Preventing the extinction of the Dinaric-SE Alpine lynx population through reinforcement and long-term conservation

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POPULATION LEVEL REINFORCEMENT PLAN

Action A.4 – Elaboration of plans for reinforcement of the Dinaric-SE Alpine population and for creation of a new "stepping stone" population

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I. INTRODUCTION & BACKGROUND

A. The Need for Lynx Population Reinforcement

The Dinaric-Southeastern (SE) Alpine Eurasian lynx (*Lynx lynx*) population found predominantly in Slovenia and Croatia suffers from genetic inbreeding depression and population decline (Sindičić et al., 2013). This small and isolated population originated from 6 related individuals that were reintroduced in 1973 (Čop and Frkovič 1998). In small populations, breeding among close relatives is inevitable and leads to reduced fitness that can manifest in myriad ways such as health issues or lower reproduction. Left unchecked, inbreeding depression leads to a decline and eventually the extinction of a population (Allendorf and Luikart 2007).

While the 1973 reintroduction was considered a conservation success story until the early 1990s, recent analysis indicates a dramatic drop in the population over the last two decades (Kos et al., 2012). Current estimates suggest that the Dinaric-SE Alpine lynx population numbers less than 130 individuals (Sindičić et al., 2010) and that the estimated number of individual lynx that can effectively breed is below the threshold of 50 (Sindičić et al., 2013), a level to be avoided based on current thinking by conservation geneticists (Franklin and Frankham 1998). Additionally, genetic analysis has confirmed considerable inbreeding of the Dinaric-SE Alpine population compared to the lynx population found in the Carpathian Mountains (Sindičić et al., 2013). This indicates that survival and reproductive capacity of the Dinaric-SE Alpine population is only a fraction of the Carpathian source. Low effective population size, inbreeding, low genetic diversity and demographic stochasticity make the likelihood of lynx population survival in the near future low (Sindičić et al., 2013). Inbreeding depression has negative consequences on all aspects of reproduction and survival (population fitness), increasing the risk of lynx extinction.

While Slovenia and Croatia both have existing lynx management plans, neither country has had the resources until recently, to address the population decline of lynx. In 2014, two lynx were translocated from the Jura Mountains of Switzerland to the Friuli region of Italy in an attempt to improve the outlook for lynx in the SE Alps, but without connections to a larger metapopulation, the outlook for lynx in the SE Alps is also poor. Without a coordinated national and transnational management response that relies on translocating and integrating new lynx into Dinaric-SE Alpine population, the existing lynx population will continue to decline. This document describes the population-level reinforcement plan within the LIFE Lynx project, an effort to prevent the extinction of the Dinaric-SE Alpine lynx population through reinforcement and long-term conservation (https://www.lifelynx.eu/).

B. Goal(s) of Project

The main goal of the LIFE Lynx project is to rescue the population from extinction by integrating 14 lynx from Slovakia and Romania into the Dinaric-SE Alpine area to restore genetic diversity and improve population fitness (https://www.lifelynx.eu/).

C. Purpose of this Plan

In order to implement the goals and objectives of this ambitious project, it is imperative to develop a population-level reinforcement plan that reflects the current state of our scientific

knowledge of lynx and the social and management processes necessary to follow the IUCN 2013 Guidelines for Reintroductions and Other Conservation Translocations (IUCN/SSN 2013). This plan follows the IUCN 2013 Guidelines and reflects lessons learned from past reintroduction efforts (Macdonald 2009, Wilson 2018).

D. Terms

In this plan, the term translocation is understood to be an overarching term to describe the deliberate release of an organism in the wild. As relevant to the LIFE Lynx project, a translocation is defined as the intentional release of wild-caught animals into the wild for the purpose of establishing a new population, reestablishing an extirpated population, or augmenting a critically small population. The more precise term relevant to this plan according to the IUCN terminology is *reinforcement*---a type or sub-category of a conservation translocation and is defined as the "Intentional movement and release of an organism into an existing population of conspecifics" (IUCN/SSC 2013:2).

E. Objectives of Project

The objectives of this project are to reverse the lynx population decline and generate broad public support for lynx recovery. More specifically, this effort seeks to develop "scaled-levels of support", built upon well-designed management plans, forums for stakeholder engagement, effective communication strategies, and institutionally-backed political and financial support at national and international levels (IUCN/SSC 2013). Ideally, this effort rests upon the support of *communities of place and communities of interest—where local and broad public support converge*. The following are the key (5) objectives of the project:

Objective 1 – To rescue the Dinaric-SE Alpine lynx population from extinction. This objective will result in a reinforcement that is socially acceptable and scientifically based. The Dinaric-SE Alpine population will be reinforced (augmented) with lynx from the viable source population in the Carpathians and maintain high public support while fine-tuning the reinforcement with the best available data to reach the ultimate indicator of success—reducing inbreeding to an acceptable level and reversing the population decline.

Objective 2 – To conserve and manage the lynx population through international collaboration. This effort relies on international collaboration and a shared vision to conserve and manage lynx at the transboundary-population level. To carry out this objective, collaboration will occur across all EU countries sharing this population (Croatia, Slovenia, Italy) to develop and implement a standardized and systematic approach to ensure long-term viability of the reinforced lynx population.

Objective 3 – To develop a stakeholder-supported reinforcement process to sustain lynx recovery. Close cooperation with core stakeholders to establish or further develop partnerships and to ensure broad public acceptance for lynx conservation is key objective of this project.

Objective 4 – To develop science-based management tools for strategic planning to ensure long-term viability of lynx. Bringing in new lynx to the Dinaric-SE Alpine region will save the population from extinction. To ensure the long-term viability of lynx, computer modelling based on data from the project will be used to understand how to genetically and demographically manage the population in the long term. This scientific information will be incorporated into existing national management plans.

Objective 5 – To improve population connectivity for lynx by establishing a "stepping stone". To increase the chances of natural gene flow of lynx, a population "stepping stone" will be established to generate a new population nucleus further northwest of the current Dinaric population, thus bringing the SE Alpine nucleus closer to the existing lynx population in the Dinaric Mountains. This will help eliminate the need to take reactive steps such as the "fireman" approach of moving single individuals in the future. Such a metapopulation of lynx will help reduce negative impacts of habitat fragmentation and will slow genetic deterioration across entire Dinaric-SE Alpine population.

F. Actions of the Project

The LIFE program is the European Programme for the Environment and Climate Action that provides European Union (EU) funding sources for a wide variety of nature conservation actions in Europe. Under a given LIFE project, successful applicants are expected to specify actions that generally involve: 1) preparations or planning actions, 2) specific conservation actions, 3) monitoring, 4) public awareness, and 5) overall project management (Table 1). For the list of actions, descriptions, and outputs associated with these actions, see the project website (https://www.lifelynx.eu/category/activities/).

Table 1. Summary List of Actions Under the LIFE Lynx project

A-Actions: Preparations, Planning, and Elaboration of Management and/or Action Plans

A1-Assessment/selection of site and lynx for live-capture from the Carpathian source population in Slovakia
A2-Assessment/selection of site and lynx for live-capture from the Carpathian source population in Romania
A3-Pre-reinforcement survey of potential release sites and genetic and demographic status of residual lynx
A4-Elaboration of plans for reinforcement of Dinaric-SE Alpine population and for new "stepping stone" pop.
A5-Management documents for Slovenia, Croatia, and Italian central/eastern Alps
A6-Assessng the spatial connectivity of the Dinaric-SE Alpine population for long-term spatial planning
A7-Assessment of public attitudes toward lynx and lynx conservation
A8-Development of the project communication plan

C-Actions: Conservation Actions

C1-Live capture and translocation of lynx from the Carpathian population in Slovakia for reinforcement of the Dinaric-SE Alpine population
C2- Live capture and translocation of lynx from the Carpathian population in Romania for reinforcement of the Dinaric-SE Alpine population
C3-Genetic reinforcement of the Dinaric population
C4-Establishment of a population "stepping stone" in the SE-Alps
C5-Surveillance and directed management of the reinforcement process
C6-Establishment of an internet-based population level monitoring database
C7-Integration of potential lynx habitat connectivity and suitability into national/international spatial planning
C8-Establishment of a specialized police investigative unit to more efficiently prosecute illegal wildlife killings
C9-Livestock protection
C10-Improving management of key prey species for lynx
C11-Implementation of lynx-based tourism to provide benefits for location communities and lynx conservation

D-Actions: Monitoring of the Impact of the Project Actions

D1-Monitoring the effects of lynx removal for translocations on the source populations
D2-Monitoring the effects of the population reinforcement
D3-Monitoring of the project impact on viability of lynx in the Dinaric Mountains and SE-Alps, and establishing Guidelines for Ensuring Long-term Viability
D4-Project visibility and public acceptance of lynx and lynx conservation

D5-Assessment of socio-economic impacts of the project actions on the local economy and communities
D6-Assessment of project's impacts on ecosystem function

E-Actions: Public Awareness and Dissemination of Results

E1-Promotion of the lynx reinforcement and long-term conservation through local consultative groups
E2-Hunter participation through partnerships
E3-Documentary film series: the role of- hunters as conservationists, lynx reinforcement, and short video clips
E4-Targeted education campaign about lynx conservation through active involvement of local schools
E5-Active engagement of stakeholders and target groups through customized events, comm., networking
E6-General communication support for lynx reinforcement and importance of Natura 2000 network
E7-Targeted lynx conservation awareness with celebrity ambassadors

F-Actions: Project Management

F1-Coordination and administration of project by coordinator and project steering group
F2-Assessment of project contribution to the overall objectives of the LIFE Programme
F3-Development of an After-LIFE Plan

II. STRATEGIC MONITORING FOR LYNX TRANSLOCATION

The IUCN 2013 Guidelines prominently specify the importance of monitoring when implementing a species translocation project (IUCN/SSC 2013). This vital aspect of a well-designed translocation effort has often been overlooked in historic carnivore translocations efforts and within many Eurasian lynx reintroduction efforts in Europe during the 1970s and 1980s (Linnell et al., 2009).

The LIFE Lynx project is focused on rigorous, systematic, and strategic monitoring to ensure that: 1) source populations of lynx from Slovakia/Romania are not impacted, 2) the population reinforcement process is monitored and managed for efficacy over time, and that 3) public attitudes regarding the acceptance of the project are documented. This overall approach will enable project partners to measure progress for meeting goals, objectives, and to ultimately assess whether this effort is a success or failure.

A. General Monitoring Program Design

This project relies on a suite of biological and sociological data to measure the overall objectives of the project and to use monitoring to allow adaptive management responses to guide the reinforcement process for maximum effectiveness.

Specific types of biological data to be used in the project include: GPS telemetry locations of lynx, camera trapping images of lynx, non-invasive genetic samples [(from lynx scats, hair, urine, saliva, blood samples (from live-caught lynx)], tissue samples of lynx found dead and snow tracking of lynx. These types of data will be collected using methods and analysis from well-established standards from wildlife biology, ecology, landscape ecology, and wildlife genetics. Examples of methods to be used include: mark-recapture methods for population estimation, site-occupancy models, computer-based models to produce forecasts of extinction risks and management scenarios, and population viability analysis (PVA) will allow robust assessment of this population reinforcement at individual-levels and population-levels. Mapping and Assessing Ecosystems and their Services (MAES) indicators will provide an assessment of impacts to ecosystems where lynx are released. Standard social science quantitative survey methods will be used to collect information on public attitudes and knowledge of lynx over time to assess levels of support for project.

All partners that are considered project beneficiaries are involved in various aspects of data collection, monitoring, and data analysis (for a list of project partners see https://www.lifelynx.eu/project_category/partners/). As the project unfolds, information is made widely available through the project website, social media platforms, public presentations, local stakeholder forums (local consultative groups), and local and national media. A formal Communication Plan has also been adopted by all project partners and guides internal communication and protocols for the project team.

B. Exit Strategy

The IUCN 2013 Guidelines plainly stipulate that all translocation efforts must have an exit strategy (IUCN/SSC 2013). This project is no exception and with any large-scale effort, planning for risks and having specific mitigation options are essential. Section VI. Risk Assessment in this plan summarizes potential risks and specific mitigation strategies. If,

however, mitigation strategies fail, the exit strategy for the project will proceed as follows:

The following general indicators will be used to trigger possible activation of the exit strategy:
1. Failure to capture or translocate lynx.
2. Failure to integrate released lynx into the resident population in the Dinaric-SE Alpine area.

The following conditions would need to occur for the exit strategy to be activated under the agreement of the European Commission to prematurely stop the LIFE Lynx project:
1. No lynx are captured and translocated within the first three years of the project.
2. No lynx are integrated into the Dinaric-SE Alpine population within the first four years of project.
3. Less than five lynx are translocated to Slovenia and Croatia within the first five years of the project.

In certain cases, an exit strategy could require the removal of individual animals that had been translocated. This is not necessary in the LIFE Lynx project since any additional lynx that were to be integrated into the Dinaric-SE Alpine population would contribute genetic material and likely improve fitness of the existing population.

III. BIOLOGICAL FEASIBILITY

A. Habitat Suitability

Active predator control, along with habitat loss and the reduction of natural prey abundance led to the extinction of large carnivores in most of Central Europe (Breitenmoser 1998), with the lynx being sensitive to deforestation and decline of natural prey. Their recovery required a change in human attitude and improved habitat. A complete change in the method of forest exploitation and the growing sensitivity of people for the protection of nature resulted in the recovery of ungulate populations, partly assisted with translocations. Today the Alps and Dinaric Mountains represent a much-improved habitat for lynx compared to conditions when lynx were eradicated. As the percentage of forest cover is over 60 and 50 % in the Dinaric Mountains and the SE Alps, respectively, both mountain ranges can be classified as excellent lynx habitat. This is reflected in the lynx habitat suitability models for the Alps (Zimmermann 2004, Becker 2013) and Dinaric Mountains (Potočnik, in prep.). Additional habitat models for the Dinaric Mts. based on Schadt's model and validated with local telemetry are available (Skrbinšek and Krofel 2008). Lynx show a preference for forested habitats, followed by shrubs and herbaceous vegetation and avoidance of highways, settlements and areas of high agricultural land use (Schadt et al. 2002, Zimmermann 2004, Basille et al. 2008).

A habitat suitability model for the entire project area has been produced by Potočnik. We generated a home range suitability model based on methodology used by Schadt et al. (2002) which used telemetry data obtained from lynx in the French and Swiss Jura Mountains and evaluated with independent radiotracking data from the low mountain range along the German–Czech border (Bufka et al. 2000) and from the Dinaric mountain range of southern Slovenia (Staniša 1998, Skrbinšek 2004, Krofel 2012).

For model validation we used several sources of lynx distribution data from Slovenia and Croatia: GPS telemetry data collected in the DinaRis project and other GPS data (8 animals (4 males, 4 females, 2,736 locations, VHF telemetry data: 3 animals (3 females), 129 locations (from Skrbinšek 2004) and from monitoring data of the Slovenian Forest Service and Biotechnical Faculty (266-C1, 1838-C2), as well as data from the Croatian DinaRis project team and data on lynx mortality in Croatia (Alojzije Frković, from Skrbinšek 2004). Thus, we used 4,901 lynx presence data, of which the vast majority are of reliable C1 or C2 category.

Schadt et al. (2002) introduced two spatial indices, RA and RC, that describe the connectivity or fragmentation of extensively used areas on larger scales than map resolution. They defined the index RA (x, y, r) as the proportion of extensively used cells, PExt, in the circular neighborhood within radius r around a given extensively used cell (x, y). RA (x, y, r) = 1 indicates that all cells in the neighborhood r of (x, y) are extensively used cells, i.e. the suitable habitat in the neighborhood r of (x, y) is non-fragmented, while RA (x, y, r) $<<$ 1 indicates that only a few cells in the neighborhood r of (x, y) are extensively used. Alternatively, we may assume that the average cover of extensive land uses in the neighborhood of a given cell determines habitat suitability.

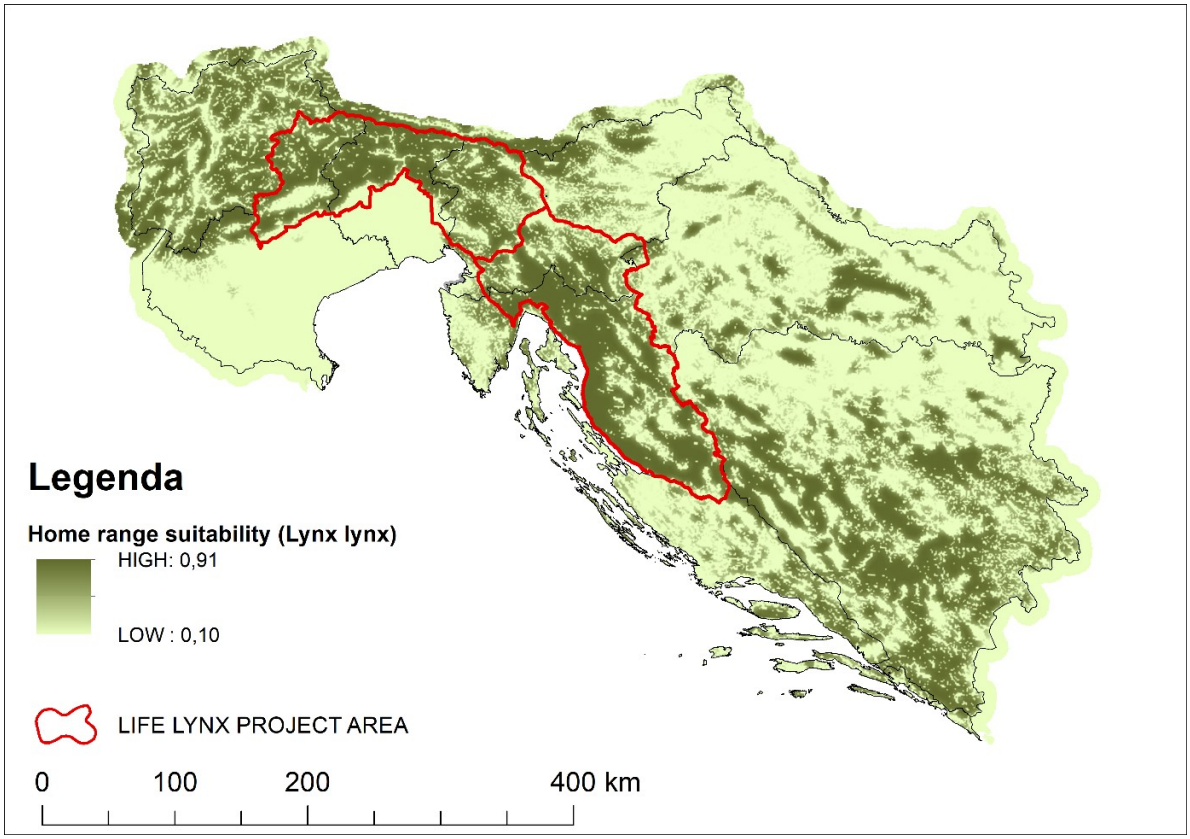

Fig. 1. Habitat suitability based on logistic regression model (Schadt et al. 2002) and validated with GPS and VHF telemetry data from Dinaric Mts. as well as C1 and C2 data from lynx monitoring in Slovenia.

The model with the highest sensitivity included »forest fragmentation« RA5 as a predictor. A circle with a radius of 5 km represents an area of about 80 km^2, which is approximately the size of the core area of a female lynx's home range (72 ± 27 km^2; Breitenmoser et al. 1993). Note that this does not reflect a forest patch of this size, but a continuous configuration of forest and other semi-natural land cover types of at least 50% in a circle around any cell. The minimal adequate model was considered to be the one with the lowest AIC and, in the case of similar AIC values, the one with the smaller number of predictors. The result is a model with the following formula: logit (P) = $\beta 0 + \beta 1 \times RA5 = -2.13 + 4.55 \times RA5$ where P is the probability of a cell belonging to a lynx home range and $\beta 0$ is the intercept.

Based on this model, more than half 16,300 km^2 of the project area (30,000 km^2) is of very high quality, and 20,900 km^2 are also still suitable habitat. The project area of the Dinaric Mountains offer 11,400 km^2 of suitable habitat and the SE Alps 9,500 km^2. Outside project area suitable habitat extends into Bosnia and Herzegovina in the Dinaric Mountains and west- and northwards in the Alps (Fig. 1).

Another habitat suitability model is based on MaxEnt (Philips et al. 2006) and also covers most of the project area (Becker 2013). Becker used the most comprehensive lynx data set with data of 102 different lynx from seven different study areas. The model shows a very high suitability in the Dinaric Mountains and SE Alps, confirming the Potočnik model (Fig. 2). Suitable habitat covers 17,000 km^2 in the Dinaric Mountains (Dalmatia and Bosnia and Herzegovina are unfortunately not included in the model) and another 15.000 km^2 in the Alpine project area. The whole Alpine range offers 100,000 km^2 of suitable habitat.

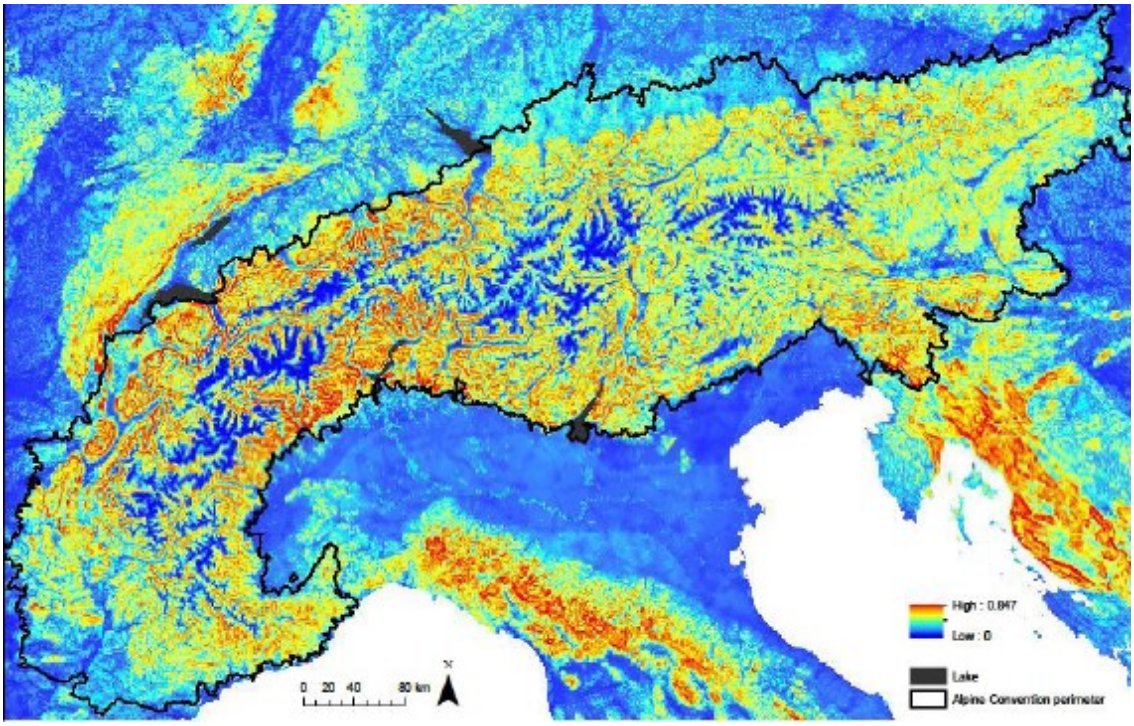

Fig. 2: Lynx habitat suitability map based on MaxEnt. Red = highly suitable habitat, blue = low suitable habitat (Becker 2013).

Although the two models differ in data origin and are based on different methodology, the results converge, predicting 50% and more of the project area as suitable habitat. The Potočnik model distinguishes between suitable and high-quality habitat, with high quality habitat reaching 50% of the project area, while being more restrictive about suitable habitat than the Becker model. The area of the Becker model of suitable habitat is about 1/3 larger than in the Potočnik model.

B. Prey Availability

The existence of a sufficient prey base is a key factor determining the successful return of large carnivores and is an important component of suitable habitat (Breitenmoser 1998). Unfortunately, data on prey availability is not available in adequate form or precision to be included in habitat suitability models. Lynx diet is highly variable depending on the availability of prey (Molinari-Jobin et al. 2007). The main prey of lynx is roe deer, followed by chamois (Breitenmoser and Haller 1993, Jobin et al. 2000), red deer (Okarma et al. 1997, Molinari et al. 2001) or, in the Dinaric Mountains, dormouse (Krofel et al. 2011). Livestock depredation levels are low in the Dinaric Mountains and SE Alps with less than ten animals killed by lynx per year. Although the number of damage cases may increase with an increasing number of lynx, damage prevention measures can drastically reduce damage cases. In comparison, an estimated 100 lynx killed between 7 and 47 sheep in the Swiss Alps where unguarded sheep graze on Alpine pastures during summer (Kaczensky et al. 2013). Therefore, major conflicts are not with livestock husbandry, but with ungulate hunting.

While hunting bags are not an ideal method to evaluate ungulate availability, these data are the only proxy available. In Table 2, the number of main lynx prey (roe deer, red deer and chamois)

harvested per 100 ha is compared across a variety of study areas where lynx are present. The numbers of ungulates harvested in the Dinaric Mountains and SE Alps varies between regions, lie however still within the range observed in other study areas. Therefore, it is generally assumed that prey availability is not a limiting factor.

Table 2. Comparison of hunting bags. Regions within the LIFE Lynx project area are in bold.

		Number harvested / 100 ha				
	Period	Roe deer	Red deer	Chamois	Total	Data source
Jura Mountains (VD)	1988-91	0.83	-	0.06	0.89	Molinari-Jobin et al. 2007
Swiss NW Alps	1997-00	0.32	0.01	0.76	1.09	Molinari-Jobin et al. 2007
Jura Mountains (VD)	1992-94	1.01	-	0.13	1.14	Molinari-Jobin et al. 2007
SE Alps (FVG)	**2015-17**	**0.74**	**0.35**	**0.23**	**1.32**	**Autonomous Region Friuli Venezia Giulia, hunting statistics**
Swiss Central Alps	1985-88	0.11	0.13	1.1	1.34	Molinari-Jobin et al. 2007
Notranjsko	**2013-17**	**0.55**	**0.92**	**0.03**	**1.50**	**Slovenia Forest Service**
Jura Mountains (VD)	1995-97	1.55	0.02	0.16	1.73	Molinari-Jobin et al. 2007
Koč. - Belokranjsko	**2013-17**	**1.22**	**1.02**	**-**	**2.24**	**Slovenia Forest Service**
Swiss NW Alps	1983-88	0.96	0	1.84	2.8	Molinari-Jobin et al. 2007
NE Switzerland	2001-04	2.98	0.49	1.53	5	Molinari-Jobin et al. 2007

C. Connectivity

The Alpine range is, in theory and according to the models (Potočnik, in prep. and Becker 2013), connected to the Dinaric Mountains. In fact, after the reintroduction of lynx to southern Slovenia in 1973 the SE Alps were colonised in the 1980s. The strongest barrier between the Alps and Dinaric Mountains is the highway Ljubljana – Trieste. Population expansion was possible in the 1980s when the highway was already built between Ljubljana – Postojna. Now also the section between Postojna and Trieste is finished. Krofel et al. (2006) found used using telemetry data on three individual lynx that this same highway may limit lynx dispersal.

Intensive brown bear monitoring has shown that bears regularly cross the highway, however bear density south of the highway is much higher than in the north (Skrbinšek et al. 2018). We assume that lynx will show a similar pattern as brown bear although the highway may be more of a barrier to lynx than to bears (Krofel et al. 2006). Highway crossings of lynx have been reported elsewhere, e.g. at least five different lynx dispersed from the Jura Mountains to the Black Forest, crossing the highway Zurich - Basel (Zimmermann, pers. com.).

Suitable habitat is more fragmented in the Alps than the Dinaric Mountains (Fig. 3). The model of Becker (2013) detected 32 patches in the Alps. Patch sizes ranged from 57–17,378 km² with 22 patches >400 km², supposed to be large enough to sustain a lynx subpopulation. Major barriers were defined subjectively based on experiences from radio-collared lynx in Switzerland. Lynx are capable to migrate between patches, e.g. one lynx dispersed from patch 4 to patch 5, and one lynx from patch 8 to patch 10. Dispersal distances of lynx vary based on habitat fragmentation and lynx population density. The longest reported dispersal distance in the Alps was 200 km (Molinari-Jobin et al. 2010). This basically implies that lynx from the release sites can reach well into Bosnia and Herzegovina and Austria. However, dispersing subadult lynx tend to establish home ranges close to territories adjacent to conspecifics

(Zimmermann et al. 2005). Comparing dispersal data of several populations Molinari-Jobin et al. (2010) found that the mean dispersal distance was 39 km. Lynx are conservative colonisers, as they need to settle in contact to neighbouring resident lynx in order to breed (Breitenmoser and Breitenmoser-Würsten 2008). Therefore, a lynx population does not easily spread across barriers that are however not a major obstacle to the movement of an individual dispersing lynx. Thus, the natural recolonisation of not yet occupied areas by lynx in a fragmented landscape such as the Alps is impeded (Zimmermann 2004, Zimmermann et al. 2007). Although the natural and anthropogenic barriers are hindering the expansion of the extant populations, they will most likely not be a problem for the maintenance of the genetic viability of the "subpopulations" once the whole of the Alpine Arc (and Dinaric Mountains) is occupied. There are enough empiric observations of dispersing lynx from radio-telemetry or camera trapping to conclude that at least one animal will cross the barriers between subpopulations per generation (Schnidrig et al. 2016).

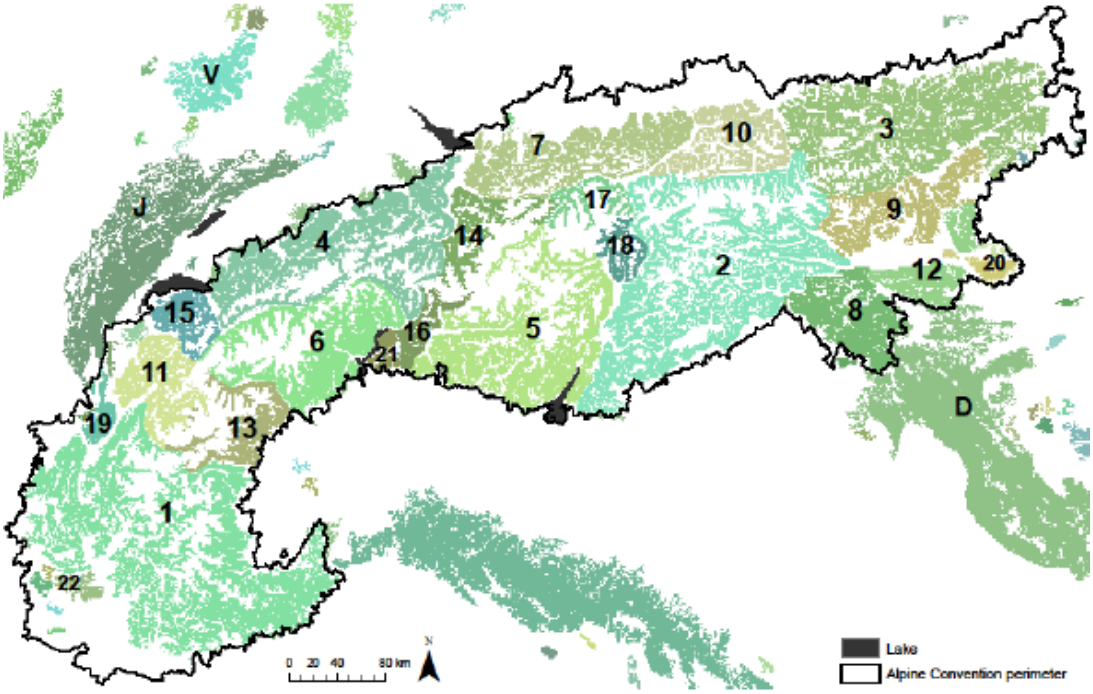

Fig. 3: Map of suitable lynx habitat patches divided by barriers as identified from experiences from radio-collared lynx in Switzerland. Each different coloured patch is assumed to represent lynx subpopulations. Patches greater than 400 km^2 are numbered in decreasing order of size. J = Jura, V = Vosges and D = Dinaric Mountains (Becker 2013).

D. Minimum vs. Potential Population Size

The minimum viable population size can be determined through population viability analysis (PVA), e.g. population simulations where the effects of demographics, genetics, environment and stochasticity are considered. Kramer-Schadt et al. (2005) combined demographic scenarios with a spatially explicit population simulation model to evaluate the viability and colonisation success of lynx in different lower mountain ranges of Germany. Based on the results, at least 10 females and 5 males are required for a start that will develop into a viable population with an extinction probability of less than 5% in 50 years. Assuming low mortality for resident and dispersing lynx, habitat patches as small as 3,000 km^2 could host a viable population. However,

Kramer-Schadt et al. did not take genetic considerations into account. Usually it takes a far larger population to maintain genetic viability compared to demographic viability (Linnell et al. 2008).

We base the assessment of a future Dinaric SE Alpine lynx population on the situation where the whole of the suitable habitat of the study area is settled. Depending on the model, Dinaric Mountains and SE Alps offer 20,900 – 32,000 km^2 of suitable habitat, e.g. for 209-320 independent lynx assuming a lynx density of 1 individual/100 km^2 (Breitenmoser-Würsten et al. 2007). If lynx densities are higher (as e.g. reported in Zimmermann et al. 2018 from Switzerland), the project area could hold up to 627-960 independent lynx.

A population can be considered as viable (i.e. at least MVP) according to the IUCN Red List if it reaches at least the category "Near Threatened NT", which is not formally a threatened category[1]. This category is reached under criterion D with a population of 1,000 or more mature individuals in the population. However, if the considered regional population is connected to a neighbouring population to such an extent that immigration can have a significant positive effect on the demographic viability of the population, then there would in principle only need to be more than 250 mature individuals in the population for it be of "least concern" (Linnell et al. 2008).

In Central Europe, no lynx population has reached the target of 1,000 individual lynx yet. Therefore, population connectivity is crucial for the long-term survival. Connectivity between Dinaric Mountains and Alps will be highly improved through the creation of a stepping stone population in the Julian Alps within the LIFE Lynx project. Kramer-Schadt et al. (2011) analysed the effect of "stepping stones" (local lynx population nuclei) and found that they could significantly enhance the colonisation. They however postulated that stepping stones would need to be big enough to produce new dispersers; otherwise they could even negatively impact the colonisation success by binding animals. By boosting the Dinaric lynx population through the integration of at least 9 lynx and especially the creation of a stepping stone nucleus with at least 5 lynx we facilitate the creation of the Dinaric-SE Alpine metapopulation with potential connectivity with other Alpine subpopulations.

[1] The ICUN Red List threatened categories are Vulnerable VU, Endangered EN, and Critically Endangered CR.

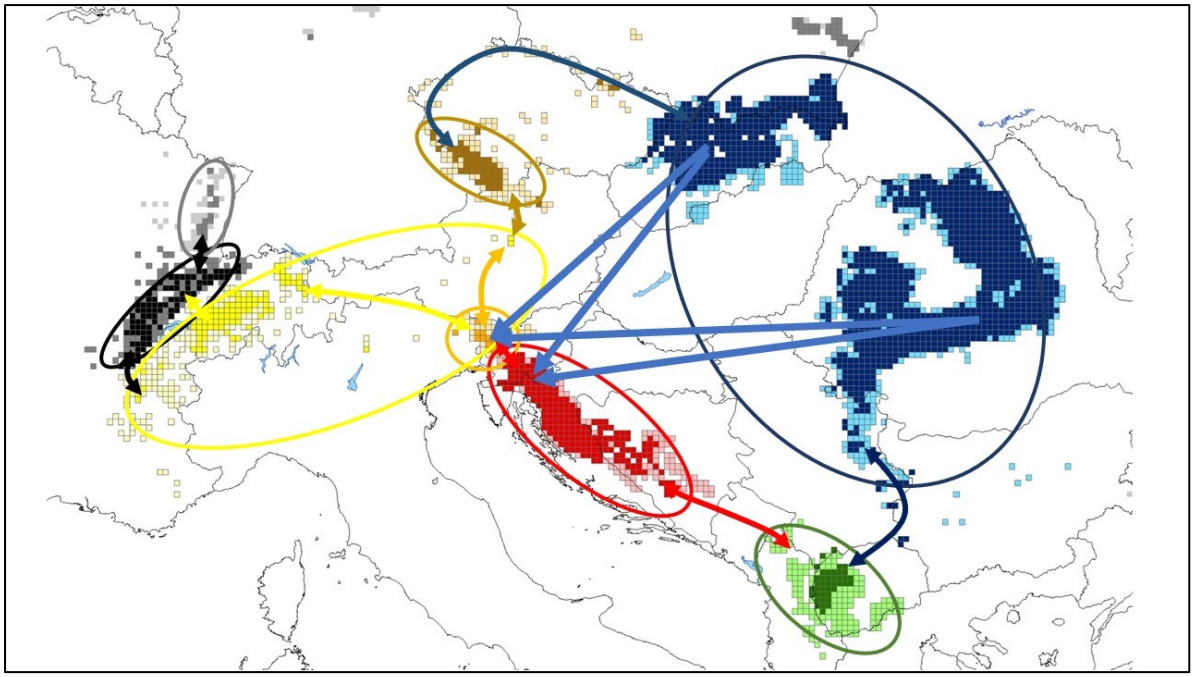

Fig. 4. Lynx populations that could eventually create a Central European lynx metapopulation. The Dinaric-SE Alps population is represented in red and orange, respectively. Blue arrows represent lynx translocations within LIFE Lynx project (Populations: Carpathian = blue, Balkan = green, Alpine = yellow, Bohemian-Bavarian-Austrian = brown, Jura Mountains = black, Vosges = grey).

E. Founder Sources and Availability

Founder lynx for the reinforcement of the Dinaric-SE Alpine population will be wild-caught individuals originating from Romania and Slovakia and belonging to the Carpathian Eurasian lynx population. Potentially (if available and if needed) we will also use orphan lynx obtained from the wild in Romania and Slovakia and rehabilitated to the typical age of dispersal (8-10 months) under strict protocols preventing habituation to human presence.

Justification for Using Wild-caught vs. Captive-Born Lynx

According to the IUCN 2013 guidelines, source animals for translocations can be either from a captive or wild source, but in general, individuals with higher predicted performance after release and more desired behavior should be favored (IUCN/SSN 2013). A conclusion of our recent review of the past carnivore reintroduction and translocation efforts (Wilson, 2018) was that wild-born animals are preferable to captive-born animals for translocation purposes. This is largely based on the fact that carnivore translocation programs were more successful (31% success) when wild-caught animals were used compared to efforts that used captive-born animals (13% success), as well as that survivorship of released wild-caught animals was higher (53%) than captive-born individuals (32%) (Jule et al. 2008). Although there are some cases of successful translocation programs using captive animals, including Eurasian lynx (e.g. reintroduction to Harz, Germany), there are several problematic issues associated with using captive-born individuals, which could jeopardize success of such projects. These include: 1) reduced ability to search for and kill prey, 2) lack of shyness of other predators, and 3) ability to recognize suitable denning sites, raise kittens, and avoid humans. Therefore, captive carnivores should only be released when there are no other alternatives. Because within the

present project we have ability to obtain wild-caught lynx, we will only use lynx born in the wild.

In addition to lynx captured in the wild for the purpose of this project, we will potentially also use wild-born individuals that were orphaned during their first year of life and taken to rehabilitation centers. If such animals are kept under strict protocols that limit their interaction with humans, they usually retain their natural behavior and can be successfully released back to the wild once they reach adequate age. This approach is currently being applied successfully within the lynx reintroduction LIFE project in the Palatine Forest, Germany (LIFE13 NAT/DE/000755). Although the sample size is small, preliminary data from this project suggest that these orphaned animals might exhibit less homing behavior in comparison to the translocated adult wild-caught animals. We will follow the same protocols used in the German project and apply them for translocating orphaned and rehabilitated wild lynx from Slovakia and Romania within the present project, if such animals become available. Additionally, further population reinforcement in the future could rely on orphaned lynx. It is difficult to predict the exact number of orphan lynx that will be available for translocation during our project timeframe. However, over the past five years in Slovakia they have typically had 2-3 orphaned lynx per year and in Romania typically 3 orphaned lynx. Thus we expect that several orphaned lynx will be available during the LIFE Lynx project.

Justification for Using Lynx from the Carpathian Population

According to the IUCN 2013 Guidelines for Reintroductions and Other Conservation Translocations (IUCN/SSN 2013), founders for translocations should be selected based on their genetic, morphological and behavioral characteristics that are assessed as appropriate through comparison with the original population and the feasibility of obtaining the adequate number of individuals.

It is believed that during large part of the Holocene single continuous Eurasian lynx population with high gene flow and low level of genetic variation inhabited Europe from Scandinavia in the north, Asia in the east, Mediterranean coast in the south and northern part of Iberian Peninsula in the west (Kratochvil 1968, Gugolz et al., 2008, Rodriguez-Varela et al. 2016). During the last centuries direct persecution, prey reduction and habitat destruction by humans caused lynx extermination in many parts of Europe, which resulted in the fragmentation of the distribution range of surviving lynx and formation of isolated remnant populations, followed by genetic drift.

Lynx became extinct in the Northern Dinaric Mountains and Southeastern Alps during the 18th and the beginning of the 19th century. Genetic analyses of historic samples from this region are not available, therefore it is unclear which of the remaining populations is genetically closest to the extinct lynx from this area. Assuming that the genetic structure of the historic continuous European population depended only on geographical distance, genetic compatibility should be highest with the Carpathian and the Balkan lynx population, which are both approximately 500 km distant from our proposed release areas. Thus, these two populations were considered as potential founder sources.

After careful consideration of the two potential founder sources we decided to use lynx from the Carpathian population for the reinforcement efforts within the LIFE Lynx project. This decision was largely based on the conclusions of the “Workshop on the Genetic Management of Small Autochthonous and Reintroduced Lynx Populations” in Saanen, Switzerland conducted by the international team of world-leading lynx experts, carnivore geneticists and

IUCN Cat Specialist Group members (Breitenmoser 2011, Breitenmoser and Breitenmoser 2012). At this workshop the experts strongly recommended to use wild animals from the Carpathian lynx population (*Lynx lynx carpathicus*) for any translocations between populations that were using this subspecies as a founder group, which includes the Dinaric-SE Alpine population. Below we provide further argumentation why lynx from the Carpathian populations are equally or more suitable and feasible for translocation to Northern Dinaric-Southeastern Alpine region than the Balkan lynx population.

Population size

The Carpathian lynx population is considered to be stable, robust and close to two thousand individuals (von Arx et al. 2004; Ratkiewicz et al. 2012; Kaczensky et al. 2013; Chapron et al. 2014).

On the other hand, the Balkan lynx population is currently critically endangered with less than 50 individuals remaining (Melovski et al. 2015). Therefore, removing even small number of individuals could seriously threaten the Balkan population, which would violate one of the main principles of the IUCN guidelines, i.e. removing individuals for translocation should not endanger the source population (IUCN/SSN 2013). In addition, securing an adequate number of animals within the project period would likely be unfeasible, since already capturing wild Balkan lynx for the research purposes during the recent years proved challenging (Melovski et al. in prep.).

Genetic diversity

Genetic analyses of the lynx from the Carpathians revealed high level of genetic diversity of this population (heterozygosity: 0.61, no. of alleles/locus: 4.59) (Breitenmoser-Würsten and Obexer-Ruff 2003, Sindičić 2011, Breitenmoser and Breitenmoser, 2012, Ratkiewicz et al., 2014), which makes it a suitable source for reinforcement of the Dinaric-SE Alpine population.

Genetic characteristics of the Balkan lynx has yet to be determined, but given the very small population size, likely isolation from other populations and severe bottleneck experienced during the 20th century (Melovski et al. 2015), it is expected that genetic diversity is low, population could be suffering from inbreeding and might need a reinforcement of its own. Therefore, we considered lynx from the Balkan population as inappropriate for the genetic rescue of the Dinaric-SE Alpine population.

Morphology

The Balkan lynx was described to differ morphologically from the other European lynx populations, especially in the smaller average skull measurements, although the differences were slight (few millimeters), they were within the variation range of the other lynx populations in Europe and they were based on relatively small number of the Balkan individuals (1 male and 3 females) (Mirić 1978). The average body mass of 4 adult males captured 7 times for research purposes (D. Melovski, pers. comm.) measured 21.1 kg (range: 17-25 kg), which is very similar to the Carpathian male lynx shot in Slovenia: 21.5 kg (range: 15-30 kg; n = 43) (Čop 1994). In Croatia, the average male body mass was 21. 9±3,9 kg (range 15 - 28 kg) (Gomerčić, 2005). Similarly, recent comparative analysis of cranial measurements between the Balkan and Carpathian lynx failed to detect any morphological differences (Gomerčić et al. 2010). Additionally, no evidence was found for differences in cranial measurements between lynx reintroduced to Croatia and the Balkan autochthonous lynx population (see Gomerčić et al., 2010 for further discussion).

Therefore, we consider both populations equally suitable in terms of morphology as a source for the reinforcement of the Dinaric-SE Alpine population.

Behavioral ecology

Spatial ecology and feeding habits of the Carpathian lynx (Breitenmoser and Breitenmoser-Würsten 2008) and the Balkan lynx (Melovski et al. in prep.) appear very similar. Both display intrasexual territoriality with limited overlap on the periphery and overlapping home ranges between the sexes, large home ranges (several hundreds of km^2) and preferential use of forests and extensively used areas.

Although some earlier authors assumed that Balkan lynx mainly rely on hunting lagomorphs and even considered it as belonging to the Iberian lynx (e.g. König 1969), recent systematic studies from Macedonia revealed similar feeding ecology to the other Eurasian lynx populations in Europe, predominately hunting small ungulates with feeding time lasting several days for each kill and occasionally complementing diet with smaller prey (e.g. rodents, lagomorphs, small carnivores, and birds). Although ungulate densities in the range of the Balkan lynx are low, the available diet data for the Balkan lynx (n =13 scats) indicated 0.77 frequency of occurrence (FO) of wild ungulates (0.55 relative FO) (Melovski et al., unpublished), which is comparable to diet of the Carpathian lynx living in the northern Dinaric Mountains (0.71-0.87 FO and 0.41-0.61 relative FO) (Krofel et al. 2011). Average ungulate kill rates for the Balkan lynx are also typical for the Eurasian lynx populations in Europe with the mean kill interval between consecutive ungulate kills of 8.85 days (range: 1.9–25.7 days, n = 75), which corresponds to 41.3 ungulates killed per year per lynx (Melovski et al. in prep.), suggesting similar ecological role as in other lynx populations (Jedrzejwski and Jedrzejewska 1998, Breitenmoser and Breitenmoser-Würsten 2008).

Based on the best available information we consider both Carpathian and Balkan populations equally suitable in terms of spatial and feeding ecology as a source for the reinforcement of the Dinaric-SE Alpine population.

F. Founder Source Populations and Genetic Considerations

The IUCN 2013 Guidelines stipulate that no negative impacts to source populations should occur from removal of individuals (IUCN/SSC 2013). Eurasian lynx populations in the Carpathians are considered to be stable (von Arx et al. 2004; Ratkiewicz et al. 2012; Kaczensky et al. 2013; Chapron et al. 2014) and sufficiently robust to handle the removal of up to (10) individuals from Slovakia and (10) individuals from Romania for the population reinforcement during the timeframe of 5 years, e.g. an average of 2 individuals per year per country. We do not expect any adverse impacts to either the Slovakian or Romanian populations based on the small number of lynx proposed for removal which represent an extremely small percentage of estimated population size.

Slovakia

In Slovakia, expert opinion historically was used for lynx population estimates based on lynx sightings, signs of presence, snow tracking, hunter surveys, and lynx mortality. Those estimates officially reported a population of approximately 350-400 lynx (Gregorová et al., 2004). However, more recent analysis suggests that those non-scientifically validated approximations were over-estimations and that current population of lynx in Slovakia based on density estimates are more likely to be approximately 197 ± SE 56 independent lynx in the 28,090

km^2 of occupied lynx range in Slovakia (Kubala et al., 2017). These are considered to be the most robust and best data now available in Slovakia.

Additionally, the most recent analysis suggests, as expected, that lynx densities vary (Table 3). Based on four sampling areas, the average lynx density is approximately 1.00 lynx/100 km^2 of suitable habitat (Kubala 2018) and meets thresholds for favorable conservation status according to national Slovakian management plans (Kropil 2005, Kubala et al., 2017).

Table 3. Eurasian lynx population density estimates in the Slovak Carpathians using opportunistic and deterministic camera sampling, 2011-2016 (Kubala 2018).

Sampling area	Size	Est. lynx density – suitable habitat
Štiavnica Mtns. PLA (2011-2014)	1,599.75 km^2	0.58 (± 0.13) lynx/100 km^2 (Kubala et al. 2017)
Veľká Fatra NP (2013-2014)	1,845.00 km^2	0.81 (± 0.29) lynx/100 km^2 (Kubala et al. 2017)
Muránska Planina NP (2015-2016)	1,401.75 km^2	1.47 (± 0.37) lynx/100 km^2 (Smolko et al. 2018)
Strážov Mts. PLA	1,145.25 km^2	0.97 (± 0.25) lynx/100 km^2 (Kubala et al. in prep.)

Proposed lynx captures for the LIFE Lynx project will occur in the neighboring areas to the Muránska Planina NP and Strážov Mtns. PLA where lynx densities are highest in Slovakia. Hence, lynx densities are expected to be very similar and the local populations viable enough to allow the lynx removals. Moreover, as part of the LIFE Lynx project, new information will be available after the current deterministic monitoring occurs in Vepor Mts. (the direct western neighbor to Muránska Planina NP). Continued opportunistic and deterministic camera trapping and opportunistic non-invasive genetic samples will be collected in these same areas ensuring that lynx densities are sufficiently high so that removal of 10 lynx over 5 years will have minimal impact on the local populations. Additionally, this monitoring will also help establish trends in lynx densities to detect any possible impacts to the local lynx population. This approach is in full accordance with the approved National Slovakian Lynx Management Plan (Antal et al. 2016) as well as in accordance with the lynx management plan in Europe (Breitenmoser et al. 2000) and the Key Activities for Large Carnivores in Europe (Boitani et al. 2015).

Romania

The Eurasian lynx population in Romania is considered stable and the most recent population estimates put the number of lynx between 1,200-1,500 animals (Kacensky et al. 2013) and as reported to the EU Commission under article 17 of the Habitat Directive in 2013, the lynx population is considered favorable.

Romanian researchers report that the lynx population may be increasing in certain game management units (Cazau et al. 2014), yet other researchers suggest that reported lynx estimates were largely overstated when compared to published growth rates for lynx (Popescu et al. 2016). In lynx habitat that is thought to be continuously occupied, lynx densities vary from less than one to more than four animals per 100 km² of forest. The average density is calculated to be 3.4 lynx per 100 km² (Kacensky et al. 2013). All experts considered these

official densities as overestimates (Kacensky et al. 2013). Researchers such as Okarma (2000) suggest that densities and populations may be 30% lower than official reports. Nonetheless, the lynx population in Romania's Carpathian Mountains is large and robust enough to tolerate the removal of up to 10 resident lynx for the project.

Moreover, as part of the LIFE Lynx project, new empirical data about lynx density will be available through continued opportunistic and deterministic camera trap sampling and opportunistic non-invasive genetic samples—these methods will be used to ensure that lynx densities are sufficiently high so that removal of up to 10 lynx will have minimal impact on the local populations. Additionally, this monitoring will also help establish trends in lynx densities to detect any possible impacts to the local lynx population. Optimal capturing locations in Romania will be determined based on current and previous field work (in Romania: LIFE08 NAT/RO/000500, LIFE13 NAT/RO/000205).

No Genetic Impacts to Source Populations Expected

Both the Slovakian and Romanian lynx populations are genetically diverse and removal of individuals is not expected to have any negative genetic impacts to these populations. Several published manuscripts analyzed genetic diversity of lynx samples from the Carpathian population. Gugolz et al. (2008), Ratkiewicz et al. (2012) and Sindičić et al. (2013) confirmed the presence of the same mitochondrial DNA haplotype, also found in reintroduced populations founded by animals from the Carpathian Mountains. Breitenmoser-Würsten and Obexer-Ruff (2003) analyzed 20 samples from Slovakia and found relatively high levels of microsatellite diversity (Ho =0,62). As a part of the research of Croatian lynx population, Sindičić (2011) analyzed mitochondrial and microsatellite diversity of 16 samples from Slovakia. All measures of genetic diversity were higher for the Slovakian population when compared to Croatia and significantly lower inbreeding coefficients were found among Slovakian samples (0,050 for Slovakia, 0,093 for Croatia). Ratkiewicz et al. (2014) analyzed 13 samples from Carpathians and confirmed previously published levels of genetic diversity. Krojerová-Prokešová et al. (2018) analyzed microsatellite diversity of samples from the western edge of the current distribution (along the Czech – Slovak border) which is not included in our project and will not be used as a source of the animals for the reintroduction. Also, this area is partially isolated from the rest of the Western Carpathians and fragmented into several discrete mountain ranges, resulting in sub-structuring of lynx from this area into 3 subpopulations (Krojerová-Prokešová et al. 2018). Additionally, as a part of LIFE Lynx project we have collected 28 samples from Romania and 34 from Slovakia with more samples to be collected in the future, and this will provide us with better insight of the genetic status of the source population. But at the moment based on presented research, and considering the population history with no significant bottlenecks and the fact that the core distribution of Carpathian population is not fragmented, we can conclude that Carpathian population harbors high levels of genetic diversity which will not be jeopardized by translocations within this project.

To ensure adequate genetic variation from source populations animals for translocation will be captured in two different countries (Slovakia and Romania) using multiple and differing capturing locations. Also, all lynx captured for translocation will be genetically screened to ensure that a close relative of the individual was not previously translocated within the project. Considering that the Carpathian lynx population is considered as part of the founder sources to the present Dinaric population, we do not expect any outbreeding depression.

G. Animal Welfare Considerations for Lynx

Regulatory Compliance

All source (Slovakia, Romania) and destination (Slovenia, Croatia) countries participating in this project are members of the European Union, thus all animal welfare issues will be handled in accordance to EU legislative. The EU has a set of wildlife trade regulations based on Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). They primarily regulate wildlife trade to, from and inside the EU, but they also contain provisions for the keeping of and caring for live specimens (Art. 9.4 of Council Regulation No 338/97).

Several laws address transport and set minimum requirements that have to be met during the transport of live animals. The CITES Parties have adopted several CITES Resolutions and Decisions dealing with the transport of live animal and plant species. Among these, the most relevant is CITES Resolution Conf. 10.21 (Rev. CoP16) on the Transport of Live Specimens.

Article 9(5) of Council Regulation (EC) No 338/97 states that any live specimens that are transported into, from, or within the EU, or are held during any period of transit have to be prepared, moved and cared for in a manner such as to minimize the risk of injury, damage to health or cruel treatment and, in the case of animals, transported in conformity with EU legislation on the protection of animals during transport.

Protocols for Lynx Capture, Narcosis, and Transport

We have prepared two documents – "Protocol for Eurasian lynx (*Lynx lynx*) capture, narcosis, transport, and quarantine in the Slovak Carpathians" and "Protocol for capture, narcosis, transport and quarantine in the Romanian Carpathians" which define in details handling of animals during these procedures (https://www.lifelynx.eu/project-outputs/). The principles that govern the protocols are: (1) avoid common mistakes that can lead to low capture success, (2) prevent any injuries of the captured lynx, and (3) prevent injuries of people. The protocol contains in detail all techniques, methods, and procedures necessary for the safe capture, quarantine, isolation, and transport of lynx to selected reinforcement areas, in respect to all legal requirements and best practice experiences from previous wildlife capturing by the project personnel. Additionally, the bulk of this document is derived from the KORA protocol Dokumentation Fang, Narkose und Markierung von Raubtieren (2013) from Urs Breitenmoser, Andreas Ryser and Marie-Pierre Ryser-Degiorgis and is considered to be the most authoritative protocols for safely and humanely handling Eurasian lynx.

Animals will be trapped with box traps and foot snares, built to prevent any injuries. Box traps will be built from waterproof plywood with smooth walls and opening for sufficient air ventilation and small lockable windows in both paddle doors for visual inspection. Foot snares are equipped with spring in the bar that accelerates the pull effect of the wire, but also acts as a shock absorber and prevents foot damage. Traps will be monitored with an alarm system and video cameras. A trigger system sends an info SMS to the capture team and to a local contact person (ranger, hunter or forester) who will check the trap as quickly as possible and release any non-target species (baggers, foxes etc.). Traps will be inspected personally every 5-7 days and after recent snowfalls.

After capture, lynx will be immobilized with combination of sedatives and narcotics administrated by a blow pipe or dart gun. The animal is approached after the induction period, in the last sixth stage when the animal is lying, head is held down, and there is no reaction to

external stimuli. The lynx is released from the trap and his legs are fixed together away from the torso and the head is stretched to the cranial position so that the upper airways are free. The respiratory function is briefly checked before any further manipulation. The mouth is checked for food remains or foreign bodies with a free-lying tongue. Protective eye drops (Viscotears®) are applied to the cornea and the eyes are covered. Depending on weather conditions and terrain, a flat and open space should be used for optimal animal placement and handling. Tranquilized lynx must be protected from rain, snow, and/or hypothermia. The vital functions/parameters (minimum frequency of respiration, heart pulse, mucous membrane color and capillary filling time) are checked along with reflexes (especially rat, cornea and ear) and body temperature as soon as possible and throughout the duration of narcosis. One member of the capture team is responsible for regular checks and recording of these parameters, as well as doses of administered substances, in the narcosis protocol.

After completion of all necessary actions (collaring/marking, sampling, health examination, measurement and photography) the narcosis will be terminated as soon as possible. If considered suitable for translocation, the lynx is put into the transport box where the antagonist is administered.

All risk scenarios associated with narcosis are described in detail in Protocols for Eurasian lynx (*Lynx lynx*) capture, narcosis, transport, and quarantine in the Slovak and Romanian Carpathians. Lynx will be transported only if they are fit for the journey. The detailed requirements regarding the fitness for transport are described in Chapter I of the Annex I of the Council Regulation 1/2005, but the most important are:

1. The lynx must be transported in conditions that guarantee that they will not be injured or endure unnecessary suffering. The lynx must be able to move independently without pain and be able to walk unassisted. Sedatives shall not be used on animals to be transported unless strictly necessary to ensure the welfare of the animals and shall only be used under veterinary supervision.

2. Means of transport must be designed, constructed, maintained and operated in such a way to avoid injuries and suffering and ensure safety to the animal transported. Animals must be protected against bad weather, extreme temperatures and unfavorable climate changes. Floor must be non – slip and impermeable for urine and feces. Access to animals must be provided in a way that they can be easily checked on, observed, and appropriately taken care for.

The lynx will be transported in the specially designed transport boxes (described in Protocols for Eurasian lynx (*Lynx lynx*) capture, narcosis, transport, and quarantine in the Slovak and Romanian Carpathians) in registered transporter TYPE 1 (up to 8 hours driving) or TYPE 2 (over 8 hours driving) licensed for animal transport. Written instructions on feeding, driving and required special care – Movement document, are required. Journey log according to Regulation 1/2005 is not required. A healthy lynx does not need any food during the transport for approximately 8-10 hours of travel, with mild temperatures. With a good transport progress, there is also no need for water. For transport over 8-10 hours water must be supplied. Moreover, if the animal is hyperventilated and there is a risk of overheating, there must be cold water available. In such cases, the transport should be also interrupted and the box placed in the shaded area with sufficient ventilation.

Quarantine Protocol

Between capturing and translocation, lynx must be in quarantine to carry out health analysis (rabies primarily) required for export documentation. The minimum duration of quarantine is

21 days. During this time, no physical contact to other captured lynx is allowed. If new lynx are placed in neighboring enclosures in the quarantine station, the start of the 21 days period begins with the arrival of the second animal.

The quarantine station should be isolated both visually and acoustically from people and other animals. Climbing and elevated places as well as hiding possibilities and the inner shelters (boxes) for protection against rain and cold have to be provided. The quarantine station should prevent the lynx from escaping and the risk of injuries to both humans and animals during quarantine should be minimized. Educated staff should be present daily to take care of the captured lynx. The enclosures should be cleaned at least once a week from feces and food remains. Fresh water and food, preferably fresh roe deer and red deer meat should be provided.

Soft-Release Protocols – Slovenia

In Slovenia a soft release procedure will be used. During soft-releases, lynx will be kept and fed in an outdoor enclosure for no more than 21 days. Minimal human presence will be tolerated at the enclosure except for feeding and routine checks to ensure that lynx are in healthy condition. The enclosures have been constructed to as to minimize any injuries of lynx. Wood paneling covers the inside of the enclosures so lynx do not injure their paws or teeth. The purpose of a soft-release is to acclimate lynx to their new environs and to ideally minimize "homing behavior" (i.e. dispersing away from the release site) and to facilitate establishment of new territories upon release. During their three-week quarantine in the enclosure the animals will receive professional veterinarian care if needed. In a large-scale Canada lynx (*Lynx canadensis*) reintroduction effort in Colorado, USA in the early 2000s, a soft-release protocol was used successfully with 178 lynx and appeared to improve body condition prior to releases (Devineau et al., 2011). The soft-release protocol according to researchers, helped improve survivorship of lynx within the first 12 months of release.

The researchers suggested that longer quarantine times allowed lynx to increase body weight and adjust to the local conditions of their new environment. This may have facilitated social interactions between individuals and further helped lynx establish territories and breeding pairs upon release.

Hard-Release Protocol – Croatia

At designated release locations in Croatia, lynx will be released immediately after transport from the source country. A licensed veterinarian will be present to confirm safe arrival of the animals and to adhere to all protocols of the TRACES electronic system.

If a translocated lynx suffers from any potential injuries or health issues, the project team will consider assessing the animal's conditions with a licensed veterinarian prior to release and to then take appropriate actions including: treatment, translocation, or euthanasia. The previously described capture and immobilization protocols will be followed. All decisions will be made to minimize welfare impacts to lynx.

H. Disease and Parasite Considerations

With a goal to prevent spreading of any infectious disease, a strict protocol will be followed for capture, transport, quarantine, release and any other handling of lynx. We have prepared two documents – "Protocol for Eurasian lynx (*Lynx lynx*) capture, narcosis, transport, and quarantine in the Slovak Carpathians" and "Protocol for capture, narcosis, transport and

quarantine in the Romanian Carpathians" which define in details handling of animals during these procedures.

At capture locations, animals will be weighed and examined according to standard veterinary procedures, with particular attention paid to their body condition, size and weight, teeth, claws and genitals. Lynx aged more than one year (Slovakia only) but not more than approximatively 12 years (estimation based on body size, weight, appearance of the genitals and teeth), without significant clinical abnormalities, will be considered as adequate for translocation and will be transfered to the quarantine. Older-aged lynx, or animals with a nonlethal malformation of potential genetic origin will be released at capture site; may be radio-collared to follow the progress of their conditions and to eventually recover their carcasses for pathological examination. Lynx younger than one year or with a disease or trauma with good chances of healing (e.g. mange after appropriate treatment) will be released on site with a collar to be re-captured at a convenient time. In some cases, a transfer to the quarantine station for more intensive care may be considered. However, animal welfare questions must be considered (e.g. stress induced by transport and captivity may have a negative impact on health), as well as the risk that an animal suffering from an infection may infect other lynx in the quarantine station.

At the capture location, all animals will be marked with a microchip and blood samples will be taken. Hematology and blood chemistry values will be analysed and compared with reference values. Animals with blood values significantly different from reference data will be submitted to additional testing as appropriate.

Blood samples will be tested for Feline Leukemia Virus (FeLV), feline panleukopenia virus (FPV) and Feline Immunodeficiency Virus (FIV) in licenced laboatories. Also Corona, Parvovirus, Calicivirus, Herpes, Bartonella and Ehrlichia will be tested. FeLV, FPV and FIV positive animals will not be translocated. Further actions with the positive animals will be discussed with the responsible authorities in source countries.

Feces taken from rectum at capture site or first feces found in the transport box/enclosure will be collected and analysed for parasites. At capture, all lynx to be translocated will receive antiparasitic treatment.

All animals included in translocation program will be vaccinated against rabies, with EU-approved vaccine for felids (for example Nobivac Rabies®). Between 10th and the 14th day after the capturing/rabies vaccination blood samples will be taken to analyze rabies antibody titter by EU accredited laboratory. A neutralizing antibody titration must be at least equal to 0.5 IU/ml. If the antibody titter is not high enough (less than 0,5 units/ml) the lynx must be vaccinated again and remain in the enclosure for another 21 days after a second vaccination and then be retested for the correct level of antibody titter (at least equal to 0,5 units/ml).

Before transport to the release site, lynx will be tranquilized and fitted with a radio-collar and undergo another clinical check before transportation. Blood samples will be taken for archive purposes, but unless there is a specific indication, no tests will be performed at this point. If at this point, a reason for exclusion not noticed earlier would be detected, experts in charge would consider three options: (1) release of the animal at the original capture site, (2) euthanasia, or (3) prolongation of the quarantine (with treatment as appropriate and subsequent re-assessment).

IV. SOCIAL FEASIBILITY

A. Overview of the Existing Conservation Infrastructure

Slovenia

Lynx are fully protected in Slovenia. Provisions for lynx protection are included in national legislation in Nature Conservation Act (2004), Environment Protection Act (2004), Hunting Act (2004), Forest Act (1993), Decree on special protection areas - Natura 2000 (2004) and Natura 2000 Management programme (2015). In 2016 the Slovenian Lynx Conservation Strategy was also adopted. The last legally shot lynx in Slovenia was harvested in 2003. A quota was allowed in 2004, but was not realized. Since 2004, no culling of lynx has been allowed in Slovenia due to the endangered status and low number of animals.
Competent authority is Ministry of Environment and Physical planning of Slovenia. The Ministry was closely involved in preparation of the LIFE Lynx project proposal, it is also co-financing and monitoring the implementation of the project. Both governmental agencies responsible for management of lynx population – Slovenia Forest Service and Institute of the Republic of Slovenia for Nature Conservation - are project beneficiaries carrying crucial roles in both planning and implementation of the project. In addition, project consortium involves also University of Ljubljana, which has long been on the forefront of large carnivore research, monitoring and conservation in Slovenia. Lastly, project consortium involves also Slovenian Hunters Association and its network of over 20 000 volunteers in the field.
One of the procedures how to implement the goals of conservation of species within Natura 2000 sites, is the Programme of management of Natura 2000 sites in Slovenia (PUN) for period 2015-2020. It is based on Habitats directive and is implemented to reach one of the goals of the European Union, i.e.to ensure the conservation of important species on EU level. With the implementations of this program, the government will contribute to the achievement of the objectives of sustainable development.

Within this program, the conservation aims and measures are specifically defined to enable the horizontal connectivity with strategic documents and development programs. The programme includes specific conservation measures for lynx population for Natura 2000 sites in several regions, including the Natura 2000 sites in the Dinaric part: preparation of expert basis for action plan for lynx conservation in Slovenia, adoption of action plan for lynx conservation in Slovenia, implementation of monitoring of the conservation goal achievement into inspection work, implementation of conservation goal in spatial planning, decrease of damages on livestock through changes in compensation system and protection measures, harmonization of regulations to decrease the number of damage cases and implementation of the conservation goal into hunting-management plans through planning of sectoral measures.
In the Dinaric region, 57% of the area is represented by Natura 2000 sites, which indicates its richness in natural diversity. In 42% of the region lynx is one of the qualifying species, what clearly shows its importance and need for effective management. All high-quality lynx habitat in this region, where animals are expected to establish territories and reproduce, is under Natura 2000 designation.

The programme includes specific conservation measures for lynx population for Natura 2000 sites also in the Alpine part: preparation of expert basis for action plan for lynx conservation in Slovenia, adoption of action plan for lynx conservation in Slovenia, implementation of monitoring of the conservation goal achievement into inspection work, implementation of conservation goal in spatial planning, decrease of damages on livestock through changes in

compensation system and protection measures, harmonization of regulations to decrease the number of damage cases and implementation of the conservation goal into hunting-management plans through planning of sectoral measures. In 2018 the Ministry of Environment and Physical Planning has initiated a new Integrated LIFE project with the goal to revise, further develop and implement new Programme for Management of Natura 2000 sites. Project team will closely work with the Ministry to ensure synergistic implementation of the two projects.
In May 2016, the Slovenian government adopted the Strategy for conservation and sustainable management of lynx for the period 2016 - 2026. The purpose of this strategic document is to define legal, organizational and conceptual framework of measures for the establishment of favourable long-term conservation of lynx in Slovenia. The strategy defines the objectives and guidelines for specific areas where it will be possible to ensure the conservation of lynx and its sustainable management.

Italy

Lynx is a fully protected species in nature protection and hunting law (157/1992). The conditions for the introduction of wildlife, which is only allowed for population reinforcement purposes or genetic rehabilitation, are defined in Article 20. Article 26 states that each region has to constitute a fund for damage prevention and compensation.
Competent authorities at national level are the Ministry of Environment (which is advised by ISPRA) and Carabinieri Forestali and at regional level the regional authorities, e.g. Friuli Venezia Giulia. There is no lynx management plan and the monitoring is organised for the last 20 years by a NGO (Progetto Lince Italia). As monitoring results revealed a decreasing trend over the past decade, two lynx have been translocated from the Swiss Jura Mountains to Friuli V.G. in spring 2014.
Natura 2000 sites in Friuli Venezia Giulia and Veneto are managed based on special conservation measures and management plans following guidelines of the "Ministero dell'Ambiente e della Tutela del Territorio" with the aim to maintain biodiversity taking into account economic, social and cultural requirements and regional and local characteristics as indicated by art. 2 of Directive 92/43 / EEC "Habitat".

Croatia

Management plans for all national parks and nature parks in Croatia that are within Natura 2000 network have been adopted and valid as Natura 2000 management documents. Croatian law recognizes these as well and does not require additional plans. Preparation of management plans for the rest of Natura 2000 sites are in process.Since the 1995 Rulebook on the Protection of Certain Mammal Species (Mammalia) lynx has been listed as a strictly protected species in CRO, and afterwards no hunting quotas were issued. The Nature Protection Law (2005, 2008, 2011, 2013) implements the obligations of Croatia arising from adopted international conventions and EU law. Based on the Population status report for 2011 and 2012, in 2013 national IUCN Red List category for lynx was changed from near threatened - NL to critically endangered - CR (D). Lynx management plan for the Republic of Croatia is implemented since 2004, and the last edition was for 2010 - 2015 period. The next revision is planned is in-progress.

In Croatia, National Strategy and Action Plan for the Protection of Biological and Landscape Diversity, as obligation from Convention on Biological Diversity – CBD, is the document that defines the strategic goals for national biodiversity protection. For the strategic goal: "Maintain and improve the existing diversity of wild species, and recover part of lost taxa wherever possible and justified. To ensure the sustainable use of plant, fungi and animal taxa" important

actions are to manage large carnivore populations at national and international level, to strengthen cross-border cooperation with Slovenia and to implement and revise lynx management plans. Lynx management plan for 2010-2015 was adopted by authorities. A revision of this document is planned and it should be valid in 2019 – 2023 period. Croatian project beneficiaries are deeply involved in the process of the revision of the national lynx management plan.

The competent authority is the Ministry of Environment and Energy. The Ministry (and former Croatian Agency for Environment and Nature was responsible for lynx management) and support the implementation of LIFE Lynx project proposal, and recommended it for co-financing to Environmental Protection and Energy Efficiency Fund. In addition, the project consortium involves the Faculty of Veterinary Medicine - University of Zagreb, which has long been on the forefront of large carnivore research, monitoring, and conservation in Croatia, and is also appointed for monitoring lynx mortality by the competent authority.

Slovakia

Lynx has been granted full legal protection when Slovakia adopted the EU Habitat Directives in 2002 (Act 543/2002 on Nature and Landscape Protection). On 2 February 2017 the Ministry of the Environment of the Slovak Republic adopted a Programme of Care for the Eurasian Lynx (Lynx lynx) in Slovakia ("Program starostlivosti o rysa ostrovida na Slovensku"). The population is in favourable conservation status. Trapping and removal of lynx for the reinforcement purposes planned in LIFE Lynx is in accordance with the adopted Programme and all necessary permits are in the process of being issued or have been issued.

Romania

Lynx is a fully protected species in Romania (Governmental Ordinance no. 57/2007, Law no. 407/2006 on hunting and game protection). There has been no proposed hunting in recent years by the Romanian government. All official reports suggest a favourable conservation status.

International Level

In the European documents, particularly in the documents of the Standing Committee of the Berne Convention (Convention on the Conservation of European Wildlife and fauna in their natural habitats), the Alpine Convention and the guidelines of the European Commission for the Implementation of the Habitats Directive, there is an emphasis on the intention that each country is responsible for the spread of populations of large carnivores as well as for the collaboration in implementation of management of populations with countries that share the same population.

The importance of the Dinaric area for lynx is emphasized also in the document Key actions for Large Carnivore populations in Europe (published in 2015). In the specific actions for lynx population it is specified that the Dinaric population has to be reinforced in Croatia and in Slovenia (Action 1, Level of urgency 1, Benefit 4) to introduce new genes into the heavily inbred Dinaric population.

Merging of populations presents a crucial step towards the long-term conservation of the species, and Dinaric Mountains can serve in the future as a source population of genetically healthy animals and can help securing the future of the small and isolated populations of Western Europe. By implementing our project, we will build a stepping stone to connect Dinaric and SE Alpine population, which is a prerequisite for recolonization of the Alps and achieving the long-term vision of creating pan-Alpine Dinaric lynx meta-population stretching from Bosnia to France.

It is important to note that all countries participating in the LIFE Lynx project are member

states of the European Union which means that, following the principle of subsidiarity of the EU law system, they all have developed basis for international cooperation in large carnivore management.

B. Lynx Population Reinforcement and Human Communities/Public Acceptance

Safeguarding core stakeholder support for lynx reinforcement in targeted areas at local, regional and national levels is one of the main objectives of the LIFE Lynx project. The support is crucial in ensuring that we have developed the social, political and management landscape necessary for the long-term lynx recovery. To achieve this project in itself is developed through wide international collaboration and partnerships and includes range of beneficiaries that have the abilities and resources to address key stakeholders' concerns in a timely and credible way. The project was developed within both national and international (EU) conservation infrastructure, it recognises the mandates of the existing institutions and agencies, all relevant legal and policy frameworks as well as national species management strategies and plans.
The project also recognizes that human communities in the project area and especially those in or around a release area have a legitimate interest in the reinforcement. Different segments of the communities hold different outlooks that can change over time. Therefore, project plans accommodate socio-economic circumstances, public attitudes and values, motivations and expectations, behaviours and behavioural change and the anticipated costs and benefits from the population reinforcement. Understanding these complex human dimensions issues was the basis for developing the project and especially for developing the public awareness and dissemination of results activities in the project.
Add paragraph on previous surveys of public acceptance.

Key Mechanisms for Addressing Key Stakeholders' Concerns

An important part of project development was identification of a range of suitable and feasible mechanisms for engagement and problem solving between the public (especially core interest groups and their representatives) most likely to be affected or concerned about the reinforcement, both in source and countries where lynx will be released.

One of the key preparatory actions of the project is preparation of the project's Communication plan to plan in detail strategies to maximize efficient communication of the project outputs and communication-related activities. The communication plan analyses all foreseen project results and outputs with respect to how they ought to be disseminated and their results disseminated to the main stakeholder groups, decision-makers and other target publics. The plan defines key messages for specific audiences and delivery means. According to the plan any transfer of information about any aspect of the project to the outside world ought to be treated as a communication process. In order to enhance internal capacities for working with stakeholders, project team members will participate in a communication training and an international networking and experience exchange in communication about large carnivores will be organized.

Regular reporting and dissemination of information has started even before the actual formal commence of the project and within the project considerable resources have been dedicated to continue creating awareness and support for the reinforcement among the key target groups as well as to contribute to the body of information on implementation of such conservation projects thus enabling experience sharing and replicability and transferability of best practices.

A core mechanism for addressing and managing local communities' concern is fostering shared

ownership through establishment of local consultative groups (LCG). LCG established in areas close to release sites bring together local stakeholders that represent different interests. Regular gatherings of the groups will enable timely resolutions of potential conflicts and enable trust building among different stakeholders and the project. The aim is to build and maintain strong local public support for lynx population recovery and long-term conservation by ensuring early and sustained public participation in the project. Participation in LCGs is inclusive and transparent in order to secure strong involvement in project activities and to build strong partnership with key local stakeholders. The LCGs will be established in Slovenia and Croatia.

Action E1 and other E actions C8, C7, C9,

In Slovenia, new guidelines for ungulate management plans that better incorporate the life history of lynx will be prepared within the project. In that way, we will, in collaboration with wildlife managers and hunters, address concerns of hunters about the availability of game species for lynx and for hunting as well as concerns of environmentalists regarding the availability of prey species for lynx survival.

C. Organizational and Institutional Aspects

An understanding and integration of key organisational and institutional (both formal and informal) arrangements is critical for the success of the reinforcement project. Institutions are the rules of a society or of organizations that facilitate coordination among people by helping them form expectations, which each person can reasonably hold in dealing with others (Blaas, 1982). In particular, "an institution can be defined as the set of working rules that are used to determine who is eligible to make decisions in some arena, what actions are allowed or constrained, what aggregation rules will be used, what procedures must be followed, what information must or must not be provided, and what payoffs will be assigned to individuals dependent on their actions" (Ostrom, 1990: 51).
LIFE Lynx project's activities that are targeting management of the multiple institutions and institutional interplay can broadly be categorized into:

1. Governance –related measures – project team's interventions that are ongoing for over a decade before even initiating the project on the ground include close cooperation with relevant governmental bodies taking into account important hierarchies and thus ensuring and maintaining political and legislative framework needed for successful project implementation.
2. Cooperation – related measures – include pre-project and project activities designed to motivate key people and groups both governmental and non-governmental to adjust their priorities and /or resource use patterns also by giving them the opportunity to participate in the forming (decision-making) and implementation of the project.
3. Market –related measures – include measures and solutions that have an impact on people's activities on markets, in the LIFE Lynx project case activities related to tourism, agriculture and education.
4. Information –related measures – include information and knowledge sharing activities that help people understand the actual benefits and costs of the reinforcement project.

D. Economic Impacts

The project acknowledges that lynx reinforcement may yield economic consequences - both positive and negative. Project activities will most likely generate or facilitate both economic

opportunities (e.g. increased ecotourism and wildlife-related recreational activities) and an increased potential for negative impacts to occur (such as lynx attacks on wildlife).
The project therefore foresees additional activities designed specifically to stimulate the positive economic consequences and minimize potential negative economic impacts.

Minimization of potential negative economic impacts will be done through supporting livestock protection from lynx depredation. Specifically, project will purchase 15 electric fence kits and distribute them to farmers with damages caused by lynx. Twelve sets are planned to be distributed in Slovenia and three in Italy. In Croatia such activities are already being implemented through Rural Development Programme for period 2014-2020. We expect that providing farmers with electric fences will not only act as a prevention measure but also as a friendly gesture that will help maintain or even increase favourable attitudes of local communities about the project activities. Members of the project team will stay in regular touch with the farmers to ensure proper use of fences and offer support when needed.

The net worth of the livestock protection activities in the project is: 64,754€

Supporting economically beneficial impacts of the project will be done through (1) targeted empowerment of local tourism sector and (2) choosing local suppliers of goods and services whenever possible during project implementation. The project will directly support and facilitate the development of a suite of lynx-based tourism experiences that benefit local communities. Specifically, innovative lynx-based tourist packages will be developed in Slovenia and Italy – art will be used as a media to create curiosity and emotional connection to people and to reach new audiences to increase conservation literacy. This will be designed together with local communities and for local communities. In addition, a transboundary "lynx walk" will be developed among Croatia and Slovenia to target adventure tourists that organize their own trips. This will be done in collaboration with local mountaineering and tourism organisations. Finally, thematic "lynx trails" (one in each Slovenia and Italy) will be developed in collaboration with a local community with a specific interest in such activity. The trails will be accompanied with the didactic guidelines for teacher and are expected to strongly support local educational activities.

In addition, empowerment of the tourism sector will be supported also through organisation of educational seminars for tourism sector and protected areas in Slovenia and Croatia. The goal of the seminars is to share best practice examples, explore economic opportunities and discuss guidelines for responsible implementation of wildlife-based tourism. Finally, Slovenian partners will organize a thematic study tour for foreign journalists in order to present lynx-related tourism offer in the Slovenian part of the project area.

The net worth of the tourism related activities in the project is: 168,555€

V. REGULATORY COMPLIANCE

A. Relevant Statutory Compliance

All countries involved in this project are members of the European Union and thus are obliged to follow European laws and ratifications of international directives that are relevant to this lynx recovery effort. Relevant statutory compliance includes the following: Convention on the Conservation of European Wildlife and Natural Habitats - Bern Convention (1979), Convention on International Trade in Endangered Species of Wild Fauna and Flora – (CITES)

(1973), Council Directive 92/43/EEC, Conservation of Natural Habitats and Wild Fauna and Flora - Habitats Directive (1992).

Eurasian lynx within the European Union are a strictly protected species and protections afforded to lynx are governed by different authority sectors by EU member countries that have a lynx population. In addition to this background, lynx management is set forth in several strategic documents such as Key Actions for Large Carnivores in Europe or Guidelines for Population Level Management. These documents provide an overarching backdrop that helps guide lynx management in Slovenia and Croatia. And as mentioned previously in this plan, the IUCN 2013 Guidelines for Reintroductions and Other Conservation Translocations are an additional source of guidance that help ensure an efficient reinforcement effort and are required to be followed under the LIFE Program.

Slovenia

For Slovenia, the following legal acts and decrees all provide guidance for regulatory compliance within the context of this plan:

- **Nature Conservation Act** (Official Gazette of the RS, no. 96/04 - official consolidated version, 61/06 – ZDru-1, 8/10 – ZSKZ-B, 46/14, 21/18 – ZNOrg and 31/18; hereinafter: ZON)
- **Rules on the Inclusion of Endangered Plant and Animal Species on the Red List** (Official Gazette of the RS, no. 82/02 and 42/10)
- **Decree on Protected Wild Animal Apecies** (Official Gazette of the RS, no. 46/04, 109/04, 84/05, 115/07, 32/08 – odl. US, 96/08, 36/09, 102/11, 15/14 and 64/16)
- **Rules on the Appropriate Manner of Protecting Property and the Types of Measures For Preventing Further Damage to Property** (Official Gazette of the RS, no. 74/05)
- **Decree on Ecologically Important Areas** (Official Gazette of the RS, no. 48/04, 33/13, 99/13 and 47/18)
- **Decree on Special Protection Areas (Natura 2000 areas)** (Official Gazette of the RS, no. 49/04, 110/04, 59/07, 43/08, 8/12, 33/13, 35/13 – popr., 39/13 – odl. US, 3/14, 21/16 and 47/18)
- **Act on Forests** (Official Gazette of the RS, no. 30/93, 56/99 – ZON, 67/02, 110/02 – ZGO-1, 115/06 – ORZG40, 110/07, 106/10, 63/13, 101/13 – ZDavNepr, 17/14, 24/15, 9/16 – ZGGLRS in 77/16); hereinafter: ZG)
- **Environmental Protection Act** (Official Gazette of the RS, no. 39/06 – official consolidated version, 49/06 – ZMetD, 66/06 – odl. US, 33/07 – ZPNačrt, 57/08 – ZFO-1A, 70/08, 108/09, 108/09 – ZPNačrt-A, 48/12, 57/12, 92/13, 56/15, 102/15, 30/16, 61/17 – GZ and 21/18 – ZNOrg)
- **Rules on The Content Defining Environmental Damage** (Official Gazette of the RS, no. 46/09)
- **Criminal Code** (Official Gazette of the RS, no. 50/12 – official consolidated version, 6/16 – popr., 54/15, 38/16 and 27/17)

Croatia

For Croatia, the following legal acts and decrees all provide guidance for regulatory compliance within the context of this plan:

- **Nature Protection Act** (Official Gazette No 70/05)
- **Ordinance on Declaring Protected and Strictly Protected Wildlife Species** (Official Gazette No 7/06)
- **Regulation on the National Ecological Network** (Official Gazette No 109/07)
- **National Strategy and Action Plan for the Protection of Biodiversity and Landscape Diversity** – NSAP (Official Gazette No 81/99)
- **Animal Protection Act** (Official Gazette No 135/06)
- **Forest Act** (Official Gazette No 140/05 and 82/06)
- **Veterinary Act** (Official Gazette No 41/07)
- **Ordinance on cross-border transport and trade in protected species** (Official Gazette No 34/06)
- **Ordinance on Crossings for Wild animals** (Official Gazette No 34/06)
- **Ordinance on Handling and Disposal of Animal Carcasses and Animal Byproducts** (Official Gazette No 24/03)

B. Regulatory Requirements/Permits That Are Needed for The Project

There is not one prescribed regulatory approach for Eurasian lynx reinforcement. However, each participating country has specific laws, regulations, and management plans that inform the process. The most essential requirements are twofold—permits are needed to trap and relocate lynx from Slovakia and Romania and permits are required in Slovenia and Croatia to release lynx. These permits are by the relevant national authorities from the aforementioned countries.

With respect to this project, we obtained support from the governments of the source countries (Slovakia and Romania) during the early phases of planning the project and agreed on all responsibilities among partnering countries. Romania and Slovakia gave official support to the LIFE Lynx project at the ministry level and signed the agreement for participating in the LIFE Lynx project.

After the project was funded and approved, we signed an international agreement on the responsible ministry level with Slovakia. In Romania the existing documents for collaboration in the LIFE Lynx project were considered to be enough to cover the international level of collaboration.

Source Countries

Within the source countries, responsible partners in the project needed to get the permission for capturing lynx from the responsible ministry. In addition to this it is necessary to make an agreement for collaboration with the local responsible entities for game management. This can be National parks, National level Forest service managers or local game management units.

Destination countries

Also, in the destination countries (Slovenia, Croatia) a national permit for releasing animals needs to be issued. In addition to this, agreements with local game management units/national park authorities need to be agreed to. In Slovenia, lynx will be released also in the hunting grounds managed by Slovenia Forest service (SFS). Because (SFS) is a lead partner in the project, no additional agreements are needed to carry out the releases in these areas.

Cross border, health, veterinary permissions

All requirements (veterinary and transport) for transport of the animals need to be fulfilled before the animals are transported from the source country to the destination country. Within the LIFE Lynx project, a protocol was developed together with the national veterinary authorities.

After the capture, lynx will be quarantined in the source country and if necessary, medical treatment will be provided according to the transport protocol where it is described which measures need to be undertaken before the transport.

When the lynx will arrive to Slovenia the animals will be quarantined for approximately 3 weeks in quarantine. Potential additional necessary health checks will be carried out during their stay in the quarantine.

VI. RESOURCE AVAILABILITY

A. Funding for the LIFE Lynx project

The LIFE Lynx project uses a cost-sharing approach that matches European Union funds (under a competitive grant process - LIFE Program) with co-financing contributions from the national governments of Slovenia, Croatia, Italy, and Slovakia, contributions from project beneficiaries, and contributions from foundations.

Under the LIFE Program, all project partners carefully planned and revised budgets during the proposal process and use standard cost-accounting measures to reflect sound financial planning to ensure the wise and pragmatic use of all contributions.

This approach has helped ensure that there are enough financial and human resources necessary to carry out and implement all proposed actions in this plan.

European Union Financial Contribution
4,081,404.00 €

Co-Financiers Contribution
1,432,447.00 €

Project-Beneficiaries Contribution
1,315,526.00 €

Total Project Budget
6,829,377.00 €

VII. RISK ASSESSMENT

A. Ecological Risks

Risk to Source Populations
The IUCN 2013 Guidelines stipulate that no negative impacts to source populations should occur from removal of individuals (IUCN/SSC 2013). The lynx populations in Slovakia and Romania are considered stable (Kaczensky et al., 2013) and sufficiently robust to handle the removal of up to 10 individuals from Slovakia and 10 individuals from Romania for the population reinforcement. We do not expect any adverse impacts to either the Slovakian or Romanian populations based on the small number of lynx proposed for removal.

Lynx Mortality
There is risk that released lynx could die from traffic accidents, disease, or illegal killing or emigrate from the study area. We will attempt to mitigate this by using soft-releases and/or optimizing release locations to minimize the chances of lynx mortality. All animals will be examined by veterinarians after the capture to avoid transport and release of individuals with health problems. An intensive public campaign will ensure public support and mitigate illegal killing as well as the development of a specialized police crime unit. All released animals will be monitored using GPS-GSM collars. If they die within the first year (before reproducing), they will be replaced by additional animals from the source population.

Lynx Fail to Breed
There is the chance that released lynx fail to breed. To increase chances the lynx will reproduce, lynx will be released within territories used by animals of the opposite sex, as determined by genetic monitoring and when possible, in locations where there are no territories of animals of the same sex in vicinity.

B. Management-Related Risks

Failure to Capture Lynx from Source Populations
If trapping efforts in Slovakia and Romania fail, the team will evaluate the possibility for translocation of orphan lynx. It is a common practice to release orphan lynx captured into the wild according to management plans in Switzerland and Germany with considerable success. Three orphaned lynx were successfully released in 2016 for a reintroduction LIFE project in the Palatinate Forest (LIFE13 NAT/DE/000755). Successful reproduction has occurred in the reintroduction effort and current estimates suggest a minimum of 15 known lynx (Rheinland-Pfalz, 2018)

Failure to Collect Genetic Samples for Monitoring
It is possible that inadequate numbers of non-invasive samples (hair, scat, urine, saliva) are collected to conduct a study of the genetic status of the population and track the breeding

success and genetic contribution of the released animals. The project team will use the best available methods for sample collection and rely on a large number of volunteers for sample collection who are well trained and motivated by LIFE Lynx project staff. All project staff will also collect genetic material throughout the project timeframe to ensure that enough samples are obtained. As of 27-November, 28 non-invasive samples have been collected from the Carpathian Mountains of Romania and 278 non-invasive samples have been collected from the Dinaric Mtns. and SE Alpine area.

Volunteers Fail to Participate in Project

It is possible that volunteers will not want to participate in lynx monitoring and sample collection. However, several project beneficiaries already have substantial databases of active volunteers and are experienced in attracting, motivating and coordinating large numbers of volunteers in citizen science efforts. The experience from previous large carnivore projects show that the charisma of these species tends to create the opposite "problem" – that more people wish to be involved than a project needs or has the capacity to accommodate.

Cameras/Pole and Hair Traps are Destroyed/Stolen

Based on previous experiences, destruction or theft of project materials is low. However, additional cameras/poles have been purchased to mitigate this risk. Local inhabitants and hunters will be informed about the activities that are being conducted in their area, and many will be directly included in the monitoring as volunteers, ensuring public support and preventing equipment damage.

GPS-GSM Collar Malfunctions

There could be malfunctions with GPS-GSM collars used for lynx movement/activity and premature collar failures could result in lack of data needed for monitoring. However, capturing and outfitting lynx with collars will be conducted by experienced professionals, using the best available techniques, and enough resources have been allocated to do this properly. Cost of collar refurbishment was planned in the budget to re-cycle GPS collars and use them in case of collar failures.

Key Stakeholders Fail to Support Project

While unlikely, there is a chance that key stakeholder groups, primarily hunters, do not support the lynx reinforcement. However, planning for the LIFE Lynx project has been conducted for several years and surveys of hunters have been favorable to the goals of the project. Local inhabitants and hunters will be involved in implementation of numerous project activities using a partnership-based approach helping to demonstrate respect and trust in carrying out this project. Effective communication and proper presentation of the performed actions will ensure public support and help build pride by all involved in the project.

No Consensus Reached on Lynx Management Documents

The project team has planned enough time (workshops) to accommodate a conflict resolution process and will use professional facilitators if needed to achieve consensus among relevant stakeholders. It is expected that the workshops will be a constructive forum for collaborative and participatory learning where not only conflicts get resolved, but also all interest groups increase their capacities and knowledge for participation in decision-making.

Lynx Prey Management Documents Ignored

Hunters are closely involved in project implementation as beneficiaries and stakeholders and

authorities support planned project actions and have already emphasized the need for improved management of wild ungulates. As such, it is not anticipated that hunters or the competent authorities and hunting managers will ignore recommendations for improved lynx prey species management.

Low Response Rate to Questionnaires

Questionnaires are used in planning and monitoring of the project and low response rates can occur. To mitigate against this, more than twice the number of questionnaires than the targeted sample size will be mailed to potential respondents. Reminder cards will also be sent to respondents after a certain amount of time, which should additionally increase the response rate. Statistical analyses will be adjusted based on data quality.

Farmers Fail to Use Electric Fences to Prevent Potential Lynx Damages to Livestock

Based on experience from previous projects (LIFE COEX, Life SloWolf, LIFE DINALP BEAR Project) farmers are willing to accept this type of tool/donation and are interested in their proper use. Agreements regulating the use of the donated electrical fences will be signed with each participant.

Media Fails to Adequately Cover Project

Based on the extensive previous experiences, the media is very interested in covering any and all news connected with large carnivores. The vast majority of reports about our previous project activities were in a positive tone. Routine checking of media clippings will monitor possible misinformation or negative coverage and the project team will respond accordingly.

C. Regulatory and Permitting-Related Risks

Permits for Lynx Translocation are Not Granted

While it is unlikely that not all permits for lynx translocation will be granted from the requisite authorities, early communications and discussions with all competent ministries have taken place to ensure a smooth permitting process. The competent ministry from Slovenia has already drafted the technical agreements with competent ministries from Slovakia and Romania within which both countries support the translocation of lynx. In addition, LIFE Lynx project staff have already contacted competent veterinarian authorities in Slovenia and Croatia to discuss all necessary conditions needed before translocations are made. During the planning process, all permits should be granted within the first 18 months of the project before any of the first lynx translocations and releases.

Environmental Impact Assessment Guidelines are Not Followed by Officials

In the past, officials including the Croatian State Institute for Nature Protection (now Croatian Agency for Environment and Nature) and Slovenian Environmental agency, have asked for such guidelines and help when preparing environmental impact assessments, therefore it is expected that once these types of guidelines are prepared that officials will be supportive and willing to follow them.

Slovenian Action Plan for Lynx is Not Adopted by End of Project

All relevant authorities are supporting the project, demonstrating strong political support and making this scenario highly unlikely. Action plans will be finished one year before the end of the project so competent authorities will have enough time to adopt the management plans.

D. Socio-economic Risks

Lynx Population Increases Rapidly and Creates Damages in New Areas

If the lynx population responds robustly to the reinforcement, there is the chance that the population will increase and lynx may disperse and occupy areas with livestock and subsequent damage could occur. To plan for such an outcome, neighboring communities to the core release areas will be informed, habitat suitability models will be used, and communication and outreach will be used and appropriate tools can be discussed in those areas where livestock damages could result.

E. Financial Risk

Funding is secured for the duration of the proposed reinforcement process.

F. Disease Risk

See Section III. Biological Feasibility, subsection F for a complete description of disease risk and mitigation plans.

VIII. RELEASE AND IMPLEMENTATION

A. Release Locations (Areas and Sites)

Lynx translocated from the Carpathian population will be released in the Northern Dinaric Mountains and Southeastern Alps of Slovenia and Croatia. The release area is divided into two parts: the Dinaric and the Alpine region (Figure 5). This division follows the geographical characteristics of the release areas and more importantly, the lynx population characteristics, which require different approaches in terms of goals and dynamics for the releases.

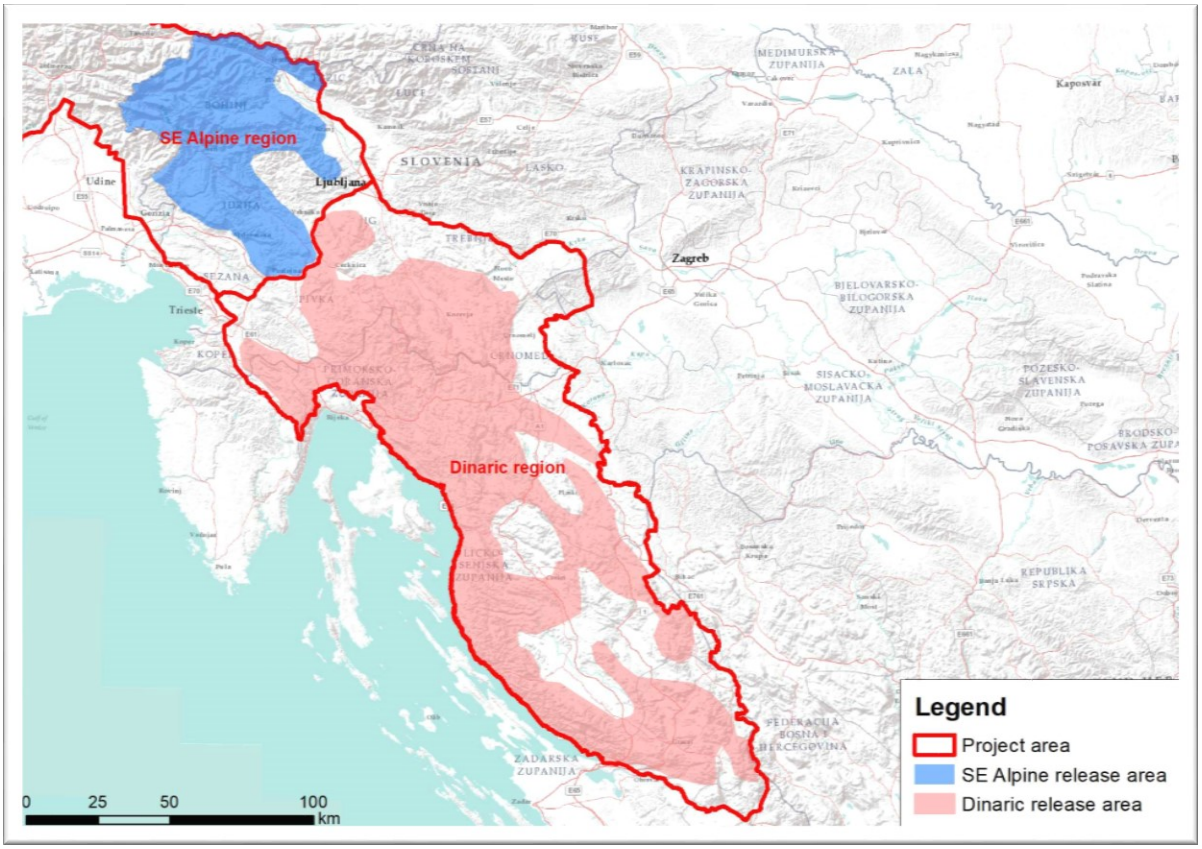

Figure 5. Division of the project area to the Alpine and Dinaric region and distribution of release areas in each of them.

In the Dinaric region the main goal of the releases is to reinforce the existing inbred population, increase its genetic diversity and prevent extinction. In the Alpine area, the lynx population is considered functionally extinct (i.e. no reproducing population exists and few animals are present at best). In the Alpine region we will reintroduce lynx in order to create a new population nucleus, which will function as a "stepping stone" between the Dinaric and Alpine subpopulations. The Dinaric and Alpine region are divided by the A1 Highway (Ljubljana – Sežana), which represents an important barrier for lynx as discussed in the Strategija ohranjanja in trajnostnega upravljanja navadnega risa (*Lynx lynx*) v Sloveniji 2016–2026.

The Dinaric Region – Selecting Release Locations and Sites

The Dinaric Mountains are one of the largest mountain ranges in Southern Europe and contain one of the largest forest complexes in Europe. They stretch along the backbone of the Balkan Peninsula, some 645 km long, straddling the coast of the Adriatic Sea. The Dinaric Mountains are of extremely high natural value, with very high forest cover and many endemic animal and plant species that are listed in the Habitats and the Birds Directive. This area is also an important habitat for the Eurasian lynx, grey wolf (*Canis lupus*), and brown bear (*Ursus arctos*). In the Dinaric part of the project area, 57% of the surface is included in Natura 2000 sites. In 42% of the region, lynx is one of the qualifying species, and habitat models have repeatedly indicated that the region is high quality habitat for lynx with good inter-connectedness, adequate prey base, cover and other requirements enabling lynx to meet all of their biotic and abiotic needs. See previous Section III. Biological Feasibility and subsection A. Habitat Suitability in this plan for more details regarding the habitat suitability models that indicate an abundance of high-quality lynx habitat in the project release areas. Additional habitat modelling will be conducted during this project to identify important areas to facilitate habitat connectivity for lynx.

The Dinaric region is also within the dispersal distance to other regions suitable for lynx in the Alps and the Balkans and can thus serve in the future as a source population of genetically healthy animals to help secure the future of other small and isolated populations in the neighboring regions of Europe. Published surveys have indicated high public support for the lynx conservation in the region (see Section IV). The importance of the Dinaric Mountains for lynx and the urgent need to reinforce the existing Dinaric population in Croatia and in Slovenia is emphasized also in the document Key actions for Large Carnivore populations in Europe (Boitani et al. 2015).

The main goal of translocating lynx to the Dinaric region is to reduce inbreeding depression of the Dinaric population and thus save it from extinction. The priority is to ensure the fastest possible introgression of new genes into the existing population by increasing the chances for reproduction with remnant animals and at the same time reduce intra-specific aggression with the territorial animals of the same sex.

Release areas in the Dinaric region were delineated according to the 1) habitat model, which defined ecologically and biologically optimal areas for releases and 2) the current known lynx occurrences in the region. They encompass large patches of suitable habitat in Kočevska and Notranjska region in Slovenia and the Učka region of Croatia. Gorski Kotar, Velebit, western Lika and northern Dalmatia regions in Croatia fall within a large area that are designated Natura 2000 sites (Figure 5).

Inside these general release areas, multiple release sites (i.e. locations of the soft-release enclosures and the hard-release sites) will be selected within the regional reinforcement plans (one for Croatian and one for Slovenian part of the Dinaric region) and annual reports on the progress of reinforcement process with plans for further releases. These will be prepared according to the latest information on lynx distribution and demographic characteristics, which will be provided through the systematic monitoring activities within the project. Regional reinforcement plans will be elaborated in close cooperation between project staff and representatives of the regional and local hunting organizations through a series of facilitated workshops and meetings in order to ensure that lynx are released in hunting grounds with adequate support of the local hunting managers and their willingness to actively participate in lynx releases. The number of release sites is not fixed and will be decided during the

reinforcement process within the annual release plans according to the development of the reinforced population and outcome of the first released lynx (their survival and location of the established territories). However, at least two and not more than four soft-release enclosures will be constructed.

The locations of the release sites will be selected based on the following criteria:

- highly suitable habitat
- support of the local hunting managers
- vicinity to occupied lynx territories or at the periphery of the occupied territories
- avoidance of the core area of resident territorial lynx of the same sex
- remote location to reduce potential for human disturbance
- forest road accessibility (including in winter conditions)

The Alpine Region – Selecting Release Locations and Sites

The Alps stretch over 8 countries across roughly 1,200 km, from France in the west to Slovenia and Austria in the east. The Alpine region is habitat for some 30,000 wildlife species and 41% of the area is included among the Natura 2000 sites, for 28% of which lynx is one of the qualifying species. The Alps are an ideal habitat for lynx with abundant prey (e.g. roe deer, chamois and red deer) and recent habitat modeling studies estimated the Alps to be suitable for more than 1000 lynx. However, less than 15% of the Alps are currently recolonized and the Alpine lynx population is divided into four currently isolated subpopulations: (1) the area occupied by lynx in the north-western Alps (Switzerland and France), has doubled in size during the past 20 years. (2) A new subpopulation was founded in north-eastern Switzerland with the translocation of 12 lynx between 2001 and 2008. (3) With the release of five lynx in 2011-2017, a new occurrence was formed in the north-eastern Alps (Kalkalpen). (4) The south-eastern Alpine subpopulation has decreased continuously since 2000 (Molinari-Jobin et al. 2018).

Lynx in the south-eastern Alps are now scarce and signs of presence reported have drastically decreased in recent years. At the moment, the Southeastern Alpine subpopulation can be considered functionally extinct, as there is only a single female present in north-eastern Italy and potentially a few additional lynx scattered across the Alpine region of Slovenia without any evidence of recent reproduction. The south-eastern Alps play an important landscape role as a “bridge” that could connect lynx (sub)populations in the Dinaric Mountains with the reintroduced populations in Switzerland/France (northwestern Alps) and Austria (Kalkalpen). The importance of the Alpine region for lynx conservation and need for creation of “stepping stones” among these isolated subpopulations is emphasized in the document Key actions for Large Carnivore populations in Europe (Boitani et al. 2015).

The main goal of translocating lynx to the Alpine region of the project area is to create a new population nucleus in NW Slovenia and eastern Italy. Releases of lynx in this area will establish an effective “stepping stone” population, which will stimulate gene-flow and functionally connect the two currently isolated sub-populations into a single Dinaric-SE Alpine population. This will be a crucial step towards the long-term vision of establishment of a large pan-Alpine-Dinaric lynx meta-population stretching from Bosnia to France through a system of “stepping stone” populations. Establishing a large meta-population is the most important aspect of ensuring long-term viability and vitality of the Eurasian lynx in the region with minimal need for further human interference. Creating smaller stepping-stone populations to facilitate demographic connectivity is an accepted practice for conserving large carnivore populations in human-dominated landscapes.

Release areas in the Alpine region were delineated according to the habitat model, which defined ecologically and biologically optimal areas for releases in the Slovenian Alps (see Section III), as well as to ensure connectivity with other suitable habitat patches with lynx presence in the Dinaric region and the Italian Alps. Release areas in the Alpine region encompass the Julian Alps and Karawanks, high pre-alpine plateaus (Pokljuka, Jelovica, Mežakla), as well as Dinaric plateaus on the western side of the Ljubljana-Koper highway: Trnovski gozd, Nanos, Hrušica and nearby hills (Figure 5).

In the Alpine region, specific release sites (i.e. locations of the soft-release enclosures) will be selected within these general release areas according to the regional reinforcement plans, which will be explored in close cooperation between project staff and representatives of the regional and local hunting organizations through a series of facilitated workshops and meetings in order to ensure that lynx are released in hunting grounds with adequate support of the local hunting managers and their willingness to actively participate in lynx releases. Because the lynx will be released in the region without a functional lynx population, emphasis will be placed on releasing several animals of different sex simultaneously in order to increase the probability of reproductive encounters to facilitate mating. In further releases we will account for the current distribution of previously released animals and their potential offspring. We will assess the current situation and take into account species' biological characteristics we will decide whether further animals will be released at the same or at another site in order to facilitate integration of released lynx into the resident population and avoid potentially aggressive interactions with territorial animals of the same sex. However, no more than two soft-release enclosures are planned.

The locations of the release sites in the Alpine region will be selected based on the following criteria:

- highly suitable habitat
- support of the local hunting managers
- remote locations to reduce potential for human disturbance
- forest road accessibility (including in winter conditions)
- distribution of the previously released animals and their potential offspring (for further releases in this region)

B. Release Strategy

In total, 14 animals are planned to be integrated in the population during the course of five years, starting in the beginning of 2019. We will consider integration of individual lynx as successful if the released animal will survive at least one year after the release and establish a territory in proximity to other lynx (i.e. in area where mating could take place). If a released lynx dies or disperses far from the remaining population (i.e. to area where contact with other lynx is unlikely for the near future), a replacement animal will be translocated to the location (in case of long-distance dispersal recapture and re-release of the same animal into a suitable area will be attempted first, if feasible). Therefore, the exact number of lynx that will need to be translocated will ultimately depend on the fate of released lynx, but we expect that approximately 15-20 animals will be required to achieve the project goal.

Lynx will be released as they will become available, following the quarantine period in the source region (see Section III. Biological Feasibility – D. Animal Welfare for details regarding the quarantine). After the first year, when releases will be conducted according to the regional

reinforcement plans, further releases in each region will take place according to the annual release plans and guided by the regional reinforcement plans. Capture efforts will be focused on the period between mid-December and mid-April, therefore lynx will arrive at release destinations between January and early May, which overlaps with the peak dispersal period for Eurasian lynx (Zimmermann et al. 2005). Exact age and sex structure of translocated lynx is not pre-determined and will largely depend on the availability of animals obtained during capture efforts and availability of rehabilitated orphaned lynx. We will strive to achieve an equal sex ratio, but some level of sex bias will be acceptable. In respect to the age, we will avoid the use of kittens before their natural dispersal age (i.e. <8 months) and very old, senile animals. Orphaned lynx will be released during the natural dispersal age (i.e. 8-10 months). Lynx will be captured at multiple source areas in two countries and will be genetically screened before translocation in order to ensure high genetic variability among the founders and avoid release of closely related animals in the same area (see chapter III C for details).

Release strategy and dynamic of the releases will somewhat differ between the Dinaric and the Alpine region, taking into account current lynx status and the species' biology.

The Dinaric Region – Release Strategy

Based on previous successful conservation projects for lynx and other felid populations (Johnson et al. 2010, Hostetler et al. 2001, 2013, Wilson 2018), we assessed that successful integration of 9 animals into the existing Dinaric population would be needed to achieve sufficient genetic reinforcement and counter inbreeding depression. Of the nine, 5 lynx will be released and integrated in Slovenia and 4 lynx in Croatia. We have prioritized releases for the Dinaric range, where the residual population is highly inbred, and where we want to facilitate intraspecific interactions among lynx to encourage reproductive encounters and facilitate rapid introgression of new genes into the existing population. Therefore, the first animals that will become available for translocation will be released in this region as fast as possible and regardless of the number of animals available. Releases will continue throughout the project until the goal (9 animals integrated in the population) is achieved and according to the annual release plans.

In Slovenia current monitoring data indicate that lynx are absent from a large part of the former occupied range and in several parts of currently occupied range only a single animal (not a pair) is present within a given territory. For reinforcement to be successful, it is important to maximize the chances that lynx will establish permanent territories close to the release sites. We will try to achieve this by using a "soft release" procedure. This means that before releasing an individual into the wild, the lynx will be kept in a soft-release enclosure at the release site to reduce the probability of "homing behavior" (i.e. dispersing away from the release site). During their three-week stay in the enclosure the animals will receive professional veterinarian care. Local hunters will be hired to feed and monitor the animals to promote a positive, affectionate, and caring attitude for the lynx released in their area.

In Croatia, preliminary data suggest fewer population gaps than in Slovenia. Moreover, in Croatia, as compared to Slovenia, releases will take place in the core area of the population and not in the periphery. If lynx do disperse away from release sites, lynx in Croatia are likely to settle in unoccupied areas that are functionally connected with the remnant population. Therefore, for Croatia there is less need to implement a soft-release procedure and a cost-effective "hard release" will be conducted (i.e. direct release into the nature, without the use of release enclosures).

The Alpine Region – Release Strategy

In the Alpine region of the project area lynx are functionally extinct and goal of the project is to create a new effective population nucleus that will serve as a stepping stone between the Dinaric and Alpine sub-populations, to establish population-level connections and gene flow between subpopulations during or soon after the completion of the project. Five animals, ideally three females and two males, will be translocated and released in the SE Alpine area in Slovenia. If any of the released lynx die or disperse far from the rest of the population, a replacement animal will be translocated to the location or a recapture and re-release of the same animal into a suitable area will be attempted.

The procedure of releasing lynx (i.e. "soft release" of animals from release enclosures maintained by local hunters) and accompanying activities will be the same as in the Slovenian part of the Dinaric region, but with somewhat different release dynamic. Since no functional lynx population exists in the region, there is less immediate need for releases and priority will be given to releases in the Dinaric region. In the Alpine region we expect that first releases will take place in 2021 or 2022, depending on the availability of lynx for translocation. If available, we will release at least two animals of the opposite sex at once in order to increase the chances that the released lynx establish territories and successfully breed. Depending on development of the new population nucleus and fate of the first released animals, additional animals (ideally again two at once) will be released at the same or another site until the end of the project or until the goal (5 animals established in the population) is achieved. Releases in the SE Alps will be conducted in tandem with releases in Dinaric region according to the annual release plans.

IX. MONITORING

A. General Approach

Scientific monitoring is an essential aspect of this population reinforcement effort. Fundamentally, monitoring will allow us to assess whether we are successful—specifically if we are realizing our expected results. These include:

1) Reversing the population decline of the Dinaric-SE Alpine lynx population.
2) Successful integration of (9) lynx into the residual Dinaric lynx population.
3) Improving outlooks for developing a metapopulation in the SE Alps by releasing (5) lynx in a "stepping stone" area at the SE edge of the Alps.
4) An increase of lynx range by at least 2,000 km^2.
5) Establishment of at least 12 new lynx territories (male and females present).
6) Improvement in the genetic health of the population by reducing the inbreeding coefficient from over 0.30 to below 0.18 with a corresponding expected increase by approximately 25% in population fitness (expectations according to the literature data).

To achieve these results, monitoring will allow us to adjust the management process of reinforcement to optimize lynx population growth and to decrease inbreeding depression within the residual lynx population—arguably the two most important results that we seek.

B. Pre-Release Baseline Data

Pre-release baseline data from monitoring will enable us to: 1) Ensure that no harm comes to source populations in Slovakia and Romania from lynx removal (See section III. BIOLOGICAL FEASIBILITY - C. Founder Source Populations and Genetic Considerations) and 2) Determine optimal release sites, and 3) Determine existing genetic and demographic status of the residual Dinaric lynx population immediately prior to the population reinforcement that will provide us the baseline for monitoring of the effects of the reinforcement.

Pre-Reinforcement Survey: Potential Release Sites and Genetic and Demographic Status of Residual Lynx Population in the Dinaric Mountains

Monitoring will enable us to determine the current genetic status, abundance, and sex-specific territorial distribution of lynx in potential release areas prior to the translocations. This is important since the success of a translocation effort depends in part, on appropriate release sites and associated habitat conditions (See section VIII. RELEASE AND IMPLEMENTATION - A. Release Locations for more details on the release strategy). We will also obtain baseline data about the status of the pre-reinforcement population that will be the foundation for monitoring the efficacy of the reinforcement and developing a long-term strategy for ensuring the long-term viability of the population (See section X. CONTINUED MANAGEMENT for details).

To understand the current genetic and demographic status of the residual lynx population, we will focus on collecting non-invasive genetic samples (hair, scats, saliva and urine) in areas identified as likely occupied by lynx. Hair samples will be collected using hair traps with olfactory bait placed on locations used for territorial marking. Camera traps will be set at the same locations to provide additional information in case not enough genetic material will be

collected to detect presence of family groups and recognize individuals based on individual-specific coat patterns.

Scat and urine samples will be collected during snow tracking sessions by the project team and volunteers. Hunters in the areas with presumed lynx presence will also be provided with genetic sampling kits to help with sample collection. Saliva samples will be taken from fresh prey remains (animals killed by lynx) found opportunistically or during snow tracking.

Hair traps will be used in combination with photo traps and maintained simultaneously by the same person at regular intervals (twice per month). This is a cost-effect way to link an individual known animal from a photograph with its genotype obtained from the genetic sample of its hair, increasing the usefulness of each data type and enabling further analyses of the animal's origin, pedigree, and individual inbreeding level. We will be monitoring at least 50 camera/hair-trap sites in Slovenia, 50 in Croatia, and 30 in Italy. Project field crews will carry out occasional (at least annually) visits to all camera and hair trap sites to check for proper use and to maintain personal communication with Slovenian, Croatian, and Italian hunters, thus ensuring their motivation and participation. All data collected will be entered into a geodatabase.

In addition to the newly collected non-invasive samples (100 samples expected), we will analyze all existing lynx samples from genetic banks in Slovenia and Croatia and establish a lynx genetic bank in Italy. We expect that altogether 150 samples will be analyzed. Through networking with researchers from Slovakia and Romania we will analyze samples of lynx from the source population to serve as a reference to estimate loss of genetic diversity in Dinaric lynx before the reinforcement.

The results from this monitoring as described above will enable us to choose optimal release sites, fine-tune releases, and ensure maximum positive effect of the reinforcement. It will also provide essential data for long-term management and conservation. The action will establish the protocols for monitoring and directing the reinforcement process at the transboundary level and initiate collaboration with local hunters.

Assessing Spatial Connectivity of the Dinaric-SE Alpine Lynx Population

This pre-release analysis will provide a scientific assessment to improve our understanding of lynx population connectivity within core habitat and across habitats at the metapopulation level with the goal of identifying areas of high and low habitat connectivity for lynx. This result in the development of important management tools including maps, habitat/connectivity models, gene flow charts, and a Population Viability Analysis (PVA) implemented through reports and peer reviewed scientific papers, that will serve as the basis for (1) guidelines for environment impact assessments for lynx population connectivity within core habitat (Dinaric – SE Alpine) and (2) for establishing internationally supported guidelines for maintaining and establishing connectivity between the genetically and demographically endangered Swiss Alpine, Kalkalpen, Dinaric – SE Alpine, and Balkan populations. As individual lynx are released and monitored during the course of this project, habitat models can be validated with empirical data.

C. Monitoring the Effect of Lynx Removals in Slovakia and Romania

This monitoring will assess the effects of lynx removal on the source populations in Slovakia and Romania. Surveys will begin after initial captures and translocations and will be completed

by the end of 2020. We will use GPS telemetry (only in Slovakia), camera trapping, non-invasive genetic sampling and snow tracking for data collection. Non-invasive genetic samples will be collected, as well as blood samples of animals captured and tissue samples of all lynx mortalities recorded during the project.

One radio collared animal in Slovakia will be re-captured and its collar will be replaced with a new one in order to prolong the surveillance period. We chose to equip lynx with GPS collars only in Slovakia due to following reasons: (1.) TUZ (partner from Slovakia) has more experiences with capturing lynx than ACDB which is the partner from Romania. The Slovak partners are already involved in the LIFE 13 NAT/DE/000755 project where lynx have already been translocated to Germany. (2.) In Romania, the specific areas selected for lynx capture will be chosen during the first year of the project. In Slovakia, these areas are already selected based on existing knowledge. Therefore, our Slovakian partners will be able to start capturing the animals with the purpose of lynx collaring within the first year when it is not yet planned that the animals will be translocated to Slovenia and Croatia (because several preparatory actions have to be completed there before the first releases can take place).

During the first year in Romania, monitoring will be carried out on a larger spatial scale. After obtaining a better insight into the status of the population, three areas will be chosen, where capturing activities will take place and more intensive monitoring will be carried out. Within this action we will continue monitoring within the chosen three areas with the same methods as in Slovakia, with the exception of using GPS collars. Data gathered within this action will be compared with the pre-capture reference situation. Based on the comparison of data from camera trapping we will estimate the changes in lynx abundance and assess the population trends following lynx removal.

Genetic samples collected during this monitoring action will be analyzed and evaluated and will provide us with data on population genetic variability and relatedness, and possibly on adaptive genetic variation through analysis of MHC (major histocompatibility complex) genes. This will help us understand the viability and vitality of the source population and will serve as a baseline for future surveys of the population, as well as for comparison with reintroduced populations, including the Dinaric - SE Alpine population.

D. Post-Release Monitoring in Slovenia and Croatia

Once lynx are released in Slovenia and Croatia, data will be gathered using several complementary methods: non-invasive genetic samples from scats, hair, urine and saliva, photo-trapping, snow-tracking, GPS-telemetry and video surveillance of lynx kill sites. These data will be collected repeatedly in consecutive years from pre-release throughout the release phase (i.e. from 2017 to 2023). Samples will be collected throughout the project area where lynx presence will be detected. The sampling area will increase progressively through the project as the population expands in space (partly through translocations and creation of a stepping stone and partly from dispersal of new animals born into the population). These data will enable a comprehensive evaluation of the reinforcement and special attention will be made to quantify the impacts of the reinforcement on the demographic and genetic status of the lynx population.

Monitoring will be conducted on two levels across the project area in Slovenia, Croatia and Italy:
1) at the individual level and 2) at the population level. This will enable us to analyze the fates

of individual lynx translocated into the population and at the overall population scale where we will measure the genetic and demographic status of the population before, during, and after the reinforcement activities.

Individual-level Monitoring

All translocated and released animals as well as some of their offspring will be equipped and tracked with GPS-GSM collars. This will provide information on their survival, physical condition, movement, dispersal, hunting ability, and potential reproduction. Reproduction will also be tracked with parentage analysis (pedigree reconstruction) from genetic samples (noninvasive and otherwise) to detect reproductive output of particular animals. Within this action we will combine and analyze all data collected previously and produce a final report that documents the outcomes for all translocated animals and their offspring.

Population-level Monitoring

In the pre-release and release phase we will collect data with the use of non-invasive genetic sampling and camera-trapping to guide releases of translocated lynx. This will enable us to use these same data to assess the genetic and demographic effects of the reinforcement at the transnational level by comparing the populations before, during and after the reinforcement. In this way, we will be able to determine and quantify the overall success of the reinforcement program at the population level. We will expand the panel of genetic markers to obtain better resolution for determining changes in inbreeding accumulation and loss of genetic diversity. Besides these selectively neutral genetic markers we will also include MHC loci (genes related to immune response and typically under strong selection) to possibly assess the changes in adaptive genetic variation.

Performance of the released individuals will be measured in three ways: 1) survivorship of released lynx will be monitored using telemetry since all individuals will be equipped with GPS-GSM collars; 2) potential homing behavior or movement of lynx out of the target area that would prevent reproduction will be monitored using GPS-GSM telemetry; and 3) monitoring female and male reproduction.

For female lynx we will use telemetry data since females restrict their movements in June-July, indicating that they have given birth. Telemetry monitoring will also allow us to locate kittens and to obtain genetic samples. Additionally, we will use snow-tracking to assess the presence of small and large tracks, another clear indication of reproduction and we will collect scat and urine sample from tracks for genetic analysis. Finally, for female lynx we will use video monitoring at kill sites to detect females accompanied by kittens. To monitor male lynx reproduction we will use parentage analysis of genetic samples collected from the kittens to determine which male sired them. Assessment of both male and female reproductive output will be augmented with inclusion of all field-collected genetic samples in the parentage analysis / pedigree reconstruction, which should also enable tracking of reproductive performance of animals that are not tracked telemetrically (e.g. offspring, native lynx…).

Monitoring this process will help us evaluate whether we have reached our main goal – stopping and reversing genetic and demographic deterioration of the population (Objective 1) and collect critical data for long-term conservation planning (Objective 4).

As lynx are released, careful monitoring and surveillance will enable us to direct the reinforcement process to maximize the likelihood that lynx are being integrated into the residual population. As described above, camera-trapping surveys, non-invasive genetic

sampling, monitoring of lynx survival and movement through GPS telemetry, and examination of all detected lynx mortality will be key sources of data that will help us monitor and direct the reinforcement.

All dead lynx that are found will be examined by an expert wildlife veterinary pathologist to confirm the cause of death and establish the health status of the animal. We will also analyze diet, age, reproductive state, pregnancy rate, and as much as possible estimate individual inbreeding coefficients.

Monitoring will be conducted across the entire project area with lynx presence in Slovenia, Croatia and Italy, but we will focus on areas directly affected by the reinforcement activities - specifically home-ranges of translocated lynx and their offspring and in areas where subsequent reinforcements will be planned. The focus area will increase in size over time as the translocated lynx and their offspring move and expand their range. This monitoring action will start with the first releases of lynx (beginning of 2019) and will uninterruptedly continue until the last lynx translocations are completed (expected in mid-2023).

According to the IUCN 2013 Guidelines for Reintroductions and Other Conservation Translocations, it is required to closely monitor the population's demographic status and how it changes during the project and account for any ecological consequences of the translocations. Together with the data collected in the pre-release period, results of this action will provide the data needed for the obligatory action of evaluating the impact of the reinforcement activities.

E. Socio-economic Monitoring

We will use an indicator-based approach to monitor potential impacts of lynx reinforcement on socio-economic conditions in Slovenia and Croatia. At the beginning of the project we will produce a set of socio-economic indicators that will be developed and agreed among the project team for each of the project actions. For each of the indicators we will establish the frequency of assessment and the baseline value, and prepare a database. Overall systematic assessments of the agreed indicators will be carried out by the project team once per year. The project team will be updated on the trends of specific indicators once per year and the implications for the project will be discussed at the project group meetings. Particular attention will be given to assessing the costs and benefits of the conservation actions implemented in the project. The results will be disseminated via the project web-page and social media once per year. We will collect all data via e-mail at the UL, analyze it, and prepare a final report. The action will be carried out in all 5 participating countries throughout the duration of the project.

Measuring, evaluating and clearly demonstrating the impacts of conservation interventions on socio-economic environment is critical for management, accountability, and lesson-learning. This is particularly important for projects that consist of community-based activities or have the potential to impact local livelihoods in either positive or negative way. Our project proposal has all those elements: community-based approach to maintain high public acceptance of lynx, actions that have the potential to provide positive impacts on local livelihoods (e.g. tourism related action), but also increasing the number of lynx which can increase livestock damages, decrease public acceptance and cause other negative socio-economic impacts.

F. Ecosystem Function Monitoring

In order to implement this aspect of monitoring we will also use an indicator-based approach. At the beginning of the project a set of indicators will be developed and agreed among the project team for each of the project actions. For each of the indicators we will establish the frequency of assessment and the baseline value, and prepare a database. Overall systematic assessments of agreed indicators will be carried out by the project team once per year. Project team will be updated on the trends of specific indicators once per year and the implications for the project will be discussed at the project group meetings. In order to develop the indicators, we will consult the MAES guidelines (Mapping and Assessing Ecosystems and their Services). According to the MAES guidelines and taking into account the nature of our project, we expect that most of the selected indicators will be related to forest ecosystem services, and to a lesser degree to grassland services. The results will be disseminated via project web-page and social media once per year. We will collect all data via e-mail at the UL, analyze it, and prepare a final report. The action will be carried out in all 5 participating countries throughout the duration of the project.

Measuring, evaluating, and clearly demonstrating the direct linkages between project activities and key ecosystem services is important both for assessing wider impacts of the project, as well as for lesson-learning.

X. CONTINUED MANAGEMENT

A. General Approach

It will be important to build off of the investment made in the LIFE Lynx project by continuing management and monitoring of the lynx reinforcement to the greatest extent possible. While the long-term probability of survival of lynx will be considerably increased if the reinforcement is a success, it will be important to maintain national and international level collaborations to ensure long-term lynx recovery.

B. Monitoring the Project Impact on the Viability of Lynx in the Dinaric Mountains and South Eastern Alps, and establishing of Guidelines for Ensuring Long Term Viability

The LIFE Lynx project will produce critical management documents, particularly the "Common Guidelines for Dinaric – SE Alpine Population-level Lynx Management" (hereafter referred to as Guidelines) and the national management documents that will ensure a robust population of lynx is well monitored and managed. These documents will prescribe specific obligations and tasks to national governments (Slovenia, Croatia, and Italy), coordinated at the population level, which will ensure long-term conservation management of lynx. In the final stage of the project science-based "Guidelines for Ensuring Long-term Viability and Vitality of Lynx in the Dinaric Mountains and South Eastern Alps" will be produced. These Guidelines will synthesize all experiences and knowledge acquired during this LIFE project and provide predictions of the population's development under different management scenarios using the best available science. The guidelines will be integrated into national management documents through the predictable revision cycle that will be determined within this LIFE project during production of the above-mentioned management documents. Specific management actions that will continue after the LIFE Lynx project include the following:

Monitoring will enable us to track the impact of the project over the long-term and to determine if the Dinaric – SE Alpine lynx population will be viable over time—an important component of the IUCN 2013 Guidelines. We will use computer modelling to project possible lynx population development into the future and to estimate extinction risks through time. We will also model different management scenarios to see how to alleviate these risks with sound management. We will use the results to produce science-based management guidelines that will help ensure that a genetically and demographically robust lynx population will be maintained well into the future.

Stochastic demographic/genetic computer models in a population viability analysis (PVA) will be used to model future development of the lynx population in Dinaric Mountains and SE Alps. We will use the experience and biological data accumulated in the project to parametrize the models as precisely as possible. Habitat availability, connectivity estimates, and dispersal capability estimates will be used to assess the possibility of natural migration from the neighboring populations and between stepping-stone populations. Realistic parameters of expected breeding success of released animals and their contribution to the population as well as the observed population conservation status at the end of the project and estimated population growth parameters will be used to determine what type of management activities will be required to ensure long-term population survival for lynx. The first analyses will be produced in 2021 to include an understanding of different population management and

development scenarios in the “Common Guidelines for Population-level Lynx Management.” These analyses will be done shortly after the reinforcement and stepping-stone creation since the data on the actual reproductive success of reintroduced animals will still be scarce which means that the analyses will need to depend to a large degree on data acquired before this Life project or literature data. We will re-run the analyses in the final year of the project to include all experiences and data obtained through the project and use the actual conservation status of the population at the end of the project as a modelling staring point. We will organize and summarize the results in the document "Guidelines for Ensuring the Long-term Viability of Lynx in the Dinaric Mountains and South Eastern Alps.” The document will be prepared by project partners and will be presented to stakeholders and decision makers from a wider area of the Dinaric Mountains and Alps to be used in after-Life conservation.

By using stochastic modelling, we can predict a range of possible future scenarios for understanding how the population will respond to different management regimes and specific management actions including changes in lynx mortality, the introduction of new animals, or improvement of fitness caused by a decrease in inbreeding. Estimating how these critical parameters will change over time, and how we can influence them, will help us provide a foundation for effective, long-term management.

Long-term monitoring and the guidelines that we will produce will contribute considerable added value to the project in the sense of replicability and transferability. This approach can also be applied to other conservation translocations elsewhere in Europe to increase their probability of success. The strategic document we will produce and the methods detailing how it was produced, will be available to the general conservation community, and will be shared widely as a best practice example for long-term management and conservation of small and isolated wildlife populations like the Eurasian lynx.

C. Ensuring Long Term Viability of the Lynx Population

The strategy for ensuring long term viability of the lynx population will be the core of lynx conservation and continued management after the LIFE Lynx project, and included in revisions of national and international management documents for this population. The Guidelines will be presented to national and international competent bodies. After 5 years, in 2028, competent bodies will evaluate whether further conservation measures are needed and in what form. This will be prescribed in the plan, "Common Guidelines for Dinaric – SE Alpine Population-level Lynx Management" and consequently in all other national management documents stemming from this plan. The guidelines will allow future lynx managers to base decisions on best-available science. All involved governmental organization (Slovenia and Croatia within LIFE Lynx, Italy in 2014 with the ULyCA project) have demonstrated that conservation of lynx for future generations is important and we expect this commitment to be supported and implemented with adequate funding and budgetary commitments.

Surveillance and Directed Management of the Reinforcement Process

Population monitoring will be established and continued as defined in national management plans for Slovenia, Croatia, and Italy and through a network of volunteers. Guidelines for Ensuring Long-term Viability and Vitality of Lynx in the Dinaric Mountains and SE Alps will inform national monitoring efforts in Slovenia, Croatia, and Italy and help maintain long-term understanding of the population trend and genetic condition of the population. Based on the work of SCALP (http://www.kora.ch/index.php?id=117&L=1), annual lynx distribution maps

will be produced over the long-term.

Internet-Based Population Level Monitoring Geo-Database

This geodatabase will be maintained for at least 5 years after the project and will help all partnering countries maintain up-dated information on lynx abundance and distribution. Specific to the contract of the software developer who designed that database, the geo-database will remain operational and maintained for at least five years upon completion of the project.

Integration of Potential Lynx Habitat Connectivity and Suitability into National and International Spatial Planning

The "Environmental Impact Assessment (EIA) Guidelines" will be published as a handbook and used to develop environmental impact assessment studies in the areas of lynx presence. The handbook will be made available to national authorities and non-governmental organizations involved in nature conservation that will assume the watchdog function, ensuring that the guidelines are being implemented. These Environmental Impact Assessment guidelines will be used after the project ends.

Minimizing Illegal Mortality of Lynx

This project will establish a specialized police investigation unit that will ensure more efficient persecution of illegal killings of lynx (and other wildlife) and act as a deterrent to illegal killing of lynx. The new police investigative unit will become a permanent group dedicated to persecuting wildlife crime in the long-term and will be funded by the competent authority in Slovenia.

Preventing Possible Livestock Losses to Lynx

Livestock protection using electrified fences will continue after the project as needed. Farmers will continue to operate the electric fences. In case of continuing problems with damages on small livestock caused by lynx, the responsible authorities will provide additional material. The correct use of fences will be controlled by damage inspectors in Slovenia under the auspices of the Slovenia Forest Service.

Improvement of Management of Key Prey Species for Lynx

Lynx presence/predation and possible impacts lynx have on ungulate populations will be integrated into game management plans. These management plans are prepared annually as part of the regular work of the competent national authorities.

Implementation of Lynx-Based Tourism

We expect that if successful, lynx-based tourism will continue well into the future after the conclusion of the project. We anticipate that lynx-based tourism will result in benefits to local communities and that decision-makers will recognize the economic value provided by lynx presence.

Continued Monitoring of Source Populations

Population monitoring in Slovakia and Romania will continue after the project to ensure that population remains viable. Guidelines will be used by wildlife managers for improvement of other translocation projects. In some of the proposed capture sites in Romania and Slovakia, monitoring will continue using methods and equipment developed in this project.

XI. DISSEMINATION OF INFORMATION

A. Public Awareness and Support for Lynx Population Reinforcement

Developing support from local communities is vital to the success of the lynx reinforcement effort. Nearly all historic reintroduction efforts that involve large carnivores like lynx raise important concerns about limiting human-caused mortality from illegal killing (poaching) (Miller et al., 1999) and maintaining public support for the translocation effort (Linnell et al., 2009). The meaningful involvement of people and communities who live with carnivores like lynx on a day-to-day basis is essential for a long-term and effective approach to human-carnivore coexistence (Wilson, 2016; Wilson et al., 2017). When possible, working closely with communities to participate, plan, implement, and to sustain efforts to recover carnivores is a proactive and pragmatic strategy. The following describe core target groups and specifies ways that this effort will develop support for the lynx reinforcement.

B. Core Stakeholders

Hunters

Hunters are one of the most important stakeholders in this project and will play active roles in a suite of project activities. The Slovenian Hunting Association, also a beneficiary in this project, will help plan, promote, and communicate to its membership, the importance of the lynx reinforcement throughout the project. At the field level, hunters will be directly involved in the reinforcement and surveillance of the lynx population. Specifically, hunters will have active roles in planning and preparation of the reinforcement program, such as selection of the micro-locations for releases of translocated animals and construction of soft-release enclosures. After translocation, in Slovenia hunters will be in charge of keeping lynx in the release enclosures and their maintenance. After releases, in Slovenia, Croatia and Italy hunters will participate in the field-work for surveillance of the population, especially through snow-tracking, camera-trapping and hair-trapping and will play a major role in data collection for this project. In Romania, hunters will be included in live-capturing of the animals for reinforcement in Dinaric-SE Alpine population. Later, hunters will also assist with capture of lynx for radio-collaring.

Building up this kind of capacity within the hunting community is crucial for project credibility, acceptance and long-term lynx population monitoring. Hunters will be invited to play important roles in local consultative groups. Hunter are indispensable "insiders" who have a strong understanding of local communities and politics and will help our project team implement key actions in local communities and more generally, help our team to work with opinion leaders to develop local capacity for ensuring lynx conservation. Hunters will also play important roles in workshops organized within the project, e.g. development of lynx management plans and improvement of game management. Hunters will also actively collaborate in developing a specialized police investigation unit to help eliminate illegal killing of lynx and other wildlife.

Local Communities

Local communities, especially those at lynx release sites, are another important stakeholder in the project as their acceptance and support to the project is crucial for the successful implementation of the activities. In order to facilitate the dialogue with them and use the consultative potential of local insight and traditional knowledge in a systematic way, we will form “local consultative groups” (LCG). Key interested persons from the local communities

will be invited to join LCG as a platform for structured dialogue about the project. We expect local hunters, environmentalists and other interested members of the local communities to participate.

Decision-makers

Key decision-makers for the project are ministries of the 5 participating countries that are responsible for nature conservation. All 5 ministries have provided letters of support and will be closely involved also in the implementation of the project. In Slovenia, Institute of the Republic of Slovenia for Nature Conservation (ZRSVN) is also project beneficiary. Especially, the decision-makers of Croatia, Slovenia and Italy will be the main stakeholders when preparing the management plans. Management plans will be drafted in a joint effort together with project team, decision-makers and other stakeholders. Decision-makers will also play a crucial role for adoption and implementation of the management plans. We will also prepare best practice guidelines for reinforcements that can be used by managers of other endangered lynx populations, but not only. As a part of C7 action "Environmental Impact Assessment Guidelines with respect to the Eurasian lynx habitat connectivity" and "International Guidelines for Establishing Connectivity between Swiss Alpine, Dinaric/SE Alpine, and Balkan populations" will be prepared. These guidelines will be a valuable tool for decision-makers for future spatial planning.

Environmentalists

One of the leading environmental NGOs in Croatia (BIOM) is also a beneficiary in the project. Them and several other conservationist NGOs (e.g. Dinaricum Society from Slovenia that has provided the project with the letter of support) will be invited to participate at workshops for preparation of lynx management plans, representatives of local environmental NGOs will be invited to participate in the local consultative groups, some members of the NGOs will also be involved as volunteers in field work (snow-tracking, camera-trapping and hair-trapping). Additionally, field trips will be organized for representatives of environmental NGOs.

Livestock Breeders

Since lynx can occasionally cause losses for livestock breeders, directed efforts will be carried out where livestock depredations occur. Breeders that experience livestock losses due to lynx will be offered electric fences and expert advice on their use to prevent further depredations. Representatives of livestock breeders will also be invited to participate at workshops for preparation of lynx management plans and as participants in local consultative groups.

Foresters

Employees of Slovenia Forest service (SFS; regional wildlife managers, professional hunters, damage inspectors) will be involved in several project activities as project personnel. In addition to that, a widespread net of SFS field personnel, especially district foresters, will be actively engaged as stakeholders in many project activities, such as camera- and hair-trapping, kill-site inspection, snow tracking etc. They will also play an important role as intermediaries in communication with local communities. Foresters will also be involved through Italian Carabinieri Forestali (CUFAA). Regional and provincial Forest Services will be involved in monitoring activities of lynx in Italy. Croatian Forests, a leading company for forest and game management in Croatia, support the project and their professionals will participate in monitoring of released animals and sampling.

Law Enforcement

Within the project a specialized group for persecution of illegal killings of wildlife will be organized among the Slovenian police. Targeted education of this group will be provided through the project.

Celebrities

Celebrities, most likely sportsmen and artists will be used as “lynx conservation ambassadors” to help raise awareness and visibility of the project especially among the general public.

C. Target groups

Journalists

Journalists will be one of the most important channels for dissemination of information about the project and the importance on lynx conservation. Local and national media outlets will be targets for information sharing with emphasis on issues related to game management, agriculture and nature conservation. We will regularly provide them with well-prepared information that will carry key messages in accordance with the project communication plan. This will be carried out through approximately 2-3 press releases yearly and press conferences that will mark the most important project milestones. Furthermore, we will actively engage journalists by organizing field trips and study tours where they will have the opportunity to document our work, especially the most appealing field activities. Besides the abovementioned planned activities, project team members will be at journalists’ disposal for interviews.

School Children

School children, as "tomorrow's decision makers" will be targeted through participation in an “adopt an animal” program (symbolic adoption of lynx) and educational lectures. They will be provided with the most recent information about lynx through educational field trips and regular communication. With the assistance of LCG and project members, school children will organize a project press conference and prepare news about lynx for local media. Through their participation in the project, we expect them to learn valuable information about lynx and to have a chance to be involved in actual lynx conservation. They will take an active role in communicating lynx reinforcement to local communities, thus building their long-lasting support for lynx conservation.

Teachers

Biology (science) teachers carry an important role in providing children with environmental education and outdoor learning. Teachers will be provided with the biology seminars in which they’ll receive an educational handbook about lynx. Handbooks will contain general information about lynx and up-to-date information about reintroduced lynx. Lynx topics will be integrated in their lesson plans. Local teachers with their schools will be invited to participate in “adopt a lynx” program in which they will be given a symbolic responsibility for the lynx released in forests of their vicinity. They will be invited to educational field trip and to participate in organization of the “open door day” event where lynx and the project will be presented to local community. In cooperation with a project group and school children they’ll disseminate relevant information about lynx through local media. Planned activities will foster and reinforce attitudes and behaviors towards lynx conservation support among teachers, school children and local community.

Tourism Professionals - Including Protected Area Managers

In order to enhance capacities for utilizing lynx in eco-touristic offer, we will organize educational seminars for tourist guides, other tourism professionals and managers of protected areas. In the seminars we will provide information on interpretation of the species and ways of responsibly utilizing lynx in eco-touristic offer. In order to facilitate this, we will develop demonstration touristic packages. We will also present this offer at an international tourism fair.

Tourists

Potential and actual visitors to the lynx area will be addressed mainly through online based media. Especially ecotourism portal developed within the LIFE DINALP BEAR project will be updated with information and offer relevant to lynx conservation. They will also be reached via media, as we will organize a thematic study tour for journalists and also present lynx-related offer at an international tourism fair. Furthermore, specific information for mountaineers will be prepared.

Lynx conservation professionals from other countries: lynx conservation professionals from other countries will be addressed mainly through targeted networking events and activities, such as workshops, project conference, experience exchange visits and scientific publications.

General Public

In order to achieve general publicity of the project we will disseminate knowledge through various materials prepared during the project (documentary, website, Facebook profile, brochures, bulletins, leaflets, hand-outs, posters etc.), public presentations, exhibitions, school programs, information boards, as well as through intensive work with media (including press conferences) and use of celebrities to help raising awareness among general public.

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