

Wolf monitoring in the Alps



5th Alpine Wolf Workshop
La Fouly (VS), Switzerland
2-3 October 2007



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Jean-Marc Weber & Julien Fattebert (eds)

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Forewords

In 2001, our colleagues in charge of wolf monitoring in France took the initiative in inviting other people working on the same topic in the neighbouring alpine areas, i.e. in Italy and Switzerland. So came up the first Alpine Wolf Workshop. The main objective of the meeting was the implementation of an effective collaboration between the three respective countries. Since, significant progress has been recorded, particularly regarding information exchange. Consequently the Wolf Alpine Group was recently appointed the technical advising board in the frame of wolf management by the French, Italian and Swiss governmental authorities.

Six years after the first discussions, the Wolf Alpine Group met for the 5th time and for the 2nd occasion in Switzerland. Located in the heart of Val Ferret, La Fouly was not chosen by chance to hold the workshop. Indeed, the first evidence of wolf return to Switzerland was found in the village's vicinity in

1995. In addition, the damage prevention program, which is currently implemented in several regions of the country, was initiated in this area with the precious collaboration of a local farmer, Olivier Sarrasin.

The aims of the 5th AWW were first to make an update of wolf monitoring and status in the different countries. Then, it appeared that despite a good collaborative work between the teams, there were still some problems to solve for an optimal communication, e.g. wolf genotyping. Finally, mapping wolf distribution throughout its alpine range every four years was not satisfactory for all partners and therefore required a new approach. Very last but not least, Germany through its experienced representatives was present. Indeed, the Land of Bayern expressed the wish to attend the workshop in order to prepare the probable return of the wolf to their region.

Jean-Marc Weber



Participants to the 5th Alpine Wolf Workshop in La Fouly, Switzerland, in October 2007

The Wolf in the Italian Alps

An update of the Wolf Project in Piemonte Region for the years 2006-2007

Presented by Francesca Marucco, Centro Conservazione e Gestione Grandi Carnivori, Regione Piemonte

Population status and monitoring

Progetto Lupo Piemonte is carried out since 1999. The main actions of this project are the following: (i) wolf monitoring over the entire region; (ii) livestock depredations monitoring and prevention methods; (iii) research and (iv) communication. The actions are conducted in each province of the Piemonte Region and in collaboration with the Liguria and Aosta Region.

Wolf monitoring

We set up a network of specialized operators from the State Forest Corp, the Provincial Police and the Natural and National Parks, to monitor the wolf population over the entire region. These operators are trained to report wolves signs and observation, which leads to high monitoring effort. At a higher level of training, some of these operators were also trained to help in the monitoring of the wolf population following a specific monitoring protocol.

Monitoring techniques consist of a combination of three non-invasive techniques: snow-tracking, genetic analysis on tissue, scat, or hair samples, and wolf howling. Since 1999, a total of 4255.6 km of wolf tracks were followed in winter during snow-tracking surveys and 1206 scats were analysed, in particular of these 53% successfully genotyped. Data were used to map the presence of the species, the minimum range of packs, and to monitor the social dynamics, and the turn over of individuals

within each pack.

The main part of the wolf population in Piemonte Region lies in Provinces Torino and Cuneo (Figure 1). The population in the Piemonte region consists of 14 packs, of which at least 5 have transboundary territories between Italy and France. One newly formed pack, the pack in Valle Varaita, has likely a transboundary territory shared with Queyras, France, but we need to compare genetic results to confirm it. We could document reproduction in all but two packs, of which one was recently on the French side of the border. In the Verbano Cusio Ossola Province (VCO), one lone female ("VCO F31") was present over the Swiss border from 2002 to 2005. In May 2006, a lone male that was run over in Bavaria and identified as "VCO 03", was previously roaming over that area.

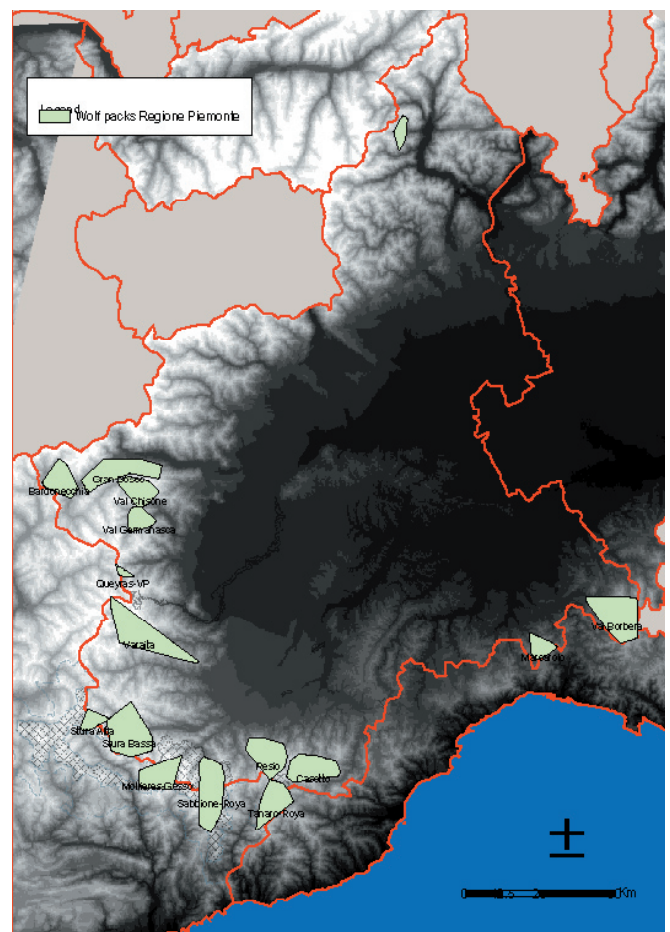


Fig. 1 Wolf packs locations and minimum ranges in the Piemonte Region, Italy.

After genetic analyses, the minimum number of wolves in the Piemonte Region detected at the beginning of the winter was between 40 and 50 in the last two years. Modelling to assess the true population size, as well as other research projects, were not reported, but conducted over the full dataset.

Damage and compensation

Livestock damages are decreasing where packs are settled for several years. In the contrary, the arrival of lone wolves or the establishment of a new pack usually trigger an increase of depredation events. In 2007, wolves killed 297 livestock in 102 attack events over the entire Piemonte region. Compensation costs in average 60'000 EUR per year. However, some shepherds started to complain that damage prevention increased their labour and costs, whereas the damage successfully decreased or stopped, thus the compensation, leading to overall economic losses. The Piemonte government, through the agriculture and the environment councillorships, set up a fund of 100'000 EUR for the premium "Premio di Pascolo Gestito" to support shepherds who use prevention method successfully in a wolf presence area and could therefore not get compensation.

The wolf in Aosta Valley and Gran Paradiso National Park

Presented by Paolo Oreiller

In the Aosta Valley, the presence of wolf was suspected for the last ten years, but was formally proved in 2005 only, following an attack on sheep. In the Gran Paradiso NP, which lies over the border of Aosta Valley and Piemonte regions, the presence of at least two wolves has been proved thanks to faecal samples send to Switzerland for genetic analysis. Recently, two cows and 25 sheep were killed by wolves and direct observations tend to

show that a 3rd individual could roam over the Park. Since the prey base is healthy, with an estimate of 11'000 chamois and many red and roe deer present, the establishment of a breeding pack is likely in a near future.

Wolf status in France: an update 2007

Presented by *Christophe Duchamp, ONCFS*

Monitoring

In France, the wolf monitoring is carried out at 2 scales : (1) a “landscape” scale survey based on an extensive sampling of depredation events, and wolf signs occurrence and (2) a “territory” scale based on intensive snow-tracking and molecular tracking within each detected wolf packs. We use different population trend indexes (i) to monitor the changes in spatial distribution of the species; (ii) to assess the trends of number of packs and the minimum wintering population size, and (iii) overlaying presence data between years, to define areas of occasional and regular presence, either of packs or lone wolves. There is currently a minimum of 23 wolf territories (packs or lone wolf) in the French Alps (Figure 2). The geographic recovery

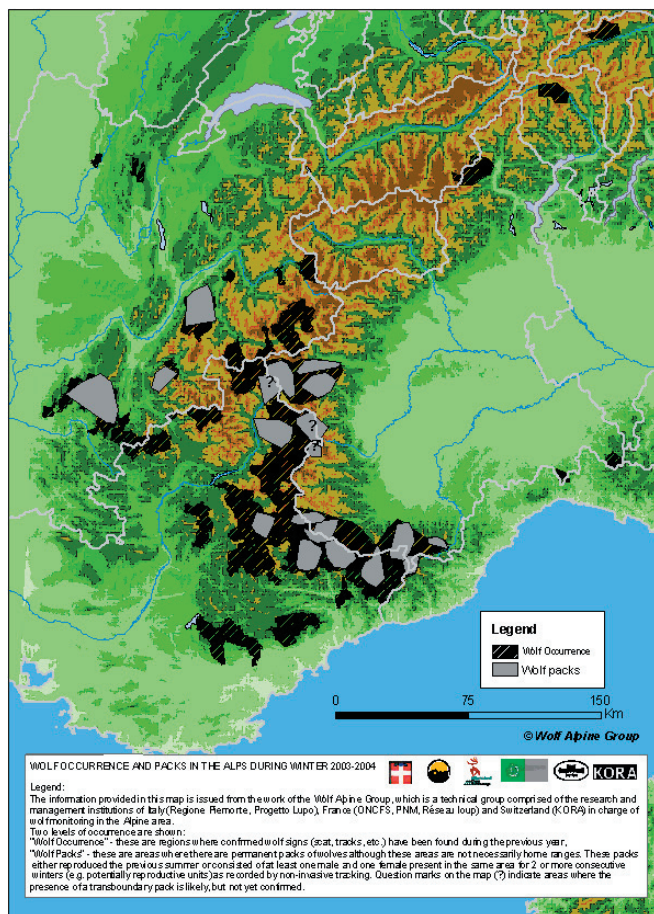


Fig. 2 Wolf packs locations and minimum ranges in the French Alps.

indexes and the population size indexes show both a general increase over years. Mainly because of unfavourable snow condition, the latter slightly decreased last year, showing that snow-tracking can only be used as long term index as it is sensitive to yearly wintering climatic conditions.

Some insight in non-invasive molecular tracking

Genotyping were performed on scats using a set of 7 microsatellites that have been evaluated to minimize the probability of identity (Valière 2002). Replication procedure has been shown to be needed to avoid allelic dropout or reading errors (Taberlet *et al.* 1996).

The first capture-recapture modelling based on faecal genotyping between 1995-2001 showed a strong heterogeneity in individual genetic recapture rates: i.e., a lot of individuals detected only once. To investigate whether the typing quality could be, at least partly, an explanation for recapture heterogeneity, a quality index (QI) associated to each sample (Miquel *et al.* 2006) has been calculated as the mean frequency of occurrence for alleles pairs at each locus, for eight replications per locus. The QI varies between 0 (no repeatability) to 1 (100% of repeatability for each six microsatellites).

The preliminary analysis showed that (i) most of the typing are of good quality, regardless of the year of sampling; and (ii) the recapture heterogeneity persisted even among a set of very high quality typing. However, further investigations are needed to integrate these results in genetic capture-recapture modelling. We identified 207 individual genotypes with quality index (QI > 0.6) over 12 years. Over years, the number of individual genotypes identified increased with the sample size. We have not reached an asymptote yet, which means we are running behind an expanding wolf population. In order to analyse kinship, we need to account for the

spatial component and to increase the number of analysis. Genotyping cross validation between labs could improve the definition of the “DNA” target population.

Wolf monitoring in Switzerland, 2006

Presented by Jean-Marc Weber, KORA

The wolf monitoring program in Switzerland has been officially initiated in 1999, i.e. three years after the first signs of wolf presence were recorded in the Val Ferret (canton Valais) and following the discovery of two dead wolves end 1998 beginning 1999 in Goms and Simplon regions (canton Valais) respectively. The monitoring is essentially based on genetic sampling, depredation survey and fortuitous observations reports. Signs of presence are categorized according to their reliability, i.e. hard facts, confirmed and unconfirmed signs (Weber 2003).

From 1999 to 2006, 843 observations have been recorded throughout the country but only 98 of them belong to the “hard fact” category (C1). More than a third of those (n = 35) have been gathered in 2006 only. Their distribution is restricted to the Alps, but for the first time some of them originated from the northern side of the mountain range (Figure 3) Despite several announcements, wolf presence has not been confirmed in the Jura Mountains, western Switzerland, yet. At least five individuals were present in the whole country end 2006, but no sign of reproduction was recorded so far.

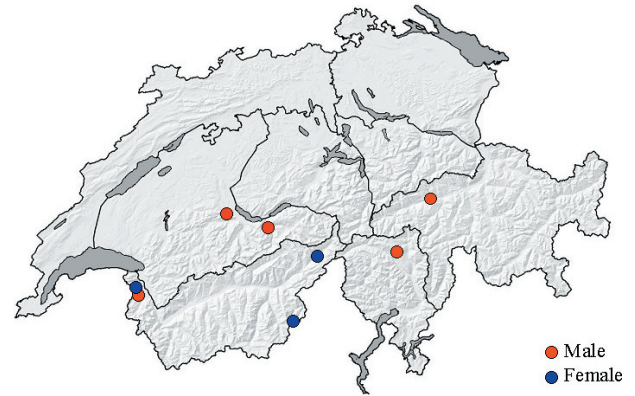


Fig. 3 Confirmed wolf presence in Switzerland, 2006.

Nearly 740 domestic animals were killed by wolves in Switzerland during the last decade. The number of depredations on livestock varies greatly from year to year. While only 19 sheep and goats were killed by wolves in 2005, 101 domestic animals died as a result of wolves’ attacks in 2006. Damages usually increase when a wolf pops up in an area where livestock is not protected by damage prevention measures (e.g. livestock guarding dogs, shepherds, electric fences). According to the Swiss Wolf Management Plan, individuals that kill more than 25 sheep and/or goats during 4 consecutive weeks, or more than 35 sheep and/or goats within 4 consecutive months can be removed. Two individuals, a male and a female, were eliminated for repeated depredations in 2006. In total, five wolves have been legally shot since 1999 (Table 1).

Tab. 1 Dead wolves in Switzerland, 1998-2006.

Wolf #	Date	Location	Canton	Sex	Age	Causes of death
1	21.11.1998	Reckingen	VS	m	ad	illegally shot
2	14.01.1999	Simplon	VS	m	ad	runover by a vehicule
3	25.08.2000	Evolène	VS	m	ad	legally shot
4	25.08.2000	Unterbäch	VS	?	?	legally shot ¹
5	29.09.2001	Sils i. E.	GR	m	ad	legally shot
6	23.03.2006	Gsteigwiler	BE	m	ad	runover by a train
7	25.10.2006	Goms	VS	f	ad	legally shot
8	21.11.2006	Collombey	VS	m	ad	legally shot

¹The signs present on the shooting spot suggested that the animal was deadly hurt. However, its carcass was never found.

Wolves in Germany: current situation

Presented by Ilka Reinhard: Wildbiologisches Büro LUPUS & Manfred Wölfl, StNUGV

Introduction

Wolf has not settled in the German Alps yet, but will probably do so soon. Being present at the 5th AWW, we wanted to learn and get prepared for wolf monitoring in the Alpine region, since the Italian strain will probably colonize this part of the country, as it did in France and Switzerland.

Population status and monitoring

Wolves are expanding westwards from Poland into Germany. In year 2000, the first confirmed reproduction event was recorded in Germany. Since then, wolves reproduced regularly in Germany. In northeastern Germany, at the border with Poland, there are currently 4 different packs plus single individuals settled across four different administrative units, namely two German federal states and two Polish provinces, which challenge the conservation and management planning (Figure 4). About 30 young wolves dispersed so far from these packs, mostly with unknown fate.

The monitoring conditions are quite different than those prevailing in the Alps, with little snow during wintertime. However, because three of the four packs have their core area on a military training area where tank exercises maintain sandy soil condition, spoor tracking is possible year-round. During summer time observations and filming at rendezvous sites are conducted in order to get information about the number of pups in each pack. Scat analysis revealed that roe deer is the main prey in the area, followed by wild boar and red deer.

Conflicts

Most of the professional sheep-breeders keep their

flocks behind electric fences at least during the night. Damages to livestock are low and therefore are not and probably will not be the main source of human-wolf conflicts, especially in Saxony where a good cooperation with shepherds is in place. Nonetheless, problems could arise elsewhere, due to poor or lacking prevention/compensation concepts and the fact that the existing mitigation measures are not coordinated between the federal states.

The main source of conflicts, however, is the low acceptance of wolves in the hunting society, despite the fact that game population (roe deer, red deer and wild boar) is high and that the hunting bag has not decreased so far. This lack of acceptance is possibly partly due to a lack of public involvement in wildlife management process in Saxony.

The management fragmentation is another source of problems for wolf conservation in Germany, since there was no transboundary cooperation or

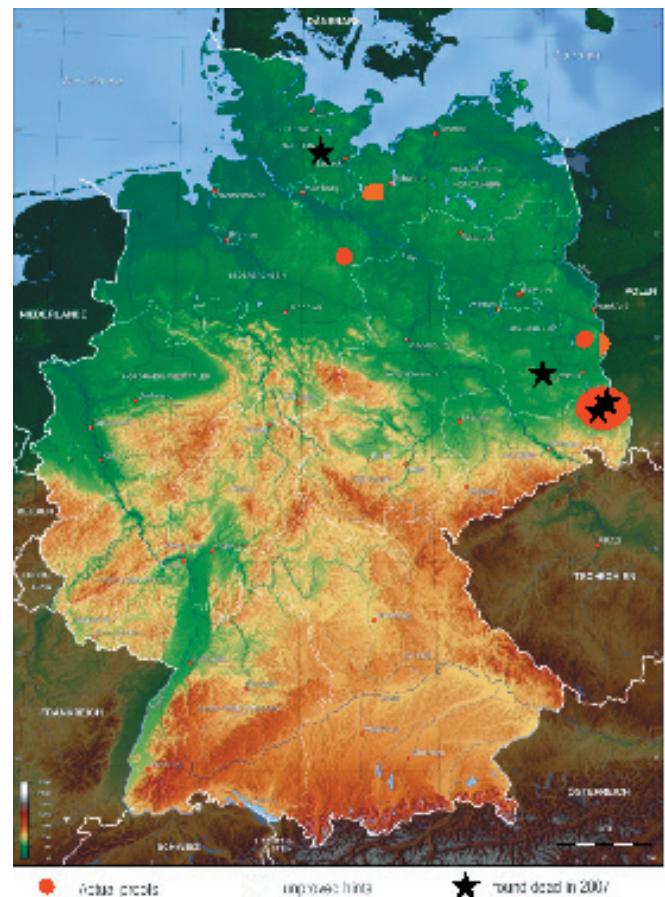


Fig. 4 Wolf presence in Germany, 2007.

coordination between federal states so far, that lead to a lack of concept and lack of structures, e.g. for monitoring. However, this is changing, and there are now some federal funded projects with involvement of the federal states: (i) technical concept for wolf management in Germany (done); (ii) dispersal study (2007 – 2009); (iii) developing a framework for wolf management in Germany (should be signed by the federal states).

Large carnivore management planning in Bavaria

In Bavaria, large carnivore management has been called for years, trying to mitigate conflicts related to the lynx presence in the Bavarian Forest, mainly focusing on human dimension issues and roe deer management. The visit of the bear JJ1 and its fate catalysed the process for an anticipative, bottom-up planning for wolves as well although permanent presence has not been proved in Bavarian forest, and certainly no reproduction, despite records of large canid-like animals. One male was shot in 2004 near Passau, and one male from Italy (“VCO 03”) was run over by a car in May 2006 south of Munich. In the Alpine region, depredation on livestock, especially sheep, is expected to be the first conflict when large carnivores will return into the region.

A steering panel „Wildlife Management / Large Carnivores” and an Enlarged Working Group now aim to develop and update management plans for bear, wolf and lynx. The plans are divided in three distinct phases, the first one being (1) to deal with lone individuals passing through (e.g., dispersers) without any goal of having a population. The next phases are (2) dealing with resident single individuals and (3) with reproductive units. The main issues to be dealt within the group will be (i) the prevention and compensation of damages; (ii) the management of the ungulates, whose numbers are low because of current forest management; (iii) human dimension and (iv) public information.

Swiss Wolf Management Plan: towards an update

Presented by Christoph Jäggi, Federal Office for the Environment, Wildlife and Forest Biodiversity Management Section

The Swiss Wolf Concept 2004

The current Wolf Management Plan in Switzerland was elaborated between 2000-04 by the Federal Office for Environment (FOE), with the Federal Office for Agriculture and the Federal Veterinary Office and in collaboration with cantons and diverse interest groups such as agriculture, nature protection, animal protection, hunters and science. Its objectives seek to create general conditions for minimising the conflicts that might arise between human activities and needs (e.g., farming, hunting, leisure pursuits, tourism) and the presence of the wolf. In particular, the presence of wolf must not constitute an intolerable restriction on livestock farming. In the purpose to mitigate conflicts, the Federal government encourages and support damage prevention measures, such as guarding dogs and/or electric fences. After a peak in 1999-2000, livestock depredation decreased, as did the compensation cost, however one may notice a slight increase in year 2006. Costs for prevention have stabilised on average ca. 500'000 EUR per year since 2000.



Fig. 5 Map of the national hunting reserves (beige) and the Swiss National Park (green), Switzerland.

The Federal government compensate livestock depredation up to 80%, the remaining 20% being charged to the cantons. However, if 35 or more livestock animals have been preyed upon by wolf over a period of four consecutive months (or at least 25 over a period of one month), the concerned canton may grant an authorization to shoot the responsible wolf. The authorization is granted on the condition that all technically and financially feasible protection measures have been taken and are maintained or on condition that no technically and financially feasible protection measure can be taken. In this latter case, the wolf might be shot only within the area that cannot be protected. If damage is caused over a period of one year, the threshold that lead to grant a shooting authorization shall be lowered to at least 15 livestock animals preyed during the following calendar years.

Need for an update

Nowadays, an update of the plan is needed, for the situation has changed since 2004. At that time, lone wolves in Switzerland were mainly male dispersing from breeding packs in the French and Italian Alps, with only one known female popping up in 2004. Since then, several other females have been identified in the Swiss Alps. Pairs have been observed (e.g., Chablais) and breeding is a matter of time.

Since there are more wolves coming, the FOE proposes to strengthen the damage prevention, whereas the kill number will not be changed. The main update proposed is that no shooting should be done during the breeding season over 4 months (April-July), in order to protect breeding females and therefore to enhance the survival of their pups. Furthermore, no shooting should be allowed in national hunting reserves, which cover 4% of the land surface (Figure 5). The shooting area should be adapted to the risk of damage. Namely, no

shooting should be allowed in area where sheep are no longer present, but should be allowed where the sheep flocks actually are and nearby, even though wolf has not killed any livestock there. In essence, shooting should be a prevention measure and not a punishment for the wolf.

The consultation of these proposals for an update of the management with the interest groups took place and the reply are currently analysed by the Federal Office. The implementation of the updated plan is scheduled in 2008.

Monitoring the Alpine wolf population: mapping wolf occurrence

Presented by Eric Marboutin

In 2006, the “*Protocollo di collaborazione italo-franco-svizzerla per la gestione del lupo nelle Alpi*” (“Italian-French-Swiss collaboration protocol for the wolf management in the Alps”), recognized the wolf population in the Alps as a distinct geographic entity, for the purpose of management. Also, the Large Carnivore Initiative for Europe (LCIE) recently recognized the Western Alps wolf population as a distinct entity. So there is a need for standardized methods to collect, process and analyse the data across countries that share this population. Since many years, the Alpine Wolf Group has identified that sharing and pooling data was a priority in order, for instance, to produce presence map, range expansion index or demographic index at the population level, regardless of national

boundaries.

The Article 17, section 1, of the Habitats Directive states that: “Every six years [...], Member States shall draw up a report [...that] includes [...] the main results of the surveillance referred to in Article 11. The report, in accordance with the format established by the committee, shall be forwarded to the Commission and made accessible to the public.” The product asked from the European Environmental Agency is a “presence area” based on the 10 x 10 km grid, which is very coarse-grained. However, producing an occurrence map from presence data may take other forms we have to agree on, with regards to what is asked and needed. The most basic, easy-to-produce map is a point map of the geo-referenced sign data. However, such a map carries no information on time-related changes. A next easy-to-produce step as well and on well demand from management authorities is to

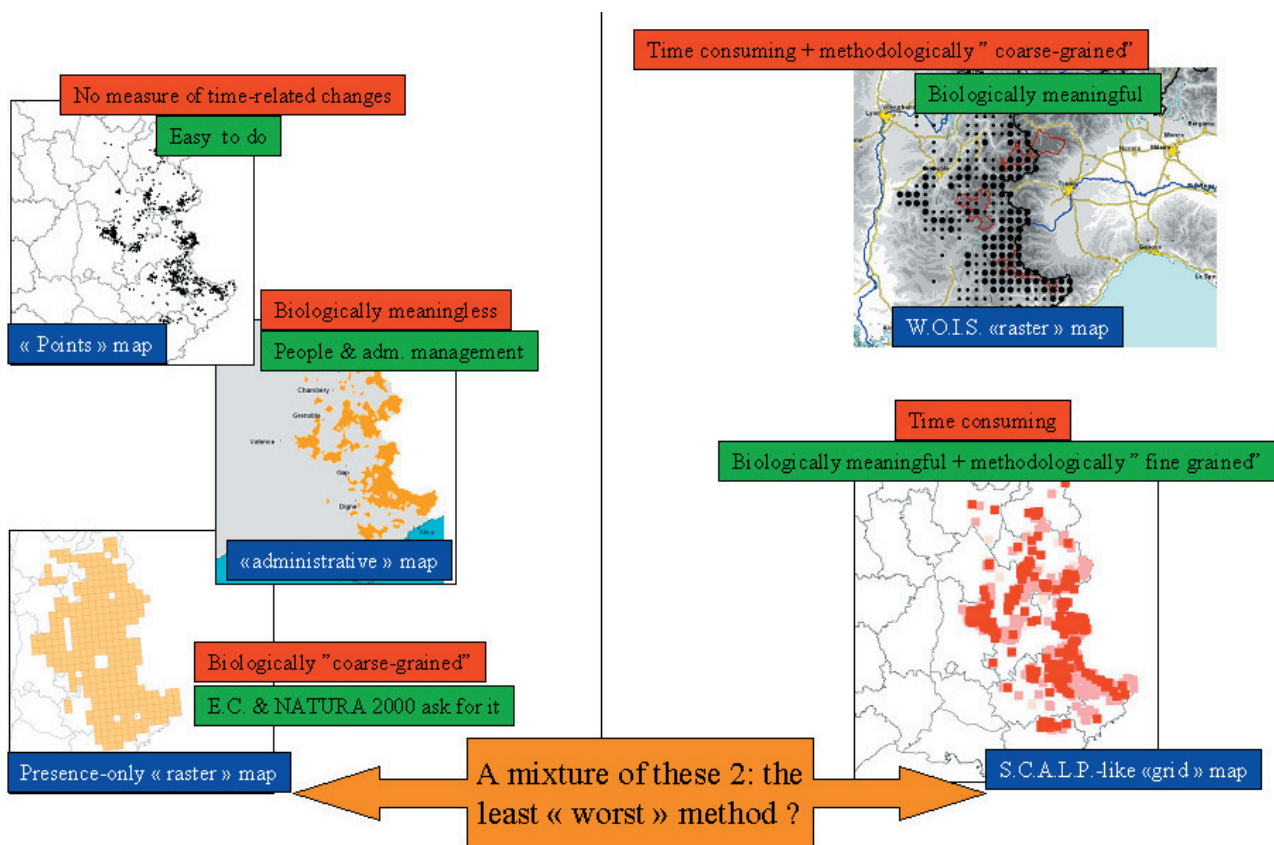


Fig. 6 Discussed mapping representations of the same dataset, illustrating the problems faced while producing such outcomes.

highlight administrative units that contain at least one sign data. This is biologically meaningless, since the boundaries of the presence areas are man-made. The raster map is handy, however it might be very coarse-grained, depending on the grid size. On the other hand, one may wish for time-consuming-to-produce map, such as expert mapping of permanent and occasional presence areas. Such maps are methodologically “coarse-grained”, although biologically meaningful. The use of standardized categories such as SCLAP criteria (used for the lynx monitoring in the Alps) for wolf might help to distinguished between certain and possible presence areas and would be more meaningful. A combination of several of these approaches in a single map would probably be a solution (Figure 6).

In conclusion, there are needs for (i) define a product: the minimum number of population indicators to survey the wolf distribution over the Alps (e.g. transboundary packs, demographic indices, range expansion index); (ii) define a process: e.g. each team as a head in charge of developing one single item, in collaboration with the others. These, however, are open questions that need to be discussed.

General discussion

Second day's morning session was assigned to a general discussion. Its purpose was to refine the objectives and basic needs of wolf monitoring in the Alps on one hand, and discuss possible improvements of the collaboration between our three countries on the other hand. Emphasis has been put on the following points:

- *Mapping wolf occurrence and packs:* following the presentation by E. Marboutin on monitoring issues, it has been decided to (i) define SCALP-like quality criteria for wolf data (based on what is done for the Alpine lynx monitoring); (ii) explore the sensitivity of the grid size (i.e., 5x5 km vs 10x10 km); (iii) produce an occurrence map yearly, with data from June to May to be biologically meaningful; and (iv) map the packs in France and Italy together: Francesca Marucco will send the Piemonte data to Christophe Duchamp, who will explore the data under these different mapping options. Francesca Marucco, Eric Marboutin and Jean-Marc Weber will meet to work out a data quality criteria standard.
- *Genotyping alpine wolf individuals:* there is a need for a common genotypes database. However, owing to methodological constraints, direct comparisons of genotypes analysed in different lab by different people is not feasible straightforward (e.g., the weights of microsatellites are not the same). It is neither practically feasible to regroup all the samples in a single lab and make data analysed there. The most practical options are (i) in the short term, exchange raw material (i.e., scats) to make redundant analyses when needed to answer questions such as where a particular wolf

is from and how do a (transboundary) pack extend, and (ii) in the long term, calibrate the samples between the different labs, to possibly use the data for population size estimate and population dynamics analyses (genetic capture-recapture). Some protocol modifications could also be brought in to enhance the success rate of the genetic analyses. Luca Fumagalli will organize a meeting between the geneticists from the different countries to discuss solutions for these issues.

- *Formal information exchange:* since things are growing, a general formal agreement on data exchange and collaboration becomes important. We will however wait until the official group is appointed by the respective government agencies. Its very first tasks will then be to write a memorandum and protocol for the common use of data.

The next meeting will be held in fall 2008 in Italy. The precise location and dates will be communicated later.

Post-meeting excursion

On Thursday 4th October, a few participants visited Mr Olivier Sarrasin's sheepfold. O. Sarrasin is a professional sheep-breeder who also runs a damage prevention competence centre and breed protection dogs. He regularly places dogs in other sheep flocks in need for wolf damages prevention.

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