



Project LIFE 12 NAT/IT/000807 WOLFALPS

*Wolf in the Alps: implementation of coordinated wolf conservation actions in core areas and beyond
Action E8 – Annual thematic conference*

PROCEEDINGS II CONFERENCE LIFE WOLFALPS

**The wolf population in the Alps:
status and management**

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The II Conference LIFE WolfAlps “The wolf population in the Alps: status and management” has been held in Cuneo on the 22nd January 2016, at the meeting Center of the Cuneo Province, C.so Dante 41, Cuneo (Italy), and it has been organized in partnership with:



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Foreword

The Conference LIFE WolfAlps addressed the issue of the **natural return of the wolf in the Alps**: gave an update on the status of the population in each Alpine country, from France to Slovenia, and discussed the species' conservation on the long term, also touching the debated topic of its management.

The first Session of the Conference, in the morning, entitled “**The LIFE WolfAlps Project: concrete actions for the conservation of the species**” has been devoted to describe in detail **the concrete conservation actions undertaken under the Project LIFE WolfAlps**: from the preventive methods promoted to contrast wolf attacks on livestock to the illegal killing control, from the development of new wolf ecotourism programs to the control of hybridization, also through the discipline of the recovery of injured or dead wolves in Piedmont. The antipoisoning LIFE WolfAlps dog team of the western Alps, an interesting innovative tool against poaching, has been officially presented to the public.

The second Session of the Conference, in the afternoon, entitled “**The wolf population in the Alps: status and management**” was interested by the presence of some of the leading international experts that presented to the public **the updated status of the wolf population in the Alps shared among different countries**. This has been an opportunity to discuss in depth the important issue of coexistence between wolf and man, for which a dedicated discussion panel closed the day.

The LIFE WolfAlps Conference has been organized in collaboration with the **Italian Delegation of the Alpine Convention**, which for the occasion hosted in partnership a meeting of the **Platform WISO** (Large Carnivores, Wild Ungulates and Society) that took place on 20th – 21st of January at the Maritime Alps Natural Park in Valdieri.

The Conference has been organized in partnership also with the 21° **Memorial “Danilo Re”**, a sporting event hosted by the Marguareis Natural Park and Maritime Natural Park, that took place on the 21st - 24th of January 2016 in Chiusa Pesio, which involved the staff of Alpine protected areas. A video, testimony of the commitment of the **Alpine Protected Areas** in wolves' monitoring and conservation programs, has been presented at the end of the Conference.

The high interest on the subject has been demonstrated by the total sold out of the Conference: 510 registrations were accepted coming mostly from Italy, but also from France, Slovenia, Germany, Austria and Switzerland. The language used for the first Session of the Conference was Italian with simultaneous translation into English, while for the second Session of the Conference was English with simultaneous translation into Italian, French, German and Slovenian.

The videos of all interventions, as well as the final panel discussion, have been uploaded on the Project LIFE WolfAlps website and are visible at this link: <http://www.lifewolfalps.eu/eventi-contest/convegno-life-wolfalps-cuneo-22-gennaio-2016/>

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Abstracts

First Session of the Conference – Morning

**“The LIFE WolfAlps Project: concrete actions for the
conservation of the species”**

1. The Project LIFE WolfAlps: new knowledge for coordinated conservation actions

Canavese G.* e Marucco F. *

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The presence of the wolf in Piedmont over the past twenty years is a reality which had important effects in ecological and socio-economic contexts. Since the first sightings of the wolf in the early 90s, the Piedmont Region has developed a monitoring and research program on the wolf natural re-colonization of the Alps to collect the technical data necessary for the management of this situation and its impact on economic activities. An Interreg (1994-1999) before, the project "The wolf in Piedmont" after, are the projects through which it has been followed the increase of the wolf population in the Region. A unique experience and an amount of knowledge made available today to the new **Project LIFE WolfAlps (2013-2018)** "Wolf in the Alps: coordinated implementation of wolf conservation actions in core areas and beyond" that now interests the whole Italian and Slovenian Alps.

The LIFE Project WolfAlps then interests the entire Alpine region because as the wolf has slowly recolonized the Apennines is now re-colonizing the largest mountain range in Europe towards Slovenia. A natural and unstoppable process that can only be **managed in a coordinated way** and this is one of the crucial points of the LIFE. The Project is led by the Maritime Alps Natural Park and involves many partners: Regional Parks of the Alpi Cozie, Marguareis, Ossola, National Parks of Val Grande and Stelvio, the Regions of Lombardy and Veneto, the MUSE of Trento, the Corpo Forestale dello Stato, together with Triglav national Park and the University of Ljubljana from Slovenia.

The LIFE Project WolfAlps was built on a **shared program**, implemented by Italian and Slovenian institutions and supported by the other Alpine countries with several objectives. The planned conservation measures are developed in particular in seven key areas (core areas; Maritime and Cozie, Ossola, Central Alps, Dolomites, Lessinia and Slovenia), and activated on the entire Italian and Slovenian Alps, in particular in order to **monitor the species, to counter the predatory impact on livestock with interventions on pastures, and to limit poaching**. All this goes together with the development of species **coordinated management guidelines** and action plans, both at the local and national levels, to allow the **coexistence among human activities and wolves on the long term**. In this context, the presence of the wolf is also considered in relation to eco-tourism and to the new business of wolf-friendly products.

Finally, **communication is one of the most important tool of the LIFE WolfAlps**. The wolf is not just a biological reality whose management follows uniquely the technical data, but it is also a complex cultural reality that comes from years of countless stories, legends, hoaxes, interpretations that have little to do with reality. The LIFE WolfAlps in these five years of implementation would like to transparently transfer the results of the research and of the actions undertaken and **disseminate objective information** on the presence of the wolf.

2. Prevention: pasture systems, vulnerability to predation and prevention methods in the Italian Alps with a focus on the Cuneo province

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During the 2014 alpine season, within the Project LIFE WolfAlps, a survey was conducted by administering questionnaires to the breeders in the project Core areas. The aims were to evaluate the livestock management methods in mountain pasture contexts and the diffusion of preventive methods, to define pasture vulnerability against wolf attacks. Data concerning the Core area 1 “Alpi Marittime” are mainly discussed.

This Core area covers almost all of the mountain area of the Cuneo Province. Here the wolf is present since 20 years and the changes observed in this period, both regarding the livestock management and the use of preventive measures, are considerable and represent an important model for other Alpine contexts. Data from Cuneo Province, collected mainly within regional projects, show that despite the increase in the years in the number of wolf packs, and therefore in the number of wolves, the number of victims (above all sheep and goats) has a decreasing trend. This success is mainly due to the hard work of the breeders that, afterwards the return of the wolf on the Alps, were able to change some aspects of livestock management (i.e. always be present during the grazing, control pregnant females and births) and to effectively use preventive measures (i.e. electric fences, livestock guarding dogs, acoustic and optic devices). In fact, from the analyses of the questionnaires, it appears that in all sheep and goats pastures at least one preventive system is active combined with a management aimed at minimizing the risk of wolf attacks. Instead, cattle pasture in the Cuneo Province turn out to be only partially protected.

Considering the realities of the other Alpine Core areas it appears evident the vulnerability both of the cattle and of the sheep and goats pastures. Thanks to the collected data and to the availability of the breeders to participate to the Project LIFE WolfAlps, during the next years it will be possible to work for the implementation of preventive measures to protect livestock and, in particular, the aim of the Project is to find out species-specific pastures action plans.

3. Protocol for the recovery of dead wolves in Piedmont: overview of the data collected in 15 years

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Since 2006, all wolves found dead in Piedmont are conveyed for necropsy at the Department of Veterinary Sciences, University of Turin. In early 2016, all relevant institutions (overall 23, including the Istituto Zooprofilattico Sperimentale in Turin, and its associated Reference Centre on Wildlife Diseases in Aosta) have agreed on a new protocol detailing all actions to implement and coordinate in case of wolf death, from localization of the cadaver to its possible taxidermic preparation.

In the frame of the ancient protocol, 90 wolves have been necropsied since 2000 in the provinces of Turin (55 wolves), Cuneo (28), Alessandria (6) and Verbania (1).

Main causes of death were, in decreasing order of frequency: collisions with vehicles and train (58.8%), illegal kills (28.8), natural causes (7.7) and undetermined causes. Amongst illegal kills, poisoning largely outnumbered firearms and traps. Natural causes included intraspecific strife, starvation, CDV infection and an avalanche. Young age and sex (higher vulnerability of males) were identified as risk factors for collisions, whereas poisoning was apparently sex (male) though not age biased. All main death causes were season biased (higher vulnerability in winter, and winter/spring limited to poisoning).

Results of the survey differed from those of a survey carried out 25 years ago (Guberti & Francisci, 1991), in that illegal kills (and firearms kills in particular) have remarkably decreased in relative importance whereas collisions have increased; however, we need to take into consideration that this is highly dependent on the non-randomness in findings, with detection rates highly dependent on the type of death, the period, the places, and on the developed protocols.

4. Ecotourism, Communication, and Recovery of Injured Wolves and Hybrids: the Role of Wolf Captive Areas

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Mountain pasture is an element that Natural Parks protect as an economic and cultural resource and as a source of biodiversity, necessary to maintain some important alpine environments. Similarly, also the wolf is a precious element of the Alpine ecosystem, that protected areas are required to safeguard. From these two premises comes the only possible solution and the goal of the project LIFE WolfAlps: the coexistence of men and wolves in the Alps.

Communication, role of captive areas and ecotourism are three different factors that work together in order to create the conditions for the development of a difficult, but possible coexistence. LIFE WolfAlps is currently conducting the census of the wolf captive areas in Italy. Captive areas have two main tasks: the spread of a scientific, objective and impartial communication on the wolf and the creation of opportunities for the promotion of a sustainable tourism model where the wolf becomes a benefit which contributes to the touristic attractiveness of an area, helping to direct the tourist flows, qualifying local productions through the “wolf friendly” label or proposing mountain pastures as an interesting summer destination for environmentally aware visitors.

Among all the captive areas belonging to the Italian “stud book” coordinated by the Corpo Forestale dello Stato and the Biopark of Rome, the Center “Men and Wolves”, which is part of the Maritime Alps Natural Park, is the only one organized in two different areas: the general aim is to provide visitors all the elements for the development of a personal opinion about the “wolf issue” by means of an involving multimedia tour. Moreover, the Center includes a large area suitable for the recovery and maintenance of injured wolves or hybrids where specialized and trained personnel take care of the animals which are not anymore releasable in nature.

5. Illegal killing control: the anti-poisoning Dog Team of the LIFE WolfAlps in the Western Alps

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The establishment of the anti-poisoning Dog Team of the LIFE WolfAlps, together with the mixed anti-poaching team made by CFS / Parks personnel also promoted by the Project Life WolfAlps, gave a significant boost to the anti-poaching activities in Piedmont. Following the training courses are now operational in Piedmont: 30 CFS staff members with specific anti-poaching training and 23 units of staff of the Parks (12 of the Ente Gestione Aree Protette Alpi Marittime - EAM, 11 of the Ente Gestione Aree Protette Alpi Cozie - EAC). In Piedmont are also fully operational 5 anti-poisoning dogs unit (2 of CFS, 2 of EAM of which a professional trainer, one of the EAC). The anti-poisoning Dog Team perform in all 3 Core Areas of Piedmont defined by the Project LIFE WolfAlps, but have already been called to work in other areas as well (Province of Asti, of Modena, of Imperia, as well as several cities in Piedmont in urban areas).

In 2015 they were carried out 25 days of training and 20 operational surveys, with 54 tracks followed and 89 km of trails travelled, 7,500 vertical meters and 52 hours of work of the dogs have been conducted. Research results - always in 2015 - were: 3 calves carcasses, 2 adults and 5 wolves dead puppies, 8 guarding dogs dead, many remains of wild animals, baits of various kind (ungulates, chicken, lamb and even ham and cheese with poison found in the woods), a rodenticide can. Of these more than thirty samples were sent for toxicological analysis. During 2015, in Piedmont, they were forwarded to the Judicial Authority 8 crime reports relating to acts of poaching. An added value of the Project LIFE WolfAlps was - and still is - to raise awareness on the issue to the organizations and institutions (municipalities, Judicial Authorities, Prefectures, Police, Regions, etc.) which had so far been undervalued and underestimated.

The anti-poisoning Dog Team of the LIFE WolfAlps in the Western Alps

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The anti-poisoning Dog Team of the LIFE WolfAlps in the Western Alps was formed in late 2014, with the arrival from Spain of three already trained dogs for this kind of research and with the recently new training of two dogs. The activity of 2015, in the first months, has been mainly related to the training of the 5 dogs, in particular in order to construct a strong unit among dog-conductor and to operate in total safety research. The work of the anti-poisoning Dog Team of the LIFE WolfAlps in the Western Alps actually started in the following months, when the team have been contacted and asked to operate in different environments where possible poisoned baits have been pointed out, the dogs immediately have shown good success in retrieving poisoned baits and carcasses, with high versatility and flexibility. Besides the "classic" meatball with poison, the team found itself in front of hidden calves, carcasses of poisoned sheep, cheese-based baits. The team was called to

operate even in urban areas (meat baits with nails abandoned in city parks) and plain areas (episodes of truffle dogs poisoned). The dogs have been essential to locate not only poisoned carcasses and baits, but also dead animals in the area: specifically in two different episodes were recovered skeletal remains of an adult wolf and five puppies. To make fruitful searches and obtain positive results, it was found necessary to have a continuous exchange of experiences and information among the team, and the several concerned Institutions, together with a personnel support in the area, and a very fast alertness of the team. It is important to point out the need of awareness on the issue by the general public, to report any cases of poisoning or poison baits discovery, and it is essential to tackle the problem by the competent institutions. A video of awareness and information to the public was made by the Project LIFE WolfAlps with the anti-poisoning Dog Team of the LIFE WolfAlps, which was previewed at the Conference, and is now viewable at: <https://www.youtube.com/watch?v=emu3xFpS47s>

Abstracts

Second Session of the Conference – Afternoon

**“The wolf population in the Alps: status and
management”**

6. Wolves in Italy: the new wolf management and conservation plan in 2016

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The wolf is a protected species by law n. 157 of 1992 and Presidential Decree no. 357 of 1997 for transposition of the Habitats Directive, as amended and supplemented by Presidential Decree No. 120/2003. 120, that puts the wolf in Annexes B and D, among the species of Community interest in need of strict protection.

The wolf was the subject of a National Conservation Plan published by the Ministry of Environment (MATTM) and ISPRA in 2002, but the plan has been poorly implemented, partly because of insufficient sharing between the competent authorities (Ministries, Regions and Provinces autonomous) and interest groups.

In 2015 the Ministry of Environment (MATTM) has asked the Italian Zoological Union to manage a new process of sharing of a renewed Management plan for the wolf in Italy. The Italian Zoological Union has set up a working group which, with the help of over 70 experts from all over Italy, and representatives of public and private organizations, has prepared a first draft of the Plan then subjected to critical reading of stakeholders (farmers, environmental, animal rights and hunting associations). On the basis of all the comments received, often competing with each other, it has been prepared the current version (22.12.15) to be submitted to the evaluation of Ministries, Regions and Autonomous Provinces. In the coming days or weeks there will be the meeting that will led to the final version of the Plan.

In the Plan there is an update on the distribution and abundance of wolves in Italy. In peninsular Italy (mainly the Apennines with major expansions to the hilly areas of Lazio and Tuscany), the population is estimated by indirect methods and the result is included in a wide range of 1000-2000 wolves. In the Alps, the estimates are more robust due to more predictable presence of snow cover and the implementation of an accurate system of detections. The Plan examines the status of the two populations (Alps and Apennines), the main threats to conservation (especially poaching, criminal use of poisoned baits, backcrossing with stray dogs), the presence of areas of conflict with human activities (especially predation of domestic animals) and the need for conservation and management.

The objective of the Plan is the maintenance of a healthy wolf population in Italy, both in the Alps and in the Apennines, as required by European legislation. To this end, the Plan identifies a series of actions to be implemented by national and regional authorities aimed at addressing the issues they need to face. Three actions are dedicated to the mitigation of anthropogenic mortality and four to the management of the presence of stray dogs and the prevention of hybridization between dog and wolf. Six actions are dedicated to the important chapter of the prevention and mitigation of conflicts with livestock activities and five actions to the need of coordination among all the local authorities involved (ministries, regions, Ispra, municipalities, etc.). An action deals with the management of the captive facilities where injured wolves might be recovered. Two actions are devoted to the dissemination of information, to the general public, press and experts,

in order to counteract the continued spread of false news and information. Finally, a chapter is devoted to the management of the exception to the protection regime as already envisaged by the Habitats Directive: the Plan details the necessary conditions that can be applied for the request of a derogation to the protection and defines the complex application procedure. Any derogation will be examined individually by the technical evaluation of ISPRA and the management one of the Ministry. In any case, it is placed a ceiling of possible derogations potentially feasible in a year, well below the threshold needed to ensure the state of positive species conservation.

7. The wolf population status in the Italian Alps

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In Italy, where the species was widespread in the past, the decline of the wolf began in the second half of the eighteenth century and continued until the seventies of the last century, because of continued persecution by humans that determined the disappearance from the Alps and the survival only in the South of the peninsula. Although in many areas wolves are still affected by anthropogenic pressure, during the last forty years there has been a major change in this trend. In Italy and in the Alps there has been a natural recovery of the species, first in the mountain areas of the Apennine with packs in Tuscany and Liguria, and later on in the western Alps. In 1996-97 the first packs have been documented in the Italian Alps in Pesio and Stura Valley (CN), and in Susa Valley (TO). In 2012 the wolf has been largely documented on the French-Italian Western Alps with 33 breeding packs and in the central-east of the Alps the first couple and wolf signs have been documented, with wolves not only coming from the Italian population but also from the Dinaric and Carpathian ones (WAG 2014).

Updated data on wolf presence and on the consistency of the population are of paramount importance, to follow the progress of this natural recolonization and to better manage it. The monitoring activity of the Italian western alpine population, conducted continuously and accurately from 1999 to 2012 with funding from the Piedmont Region, was unfortunately suspended in the winters of 2012/2013 and 2013/2014 due to a lack of funds and therefore the estimate of wolf presence for these years is incomplete.

At the end of 2013 the project LIFE WolfAlps was funded, to promote coordinated actions for the conservation of wolves throughout the Alps. One of the first implemented action was to organize a **systematic monitoring on the entire Italian Alpine region to estimate wolf population trends** and collect objective data on the status of the wolf population, critical for any management decision.

The sampling strategy and the specific monitoring objectives have been defined in detail in the document "Strategy, methods and criteria for monitoring the conservation status of the wolf population in the Italian Alps" (Marucco et al. 2014) prepared in the framework of the Project LIFE WolfAlps, where the methods for the evaluation of the distribution of the population are described. In summary, a unique study design has been defined which allows to collect robust data for the estimation of all the parameters of interest on a large scale. A grid of 10 x 10 km was defined on which **a stratified sampling** was conducted, where the **strata** (i.e. groups of sampling units by type) are defined by the expected probability of wolf presence on the basis of previous indications, and on this basis it is quantified the applied effort. **The monitoring year is based on the species' reproductive cycle, and lasts from 1st of May to the 30th of April of the following year, with a higher effort in the winter time.** This analysis and distribution map with quantification of the number of packs and territories is based on the monitoring conducted **in year 2014-2015**, with higher sampling effort between November and April. The active sampling was based on a combination of a systematic and opportunistic data collection conducted by properly trained staff on standardized protocols, with a constant working program which provided a regional calendar of activities, with adaptations to the local needs, according to protocols integrated with the French, Swiss and Slovenian ones. The non-invasive methodology applied is based on snow-tracking, wolf-howling, genetic analysis of biological samples and photo-trapping and **is centered on documenting the presence of packs, pairs and solitary individuals with a stable territory (documented for more than 1 year).** The standards are also based on the **SCALP criteria**, which categorize the data according to their verifiability. For the estimates of the population size and distribution **only the data C1 (hard facts) and C2 (confirmed observations) have been used.** All this allowed to have **large-scale comparable data and to implement the first standardized monitoring of the wolf population in the Italian Alps for year 2014/2015.** The same monitoring was repeated for year 2015/2016.

The staff of the bodies involved in the project has been prepared through ad hoc training courses and constitutes the **Alpine Network for the Wolf monitoring**, operating for the collection of data and samples. It is composed of about **300 operators** belonging to 40 Institutions distributed throughout the Alpine region (regional and national protected areas, the National Forest Service, Regions and Provinces, Autonomous and not). The Network represents a high quality resource in the long term. The wolf monitoring, coordinated by the Large Carnivores Center, was also held in collaboration with the stakeholder associations (farmers, hunters, conservationists), Universities, Regional Health Services (A.S.L.), and the Hunting Districts.

This work, presented in preview at the LIFE WolfAlps Conference of Cuneo and that will be the subject of a detailed report scheduled for fall 2016, allowed to estimate the minimum wolf distribution in the Italian Alps, as well as the number of reproductive units (packs and pairs) and lone wolves with a stable territory for the 2014-2015 year.

The area of presence of the Alpine wolf population is estimated to be 11,800 km², of which 69% has been documented with C1 data. **Wolf presence is increasing in the Italian Alps** as expected compared to 2012, **reaching in year 2014-2015 a minimum of 21 packs, 8 pairs and one solitary individual with a stable territory, with a total of 30 stable wolf territories documented by C1 data**, most of which are present in Piedmont in the provinces of Turin and Cuneo (**Figure 1**). Two more packs may be present in Liguria on the border with Piedmont, but their presence is documented by C1 data only until 2013. The transboundary pack between the province of Como

and Switzerland is documented only since summer 2015, so it is not represented in this estimate. In detail, **in Piedmont region at least 19 packs and 6 breeding pairs have been estimated in year 2014-2015**: 12 packs and 4 pairs in the province of Cuneo and 7 packs and 2 pairs in the province of Turin. Of these packs at least 4 have a transboundary territory with France. In the rest of the Italian Alps **1 pack and 1 pair have been documented in Valle d'Aosta**, and **one pack in Lessinia** (Veneto-Trentino) whose breeding pair, which **regularly reproduced since 2013**, is formed by a male from Slovenia and a female of Italian origin. **In Friuli it was documented a new couple** formed by two new individuals both from the dinaric population and **in Lombardy, Trentino, South Tyrol 4 solitary individuals have been genetically identified, but documented for less than a year**. Increasing sporadic sightings are registered in the rest of the Central Eastern Alps and in the Western Alps even in hilly areas. By assigning only 50% of the 4 transboundary packs to the Italian part of the alpine population, and assuming an average value of 5-6 wolves per pack, **a conservative estimate of the number of wolves in the Italian Alpine population, referring to the year 2014-2015, is 110-130 individuals**. This number, which is a rough estimate, it can be raised **to about 150 wolves taking into account the part of the population represented by dispersals**, generally estimated as 10-20% of the stable population. The density estimate of the stable Alpine population of the Italian side in its current distribution area is therefore of 0.9-1.1 wolves/100 km², which is an expected value for a small expanding population.

This work is essential to properly **define the long-term and large-scale wolf management strategy, which should refer primarily on the number of stable packs/pairs**, rather than on the number of individuals, especially because the latter estimate is highly dependent on the number of samples collected and genetically analyzed. **The number of packs/pairs provides a more robust estimate** in the long term, **especially for the Alpine wolf population which is rapidly expanding and it is shared with other Alpine countries**. This estimate also provides an indication of the reproductive units that are territorially stable over time, where it is important to locally invest on livestock preventive systems against attacks and **to promote the coexistence between wolves and humans**.

Citations

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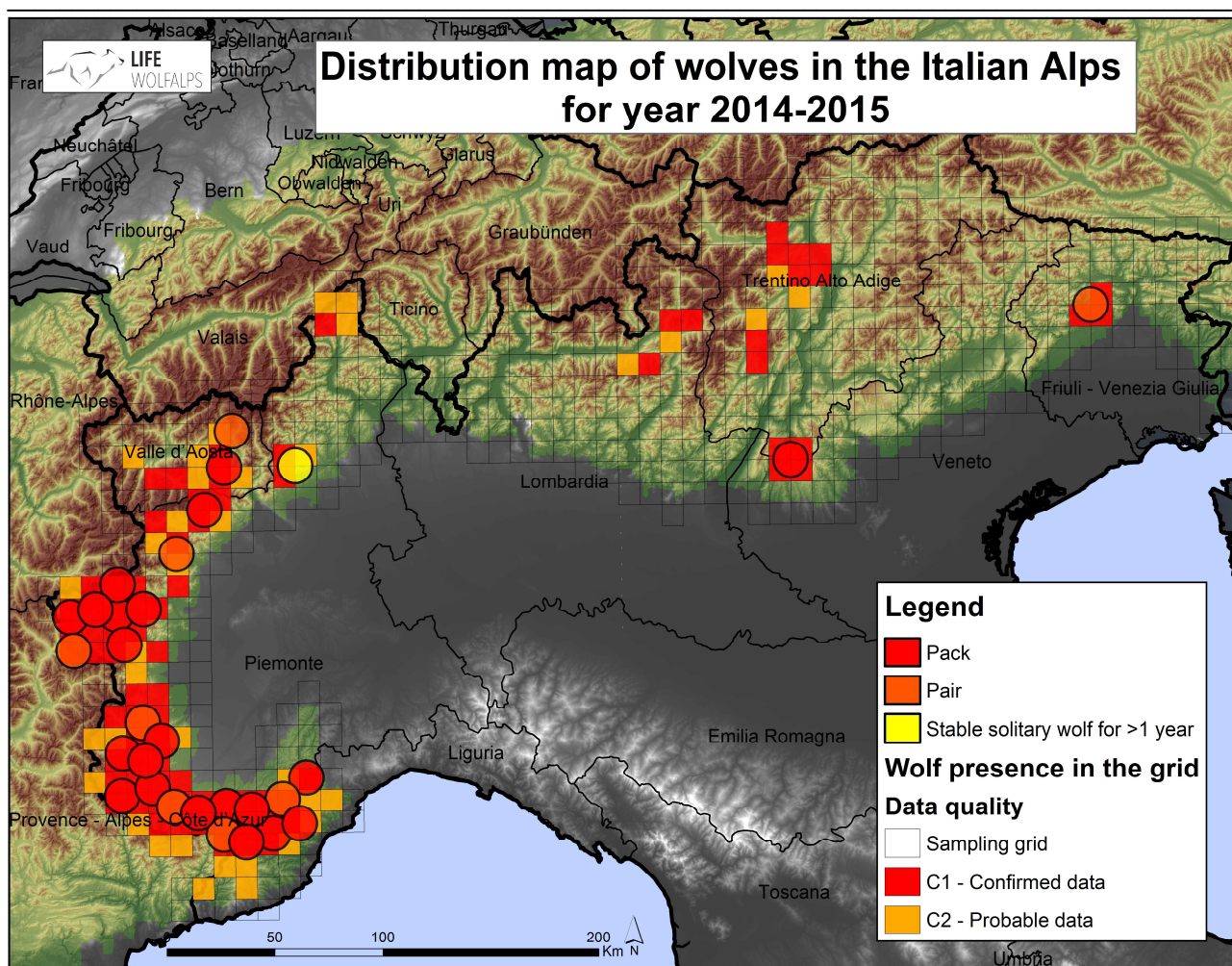


Figure 1. Wolf distribution in the Italian Alps and reproductive units (packs and pairs) and lone wolves with stable territory for the year 2014-2015, based on data collected in the framework of the Italian Alpine monitoring organized by the Project LIFE WolfAlps.

8. The wolf population status in France and how the Monitoring may enlighten the decision making process

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Wolves recovered over the French Alps since the early 90's from the recolonizing Italian population. Being a large predator, the presence of wolves where people live and work very quickly challenges the balance between conservation needs as a protected species (European directives and French laws) and management requirements because of livestock depredations.

We aimed at demonstrating how science-based data (wolf distribution and demographic dynamics) may be used by decision makers when elaborating the management options to reach such a controversial balance. We address the question of monitoring designs in order to (1) assess the conservation status and its temporal dynamics (2) identify the relevant factors that drive the underlying biological mechanisms and (3) provide a tool for risk analysis when considering legal wolf removal as one management option.

Based on a spatially designed network of more than 3000 volunteers, all trained with standard field sampling procedures, the monitoring is conducted at a large spatial scale using the combination of signs surveys, intensive snowtracking in winter, wolf howling in summer, and non-invasive genetics. This design allows to yearly update the geographical increase in distribution (+ 19% / year on average), mostly first within the Alps, then, more recently in lowlands north and westward. The census of the population on the French side is about 30 packs and 12 lonely sedentary wolves, a majority being part of the 54 wolf territories (41 packs and pairs) recorded by the Wolf Alpine Group over the whole transboundary alpine range in 2012.

The biggest challenge in managing wolf presence clearly focuses about wolf-related damages on livestock. More than 2400 wolf attacks per year were compensated (for a total of > 8900 dead or wounded sheep) among almost one million of sheep at risk grazing outdoor in summer. Given the spatial distribution of domestic preys at risk, a risk model would help mapping the main predation hotspots and identify the locally driving factors to target which kind of mitigation measure would fit best to the local context (incl. removal of wolves using legal derogations).

The third 5-years long Wolf Action Plan is being implemented (2013-2017) by the French government after defined with a national stakeholder consultative group. The Plan includes the possibility to remove some wolves under derogations as defined in art. 16 of the European Habitat Directive. A model has been developed to simulate the short term consequences of a given number of wolves removed on the trend in numbers of wolves in the population. Rather than trying to identify what would be the theoretical "best" threshold in wolf number, the analysis turns the demographic model into a risk estimate of leading a population decline – or increase – the years after. Managers then discuss about which level of risk is acceptable given political goals and legal framework. The associated uncertainty around the estimates of population size and trend gives the manager a range of options to compose the decision. The adaptive nature of this

“learning by doing” management process allows to update the decision from one year to another given the previous goals are achieved or not.

9. The wolf in Slovenia: status and management

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Slovenian wolf population is the farthest NW part of Dinaric –Balkan population and represents a connection between the Dinaric Mountains and the Eastern Alps. Therefore wolves from Slovenia might act as a source for colonization the Alps from south-east and meet there the wolves expanding over the Apennines and towards the Alpine arch from west. In Slovenia, wolf enjoys complete legal protection with exceptional culls permitted to decrease conflicts with agriculture. Before 2010 wolf population status estimations in Slovenia were based merely on professional opinion of Slovenia Forest Service considering data from wolf mortality and especially trends in livestock damages caused by wolves. In 2010 wolf management/conservation (LIFE SloWolf) project started, which was opportunity to facilitate long-term conservation of wolves, their prey base and their habitats in Slovenia, and their co-existence with humans. Its main goal was to provide a solid base for efficient conservation and management by establishing of an effective, science-based national surveillance of wolf population conservation status. To efficiently include wolf conservation and management into national legislation, a Management Action Plan was prepared based on scientific knowledge about the population and its habitat that would implement wolf monitoring data.

It includes governmental institutions concerned with wildlife management, as well as academic institutions and non-governmental organizations that coordinate involvement of volunteers, including hunters. The goal is to achieve synergy of advanced monitoring methods and organizations/volunteers involved to maximize cost effectiveness, raise public awareness and at the same time, to maintain high quality monitoring needed for sustainable/conservation management. Combining traditional and new methods utilizing systematic »howling tests« with involvement of volunteers, noninvasive genetic sampling and modern genetic methods, and mark-recapture modeling, make the goal more achievable. In 2015/16 this has been extended into long-term (hopefully continuous) genetic monitoring of the population funded by the Government of the Republic of Slovenia.

In last five years we genetically detected between 46 and 53 individual wolves per season, estimating population up to 60 adult animals living in 10 to 12 packs each year with a “genetic recapture rate” of each wolf about 4 times per season. The population showed extreme yearly dynamics. Detected mortality of wolves was high (13 or 14 wolves per year, 26%), but so was “disappearance” of wolves (undetected mortality or emigration, 12 or 18 wolves per year, about 20%). On the other hand population effectively compensated for the losses – 56% of new wolves were detected each year, 45% through reproduction in residential packs and 11% through immigration. The genetic analysis of wolf-dog hybridization in Slovenia provided a clear differentiation between wolves and dogs, and also a reliable detection of F1 and F2 hybrids. We didn't detect any dog - hybrid backcrosses in Slovenia.

The extent and nature of damages which wolves do to agriculture was assessed in 2010. All registered wolf damage cases since 1994 until 2009 have been analyzed in order to detect

“conflict hot spots”. The analyses showed that at only few hot spot pastures more than 40% of all damage compensations are paid in Slovenia. According to Wolf Action plan all recognized hot spots should introduce special damage prevention measures; protection of livestock with 145-170 cm high electric netting and/or using livestock guarding dogs. Since introduction of these measures an amount paid by the state for wolf damage compensations has been reduced on average for 70%.

10. Status of Wolves in Germany

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After more than 150 years without wolves a first wolf pack was confirmed in 2000 in Germany. Since then the population increased and spread continuously. In the monitoring year 2014 (01.05.2014 – 30.04.2015), 31 family groups, 8 wolf pairs and 6 single territorial animals were recorded in northeastern Germany. These wolves belong to the Central European Lowland population (former German-West Polish population). The distribution area of this population stretches from the Vistula river in the middle of Poland to Lower Saxony in Germany.

In recent years an increasing immigration from wolves from the Alpine population is observed in southern Germany. However, so far none of these individuals became resident. For the German Alpine part these observations started in 2006. Some of the individuals confirmed - exclusively males so far - could be genetically backtracked to their natal pack or at least to places sampled before. Wolves recorded in the Bavarian Alps and foothills so far stemmed from Italian Alps Maritimes and French “Mont Blanc” region or were previously recorded in Switzerland and Austria.

Germany has national monitoring standards for large carnivores. These standards strongly rely on the SCALP criteria* thus categorizing data according to their verifiability. For population size and area of occurrence estimates only C1 (hard facts) and C2 (confirmed observations) are used. The monitoring year is based on the reproduction cycle of the species, lasting from May to April the next year.

The return of the wolf into the German Alps poses two main conflicts: (1) extensive grazing done with free ranging sheep is extremely vulnerable towards depredation ; therefore adaption of grazing systems will be necessary to avoid larger conflicts; (2) red deer management currently relies on zoning mostly excluding possible winter habitat; therefore deer are fed in into winter enclosures to avoid browsing pressure on mountain forest in springtime; these enclosures will be very attractive as a predictable food source for wolves.

* SCALP-criteria: Monitoring system developed for the lynx in the Alps (**S**tatus and **C**onservation of the **A**lpine **L**ynx **P**opulation): three categories (C1, C2, C3), based on verifiability of given data.

11. Status and Management of Wolves in Switzerland

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The wolf monitoring in Switzerland is mainly based on the collection of chance observations (e.g. sightings, tracks and wild prey remains), damages to livestock, dead wolves, opportunist camera trapping, and opportunist collection of biological samples for genetic analyses. Snow-tracking sessions in winter and wolf howling sessions in summer, which are standard methods in Italy and France, were so far only applied on very rare occasions. The future management of the wolf population in Switzerland requires information on the number and size of the packs and the number of young. Therefore, a monitoring system allowing to register all packs, resident pairs, resident solitary wolves, and as many transient (dispersing) solitary wolves as possible is presently developed. Under these premises a pilot study was conducted in the area of the Calanda pack to find out if camera-trap sampling can be used to reliably monitor pack composition (e.g. pack size, breeding events) in a synergetic large carnivore monitoring (i.e. wolves and lynx) or if adaptations in sampling design or camera trap type and setting would be needed. While this method is efficient at detecting wolf presence/absence, its reliability to estimate wolf group size including reproduction depends on: i) the period (i.e. summer<spring<autumn and winter); ii) the material (i.e. camera-traps capable of quick sequence of pictures or movies); iii) the site (e.g. forced passage, marking site); and iv) the setup (e.g. angle between the camera detection axis and the animal trail).

In 1995, the first damages to livestock imputed to wolf occurred in the southern Alps in the canton of Valais. On 5 February 1996, the presence of wolf was confirmed by means of camera trapping. In 1998, the first males from the Alpine wolf population were genotyped in the Valais followed in 2002 by the first female. In 2006, a first male was killed by a train in the northern Alps near Gsteigwiler in the canton of Bern. A first pack established in 2012 in the Calanda region in the canton of Grisons. From 2012–15, it reproduced each year and gave birth to at least 19 pups (15 males and 4 females) of which five are for sure dead. Since 2015, a second pack has established near Morrobia, on the border between the canton of Ticino and Italy. A photographic proof of reproduction of at least three pups was recorded in the same year. From 1998 to the end of 2015, 73 wolves (15 females and 58 males) were genotyped in Switzerland. The number of genotyped wolves per year increased yearly to reach 26 in 2015. So did the number of wolves detected for the first time in a given year, which reached 14 in 2015. The number of dead wolves reported per year varied between one and four per year. From 2006 to 2015, the damages to livestock fluctuated between 96 and 383 individuals. These fluctuations are merely linked to whether wolves immigrate or not to areas without adequate prevention measures. Livestock guardian dogs are key to success but sustainable prevention measures require adequate financing.

The Swiss wolf management plan established in 2001 and adjusted in 2016 has the following aims: i) wolves are part of the Alpine wolf population; ii) conflicts with agriculture, hunting, tourism and concerned people are minimised; iii) restrictions in livestock husbandry are prevented; iv) damage prevention measures are established; and v) criteria for wolf regulation are defined. This management plan foresees the removal of notorious stock raiders, but also controlled culling of

establishing wolf populations if they cause (locally) extensive damage to livestock or a substantial reduction in the hunting regal of the cantons. A behavioural development towards less shy wolves where wolf pack has established was recently observed in the Calanda. The Swiss authorities are determined to prevent all habituation as a key to acceptance of wolves in a cultural landscape. To respond to this behavioural development of wolves, the relevant by-law was adapted to give the possibility to intervene when wolves lose their shyness and are entering villages at day-time. Wolf is a protected species and intervention is an exception. Since 2000, eight wolves have been legally removed in Switzerland.

12. Status of Wolves in Austria

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The remnant wolf populations in Austria were eradicated within the 19th century. Single individuals continued to migrate into Austria occasionally within the 20th century. Since 2009 the number of dispersing wolves reaching Austria has increased substantially and evidence of 2-7 individuals has been found every year. The wolves in Austria originate from the Alpine and Dinaric population, and presumably also from the Carpathian or even Central European Lowland population. The majority of wolves were registered only once or a few times and may have traversed Austria within a short period of time. Other individuals have stayed for up to three years within a certain area.

Concerning the management a national reference paper offers guidance to the competent authorities of the Länder. Most of the damages by wolves are related to untended sheep on Alpine pastures. A system of damage compensation exists in all Länder, financial support for damage prevention measures has not yet been established. The number of wolves traversing or trying to settle in Austria will probably increase in the near future. A pack may form at any time and with a pack formed the recolonization process will speed up significantly.

13. Wolf Management in practice : Protected Area's Experiences

Video and presentation coordinated by Arneodo L.

ALPARC

Several Alpine protected areas are doing an intensive work on wolf management in different fields such as monitoring and research, activities to prevent wolf's attacks, communication, awareness raising and environmental education activities.

Four videos have been presented at the LIFE WolfAlps conference. They show in details the activities implemented by some alpine protected areas on the topic. The videos can be seen at <https://www.youtube.com/watch?v=jmhUZ2HNrxs>

Some Italian Alpine Protected Areas coordinated by the LIFE WolfAlps project, presented via multiples photographs, the diverse and transversal actions settled on the topic and the concrete impact on their territory.

The Triglav National Park (SL) presented the ranger's daily work and how it changed since the return of wolf in the protected area focusing on the communication actions and the activities done to prevent the wolf attacks and to encourage the coexistence of this species with local inhabitants. The Mercantour National Park (FR), presented the project CanOVIS analyzing the interaction between wolf, flocks and shepherd dogs. By using the support of thermal- camera the project analyzes the interactions during the night between wolves and shepherd dogs.

The Ecrins National Park (FR) presented the interaction between the predators and the farming sector. Innovative approaches have been settled up to facilitate the coexistence of wolf and the farming sector as the installation of mountains huts for shepherds.