

Ministère de l'Ecologie, de  
l'Energie, du Développement  
durable et de l'Aménagement du  
territoire



Ministère de l'Agriculture et de  
la Pêche

**2008-2012 NATIONAL WOLF  
ACTION PLAN,  
IN THE FRENCH CONTEXT OF SUBSTANTIAL AND  
TRADITIONAL LIVESTOCK FARMING**

# INTRODUCTION

## PART ONE: GENERAL OVERVIEW

### I. Legal status of the wolf in France

I.A. The rejection of the reclassification of the wolf from appendix II to appendix III of the Bern Convention

I.B. The interpretation of the provisions of the "habitat, fauna and flora" Directive regarding the wolf

I.B.1. The "Interpretative guide on the strict protection of animal species identified as being of community interest by the Habitat Directive 92/43/EEC"

I.B.2. The ruling by the Luxembourg Court of Justice on wolf removal in Finland (Reference: Judgment Wolf Finland: C- 342/05 of 14<sup>th</sup> June 2007)

I.C. French governmental framework regarding the management of the wolf population

I.C.1 Inter-ministerial decisions governing authorisations for limited wolf removal

I.C.2 Analysis of national case law

### II. Ecology of the wolf

II.A. Distribution range

II.A.1 Presence in Western Europe

II.A.2 Species distribution in the Alps (France-Italy-Switzerland)

II.B. Population trend

II.B.1. Dynamic of pack formation

II.B.2 Indirect monitoring of the numbers of wolves in France

II.C. Biology

II.C.1. Sociability

II.C.2. Territoriality

II.C.3. Hunting

II.C.4. Diet

### III. Interactions with man

III.A. Interactions with livestock farming

III.A.1. The situation of livestock farming in France

III.A.2. Constraints linked to the presence of the wolf

III.A. Interactions with hunting

III.C. Interactions with tourism

III.D. Man/wolf interactions

## **PART TWO: 2004-2007 OUTCOME AND 2008-2012 PROSPECTS**

### **IV. Limiting the impacts of the wolf by assisting farmers**

#### **IV.A. Protecting flocks against predation**

IV.A.1. Outcome of the actions implemented between 2004 and 2007

IV.A.2. 2008-2012 prospects

#### **IV.B. Improving conditions for pastoralism and the implementation of pastoral practices that are less vulnerable to predation**

#### **IV.C. Compensation scheme for domestic animal losses**

#### **IV.D. Assessment of the impact of the presence of the wolf on the farming systems**

### **V. Wolf population monitoring in France: improving knowledge about the demography, biology and ecology**

#### **V.A. Wolf monitoring by the Large Carnivores Network**

#### **V.B. Ongoing monitoring of the wolf population and consolidation of the genetic analysis tool**

#### **V.C. Extending wolf monitoring to the new areas being colonised**

#### **V.D. Descriptive analysis of the wolf's diet**

#### **V.E. A national programme for studying the place of role of the wolf in the ecosystems.**

### **VI. Tools and methods for wolf population management**

#### **VI.A. The adaptive management strategy**

#### **VI.B. Differentiated management rules according to the situation**

VI.B.1. Type of criteria selected for characterising situations

VI.B.2. Case typology and principles for intervention to control the increase in the wolf population

VI.B.3. Tools for managing the wolf population

#### **VI.C. Controlling poaching**

#### **VI.D. Systematic identification of captive wolves at the national level**

### **VII. Cross-border cooperation and international exchanges**

#### **VII.A. The Italian-Franco-Swiss governmental protocol on the wolf management strategy in the Western Alps**

#### **VII.B. The development of cross-border cooperation in the Pyrenees**

#### **VII.C. Exchanges at the European level**

#### **VII.D. Improving international technical exchanges**

### **VIII Communication**

#### **VIII.A. Coordinating institutional communication**

#### **VIII.B. Improving information exchanges between people**

## **PART THREE: MONITORING AND ASSESSMENT OF THE IMPLEMENTED ACTIONS**

**IX Financial support**

**X Indicators measuring the effectiveness of the wolf action plan**

**XI Implementation and monitoring of the action plan**

# INTRODUCTION

The wolf's comeback to France in 1992 provides an enrichment of the diversity of our natural wildlife heritage. As is also the case for many other species, the wolf is protected by the provisions of the Bern Convention of 19th September 1979 on the Conservation of European Wildlife and Natural Habitats as well as those of the 1992 European Council Directive 92/43/EEC of 21<sup>st</sup> May 1992 on the conservation of natural habitats and of wild fauna and flora ("Habitats" directive).

However, the natural recovery of this species presents problems for livestock farming. Indeed, the French case is unique in Europe in reconstituting a wolf population in a country where traditional and substantial livestock farming has existed, been organised and carried out for nearly a century in the absence of any large predator.

In response to this situation, and as early as 1993, the government allocated resources for the scientific monitoring of the species, compensation for sheep losses, prevention tools and assistance for livestock farmers faced with the presence of the wolf through two LIFE-Nature projects, (the financial instrument for the environment), set up with the help of the European Commission.

The aim of the action plan for the 2004-2008 period worked out by the ministries in charge of ecology and agriculture was to firmly establish what had been learned during the LIFE projects and set out the measures for reconciling the controlled development of the wolf population alongside a continuation of pastoral activities and, more generally, livestock farming.

Its goals were to:

*"- guarantee the conservation status as being favourable to the species, i.e. maintaining its population in a demographic situation and with a geographical distribution in accord with the criteria set out in the Habitats' directive,  
- reduce livestock depredation,  
- research and implement management methods more economical in terms of human and financial resources, in particular through the harmonisation of the management of large predators."*

In order to achieve this, the 2004-2008 wolf action plan was based mainly on the following actions:

- Scientific monitoring of the wolf's population dynamic and related ecological issues.
- Assistance to livestock farmers to limit the impact of the wolf, mainly based on prevention tool implementations to prevent damage caused by predation, (financed by the Ministry of Agriculture), as well as a system of compensation for the losses caused by wolves, (financed by the ministry of Ecology).
- A framework of the provisions to which scaring operations, defensive shooting and authorised limited shooting for preventing losses that the wolf's predation may cause to the flocks are subject.
- A set consultative group made up of interested parties both at national level (chaired by the government ) and at local level (chaired by the *département* authorities).

In order to improve the management of the species in the Alps and to anticipate the consequences of the rapid geographical expansion of the wolf population beyond the Alpine ranges, the Ministry of Ecology announced during the meeting of the National Wolf Group of 1<sup>st</sup> August 2007, an early revision of the 2004-2008 wolf plan. For this purpose, three working groups from the National Wolf Group, led by the MEEDDAT and the MAAP, met several times between December 2007 and February 2008 to make proposals for the monitoring and management of the wolf population as well as the protection of flocks. These consultative meetings were supplemented by a wide consultation of the Wolf Committees in the *départements* whose proposals were examined during the National Wolf Group meeting of 30<sup>th</sup> January 2008. Finally, an appraisal of the actions undertaken by the State as part of the 2004-2008 action plan, carried out by IGE/CGAAER at the request of the Ministry of Ecology presented its conclusions to the National Wolf Group meeting of 25<sup>th</sup> March 2008.

The expansion of the wolf population is a phenomenon observed in all the European countries, both in southern and northern Europe due to favourable natural conditions linked to changes in the human occupation of the regions, reforestation, abundance of wild prey and its legal status as a protected species.

Between 2004 and 2008, the wolf population in France rose: the number of areas with a permanent presence of the species thus increased from 13 to 25 of which 16 are packs. The measures recommended in the action plan thus ensured the species a favourable conservation status as far as may be deduced from the observed trend in population and territorial expansion. With 26 packs identified between Italy's Piedmont and France (cross-border packs included), it can henceforth be considered that the wolf population is durably established in the western Alps.

In the areas where there has been a longstanding permanent presence, most of the flocks concerned by the wolf's predation are now protected. With a tendency towards a reduction in the average number of animals lost through attacks since 2001, the overall efficiency of the measures has been acknowledged, although undeniably leading to a certain number of non-negligible restrictions for sheep farmers. The extension of the predatory pressure exercised by the wolf in new contexts such as inter-seasonal areas or cattle farming in the northern Alps, immediately poses the problem of what adaptations are required to be made to the system and current techniques.

The IGE/CGAAER reported a favourable outcome of the policy begun in 2004, despite sharp contrasts in local situations and suggested possible improvements to the existing arrangements.

The potential colonisation of new regions by the wolf beyond the Alpine range (to Languedoc-Roussillon, Auvergne, Midi-Pyrénées and Franche-Comté) requires the State to come up with new management approaches to accompany its expansion nationally. These new approaches must guarantee the long-term management of the wolf population, simultaneously excluding its destruction and its uncontrolled extension, and maintain the need for proportionality between the resources invested and the goals sought. The government has clearly identified the necessity of finding a way of controlling costs for supervising the presence of this predator as well as facilitating its cohabitation with livestock farming.

In this context and in continuity with the previous action plan, the actions recommended as part of the 2008-2012 plan resulting from close consultation undertaken with the representatives of the professional farmers' organisations (OPAs) and environmental NGOs both at *département* and national level aim to:

- Safeguard a conservation status favourable to the wolf that accords with the criteria set out in the Habitats' Directive;
- Accompany the expansion of the wolf population by limiting the impacts of the presence of the species on human activities and in particular on livestock farming;
- Implement management methods that allow a streamlining of the resources allocated to this policy

In order to do so, and besides the work required for the adaptation of the measures for protecting flocks in the new contexts as part of the continuation of the assistance provided to farmers, the three following major levers have been identified:

- Forward planning the natural expansion of the wolf beyond the Alps by extending the species' scientific monitoring network to the new *départements* concerned or likely to be, through improved communication and the development of an intervention capacity able to respond more quickly and in an appropriate way when the species arrives in a new area in order, as far as possible, to prevent conflicts in these new regions;
- Implement differentiated management for the wolf population based on both biological and anthropogenic criteria;
- Strengthen discussions and consultation by the various partners of the State on this issue by setting out the conditions for greater independence for the management of the species locally in compliance with the general strategy set out by the State.

# PART ONE

## GENERAL OVERVIEW

### I. Legal status of the wolf in France

The wolf (*Canis lupus*) is protected:

- internationally by the Bern Convention on the Conservation of European Wildlife and Natural Habitats in Europe,
- in Europe by Council Directive 92/43/EEC of 21<sup>st</sup> May 1992 on the conservation of natural habitats and of wild fauna and flora,
- nationally, under the Environment Law and the ministerial decree of 23<sup>rd</sup> April 2007 setting out the list of protected mammals for the whole country and the provisions for their protection.

The Bern Convention (appendix II) and the European directive on the conservation of natural habitats and of wild fauna and flora (appendixes II and IV) outlaw any form of detention, capture, intentional killing, intentional disturbance or trading of specimens taken from their natural habitat of wildlife species which include the wolf. Under the Bern Convention and Directive 92/43/EEC, the habitat of the species concerned is also subject to a general conservation obligation. The European Habitats' directive both outlaws the deterioration or destruction of breeding sites or resting places of the species as well as setting up Natura 2000 sites.

However, derogations to the prohibition on capturing or killing animals (art. 8 of the Bern Convention and art. 16 of the Habitats directive) may be granted in particular to prevent extensive losses to livestock or in the interest of public health and safety provided no other satisfactory solution exists and that the derogation is not detrimental to maintaining the species in a favourable conservation status. Thus, a general measure for killing animals cannot be envisaged and derogations may only be granted in response to problems that occur at a particular time. The Member States remain accountable after the event for any derogations granted.

In internal law, these provisions of the Bern Convention and the Habitats Directive are transcribed into the Environment Law in articles L.411-1, L.411-2 and R.411-1 to R.411-5 and by the decree of 23<sup>rd</sup> April 2007 setting out the list of protected mammals nationwide and the provisions for their protection. Other legal texts (art L. 427-6 of the Environment Law regarding the hunting and destruction of pests and L. 2122-21 point 9 of the General Law of Local Authorities regarding the naming of animals that may be killed) have been expurgated of references to wolves.

However, under the General Law of Local Authorities and administrative law relating to municipal police, in the event of serious and imminent danger involving a threat to people's safety, the mayor and, if appropriate, the *préfet* may use their general police powers to bring an end to this dangerous situation by all means at their disposal.



## **I.A. The rejection of the reclassification of the wolf from appendix II to appendix III of the Bern Convention**

In 2004, Switzerland made a request for the wolf to be downgraded from appendix II to appendix III of the Bern Convention. This appendix protects species included in it less strictly and allows greater flexibility in their management.

In December 2004, the permanent committee of the Bern Convention first postponed a decision regarding this downgrading on the grounds that a scientific and legal assessment was needed. In November 2005, a decision was again deferred so that the contractual parties could have more time to examine the scientific and legal elements sent to them with too short deadlines.

Following a proposal by the European Commission, the Council of Ministers of the European Union decided in 2006 not to support the Swiss proposal to downgrade the wolf at the meeting of the permanent committee of the Bern Convention held in November 2006. The grounds given were the lack of data from some countries about their wolf populations and the possibility of managing the level of the wolf populations using measures other than a change in the protection status of this species.

In the event of a downgrading of the wolf from appendix II to appendix III of the Bern Convention, France would remain subject to the "habitat, fauna and flora" directive and the wolf would therefore keep its current protection status nationally.

## **I.B. The interpretation of the provisions of the "habitat, fauna and flora" Directive regarding the wolf**

### ***I.B.1. The "Interpretative guide on the strict protection of animal species identified as being of community interest by the Habitat Directive 92/43/EEC"***

Within the context of the rejection of the Swiss request to reclassify the wolf within the Bern Convention, the decision by the EU Council of Ministers rejecting Switzerland's proposal recognises the possibility of managing the level of the wolf populations within the current framework of the directive.

After several years of discussions with the Member States, in 2007, the Commission published an interpretative guide to article 12 of the "habitat, fauna and flora" directive which establishes the protection afforded to species in appendix IV including the wolf. Legally, this guide is neither a modification of the directive nor an interpretative protocol between Member States and the Commission: it sets out the point of view of the European Commission. This text does not therefore bind the Member States, but must be read as a means of preventing disputes with the Commission by clarifying the boundary between what is acceptable or unacceptable from the Commission's point of view in the interpretation of the strict protection of species of community interest in appendix IV and the conditions for its implementation.

With a concern for practicality, this guide introduces two factors which provide some space in particular, defining the principles of flexibility and proportionality. It thus states that *"the directive does not set out in detail the concrete measures required to meet the obligations resulting from its various provisions and allows the Member States a certain leeway or flexibility. The definition, adoption and implementation of these measures come under the competence of the national authorities. The "Habitats" directive thus allows the Member*

States to implement these provisions proportionality and appropriately; this approach underlies all the provisions of the "Habitats" directive, in particular articles 12 and 16" (I.2.4.b.53).

The principle of proportionality between the resources invested and the goals pursued therefore leaves the national authorities *"a certain latitude in adapting their provisions for implementation according to the characteristics of each case (in terms of the state of conservation but also in social, economic and cultural terms). The implementation of a flexible and proportionate approach requires the Member States to act within a clear framework of coordinated and effective measures, applied coherently and with a sufficient system of checks."*

Furthermore the guide proposes a new and open approach for *"normal management activities"* for the benefit of the Member States and professionals whether they are farmers or foresters: *"for normal activities such as farming and forestry, the challenge is to apply the provisions of article 12 on the protection of species using appropriate means in order firstly to avoid conflict."* (II.2.4 Summary) Within this context, the measures of protection used should *"allow a certain flexibility, i.e. while recognising that the absolute protection of all the individuals of a species cannot be guaranteed, taking care that any harmful action takes into account conservation needs of the species/populations concerned"* (II.2.4. 28). Therefore, subject to a practical measure used in good faith to guarantee the conservation of the species and their habitats as far as the undertaking of certain practices, in particular farming ones is concerned, whose *"positive contribution (...) to the creation and maintenance of certain of the most significant habitats in Europe"*, is recognised, the Commission considers that in virtue of the principle of proportionality *"the disturbance or accidental killing of individuals of the species concerned because of these practices must be accepted in the interest of the overall population (following the principle of proportionality aimed at achieving the overall goal)"* (II.2.4 26).

In respect of the particular case of the protection of large carnivores, the Guide notes the importance of *"action aimed at lessening the impact of these species on everyday activities"*, in this instance on sheep farming: *"the fitting of electric fences, the introduction of sheepdogs to guard the flocks, the release of natural prey, the improvement of the habitat and the possibility of food sources within it etc, and/or offering compensation for losses caused".* *"These pro-active measures aim to prevent losses attributable to large carnivores by supplementing national legislation prohibiting any type of action that has negative effects on the species such as killing, trapping and the use of baits etc"*.

However, when these measures are shown to be insufficient for preventing conflicts, the Commission's interpretative guide provides more detailed guidance on the interpretation of the derogation conditions *under article 16 of the Habitats' Directive*.

It states that generally *"the application of proportionality neither replaces nor marginalises any of the conditions applicable to the derogation regime, but may adapt how they are implemented by taking into account the directive's general goal"* (III.1.2.11).

It establishes compliance with article 12 of the Habitats Directive with the possibility in certain situations assessed on a case by case basis of implementing measures intended to prevent imminent losses: *"isolated disturbances with no probable negative effect on the species, such as for example the fact of scaring a wolf to stop it from getting inside a sheepfold to avoid doing harm should not be considered a disturbance within the meaning of article 12"* (II.3.2.a).

It validates the possibility, in the absence of another satisfactory solution, of granting an exemption *"to prevent serious damage, in particular to crops, livestock, forests, fisheries,*

*water and other forms of property", acknowledging that "since this provision is intended to prevent serious damage it is not necessary that serious damage has already occurred; it is sufficient that it is likely to occur" (III. 2. b. 19).*

It clearly indicates the appropriate scale for estimating an exemption's impact on the population of a protected species, by indicating that the notion of population must be in line with the biology and ecology of the species being considered and refers explicitly to the case of the large carnivores: *"Of interest in this respect could be that of the (local) population. The wording of article 16 which speaks of the "populations of the species concerned", confirms this interpretation. This approach must of course be adapted to the species in question: killing individuals of a large carnivore species with an extended distribution area must be assessed with regard to the population (if appropriate across borders)" (III.2.3.a. 46).*

Finally, it stresses the importance of monitoring and assessing the effects of derogations and their compensatory measures as part of the general obligation (set out in article 11) of surveillance of the conservation status of the species and habitats referred to in Article 2.

## **I.B.2. The ruling by the Luxembourg Court of Justice on wolf removal in Finland ( Reference: Judgment Wolf Finland: C- 342/05 of 14<sup>th</sup> June 2007)**

The judgment of 14<sup>th</sup> June 2007 of the ECJ on the wolf in Finland was the first explicit ruling on the application of the "Habitats Fauna and Flora" Directive with respect to the protection of the wolf. The final decision was the partial rejection of the appeal by the European Commission against Finland for a failure to comply with the obligations under articles 12 (prohibition from capturing or intentionally killing) and 16 (conditions for the granting of derogations) of the directive.

The following points may be noted in the Court's ruling:

- *Derogations are possible exceptionally even where the wolf population is not in a favourable state provided it does not worsen this situation or does not prevent its recovery to a favourable conservation status (point 29)*
- *Permits for hunting wolves may not be issued without providing precise and sufficient grounds on the lack of another satisfactory solution, without an assessment of the conservation status of the species or without having identified the wolves causing the damage (points 30 and 31)*
- *Authorisations to kill wolves may not be issued as a preventative measure without it being established that they are of a kind to prevent serious damage within the meaning of article 16§1,b).*

## **I.C. French governmental framework regarding the management of the wolf population**

### **I.C.1 Interministerial decisions governing authorisations for limited wolf removal**

The derogation clauses to complete protection status for the *Canis lupus* species as set out in article 16 of the 92/43 Directive of 21<sup>st</sup> May 1992 on the conservation of natural habitats and of wild fauna and flora are the following:

- these operations must not harm the maintenance of the *Canis lupus* species in a favourable conservation status within their natural area of distribution;
- they are used to prevent serious damage to livestock;

- they are only implemented if no other satisfactory solution exists.

Between 2004 and 2007, each year an interministerial decree set out the rules organising the conditions to which scaring operations, defensive shooting and authorised limited shooting for preventing losses that the wolf's predation may cause to the flocks are subject. The technical intervention protocol for the wolf population enclosed with these decrees sets out for France, every year, the criteria and thresholds that must be respected to meet the conditions stated in article 16 of the directive.

<i>Derogation clauses mentioned in article 16 of Directive 92/43/EEC</i>	<i>Regulatory conditions set out in the protocol enclosed with the decrees</i>
Favourable conservation status of the population	- the situation of the population is estimated overall nationally; -the annual setting of an authorised maximum number of wolves that may be killed
Existence of serious damage	- the setting of a threshold of recurrent observed attacks despite protection and scaring measures
No other satisfactory solution	- effective deployment of protective measures - deployment of scaring means, - opinion of a select consultative group from the <i>département</i> wolf committee (representatives from farmers' organisations, NGOs, government offices and experts)

Six national decrees have thus been made within this context since 2004:

- a decree of the Ministers of Ecology and Sustainable Development and Agriculture and Fisheries of 12<sup>th</sup> August 2004 *authorising the culling of wolves for 2004*

- a decree of 17<sup>th</sup> September 2004 amending the decree of 12<sup>th</sup> August 2004

- a decree of the Ministers of Ecology and Sustainable Development and Agriculture and Fisheries of 17<sup>th</sup> June 2005, *authorising until 31<sup>st</sup> March 2006 the culling of 6 wolves in the départements of L'Ain, Les Alpes La Haute-Provence, Les Hautes-Alpes, Les Alpes-Maritimes, La Drôme, L'Isère, La Savoie, La Haute-Savoie and Le Var;*

- a decree of the Ministers of Ecology and Sustainable Development and Agriculture and Fisheries of 24<sup>th</sup> May 2006 *authorising the scaring operations, defensive shooting and limited shooting of the Canis lupus species for the 2006-2007 period.*

- a decree from the Ministers of Ecology and Sustainable Development and Agriculture and Fisheries of 13<sup>th</sup> April 2007 *authorising the limited culling of wolves (Canis lupus) for the 2007-2008 period.*

- a decree of 16<sup>th</sup> April 2007 pursuant to article 5 of the decree of 13<sup>th</sup> April 2007 *authorising the limited culling of wolves (Canis lupus) for the 2007-2008 period.*

Within the context of the interministerial decrees regulating the authorisations for the limited culling of wolves, a certain number of decrees by *préfets* were made to apply at the *département* level the technical intervention protocol for the wolf population defined nationally. A table setting out all the prefectural decrees made since 2004 is included in Appendix I of this document.

## **I.C.2 Analysis of national case law**

The ministerial decrees regulating the derogations to the status of the wolf as a protected species have been subject to court appeals. Until now, the *Conseil d'Etat* has ruled on the side of the authorities through the following rulings:

- judgment of 20<sup>th</sup> April 2005 rejecting the action against the decree of 12<sup>th</sup> August 2004
- judgment of 26<sup>th</sup> April 2006 rejecting the action against the decree of 17<sup>th</sup> September 2004 amending the decree of 12<sup>th</sup> August 2004
- judgment of 10<sup>th</sup> July 2006 rejecting the action against the decree of 17<sup>th</sup> June 2005
- judgment of 4<sup>th</sup> February 2008 rejecting the action against the decree of 24<sup>th</sup> May 2006

In its ruling of 20<sup>th</sup> April 2005 the *Conseil d'Etat* considered that the authorisation to kill four wolves in 2004 did not disregard the goals of the "Habitats" Directive or the interministerial decree of 17<sup>th</sup> April 1981, deeming in particular that although these provisions "*subordinate the destruction of the wolves to the condition that no other satisfactory solution exists to prevent serious damage to livestock, the evidence provided by the case shows that possible alternatives, either for protecting the flocks, such as shepherding and nightly gathering or for distancing the wolves such as scaring and diverting to less sensitive areas have already been deployed to different degrees by the public authorities and do not allow a satisfactory balance of the public interest that oppose, on the one hand, social and economic interests and on the other the protection of the environment; (...) that the 4 animals in question in the challenged destruction measure represented on the date of this decision around 10% of the minimum number of wolves permanently established in France (...); that the ONCFS technical memorandum drafted in March 2004 set out the possibility of a limited culling of the same order based on the average population forecasts set out in a 2003 study by two CNRS researchers; that it does not appear based on the evidence of the case that on the date of the challenged decision the main hypotheses on which these forecasts were based and in particular the rate of growth of the wolf population had been invalidated.*"

The decree of 10<sup>th</sup> July 2006 which rejected the action for annulment made against the decree of 17<sup>th</sup> June 2005 deemed that considering the overall volume of predation usually observed in France "*the condition (...) requiring the existence of serious damage to livestock must be regarded as having been met once these figures (...) establish the existence of widespread disturbance affecting the region's livestock farming*"; this decree furthermore acknowledges the lack of any other satisfactory solution except for shooting where the flocks are subject to protective measures and scaring of the wolves is undertaken; finally this ruling deems that "*article 16 of the Habitats Directive and article 3 paragraph 3 subordinate the destruction of the wolf to the maintenance, in a favourable conservation status, of the populations concerned within their natural area of distribution; that this condition (...) must be judged, in accordance with the interpretation given to it by the European Court of Justice in relation to the whole of the European territory of the Member States in which the directive applies; (...); that the challenged measure, on account of it limiting the shooting to six animals and of the size of the wolf population judged within its natural area of distribution*

*neither disregards the goals of the "Habitats" Directive nor the interministerial decree of 17<sup>th</sup> April 1981."*

The ruling of 4<sup>th</sup> February 2008 which rejected the action against the decree of 24<sup>th</sup> May 2006 judged that *"that damage has regularly increased since 2003 and in particular between 2004 and 2005; that the request for the use of defensive shooting is subordinate to the strict rules judged by the prefectural authority which may allow such shooting; that the condition set out in article 16 of the Directive and article 3 paragraph 3 of the interministerial decree of 17<sup>th</sup> April 1981 departing from the protection of the wolf due to the existence of serious damage to livestock must be considered as having been met once a high number of accidental deaths of sheep establishes the existence of widespread disturbance to livestock farming (...)"*. As far as the lack of other satisfactory solutions is concerned, the decree allows that *"the other possible solutions continue to be used with strong encouragement by the public authorities (...); that however these protection measures alone cannot guarantee a satisfactory balance of the public interest that oppose, on the one hand, social and economic interests and on the other the protection of the environment" (...)*; that finally, it does not appear that *"the resort to the defensive measures set out in the disputed decree presents a danger that would endanger the wolf's presence within the country"*.

The *Conseil d'Etat* therefore judged that the decrees authorising the limited shooting of wolves between 2004 and 2006 were perfectly legal with respect both to the goals of the "Habitats" Directive and the provisions of the interministerial decree of 17<sup>th</sup> April 1981.

This case law gradually ensures a better control of the provisions for managing the wolf and backs the French approach of adapting the intervention measures for this species in a way that is proportionate to the means employed for ensuring its coexistence alongside human activities and livestock farming in particular.

## II. Ecology of the wolf

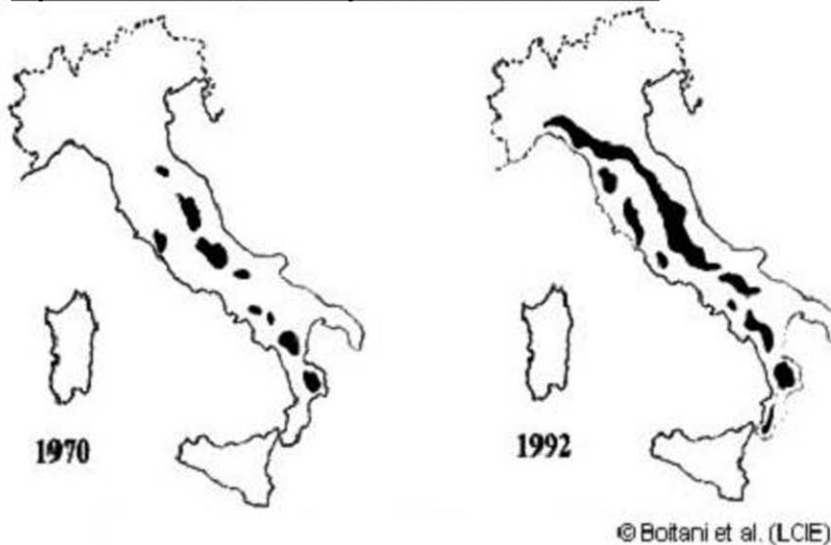
### II.1. Distribution range

#### II.1.1 Presence in Western Europe

Originally distributed over the entire holarctic region with the exception of North Africa, the wolf (*Canis lupus*) was subjected to eradication campaigns in several countries of Western and Northern Europe between the end of the 19<sup>th</sup> century and the first half of the 20<sup>th</sup> century. In France, the species disappeared just before the 1940s (the last confirmed sighting dates from 1939) (see Appendix II).

Of the bordering countries, only Spain and Italy still have significant populations of wolves. In Italy, the wolf is present discontinuously along the chain of the Apennines as far as Sicily. The Abruzzes were a refuge for a remaining population of wolves until the 1970s. Following the protection of the species, the population started to increase and recover, recolonising the peninsula and spreading both southwards and northwards as far as the Alps in the last thirty years. According to the sources used, numbers on Italian territory in 2008 are estimated to be between 500 and 800 individuals.

#### Expansion of the wolf in Italy between 1970 and 1992



### Situation in 2005

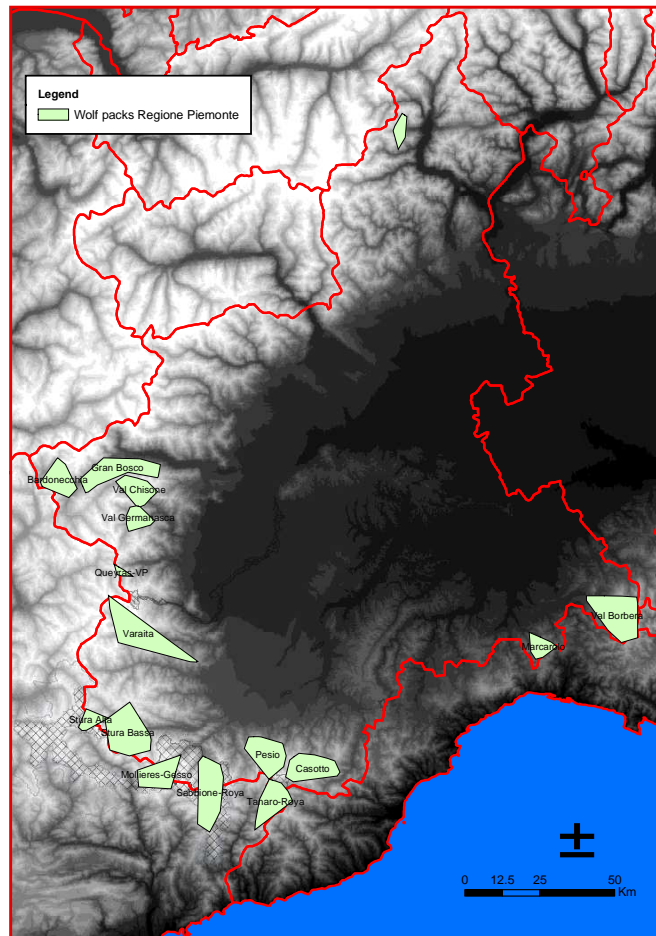


The Italian Alpine area was home, in 2007, to between 45 and 55 resident individuals spread among 14 packs (Progetto lupo<sup>1</sup>, 2007) of which 5 currently cross the border with France (not counted in the French population).

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<sup>1</sup> Wolf project (2007): The wolf in Piedmont: action for knowledge and conservation of the species, for the prevention of losses to domestic livestock and for the implementation of a regime of stable coexistence between the wolf and economic activity. 2007 Report. Piedmont Region.





*Territories of wolf packs identified in the Piedmont Region in winter 2006-2007 (source Progetto lupo, 2007)*

In Switzerland, 5 different wolves were identified in 2006 all within the Alpine area. All of these do not belong to a formal pack, but appear however to be stabilised on the various sites. As part of the Swiss wolf management plan a total of 5 wolves have been legally killed since 1999 with the aim of preventing serious damage to domestic livestock.

In the Iberian Peninsula, the wolf population is estimated at 2,500 individuals in the north-west quarter of Spain and in the surrounding area bordering on Portugal. The population is expanding southwards and south-eastwards. The species is also present in the Spanish Basque Country. The population growth rate north of the Duero River appears to be around 15% per year but lower across the remainder of the distribution range. The eastward expansion of the Spanish population may possibly contribute in the future to wolf colonisation in the French Pyrenees.

In the Scandinavian Peninsula, the population remained low until the 1990s ranging between 1 and 10 wolves within a single pack. The wolf population started to increase after the formation of a second pack with a 25% annual growth (Liberg, 2005<sup>2</sup>). The population is currently estimated at around 160 animals.

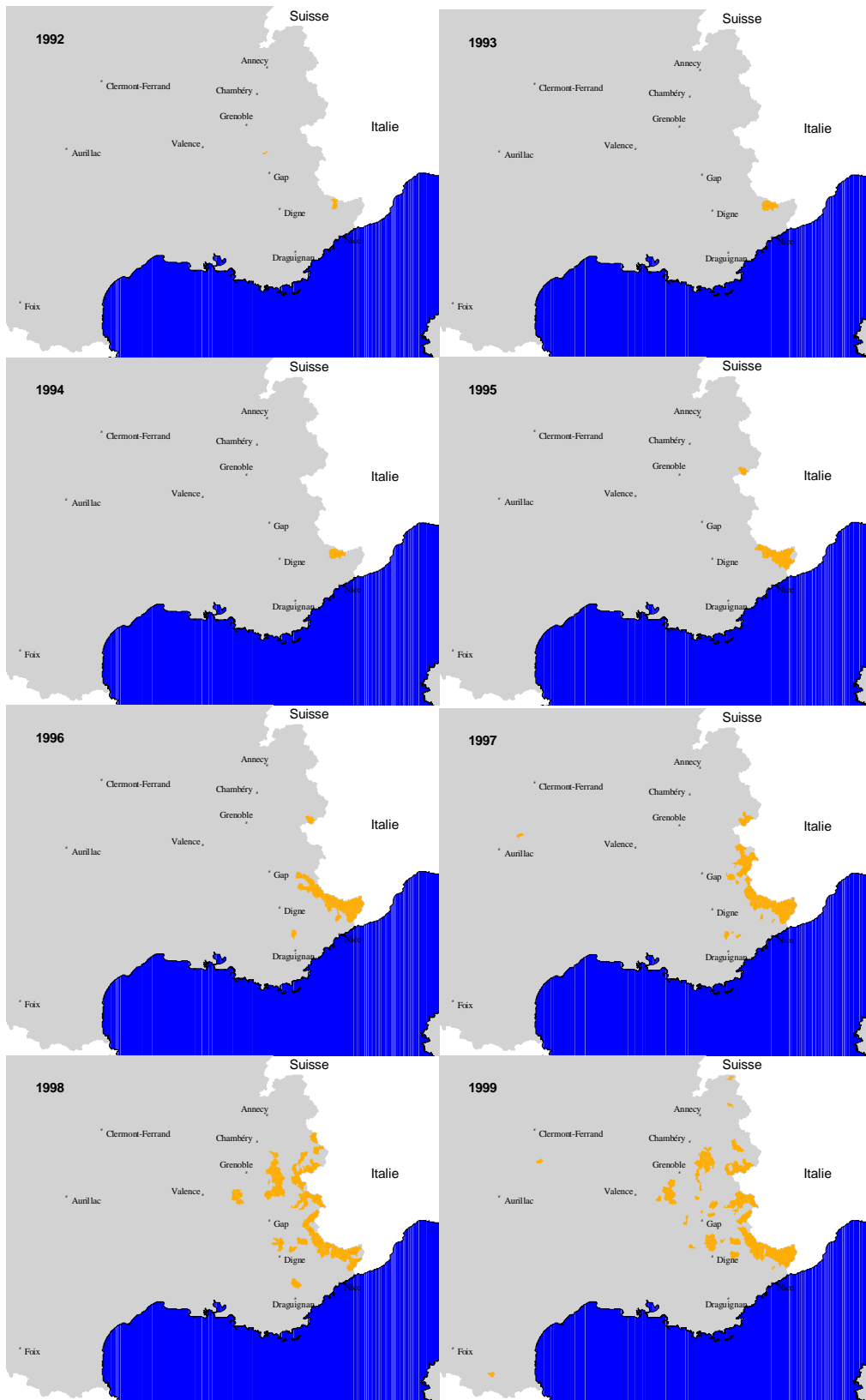
In Europe, the diversity of the monitoring methods used to find out about changes in the population of large carnivores limits the possibilities of making international comparisons. However, a general trend seems to be revealed: among 25 European countries recently surveyed, the wolf populations in at least 20 countries are stable or are rising.

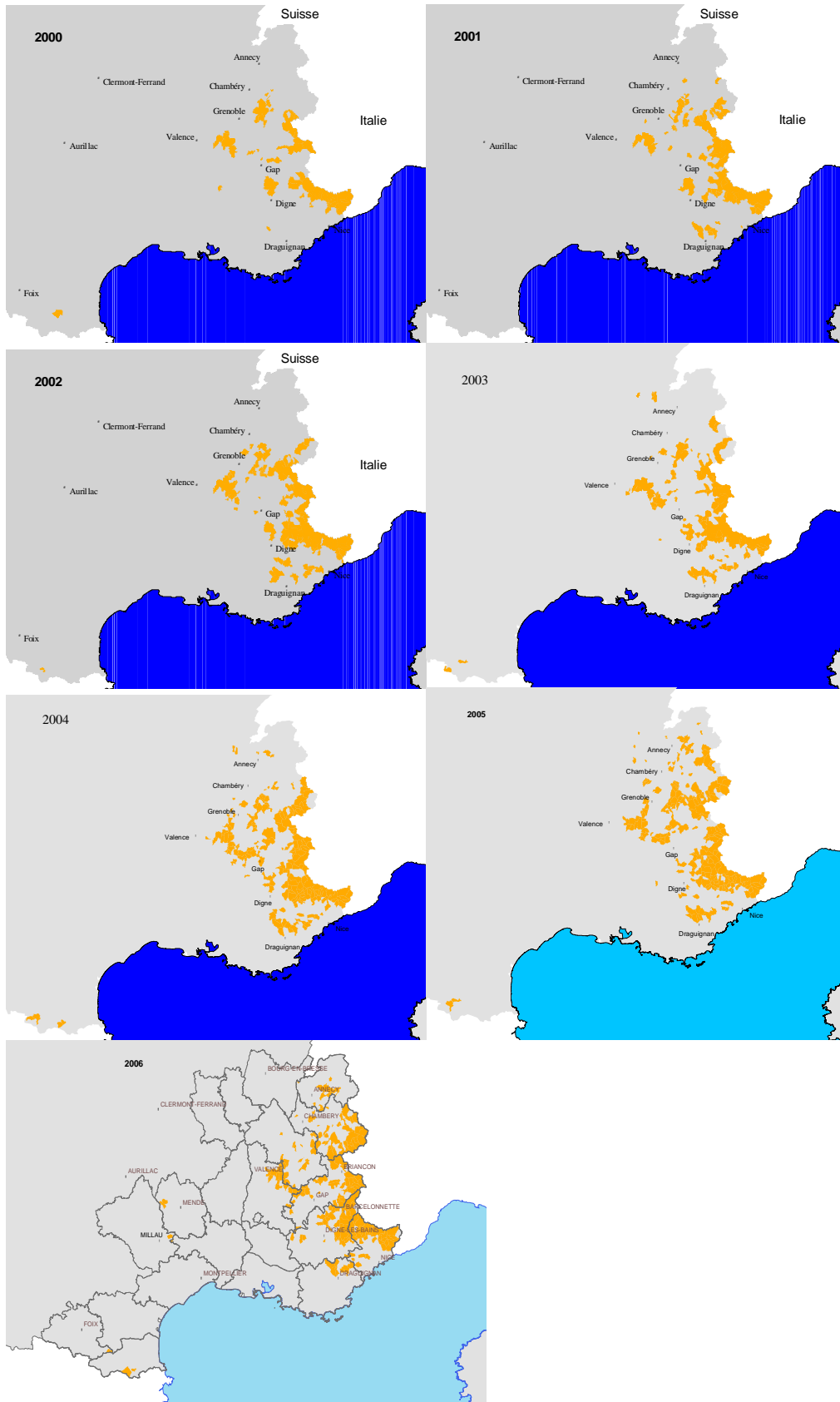
<sup>2</sup> Liberg O. (2005) Genetic aspects of viability in small wolf populations with special emphasis on the Scandinavian wolf population. Report from an international expert workshop at Färna Herrgård, Sweden 1st – 3rd May 2002

## **II.A.2 Species distribution in the Alps (France-Italy-Switzerland)**

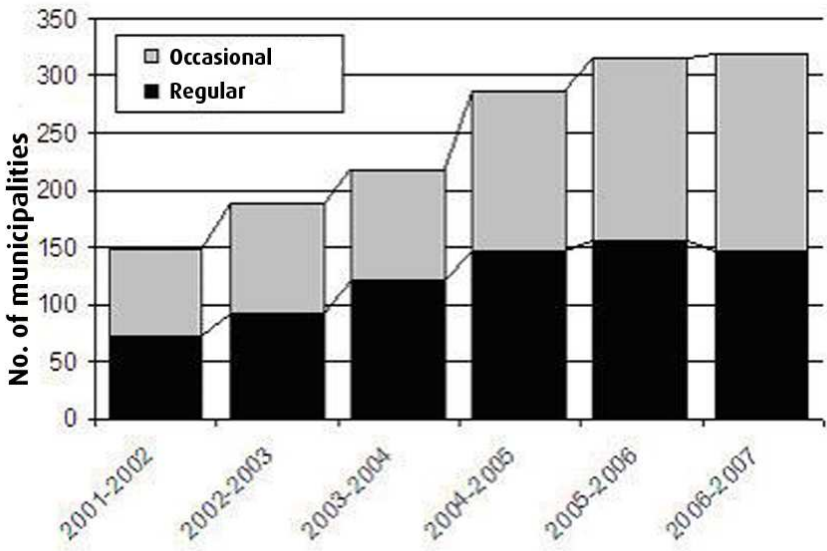
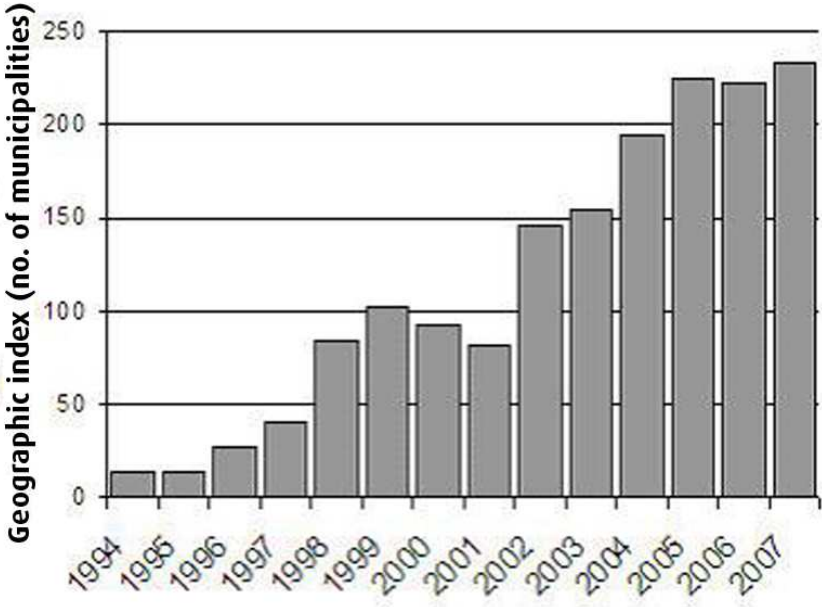
The natural wolf recovery in France followed the progressive expansion in the last thirty years of the Italian population which began in the Apennine chain. After the first confirmation of the presence of two animals in Mercantour (south-east France) in 1992 and a wolf killed in Les Hautes-Alpes a few weeks later, the colonisation process then progressed northwards along the French Alpine chain towards the north with the "bump" characteristics already demonstrated elsewhere in Europe and the United States. Monitoring carried out yearly by a network of specially organised and trained wolf-lynx correspondents along with the use of complementary non-invasive molecular tools has enabled a reconstruction of the dispersion processes and the installation of the packs to be made.

*Illustrations: Municipality distribution maps of the wolf's presence between 1992 and 2006. The distribution is based on all the probable or confirmed indications as well as the reports of attacks on domestic livestock for which the responsibility of the wolf has not been ruled out (Sources: Wolf/lynx network / ONCFS supplemented by LIFE MEDAD/MAPAR Report: the return of the wolf to the French Alps 1999-2004: 2004 final report.)*





The annual trend in the number of municipalities with a wolf presence shows an overall positive spatial dynamic over the monitoring period. Geographical growth combines both the switch of temporary presence into regular wolf presence (pack formations) with the colonisation of new areas each year. In 2007, a slight stabilisation was observed.



In addition to the areas with regular wolf presence in winter (animals holding a territory), a high number of presence signs are collected over space and time. These signs make up the basis of the so called "occasional presence" areas and depict new colonisation mostly due to the dispersion of sub-adults. In some of these areas, some attacks are also recorded. The area changes from the occasional to regular category only once the wolf's presence is recorded (through sign surveys) for 2 consecutive winters within the same area.

The detected species distribution area (number of municipalities with at least one validated presence sign) has been increasing since the reappearance of the species in 1992 by around 25% per year on average. Outside the Alpine range, presence signs outside the Alps have been recorded in the centre of France in the Massif Central (Lozère in 2006, Gard and Aveyron in 2007, and more recently in Le Cantal in 2008). Wolf occurrence (Italian haplotype identical to the one in the Alps) continued to be detected in the eastern part of the Pyrenees (SW France) in 2008 (See maps above).

## **II.B – Population trend**

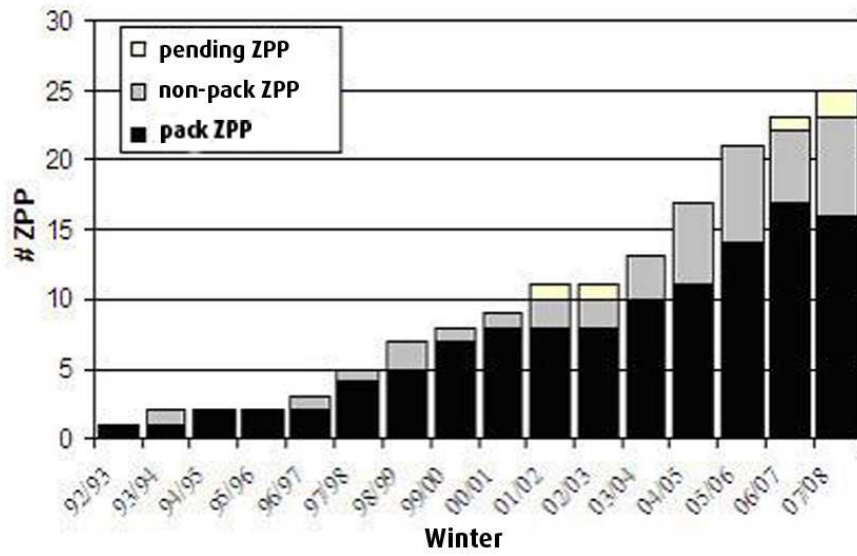
Biological indicators have been developed and tested to monitor numerical and geographical population trends using presence signs. For the demographic aspects these concern:

- the number and trend of areas with sedentary animals (ZPPs), classified as pack structured or non-pack (a pack is defined as having at least one male and female during 2 successive winters or breeding evidence – Wolf alpine group, 2003);
- the minimum number of wolves alive detected within these ZPPs during winter, by snow tracking and trend (EMR);
- an estimate of the total number of individuals present in the whole population through "Capture-Mark-Recapture" modelling process (CMR), carried out by the genetic signatures on faeces, hairs, urine, blood or tissues, with the individual monitoring of a sample of animals, CMR models make available an estimation of the probability of not detecting an animal (so called detection probability). For the 13 years of molecular tracking (1994 to 2007), the genetic analyses identified 207 different wolves among the whole period. This total represents all the detected flows (birth, death, dispersion) for the whole period and also includes the animals having continued their dispersion to neighbouring countries (Switzerland, Italy and Spain).

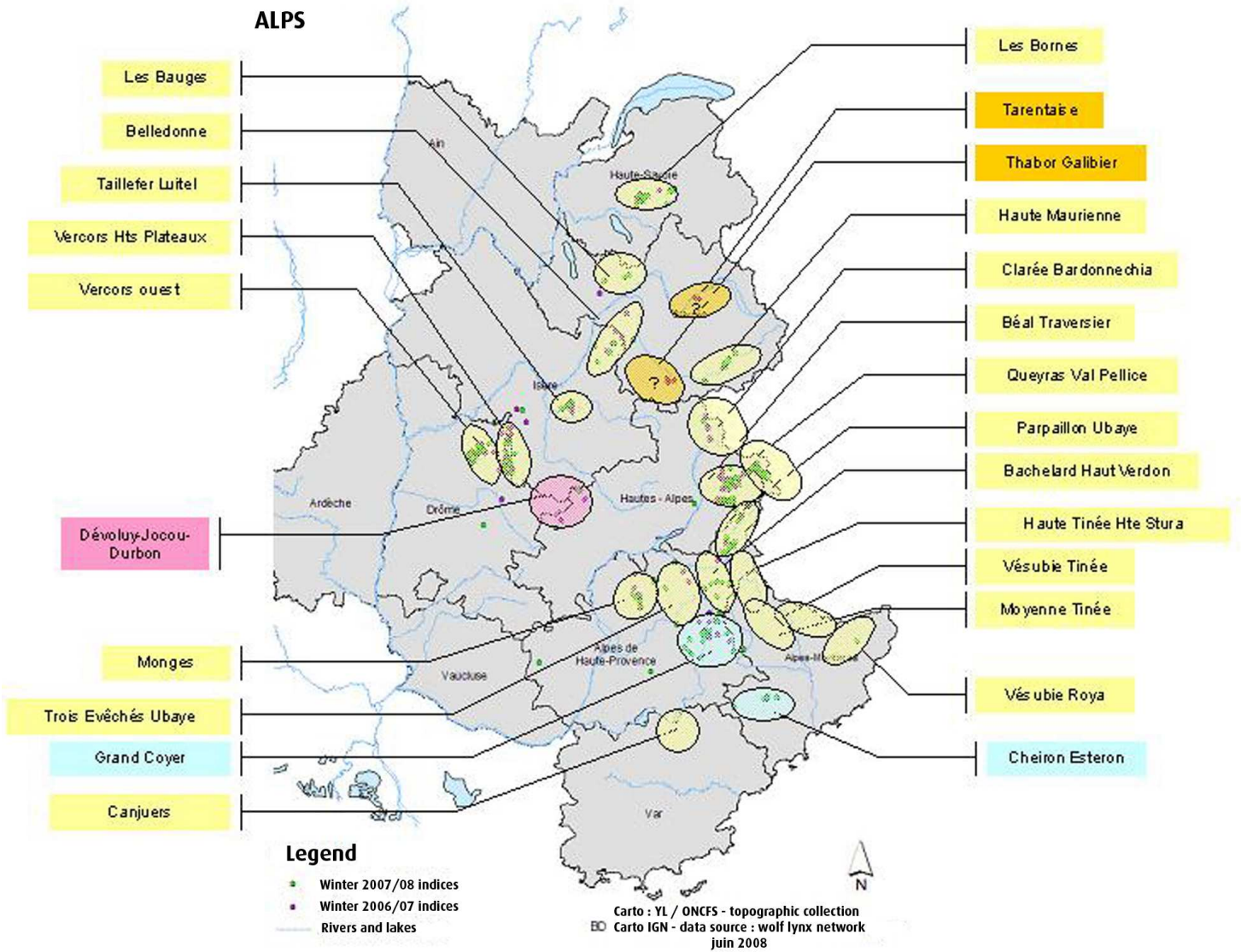
### **II.B.1. Dynamic of pack formation**

Because of the wolf's social structure, the territory (one or several wolves holding an exclusive territory) is the functional unit of a wolf population to the extent that a single litter per year and per pack is possible (barring exceptions).

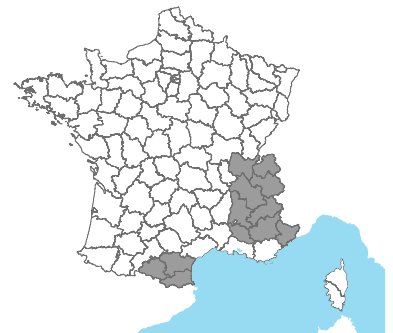
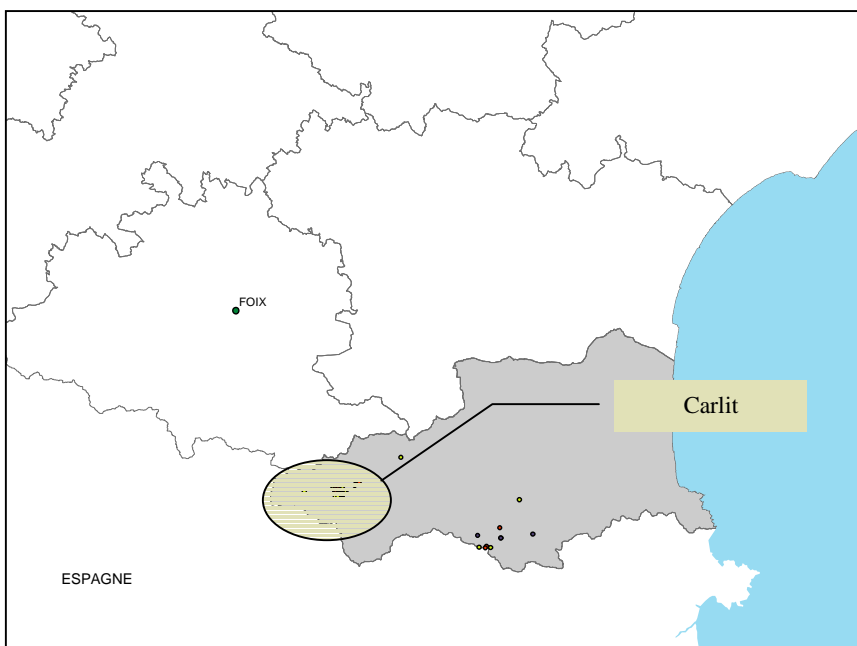
Whereas the number of wolves living within each pack can vary drastically from one year to another (depending on reproduction quality and mortality), the number of these ZPPs seems to be the best indicator of the species' conservation status and it has been regularly increasing since the beginning of the 1990s. Thanks to the first level of monitoring implemented through the Wolf/Lynx expert Network (see section V), so called "coarse-grained monitoring", 25 wolf (pack and non-pack) territories have been established within 15 years of which 16 are pack structured (see map below). Breeding has been recorded in 9 of these packs. The number of ZPPs detected has been increasing since 1993 by around 22% per year on average, and by 15% for the 2000-2006 period. Overall, the exponential increase of pack formation equates to a doubling of the population every 5 years.



Since the species is territorial and organised in packs, this population growth is accompanied by the colonisation of new territories by the species (See map below).



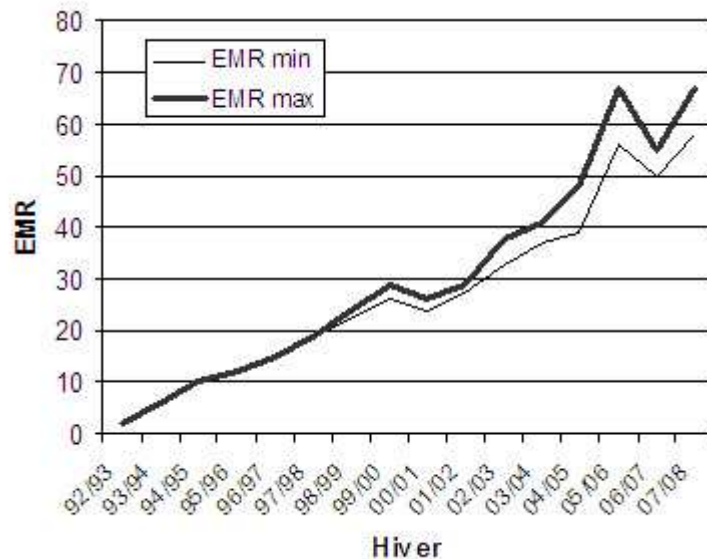
Sources: Wolf/lynx network journal No. 19 ONCFS (ed).





## II.B.2 Indirect monitoring of the numbers of wolves in France:

An abundance index (EMR) correlated with the estimated size of the actual population (using CMR) has been set up: EMR is the minimum number of animals detected during the standardised snow tracking sessions implemented for all packs. EMR is obtained by adding together the minimum number of wolves in each ZPP observed at least twice in the winter.



The EMR have increased by around 17% on average per year since 1994 and by 20% on average in the 2000-2005 period. The EMR variation between 2006 and 2007 is difficult to interpret in terms of a trend, in particular, because of the long snow-free period during the 2006/2007 winter to which the EMR are very sensitive; For the 2007/2008 winter, this numeric indicator records 58 to 67 wolves installed in the ZPPs, bringing the number down to a value almost equivalent to that of 2 years ago. As a consequence, EMR can only be interpreted as a numerical trend across time instead of a numerical value.

The analysis of the variations in the demographic and spatial indicators provides information about the underlying rate of increase in the wolf population. These indicators are updated annually. However, despite being methodologically detailed the CMR estimate of population size is only available about two years after the period being analysed (the time required for the collection of the excrement in the field, their genetic analysis and subsequent modelling) being then less attractive for current management application. However, it is very useful for later validation of the other numerical indices as a reference. As far as the estimate of the numbers of the wolf population is concerned, EMR and CMR have their own limitations:

- the EMR only concern a minimum number of individuals detected within the ZPPs. EMR is then an underestimate of the actual numbers within the ZPPs, and therefore an underestimate of the total numbers of the population which includes both the sedentary animals and dispersers;
- although EMR do actually reflect the whole population (CMR Based), the population size at time  $t$  can only be estimated taking all the precautions using the link function previously established  $CMR=f(EMR)$  ( $CMR = 2.3 \times EMR$ ).

The latest CMR modelling is from 2001 and gives an estimate of 87 individuals (95% confidence limits = 46 – 137).

In 2007, by a simple projection of the  $CMR = f(EMR)$ , the French wolf population may be estimated at around 150 individuals. Geographic and demographic indices show a significant increase. This conclusion is strengthened by the convergence of the various indicators even though they are independent in their methodology. This  $\lambda = 1.18$  population growth rate observed in France is at least equal, or perhaps greater than that of the population of "neighbouring" wolves. The maximum theoretical growth of this species for a population undergoing a colonisation phase is 46% per year and decreases to a maximum 18% a year for a spatially stabilised population. In the literature, observed growth of 25 to 40% per year is found with occasional values of 100% annual growth over a short period of time for a given pack. Thus the conservation status of the species in France shows a small-sized population, evolving however with a positive demographic trend.

Spatially, growth mainly comes about within the Alpine massif. The detection of individuals in the Massif Central is recent; those detected in the eastern part of the Pyrenean chain since 1999 do not show any particular development. It is extremely difficult to forecast the spatial and/or numeric development of a species for which the demographic outcomes are highly variable and associated with strong plasticity in adapting to various environments. However, models combining spatialised demographic data with GIS interfaces (Geographic Information Systems: geographic data analysis software) may hypothetically provide a reasonable and credible forecast and are currently under study to see how they may be applied to the wolf in France.

In all, over the Franco-Italian-Swiss Alpine range and with the current state of knowledge in 2008, there are at least 34 wolf territories (pack or non-packs) for the species among which 26 are packs (i.e. 1M + 1F for 2 successive winters or identified breeding).

## **II. C. Biology**

The wolf is a species which is able to live in a very wide variety of biotopes: cereal crop areas and pine tree plantations in Spain, eucalyptus plantations in Portugal, the semi-arid plateau of the Golan in Israel/Syria, the Sinai desert in Egypt, Arctic areas of Siberia, large Polish forests etc. It can adapt its strategy for occupying a territory to human pressure by preferring to avoid areas where there is a strong human influence; Forested areas remain an essential factor for the presence of the wolf, offering it a place of refuge during the day as well as sites for giving birth to its young. The forest is also often home to the game required for the pack's survival. In the mid-19<sup>th</sup> century, it was present throughout Europe in all environments (open country, mountains, valleys, forests etc). In France, wolves were always present in the forests on the upland and mountain slopes (at between 500 and 1,500 m of altitude). Campaigns to rid areas of the wolf gradually pushed the wolf into areas of refuge in still less populated areas, especially on higher land. Today the populations are mainly located in mountainous areas: The Cantabrian Mountains (Spain), the Apennines (Italy), the Alps etc. However, the species is not restricted to mountainous environments. On account of the behavioural flexibility of the species, the development of populations, in particular in France, could bring with in the next few years a gradual colonisation of areas of lower altitude or open country.

The density of wolf populations is generally low, of the order of one individual for 100 sq. km.

Wolf mortality may be due to several natural factors: malnutrition which leads to the death of

around 50% of wolf cubs, fights between [packs and/or individuals](#), hunting accidents and various canine diseases (distemper, parvovirus, leptospirosis, Rubarth hepatitis, scabies, echinococcosis etc).

### **II.B.1. Social structures**

Wolves live in packs of variable size depending on the density of prey (from 2 to 15 individuals according to the region). In France they rarely exceed 5 to 8 individuals. Links are very strong within the pack as the members are often related. Breeding is generally reserved to the dominant pair.

### **II.C.2. Territoriality**

Wolf packs live over wide areas which cover all of their needs. These areas are made up of several entities which have various functions:

- living space, very extensive and undefended within which the pack can find the food it needs;
- territory, a more restricted area but strictly defended against other packs or outside individuals. Within its perimeter breeding, protection, rest and feeding are assured. Its surface area varies depending on the latitude and abundance of the prey: the fewer the feeding resources, the bigger it is. For wolves of Italian lineage, it is of the order of 150 to 250 sq. km. Its use is not uniform throughout the year: while the young are being raised, the pack is more sedentary around the den and meeting places. The occupation of the territory also depends on the seasonal movement of the prey.
- the den where the female will give birth and raise her young in their first few weeks is indispensable for breeding. The territory has at least one den that is used for several consecutive years.
- the meeting place is where the pack meets in the summer and the start of autumn (while the cubs are being raised). When the young are 6 to 10 weeks old, the pack leaves the den for this place. The cubs, sometimes accompanied by an adult, wait there for the other members of the pack while they are away hunting. A territory has several meeting places which are used successively (between 10 days and 2 months per site) until the cubs are able to follow the adults. The meeting places are of a fairly small area (< 1ha) and are in an open area near water.

Besides the availability of food, there are two main limitations to the installation of a new pack on a territory. The first is social: in an area where the packs are close, it is very difficult for new individuals to find a free area to move into. This is now the case in much of the French Alps which strengthens the phenomenon of the colonisation of the other mountain areas. The second is anthropogenic: it is linked to human occupation of the territory and the density of infrastructure. It is rare for pack territories to be contiguous: there is often a "buffer zone" non-frequented by wolves between two packs.

Dispersion for wolves is very high since they often migrate over several hundred kilometres before settling in a new territory. Dispersion may be due to a physiological change (rut, competition for breeding), attacks (dominance), social pressure (only the dominant animals breed) or feeding restrictions.

There are 2 preferred dispersion periods in the year, both linked to social tensions between the group's individuals:

- winter (from January to March): tension is due to competition for breeding where the dominant female and male impose themselves as breeders;
- autumn (October to November): at the time the young of this year (born in May) begin to join the group for hunting.

Dispersion involves both males and females and mainly sub-adults. A quarter to a third of individuals may disperse. Most are young wolves younger than 2 years old although occasionally subordinated adults do so later. Dispersion is mainly done by lone individuals

### **II.C.3. Hunting**

To maximum its hunting success, the wolf selects the prey which is more readily caught (individuals which are young, old, diseased or wounded) and less dangerous. The wolf will more easily kill species whose ability for defence and escape is limited, such as a mouflon in snow. In the absence of means of protection, domestic prey can be an easy option.

The number of individuals in the pack directly influences hunting success: the larger it is, the better its success rate. However, this relationship is not linear and young wolves younger than 2 years old and inexperienced only contribute marginally since their real cooperation during the hunt (relaying while chasing, ambushing etc) is very rare. Efficiency expressed by the number of wolves appears to be optimal in the case of an experienced pair. Success also depends on various other factors such as the climate and human activity. Heavy snow is generally more favourable to the wolf as it sinks less deeply than its prey in snow. Moreover, the presence of snow lessens the possibilities for access to food for herbivores which has a knock-on effect on their ability of escaping. Conversely, a mild winter encourages the development of individuals which are stronger than normal and more likely to be able to escape the wolf.

The amount of prey killed is not directly proportional to the number of wolves present in a pack: a lone wolf will find it harder to hunt wild prey of a large size than an animal in a pack, it may then have a greater tendency to seek out domestic animals.

### **II.C.4. Diet**

The wolf is at the top of the food chain in its ecosystem. It is not preyed on by any other species (at least for adults). An opportunistic carnivore, it adjusts its diet to the region in which it lives, to the season and to the type and density of prey. Its preferred prey are ungulates (in France: Red Deer, Roe Deer, Chamois and Isard, Mouflon, Ibex, Boar etc) but does not discount smaller prey such as lagomorphs (rabbit, hare), rodents, birds, reptiles etc. The main species of the wolf's diet is in general the most common species of the region provided its predation is not too dangerous. The wolf may also feed, according to conditions, on carcasses, fruit or even waste. On average a wolf needs to consume 17% of its weight in meat every day, i.e. 4 to 5 kilos for a European wolf. It has no hesitation in eating fruit, a source of vitamins, and grass used above all as a purgative.

The various studies carried out on the wolf's diet seem to show that it prefers to hunt wild ungulates. However, in livestock farming areas it also attacks domestic flocks/herds and especially small ruminants. The proportion of domestic prey in its diet is generally low, but varies according to the season (greater during the summer months) and according to the region, depending in particular on the density of wild ungulates.

### III. Interactions with man

#### III.A. Interactions with livestock farming

##### III.A.1. The situation of livestock farming in France

French agriculture plays an important role at the European level. In 2000, it was the leading producing country of the Union, in particular for cereals, poultry and beef.

According to the data from the 2000 agricultural census, France has a wide diversity of farm types which depend on the characteristics of the soil and climate but also on history, the local socio-economic context and the direction of agricultural policy.

Of around 663,800 farms counted in 2000, over a third specialise in herbivore livestock. Around 20% practice mixed farming.

An important part of herbivore livestock farming is concentrated in the west (Lower Normandy, Brittany and Pays de la Loire regions) as well as in the mountains.

##### Sheep farming

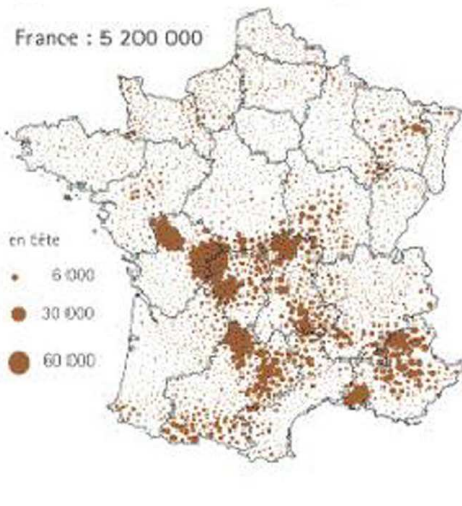
In 2000, 9.4 million sheep were recorded including 5.2 million ewes for lamb production and 1.4 million dairy ewes, spread respectively over 87,870 and 6,070 farms.

Three-quarters of the animal numbers are concentrated in four areas: Les Alpes du Sud and la Crau, the south-west of the Massif Central, the West of France and the western Pyrenees.

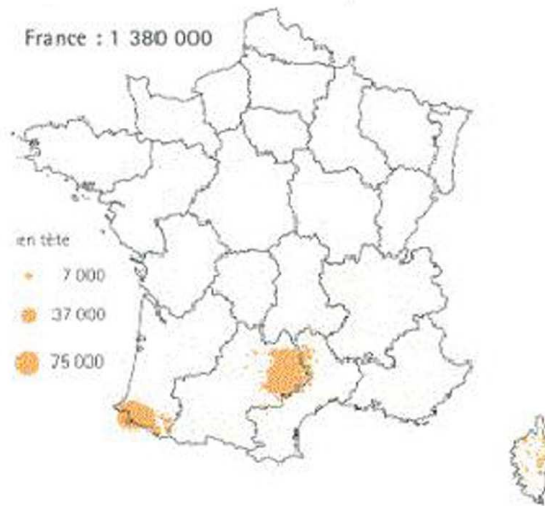
The number of farms raising sheep in 2000 showed a decrease of 40% compared with 1988, the date of the previous agricultural census. This in particular shows the difficulties faced by producers of sheep meat in respect of the organisation of the common market.

Dairy livestock has increased, concentrated in three traditional areas thanks to the openings afforded by the AOC produced cheeses: the Roquefort area (*départements* of Aveyron, Le Tarn, Le Tarn et Garonne, La Lozère, Le Gard, Hérault and Aude) accounting for 80% of the volume collected, Les Pyrénées Atlantique (16%) and Corsica (3%).

Numbers of ewes for lamb production by canton in 2000



Numbers of dairy ewes by canton in 2000

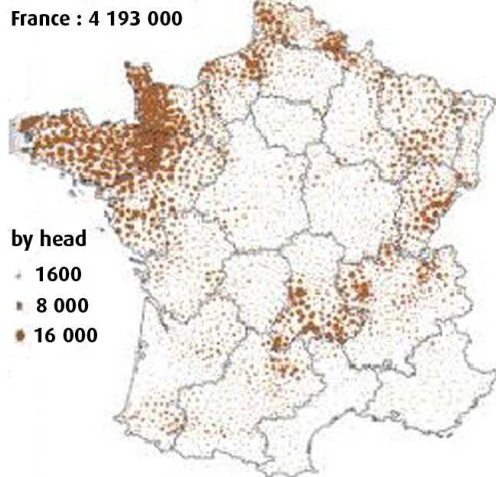


Source: Agreste-Cahiers nos. 3 and 4 (2001)

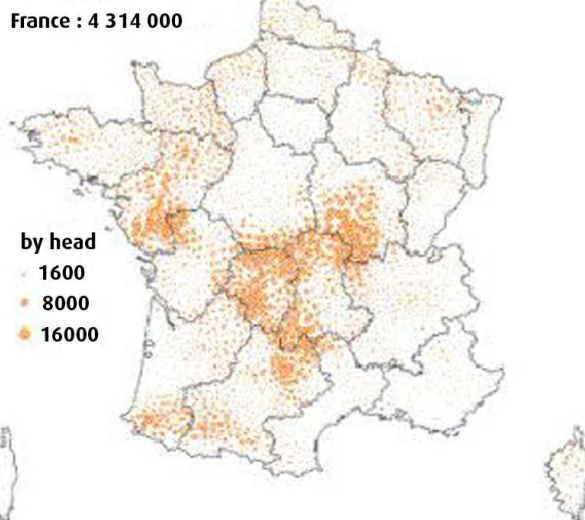
### Cattle farming

With 20.3 million head of cattle in 2000, of which 4.2 million were dairy cows and 4.3 million suckling cows spread respectively over 128,300 and 166,900 farms, cattle farming is present over the whole country. It is concentrated however, primarily in the West of France for dairy production and in the centre of France for beef production.

Dairy cows by canton in 2000



Calving cows by canton in 2000



Source: Agreste-Cahiers nos. 3 and 4 (2001)

In 2000, one suckling cow out of three was in the Massif Central where cattle farming is an essential activity: it represents 90% of the farms and the agricultural economic dimension of Le Cantal as well as 80% of farms and 70% of the agricultural economic dimension of Corrèze.

It is 70% of the agricultural economic dimension in Le Doubs and Les Vosges.

#### Other types of herbivore livestock

Goat farming represents 1.2 million head. Besides the main area found in the Poitou Charente region and the Centre region, it includes a production basin in Rhône-Alpes region and between 1988 and 2000 began to develop in the west of the Massif Central.

The farming of equidae (horses, donkeys) is expanding with 449,000 animals.

#### Farming in mountain areas

Mountain areas represent nearly a quarter of French territory. A sixth of French farms, often specialising in herbivore farming were located in these areas in 2000.

Mountain areas include: 22% of suckling cows and 17% of dairy cows, 32% of suckling ewes and 88% of dairy ewes, 23% of goats and 20% of equidae.

The agriculture aptitude of the Jura and Massif Central are reflected by high levels of Utilised Agricultural Land (36 and 48%) whereas Les Alpes du Sud and the Pyrenees devote a greater share to grazing land and common rangeland. In Les Vosges, the forest holds sway whereas Les Alpes du Nord shows more of a balance between the various elements.

An analysis of the dominant technical and economic direction locally shows the wide variety of mountain animal production systems. Independently of the mixed systems, the following specialisations stand out:

- in Les Vosges, dairy cattle (16%) and sheep-goats (15%) respectively share the southern and northern part of the Vosges mountains
- in the Jura, dairy cattle (51%) occupy the northern part due to good value being given to the milk used for making high-quality cheeses with the southern part being more marked by sheep and goats.
- the massif of the northern Alps seems more diverse. Beef and dairy farming (14%) is more of interest in both *départements* of Savoie, with the production of high-quality cheeses; some sheep areas for meat exist in Isère (Oisans) and Savoie (Maurienne)
- in the southern Alps, the sheep and goat system (25%) is found in the high mountains
- the Massif Central is split between the three herbivore sectors: dairy cattle (9%) in the north east (Haute-Loire and Cantal); beef (26%) in the north-west: plateau de Mille-vaches (Creuse and Corrèze), Cantal, Aubrac (Cantal, Aveyron and Corrèze) and sheep and goats (13%) in the south: Monts de Lacaune and Ségala (Tarn et Aveyron), Grands Causses (Aveyron, Lozère and Gard)
- in the Pyrenees, sheep and goats (30%) dominate. A strong specialisation in dairy sheep is noted, to the west of the massif and an important fraction of beef and sheep for meat in the centre and east of the massif.

Finally, an analysis of the average size of farms shows that those which are of a very large size are mainly located in the south of the Massif Central and Les Alpes du Sud. However, all of the Jura, the bottoms of the Maurienne and Tarentaise valleys in Savoie, the plateau de mille-Vaches in Limousin, the central Pyrenees in Ariège and la Montagne Noire in Aude also have large farms.

## Pastoralism

Extensive livestock farming and pastoralism are a leading economic activity in those regions with a strong natural disadvantage and subject to abandonment. They support an ancient cultural heritage and participate in the maintenance of open natural and semi-natural habitats.

Grazing areas, made up of pastures used extensively and seasonally, constitute a more or less large amount of the land depending on the massifs within which large physical and practical differences can be identified.

A large amount of pastoral land is to be found in the mid and high altitude levels, but it also includes many inter-season pastures used in the spring and autumn or even in winter, especially in those areas with a Mediterranean influence.

Around 60,000 mountain farms and a fringe in the southern Massif Central practice individual or collective transhumance.

Highly contrasting situations are observed in terms of the type and origin of the herds and flocks, how the pastures are used and the ownership of the land.

*In the Alps*, the area covered by the previous 2004-2008 wolf plan, high mountain pastures cover 680,000 ha i.e. a sixth of the massif (*Cahiers Agreste no. 41-1999*). In summer they are host to nearly 100,000 cattle and 800,000 sheep. 60% of cattle involved in Alpine grazing are located in the two *départements* of Savoie and two-thirds of the sheep in the south. Cattle transhumance most often remains within the boundaries of the *départements*, although some herds come from Italy, whereas a third of sheep undergo large transhumance (from the Crau plain and plateaux of Le Var). The high pastures are grazed by large flocks (mainly arriving in June for around a 100 days). The mid altitude pastures, at the same level as the permanent habitat and smaller, are grazed for longer, from May to October (closer to the farmhouses, they are of interest to many farmers who do not have to collaborate with others to use this type of land).

Joint management of the flocks is above all developed in Isères, in Les Hautes-Alpes and Les Alpes-de-Haute-Provence. The municipalities own two thirds of high grazing land.

The other grazing land, used in the inter-season, winter or for a period at some time in the year covers 300,000 ha in Les Alpes du Sud.

*In the Pyrenees*, transhumance mainly takes place within the massif, with mainly joint use of the summer pastures (80%) and ownership mainly by the municipalities (60% of the pasture).

*In the Massif Central*, the situation is contrasted, ranging from the high grazing areas of the south (Causses and Cévennes), a place where joint transhumance of sheep is practiced, for example for the garrigues of Le Languedoc, to the close-by Alpine pastures of the north used by suckling systems and mainly farmed individually.

The importance of traditional livestock farming and pastoralism and the diversity of the systems define to a large extent the place that can be given to the wolf in France.

### **III.A.2. Constraints linked to the presence of the wolf**

The presence of the wolf is an important problem for livestock farmers due to its predation and in particular on the flocks of small ruminants, but also because of the constraints caused by the introduction of means of protection and changes in the way the flocks are shepherded.



- **Losses linked to predation**

Predation causes immediate losses during attacks (animals that are killed, injured, have disappeared or have fallen from rock faces). The stress to which the animals have been subjected cause other losses that may be described as indirect (degradation in their state or weight, fewer lambs being born).

In the Alpine massif, the great majority of attacks by wolves are on sheep which represent 95% of the victims.

Although cattle currently compose a very small part of the recorded victims, examples studied in other countries show that they make up the majority of the domestic livestock exposed to the risk of predation (e.g. U.S.A.) and they are also the main victims. Theoretical possibilities for a switch of predation to cattle may therefore be supposed (in particular on young cattle) in some situations, e.g. in circumstances where large wild ungulates become scarce or in the case of a high general efficiency level in the means of protecting sheep flocks.

- **Constraints linked to the use of means of protection and to the adaptation of shepherding systems**

Changes made to pastoral practices due to the implementation of protection measures and an adaptation to the risk of predation have permanent economic consequences for the livestock farmer.

Among these, may be noted in certain cases a degradation in the state of the animals and the health risks linked to a shortening of grazing time and night-time gathering of the flocks as well as an increase in the workload of several hours per day. To these technical-economic constraints can be added the sometimes high amount of stress caused to the farmer.

These changes also have potential impacts in respect of some external features of pastoral farming, e.g. in landscape and ecological terms.

The arrival of the wolf in the inter-season areas in the Alps, at an intermediate altitude, as well as its appearance in other regions such as Midi-Pyrenees, Auvergne, Languedoc-Roussillon and Franche-Comté present new problems linked to the specific characteristics of the livestock farming systems in these areas.

Thus depending on the type of animals produced, the extent of the equipment, the feed system and the length of grazing, the management of calving or lambing, the number and features of the batches of animals and those of the grazing areas (distance from the farmhouse, fragmentation, size etc), daily practices (herding or not, gathering in of the animals at night etc) and on the characteristics of the site (topography, area with covered in scrub etc), the farming system will be more or less vulnerable to predation by the wolf, with variability depending on the season.

Besides the questions of adapting known protection techniques in these contexts, taking into account the risk of predation may lead to changes in the herding system aimed for example at reducing the duration and intensity of exposure of the strategic animals, with inherent consequences in economic and organisational terms for the farmer's work.

## **II. B. Interactions with hunting activities**

As for all large predators, the wolf may have an impact on the populations of wild ungulates. The French context in general and in the Alps in particular is however characterised by a situation of relative abundance for all the species of wild ungulates, even if local disparities continue to exist.

On account of this system with multiple prey and the generalist nature of the wolf, the impact of predation by the wolf is therefore only rarely immediately apparent on the ground, except perhaps locally if the case of the more sensitive prey is considered since it may be maladapted to the habitat (the case of the mouflon in mountain areas), or subject to joint exploitation by human hunting and a numerically high pack of wolves and/or concentrating its search for food over small areas (the case of some populations of roe or red deer locally denser before the arrival of the wolf).

Whatever the case, the risk of the disappearance of any one of these species is excluded. At the most, it is possible to note a more or less marked limitation of prey presenting the best relationship in terms of the cost of capture and provision of calories. Each local situation however remains to be assessed, in particular in respect to the possible interactions with human hunting activities. Among the species concerned by predation in the Alps, the mouflon, where it is present, is the most vulnerable and is replaced in the diet by more common widespread alternatives such as chamois or roe deer depending on their respective abundance as well as red deer.

Little is known about the true impact of the wolf on the structure of the prey populations. Studies carried out in North America on large prey such as red deer shows that wolves tend to select weaker individuals: young, old, diseased, under-nourished etc. The remaining animals are the healthiest and more easily get through the winter, and breeding may also be increased by a string of underlying mechanisms. However, in the case of the exploitation especially of ungulates of smaller size such as is the case in France (chamois, roe deer, mouflons etc), it is not necessarily true that the selection of weaker animals operates systematically. It is therefore difficult to arrive at a conclusion about the quantitative impact on the populations of ungulates given the diversity of the potential prey present in France (sympatry of 5 to 7 prey species according to the massifs). Research studying the system seen "from the prey's point of view" is underway and will be developed, as indicated, in the current action plan (part V.4.).

Independently from its impact on their demography, the presence of the wolf modifies the behaviour and distribution of the ungulates: they become more fearful and watchful, they disperse and seek out more sheltered and protected areas. This change in habits may make it much harder for hunters to approach them.

Overall, the question of the impact of the wolf on wild ungulates must be dealt with in the overall context of a very sharp increase in the populations of roe deer, red deer and boar in the last twenty years. This increase has led to the occupation by these animals of land where they were previously unknown and in very high densities.

The return of livestock guardian dogs in the high pastures may also lead to conflicts with hunters, in particular, with problems of cohabitation with hunting dogs. In some situations, they can also adopt predatory behaviour (chasing, hunting) in respect to the game.

### **III. C. Interactions with tourism**

A possible negative or positive impact of the wolf on tourism has not been measured.

A potential indirect impact through the implementation of measures of protection of flocks has been noted, and more precisely of possible interactions between hikers and livestock guardian dogs. These interactions may lead to conflict from time to time and require, in order to prevent them, the use of awareness campaigns aimed at hikers and cyclists on the appropriate behaviour to adopt, or indeed occasionally measures for limiting potential interactions by the setting up of nets or alterations being made to the routes of some paths.

In Europe no studies have been made on the impact of the presence of wolves on tourist numbers. Although some people claim that the wolf deters tourists, it is probable that the overall impact tends to be positive as is the case in some American or Swedish national parks or closer to us in Spain and in Italy.

### **III.D. Man/wolf interactions**

The risk of aggressive behaviour by the wolf in respect of humans is extremely low, in particular because rabies, an essential factor in these interactions, is no longer present in France except in exceptional cases due to the illegal introduction of infected animals.

## PART TWO

### 2004-2007 REVIEW AND 2008-2012 PROSPECTS

#### IV. Limiting the impacts of the wolf through assistance to farmers

##### IV.A. Protecting flocks/herds against predation

In order to prevent and limit losses due to wolves on the flocks/herds of domestic animals, protection measures were implemented following the return of the species.

The initial measure came about in particular as part of the two LIFE Nature programmes ("The financial instrument for the environment", a financial tool of the European Commission).

The first LIFE-Nature programme 1997-1999, "Conservation of large carnivores in Europe: the wolf in France", was thus implemented with an experimental dimension, mainly in Les Alpes-Maritimes, but also in Les Alpes-de-Haute-Provence and Les Hautes-Alpes. Following this programme, 70 pastoral grants, 66 dogs, 69 mobile pens and 5 fixed pens were funded over these three *départements*. Their use was tested and led to the initial development of the flock protection mechanism.

The second LIFE programme 1999-2003 "The return of the wolf to the French Alps" included developments in the types of protection equipment and the funding offered to farmers. It allowed 390 seasonal jobs as shepherd-assistants to be funded representing around 1,050 months of protection over 4 years as well as the purchase of 205 dogs. Moreover, around 760 mobile pens and 37 fixed pens were acquired between 2000 and 2003.

##### IV.A.1. Review of the actions implemented between 2004 and 2007

###### IV.A.1.1. *The administrative mechanism*

- **The "t" measure of the PDRN**

A new voluntary and contractual measure, funded by the Ministry in charge of agriculture was implemented from 2004 to take over from the LIFE programmes.

This was the "t" measure, included in the national rural development plan (PDRN) 2000-2006 and co-funded by the European Union.

This measure was based on a national legal framework and set out in the decree of 28<sup>th</sup> July 2004 and by ministerial order providing a framework for an Operation for the protection of the environment in rural areas (OPEDER), Large predators.

In 2007, as part of the new programme for rural development and pending the approval of France's Rural Development Plan 2007-2013, a temporary measure was implemented based on national credits along the same lines as the "t" measure.

The "t" measure remunerated, through four options, the increased costs linked to improved protection of flocks against attacks:

- the additional protection time worked by the farmer or a shepherd taken on by the farmer
- the gathering of the flock into a night pen within moveable fences: electrified wires and nets and electrifiers
- the purchase and upkeep of livestock guardian dogs
- the analysis of the flock's vulnerability to predation.

In order to take into account the diversity of the livestock farming systems affected, it was organised according to the size of the flock as well as the duration of its grazing in the area of application of the measure.

This area, defined each year by the *Préfets* of the *départements* on the basis of information supplied by the National hunting and wild fauna office, was divided into two rings, corresponding to the proven area of predation (ring 1) and the short-term likely extension area of predation pressure (ring 2).

The OPEDER Large predators measure was implemented via five-year or annual contracts.

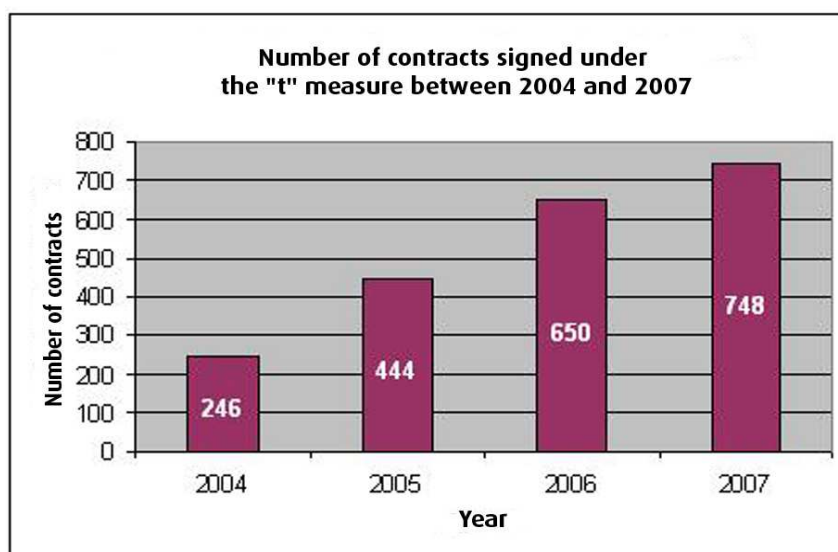
2004 was the year the "t" measure was tried out. Successive technical adjustments were carried out in the following years aimed at improving the system and making it match needs on the ground better, in particular with respect to the issues linked to the colonisation of the Alpes du Nord.

Without being exhaustive, these included a consideration of the case of the farmer-shepherd in the specifications for the protection option, adjustments aimed at the improved protection of small flocks and the possibility of the temporary hiring of a shepherd or assistant shepherd for occasional needs.

The "t" measure was implemented in the Rhône-Alpes and PACA regions within the departments concerned by the presence of the wolf (*départements* 04, 05, 06, 83, 26, 38, 73, 74, 01).

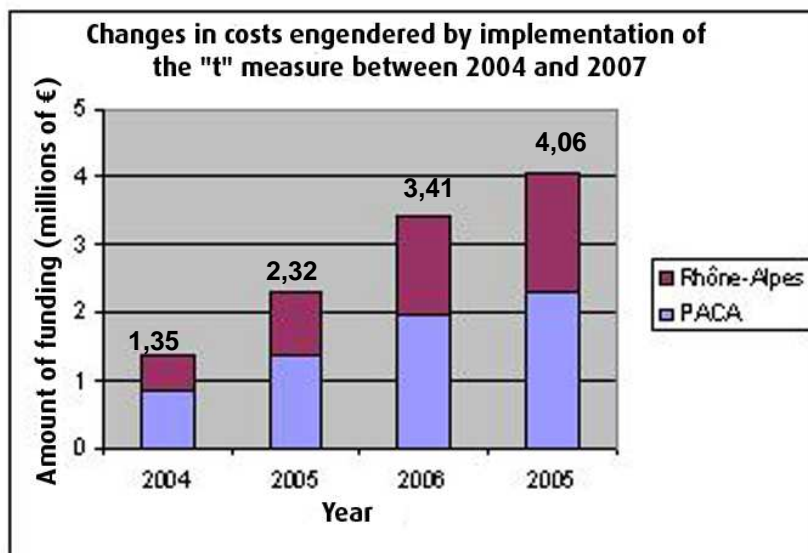
At the end of the LIFE programme, 181 contracts had been signed by the farmers for the deployment of protection measures.

As soon as the "t" measure was deployed in 2004, 247 contracts were signed, a figure which regularly increased until 2007 with 748 contracts as the chart below shows. The great majority of the contracts were made in ring 1, where predation was actually observed.



The number of contracts signed must not be confused with the number of farmers included in the "t" measure since a farmer may have signed several contracts.

Due to the increase in needs linked to the expansion of the wolf population, the financial resources devoted to deploying protection measures have greatly increased: from €1.35 million in 2004, the funding allocated in 2007 reached €4.06 million.



Assistance with protection herding, only available in ring 1 where the "t" measure represents between 80 and 85% of the amount of protection assistance, guardian dogs 10 to 15% and the pens 5%.

- **The assistance mechanism**

#### Emergency measures

In addition to the "t" measure, in 2004 the Ministry of Agriculture set up emergency funding.

Its aim is to be able to respond with greater urgency to situations of predation in sectors where previously the wolf's presence was not observed and where protection measures are inexistent, by enabling the purchase of equipment such as fencing, the funding of a shepherd or assistant shepherd or possibly the purchase of guardian dogs(s).

As part of the wolf intervention protocol, where the use of protection measures constitutes one of the prior mandatory requirements to the issuance of any authorisation for a culling operation, emergency funding constitutes a key element of the process.

Similarly to the amounts granted for funding the "t" measure, the resources made available for emergency funding between 2004 and 2007 increased markedly reaching €280,000 per year.

#### The "Prevention against predation" coordinators

The "Prevention against predation" coordinators, working under the local *département* Agriculture and Forest Divisions, coordinate the deployment of the protection measures of the flocks against predation by the wolf in a technical and administrative support role for farmers in the 9 *départements* concerned.

They contribute to the design, the implementation and the follow-up of the contracts for the protection measures and provide advice and leadership on the ground on a day-to-day basis.

The positions of coordinator, funded through credits provided by the Ministries of the Environment or Agriculture have been integrated into the staff of the MAAP a process begun in 2006 and finalised in 2008.

#### ***VI.A.1.2. Efficiency of the protection measures***

- **Overall efficiency of the measures**

In particular areas of study, a demonstration of the effectiveness of the means of protection has been made in several reports, in particular the reports of the two LIFE programmes and the thesis by Nathalie ESPUNO (Impact of the wolf on wild and domestic ungulates in the massif of the Mercantour, September 2004).

The lessons drawn from these studies indicate the importance of combining the tools, in particular dogs and pens for night-time herding to markedly lessen the risk of attack. Farmers were thus encouraged, in the second LIFE programme to use several means of protection.

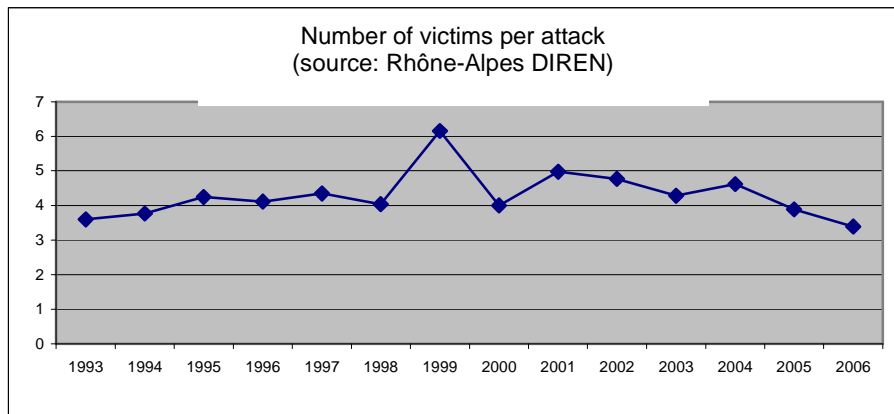
As far as an estimate of the effectiveness of the protection measures for the Alpine range is concerned, there exists a certain number of limits, linked to the data available regarding the protection of flocks and losses (e.g. the "t" measure does not cover all actual protection of the flocks since some flocks are protected without resorting to financial assistance), as well as the possibility of crossing referencing these.

In order to facilitate the use of information both locally and nationally, the Rhône-Alpes DIREN from 2006 set up a data pooling facility allowing some cross-checking.

However, the interpretation of the results of these correlations remains fragile, to the extent that various factors may influence how attacks happen and the effectiveness on the ground of the protection measures: the development of the wolf population, the natural conditions such as the topography, the weather, the vegetation, the availability of wild prey; factors linked to the way the flocks are herded, the deployment of the protection measures and even the type of livestock itself; factors of adaptation over time: a change in the wolf's behaviour confronted by means of protection, a switching of predation to unprotected flocks in colonisation areas and the time required for an optimum deployment of the measures.

Generally, there are varied solutions in response to diverse and complex situations. The areas of recent colonisation constitute a particular case to the extent that a certain amount of response time is needed for a general setting-up of protection measures and for observing their effects.

Over the Alpine range, since 2001, a downward trend in the average number of victims per attack has been noted, most probably linked to the deployment of protection measures.



In the already well-known contexts of the presence of the wolf (summer Alpine pasture), the effectiveness of the means of protection is recognised even if it is not absolute. A certain number of measures may be carried out to improve yet further how they are used and their effectiveness.

Furthermore, the expansion of the wolf population is leading to changes in the affected areas and farming systems: inter-seasonal grazing, cattle farming etc.

Hand in hand with these new contexts come new constraints and compatibility which is often very hard to achieve with the deployment of protection measures, in particular, in how the flock or herd is managed (e.g. management in batches, a division of the grazing land etc), or by the type of livestock (the case of cattle herds for which the use of a guardian dog is more problematic).

- **Guarding the flock/herd**

Assistance for guarding the flock/herd enables the investment in additional time by the farmer to be remunerated or the hiring of a shepherd or assistant shepherd to be financed for deploying the protection means and the management they require.

In 2007, 290 protection contracts involved the hiring of staff, i.e. around 1,200 months of funded guarding. Around 430 contracts concerned the strengthening of practice (fee for farmers).

The role of the shepherd and assistant shepherd is absolutely essential for carrying out the extra work linked to predation, and to the extent that a regular human presence on the site allows for an optimum installation at the right time of the means of protection. However, the work carried out as part of the revision of the wolf plan has shown that there are problems in hiring linked to the lack of qualified shepherds and problems in retaining them.

Two main factors have been identified:

- training which appears poorly adapted to current needs and for which the seasonal nature of shepherding may be an obstacle.
- facilities for shepherds

Above all being able to make decent housing available which complies with legal working requirements is an essential condition for accommodating a shepherd on high pasture land. However, there are disparities depending on the *départements* and policies towards investment for pastoral farming. Some *départements* are therefore faced with major problems linked to the lack and age of facilities in respect to the requirements for a human presence created by the return of the predator (resulting in a "flight" of shepherds to those *départements* where investment has been made).



Livestock farmers are often not the owners of the high grazing land; most often these are municipalities or even private owners, something that can present problems in encouraging investment to be made.

- **Enclosures**

Around 420 contracts in 2007 were for this option.

There are several advantages to the system of gathering the flocks/herds into night pens. Firstly, the fence is a physical barrier between the predator and the livestock, and electrifying it is a dissuasive measure which can lead to a "learning" process by the wolf.

Seconding, gathering into pens makes guarding easier by the shepherd or shepherds, avoids the dispersion of the ewes in the event of an attack and contributes to optimising the efficiency of the protection carried out by the dogs.

The efficiency of the night pen system in the current contexts of the wolf's presence is therefore acknowledged.

However, many drawbacks should be noted in respect of this operating system and of the flock:

- the workload caused by setting up the equipment
- the risks of accidents linked to the layout of the sites or the size of the pen in the event of a panic by the flock; precautions must thus be taken
- impacts on grass consumption and the state of the flock, in particular its health
- the ecological impact on the Alpine pasture, in particular the increase in trampling and nitrogen fertilisation in the penning area (modification of the flora); the abandonment of some areas depending on changes to the range necessary for fast access to the gathering site should also be noted.
- problems in relations linked to interactions with the other users of the space (hunters, hikers).

Moreover, in Les Alpes du Sud the efficiency of the system of gathering the flocks in night pens seems to be leading to a phenomenon of a shift of predation to the day which has not yet been quantified.

Thought must therefore be given to other systems. In some *départements* such as Les Alpes-Maritimes, where many attacks take place after the summer, an experiment on setting up afternoon pens is underway.

- **Guardian dogs**

Around 470 contracts in 2007 (i.e. a notable 57% increase compared with 2006), were for this option which corresponds to the funding of around 80 purchases and the upkeep of 700 dogs.

The guardian dog is a basic measure whose action dissuades certain attacks and reduces the number of victims. It also raises the alarm for the shepherds. Finally, it also confronts other predators.

The IGE/CGAAER report states that the guardian dog is a measure whose efficiency is widely recognised and optimised by combining it with penning at night.

However, its use presents a certain number of constraints.

Firstly, the right conditions for introducing and training the dog are of the utmost importance for the success of the measure; learning the particular principles by the shepherd as well as the farmer through specific training are essential for this.

Moreover, a lack of overall organisation of the sector and selection criteria for identifying and breeding individuals with the most suitable characteristics should be noted.

Finally, problems and situations causing conflict may appear as part of the interactions with other users of the Alpine pastures, in particular with walkers and hikers in the high grazing land but also with neighbours on the return to lower areas.

Potential consequences of this are serious for the livestock farmer, in particular socially, but also in terms of legal action or indeed economically were the use of municipal land by the farm to be brought to an end.

This issue is a real concern for the farming world but also for the elected representatives of the mountain areas.

A national Guardian dogs programme led by the Livestock institute with the assistance of the Central Canine Society (SCC) and supported financially by the Ministry of Agriculture and Fisheries and the Livestock Office began at the end of 2006. Its focus areas are:

- a census of working guardian dogs in France and the creation of a national listing managed by the SCC;
- an appraisal of the behaviour of guardian dogs;
- the organisation of training for farmers and information for users of grazing areas (a census of what already exists and what is needed).

In particular, as part of the second focus area, a test for assessing the aptitude for guardian and the efficiency of the working dog as well as its potential aggressiveness with respect to people is being worked on.

As far as cattle herds, which concerns the Alpes du Nord *départements* especially, integrating a guardian dog is especially tricky for several reasons linked to the animals' behaviour as well as batch management methods.

Experiments are underway on this issue in some *départements* (Savoie, Drôme and Haute-Savoie).

- **Analysis of flock/herd vulnerability**

The vulnerability diagnosis aims to identify practice, periods and sectors at risk in order to best gauge the protection measures. Adaptation is only possible if the farm has enough leeway.

On the basis of a description of the grazing system and the identification of predation risk factors, this involves working out the most suitable technical options and designing a new viable grazing management plan.

The vulnerability analysis is an essential tool in respect of the protection logic, in particular in areas of colonisation for properly setting up measures prior to any attacks or in sectors which undergo recurrent attacks for an improved assessment of the problems and possible solutions.

Written specifications were drafted in 2006 for facilitating its deployment in consultation with the organisations concerned with grazing.

However, this option was very little used within the context of the "t" measure (3 analyses funded in 2006 and 2 in 2007).

The approach has certain limitations: its complexity, the limited nature in time of the analysis and in particular the resources possibly required for implementing its recommendations (changes in access, setting up facilities for housing a shepherd etc).

#### ***IV.A.1.3. Training and communication***

Several training initiatives have been organised for farmers, depending on the various different mountains, in particular through the chambers of agriculture and agricultural teaching establishments.

Most have been about introducing and training guardian dogs.

As far as communication is concerned, a strong focus area has been the awareness of hikers of the reflex to adopt with respect to guardian dogs. Various programmes have been implemented on this subject: information notice boards on the hiking trails, the inclusion of this issue in leaflets and information campaigns for summer tourism locally etc.

#### **IV.A.2. 2008-2012 prospects**

##### ***IV.A.2.1. The administrative mechanism***

The report drafted by the IGE/CGAAER notes the undeniable interest of the "t" measure implemented between 2004 and 2007 and its usefulness in the light of the gradual increase in the number of contracts being signed. It also stresses the requirement for regularly adapting, improving and simplifying the system.

As part of the continuation of the "t" measure, the financing of the flock/herd protection measures given by the MAAP with assistance from the European Union has been carried out since 2008 as part of the new rural development timetable and the 323c mechanism of France's Rural Development Plan (PDRH) 2007-2013,

The 323c mechanism is an integrated measure for pastoralism regarding investments in grazing, the required action for properly managing and protecting flocks/herds, as well as environmental awareness programmes, diagnoses and studies.

The provisions set out for the 2008-2013 period by decree relating to the OPEDER of 12<sup>th</sup> February 2008 are in line with the "t" measure with henceforward annual contracts.

As for the "t" measure, particular attention will be given to the technical adjustments which may appear relevant for improving the conditions for implementation both in known and new contexts.

The possible colonisation by the wolf of new territories, with the widening in the number and types of livestock farming subject to predation, may require an adapted extension of the mechanism by seeking and testing out the means that present the best cost effectiveness.

All of the assistance mechanism which plays an essential facilitation role has been continued and strengthened.

In the context of implementing the wolf plan, the emergency measures will play an absolutely strategic role in the colonisation areas in order to provide fast and concrete responses for the farmers.

The role of the "Prevention against predation" coordinators, now part of the MAAP's staff, has been maintained for efficient implementation of the arrangement.

Using differentiated management of the wolf population, in accordance with the directions set out in part V of the present plan cannot be dissociated from this mechanism.

It should also be noted that the deployment of OSIRIS, a software program for optimised management of the CAP's second pillar payments should make the use of data easier as regards the protection of flocks/herds. Moreover, the inclusion of the compensation measure within this software program should allow data cross-referencing to be made easier.

#### ***IV.A.2.2 Optimising and adapting the measures to new contexts***

The conclusion of the prior work and consultation carried out for drafting the 2008-2012 wolf plan resulted in a certain number of limitations being identified in the implementation of the measures. Besides the technical adjustments which may be necessary during the implementation of the plan as part of the 323 c mechanism, the following avenues for work have been laid down for the coming period.

- **Guarding the flock/herd**

Studying the possibility of:

- modifying the status of shepherds and assistant shepherds (link with the National Mountain Group)
- including a "large predators" module as part of shepherds' and assistant shepherd's training
- providing better coordinated consideration of the problems of protecting flocks/herds and pastoral facilities as part of public policy

Continuing with experiments relating to the implementation of innovative systems: itinerant shepherds and emergency intervention teams.

- **Gathering pens**

- A continuation with experiments concerned with optimising the current system, seeking alternative systems to night-time gathering and adaptation to new contexts
- 

- **Guardian dogs**

- A continuation of the National guardian dogs protection programme managed by the Livestock Institute in collaboration with Central Canine Society with, in particular, the design and implementation of a behaviour test for assessing the aptitude of the dogs and in particular their potential aggressiveness with respect to people.
- The development of a supervision policy and the monitoring of the development of this tool, with a strong focus on the search for ways to prevent conflicts with users of mountain space and the strengthening of information and awareness by the public and local elected representatives on this issue
- The continuation of experiments or studies for optimising or simplifying the implementation of this measure for farmers, but also for making them more aware of how they can adapt to the new contexts
- The promotion of the farmers and shepherds' training in techniques for introducing and training dogs.

- **Vulnerability analysis**

- Studying, in collaboration with the various partners, the possibility of adapting the existing approach (specifications, planning and carrying out of the project, etc) to integrated approaches according to the site or massif.
- Promoting, in a targeted way, the use of this type of diagnosis (in colonisation areas and in areas of recurrent attacks).

With the expansion of the wolf population, the issue of adapting protection measures to new contexts, technically and economically as well as the way in which the work is organised and the flocks/herds are managed is timely.

Organising the carrying out of experiments and studies on the issue will be one of the strong focus areas of the implementation of the current plan.

The Regional Natural Parks and the National Parks constitute, for this purpose, a precious network of organisations and areas for experimentation.

#### ***IV.A.2.3. Training and communication***

The importance of the Wolf issue requires the integration of a module on large predators in the training provided to farmers and shepherds.

As far as communication is concerned, a real policy must be developed around the issue of guardian dogs, in particular for tourists, in order to make them aware of the role and specific nature of this type of dog, but also for elected representatives in mountain regions.

In order to do so, it is desirable to design a national "toolbox" as well as linguistic terms that can be made available to *Préfets*.

The awareness by users of the mountain space of the role of pastoralism economically and as part of heritage as well as in the upkeep of landscapes, appears strategic.

### **IV.B. Improving conditions for pastoralism and the implementation of pastoral practices that are less vulnerable to predation**

The guarding of flocks during grazing on Alpine pastures requires a daily presence in the Alpine pastures with difficult access and work in reducing the danger of certain pastures.

It is mainly local authorities (municipalities, *département* councils, regional councils) which fund this type of investment that may be co-funded by European grants (former j measure of the PDRN and now measure 323 c of the PDRH).

The action for pastoral improvements targeted by the PDRN's j measure were for collective initiatives led by local authorities, associations, public bodies or pastoral farmers' groups (those led by farmers' on an individual or partnership level came under measure a).

These initiatives concerned the clearing of scrub allowing for the restoration of abandoned areas as well as the adaptation and modernisation of pastoral logistics: shepherd's' huts or high pasture chalets, access roads suitable for farm vehicles, holding and sorting pens near the hut, fences, drinking troughs, health equipment (foot baths etc), multiple-use equipment (fence crossing gear, information signs, cattle grids etc).

The MAAP, as part of European co-funding, allocated around 3 million euros to the collective investment part of the j measure during the 2000-2006 period (of which €584,000 was for the Rhône-Alpes region). In the PACA region, funding was provided by local authorities with Community consideration.

In the Rhône-Alpes region, the initiatives undertaken by the Regional Council regarding intervention measures for pastoralism must be highlighted. For this purpose, it was decided that this should be structured by contracting Territorial Pastoral Plans (PPT). Moreover, each *Département* itself has an intervention mechanism that is more or less allocated and extended towards pastoralism, established independently or which is complementary to the Region's.

The IGE/CGAAER report notes that bodies such as the Regional Natural Parks of Le Queyras, Le Vercors, Les Bauges and La Chartreuse are strongly involved in setting up assistance policies for pastoralism which make the protection of flocks/herds easier: the development of means of communication (telephone and radio) in the mountain pasture shepherds' huts aimed at making shepherds less isolated during the summer grazing period, the organisation of joint delivery of equipment on moving up to the high pastures in summer, the setting up of "pastoralist teams" on horseback or with pack donkeys that can intervene on any mountain pasture to assist the shepherd, in particular, in carrying equipment.

The major structuring role that pastoralism can provide, underlines the interest of promoting the development of experimental programmes, the acquisition of sources of information and their dissemination, in particular concerned with:

- a reduction in the vulnerability of pastoral activities to the presence of large predators
- the sustainable management of the pastoral spaces and the inclusion of these extensive resources into the farming strategies and territorial projects
- an adaptation of the farming systems to the economic context of the sheep sector
- a taking into account of environmental challenges and social expectations in farming practices.

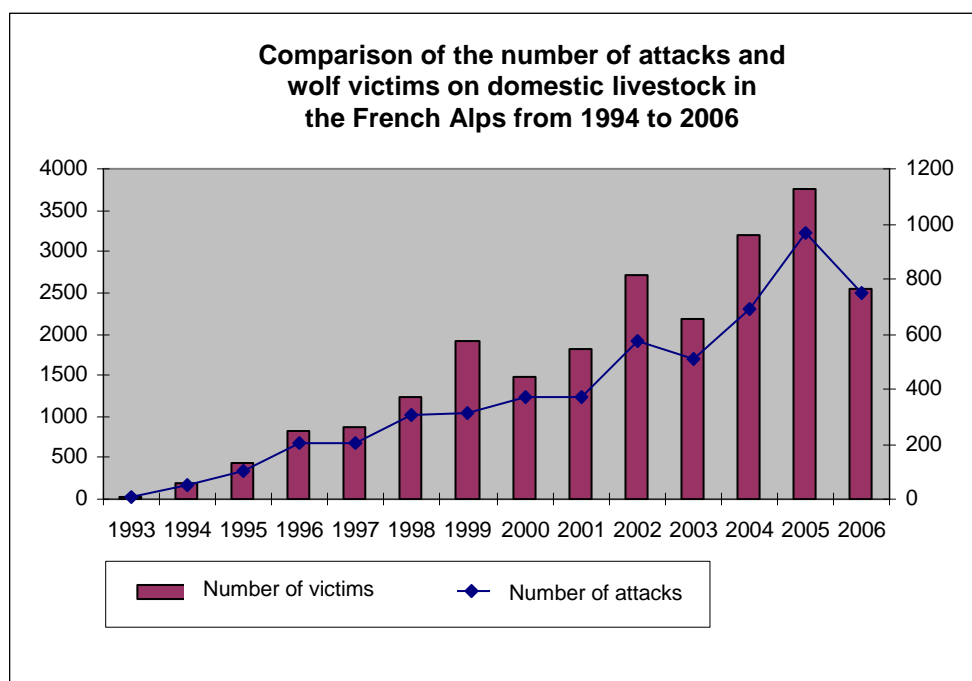
More widely it would appear necessary to take care to have a coordinated approach for the implementation of public policies for supporting the protection of flocks/herds and assistance for pastoralism (the inclusion of a "vulnerability" section with pastoral diagnoses, etc).

## **IV.C. Compensation scheme for domestic animal losses**

In parallel to the assistance provided to farmers for protecting their flocks, a compensation system for the damage done by wolves was set up as early as 1993. The compensation of damage caused by large predators is a pro-active measure by the State, borne financially by the Ministry of Ecology, Energy, Sustainable Development and the Development of the Territory (MEEDDAT).

### **IV.C.1. Development of the damage caused by wolf predation in the Alpine range**

From around fifty in 1994, the number of recorded attacks increased to 969 in 2005. However, despite the increase in the wolf population, a stabilisation or indeed even a slight reduction in the number of attacks has been observed since 2006 with 753 attacks being compensated for and around 750 in 2007.



The increase in the number of attacks has been accompanied by an increase in the number of victims: in 1994, around 200 victims were recorded; in 2005, this figure reached over 3,700 victims. In 2006, this figure is around 2,500 victims. We are thus seeing a reduction in the number of victims. These victims are mainly sheep and goats but predations on cattle and more exceptionally on horses and donkeys have also been observed in the past few years.

In all the reports indicating the number of attacks and victims, it is now planned, without wishing to minimise them, to separate the figures for damage linked to falling from rock faces which are exceptional events, with often a large number of indirect victims which tend to skew the actual predation measurement indicators for the flocks and the assessment of the protection measures.

Despite the efforts for protecting the flocks/herds, and even if the number of victims per attack is tending to stabilise – which might be interpreted as an index of the effectiveness of

the existing means of prevention - , no "complete" protection exists against attacks by wolves whose predation constitutes a serious constraint for livestock farming.

#### **IV.C.2. The compensation mechanism**

This mechanism, funded by the Ministry responsible for nature protection allows the owner to be compensated for:

- losses linked to animals killed or injured during an attack. Compensation is calculated on the basis of the estimated value of the animal using the reported market price and according to a scale discussed with professional managers.
- "indirect" losses such as the stress caused to the animals, production losses or abortions following the attacks. These losses are calculated on the basis of a fixed price with an upper ceiling, depending on the number of animals making up the flock/herd that has been attacked.
- animals that have disappeared during an attack. A fixed price has been set to take account of these.

Since 1998, the Ministry responsible for nature protection has entrusted the National hunting and wild fauna office (ONCFS) with the responsibility for paying this compensation. An annual grant is allocated to the ONCFS for this purpose which is therefore the delegated ordering party acting on behalf of the Ministry responsible for nature protection. The ONCFS regularly informs the central and decentralised services of the progress of the payments. Besides being economic in resources and providing uniform checks, the appointment of a single body to make the payment enables the necessary funds to be finely controlled within a single financial allocation.

Unstinting efforts have been made by the government to provide speedy compensation for losses caused to flocks/herds by the predation of the wolf.

Compensation timescale		Attack-report time	Report-sending DDAF→ ONCFS	Sending DDAF - receipt by ONCFS time	Receipt ONCFS - payment time	Attack-payment time
Alpine range	<i>average</i>	1.9	72	5	19	98
	<i>median</i>	1.0	75	3	15	99

*Timescales for reporting and payment to farmers for compensated losses due to wolf predation (Source, DIREN Rhône-Alpes, July 2008)*

Following damage to a domestic flocks/herd, the farmer contacts either the DDAF or the ONCFS depending on the *département* which assigns an employee qualified to make a report. After having carried out certain administrative checks the DDAF decides to compensate all or a part of the losses on the basis of the technical conclusions of the case and taking into consideration the context.

Losses following an attack for which the wolf's responsibility has not been technically ruled out are compensated for within the framework of this mechanism, as well as some losses for which the technical elements do not enable a final conclusion to be reached, but for which contextual elements are taken into account by the local reporting service. The expert's report is carried out by applying an analysis grid to the data gathered during the observation of all the victims. The criteria used were selected on a veterinary basis. They take into account, for example, the presence or absence of bites, the depth of the lesions, the diameter of the perforation seen on the skin, the part of the bodies consumed and the way they have been



eaten etc. On account of the variability of the cases which may be presented and in order to guarantee the strength of the conclusions, the technical solution adopted and evaluated on the veterinary bases for the classification of the damage is to proceed by excluding responsibility according to a dichotomous rule. Thus the expert's report initially sets out the file's technical conclusion: whether the observed damage is due to predation (Yes / No / Unverifiable) and then when this is the case whether the responsibility of the wolf is excluded (Yes/No). Finally, the expert's report gives rise to the compensation ruling which unless it is excluded, recommends compensation with the benefit of the doubt going to the owner of the victims of the damage.

The DDAF informs the owner of the conclusions of the expert's report, sends the file to the financial department of the ONCFS which checks the strict application of the scales and then pays the farmer. The farmer then has one week to make an appeal to the DDAF against the ruling. This appeal must be supported. This possibility of appeal is open in cases where the ruling is unfavourable or partly unfavourable (a refusal to compensate, compensation of a part of the observed or declared victims etc). In the event of an appeal, the file is frozen until it is examined by a committee bringing together representatives from government offices, the farming profession and nature protection associations. This committee rules on the compensation (or non-compensation).

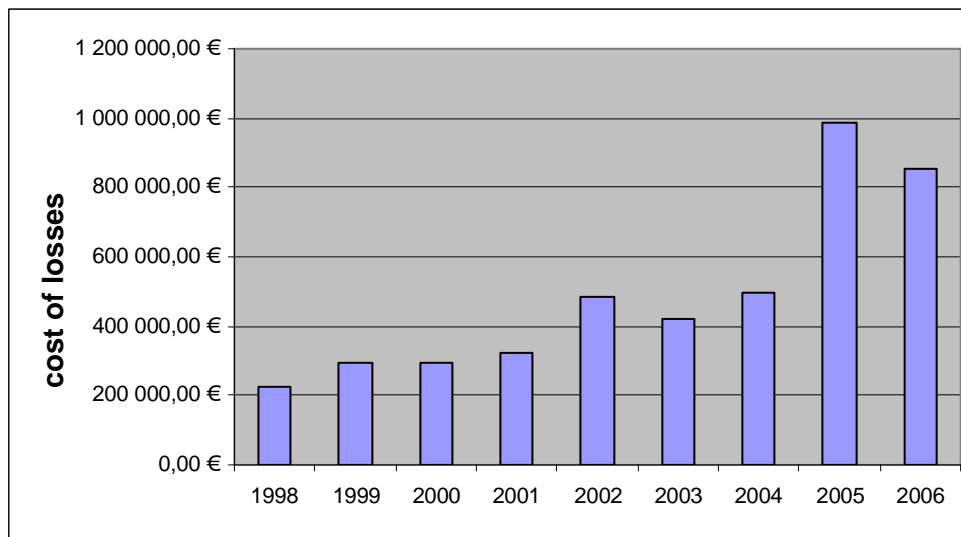
#### **IV.C.3. Monitoring and updating the compensation system**

A working group, made up from within the national wolf group met several times in 2005 to improve the compensation system. Following this consultation with the farming profession, the compensation scale for damage caused by the wolf was updated in the official circular of 11<sup>th</sup> July 2005 to better reflect the changes in the prices of the animals (e.g. an increase of 15.7% in the scale for sheep) and new provisions for appropriate compensation for other losses caused by wolf attacks were set up. During these discussions, the position of the farmers' organisations consisted in obtaining compensation corresponding to the reality of the damage caused and avoiding any procedure that might lead to the setting up of set amounts of compensation. In this context, a pilot project for a declaratory system with random checks and no longer systematic of the losses which was put forward by the government offices was also rejected.

As a response in particular to the situations linked to the possible increase in losses caused to herds of cattle and goats, regular updates of the scales and the compensation provisions will be defined in partnership with the farming profession.

#### **IV.C.4. Development in the cost of the losses attributed to wolves**

The development of the cost of compensation overall follows that of the losses attributed to the wolf. The strong increase that occurred in 2005 corresponds for the most part to the improvements made to the system at this time.



*Development in the cost of the losses attributed to wolves between 1998 and 2006*

In 2007, the total amount for compensated losses is estimated to be around 820,000 euros.

#### **IV.C.5. Prospects for the 2008-2012 period**

Among the possible working avenues for improving the system, the following elements are included:

*- Studying compensation for losses being a precondition to the deployment of means of protection against predation*

As highlighted in the report carried out by the 2004-2008 wolf plan appraisal mission, the current losses compensation system does not favour farmers who invest in prevention and furthermore it does not encourage farmers to adopt the prevention mechanism. The opportunity and feasibility of a compensation mechanism which favours farmers who deploy protection measures that may reduce damage to their flocks/herds will be studied.

*- Studying a change in the procedure for reporting damage*

A change in the compensation procedure, either by setting up fixed compensation according to a wolf risk damage area or a simplification of the reporting methods will be examined.

The goals sought will be to:

- preserve fairness between farmers
- compensate the true cost of the damage
- simplify the procedures linked to compensation both in the interest of farmers and with the aim of an improved use of public resources.

This innovative approach may be tried out in some ZPPs established for over 5 years where a stabilisation of the damage has been observed and the frequency of attacks is known. In the other areas, where the current system of reporting also contributes to the monitoring of the species and provides support to those farmers newly confronted with predation no change is planned.

#### **IV.D. Assessment of the impact of the presence of the wolf on the farming systems**

A study assessing the impact of the presence of the wolf on the continuation of pastoralism in the areas of historically known presence (change in the number and size of the farms and the occupancy of the pastoral units etc) will be funded by the Ministry of Agriculture and Fisheries. The results will be presented to the members of the National wolf group. Studies may furthermore be usefully made on the changes caused within farms by them having to adapt to the constraints of the presence of the wolf, as well as on the highlighting of vulnerability indicators in the new colonisation areas (this last point should be in relation with the differentiated management provisions developed in part V of the present plan).

## **V. Monitoring of the wolf population in France: improving knowledge about the demography, biology and ecology**

The studies carried out in France as part of the scientific monitoring of the wolf are mainly concerned with monitoring the demographic development and the dietary composition of this species. Scientific research leading to greater knowledge of the interactions between the wolf, the communities of ungulates and their habitats will be continued and encouraged. An assessment of the ecological changes that may be brought about by the installation of wolves in the natural environments from which they had disappeared will enable the degree of functional integration of the population into the ecosystems to be evaluated, something that using the demographic criteria alone cannot be achieved.

### **V.A. Wolf monitoring by the Large Carnivores Network**

France has set up specific scientific monitoring for this species which has been entrusted to the National Study and Applied Research Centre for Predators (CNERA-PAD) of the ONCFS. Making an estimate of the numbers is difficult and requires a high degree of specialised skill which France has gradually been acquiring since the return of the wolf.

The monitoring of the wolf population meets several operational goals:

- an appraisal of the conservation status of the species,
- knowledge of the distribution area of the species in order to provide proper information to the public and set up means to prevent predation of domestic flocks/herds,
- determining the possibilities for intervention to regulate the wolf population.

#### **V.A.1. Overall presentation of the Network**

The wolf population monitoring programme, begun in 1994, is based on a mechanism for the wide-scale gathering of presence signs, called the Wolf Network. Once centralised and analysed, these data (visual sightings, tracks, wild and domestic prey, biological samples, wolf-cries etc) are used to create population indicators which reflect the development, depending on the case, of the distribution area, individual numbers and the numbers of packs. Since the potential distribution areas of the lynx and the wolf overlap, the Wolf Network was merged with the Lynx Network (also present in the Jura and Vosges mountains) to form the Large Carnivores Wolf-Lynx Network in 2001, resulting in common procedures and standardised data gathering.

The wolf network is currently operating in twelve *départements* (01, 04, 05, 06, 09, 11, 26, 38, 66, 73, 74, 83), thereby following the detected progression of the species. A little more than 1,000 field correspondents (of whom 70% are State workers), uniformly trained by the ONCFS, gather directly - or through their informants – the signs which indicate the presence of the wolf. In each *département*, the DDAF are responsible for the logistical management of the network; the correspondents send them the information relating to the presence signs described on specific sheets, then entered into databases, ultimately managed by the ONCFS' CNERA PAD. This extensive surveillance, established on a wide-scale over more than 70,000 sq. km is combined with a so called "intensive" monitoring system, solely deployed over the area where the presence of the species has stabilised. Two specific protocols in addition to those governing the extensive gathering of presence signs aim to fill

out key elements of the species' demography: winter tracking in the snow through the use of associated data sources allow the minimum sizes of the group to be worked out and the summer wolf-cries are used to detect breeding episodes.

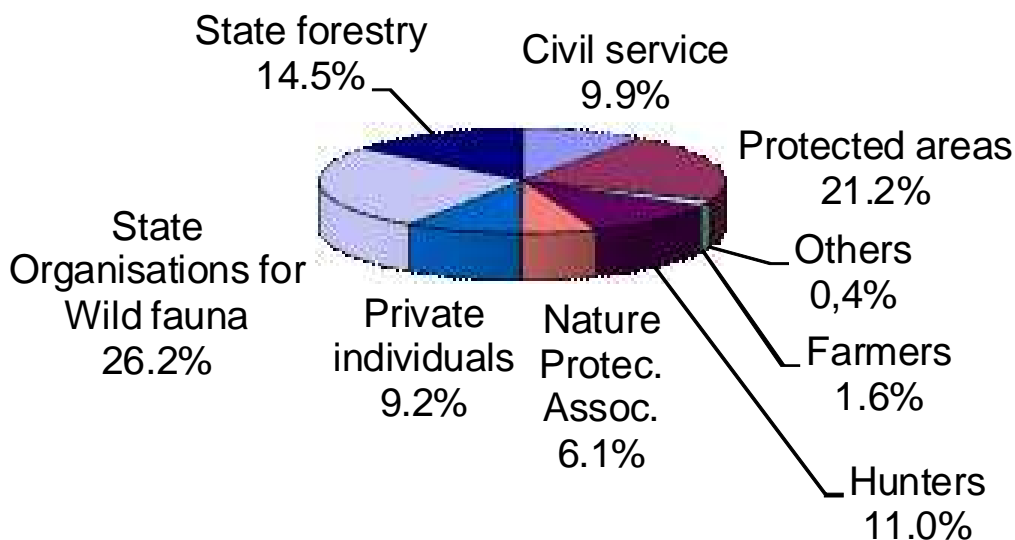
## V.A.2. Current methodology

### V.A.2.1. *Training of correspondents and current composition*

Training sessions are organised 1 or 2 times per year and per department, when a sufficient number of selected applications have been received by the DDAF. They last 3 days and cover the biology of the wolf populations, a recognition of the signs, the network's operating procedures and the making out of damage reports. The Network is officially established in a *département* after a decision by the services concerned of the Ministry responsible for nature protection.

Currently, outside of the Alps, the Network has been officially established in *départements* 09, 11 and 66 where all the procedures have been implemented. In the other *départements* of the Pyrenees and Jura mountains and the Massif Central, some correspondents have been trained internally by the ONCFS and some other (National Parks) are present due to transfers of personnel.

The current make-up of the Network in terms of the origin of the correspondents is represented below. Of the 1,000 correspondents, around 70% are State employees working for Public Establishments (ONCFS, ONF, Parks etc) or protected areas; 15% work for hunting organisations or in nature protection; many private individuals (9%) with no particular affiliation are also present as well as members of the farming community.



Schematic diagram representing the distribution of correspondents according to their affiliation.

### V.A.2.2. The various levels of wolf monitoring depending on the goals to be met

As part of their field work and contact with third parties (nature police, sector surveillance, forestry, guided mountain hikes, outside activities etc), the correspondents themselves gather the wolf signs or enquire about the data provided by third parties. In all cases, they record the technical characteristics describing the signs on special sheets according to standardised protocols. All the gathered signs are entered into the database and those which have technical elements which converge with the identification of the wolf species are used to make summarised reports.

The standardisation of the collection and analysis procedures allows all the signs to be processed in the same way, independently of who collects them and where they come from. These raw data are then transformed into data processed in a more sophisticated way (indicators of the situation of the wolf population for example) according to the framework of the type of monitoring in which they are gathered and used (see table below).

Depending on the type of monitoring being carried out, sampling is either controlled (winter monitoring by tracking, summer monitoring by the wolf howling technique), or random (chance monitoring). In the latter case however, the geographical spread of the correspondents depending on their professional or personal activities enables the land area to be covered fairly uniformly and the concentration of observation to be considered as homogeneous qualitatively. All the protocols are not systematically used: winter tracking is only meaningful in areas which are permanently snow covered and the wolf howling technique only in areas occupied by packs.

#### Summary of monitoring techniques used for the wolf sign survey according to the biological goals and spatial scales involved.

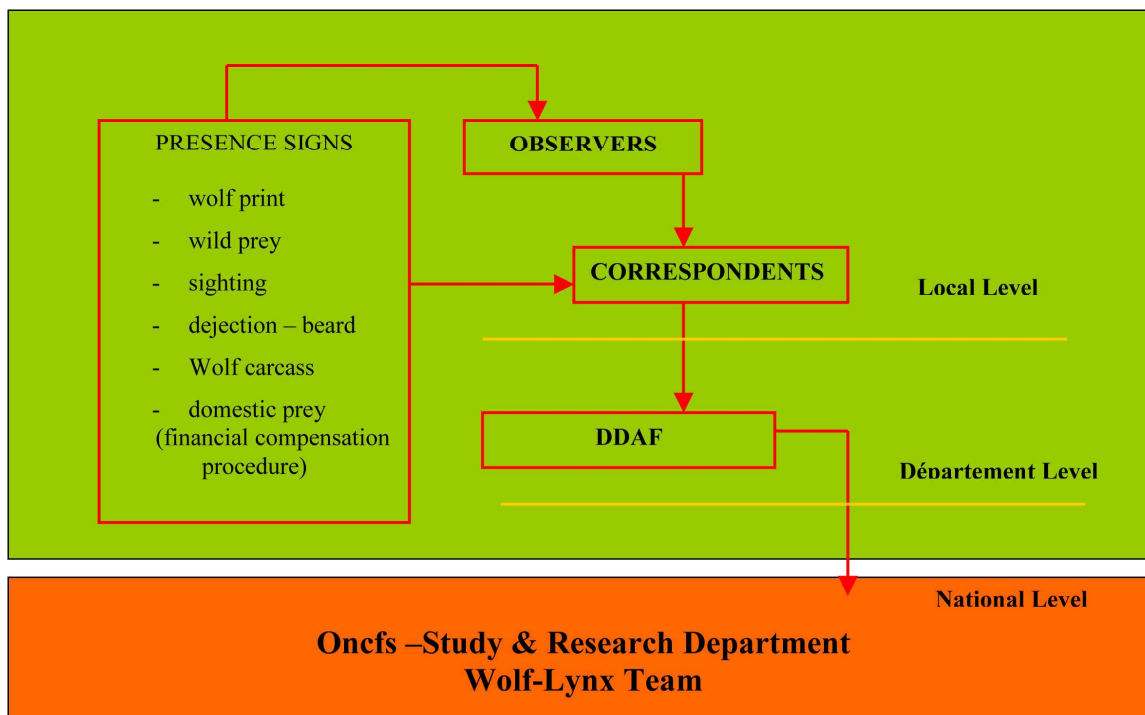
Type of monitoring	Operator	Method	Goal	Site
Random sampling (spatially distributed)	All wolf/lynx experts belonging to the network	Opportunist Gathering	Detection of New species occurrences + pack formation	National scale
Stratified sampling in winter	Local monitoring groups of the Network	Snow tracking	Minimum number of wolves alive within packs (territorial individuals)	All wolf pack territories
Stratified sampling in summer	Local monitoring groups of the Network	Wolf howling technique	Detection of breeding occurrence and of pack differentiation	All wolf packs

The protocols are used depending on the ecological circumstances. Thus, if there is no snow, the indicator for winter tracking is no longer available but the winter PAA presence/absence indicator is used instead with which it has a high correlation.

### V.A.2.3. The principles for the flow of information

The presence of a large carnivore type of species induces interactions with farming activities (livestock). It is therefore logical that the sheets describing the presence signs, once filled in by the correspondents are firstly sent to the DDAFs as quickly as possible, the coordinators of the network at the *département* level. They then send these for technical validation to the ONCFS's wolf-lynx team which analyses them and makes the summary reports (see diagram below). This way of working for the circulation of information, guarantees both a certain responsiveness by the decision-making bodies and a certain robustness of the information on which the decision-making processes are based.

Diagram of the flow of the raw field data



The Wolf-Lynx team drafts summary reports including both the processed data (population indicators) and listings of all the collected raw data. All these are periodically updated and made available to the institutional partners, the Network correspondents and the public via a half-yearly newsletter for the network correspondents. This information is put on-line as soon as it is available on the ONCFS website at:

[http://www.oncfs.gouv.fr/events/point\\_faune/mammifere/2006/loup.php](http://www.oncfs.gouv.fr/events/point_faune/mammifere/2006/loup.php).

Every year, in each *département* in which the Network is present, the DDAFs organise a meeting where the local and national data is presented, led in partnership with the ONCFS for the members of the Network and well-known figures that the DDAFs wish to invite.

### V.A.2.4. The particular case of presence signs subject to genetic validation

The signs of a biological type (excrement, urine, hairs, tissue etc) are subject to genetic analysis carried out by the CNRS's Mixed Research Unit "Alpine Ecology Laboratory of Grenoble" which allows the species, the genetic lineage, the sex and the individual to be determined. Samples collected for a given year in the field are centralised into "collection points" (freezers in the Ddafs, in the SD-ONCF etc) and then gathered together after the winter monitoring and processed by the Oncfs-Cnera Pad for genetic analyses. Two analysis procedures exist: one so called "urgent" analysis for samples taken from new areas of the assumed presence of the species; the other so called "routine" analysis for the great majority of the samples taken from areas where there is a known presence. In all, since 1992, 2,700

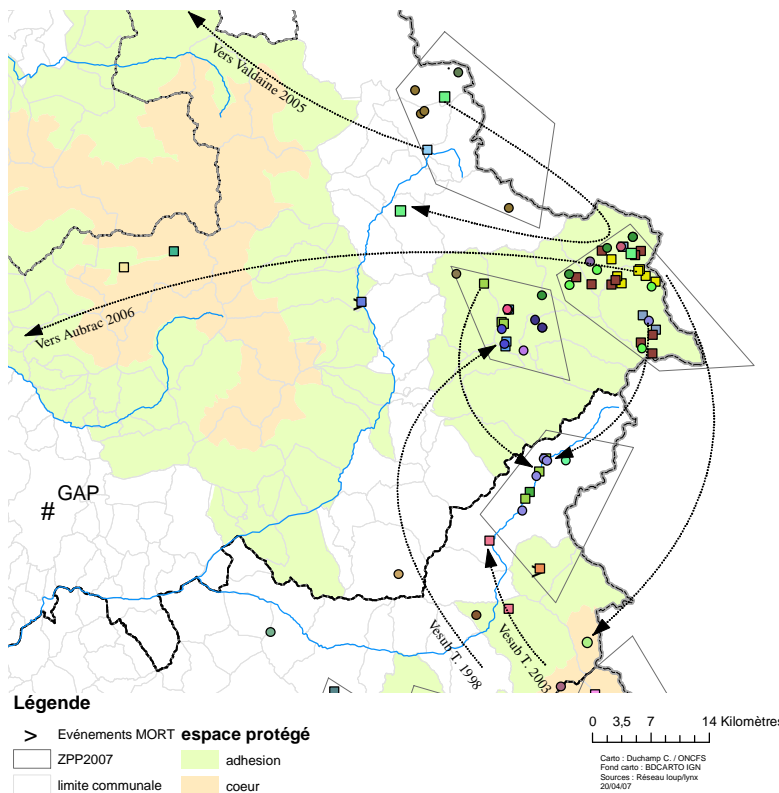
genetic analyses have been carried out, that has enabled in all 207 different individuals to be identified (see table below).

**Annual development of the total number of  $N_T$  analyses carried out, of which  $N_{A+}$  positive (detection of the wolf species), of which  $N_{G+}$  having enabled individual genotypic characterisation, corresponding to  $N_I$  + different individuals (NB: all the 2004-2007 samples have not yet been analysed).**

	Tot	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07
$N_T$	270																
$N_{A+}$	161	1	1	2	26	91	123	238	221	245	277	456	346	264	259	137	13
$N_{G+}$	118	0	0	0	7	22	54	113	85	58	94	226	189	101	136	93	4
$N_I$	207	0	0	0	4	11	20	29	30	24	37	68	65	45	56	39	3

All of these data enable structuring in groups to be detected, cases of dispersion to be documented (see map below for an example), and an estimation of the total population using the so called capture-marking-recapture method to be made (CMR used by the CNRS "Biometry and Ecology of Populations" team of Montpellier). This method takes account of the fact that the "genetic signatures" of all the wolves are not detected.

**An example of the use of genetic analyses to detect structuring in groups and cases of dispersion: the distribution of the various wolves identified since 2003 in Les Hautes Alpes and surrounding areas. Each symbol represents a different genotype (square for males and circles for females). Source: Wolf network newsletter No. 18 – 2008.**





## **V.B. Ongoing monitoring of the wolf population and consolidation of the genetic analysis tool**

Long-term monitoring of all the sectors where the wolf is present including the new sectors will be maintained in partnership with the decentralised services of the State and its public organisations, local authorities and any other professional or associative body, which accepts as part of this process to participate in implementing standardised protocols.

It will also be necessary to implement monitoring based on molecular genetics over the entire French-Swiss-Italian Alps area using methods defined jointly and applied in concert. This approach will allow for extensive cross-border harmonisation over the Alpine region (France / Italy / Switzerland).

In order to consolidate the monitoring mechanism using genetic analyses, the creation of a genetic reporting laboratory for use by environmental managers as part of the Alpine Ecology Laboratory or LECA (UMR CNRS 5553, [www-leca.ujf-grenoble.fr](http://www-leca.ujf-grenoble.fr)) will be supported by the MEEDDAT in partnership with the CNRS and the Joseph Fourier University of Grenoble. This partnership will allow the ONCFS to ensure the long-term processing of the signs of the wolf's presence and an improvement in its results.

## **V.C. Extending wolf monitoring to the new areas being colonised**

The *préfets* have the responsibility for organising within their *département* the flow of information about wolf monitoring to all the area's stake holders, in particular the local authorities, national and local elected representatives, the farming profession and environmental players.

Scientific and technical management is carried out by the ONCFS in collaboration with the partners of the wolf/lynx network and associated scientific bodies.

The experience gained has shown the importance of forward planning for the arrival of the wolf beyond those sectors immediately concerned by the presence of this predator, allowing people to get used to the idea and avoiding a situation where communication about the wolf's presence comes too late and a crisis situation has already developed.

It is therefore recommended that in all those *départements* where the signs of the wolf's presence have been noted beyond the Alps (regions of Franche-Comté, Languedoc-Roussillon, Auvergne and Midi-Pyrénées) that a Large Carnivores' Network be set up.

A network of correspondents able to cover the land area of a department uniformly will be set up with the assistance of the ONCFS's services and administrators of natural areas.

In order to ensure that information flows between the various stake holders concerned, a watch cell will be formed by the *préfet*. This cell will be based on the model of the *département* wolf committee by members of government offices, representatives of the professional farming organisations and nature protection associations.

Regionally each DIREN will have a role of ensuring awareness in the *départements* and a proper flow of information.

Technical coordination by the various regions concerned, during this phase, will be relayed by the Rhône-Alpes DIREN in collaboration with the Rhône-Alpes DRAF for possible questions concerned with pastoralism.

The organisation of an annual interregional information meeting will complete this measure.

## V.D. Descriptive analysis of the wolf's diet

### V.D.1. Equipment and methods

The study of the wolf's diet is carried out by the ONCFS using the excrement collected by the Wolf/lynx network for which the genetic analyses certify that the sample belongs to the *Canis lupus* species. The analysis consists of determining under the microscope the hairs of prey contained in the faeces. The diet is thus measured by frequency of appearance (% of faeces which contain the species in question).

These laboratory analyses represent the equivalent of 5 months' full-time work per year, as ½ to 1 day's work is needed per sample. Four reference sites located from north to south and presenting variations of pastoral types (in particular the duration of annual grazing) are presented here for a very general description of the annual diet.

### V.D.2. Descriptive results

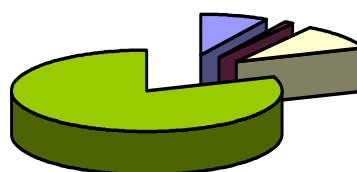
The frequency of appearance of the various prey shows a preponderance of wild ungulates in the wolf's diet whatever the site. Among these, chamois and roe deer are the mainly consumed species with a different intensity depending on the sites (in part depending on the availability of each prey species in the various massifs). Red deer, ibex and some boar are also present in lower proportions.

With the exception of the Vésubie-Roya pack (*département* 06), the proportion of domestic ungulates represents between 8% and 13% of the wolf's diet on an annual basis. However, this percentage varies with the seasons and reaches, on average in the ZPPs, 15 to 20% of the summer diet. In the ZPP of Vésubie-Roya, this percentage reaches 50% in some years.

Vercors Pack HP (26-38) N = 98



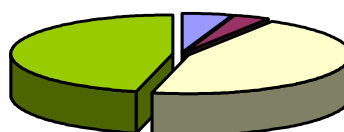
Queyras Pack (05) N = 87



Haute Tinée Pack (06) N= 191



Vesubie-Roya Pack (06)  
N= 178



Others  
 Domestic ungulate  
 Unidentified  
 Wild ungulate

Annual diet of wolves in 4 ZPPs distributed from the northern to the southern parts of the Alps. Marked seasonal variations.

An analysis of the spatio-temporal development of the diet requires a greater amount of data and additional investigations. It is thus planned to continue and develop this scientific programme.

### **V.E. A national programme for studying the role of the wolf in the ecosystems.**

The return and current maintenance of the wolf population in France is the result to a large extent of the abundance of wild ungulates whose numbers have greatly increased in the past few decades. In Europe, the dynamics of the populations of ungulates without predation is being studied in a network of sites using the long-term monitoring of marked individuals. France is a unique case in Europe as all the species of ungulates (ibex, red deer, chamois, roe deer, Isard, mouflon and boar) have thus been studied individually, mainly in more than one site for over 20 years. However, none of these studies for the moment has taken into account the role that large predators can play in the workings of the populations of ungulates since most of the monitoring sites were not yet concerned by this phenomenon. However, the geographical and numerical expansion of the large predators make the study of the workings of the populations of ungulates necessary, no longer solely depending on the environmental variations they must face but also on the presence of predators. More generally, the return to France of the predation of large ungulates encourages us to consider the roles of the wolf and the ungulates in an overall context of the workings of the ecosystems, where predators, herbivores and plant resources interact with each other and with the other components of the ecosystem, whether they are other taxons or human activities.

Large predators have a dual impact on the populations of ungulates: a direct numeric impact due to their lethal effects and an indirect impact by bringing about a "landscape of fear" that can change the behaviour (vigilance and selection of habitat) of the prey. Under a "cascading" effect, large predators can therefore modify the spatial distribution of ungulates and consequently the impact that they have on their habitat and the biodiversity located there.

By a combination of lethal and non-lethal effects, the consequences of the return of large carnivores on their prey and indirectly on the ecosystem it is a part of, are varied, complex and subject to controversy. In some cases, predation can have such an influence on the numbers of prey or on their behaviour (selection of habitat, group size, vigilance and diet etc) that it leads to "trophic cascades" and indirectly changes the vegetation and associated micro-fauna. In other cases on the contrary, predation may only have a limited effect on the populations of prey. Working out the effects of predation on the workings of the populations of prey is especially complicated since it interacts with many other factors (habitat, climate, density of predators or prey, specific diversity of the predators and prey, hunting etc), which may be inextricably linked or difficult to distinguish. The example of the results published about the Yellowstone National Park (USA) is particularly eloquent. Wolves were reintroduced in 1995, the year in which the deer population began to decline steeply. A consensus arguing that the wolves were responsible for this reduction in the numbers of deer was arrived at. However, a recent study has shown that the meteorological conditions were particularly unfavourable and an increase in the hunting tally was mainly responsible for the decline in the number of deer and that predation by the wolf only had a minor impact. This example shows the need for a rigorous approach to the protocols used for studying predation as well as possible changes to conclusions to reflect improvements in the available methods.

Studying the true impact of predation on the populations of prey becomes indispensable when the predator is regarded as a competitor of man. This is the case in the French Alps between the wolf and hunters who fear that the predators will take out a significant part of the ungulate populations. However, there is no obvious case for stating that a predator has a negative effect on the dynamics of a population of prey, due to two non-exclusive processes, since firstly, the selection of a certain type of prey by predators may attenuate the numerical impact the killing of prey by wolves has, if they kill prey that would in any case die, and to the extent that killing may allow, in high-density populations, an increase in population growth through density-dependent phenomena coming into play.

In our mountain ecosystems, relationships between the predator and its prey are especially complex due to the specific diversity of the ungulates. Indeed, in the French Alps, up to 6 species (ibex, red deer, chamois, roe deer, mouflon and boar) may share the habitat, all of them potential prey for the wolf. Several levels of predator-prey interaction will thus be added in comparison to the relationships which exist in a mono-species system: (1) to the intra-specific selectivity of the predator which acts individually, is added selectivity between prey species; (2) to the phenomena of density-dependence of a population, interactions between species of the same trophic level may be superimposed; (3) in selecting the habitat, a species must deal with the presence of other species and this is also determined by possible competition phenomena.

Two research programmes which aim to understand the workings of the populations of large herbivores in relation to their habitat or predation are currently underway in France: the "Herbivore network" and the "Predator-Prey programme", both being closely linked.

The first aims to find what features determine the dynamics of a herbivore community by concentrating its investigations on the interrelationship between herbivores and resources and between herbivores. It is therefore focusing its attention on a comparison of the dynamics of the populations of sympatric herbivores, on their behaviour, their occupation of the space, the spatial and temporal distribution of the resources and all the interrelationship between these components. It is implemented intensively on the massif of Les Bauges, with monitoring based on marked individuals on chamois (since 1985), mouflon (since 2003) and roe deer (since 2003).

The second seeks to understand what the impact of predation by the wolf on a herbivore community is. Begun in 2003, this programme has, for the moment, been focused on comparing the dynamics of the red deer, chamois, roe deer and mouflon populations of the National Park of Le Mercantour, where the wolf has been established for fifteen years, and Les Bauges, a control area, where the wolf was absent until 2005, and where no pack is yet established. The study of the indirect impact of the wolf and possible trophic cascades has not yet been tackled in these two study sites, in Les Bauges to the extent that the presence of the wolf has up to now only been sporadic and in the National Park of Le Mercantour, to the extent that the relationship between the ungulates and their habitat has not yet been investigated.

Starting in 2008, a national programme on "the place and role of the wolf in the ecosystems" will have as its aim understanding the indirect impacts of the wolf on the behaviour of ungulates, on their way of selecting habitat and on the biodiversity through the effect of "trophic cascades". This work, lasting 5 years, will allow the "indirect impact" field of study with the PPP already set up in Le Mercantour to be developed simultaneously with the "use of habitat and resources" study underway in the massif of Les Bauges. The aim is therefore, in each of the two sites, to have the same approach to the study of the workings of the ecosystems, focused on large herbivores and including the direct and indirect roles of large predators that are assumed to be important both on the workings of the ecosystems and on the biodiversity.

## **VI. Tools and methods for wolf population management**

The conservation status of the wolf population present in France in 2007 was considered to be favourable: numbers rose by over 30% between 2004 and 2008. The number of ZPPs increased from 13 to 25 over the same period and the distribution area has expanded by a factor of 1.4 since 2004. The expansion of the wolf population beyond the Alps has been confirmed in the départements of Les Pyrénées-Orientales, L'Aude, Le Cantal, L'Aveyron and La Lozère.

With a population of 26 packs identified between the Italian Piedmont and France, it can henceforth be regarded that the wolf population is permanently installed in the western Alps. The measures recommended as part of the adaptive management used in the previous action plan have therefore accompanied the regular expansion of the species' population and territory.

In the sectors currently occupied by wolves as well as in the sectors of new colonisation where livestock is present, the installation of this predator represents a high cost, in particular in terms of protection measures and may be highly detrimental on account of the characteristics of the farming system that it may endanger in the long term. When protection measures are shown to be insufficient, management adapted to the wolf populations becomes necessary and limited culling may then be envisaged in order to reduce these problems as part of the framework of complying with the status protection of the species and good conservation status.

In addition to the flock/herd protection policy, the aim of the Government for the period in question is to manage the demographic expansion of the population and the colonisation of new sectors, especially in areas of livestock farming by limiting the pressure caused by wolf predation locally. Thus some individuals may be culled each year while respecting the goal of maintaining the favourable conservation status of the population.

### **VI.A. The adaptive management strategy**

In order not to compromise the conservation status of the population and in accordance with the principles of adaptive management worked out in the previous action plan, the maximum number of wolves whose culling is authorised, calculated each year, will take account of the demographic situation of the species, assessed using various monitoring indices used by the ONCFS. The management methods used are therefore open to change from one year to the next, depending on the consequences observed of the expansion of the wolf population and the reduction in damage to livestock.

In the 2004-2008 action plan, 5 wolves were culled: one in the Vercors area of La Drôme *département* (26) and one in Le Taillefer area (38) in 2004, one in La Valdaine area (38) in 2005 and two on the Belledonne Nord massif (38) in 2006. No wolves were shot in defence.

From standpoint of implementing shooting, the cost of these operations remains high. In 2004 and 2005, when the ONCFS was given the task of organising and carrying out culling, these operations respectively used 1558 staff days for 2 culled wolves and 865 staff days for one wolf. In 2006 and 2007, when the investment by the ONCFS was reduced to organising the shooting which was entrusted to wolf hunters, authorised huntsmen and private gamekeepers, the shooting used 21 ONCFS staff days for 2 culled wolves during the same

operation in 206 and 104 ONCFS staff days in 2007 with no wolf being culled for supervising 14 authorisations of defensive shooting and two culling protocols.

In this context, the importance of the work carried out on a voluntary unpaid basis by the official wolf hunters should be highlighted who, in 2007, spent a total of 2,000 hours in wolf hunting trips (including nights and weekends).

These exceptionally deployed operations are not aimed at regulating the wolf population. Their purpose is to provide occasional and limited assistance to livestock farmers whose flocks/herds are faced with recurrent losses despite the installation of protective measures and the use of scaring mechanisms.

Culling a wolf may be necessary for preventing livestock losses, locally and in the short term, but nothing guarantees the efficiency of this measure in the medium or long term (avoidance of the area by other wolves etc), in particular during a time when the population is growing and there is geographical expansion regionally.

The experience acquired from these interventions shows that the probability of successfully culling an individual in dispersion in a new territory is very low. The measures needed to be taken in these situations cannot therefore simply include the culling of wolves but they also require assistance for all the exposed flocks/herds on the arrival of the predator.

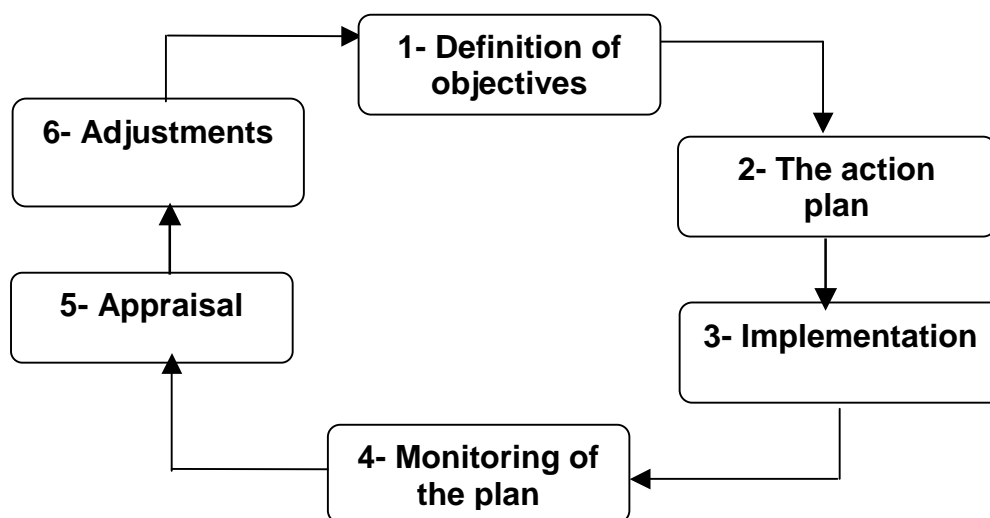
Although the yield of the culling operations judged in comparison with the volume of the losses is overall fairly low, these operations, when successful contribute to an easing of tension. Moreover, to the extent that defensive shooting like culling does not endanger the species and that it also constitutes a means of limiting clandestine attempts to eliminate the wolf, it can be regarded as contributing positively to the maintenance of the favourable conservation status of the wolf population.

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### *The principles of adaptive management*

This involves a process of improving the management policies and practices based on the lessons drawn from the results already acquired. In the case of the wolf in France, the legal status of the species leads to specific strategic directions. Planned action is necessarily "restricted" through the exercise of this legal framework, and some alternative models are not possible because of the requirement to guarantee favourable conservation status.

An adaptive management process can be structured into six stages carried out iteratively according to a cycle whose duration is defined at the start of the operation:



Different cycles, operating at different time intervals are reconcilable. Within the context of the wolf plan, the following can be distinguished:

- An initial cycle concerned with the overall goal of the plan, i.e. the maintenance of the wolf population in a favourable state of conservation and the control of its interactions with livestock farming;
- A second cycle, internal to the first, in which certain indicators, such as spatial and demographic indicators for monitoring the wolf population and those relating to changes in the number of wolf attacks and compensation for victims are documented annually in order to measure the convergence, year on year, towards the plan's objective;
- The action planned in the plan, to achieve the objective, which may (or indeed must) also be adjusted year on year.

The main advantages of practice based on the principles of adaptive management are due to the fact that the state of the system at a given time, even imperfectly known and/or controlled, does not paralyse the action process. The difficulty posed by this possibility to act despite a kind of uncertainty about the knowledge of the system and the expected results, is that the mechanism must itself change during the successive iterations. This implies therefore an ability to adjust the action, or indeed the objectives, during the process. Other principles can be used to accompany and secure the carrying out of the plan as part of an adaptive approach faced with uncertainty, such as the principle of precaution or any other principle stemming from the theories of risk management.

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### Adaptive management and culling of wolves: review of the 2004-2008 plan

Every year, the observed growth of the wolf population can be used to set out a state of viability conditional on the most likely underlying demographic scenario, which may come from a threshold expressed in the number of packs (independently of their breeding status). The spatial and numeric growth parameters measured from the French Alpine population thus provide information about which scenario can be used. Once the scenario has been determined, the viability model then gives an estimated of the proportion of the population able to be culled. This proportion is multiplied by the minimum winter numbers on the ZPP (the most conservative approach), or by the total estimated numbers (the least conservative approach) to calculate a "range" of possible culling. The objective of the 2004-2008 plan, for the biological part of the wolf's conservation, was to guarantee a favourable state of conservation: the number of packs reached at the end of the plan, its positive observed development during the period in question as well as the index of spatial growth, shows that the objective has been reached as part of the defined adaptive management strategy.

	2004	2005	2006	2007
"Spatial" growth	+ 5 %	+ 21 %	+ 15 %	-2 %
"Demographic" growth	+ 18 %	+ 31 %	+ 24 %	+ 9 %
"Numeric" growth	+ 8 %	+ 15 %	+ 36 %	- 15 %*
Number of packs	10	11	14	17
Theoretic "quotas" (modelling)	3 - 5	2 - 4	6 - 10	2 - 6
"Quotas" used by the State	4	4	6	6
Number of culled wolves	2	1	2	0

\* winter monitoring conditions not having allowed optimum monitoring of the 2007/2008 EMR

*For further information about adaptive management:*

- Marboutin E. & Duchamp C. (2006) - Gestion adaptative de la population de loup en France :du monitoring à l'évaluation des possibilités de prélèvements.(Adaptive management of the wolf population in France: from monitoring to the assessment of the possibilities of culling.) ONCFS, 2005 scientific report: 14-19.  
[http://www.oncfs.gouv.fr/events/point\\_faune/mammifere/2006/marboutin\\_rs05.pdf](http://www.oncfs.gouv.fr/events/point_faune/mammifere/2006/marboutin_rs05.pdf)
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## **VI.B. Differentiated management rules according to the situation**

The particular situation of France has led to investing a great deal of funding in the range of measures supporting human activity faced with the wolf's presence.

The social acceptability of the predator relies on controlling conflict caused by the species. The approach in terms of differentiated management must allow this requirement to be taken into account by working out a fair balance between the resources invested and the goals pursued depending on the situations, while maintaining a favourable state of conservation of the species. In these conditions and in compliance with the clauses setting out the possibilities of exemptions to article 12 of the Habitat Directive, intervening in the wolf population may be justified in the absence of another satisfactory solution and within the limits of costs and social acceptability to be defined depending on the situation.

Limiting predation pressure on livestock herds/flocks is a necessity for farmers and an indispensable condition to cohabitation with this predator. As part of an approach combined with the implementation of flock/herd protection measures, shooting operations may therefore either be carried out defensively near the flocks/herds, or by culling. These intervention measures will be adjusted depending on the diversity of the situation, taking into account both the biological and ecological criteria linked to the dynamics of the wolf population and anthropologic criteria associated in the main with the features of the livestock farming activities.

In areas currently being colonised, in order to anticipate serious losses, there is a need for improvements in identifying the factors making domestic flocks/herds vulnerable to predation and obtaining more accurate knowledge of the differentiated sensitivity of the flocks/herds according to the farming systems.

### **VI.B.1. Type of criteria selected for characterising situations**

The use of protection measures for flocks/herds and intervening in the wolf population may be adjusted using a differentiated approach according to two broad categories of criteria:

- biological linked to the dynamic of the wolf population;
- anthropological linked mainly to the way the habitats are used for livestock farming.

From the biological standpoint, the most relevant unit for the conservation of the species is not the individual but the pack (the social breeding unit). Therefore, for example, the fate of an individual according to whether s/he is in dispersion or within a pack does not have the same importance in respect to the conservation status of the population.

Two types of situations can be distinguished according to whether the area concerned is in a ZPP which corresponds with an established pack or outside a ZPP, either in an area that is likely to be transformed quickly into a new ZPP (near known ZPPs, a large part of the habitat is wooded, low human disturbance, availability of wild prey), or in a transit area where conditions suitable for wolf installation cannot be regarded as being met.

From the anthropological standpoint, the various territories occupied, or likely to become so by wolves are characterised by particular types of livestock farming, due both to the natural conditions (distribution of environments, soils, climate, gradients etc), changes brought about by man's activity and socio-economic contexts. These specific features are reflected in

farming contexts which are particular to each area: the number and size of grazing units, the type of pastureland (high mountain, inter-seasonal pasture, dry or wet, wooded or not, with or without rocky outcrops etc), the type and size of the herds (cattle or sheep, large or small herds/flocks), type of farming (involving transhumance, local, mountain, foothills etc), length of flocks/herds' presence on the grazing land, type of management (protection or not, gathering in of herds/flocks at night or not etc), sedentary farming or not etc.

The extent of the damage inflicted by the wolves, the specific features of the farming and the socio-economic conditions of the farms concerned constitute the main criteria for enabling the exposure to the risk of predation to be assessed. As an example, for an already protected flock in a ZPP, the recurrence of attacks is a good indicator of the extent of damage and the predation pressure. But this criterion must also be compared with the problems for implementing protection measures according to the particular features of the environment and with the technical and economic adaptability of the farming system being considered. Thus, in the so called "intermediate" areas, the flock/herds, split into batches, are more difficult to protect than on the Alpine pastures. For small flocks and sedentary farming, the existing prevention measures may be difficult to apply on the ground.

The table below summarises the various criteria likely to characterise a cohabitation situation between the wolf and livestock farming:

The overall costs of installing protection measures for the flocks/herds and compensation need also to be taken into consideration. This requirement is an application of the principle of proportionality which is part of the general principles of community law.

This principle was recalled several times in the conclusions of the Advocate general as part

<i>Ecological context</i>	<i>Livestock farming context</i>	<i>Cohabitation situation</i>
<p><b>Characteristics of the environment:</b></p> <ul style="list-style-type: none"> <li>- Forest cover,</li> <li>- Presence of refuge areas for wolves,</li> <li>- Availability of wild ungulates</li> </ul>	<p><b>Details of the farms:</b></p> <ul style="list-style-type: none"> <li>- Number and size of the parcels or grazing units</li> <li>- Type of grazing land (high mountain, inter-seasonal etc),</li> <li>- Socio-professional and socio-economic elements of the farming</li> </ul>	<p><b>Extent of damage:</b></p> <ul style="list-style-type: none"> <li>- Number of attacks and animals killed,</li> <li>- Number of grazing units concerned,</li> <li>- Number of flocks/herds affected by predation,</li> <li>- Recurrence of damage from one year to the next.</li> </ul>
<p><b>Occupation of the territory by wolves:</b></p> <p>In ZPP: number of wolves, number of packs with or without observed breeding</p> <p>Outside ZPP:</p> <ul style="list-style-type: none"> <li>- number of wolves, likelihood of becoming a ZPP in the short term</li> <li>- transit zone for the wolf or inappropriate for its establishment</li> </ul>	<p><b>Farming characteristics:</b></p> <ul style="list-style-type: none"> <li>- Type of herds/flocks: sheep, goats, cattle, horse/donkey etc.</li> <li>- Size of herds/flocks,</li> <li>- Type of farming: transhumance, local, mountain, foothills, plain etc.</li> <li>- Length of presence on pastureland,</li> <li>- Types of management and allocation (shepherding or not, night gathering or not, grouping of herds/flocks or not, contiguous parcels or not etc)</li> <li>- Degree of facilities and equipment of the pastoral units</li> </ul>	<p><b>Assessment of exposure of livestock to predation</b></p> <ul style="list-style-type: none"> <li>- Degree of protection of the flocks/herds,</li> <li>- Vulnerability to the risk of predation,</li> <li>- Adaptability to the farming systems in terms of changes to the type of farming: management of the flocks/herds, use of high mountain pasture, feasibility of implementing means of protection,</li> <li>- Economic capacity to implement means of protection,</li> <li>- Importance of predation pressure (seasonal, all year round etc)</li> </ul>

of the decree-law of 14<sup>th</sup> June 2007 of the EJC on the wolf in Finland. As explained by the Advocate general regarding exemptions to the rules of article 12 of the "Habitats Fauna and Flora" Directive, this principle sets out *"that the action adopted must not exceed the boundaries of what is appropriate and necessary for the completion of the goals legitimately pursued by the regulation at issue, it being understood that where a choice is offered among several appropriate measures, the least restrictive should be used and the negative effects caused must not be disproportional to the ends pursued"*. The *"Interpretative guide on the strict protection of animal species of community interest by the Habitat Directive 92/43/EEC"* also recalls that *"the measures taken by the Member States must be adapted to the pursued goals, i.e. the maintenance and re-establishment of a favourable conservation status, without losing sight of the economic, social and cultural requirements as well as regional and local particularities (article 2, paragraph 3). In order to be proportionate, these measures must enable the sought goal to be achieved, be necessary for this objective to be achieved and be appropriate in terms of resources deployed"* (I.2.4.b.56). More particularly, regarding the implementation of the conditions for an exception set out in article 16, this document by the European Commission states that *"the application of proportionality neither replaces nor marginalises any of the conditions applicable to the exception regime, but may adapt how they are implemented by taking into account the directive's general goal"* (III.1.2.11).

Considering that the application of the criterion of the lack of any other satisfactory solution must take account of this requirement of proportionality and with a concern to maintain the credibility of the public policies for the protection of nature, the State will use the means it deploys as efficiently as possible to ensure both the protection of the flocks/herds confronted with predation and the favourable state of the wolf population on national territory.

### **VI.B.2. Case typology and principles for intervention to control the increase in the wolf population**

A "cohabitation situation"<sup>3</sup> is characterised by a set of factors resulting from the interaction, because of the risk of predation, between the ecological and biological context of the wolf's presence and the livestock farming context: the number of packs, the number of wolves, formerly colonised territories, recent or potential colonisation, the number of pastoral units concerned by predation, the number of animals killed, the vulnerability of the flocks/herds, the capacity for the farms to bear the risk of predation, changes to pastoral practices by farmers or shepherds, etc.

It is possible to distinguish two large categories of situations using the biological notion of a ZPP which is used for monitoring the species since its return to national territory and which has proved to be a robust tool for assessing the conservation status of the population.

The various possibilities for intervening to manage the wolf population can be deduced from it with the aim of preventing serious damage being done to the flocks/herds.

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<sup>3</sup> The term "cohabitation" is used here in a purely descriptive way: it does not describe a political goal to achieve but simply the presence at a certain time within the same area of wolves and domestic flocks/herds.

### In ZPPs:

- Situations where the wolf has been established for at least 5 years: in these sectors, the very great majority of the flocks/herds are protected and a relative stabilisation of damage can be observed: the 13 ZPPs concerned in 2008 are all situated in the Alpine massif (the massif of Le Mercantour, Queyras, Béal-Traversier, Belledonne, Vercors, Monges etc).
- Situations where the wolf has been established for less than 5 years: 11 ZPPs are concerned in 2008 and the situations are more varied.

In these areas, the occurrence of damage may be recurrent even though protection measures and the use of scaring mechanisms have been deployed. Indeed, whatever the efforts used for protecting the flocks/herds, it is impossible to guarantee the complete elimination of damage or very high restrictions imposed on farmers by excessive predation pressure. This fact, in the protected flocks/herds, must allow an adaptation of the application of the criterion of a satisfactory alternative solution set out in article 16 of the Habitats Directive for the granting of an exemption, and gradually lead to the use of defensive shooting near the flocks, taking into account the time the wolf has been installed and that of the deployment of protection measures.

In exceptional situations and as a last resort, culling operations may take place with the aim of locally reducing predation pressure.

Outside ZPPs: Situations that correspond to colonisation expansion are the most often due to young adults in dispersion. When attacks take place in these areas which are not prepared for the arrival of the predator and where the domestic flocks/herds are not yet protected, damage may be substantial and must be dealt with urgently.

From a biological standpoint, it is possible to distinguish two configurations in this category:

- Situations near known ZPPs and in which the ecological conditions (abundance of wild prey, forest cover, a sparse human presence, a continuity and connectivity with known areas of presence able to reinforce the colonising dynamic) make the installation of the wolf likely in the near future;
- Situations in which these conditions are not met, and, in particular, sporadic presence of wolves observed in areas which have low connectivity with any known ZPP.

From a socio-economic standpoint, these situations are also differentiated according to the consequences of the wolf's predations on the farms through their ability to adapt to the species by developing means of protection and the costs of protecting the flocks/herds.

Some colonisation situations do not present significant difficulties in terms of cohabitation with livestock farming. In this case, the implementation of a local monitoring, information and consultation mechanism for the wolf is recommended (as indicated in V.C).

In colonisation situations where the presence of the wolf leads to serious conflict with livestock farming, two types of action will be implemented:

- As an urgent measure, in the case of attacks observed on flocks that cannot be protected satisfactorily in a short space of time and where the probability of establishment in the short-term by the wolf is estimated as being low, rapid intervention measures will be made easier against the individual or individuals causing this predation with the purpose of preventing further damage.

In the medium term, the area of colonisation will be characterised by their capacity to host a wolf population and by adapting, in consequence, the methods for preventing damage and the management of the population.

In any event, for the application of these principles, a logic of proportionality will be chosen between the resources invested and the sought-after goals.

From the standpoint of decision-making, information and local consultation will be used to ensure both the transparency of the action undertaken and the most efficient use of the technical elements required for managing the species.

### **VI.B. 3 Tools for managing the wolf population**

Taking into account the seriousness of the damage (recurrent attacks) and the characteristics of the livestock farming allow the measures for managing the wolf population to be adapted locally according to the situations.

Annual authorisations may be granted after an opinion by the National Council for the Protection of Nature, to the *préfets* of the *départements* concerned responsible for organising culling in accordance with the conditions set out by the Habitats Directive for exemptions (important damage, lack of another satisfactory solution and maintenance of good conservation status).

A technical protocol for intervening to manage the wolf population annually sets the regulatory framework within which scaring operations, shooting in defence of the flocks/herds and culling by shooting are authorised according to the situations set out above.

- **Scaring**

The "Interpretative guide on the strict protection of animal species of community interest by the Habitat Directive 92/43/EEC" *establishes compliance with article 12 of the Habitats Directive of the possibility in certain situations assessed on a case by case basis to implement measures intended to prevent imminent losses: "isolated disturbances with no probable negative effect on the species, such as for example the fact of scaring a wolf to stop it from getting inside a sheepfold to avoid any harm should not be considered a disturbance within the meaning of article 12"* Once again, a case by case approach must be stressed which implies that the competent authorities must carefully define the level of disturbance that is considered harmful, taking account of the particular characteristics of the species concerned and the situation". Thus, to the extent that the scaring actions are not disturbances that affect *"the chances of survival, breeding success or the ability to breed for a protected species or which leads to a reduction in the occupied area"*, they are not considered to be disturbances (II.3.2.a).

Since 2005, use of scaring action is no longer subject to authorisation for protected flocks/herds. The types of scaring operations authorised are set out each year in an inter-ministerial decree.

In addition to the protection means deployed for preventing damage to domestic flocks, emphasis will be placed on experimentation, development and generalisation of non-lethal tools, techniques and management strategies against wolf attacks.

It is however recognised that despite the systematic use of prevention measures and scaring, there is no "miracle" solution applicable to all situations or to all types of livestock farming, and that none will guarantee complete protection against attacks. The ability of the wolf to adapt to the various scaring methods (using light or sound, scaring shots with shot, plastic bullets) have also been recorded in the past few years. This situation means resorting in certain required cases to the use of other measures for controlling the wolf population.

- **Defensive shooting**

Between 2004 and 2007, the technical protocol for intervening to control the wolf population has imposed as a mandatory prior condition the possible use of defensive shooting or culling by shooting, the installation of flock/herd protection measures and the use of scaring methods where these are possible. Taking into account the recurrence of recorded losses from one year to the next to facilitate defensive shooting that falls within the regulations (reduction of the activating threshold to a single attack, extension of the authorised duration) was tried out in 2007-2008 over well defined areas. This simplification in using defensive shooting has not had any consequences on the wolf population (no wolf shot as part of this measure) and it has been warmly welcomed by the livestock farmers.

For the 2008-2012 wolf plan, gradually making it easier for farmers or shepherds who so request to use defensive shooting is recommended, while taking into account the various cohabitation situations. This practice means that an immediate and selective response can be made in connection with the attack on the flock/herd. When dealt with promptly, this measure, by increasing the risk for the wolf of attacking domestic animals, may redirect this predator away from them and towards wild prey. It must however remain conditional on implementing, wherever possible classic protection means and is not an alternative or a substitute.

For each stage of the modifications made to the conditions of resorting to defensive shooting, monitoring and supervision of the implementation of the measure will be led nationally as part of the adaptive management of the wolf population.

In the central areas of the national parks and in the national natural reserves where the regulations in force exclude the holding and use of hunting weapons other than by particular State employees, the use of defensive shooting is prohibited. In these areas, alternative solutions are being investigated in order to improve the protection of domestic flocks/herds.

- **Culling by shooting**

Since January 2007, the "Interpretative guide on the strict protection of animal species of community interest by the Habitat Directive 92/43/EEC" has approved the possibility of deploying exempted preventive culling without holding back until damage has occurred in circumstances where it is likely to take place. It is thus possible to grant an exemption to article 16 of the Habitats Directive in the absence of another satisfactory solution, *"to prevent substantial damage, in particular to crops, livestock, forests, fisheries, water and other forms of property (...), Since this provision is intended to prevent substantial damage it is not necessary for substantial damage to have already occurred; it is sufficient that it is likely to occur"* (III. 2. b. 19).

Unlike defensive shooting which is part of an extension to the protection of flocks/herds and scaring, culling is a way of managing the wolf population. The conditions of substantial damage and a lack of an alternative solution that can be used to justify culling by shooting are not the same as those for deploying defensive shooting.

Deploying measures for controlling the wolf population is justified in situations where particular difficulties in protecting the flocks/herds are observed and where cohabitation between the livestock and the predator is not deemed acceptable or tolerable. These situations may be ranked in the following way:

- Situations of recent colonisation because of the particular sensitivity of the livestock to the risk of predation
- Situations where the inclusion of means of protection strongly limits the farming system
- Situations where the cost of prevention and compensation for damage is disproportionate in comparison with the goal of protecting the wolf
- Situations where the damage is serious and recurrent despite the deployment of protection measures and the use of defensive shooting.

In order to determine whether the local context is covered by one or more of these situations, the *Préfets* will in particular take into account the criteria relating to the abundance of wild prey as well as the established severity of the damage to the domestic flock(s)/herd(s) concerned or their potential, due to the:

- Average length of presence on the grazing land and therefore their exposure to risk
- Presence of animals batches which are especially fragile during certain periods, especially difficult to protect or particularly exposed to potential predation due to the layout of the site.

Culling may not take place in the central area of national parks and in national natural reserves. In these legally protected areas where nature conservation is a priority and where the contribution of livestock farming to this goal is acknowledged, specific solutions may be sought.

For this policy, the Natura 2000 sites fall within the general policy, except in the cases of sites whose specific management goals would explicitly limit any culling of wolves.

The *préfets* will consult with each other where several wolves are planned to be culled over an area with sedentary animals which straddles two *départements*: this consultation will concern the coordination of actions on the ground and the appraisal of the consequences of taking out several individuals within a single area in terms of the conservation of the species.

They will also consult, before any decision is made, with the local cross-border authorities, in the case of cross-border packs and more especially where animals fitted with a tracking collar as part of a research programme may be affected.

Each wolf culling results in a report being sent immediately to the Ministries responsible for ecology and agriculture.

- **Intervention by the official wolf hunter (louveterie) lieutenants in culling and defensive shooting**

For deploying shooting for defence and culling, the *préfets* may, where required, use the services of lieutenants of the official wolf hunting body.

This institution created by Charlemagne (statutes of 800 and 813) was originally responsible for controlling wolves. At that time the wolf hunters bore the name "luparii". Nowadays, this "body" of voluntary officials numbering over 1,600 officers placed under the authority of the *préfets*, is regularly used for controlling the damage caused by large game, in particular boar as well as populations of animals considered to be pests such as foxes. Since the return of the wolf to the national territory, the wolf hunters have increasingly become involved in operations linked to the management of the species. Calling on their services for wolves is an additional responsibility for the wolf hunters to their traditional activities.

With a concern for clarification, the Ministers responsible for ecology and agriculture will make the required additions and modifications to the regulatory status of the wolf hunting body to ensure the permanent participation of the wolf hunter officials in the management of the species and to acknowledge the new requirement that these interventions constitute for their activity.

- **The management of exemptions and calculation of a maximum national number annually setting the number of wolves that may be culled**

All of the wolves killed within this context (by defensive shooting or culling) are included in a national "quota" worked out annually depending on the development of the population in order that this maximum number is not detrimental to its conservation status. It is not planned to work out quotas on a more local level, but particular attention will be given to balanced handling of all the situations which may require the deployment of operations of this kind.

Each year the national culling ceiling will be set by the Ministries responsible for ecology and agriculture, after consultation with the national wolf group and the opinion of the CNPN.

In order to establish, depending on the situations, the conditions of substantial damage, the lack of an alternative solution as well as the maximum number of individuals that may be culled pending the granting of the exemptions, the departments concerned of the central government offices of the ministries responsible for ecology and agriculture will base their decisions annually on:

- an analysis of the demographic situation of the wolves (elements relating to the numbers, the number of areas with sedentary animals etc), with particular details for the areas where culling will take place
- a review by *département* of changes to the rate of damage and of implementing means of protection
- a review by *département* of the consequences of the removal of animals, both from the standpoint of wolf conservation and from the standpoint of limiting predation and the cost of protection.

The review of the situation about the wolf population, carried out by ONCFS and the aforementioned reviews by *département* carried out by the *préfets* will be sent to the central government offices from 1<sup>st</sup> April of each year for an updating of the mechanism. All of the provisions made annually fall within the principles of adaptive management allowing for the adjustment of decisions depending on the objectives and the effects of the previous measures.

In the event of the national culling ceiling described above being reached before the end of the period for which it has been set, the Ministries responsible for ecology and agriculture will



consult the national monitoring group of the current action plan (national wolf group) as well as the National council for nature protection taking into account the biological situation of the species, after expert advice by the ONCFS and the situation of the losses linked to the wolf's predation, for defining the provisions for managing the interactions between the wolf and livestock at a later time.

## VI.C. Controlling poaching

The implementation of protocols for shooting used for scaring, in defence and for culling also has the purpose of reducing poaching pressure. A continuation with the strategy of appropriate shooting for defence and culling should prevent this illegal way of acting from developing.

The table below shows all of the cases of mortality recorded as part of the research by the Wolf Network on the French Alpine range since 1987.

*The cases of mortality recorded as part of the research by the Wolf Network on the French Alpine ring. \*All the cadavers, genetically examined by the Alpine Ecology Laboratory of Grenoble (except where mentioned to the contrary in the table), belong to the Canis lupus species and the Italy/Mercantour lineage. The autopsies were carried out by a veterinary surgeon after transport by a certified officer. The percentage of mortality due to the various different causes is not interpretable given the much higher probability of finding a cadaver of anthropological origin compared with the cases of natural mortality. Sources: Wolf/lynx network / ONCFS*

N°	Date	Dpt	Municipality	Type	Sex	Age	Weig ht (kg)	Cause of death	Observations
1	?? 1987	06	Fontan	Cadaver*	?	?	?	Shot	Morphol analysis (Pfeffer)
2	Aug 1992	05	Aspres les corps	Cadaver*	M	?	37	Shot	-
3	July 1993	06	St-Martin vésubie	Cadaver*	?	?	?	accidental	Avalanche
4	Nov 1994	88	Vosges	Cadaver*	M			Shot	Buried cadaver
5	Apr 1995	06	St-Sauveur / Tinée	Cadaver*	F	3-4 years	25	accidental	Collision
6	Sept 1995	06	Isola	Cadaver*	M	?	30	Shot	Merlier high alp
7	Sept 1996	05	Les Orres	Cadaver*	F	2 years	27	Shot	-
8	Oct 1997	15	Puy Mary	Cadaver*	M	3-4 years	39	accidental	Car collision
9	Feb 1998	06	Tende	Vomit*	?	?	?	poison	Cadaver not found
10	Apr 1998	06	St-Etienne de Tinée	Vomit*	?	?	?	poison	Cadaver not found
11	Apr 1999	06	St-Martin Vésubie	Cadaver*	M	?	?	poison	Pesticide, partial cadaver
12	July 1999	63	Apchat	Cadaver*	M	?	?	Shot	Decomposed cadaver
13	Nov 2000	38	Allevard	Cadaver*	M	2-3 years	30	Shot	Poaching
14	Nov 2000	05	St-Crépin	Cadaver*	?	?	?	trap	Decomposed cadaver
15	Janu 2001	05	Abriès	Cadaver*	F	2-3 years	23	accidental	Car collision
16	Aug 2002	06	Valdeblore	Cadaver*	F	3-4 months	?	poison	cholinesterase inhibitor
17	May 2004	05	La Roche de Rame	Cadaver*	M	2 years		accidental	Car collision
18	Oct 2004	26	Bouvante	Cadaver*	F	18 months	19,2	Shot	Culled
19	Oct 2004	38	Livet-Gavet	Cadaver*	M	>2 years	35	Shot	Culled
20	Mar 2005	73	Montailleur	Cadaver*	F	3 years	30.4	accidental	Collision
21	May 2005	06	Breil sur Roya	Cadaver*	M	?	-	Shot	Decomposed cadaver on railway
22	Aug 2005	73	Aillon le Jeune	Cadaver*	M	?	31.5	Shot	Poaching
23	Sept 2005	38	St Sulpice de Rivoire	Cadaver*	M	>2 years	35	Shot	Culled
24	Oct 2005	26	Bouvante	Cadaver	?	?	?	Accidental	On photo, Not found
25	Dec 2005	04	Meyronne	Cadaver*	M	<1 year	21	Accidental	Car collision
26	?? 2005	83	Canjuers	Skull*	M	?	?	Poaching	Skull found in avens
27	Sept 2006	38	La chapelle de Bard	Cadaver*	F	<1year	11.2	Shot	Culled
28	Sept 2006	38	La chapelle de Bard	Cadaver*	M	>6 years	37	Shot	Culled
29	July 2006	12	St André de Vésine	Paws*	M	-	-	-	Poaching
30	June 2007	04	Allos	Cadaver*	F	1 year	26	Accidental	Car collision
31	Janu 2008	06	St Dalmas le selvage	Cadaver*	F			Accidental	Car collision
32	Janu 2008	73	Allevard	Cadaver*	M			Shot	Found without head

In the case of mortality caused by poaching, investigations are carried out and legal action is taken. The fight against poaching, and in particular the use of poison which is a serious threat to all wild animals, is a priority for the State.

Poaching is sometimes put forward as a serious threat for the wolf population. This threat is currently assumed and not quantified. The amount of the annual growth rate observed does not reach the biologically known maximum for this species. Modelling by capture-marking-recapture of the genetic signatures will enable an estimation of the survival rates to be known and it would be desirable to find out to what extent differentiated estimates can be carried out between protected territories (parks, reserves etc) or if this is not possible.

At the request of the Ministry responsible for nature protection, in order to put forward a formal mechanism for monitoring the situation on the ground to be undertaken as effectively as possible and a regular summary of the data to be made, ONCFS will set up a centralised monitoring service for wolf poaching whose mission will be to carry out detailed monitoring of this phenomenon and the measures taken at the police, administrative and legal levels by gathering together nationally all the available information.

#### **VI.D. Systematic identification of captive wolves at the national level**

The marking of captive wolves was made mandatory by the promulgation of the decree order of 19<sup>th</sup> May 2000 making the holding of wolves in establishments subject to authorisation from the *préfet*. The order sets out that a register of incoming and outgoing animals should be kept, the identification of each animal by a unique and permanent marking on the animal's body be made, that it should be recorded in a national file and that an identification card be created and issued to the holder of the animal.

The order of 19<sup>th</sup> July 2000 setting out the provisions for the operation of the national identification file for wolves held in captivity provides for a performance indicator for the file records and the setting-up of a supervisory committee responsible for checking that these provisions are complied with.

The order of 24<sup>th</sup> August 2000 regarding the accreditation of the manager of the national wolf identification file stipulates that the national union of zoological parks is accredited to carry out the management of the national wolf identification file that it must keep in accordance with the rules of the order of 19<sup>th</sup> July 2000.

The regulatory conditions are therefore fulfilled to ensure monitoring of captive wolves. A review of the implementation of these provisions will be made.

## VII. Cross-border cooperation and international exchanges

### **VII.A. The Italian-Franco-Swiss governmental protocol on the wolf management strategy in the Western Alps**

Considering that the wolf population located between the Italian Piedmont, Switzerland and the French Alps constitutes a distinct biological entity – a population is a continuum of breeding individuals at usual dispersion distance - , and given the large ability of this species to move around, an "*Italian-Franco-Swiss partnership protocol for the management of the wolf in the Alps*" was signed by the three States on 13<sup>th</sup> July 2006.

This protocol commits the three signatory States to:

- organising periodic official meetings between the countries which favour exchanges
- creating a standing committee for wolf management in the Alps
- setting up a technical group made up of researchers and experts to support this standing committee.

It also promotes:

- efficient exchanges of publications and information (technical, administrative and regulatory)
- exchanges of personnel to promote research activities
- signing up to conservation programmes in the border areas
- prior information and permanent and fast communication of culling that has been undertaken or that will be undertaken.

The standing committee made up of representatives of the national authorities was constituted and met for the first time in December 2007 at Turin. Two technical groups concerned respectively with the organisation of prevention of damage to livestock and with the scientific monitoring of the wolf population were created.

In the field of cross-border monitoring of the wolf population, the planned initiatives are:

- a harmonisation of the criteria used to validate the gathering of presence signs
- harmonising the methods and genetic databases
- setting out a common assessment of the status of the wolf population in the Western Alps.

In the field of prevention and compensation of damage, it is initially planned to draw up a joint review of the situation in the three countries and propose working avenues for improving the existing mechanisms.

### **VII.B. The development of cross-border cooperation in the Pyrenees**

Scientific and technical coordination has been deployed by ONCFS since the detection of signs in 1999 confirming the presence of wolves of Italian origin in the *département* of Les Pyrénées-Orientales. It concerns the gathering of signs, genetic analyses, the establishment of the network and the training of staff. In order to supplement this monitoring mechanism, the Midi-Pyrénées DIREN in 2006 widened the "wolf" issue to the inter-regional and inter-

*département* skills cluster for services and organisations of the State concerned with the bear programme in the Pyrenees.

Since 2004, the presence of wolves of Italian lineage was confirmed on the border with Les Pyrénées Orientales (Sierra del Cadi) in Catalonia and a plan for assistance measures and compensation for damage was set up in this province. Following this announcement, exchanges of field information about the wolf and training connected with the French experience were organised at the ONCFS's initiative.

In line with the working focus areas set out in the "Declaration of intent between the Minister of Ecology and Sustainable Development of the French Republic, the Minister of Agriculture and natural heritage of the principality of Andorra and the Minister of the Environment of the kingdom of Spain for cooperation regarding the conservation of the brown bear in the Pyrenees as well as other species of common interest", on 22<sup>nd</sup> June 2006, an institutional cooperation and monitoring protocol for the wolf between France, Spain and the Principality of Andorra will enable the cross-border technical exchanges already undertaken in this field to be structured and long lasting.

### **VII.C. Exchanges at the European level**

The protection of the wolf is controlled at the European level by the Bern Convention on the preservation of wildlife and the natural environment of Europe and by the European Union by the "habitat, fauna and flora" directive.

Different European countries have set up mechanisms for the management of the species within the context of these regulatory provisions.

As a consequence various approaches exist depending on the biological situation of the populations concerned and their interactions with human activities. These management methods may be backed by legal arrangements set up pursuant to the provisions of the Bern Convention and the "habitat, fauna and flora" directive which may be useful for countries confronted with similar issues to become aware of.

From these there should emerge general principles as to the interpretation of the regulatory protection provisions for the species in line with the interpretative guide to article 12 and 16 of the "habitat, fauna and flora" directive.

The Ministries responsible for ecology and agriculture will carry out and support the action needed aimed at increasing exchanges of experience about dealing with the protection status of the wolf and the management methods of the populations, both with the other Member States concerned and with the European Commission.

### **VII.D. Improving international technical exchanges**

In 2006, study missions were undertaken by the Ministries responsible for nature protection and agriculture in the various European countries where a wolf population has always been present (Poland, Romania and Spain) in order to open up prospects of collaborating in the field with the monitoring of the populations and with the protection of livestock.

Since 2005, Franco-American scientific and technical collaboration has resulted in exchanges of expertise aimed at exploring the possibility of adapting some non-lethal management techniques deployed in Montana, Idaho and Wyoming to the situation in

France. The goal is to supplement the existing scientific monitoring mechanism for the wolf and the protection of flocks/herds by setting up a **strategy** based on developing the ability to find out about and take action on this species which is fast colonising the national territory. Wolves are regularly captured in North America where knowledge of this technique has been preserved and improved, in particular as part of the species conservation programmes, in developing non-traumatic traps. By making radio-tracking of the captured individuals possible, this technique not only provides improved knowledge of the packs and their development, the ability to study the impact of the presence of the predators on the population of ungulates, and the "cascading" effect on the systems, but it also opens up new possibilities of action against pests by providing an alternative to shooting.

The exchanges undertaken with the Yellowstone National Park, the State of Montana and the State of Idaho led to a trip to France to the Mercantour National Park in October 2006 of an expert in capturing wolves with the purpose of participating in the development of a scientific programme aimed at studying the impact of wolf predation on wild ungulates and indirectly on the biodiversity of the ecosystems concerned. This visit resulted in the drawing up of an expert's report on capturing wolves in France.

New exchanges of this kind will be developed.

## VIII. Communication

Communication is an important part of the construction of public management policy for the wolf population in France. Since the return of the wolf to the national territory, during the two LIFE programmes and action undertaken as part of the wolf action plan for the 2004-2008 period, communication has been a means of strengthening links between professional livestock farmers, the associations for nature protection and the Ministries responsible for nature protection and agriculture. Gradually, a common framework based on relatively shared values has been constructed by the various parties involved in wolf management.

### VIII.A. Coordinating institutional communication

The Rhône-Alpes DIREN, in partnership with the *préfets*, the DDAFs and ONCFS has provided the coordination of institutional communication for the wolf plan since 2004.

In the light of the experience acquired in this period, the need for communication and information that has been validated from a technical standpoint has been clearly identified. For this purpose, a position of communication coordinator for communication and information about the wolf, located at the Rhône-Alpes DIREN will be created as soon as possible. The communication coordinator's mission will be to produce, for the 2008-2012 period, a communication plan based mainly on the technical and audio-visual tools that will allow information, both internally (central and decentralised government offices) and externally (players, partners, the general public etc), to be provided in "normal times" as well as in "periods of crisis". Real coordination, broadcasting and dissemination of information on all the issues linked to the wolf and livestock farming will thus be organised at all levels.

The plan setting out the State's information and communication strategy will be included in the current action plan.

A website on the wolf in France and its interactions with livestock farming intended for the general public and socio-professionals will also be created by the Rhône-Alpes DIREN.

### VIII.B. Improving information exchanges between people

Communication is provided by the *préfets* and the decentralised services which are supported by the communication coordinator. Communication in a crisis situation will be coordinated with the central services.

In the *départements* where signs of the presence of the wolf have been identified, a surveillance cell will be set up by the *préfets*. This surveillance cell prefigures the *département* wolf consultation group which is created by the *Préfet* where the wolf's presence interferes with human activities. This group's mission, among others is to:

- Disseminate information in order to act with greater transparency (for elected representatives, nature protection associations, professional organisations etc) about the development of the wolf population, compensation received for damage caused by its presence etc.
- Relay back the information required for taking into account the possible problems linked to the wolf's presence to the Ministries responsible for ecology and agriculture.

## PART THREE

### MONITORING AND ASSESSMENT OF THE IMPLEMENTED ACTIONS

#### IX. Financial support

Annual financial assessment of the various actions undertaken as part of the plan will be carried out by the two Ministries. Their appropriateness with the plan's goals will also be assessed.

Every year the DRAFs and DIRENs will provide the two Ministries with:

- A report by *département* of the damage (financial amounts and number of victims) showing the proportion of farmers having signed a protection contract as part of the 323 c mechanism of the PDRH and for which options, as compared to the previous year (see part B),
- A financial balance sheet for the implementation of the 323 c mechanism and the financial forecasts for the following year
- A financial balance sheet of the use of possible allocations of emergency funding
- A financial balance sheet of possible authorised wolf shooting operations
- Possible local economic transfers (job creation linked to prevention for example).

#### X. Indicators measuring the effectiveness of the wolf action plan

An analysis of the results of the actions deployed is an essential element in the adaptive management strategy on which the action plan is based. An annual measurement of the following indicators enables useful readjustments to be made to the procedures deployed.

##### Information communicated by ONCFS

- Number and development of Areas with Sedentary Animals
- Minimum numbers and index of the actual population
- Geographical development of
- Number of new presence sectors

##### Information communicated by the DRAFs and DIRENs

- Number of livestock farmers in areas with sedentary animals and those with a temporary presence,
- Number of declared attacks and compensated animals,
- Development in the number of municipalities classified within the OPEDER application area
- Number of livestock farmers having signed a protection contract in comparison with the number of livestock farmers in the OPEDER application area
- Number of farmers concerned by predation compared with the number of livestock farmers having contracted a protection measure
- Number of contracts per type of measure
- Number of management units per type of contracted measure
- Number of livestock farmers having benefited from emergency measures



Technical and financial inventories were regularly presented as part of the previous 2004-2008 plan, at *département* committee meetings, regional coordination meetings and during national wolf group meetings.

Apart from these indicators, sociological studies on the implementation of the action recommended in this plan have been carried out as part of an agreement between MEEDDAT and CEMAGREF. These studies have focused on the aspects linked to communication of the scientific monitoring of the species and the perception by the livestock farmers and shepherds of the proposed changes for the application of the technical scaring protocols and the use of defensive shooting.

New studies will be undertaken in order to continue with the assessment of the State's action during the 2008-2012 period.

## **XI. Implementation and monitoring of the action plan**

The plan is monitored by the Ministries responsible for nature protection and agriculture assisted by a national monitoring group.

This is supported by the regional environment department, responsible for the inter-regional technical coordination together with the Rhône-alpes regional department of agriculture and forestry which deals with the protection of flocks/herds.

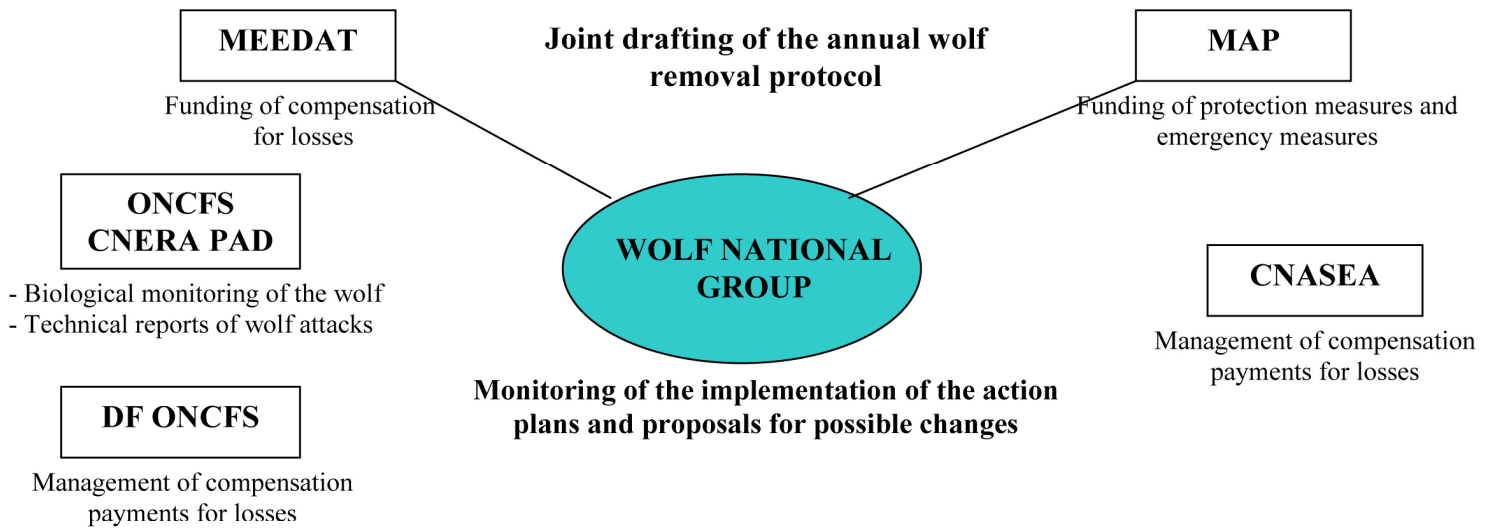
The mission of the national group is to monitor the execution of the plan and to propose possible changes. In order to taken into account the expansion of the wolf beyond the Alps, its composition may be widened as required. A summary of the outcomes and forecasts is presented to it every year.

In order to supplement this arrangement, inter-regional coordination meetings in the technical field will be organised jointly by the Rhône-Alpes DIREN and DRAF.

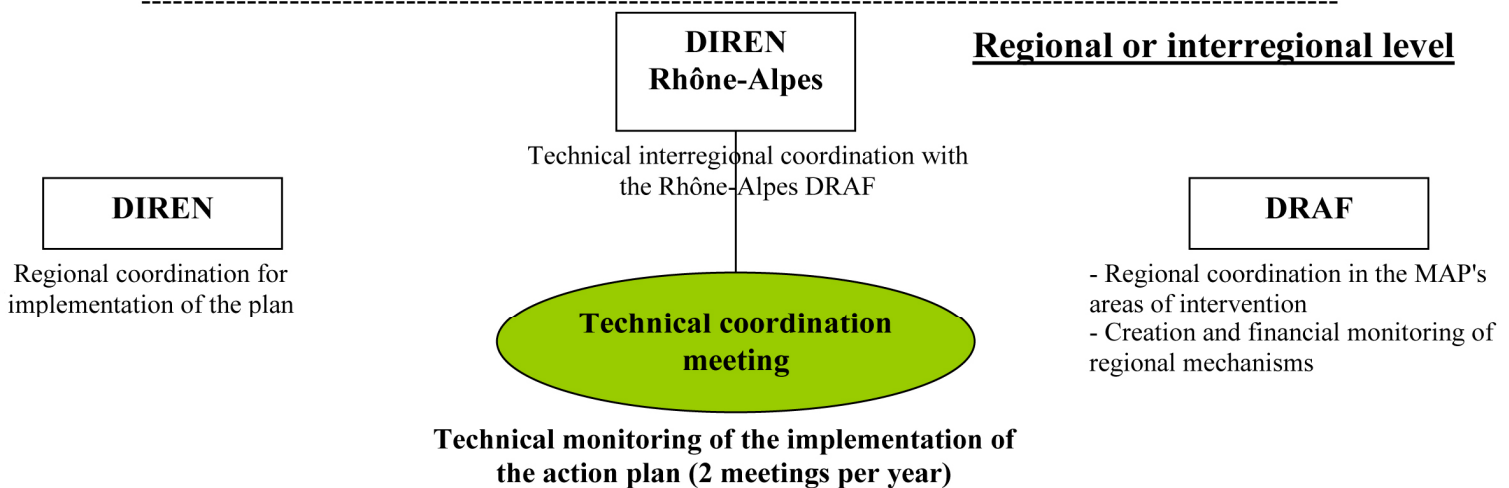
All intervention by the State and its public bodies, and the presentation of the whole of the consultation mechanism at the national and *département* levels is presented in the diagram below.

**Implementation of the wolf action plan 2008-2012**  
Intervention of the State and its public bodies and structure of cooperation  
at the national and local levels

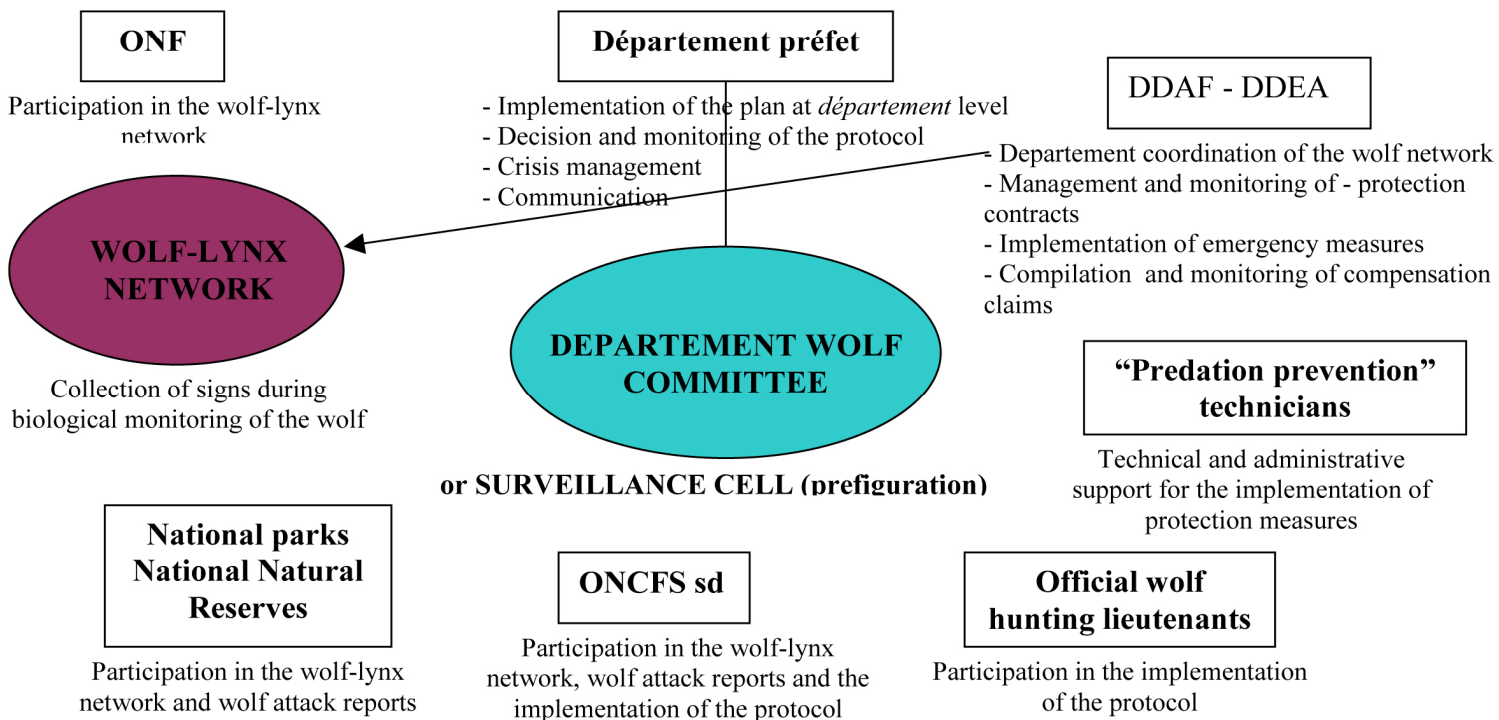
**National level**



**Regional or interregional level**



**Département or infra-département level**



## APPENDIX 1

### *Département orders for wolf culling - 2004-2008*

Year	Département	Category	Signing date	Result	Disputed
2004	26	culling	see Ministerial order	1 wolf culled	see Ministerial order
2004	38	culling	see Ministerial order	1 wolf culled	see Ministerial order
2005	05	culling	07/07/2005	nothing	yes
2005	05	culling	07/07/2005	nothing	yes
2005	05	culling	08/08/2005	nothing	no
2005	06	culling	11/08/2005	nothing	yes
2005	26	culling	19/08/2005	nothing	yes
2005	38	culling	20/06/2005	1 wolf culled	yes
2005	73	culling	22/07/2005	nothing	yes
2005	73	culling	20/09/2005	nothing	yes
2005	73	culling	24/10/2005	nothing	yes
2005	73	culling	24/10/2005	nothing	yes
2006	06	défense	07/09/2006	nothing	no
2006	06	défense	07/09/2006	nothing	no
2006	06	défense	23/10/2006	nothing	no
2006	06	défense	23/10/2006	nothing	no
2006	38	culling	22/08/2006	2 wolves culled	yes
2007	04	defensive	06/09/2007	nothing	no
2007	05	defensive	31/05/2007	wolf scared away twice	no
2007	05	defensive	02/07/2007	nothing	no
2007	05	defensive	03/07/2007	nothing	no
2007	05	defensive	21/09/2007	nothing	no
2007	05	defensive	11/10/2007	nothing	no
2007	06	defensive	03/09/2007	nothing	no
2007	06	defensive	03/09/2007	nothing	no
2007	26	defensive	17/08/2007	nothing	no
2007	26	defensive	12/09/2007	nothing	no
2007	38	defensive	16/08/2007	wolf scared away	no
2007	73	defensive	07/08/2007	nothing	no
2007	73	culling	10/08/2007	nothing	no
2007	73	culling	28/09/2007	nothing	no
2008	05	culling	25/01/2008	nothing	no

## APPENDIX 2

### Historical distribution of the wolf in France from the 18<sup>th</sup> century until the mid-20<sup>th</sup> century

The historical situation of the area of distribution of an animal species remains difficult to assess, in particular due to the lack of standardised methods of information gathering at the time. Several scientific articles deal with the partial truth of such analyses. Although these data cannot of course be used to establish indices of changes that the species has undergone, they do however remain as testimony to a known situation based mainly on entries in the registers of grievances from Parliamentary ('States') archives or from church records. In 1984 François de Beaufort undertook this work (Historical ecology of the wolf (*Canis lupus*, L. 1758) in France. Doctoral Thesis of the University of Rennes I. SFF, Paris: 1104 pp.) by making up a file of over 50,000 observations of wolves about which the information is divided into several sub-files according to the level of interpretation to which the various types of data lend themselves.

The results of this investigation are summarised in the maps below, showing the presence of the species for 3 periods: at the end of the 18<sup>th</sup> century, at the end of the 19<sup>th</sup> century and in the mid-20<sup>th</sup> century, at the time of its disappearance.

