REPORT FROM AN EXPERT MISSION FOR EVALUATION OF THE WOLF MONITORING SYSTEM IN FRANCE,AUGUST 2012
on request by the French Ministry of Environment
through IUCN French Committee

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Objectives of the mission:

Assessment of the wolf population monitoring in France in the framework of the National action plan 2008-2012 of the Ministry of Environment

The expert mission has two main purposes:

- the first one regarding the objectives of the wolf monitoring carried out during the action plan 2008-2012;
- the second one, in a prospective goal, regarding the relevance of the current methods to adequately address the new questions and emerging issues identified in France.

In this context, the assessment will address:

- the aptitude of the wolf population monitoring to describe the conservation status of the species;
- its aptitude to allow to determine the possibilities of derogation from the strict legal protection (determining the possible level of take without harming the conservation status)
- its aptitude to provide information on wolf presence in the different territories (area of presence, reproductive packs or not, approximate number of individuals in each territory);
- the relevance of the monitoring operations regarding wolf extension to new territories (for example, the relevance of methods like "minimum numbers detected" in territories where snow cover is absent or insufficient);
- the aptitude to detect the presence of wolves in territories of colonization;
- theorganizationof data collection;
- the relevance of the transborder approach to estimate the species conservation status at the level of the population shared with Italy and Switzerland.

Schedule of the mission

June 1st 2012

The first request for this mission was received

June 7th2012.

The request for the mission was accepted

Monday morning 27th of August

Meeting at the Ministry of Environment in Paris with following persons:

Paul Delduc, Michel Perret and Julien Transy , Ministry of environment (MEDDE/DEB/SDPEM),

Pascale Eimer, Ministry of Agriculture DGPAAT

Florian Kirchner, IUCN France

Monday afternoon 27th of August

Meeting in Lyon with Philippe Ledenvic, Laurent Charnay and Denis Felix from the Regional Service of Environment (DREAL) and Veronique Guillon from the Regional Service of Agriculture and forest (DRAAF).

Tuesday 28th of August

Discussions in Grenoble with Eric Marboutin at Office National de la Chasse et le Faune Sauvage (ONCFS)

Wednesday 28th of August

 In the morning discussions in Gap on technical details of the monitoring program with personnel from ONCFS responsible for the wolf monitoring, especially Christophe Duchamp and Eric Marboutin

In the afternoon meeting with stakeholder representatives:
From the hunting organizations Mr. Mugnier and Mr. Coudurier)
From the farmers organizations, Mr. Royannez, Mr. Motte and Ms. Metery
From FERUS (Environmental NGO) MmeBonnet and Mr Pierre Peyret

In the evening participating in a field exercise with induced howling (hurlement provoqué) in a local wolf territory

Thursday 29th of August

Continued discussions with ONCFS personnel in Gap

Friday 30th of August

In the morning meeting at the Ministry of Environment in Paris with Mme Odile Gauthier, director of MEDDE/DEB) and Michel Perret SDPEM.

and a meeting in the same place with Mr. Monnier and Mr. Lefebvre, General Inspection Mission on Wolf

In the afternoon workshop and presentation of the first impressions from the mission with representatives from Ministries, and with members of the Species Commission of IUCN France and members of the National Group on Wolf.

The wolf population

The wolf became extinct in the Alps in the beginning of the 1900 ´s, but survived in the Apennines in Italy. In the beginning of 1990´s dispersing wolves from the Apennines started colonizing the Italian Alps, and soon after also appeared in the French Alps. In 2012 most of the French Alps seem to be occupied by wolves, and there also are small but regular occurrences of wolves in the eastern French Pyrenees and in the Vosges. Irregular occurrence also is reported in recent years from Jura and Massif Central. The census from the winter 2011/12 indicates about 250 wolves in France.

The organization of the wolf monitoring

The French wolf population is monitored annually. Office National de la Chasse et de la Faune Sauvage (ONCFS) is responsible for organizing this monitoring, for compiling and analyzing the data, and for reporting the results. This Government organization has offices in all departments in France, but the central responsibility for the wolf monitoring is placed in the offices in Grenoble (Isère) and Gap (Haute Alpes), under the direction of Eric Marboutin. At its help, ONCFS has the so called "Wolf Network" (Le Reseau de Correspondants Loup-Lynx). This network consists of approximately 1200 volunteers, trained by the ONCFS to detect, evaluate and report signs of wolf and lynx in the terrain. The majority of people in this network are officials employed in the ONCFS itself, in the Forest Service and in the National Park Service, but around one third comes from NGO´s (hunters and nature protectionists) or from the unorganized public.

Montoring design and data collection

The design of the French monitoring system is described in detail in The 2008-2012 National Wolf Action Plan, and in Duchamp et al (2012). In short, it can be said to aim at three types of data important for the management, geographical distribution and expansion, population size and population growth.

Geographical distribution and expansion to new areas is based on collection of data from the Wolf Network that indicate presence of wolves. Such data are killed prey (wild or domestic) found with typical signs for a wolf kill, dead wolves or parts of wolves, scats, foot prints, howls and visual observations of wolves, preferably confirmed with photos. These data are collected opportunistically by people within the Network, often after reports from people outside the Network. All presumed wolf signs are described on standardized forms and sent in to ONCFS, where they are evaluated and entered into a national monitoring database (Base de Données Nationale Loup-Lynx). Distribution data are reported on commune level each year, which is at a rather fine scale (French communes are generally small, often just tens of square kilometers).

When wolf signs have been reported two consecutive years over a given massif and species identity has been confirmed through DNA-analyses, the area is declared as a "Zone de Presence Permanente" (ZPP), in fact corresponding to a wolf territory. Minimum number of wolves within each ZPP is estimated based on snow tracking and visual observations of groups (Effectif Minimum Retenu EMR). When no one presence sign is detected over a given ZPP during 2 consecutive winters, the area is declassified.

A second method to determine number of individuals is by applying a so called Catch-Mark-Recapture (CMR) model, based on DNA-samples from feces and hair collected from the whole wolf range (even outside of ZPP´s), where an effort is made to get an individual DNA-profile from each sample, based on seven micro satellite markers (one is a sex marker). Presently 600 samples well distributed over the wolf range are analyzed per year. On

average 65 % are successfully analyzed as wolf samples, and of these 65 % produce individual DNA profiles, i.e. on average 250 individual profiles are received annually. The CMR yields numbers approximately 2,5 higher than the EMR. The number determined through this method is regarded much closer to the true number than EMR, but the confidence limits of CMR are very high (EMR yields no confidence limits).

Finally, number of reproductions are determined each year in August and September by "induced howling" ("hurlement provoqué"), which is performed up to 6 times in each known wolf territory (ZPP). At each occasion in a territory, a number of points are visited simultaneously to cover the whole territory, which requires up to 60 people the same night for one specific territory.

Growth rate can be determined on a number of different data sets. The mean growth rate of CMR for the period 1995 – 2007 is 1,27 ± 0,07. The same value for EMR and number of ZPP´s for the shorter period of 2002 – 2006 was 1,24 for both estimates. For number of communes with wolf presence it was somewhat lower (1,16).

Evaluation of the monitoring system

A general evaluation, problems and suggestions

My general impression of the French wolf monitoring program, how it is organized, the methods it is using, and the personnel involved, is that it holds an unusually high standard, also in an international context. The use of several independent methods that support each other is a tremendous strength. This is especially the case for the estimate of the growth rate, which probably is the most important parameter for the management and conservation of this species. However, I will also point to a few problems I have noticed, and give some suggestions for improvements.

The CMR method builds on a sophisticated statistical model on which I have great confidence. But there are a couple of small problem with the collecting and handling of data that probably could be improved. The first is the long delay between monitoring year and a final figure. The last estimate for the CMR today (7th September 2012) is from winter 2007/2008. There are several reasons for this delay. One is that samples are collected only once or twice per year from the different departments where they are stored. This could be speeded up by fetching them or sending them in to ONCFS much more frequently, at least each month. Now the laboratory analysis of them starts more than a year after they were collected, and takes another year, at least. If samples were taken in continuously, the analysis of them could start already during the very monitoring year they are sampled. Also the routines of the laboratory should be checked, to see if there cannot be a faster process. In Scandinavia we sample and send in wolf feces continuously during the monitoring period October – February, and start the analysis immediately the first samples have arrive to the lab, which means that the analysis of all samples (500) are ready by May the same year.

This delay is, at least for the time being, not a big problem as there is a strong correlation between CMR and EMR and therefore the CMR-value can be deduced from EMR with a simple formula. However, it can be a larger problem in the future, when wolves colonize areas without snow, where EMR will be very difficult, or even impossible, to estimate.

Also, in the genetic dataset I found an unusual high number of alleles at the different micro satellite markers used with very low occurrence frequencies ("rare alleles"). However, I want to stress that even if there should be some methodological problem here, I judge that this still would not have caused any big errors in the CMR population estimate, Still, I suggest that this should be looked into to find out whether there are some methodological problems here

or if there are biological reasons for this unexpected finding. Maybe the first thing to do would be to check if these rare alleles occur in the source population, i.e. in the Apennines.

Now only six somatic micro-satellite markers are used in the DNA-analysis. I suggest that a power analysis is applied to find out if it would be more efficient to cut down on the total number of samples analyzed, and spend the gained money/time on more markers instead. If this is done it should of course be synchronized with the monitoring of the wolf population on the Italian side of the Alps, which now is using the same markers as France.

I also suggest that scat samples are collected only during winter (October – March), as there are reasons to believe that summer scats contain DNA of lower quality, due to faster break down when temperatures are high. This of course would prevent estimating seasonal survival rates, but I got the impression that this is not done anyway. Possibly a more limited sampling season could also speed up the whole process of determining CMR. Actually, I understand that a pilot study already has been conducted by ONCFS and CNRS that demonstrates convergence between population size estimators when they are estimated based either on data collected all the year round, or only during winter time.

Now, there is a large gap between the two methods that yield absolute numbers, the EMR and the CMR. While it is harder to evaluate the quality of the CMR, it is clear that the EMR is an underestimate of the true number. That is of course also the reason why it is called "Effectif minimum retenu". However, there is a clear correlation between number of observations and number of wolves observed per territory ($R^2 = 0,37$). This indicates that a way to improve this minimum number would be to increase number of observations in those territories (ZPP´s) where there now are reported few observations. I have no idea whether this is possible for logistic or financial reasons, but if possible it should be done.

A problem for the detection of new wolf occurrences is that in most *departements* where there are no wolves today, there is also no Wolf Network. The only personnel trained to identify wolf signs in these areas are ONCFS personnel. I understand that in such *departements* , it isn't so easy to support a Wolf Network (so as not to worry people in these *departments).* A way to avoid pointing out certain *departements* as possible future wolf areas, would be to set up networks in all *departements* in France, or at least in all that have at least some area with suitable wolf habitat.

Answers to the specific questions in the objectives of the mission

Here I will try to give short answers to the specific questions asked in the objectives of the mission:

- the aptitude of the wolf population monitoring to describe the conservation status of the species;

I find the French wolf monitoring system well suited to judge the conservation status of the population. Here the strength of several independent methods supporting each other is important, especially for determining the growth rate of the population.

- its aptitude to allow to determine the possibilities of derogation from the strict legal protection (determining the possible level of take without harming the conservation status)

The present monitoring system certainly is sufficient for determining possible levels of take out without harming the conservation status. The EMR is a conservative estimate of number of wolves. My judgment is that it would be possible to use the number and growth

rate of EMR to estimate a maximum harvest number that still would be very safe (i.e. not cause a decline of the population).

<u>- its aptitude to provide information on wolf presence in the different territories (area of presence, reproductive packs or not, approximate number of individuals in each territory);</u>

As long as wolves mainly live in areas where there is a snow cover during winter, the present system is adequate to deal with all these estimates.

<u>- the relevance of the monitoring operations regarding wolf extension to new territories (for example, the relevance of methods like "minimum numbers detected" in territories where snow cover is absent or insufficient);</u>

The present monitoring methods for determining numbers of individuals will run into problems if wolves start colonizing areas without snow. Minimum number of wolfs determined by the present method (EMR) will be much more difficult in areas without snow. There it would be dependent completely on visual observations, as no snow tracking will be possible. I doubt that this will be enough for receiving a meaningful estimate.

The CMR method could be possible also in snow-free areas. However, it requires that collection of enough number of scats can be organized even in such areas. This will certainly demand much more effort than in areas with snow. Another problem is that this method has several years of delay. When EMR is no longer available, up-to-date CMR- estimates can no longer be deduced from that method.

A rough estimate of population size determined by multiplying pack numbers with the average pack size (e. g. received from wolf howling and genetics) might provide another way to get rid of some of the problems in detecting individuals without snow.

Number of reproductive packs probably can be determined with the present system (induced howling) even in areas without snow, but takes much more effort than today, due to the difficulty of identifying areas where this method should be applied. But it should not be impossible.

<u>- the aptitude to detect the presence of wolves in territories of colonization;</u>

I judge that the present system is adequate for detecting permanent presence of wolves in new areas within a year after the first wolf has established there, even without snow. Establishing a Wolf Network in potential colonizing areas should improve this ability.

<u>- the organization of data collection;</u>

The present organization is excellent. The only problem is the extension of the Wolf Network to new areas where there now are no wolves.

<u>- the relevance of the transborder approach to estimate the species conservation status at the level of the population shared with Italy and Switzerland.</u>

There is some cooperation across the border, for example use of the same genetic markers of the CMR method. Here I think however that more could be done. It would be optimal to synchronize all monitoring methods across the national borders, and to hold at least one annual meeting with all the concerned countries to evaluate the monitoring results of the

year, and finally to produce a common annual monitoring report for the whole Alpine wolf population.

Final remarks

The French wolf monitoring system is not perfect. But there is no perfect method for monitoring large carnivores anywhere in the world. In fact I find the French monitoring system to be one of the absolutely best in Europe. It is hard to point to any method not used presently, that could improve the results. For the time being, the methods used fulfill all the demands that the management and conservation of the species can have. The challenge for the future is to continue this success even when wolves to a larger extent colonize area without a snow cover during winter. However, with the competence available, I have great confidence that this will be possible.

Literature cited

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