using both ecological and social factors to predict future areas for natural recolonization and forecast the level of conflict that may arise.</li> <li>3) Implement measures to improve social acceptance of wolves in the best selected areas for wolf expansion, by implementing damage prevention measures and education campaigns.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• An accurate and up-dated knowledge on wolf natural expansion patterns, in both a temporal and spatial scale;</li> <li>• Recommendations to support decision-making for wolf management, by selecting the best areas for wolf expansion;</li> <li>• Achieve a lower level of conflict in future areas of wolf occurrence.</li> </ul>
<b>Responsibility for implementation:</b>	National and regional conservation agencies. Wolf experts.
<b>Timing of the activities:</b>	Continuous.
<b>Level of urgency:</b>	3
<b>Benefit:</b>	3

ACTION 5	
<b>Title of the Action:</b>	<b>Establish an International North-Western Iberia Wolf Population Committee (IWC).</b>
<b>Objective:</b>	In one year, the North-Western Iberia wolf population Committee is fully

	functional: representatives from 2 EU states and the relevant Spanish Comunidades are formally nominated, the Core Group designated, and the working principles and long term goals agreed on.
<b>Description of activities:</b>	The North Western wolf population is shared by 2 EU states (Spain and Portugal) and management responsibilities are given, in Spain, to regional governments. Uncoordinated management decisions may seriously impede the progress towards national population goals. The population-level goals may be recognised and achieved only within transboundary cooperation framework. Therefore, the International North Western Iberia wolf population Committee will be established to coordinate and oversee population-level management activities. Activities: 1) Expand the already existing activities at level of experts (researchers, NGO representatives) and management authorities; 2) Discuss and agree on the working scheme, main principles, and long term goals for the Committees; 3) Designate the Core Group of 3-5 experts to coordinate agenda, activities, reporting, etc.; 4) Claim for the formal acknowledgement of the Committee as authoritative technical body from national management authorities.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Established working group of experts;</li> <li>• Platform and process for sharing data and knowledge;</li> <li>• Framework to address population-level management issues;</li> <li>• Technical guidance and expertise for national management authorities;</li> <li>• Improved the transboundary cooperation;</li> <li>• Body responsible for population-level activities, including all actions listed in this document.</li> </ul>
<b>Principal responsibility for implementation:</b>	National and Regional Governments.
<b>Timing of the activities:</b>	Establishment of the Committee: 1 year, starting from 2015. Operating of the group: continuous.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	5

## 9. Scandinavian population

Specific actions :

1. Establish science-based estimates for Favourable Conservation Status
2. Develop instruments or practices to address attacks on hunting dogs

ACTION 1	
<b>Title of the Action:</b>	<b>Establish science-based estimates for Favourable Conservation Status</b>
<b>Objective:</b>	Expand the scientific consensus upon what is FCS for wolves in Scandinavia to support parliamentary decisions.
<b>Description of activities:</b>	Establishing peer-reviewed science-based estimates for FCS that include genetic aspects (low inbreeding, increased allelic diversity)

	long-term viability and connectivity with other populations. A robust scientific basis of FCS definition is of paramount importance to inform the parliamentary discussion and decisions in the future.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• A peer-reviewed FCS based on scientific consensus established</li> <li>• Included as a goal in management plan</li> <li>• Ensured compliance with Habitats Directive</li> <li>• Management becomes more adaptive</li> </ul>
<b>Principal responsibility for implementation:</b>	Swedish Environmental Protection Agency delegating to relevant scientists
<b>Timing of the activities:</b>	6 months
<b>Level of urgency:</b>	4
<b>Benefit:</b>	4

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Develop instruments or practices to address attacks on hunting dogs</b>
<b>Objective:</b>	Provide hunters with instruments or practices to address attacks on hunting dogs
<b>Description of activities:</b>	Developing possible tools (such as protective vests) to avoid dogs being killed in case of an encounter with wolves and assessing the efficiency of alternative hunting practices that would expose less dogs to wolf encounters.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Decreased number of dogs killed by wolves;</li> <li>• Keep hunting traditions when possible and/or adopt alternative practices instead if desirable;</li> <li>• Reduced conflict with hunters.</li> </ul>
<b>Principal responsibility for implementation:</b>	Wildlife Damage Center in collaboration with hunter associations.
<b>Timing of the activities:</b>	Continuous.
<b>Level of urgency:</b>	4
<b>Benefit:</b>	4

## 10. Sierra Morena population

Specific actions :

1. Set up a specific Committee for the Recovery of the Wolf in Sierra Morena
2. Debate within the Committee the opportunity and feasibility of reinforcing the Sierra Morena wolf population
3. Identify the elements of the conflict between the wolf and the red-deer hunting in Sierra Morena, and propose measures to alleviate it

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Set up a specific Committee for the Recovery of the Wolf in Sierra Morena</b>
<b>Objective:</b>	Discuss the status and the future of the wolf in Sierra Morena in a specific committee formed by the relevant agencies of the regional and national governments, the scientists and the stakeholders.
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) To reach a consensus between the autonomous regions of Andalusia, Castilla-la Mancha and The Ministry of the Environment to establish the Committee;</li> <li>2) To agree the representatives of the two regional governments and of the Ministry of the Environment;</li> <li>3) To agree the details on the coordination of the group;</li> <li>4) To agree on the composition of the group of experts;</li> <li>5) To agree on the composition of the group of stakeholders;</li> <li>6) To discuss the current status of the wolf population, how to improve the population monitoring, the options facing a likely imminent extinction of the population, and the social and economic problems that the recovery of the population can cause, and to reach a consensus with the stakeholders;</li> <li>7) The Committee will be composed of 1) representatives of the regional government of Andalucía, the regional government of Castilla-La Mancha and the Spanish Ministry of the Environment; 2) national and international experts; and 3) representative of stakeholders (land owners, hunters, livestock breeders, environmentalists, etc.).</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• An interregional, multidisciplinary and specific Committee on the recovery of wolves in Sierra Morena is established;</li> <li>• The actual status of the wolf population is discussed by a team of independent experts;</li> <li>• The options facing the extinction of the population are considered;</li> <li>• Independent experts and stakeholders contribute to the recovery of wolves in Sierra Morena.</li> </ul>
<b>Principal responsibility for implementation:</b>	Regional governments of Andalusia and of Castilla-La Mancha, Ministry of the Environment. Wolf experts, stakeholders.
<b>Timing of the activities:</b>	Three months since the agreement to establish the Committee.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	5

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Debate within the Committee the opportunity and feasibility of reinforcing the Sierra Morena wolf population</b>
<b>Objective:</b>	The current wolf population of Sierra Morena might need to be reinforced in order to recover, by introducing individuals from the Iberian population, considering the demographic, genetic, ecological, legal, economic and social aspects. This very hot issue should be debated within the Committee for the Recovery of the Wolf in Sierra

	Morena and a decision must be made.
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) After the establishment of the Committee for the Recovery of the Wolf in Sierra Morena, the actual status of the wolf population must be assessed;</li> <li>2) To decide if the wolf population can recover by itself considering wolf numbers, the genetic variability, the distance to the main Iberian wolf population and the physical and social barriers which hampers the connectivity;</li> <li>3) Debate the legal obligations of the Spanish State under the Habitats Directive if the wolf population in Sierra Morena becomes extinct;</li> <li>4) Debate the human dimension aspects related with the reinforcement (or reintroduction) of wolves in Sierra Morena;</li> <li>5) Debate the impact of a full recovery of the wolf population of Sierra Morena on the local economy;</li> <li>6) Debate the feasibility of a reinforcement or a reintroduction of wolves in Sierra Morena;</li> <li>7) Make a decision on the reinforcement or reintroduction of wolves in Sierra Morena and prepare a detailed project if appropriate.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• The Committee for the Recovery of the Wolf in Sierra Morena appoints a group of experts to debate this topic;</li> <li>• After being debated, a report on the need and the feasibility of a reinforcement is produced, considering many different perspectives and with the input of government officials, experts on wolf demography, genetics and conflicts, and stakeholders;</li> <li>• A decision is eventually made and integrated in the Wolf Recovery Plan of Sierra Morena.</li> </ul>
<b>Principal responsibility for implementation:</b>	Mainly, regional governments of Andalusia and Castilla-La Mancha. In addition, Ministry of the Environment, wolf experts and stakeholders.
<b>Timing of the activities:</b>	One year.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	5

<b>ACTION 3</b>	
<b>Title of the Action:</b>	<b>Identify the elements of the conflict between the wolf and the red-deer hunting business in Sierra Morena, and propose measures to alleviate it</b>
<b>Objective:</b>	Obtain detailed information on the economic and social impacts of wolves on the hunting business carried out by private owners and the municipalities in Sierra Morena, and to look for ways to mitigate or to compensate them, if appropriate.
<b>Description of activities:</b>	<ol style="list-style-type: none"> <li>1) To select a multidisciplinary team, composed at least by an economist, a sociologist and a biologist to conduct the research;</li> <li>2) To carry out personal interviews and/or mail enquiries with private owners, representatives of the municipalities and other local and regional agencies, hunting managers, hunters, biologists and other stakeholders involved in the red deer hunting business in Sierra</li> </ol>

	<p>Morena, in order to assess the economic and social impact of the wolf on this industry, proposing measures to minimize it;</p> <p>3) To submit the report to the Committee and to peers for review;</p> <p>4) To integrate the mains conclusions in the Recovery Plan of the Wolf in Sierra Morena.</p>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• A report is produced with detailed information on the wolf impact on the hunting business in Sierra Morena;</li> <li>• The results of the report allow to implement measures to minimize or to compensate the conflict.</li> </ul>
<b>Principal responsibility for implementation:</b>	Autonomous region of Andalusia and of Castilla-La Mancha. Ministry of the Environment, economists, sociologists and wolf experts.
<b>Timing of the activities:</b>	18 months to conduct the research and to write the first manuscript.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	4

# SECTION 4: LYNX

## PART I – Eurasian lynx populations in Europe

### 1.1 Populations

Eurasian lynx are widely 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 11 populations (Fig. 1). Five of these eleven 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. Based on its present status we herein consider the Harz Mountain's to be an own population.



**Figure 1.** The 11 lynx populations in Europe.



## 1.2 Status

The total number of lynx in Europe is around 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. A small population is building up in number (~20) in the Harz Mountains (Central Germany) following a reintroduction programme started in 1999.

Population	Population size 2011	Countries (and approx. % share of population)	Trend	Red List assessment
<b>Alpine</b>	130	CH (77%), FR (10%), IT (7%), SI (3%), AT (3%)	Stable	EN (D)
<b>Balkan</b>	40-50	FYROM (85%), AL (15%), RKS (?), ME (?)	Decrease?	CR (C2a(i,ii) D)
<b>Baltic</b>	1600 (without BY and RU)	EE (49%), LV (37%), PL (6%), UA (5%), LT (3%)	Stable	LC
<b>Bohemian-Bavarian</b>	50	CZ (67%), DE (23%), AT (10%)	Stable or decrease	CR (D) -
<b>Carpathian</b>	2300-2400	RO (57%), UA (16%), SK (15%), PL (9%), RS (2%), CZ (0.5%), BG (0.5%), HU (<0.05%)	Stable	LC
<b>Dinaric</b>	120-130	BA (53%), HR (39%), SI (8%)	Stable or decrease	EN (D)
<b>Jura</b>	100	FR (70%), CH (30%)	Increase	EN (D)
<b>Karelian</b>	2430-2610 (without RU)	RU, FI (% unknown)	Increase	LC
<b>Scandinavian</b>	1800-2300	SE (81%), NO (19%)	Stable	LC
<b>Vosges-Palatinian</b>	19	FR (100%), DE (currently 0%)	Stable or decrease	CR (C2a(i,ii) D)
<b>Harz Mountains</b>	20	DE (100%)	Increase	-

## 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 that are probably interlinked with the first) and habitat loss due to infrastructure development, poor management structures and accidental mortality. The small population in Slovenia is probably suffering from excessive inbreeding and appropriate actions will have to be planned.

## 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 – Actions for all populations

Note:

<i>Level of urgency:</i>	<i>(scale of 1-5: 1 = high urgency, 3 = medium urgency, 5 = low urgency)</i>
<i>Benefit:</i>	<i>(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)</i>

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Population-level and national management plans</b>
<b>Objective:</b>	To assist a coherent conservation of lynx populations through the development of both (1) transboundary, population-level management plans and (2) national management plans, as implementation instruments through a participatory approach involving all relevant stakeholders.
<b>Description of activities:</b>	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>Activities:</p> <ol style="list-style-type: none"> <li>1. Establish a population-wide working group with representatives from all countries and all relevant national stakeholders;</li> <li>2. Develop, in a participatory and facilitated approach, goals, standards and common management principles for the entire population;</li> <li>3. Establish national working groups with representatives from all relevant national and provincial authorities and stakeholder groups;</li> <li>4. Develop national management plans considering the agreed population-level principles and the national/provincial legislation, practices and particularities;</li> <li>5. Implement activities on population and national level;</li> <li>6. Review and revise the management plans in regular intervals or as needed.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Consensus on common goals and approaches at population level;</li> <li>• Transparent, approved, operational and adaptive plans for the implementation of conservation and management measures;</li> <li>• Increased acceptance of lynx through the use of a participatory approach and involvement of stakeholder groups.</li> </ul>
<b>Principal responsibility for implementation:</b>	Authorities in charge at national/provincial level and mandated/involved interest groups or institutes.
<b>Timing of the activities:</b>	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.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	5

ACTION 2	
<b>Title of the Action:</b>	<b>Intra- and inter-population connectivity and fragmentation</b>
<b>Objective:</b>	To assess and mitigate the negative effect of habitat fragmentation on lynx populations and assist the merging/genetic exchange of isolated (sub)populations.
<b>Description of activities:</b>	<p>Lynx has a reduced ecological valence 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 population size and fragmentation impedes the genetic and 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"> <li>1. Assess the status and viability of all lynx populations in regard to their fragmentation into subpopulations and their connectivity to neighbouring populations;</li> <li>2. Assess the risk of planned infrastructure development (e.g. the</li> </ol>

	<p>Trans-European Transport Network) to further fragment a lynx population and reduce its viability;</p> <ol style="list-style-type: none"> <li>3. Promote the merging of subpopulations and maintenance or restoration of habitat corridors between neighbouring populations;</li> <li>4. Promote the assisted exchange of lynx in situations where natural dispersal is inadequate to maintain the (genetic) viability of a (sub)population.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Enhanced demographic and/or genetic viability of small and isolated (sub)population and populations.</li> </ul>
<b>Principal responsibility for implementation:</b>	National/provincial authorities, scientific experts.
<b>Timing of the activities:</b>	Assessment of population status: 1–3 years; assessment of infrastructure: continuous; implementation of mitigation: many years.
<b>Level of urgency:</b>	2–5 (depending on the size and the level of inbreeding of a population)
<b>Benefit:</b>	1–5 (depending on the fragmentation and inbreeding status of a population).

<b>ACTION 3</b>	
<b>Title of the Action:</b>	<b>Standardised, robust quantitative monitoring of lynx populations</b>
<b>Objective:</b>	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 effective provisioning of information to the public.
<b>Description of activities:</b>	<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 joint monitoring system for each population should be based 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. It should produce results that are comparable between the countries and allow a continued assessment of the entire population and the information of stakeholders and the public.</p> <p>Activities:</p> <ol style="list-style-type: none"> <li>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;</li> <li>2. Establish the network (experts, game wardens, hunters, naturalists, etc.) needed to generate the data;</li> <li>3. Define monitoring rhythm and common interpretation and publication of findings.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Shared database for the entire population;</li> </ul>

	<ul style="list-style-type: none"> <li>• Regular reports on the status of the population;</li> <li>• Reliable data on the population allowing the identification of appropriate management measures and assess their effectiveness;</li> <li>• Stakeholder involvement;</li> <li>• Agreed/accepted population data for the discussion of further conservation/management measures with stakeholder groups;</li> <li>• Enhanced public awareness and understanding.</li> </ul>
<b>Principal responsibility for implementation:</b>	National/provincial wildlife conservation authorities; international working group; experts; stakeholder groups participating in the monitoring.
<b>Timing of the activities:</b>	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.
<b>Level of urgency:</b>	1 (for population without any monitoring), 3 (for population with a certain monitoring)
<b>Benefit:</b>	4

<b>ACTION 4</b>	
<b>Title of the Action:</b>	<b>Health monitoring and genetic reinforcement of small, inbred populations</b>
<b>Objective:</b>	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.
<b>Description of activities:</b>	<p>All reintroduced and some autochthonous populations (Balkan and parts of the 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"> <li>1. Establish and apply standardised protocols for veterinary examinations (e.g. necropsies);</li> <li>2. Establish and apply standardised protocols for genetic monitoring (survey of inbreeding status);</li> <li>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);</li> <li>4. Implement wherever appropriate measures for genetic/health conservation.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Information on health status and degree of inbreeding per population/subpopulation;</li> </ul>

	<ul style="list-style-type: none"> <li>• Genetic/health conservation measures implemented;</li> <li>• Improved health status and reduced inbreeding coefficient in the respective populations/subpopulations.</li> </ul>
<b>Principal responsibility for implementation:</b>	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.
<b>Timing of the activities:</b>	1–3 years for screening (depending on the availability of samples); 1–3 years for the implementation of conservation measures.
<b>Level of urgency:</b>	1 (high level of inbreeding) – 2 (unknown level of inbreeding)
<b>Benefit:</b>	5

<b>ACTION 5</b>	
<b>Title of the Action:</b>	<b>Habitat conservation and environmental impact assessments</b>
<b>Objective:</b>	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.
<b>Description of activities:</b>	<p>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"> <li>1. Assess the impact of infrastructure development on lynx population viability (literature review, expert model);</li> <li>2. Develop Guidelines for assessing the impact of new infrastructure on lynx populations in EIAs;</li> <li>3. Submit these Guidelines to the relevant European institutions and the authorities in charge in the range countries.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Better understanding of the impact of infrastructure development on lynx populations;</li> <li>• Standardised criteria for considering lynx conservation in EIAs in all EU countries;</li> <li>• Enhanced awareness for the potential impact of infrastructure development on lynx populations.</li> </ul>
<b>Principal responsibility for implementation:</b>	Development of Guidelines: Lynx experts, NGOs; application: relevant governmental institutions, infrastructure developers, EIA consultancies.
<b>Timing of the activities:</b>	Development of Guidelines: 1 year; application: continuous.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	4

ACTION 6	
<b>Title of the Action:</b>	<b>Integrate lynx predation impact into wildlife management practise</b>
<b>Objective:</b>	To study and assess the predation impact of lynx on its main prey species (e.g. roe deer) and the extent of competition between lynx and hunters for game, and make recommendations on how to consider the predation impact by lynx into wildlife management and hunting plans.
<b>Description of activities:</b>	<p>Perceived or real competition between hunters and lynx, and resulting opposition of hunters to lynx presence or recovery is believed to be the main obstacle 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 plans for small ungulates (e.g. roe deer hunting quotas).</p> <p>Activities:</p> <ol style="list-style-type: none"> <li>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);</li> <li>2. Assess the combined and mutual impact of lynx predation and hunter harvest on the prey population;</li> <li>3. Investigate the attitudes of hunters towards lynx and their view of its predation impact;</li> <li>4. Develop recommendations on how to adapt wildlife management plans and hunting quotas (e.g. for roe deer) to the presence of lynx and its predation impact;</li> <li>5. Inform wildlife managers and hunters and implement the recommendations in the wildlife management and hunting regime.</li> </ol> <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>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Qualitative and quantitative assessment of predation impact of lynx on its main prey species and a better understanding of predator-prey relationship;</li> <li>• Integration of lynx predation into wildlife management and hunting plans and hence reduction of competition between lynx and hunters;</li> <li>• Improved lynx conservation through mitigation of the conflict between hunters and lynx.</li> </ul>
<b>Principal responsibility for implementation:</b>	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.
<b>Timing of the activities:</b>	1 to several years for the assessment (depending on the availability of information); 1 year for the development of recommendations; continuous implementation.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	4

## PART III – Specific actions for each population

### 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	
<b>Title of the Action:</b>	<b>Pan-Alpine and integrated conservation and management of lynx</b>
<b>Objective:</b>	To compile ecological/biological knowledge and sociological/human dimensions understanding into a conservation vision and management model for the Alpine lynx population shared by all range countries.
<b>Description of activities:</b>	<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"> <li>1. Review biological and ecological features for lynx in the Alps (habitat suitability model, fragmentation, population viability, predation);</li> <li>2. Review people's attitudes and stakeholder opinions and factors defining the tolerance level towards lynx presence;</li> <li>3. Identify conservation needs and develop management scenarios for the Alpine lynx population and all Alpine countries;</li> <li>4. Submit the proposal to the Alpine Convention for discussion and endorsement.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Review and compilation of ecological and sociological knowledge and comprehensive understanding of lynx conservation options;</li> <li>• Pan-Alpine consensus on conservation goals and management options for lynx;</li> <li>• Improved cooperation between the Alpine countries in regard to lynx conservation;</li> <li>• Better involvement of stakeholder groups.</li> </ul>
<b>Principal responsibility for implementation:</b>	Compilation of background information: experts (SCALP, RowAlps project); conservation and management options: WISO Platform Alpine Convention; review and endorsement: Alpine Convention.
<b>Timing of the activities:</b>	Results available by end 2015.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	4

### ACTION 2



<b>Title of the Action:</b>	<b>Genetic reinforcement</b>
<b>Objective:</b>	To reinforce the Alpine population with new lynx from the original source population to mitigate the high inbreeding level and possibly related health problems.
<b>Description of activities:</b>	<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"> <li>1. Conceptualise the genetic reinforcement within the discussion about the integrated management of the Alpine population (Action 1);</li> <li>2. Develop a plan (principles, procedures, monitoring) for the genetic reinforcement;</li> <li>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.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Better understanding and consensus of the genetic management of small/reintroduced populations;</li> <li>• Genetic rehabilitation of the Alpine lynx.</li> </ul>
<b>Principal responsibility for implementation:</b>	National wildlife conservation authorities (decision, permissions); expert groups: SCALP, genetic and lynx experts (concepts, monitoring); National/provincial authorities (implementation).
<b>Timing of the activities:</b>	Within the next 2–4 years
<b>Level of urgency:</b>	1
<b>Benefit:</b>	5

ACTION 3	
<b>Title of the Action:</b>	<b>Assisted merging of subpopulations</b>
<b>Objective:</b>	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).
<b>Description of activities:</b>	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>Activities:</p> <ol style="list-style-type: none"> <li>1. Develop a plan for the merging according to general Alpine lynx conservation and management principles;</li> <li>2. Assess public attitudes and gain public support;</li> <li>3. Create the stepping-stones needed through translocation/local reintroduction or reinforcement (e.g. isolated lynx).</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Wider distribution of lynx in the Alps;</li> <li>• Gene flow between subpopulations and enhanced genetic viability.</li> </ul>
<b>Principal responsibility for implementation:</b>	Assessment, planning: experts (e.g. SCALP group); permissions, implementation: national/provincial authorities.
<b>Timing of the activities:</b>	1–10 years.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	5

## 2. Balkan population

Specific actions:

1. Increase capacity in wildlife management institutions and improve wildlife management practices.
2. Integrate Balkan lynx conservation into a broader national / regional strategy and the EU integration processes

ACTION 1	
<b>Title of the Action:</b>	<b>Increase capacity in wildlife management institutions and improve wildlife management practices</b>
<b>Objective:</b>	To create the required capacities within institutions responsible for wildlife conservation and management and to improve wildlife management practices in the range countries.
<b>Description of activities:</b>	<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 poorly enforced.</p> <p>Activities:</p> <ol style="list-style-type: none"> <li>1. Review the existing wildlife management structures and capacities in all range countries;</li> <li>2. Launch an awareness and capacity building/training programme for wildlife management and law enforcement;</li> <li>3. Cooperate with scientific institutions in order to establish a curriculum for wildlife research and conservation;</li> <li>4. Facilitate close cooperation with hunters in the region through a series of workshops for awareness rising;</li> <li>5. Support the integration of hunters into wildlife monitoring and management.</li> </ol>

<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Review of the legal situation and institutional structures of wildlife management in the range countries;</li> <li>• Improved awareness and professional skills of wildlife management authorities and institutions;</li> <li>• Improved integration of and cooperation with hunters.</li> </ul>
<b>Principal responsibility for implementation:</b>	Specialised conservation and wildlife research institutions (NGOs), national wildlife conservation authorities, national and international scientific institutions, hunters' associations.
<b>Timing of the activities:</b>	5 years.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	4

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Integrate Balkan lynx conservation into a broader national / regional strategy and the EU integration processes</b>
<b>Objective:</b>	To achieve cross-sectorial integration of lynx conservation issues into strategic development documents in each of the range countries, as well as evaluating and predicting the impacts of current and future EU integration activities on lynx conservation issues.
<b>Description of activities:</b>	<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"> <li>1. Review the goals/objectives of the Balkan Lynx Conservation Strategy regarding its compatibility or conflicts with the existing legal framework and development plans;</li> <li>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.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Working group for integration of lynx conservation issues in strategic approaches;</li> <li>• Implementation of range-wide Conservation Strategy and National Action Plans;</li> <li>• Task force for exploring EU harmonisation processes;</li> <li>• Studies on EU integration effects on lynx conservation.</li> </ul>
<b>Principal responsibility for implementation:</b>	International and national (conservation) NGOs, national authorities for wildlife management, ecological/environmental faculties of (national) universities.
<b>Timing of the activities:</b>	3 years.
<b>Level of urgency:</b>	3
<b>Benefit:</b>	4

### 3. Baltic population

Specific actions:

1. Working group for transboundary cooperation
2. Trade surveillance

ACTION 1	
<b>Title of the Action:</b>	<b>Working group for transboundary cooperation</b>
<b>Objective:</b>	To establish an international Baltic lynx population (BLP) working group cooperating on the population level comprised of lynx experts and management officials from all countries sharing the BLP.
<b>Description of activities:</b>	<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"> <li>1. Establish BLP working group with each country represented by at least one researcher and one specialist from the decision making authority;</li> <li>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 an improved transparency;</li> <li>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.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Increased transparency and mutual understanding of national management and conservation issues;</li> <li>• Ground prepared for improved conservation and shared conservation of the population (general Action 1).</li> </ul>
<b>Principal responsibility for implementation:</b>	BLCI core group, namely large carnivore researchers from Estonia, Latvia, Lithuania, and Poland.
<b>Timing of the activities:</b>	1–2 years, continued
<b>Level of urgency:</b>	1
<b>Benefit:</b>	5

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

#### 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 for the Bohemian-Bavarian population:

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

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Apply active population reinforcement</b>
<b>Objective:</b>	To create and develop stepping stones to neighbouring populations (foremost the Carpathian population) in order to prevent inbreeding of the small and isolated population.
<b>Description of activities:</b>	The Bohemian-Bavarian population is still small and isolated, but has the potential to be connected to the large source population of the Carpathians.

	<p>Activities:</p> <ol style="list-style-type: none"> <li>1. Replenish documented illegal killings by releasing animals from genetically suitable populations;</li> <li>2. Rehabilitate and release orphaned animals by translocation into suitable stepping stone sites.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Counteract possible inbreeding in the population;</li> <li>• Create and foster possible stepping stones to support spreading of population and linkage to other lynx occurrences (esp. Carpathian population).</li> </ul>
<b>Principal responsibility for implementation:</b>	Bavarian Environmental Agency, Czech Ministry of Environment
<b>Timing of the activities:</b>	1–2 years, ongoing
<b>Level of urgency:</b>	3
<b>Benefit:</b>	4

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Damage prevention and compensation</b>
<b>Objective:</b>	To support prevention measures against lynx attacks on livestock and compensate damages caused by lynx in effectively protected livestock herds and game enclosures.
<b>Description of activities:</b>	<p>In the Czech Republic, no prevention measures against large carnivore attacks are supported on a national or regional level.</p> <p>Activities:</p> <ol style="list-style-type: none"> <li>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;</li> <li>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.</li> <li>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).</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Professional documentation of possible lynx depredation on livestock;</li> <li>• Comparable procedures across population;</li> <li>• Smooth coverage of documented attacks;</li> <li>• Increased tolerance of lynx among sheep breeders and hunters.</li> </ul>
<b>Principal responsibility for implementation:</b>	Implementation: Bavarian Environmental Agency Funds: private associations (hunting, nature protection) combined with governmental aid.
<b>Timing of the activities:</b>	1, ongoing.
<b>Level of urgency:</b>	5
<b>Benefit:</b>	2

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

## 5. Carpathian population

Specific actions:

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

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Public awareness and education</b>
<b>Objective:</b>	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.
<b>Description of activities:</b>	<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"> <li>1. Work with media, social networks, local opinion makers and politicians in order to get objective information from scientists to public;</li> <li>2. Develop printed materials (educational and PR) for the interest groups – hunters, livestock owners, foresters – and distribute them in on-site meetings;</li> <li>3. Include lectures on lynx impact to game into the system of hunters' education;</li> <li>4. Involve local people and interest groups in data collection.</li> <li>5. Develop an educational programme for schools as well as for the general public;</li> <li>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.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Better informed interest groups concerning lynx role in ecosystems and its conservation;</li> <li>• Active involvement of the interest groups and the general public in the issues of lynx conservation;</li> <li>• Better acceptance of the species by interest groups like livestock owners, hunters and foresters.</li> </ul>
<b>Principal responsibility for implementation:</b>	NGOs involved in large carnivore conservation (BG: Balkani Wildlife Society, Ro: Carpathian Foundation and/or Association for Conservation of Biodiversity, CZ: Friends of the Earth CZ, PL: Association for Nature Wolf, SK: Slovak Wildlife Society), national interest groups, media..
<b>Timing of the activities:</b>	1 year for preparation, continuous.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	4

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Reduction of feral and free-ranging dogs and cats in the wild</b>
<b>Objective:</b>	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.
<b>Description of activities:</b>	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 Romania and Bulgaria.  Activities: 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.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Increased awareness of dog and cat owners about impact of their pets on wildlife and responsibility of owners for damage to livestock and wildlife;</li> <li>• Reduced transmission of parasites and diseases to lynx population;</li> <li>• Solutions for the effective reduction of feral and free-ranging dog populations;</li> <li>• Reduced mortality of wild ungulates and better food basis for lynx.</li> </ul>
<b>Principal responsibility for implementation:</b>	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.
<b>Timing of the activities:</b>	1–2 years for assessment and developing concepts, continuous implementation.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	5

## 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	
<b>Title of the Action:</b>	<b>Reinforcement of the population in Croatia and Slovenia</b>
<b>Objective:</b>	To introduce new genes into the heavily inbred Dinaric lynx population.
<b>Description of activities:</b>	The reintroduced Dinaric population needs genetic remedy.  Activities: 1. Obtaining all necessary permits and agreements; 2. Selection of country within the Carpathian lynx population range

	<p>for a source;</p> <p>3. Solving of logistics of lynx capturing, quarantine, transfer and release;</p> <p>4. Monitoring the post release life of transferred animals, their effect on population size and genetic situation.</p>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Transferred lynx produce offspring with resident ones;</li> <li>• Genetic diversity is improved.</li> </ul>
<b>Principal responsibility for implementation:</b>	Lynx researchers, relevant Government bodies, international partners.
<b>Timing of the activities:</b>	2 years for translocations, 4+ years monitoring.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	4

ACTION 2	
<b>Title of the Action:</b>	<b>Capacity building for lynx management (including large carnivore emergency teams)</b>
<b>Objective:</b>	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.)
<b>Description of activities:</b>	<p>Activities:</p> <ol style="list-style-type: none"> <li>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;</li> <li>2. Review theoretical sessions systematically under the scope and importance of situations such 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;</li> <li>3. Give special attention to manage the case of orphaned lynx cubs.</li> </ol> <p>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.</p>
<b>Expected results:</b>	<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"> <li>• Urgently if case requires, or prepare report and propose next steps;</li> <li>• Advise on prevention of problem with lynx;</li> <li>• Advise on eventual need for lethal removal of lynx (e.g. rabies);</li> <li>• Know how to properly take samples of dead lynx;</li> <li>• Know how to properly take measurements of lynx carcasses.</li> </ul>
<b>Principal responsibility for implementation:</b>	Lynx experts (training), relevant governmental agency (organisation and contracting trainees)
<b>Timing of the activities:</b>	1–3 years (several training workshops)

<b>Level of urgency:</b>	2
<b>Benefit:</b>	4

## 7. Jura population

Specific actions:

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

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Review and harmonise measures against predator attacks on livestock</b>
<b>Objective:</b>	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.
<b>Description of activities:</b>	<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"> <li>1. Review and compare experiences in both countries regarding lynx damage prevention;</li> <li>2. Make recommendation on how to improve the prevention (considering the challenge of the arrival of wolves);</li> <li>3. Implement the improved prevention measures.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Evaluation of livestock husbandry and existing damage prevention measures in the light of expanding large carnivore populations;</li> <li>• Proposal for amendments where needed in improved system implemented where possible.</li> </ul>
<b>Principal responsibility for implementation:</b>	France: ONCFS, livestock breeding associations; Switzerland: AGRIDEA, FOEN & cantonal authorities, livestock breeding associations
<b>Timing of the activities:</b>	1 year for assessment, 1–3 years for implementation
<b>Level of urgency:</b>	3
<b>Benefit:</b>	4

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Information programme for hunters</b>
<b>Objective:</b>	To increase the awareness and improve the information of and cooperation with hunters regarding lynx and predation.

<b>Description of activities:</b>	Beyond general Activity 6, a specific programme for the cooperation with hunting associations and hunters in the Jura is proposed.  Activities: 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.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Active involvement of hunters through Action 4;</li> <li>• Popular articles and presentations;</li> <li>• Improved understanding, relationships and dialogue.</li> </ul>
<b>Principal responsibility for implementation:</b>	Wildlife researchers and wildlife management authorities in collaboration with hunting associations with the support of human dimensions scientists.
<b>Timing of the activities:</b>	1 – 3 years, continuous.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	5

## 8. Karelian population

Specific actions:

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

ACTION 1	
<b>Title of the Action:</b>	<b>Evaluate smaller management zones for lynx in Finland</b>
<b>Objective:</b>	To assess the zoning for lynx in Finland for best practice management
<b>Description of activities:</b>	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 the identity of their staple prey).  Activities: 1. Consider/assess a further division of Finland – especially the area south of the reindeer zone – into two zones, one where mountain hares (showing pronounced inter-annual population fluctuations) are the primary prey of lynx, and another one where the primary prey are cervids (roe deer and white-tailed deer).
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Improved and more adaptive lynx management.</li> </ul>
<b>Principal responsibility for implementation:</b>	Finnish Game and Fisheries Research Institute.
<b>Timing of the activities:</b>	1 year
<b>Level of urgency:</b>	3

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

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Coordinate management plans for lynx with wolf, bear and wolverine</b>
<b>Objective:</b>	To better take into account both ecological interactions and cumulative aspects of conflict associated with having multiple large carnivore species in the same region.
<b>Description of activities:</b>	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.  Activities: 1. Estimate the interactions between different large carnivore species

	<p>and the cumulative losses of domestic prey;</p> <p>2. Integrate these findings into the respective management plans and coordinate the plans among each other accordingly.</p>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• 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);</li> <li>• 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.</li> </ul>
<b>Principal responsibility for implementation:</b>	National wildlife management agencies in Sweden and Norway; Regional wildlife management agencies in Sweden and Norway; Wildlife research institutions and universities.
<b>Timing of the activities:</b>	3 years; Operation of system: continuously as part of the management plans.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	4

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Introduce robust population models for managing harvest quota setting</b>
<b>Objective:</b>	To develop robust population models based on existing monitoring data to set harvest quotas for lynx
<b>Description of activities:</b>	<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"> <li>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.</li> <li>2. Annual update of the models based on the most recent monitoring results and harvest.</li> <li>3. Include the evaluations and forecasts into the annual monitoring.</li> <li>4. Evaluate the observed effects of harvest with the predicted effects within an adaptive management framework.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Produce robust population models using monitoring data and other relevant population dynamic data for setting harvest quotas;</li> <li>• Evaluate the observed effects of the harvest on the population size with the forecasted effects;</li> <li>• Compliment annual monitoring reports with an evaluation of the most recent harvest by comparing the forecast and results from</li> </ul>

	<p>the monitoring;</p> <ul style="list-style-type: none"> <li>• Compliment annual monitoring reports with a forecast of different harvest levels on future population size (see Action 4) .</li> </ul>
<b>Principal responsibility for implementation:</b>	<p>National management agencies in Sweden and Norway  Regional management agencies in Sweden and Norway  Wildlife research institutions and universities</p>
<b>Timing of the activities:</b>	1–2 years (development of system); operating of system continuous
<b>Level of urgency:</b>	2
<b>Benefit:</b>	3

ACTION 3	
<b>Title of the Action:</b>	<b>Preventive measures for sheep and reindeer and improved compensation system</b>
<b>Objective:</b>	<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>
<b>Description of activities:</b>	<p>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 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 context of agricultural economics.</p> <p>Activities:</p> <ol style="list-style-type: none"> <li>1. Test and evaluate different potential preventive measures (both lethal and non-lethal) to reduce depredation on sheep and on reindeer;</li> <li>2. Consider lynx harvest as one preventive measure to reduce depredation and evaluate it within an adaptive management framework;</li> <li>3. Perform tests in very close co-operation with sheep farmers and reindeer herders;</li> <li>4. Assess cumulative effects of multiple large carnivore species for cost effective preventive measures;</li> <li>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;</li> <li>6. Adapt the system in Scandinavia in order to maximise the</li> </ol>

	conservation effect of prevention and compensation.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Estimation of the effect, costs and benefits of different non-lethal preventive measures to reduce lynx depredation on reindeer and sheep;</li> <li>• Evaluate lethal control as a measure to reduce depredation within an adaptive management framework;</li> <li>• Review of different compensation systems in Europe;</li> <li>• Improved prevention and compensation system promoting lynx conservation.</li> </ul>
<b>Principal responsibility for implementation:</b>	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.
<b>Timing of the activities:</b>	3 years.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	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

<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Sociological study, and education and awareness raising campaign</b>
<b>Objective:</b>	To investigate human attitudes and to prepare the ground for the potential enhancement of the population by improving awareness about the critical status of the population on local, national and international level and among different stakeholders.
<b>Description of activities:</b>	<p>The status of the population on the French side (Vosges Mountains) is critical, and reinforcement/reintroduction is planned on the German side (Palatinian Forest; ongoing LIFE project). 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"> <li>1. Conduct human attitude studies in order to establish methods to enter into dialogue with different interest groups, particularly hunters and livestock owners;</li> <li>2. Inform the public and particular interest groups about results from this study by means of different media;</li> <li>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</li> </ol>



	population.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Improved understanding on attitudes and conflicts;</li> <li>• Entering into a dialogue with interest groups;</li> <li>• Material for popular articles, conferences, exhibitions, excursions, presentations at schools;</li> <li>• Awareness raised amongst the public and particular interest groups (like hunters and livestock owners);</li> <li>• Better public support for conservation measures.</li> </ul>
<b>Principal responsibility for implementation:</b>	ONCFS, protected areas, NGOs (e.g. Luchs-Projekt Pfälzerwald / Vosges du Nord), national monitoring networks, hunters associations.
<b>Timing of the activities:</b>	1– 3 years, continuous.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	5

ACTION 2	
<b>Title of the Action:</b>	<b>Harmonisation of mitigation systems between France and Germany</b>
<b>Objective:</b>	To harmonise prevention measures in France and Germany in order to mitigate lynx-sheep interactions.
<b>Description of activities:</b>	<p>Damage on livestock has so far been comparatively low and prevention measures are not yet established. 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"> <li>1. Review the (experience with) preventive measures in France and Germany;</li> <li>2. Make recommendations for improvement and harmonise the prevention in the two countries for the shared population.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Revision and evaluation of the situation and the preventive systems;</li> <li>• Recommendations for amendments;</li> <li>• Consultation and cooperation of/with livestock owners, implementation of measures (inclusive securing funding).</li> </ul>
<b>Principal responsibility for implementation:</b>	National wildlife authorities, livestock breeders' associations, local livestock breeders, NGOs and experts.
<b>Timing of the activities:</b>	2 years.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	4

## 11. Harz Mountains population

1. Assessment of intra- and inter-population connectivity and fragmentation in the Harz Mountains
2. Intensify and harmonize an effective lynx monitoring in the Harz Mountains

ACTION 4	
<b>Title of the Action:</b>	<b>Assessment of intra- and inter-population connectivity and fragmentation in the Harz Mountains</b>
<b>Objective:</b>	To assess the possibilities of the Harz nucleus to expand into the surrounding areas in order to a) avoid isolation caused by future construction projects and b) evaluate the population's ability for further expansion.
<b>Description of activities:</b>	<p>The small Harz population is currently showing a strong tendency to expand into the areas west and south of the mountain range with fragmented forest cover and a high percentage of agricultural land. Since 2010, two nuclei of reproduction have established far from the Harz borders. Field data should be collected to better understand lynx dispersal and population development and dynamics in more fragmented habitats.</p> <p>Activities:</p> <ol style="list-style-type: none"> <li>1. Asses the landscape use of individual lynx in fragmented habitats;</li> <li>2. Modify existing models with regional field data in order to predict the potential future development of the Harz population;</li> <li>3. Establish or increase a standardised genetic monitoring in all federal states sharing the Harz population;</li> <li>4. Promote the maintenance or restoration of (predicted) habitat corridors between neighbouring (sub)populations.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Increase the awareness of federal and national authorities and stakeholders of lynx expansion;</li> <li>• Keep relevant landscape corridors open for lynx dispersal;</li> <li>• Better understand the species' landscape use in fragmented lowland habitats.</li> </ul>
<b>Responsibility for implementation:</b>	Authorities of the federal states of Lower Saxony, Saxony-Anhalt, Hesse and Thuringia.
<b>Timing of the activities:</b>	Assessment of landscape use: at least 5 years; genetic monitoring: continuous; modify models after landscape assessment : 1-3 years; Promote habitat corridors: continuous
<b>Level of urgency:</b>	5
<b>Benefit:</b>	4

ACTION 5	
<b>Title of the Action:</b>	<b>Intensify and harmonize an effective lynx monitoring in the Harz Mountains</b>
<b>Objective:</b>	Establish an intensified lynx monitoring in all federal states sharing the

	Harz population. Standardize the efforts taken to gain robust quantitative data a) allowing the continuous assessment of the population status and b) serving as a basis for public information.
<b>Description of activities:</b>	<p>The monitoring by all German federal states has been standardized by a national working group within recent years. Meanwhile the Harz population has been expanding into 4-5 federal states. So far, an evaluation and harmonization of monitoring efforts on the level of the Harz population has been missing but is becoming increasingly important as the tempo of the population's expansion is increasing.</p> <p>Activities:</p> <ol style="list-style-type: none"> <li>4. Establish a working group with members from all federal states sharing the Harz population to harmonize monitoring efforts and field methods;</li> <li>5. Increase the effectiveness of the existing network (experts, hunters, foresters, naturalists, etc.) and revise and update methods needed to generate the data;</li> <li>6. Define what methods are used at what intervals and by whom and how, when and by whom results are made public.</li> </ol>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Harmonized database allowing quantitative interpretations for the entire population;</li> <li>• Reliable data and analysis to obtain robust population estimates allowing to define management measures and assess the effectiveness of implemented measures;</li> <li>• Agreed/accepted population data for the discussion of further conservation/management measures with stakeholder groups.</li> </ul>
<b>Responsibility for implementation:</b>	Federal wildlife conservation authorities.
<b>Timing of the activities:</b>	One meeting of working group each year;
<b>Level of urgency:</b>	3
<b>Benefit:</b>	4

## SECTION 5: WOLVERINE

### PART I – Wolverine populations in Europe

#### 1.1 Populations

Wolverines are presently found in four counties in Europe: Sweden, Norway, Finland and Russia. Their distribution is divided into two populations; the Scandinavian population (common to Norway and Sweden, and the extreme north of Finland) and the Karelian population (Finland and Russia), but there is probably some connection between the two populations. In addition, there are also wolverines on the Kola Peninsula, which are neither part of the Scandinavian nor the Karelian populations, but probably connected to both these populations. Unfortunately there For this assessment, data are presented on population trends and distribution from Sweden, Norway, and Finland. Because the connection with Russia is so important for wolverines, we have included any available information from the areas of Karelia, Murmansk and Kola.



**Figure 1.** The two wolverine populations in Europe.

## 1.2 Status

The estimated total number of wolverines in Europe is about 1500 – 2000. The Scandinavian population is increasing in numbers in Sweden and northern Finland, but is stable in Norway. The range is also increasing in Sweden and northern Finland, but is more or less stable in Norway. The different developments in Sweden and Norway can be explained by the much higher legal harvest rate and use of lethal control in Norway, as compared to Sweden. The Karelian population in Finland is increasing both in numbers and distribution, whereas the population is reported as being stable in the Karelian Republic, Russia.

Name of population	Population estimate (2011)	Trend 2006-2011	IUCN Red List assessment
<b>Scandinavian</b>	Sweden: 680 ± 100 St.dev. Norway: 385 ± 46 St.dev. Finland: ~ 70 - 80 <b>TOTAL: ~ 1000-1300</b>	Increase	Sweden: Vulnerable Norway: Vulnerable Finland: Critically endangered
<b>Karelian</b>	Finland: ~ 80-90 Russia: ~ 150-170 <b>TOTAL: ~ 230-260</b>	Increase	Finland: Critically endangered Russia: Vulnerable - endangered
<b>Kola peninsula</b>	Russia: ~ 350 <b>TOTAL: ~ 350</b>	Stable	Russia: Vulnerable - endangered

## 1.3 Threats

In the past, the main threats to wolverines were over-harvest and poaching. The disappearance of the other large carnivores in the past might also have had a negative impact on the wolverine, as carrion provided by the kills of other predators is important for wolverines. Currently, wolverines in the Karelian population benefit from the presence of wolves, and wolverines in the Scandinavian population benefit from the presence of Eurasian lynx.

Today, the threat because of over-harvest is lower, as the harvest quotas are set in relation to management goals and the effects are continuously evaluated by the results from annual surveys. The management system (in Norway and Sweden) is coming closer to an adaptive management approach, which means that any undesired reductions in population size can be addressed by reducing harvest quotas. There has not been any harvest of wolverine in Finland since 1982.

An emerging threat is climate change as wolverines are presumed to be dependent on good snow conditions (deep snow that lasts into late winter/spring) for denning and food caching. Wolverines reproduce successfully also in forested areas in central and eastern Finland and Russian Karelia, where snow conditions meet the requirements of wolverine denning. The impacts of climate change call for attention and investigations to gain more knowledge on the possible impacts of climate change on the species demography and distribution, and on the development of future monitoring methods (which are currently dependent on snow).

A potential threat is the low population goals set by both Norway and Sweden because of conflict with semi-domestic reindeer herding in both countries, and additionally with sheep farming in Norway. The Swedish reindeer husbandry industry has proposed certain tolerance levels for the total losses of reindeer to all predators, based on economically acceptable losses. These “acceptable” losses are much lower than the current estimated losses. Thus, if the politicians decide to follow these tolerance levels, then the management goals for all predators, including wolverines, would have to be lower than today.

For the Karelian population, especially the Finnish part, there are no set population goals, and the population is increasing. Furthermore, the Karelian population (both the Finnish and Russian parts) is outside the reindeer husbandry area. Thus, the situation differs from that in Sweden and Norway as there are no major threats to the Karelian population based on their depredation of livestock. However, the conflict with semi-domestic reindeer herding is also severe in the Finnish reindeer husbandry area (where wolverines are mainly part of the Scandinavian population), as wolverine depredation on reindeer has increased rapidly during recent years in northern Finland.

Genetic isolation and lack of connectivity between (sub)populations might be a threat for certain wolverine populations within the wolverine distribution range.

#### **1.4 Conflicts**

The main human-wolverine conflict is similar in Sweden, Norway and northern Finland, i.e. wolverine depredation on semi-domestic reindeer. In Norway, there is an additional conflict because of depredation on unguarded free-ranging domestic sheep throughout wolverine range. In all three countries, the government pays compensation for wolverine-killed domestic animals. In Sweden the costs are between 2 - 2.5 M€ per year for reindeer and in Norway between 1.8 - 2.2 M€ per year for reindeer and between 2.7 - 3.8 M€ per year for sheep. In Finland, the compensation paid for wolverine-killed reindeer was between 1 – 2.6 M€ per year during 2010-2012. The Swedish system is based on a risk-based system where compensation is paid *a priori* based on the presence of reproductive wolverines, whereas in Norway the compensation is paid *ex post facto* based on both documented losses and estimated losses. Because of the difficulty of finding freshly killed animals under extensive grazing conditions only a small proportion of the losses compensated are based on documented kills. Finland pays for a combination of documented losses and estimated losses of calves (occurring before the end of November) in reindeer.

An important management issue in Sweden is the high level of poaching that lowers the growth rate in the wolverine population, although the population is still increasing. An important management issue in Norway is that the current wolverine population is above the management goal and therefore the harvest quotas are set quite high in order to reduce the population. State wardens conduct lethal control operations (including using shooting from helicopters and digging out dens) in order to ensure that quotas are filled.

## PART II – Actions for all populations

### 1. Scandinavian and Karelian populations, i.e. general actions for wolverine

<i>Level of urgency:</i>	<i>(scale of 1-5: 1 = high urgency, 3 = medium urgency, 5 = low urgency)</i>
<i>Benefit:</i>	<i>(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)</i>
<b>ACTION 1</b>	
<b>Title of the Action:</b>	<b>Coordinate management plans for wolverine with lynx, wolf and bear</b>
<b>Objective:</b>	To better take into account both ecological interactions between carnivore species and cumulative aspects of conflict associated with having multiple large carnivore species in the same region.
<b>Description of activities:</b>	Estimate the interactions between different large carnivore species and the cumulative losses of domestic prey. Wolverines are found in regions with several other large carnivores' species. The tolerance levels for wolverines depend on both the abundance of wolverines and 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-exist.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Estimates of the ecological interaction of multiple large carnivore species in the same region. There are both negative interactions (e.g. intra-guild predation) and positive interactions (e.g. scavenging opportunities);</li> <li>• 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.</li> </ul>
<b>Principal responsibility for implementation:</b>	National wildlife management agencies in Sweden, Finland and Norway Regional wildlife management agencies in Sweden, Finland and Norway Wildlife research institutions and universities.
<b>Timing of the activities:</b>	Three-year project; Operation of system: Continuously a part of the management plans.
<b>Level of urgency:</b>	1
<b>Benefit:</b>	Improved coordination of cross species management to better manage the total impacts of all carnivores on stakeholder interests: 4-5

<b>ACTION 2</b>	
<b>Title of the Action:</b>	<b>Measures to prevent depredation on reindeer and sheep</b>
<b>Objective:</b>	Test and evaluate lethal and non-lethal preventive measures to reduce depredation on reindeer and sheep in close co-operation with stakeholders.
<b>Description of activities:</b>	Test and evaluate different potential preventive measures (both lethal

	<p>and non-lethal) to reduce depredation on reindeer and sheep. These tests should be done in very close co-operation with the reindeer herders and sheep farmers. The exact preventive measures should be decided after several stakeholder meetings. The cumulative effects of several carnivore species increase the challenge for cost effective preventive measures. Costs and benefits of various preventative measures should be viewed within the wider contexts of agricultural economics.</p> <p><i>Wolverine harvest can be one preventive measure to contain or reduce depredation, and hence potentially increase social acceptance, and should be evaluated within an adaptive management framework</i></p>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Estimate the effect, costs and benefits of different non-lethal preventive measures to reduce wolverine depredation on reindeer and sheep;</li> <li>• Evaluate lethal control as a measure to reduce depredation within an adaptive management framework.</li> </ul>
<b>Principal responsibility for implementation:</b>	<p>National wildlife management agencies in Sweden, Finland and Norway;  Regional wildlife management agencies in Sweden, Finland and Norway;  National reindeer management agencies in Sweden, Finland and Norway;  Regional reindeer management agencies in Sweden, Finland and Norway;  Stakeholders (reindeer herders and sheep farmers) in Sweden, Finland and Norway;  Research institutions and universities.</p>
<b>Timing of the activities:</b>	<p>Start: Several stakeholder meetings to discuss and plan both lethal and non-lethal preventive measures.  Three-years projects to evaluate the effects of different preventive measures.</p>
<b>Level of urgency:</b>	1
<b>Benefit:</b>	Reduced losses of domestic livestock to wolverine predation: 4

ACTION 3	
<b>Title of the Action:</b>	<b>Towards a robust adaptive management</b>
<b>Objective:</b>	Formalise the use of adaptive management in wolverine population management, i.e. use available knowledge, set clear goals, make decisions related to these goals and most importantly evaluate actions in relation to set management goals.
<b>Description of activities:</b>	Continue to develop the on-going adaptive management framework for wolverine management. Management actions should be taken in relation to management goals and are evaluated based on both forecasted result and observed results. A working adaptive management will reduce the risk of undesired results of management actions and will increase the acceptance for some management actions. For example, if harvest/lethal control is used to reduce the depredation rate on reindeer and/or sheep, then the effect of harvest needs to be evaluated both in relation to the forecasted reduction in wolverine



	<p>population size and the forecasted decrease in depredation on reindeer and/sheep.</p> <p><i>Actions 2, 4, and 7 are parts of a working adaptive management system.</i></p>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• A working framework on how to apply adaptive management in wolverine management.</li> <li>• Clear management goals. Management actions that are related to these goals, that in turn are evaluated in relation to forecasted results as well as the observed results.</li> </ul>
<b>Principal responsibility for implementation:</b>	National wildlife management agencies in Sweden, Finland and Norway; Regional wildlife management agencies in Sweden, Finland and Norway; Wildlife research institutions and universities.
<b>Timing of the activities:</b>	Establishment of the system: Several years; Operation of the system: Continuous.
<b>Level of urgency:</b>	1-2
<b>Benefit:</b>	To create a formal and robust decision making framework that ensures that no management actions taken to reduce conflict will affect wolverine conservation status: 4

ACTION 4	
<b>Title of the Action:</b>	<b>Introduce robust population models for setting harvest quotas</b>
<b>Objective:</b>	Robust population models and decision theory can help wildlife managers use monitoring data and set harvest quotas that minimise risks of unintended consequences and promote transparency and predictability in the process.
<b>Description of activities:</b>	<p>Use existing monitoring data, harvest data and other relevant population dynamic data to develop robust population models for forecasting the effect of different harvest levels on the wolverine population size at different spatial scales (e.g. regional, national and population levels). Use the experience from other similar population models. Annual update of the models based on the most recent monitoring results and harvest. The evaluations and forecasts could be included in the annual monitoring reports.</p> <p><i>Evaluate the observed effects of harvest with the predicted effects within an adaptive management framework.</i></p>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Production of robust population models using monitoring data and other relevant population dynamic data for setting harvest quotas;</li> <li>• Evaluate the observed effects of the harvest on the population size with the forecasted effects;</li> <li>• Compliment annual monitoring reports with an evaluation of the most recent harvest by comparing the forecast and results from the monitoring;</li> <li>• Compliment annual monitoring reports with a forecast of different harvest levels on future population size (see below Action 7).</li> </ul>
<b>Principal responsibility for implementation:</b>	National management agencies in Sweden, Finland and Norway Regional management agencies in Sweden, Finland and Norway

	Wildlife research institutions and universities.
<b>Timing of the activities:</b>	Establishment of the system: 1 or 2 years; Operation of the system: Continuous.
<b>Level of urgency:</b>	1-2
<b>Benefit:</b>	Implementation of population level conservation. Reduction of conflicts associated with uncertain impacts of different ad hoc quotas: 4

<b>ACTION 5</b>	
<b>Title of the Action:</b>	<b>Coordinate national management plans for the Scandinavian and the Karelian (and Kola Peninsula) wolverine populations</b>
<b>Objective:</b>	To better take into account management actions occurring at national levels affecting cross-boundary populations.
<b>Description of activities:</b>	Develop a conservation strategy that spans both populations, based on national management plans, and includes the importance of connectivity between the populations. National management plans in each country should take into account management activities in the neighbouring countries. The connectivity between populations should be co-ordinated between countries. Review and revise the conservation strategy e.g. every 5-6 years.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• A common population-wide conservation strategy for the Scandinavian and Karelian wolverine populations, including the importance of connectivity between the populations;</li> <li>• National management plans that include the population-wide conservation strategy and are coordinated with the management plans in the neighbouring countries;</li> <li>• Continue the regular meetings between the national wildlife management agencies to discussion management actions and coordinate management actions between the countries.</li> </ul>
<b>Principal responsibility for implementation:</b>	National wildlife management agencies in Sweden, Finland, Norway and Russia.
<b>Timing of the activities:</b>	Continue and develop the on-going coordination between the countries. Operation of the system: Continuous.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	To improve the implementation of population level conservation: 4 Ensure that wolverine populations have sufficient connectivity for long term viability: 2

<b>ACTION 6</b>	
<b>Title of the Action:</b>	<b>Investigate and promote connectivity within and between the Scandinavian and Karelian populations</b>
<b>Objective:</b>	Conduct joint investigation of distribution and the degree of genetic exchange between Norway, Sweden and Finland to determine the extent to which these populations are connected. Promote monitoring

	of the Russia part of the Karelian population.
<b>Description of activities:</b>	Estimate the genetic structure of the Scandinavian and Karelian wolverine populations, the genetic differences and the gene flow between them, by collecting and analysing samples from both populations. If the connectivity is low, then actions need to promote dispersal of wolverine individuals between the populations. Promote, by cooperation, monitoring and compilation of the status of the Russian part of the Karelian populations.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Estimates of the connectivity (both the genetic differences and the gene flow) between the Scandinavian and the Karelian wolverine populations. Standardised protocols for genetic sampling, analyses and storing;</li> <li>• A compilation of the status of wolverines in Russia for the Karelian population, as well as the abundance and distribution in Russia further north (Kola Peninsula and Murmansk province) and east.</li> </ul>
<b>Principal responsibility for implementation:</b>	National wildlife management agencies in Sweden, Finland, Norway and Russia Wildlife research institutions and universities
<b>Timing of the activities:</b>	Three-years project, Operation of the system: Continuous
<b>Level of urgency:</b>	2
<b>Benefit:</b>	To improve the implementation of population level conservation: 4 To ensure that wolverine populations have sufficient connectivity for long term viability: 2

<b>ACTION 7</b>	
<b>Title of the Action:</b>	<b>Standardisation of monitoring across borders</b>
<b>Objective:</b>	Continue the on-going work to standardise monitoring protocols between Norway and Sweden and extend this to Finland to create a common assessment of population status with standardised methodology. Explore ways to motivate stakeholders and the public to continue their involvement in reporting of tracks and observations.
<b>Description of activities:</b>	Establish, based on the already on-going standardisation, a common transboundary monitoring system in Sweden, Norway and Finland. The system will be based on: (1) the on-going natal den surveys (2) line transects (Finland) and (3) the development of new monitoring methods (e.g. camera trapping and DNA-sampling), especially in areas without stable snow conditions. Common reports on the status of the population (abundance and distribution) should be published every year.  <i>Robust monitoring is a part of adaptive management.</i>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Shared databases for monitoring data (on-going work for Sweden and Norway);</li> <li>• Annual common assessment and reports of the population status</li> </ul>

	<p>(on-going work for Sweden and Norway, Finland should be included as soon as possible);</p> <ul style="list-style-type: none"> <li>• The annual monitoring report with an evaluation of the most recent harvest by comparing the forecast and results from the monitoring;</li> <li>• An annual monitoring report with a forecast of different harvest levels on future population size (see above Action 4).</li> </ul>
<b>Principal responsibility for implementation:</b>	National management agencies in Sweden, Finland and Norway; Regional management agencies in Sweden, Finland and Norway.
<b>Timing of the activities:</b>	On-going for Sweden and Norway. Finland should be included as soon as possible. Operating of system: Continuous.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	Reduced uncertainty over wolverine numbers and the extent of population isolation: 3

ACTION 8	
<b>Title of the Action:</b>	<b>Foster the expansion of wolverines into forested areas outside the reindeer husbandry area</b>
<b>Objective:</b>	<p>Adopt necessary management actions to promote wolverine expansion into forested areas outside the reindeer husbandry area in Sweden, Finland and parts of Norway.</p> <p>Enable translocations to mitigate conflict (increase social carrying capacity) in reindeer husbandry area with high wolverine density and high levels of depredation as well as to improve connectivity and genetic diversity of wolverines in forested areas.</p>
<b>Description of activities:</b>	<p>Data on abundance and distribution of wolverines in forested areas outside the reindeer husbandry area without stable snow conditions is not as good as in other areas. Therefore, one needs to improve the monitoring in these areas, before any action can be taken to promote the expansion.</p> <p>Mapping suitable habitats and examining the attitudes of local people to prepare for translocation of wolverines to areas outside the reindeer husbandry would foster the expansion and benefit the wolverine population status. By translocation, gaps between subpopulations could be filled and thus obtain improved connectivity and genetic diversity.</p> <p>One action can also be to evaluate the effect of other management actions that might counteract the expansion, e.g. harvest at the edge of distribution might decrease the expansion rate.</p>
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Improved monitoring in forested areas outside the reindeer husbandry;</li> <li>• Improved social carrying capacity in reindeer husbandry area;</li> <li>• Improved connectivity and genetic diversity;</li> <li>• Evaluate the effect of different management action that might counteraction the expansion.</li> </ul>
<b>Principal responsibility for implementation:</b>	National wildlife management agencies in Sweden, Finland and Norway; Regional wildlife management agencies in Sweden, Finland and Norway.
<b>Timing of the activities:</b>	Continue the on-going development of monitoring methods (see Action

	6). Operation of the system: Continuous
<b>Level of urgency:</b>	2
<b>Benefit:</b>	Expand the area over which wolverines are distributed in Sweden to permit the reduction in wolverine depredation pressure in reindeer herding areas. It will also permit the restoration of ecosystems where all four large carnivores can interact ecologically: 3

<b>ACTION 9</b>	
<b>Title of the Action:</b>	<b>Create structured forums and protocols for the involvement of a diversity of stakeholders</b>
<b>Objective:</b>	Strive towards involving stakeholders in development and implementation of management actions
<b>Description of activities:</b>	Developing management plans and implementing management actions mean compromises between different stakeholders. An adaptive management framework could improve the acceptance of controversial decision, as there should be quantitative predictions for a decision. Forums that involve a diversity of stakeholders and that also have credibility among the stakeholders will improve the acceptance of different management actions.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Establish a process for, and a platform supporting, local/regional/national wolverine management through involvement of a diversity of stakeholders;</li> <li>• Develop the existing forums for discussing wolverine management at national and regional levels.</li> </ul>
<b>Principal responsibility for implementation:</b>	National wildlife management agencies in Sweden, Finland and Norway; Regional wildlife management agencies in Sweden, Finland and Norway; National reindeer management agencies in Sweden, Finland and Norway; Regional reindeer management agencies in Sweden, Finland and Norway; Stakeholders (e.g. reindeer herders, sheep farmers, conservation NGOs) in Sweden, Finland and Norway.
<b>Timing of the activities:</b>	Continue and develop the existing forums at both national and regional levels; Operating the system: Continuous.
<b>Level of urgency:</b>	2
<b>Benefit:</b>	Improved communication and trust between stakeholders: 4

<b>ACTION 10</b>	
<b>Title of the Action:</b>	<b>Improve compensation systems</b>
<b>Objective:</b>	Evaluate, and where needed modify, compensation systems so that they are efficient and fair and provide positive incentives for wolverine conservation and effective husbandry. Exchange experience of different

	compensation systems in Europe.
<b>Description of activities:</b>	There are several different methods to compensate the losses of domestic animals, from paying incentives for large carnivore presence to those that pay compensation for documented and estimated losses. The different compensation systems have their pros and cons. Modifications of existing compensation systems should therefore include the transfer of experience from other systems. One important aspect is how different compensation systems can improve the coexistence of large carnivores with local stakeholders. This should also be addressed within the future framework of European Union agricultural policy.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• A review of different compensation system (e.g. risk-based a priori compensation and ex post facto documented losses) in Europe for large carnivores, and exploration of the pros and cons of different compensation system under different circumstances.</li> </ul>
<b>Principal responsibility for implementation:</b>	National wildlife management agencies in Sweden, Finland and Norway in cooperation with other national wildlife management agencies throughout Europe; Regional wildlife management agencies in Sweden, Finland and Norway; National reindeer management agencies in Sweden, Finland and Norway; Regional reindeer management agencies in Sweden, Finland and Norway; Stakeholders (reindeer herders and sheep farmers) in Sweden, Finland and Norway; Research institutions and universities.
<b>Timing of the activities:</b>	Two-three years project
<b>Level of urgency:</b>	3
<b>Benefit:</b>	Fairer and more efficient systems that redistribute the costs of large carnivore conservation: 4

<b>ACTION 11</b>	
<b>Title of the Action:</b>	<b>Investigate the effects of climate change on wolverines</b>
<b>Objective:</b>	Investigate how climate change may influence wolverine ecology and management procedures (including monitoring).
<b>Description of activities:</b>	An emerging threat is climate change as wolverines are dependent on persistent snow cover (later winter/spring) for denning and food caching. Climate change will also influence monitoring methods. Data on reproductive success should be collected from different areas as well as during years with different weather/snow conditions and use this information as a proxy for climate change.
<b>Expected results:</b>	<ul style="list-style-type: none"> <li>• Improved monitoring in areas without stable snow conditions;</li> <li>• Quantitative assessment of the impact of different weather/snow conditions on reproductive success, as a proxy for climate change;</li> <li>• Forecast the effect of climate change on abundance and distribution of wolverines.</li> </ul>

<b>Principal responsibility for implementation:</b>	Wildlife research institutions and universities; National wildlife management agencies in Sweden, Finland and Norway.
<b>Timing of the activities:</b>	Continue the on-going development of monitoring methods (see Action 7); Three-year project.
<b>Level of urgency:</b>	4
<b>Benefit:</b>	Improved knowledge base for making policy decisions relevant for wolverine viability in the long term: 3

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