



TRENTINO

AUTONOMOUS PROVINCE OF TRENTO

2013 BEAR REPORT

WITH APPENDICES ON THE LYNX, WOLF
AND GOLDEN JACKAL



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2013 BEAR REPORT



www.orso.provincia.tn.it

mailorso@provincia.tn.it

Overall coordination and supervision

Ruggero Giovannini - Director, Wildlife Office

Coordination

Claudio Groff

Edited by

Natalia Bragalanti

Claudio Groff

Renato Rizzoli

Paolo Zanghellini

With the contribution of

Museo delle Scienze di Trento (MuSe) and the Adamello Brenta Nature Park (ABNP)

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The bear Daniza in the Val d'Algone, May 2013

Photo by Massimo Vettorazzi (with camera trap)

Back cover

“Beech trees in Autumn”

Photo by Claudio Groff - APT Forestry and Wildlife Department archives

Photos without captions

Claudio Groff, Renato Rizzoli - APT Forestry and Wildlife Department archives

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Presentation

For the first time since the end of the reintroduction project, implemented to avoid the disappearance of the bear in Trentino and the central Alps, in 2013 there was a **reversal of the trend** for the bear population, which had grown constantly up to this point. The reasons which may have led to this phenomenon are analysed in this report, which has now reached its seventh edition.

Although it is too early to arrive at definitive conclusions, the signal certainly should not be underestimated. 2013 also saw the first case of **poaching** documented in the province; an adult male bear, M2, was shot with a rifle in the Val di Rabbi. What is more, this may not be the only case, given the sudden disappearance of the bear M11 from Monte Baldo during the spring for example. These facts, probably linked to the poor social acceptance ascertained by a public opinion survey in Trentino at the end of 2011, further underline the importance of the question that the provincial administration has set itself for some time: namely the need to be able to act quickly and effectively to deal with a few problem bears, naturally respecting the agreed technical criteria. It is therefore necessary for the Ministry for the Environment, Land and Sea (Ministry) and the Istituto Superiore per la Ricerca Ambientale (ISPRA) to play their part in this context, in order to avoid gradually sliding towards a form of hidden and illegal **management** of the phenomenon, which should instead be managed in a **competent, responsible, prompt** and **transparent** manner.

In this context, the need to **update** the management tools available (the Action Plan for the Conservation of the Brown Bear in the Central-Eastern Alps – **PACOBACE** – first of all) is underlined, in the light of the current situation, which is very different from the situation just ten years ago. From this point of view, 2013 has not gone by without success and it is hoped that the Ministry of the Environment will shortly agree an updated version of the Action Plan mentioned above, the fruit of work promoted by the Autonomous Province of Trento (APT), in association with the other administrations in the central-eastern Alps.

However, the year that has just ended has also confirmed and emphasised the statistics, showing that the “bear project” is a technical endeavour which is carried out by the administration with great commitment and competence. Genetic monitoring has taken place for twelve consecutive years, with more than 5,600 samples collected and analysed and almost 1,000 prevention works have been distributed. These are just some of the figures showing the **success of the management programme at biological level**, in some ways unique in Europe. It should be recalled that this has also been recognised by the national and international scientific community.

In 2013 the Department also continued to make its contribution and to receive input at **international level**, even in new and demanding areas, such as the Large Carnivores Platform in the context of the Alpine Convention (taking on the presidency), the new initiatives started up by the European Commission and the Bear Specialist Group of I.U.C.N.

There continues to be a strong commitment to introducing innovative elements and improvements made available over time. In this context, for example, it has been decided to move forwards from a “minimum population estimate”, nevertheless important, to a genuine “**population estimate**”, making use of sophisticated CMR methods for data analysis, which it is intended to prepare for the first time in 2014, also thanks to technical support from Science Museum in Trento (MuSe).

In the same way it is strategically important to maintain the **network** of collaborative relations **at provincial level** which this year has once again made it possible to build up the picture summarised in this report. This is based on the fundamental contribution made by bodies



such as the Science Museum in Trento (MuSe) and the Adamello Brenta Nature Park (ABNP), along with numerous volunteers, and the constant commitment of forestry staff.

As regards genetic monitoring, ISPRA and the **alpine partners**, the Autonomous Province of Bolzano first of all, along with the Autonomous Region of Friuli Venezia Giulia, the Veneto Region and the Lombardia Region, also play an important role and have made available some of the data contained in this report. Our sincere **thanks** go to all of them.

Finally the report analyses the situation of the **wolf**, another large carnivore which Trentino is likely to have to deal with in the next years. 2013 was marked by the appearance of the first pack in the eastern Alps (in an area between the provinces of Trento and Verona), after around 150 years since wolves were last present, with the first significant cases of preying on domestic livestock.

The return **of the wolf**, in contrast with what has taken place for the lynx and the bear in the Alps, is a completely **natural phenomenon**, undoubtedly bringing with it new and important commitments, involving the search for a possible equilibrium between man and the large alpine carnivores.

DOTT. MAURIZIO ZANIN

Manager of APT's Forestry and Wildlife Department



Introduction

The brown bear has never completely disappeared from Trentino, which is thus the only area in the Alps that can proudly affirm the continuous presence of bears.

However, protection of bears, which began in 1939, has not eliminated the risk of their becoming extinct. Direct persecution by man and, to a lesser extent, environmental changes taking place in the last two centuries, reduced the original population, bringing it to the threshold of extinction. At the end of the 1990s there were probably no more than three or four bears remaining, confined to the north-eastern Brenta area, the last bears in the Alps. However, just when all seemed lost, there was a turn in fortunes, originating in the action taken by ABNP, which started up the *Life Ursus* project together with the APT and ISPRA, co-funded by the European Union. Between 1999 and 2002 this led to the release of 10 bears (3 males and 7 females), giving rise to the current population. The release of the bears was preceded by a detailed feasibility study supervised by ISPRA, which ascertained the environmental suitability of a sufficiently large area to play host to a viable bear population (40-60 bears), which is the minimum aim of the project. This area extends well beyond the confines of the province of Trento, also involving neighbouring regions and countries.

Following the conclusion of the phase involving the release of the animals, the phase dedicated to the conservation and ordinary management of the bear population, perhaps even more demanding, began in 2002. For this purpose the provincial government set out the operational guidelines on which these management activities should be based in resolutions no. 1428 of 26 June 2002 and no. 1988 of 9 August 2002. Specifically, six programmes of action were identified (Monitoring, Damage Management, Management of Emergencies, Staff Training, Communication and National and International Links), which represent the underlying structure followed in this report.



1. Monitoring

Monitoring of the bear has been carried out continuously by APT for 40 years. Over time, traditional survey techniques in the field (Photo 1) have been supplemented by radiotelemetry (a method first used in Eurasia, in the second half of the 1970s), automatic video controls by remote stations, camera traps and finally, since 2002, by **genetic monitoring**.

The latter technique is based on the collection of organic samples (hairs and scats) and takes place using two methods commonly described as **systematic monitoring**, based on the use of traps with scent bait, designed to "capture" hairs using barbed wire, and on **opportunistic monitoring**, which is based on the collection of organic samples found in the area during routine activities. In the last few years, genetic monitoring has represented the most crucial technique for collecting information regarding the bear population present in the province. It was carried out coordinated for the **twelfth consecutive year**, coordinated by APT's Forestry and Wildlife Department, with the collaboration of ISPRA, ABNP, MuSe and volunteers.

It is nevertheless implicit that the monitoring techniques cited do not guarantee that **all the bears present** will be detected, so the data in this report must be read bearing in mind this **intrinsic limitation**.

Finally it should be recalled that monitoring of the other two species of large carnivores in the Alps (the **eurasian lynx** and the **wolf**) began following their reappearance in the province, hence from the end of the 1980s for the lynx and since 2009 for the wolf. The monitoring of these two species also involved the use of

traditional survey techniques in the field, camera traps, radio-tracking and genetic monitoring.

In 2013 **genetic testing** was again carried out by technicians from the conservation genetics laboratory at **ISPRA**. The samples collected (hairs, faeces, tissue or other) are sent to the laboratory for genetic tests, carried out using standard protocols; the data is validated using population genetics software. The organic samples collected may be analysed according to the standard procedure (730 in 2013), or in more urgent cases (1 in 2013), using a faster system. The methods developed, in accordance with the provisions of PA-COBACE, provide for amplification of ten different genomic regions (DNA microsatellites) and molecular sexing of all the hair and faeces samples collected by staff and sent to the institute's laboratory. The high risk of error associated with analysis of samples collected



Photo 1 - Bear tracks in the snow in Val Brenta (C. Groff - APT Forestry and Wildlife Department archives)

using non-invasive techniques demands optimisation of laboratory procedures, designed to minimise the risk of genotyping errors.



With this scope the multiple amplification approach has been adopted, involving repeating a series of tests until a genotype considered to be reliable is obtained. Reliability was established using statistical evaluation, carried out using the Reliotype programme. This calculates the likelihood of the particular genotype observed effectively belonging to the population, based on the allele frequency observed in the population of reference and on the number of repeat tests providing concordant results. If the reliability of the genotype arrives at or exceeds 95% it is accepted and the sample identified is added to the database. Following processing of the initial results of genetic tests, the combination of genotypes identified is subjected to careful quality control carried out subsequently, through comparison of genetic data, sampling and data coming from other activities in the field (telemetry, sightings etc.) designed to identify samples potentially subject to error. Further tests were used for these samples in order to clarify any uncertainty. Finally, blind tests are carried out regularly by the authority (tests designed to reveal any possible errors in the system of analysis).

Collection of organic samples

A total of 821 organic samples from wild predators were collected in the province of Trento in **2013**, of which 206 using the systematic method (hair traps) and 615 with the opportunistic system, with 731 of these being sent for genetic testing. Some of the samples collected (90) were not sent for testing, as they were duplicates (or further repeats) of samples which had already been analysed and led to positive identification. It was possible to attribute **719** samples (602 hair and 117 faeces samples) to the **bear**, **9** to the **wolf** (1 hair, 6 faeces and 2 saliva samples) and **3** to the **lynx** (faeces). The organic samples related to bears were collected from rub trees (272), hair traps (206), damage sites (59), following capture (1) and elsewhere (181), whereas in the case of the wolf and the lynx the samples came from casual findings of their presence, except for 1 sample collected at a site related

to possible damage by wolves. The 719 samples analysed in 2013 brought the total number of organic samples related to the bear collected and subjected to genetic testing **since 2002 to 5,671**.

The fact that **genetic monitoring** has now been carried out for **twelve consecutive years** makes the “Trentino case” particularly interesting, as the medium-long term time-scale for these activities (generally difficult to keep up and hence rare, perhaps without precedent), makes certain types of analysis possible which would be unthinkable with more fragmentary monitoring.

The 731 organic samples (bear, wolf and lynx) analysed were collected by the staff of the Autonomous Province of Trento (415; 57%), ABNP (297; 41%) and by volunteers (19; 2%).

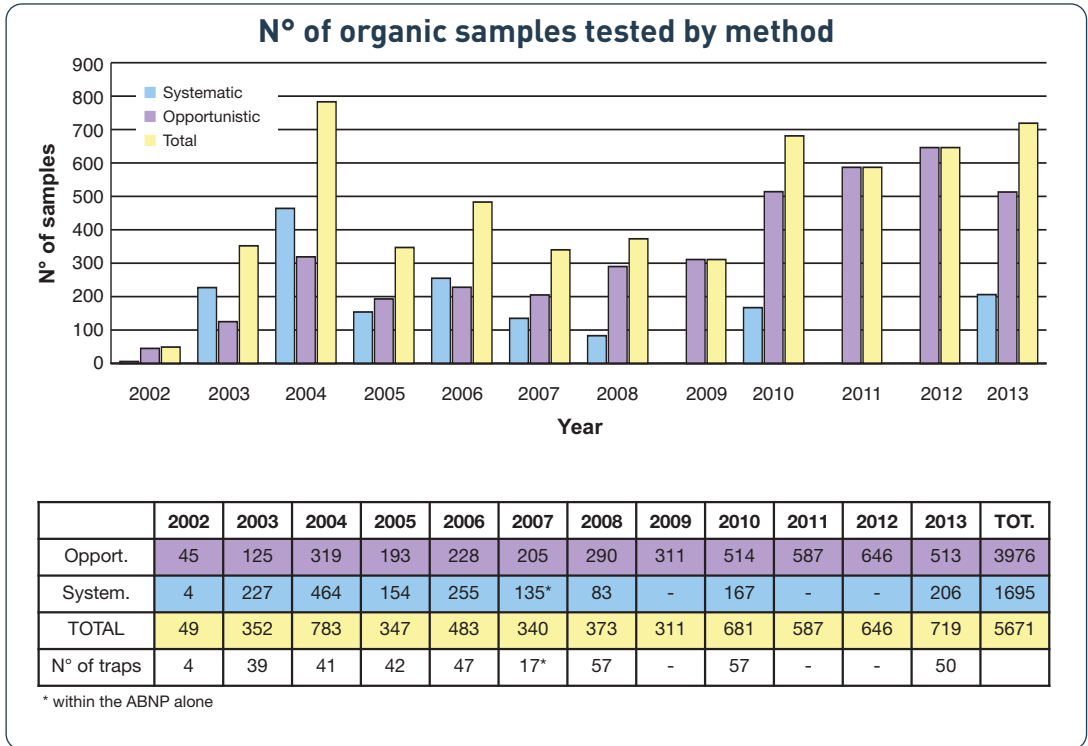
Further samples were collected outside the province, contributing towards determining the total number of bears from this population identified; the data was kindly provided by the **Autonomous Province of Bolzano**, the



Lombardia Region, the Veneto Region (the Province of Belluno in particular) and the **Autonomous Region of Friuli Venezia Giulia**.

The trend in relation to the number of samples collected in Trentino over the last twelve seasons can be seen below (Graph 1).

Graph 1



The monitoring of rub trees

During 2013, (for the fourth consecutive year) the Forestry and Wildlife Department, with the collaboration of MuSe and ABNP, again carried out **monitoring of rub trees**, namely plants on which bears leave signs of their presence by leaving their odour and hair on the bark. For the second year running, this monitoring activity, begun in 2010, took place in a **standardised manner**, as described below and with the results given.

Overall, **137 trees** equipped with barbed wire were monitored, with the scope of collecting organic samples, assessing the possible significance of the use of these trees by bears and consequently understanding how useful they may be in monitoring the popula-

tion. The checks, carried out **every three weeks** from **April** until **November**, interrupted in July and August at some sites, with a total of **9 sessions** in total, provided for the collection of samples of organic material from each positive rub tree (collected exclusively from the barbs of the barbed wire). In order to avoid changing the habits of bears, no lures were used. Identification and monitoring of the sites was possible thanks to the local knowledge of staff from the Wildlife Office, the park wardens of the Adamello Brenta Nature Park, the staff of the Trentino Forestry Service, forest wardens and volunteers.

During the season **272 hair samples** were collected on rub trees. A total of **15 bears** were genotyped; **9 males and 6 females** (re-

presenting 45% of males and 30% of females known to be present in the area studied in 2013, also considering all the cubs). Of these **12** were **adults** and **3 young bears**. In the four years of monitoring (**2010-2013**), a total of **23 bears** actively frequented the rub trees.

Sampling bears by collecting hairs left naturally on rub trees was thus confirmed as a helpful addition to monitoring methods pro-

viding for opportunistic collection of samples and the use of hair traps with lures. Rub trees are indeed an efficient, safe, flexible, non-invasive and relatively cheap method for the collection of data useful for estimating the extent of the population investigated and population trends.

For the second year photographic monitoring of rub trees was also carried out (box 1).

BOX 1 - Photographic monitoring of rub trees

After a promising first season of standardised camera trap monitoring of rub trees in 2012, following renewal of the agreement signed by APT and MuSe - the Science Museum, and in collaboration with ABNP, the monitoring programme was conducted for a second season. The main scope was to obtain quantitative and qualitative data on the use of rub trees by bears, in relation to the frequency and ways in which they are used by the different sexes and age groups and during different seasons. Secondly, the camera traps made it possible to obtain important information on seasonal variations and the activities of bears in general, along with information about numerous other species.

*Repeating the data collection system adopted in 2012, **20 “IR-plus” camera traps** were used (Photo A). These are activated by infrared sensors following the passage of animals, recording a video or photographic image after a trigger time of around 1 second from the time the animal comes within the field of the sensor.*

The cameras were attached to trees opposite the chosen rub tree, at a height of around 2 metres and an average distance of around 4 metres. They were set to video mode, with continuous filming (20 second sequence) and the date and time of the footage impressed on the image. They were equipped with a 4 GB memory card, making it possible to record hundreds of videos, also thanks to the extensive operational autonomy guaranteed by an external battery, in addition to the internal batteries.

*The camera traps were **checked every 3 weeks** by APT/ABNP staff, in order to download the data and control the batteries.*

In order to guarantee comparability of

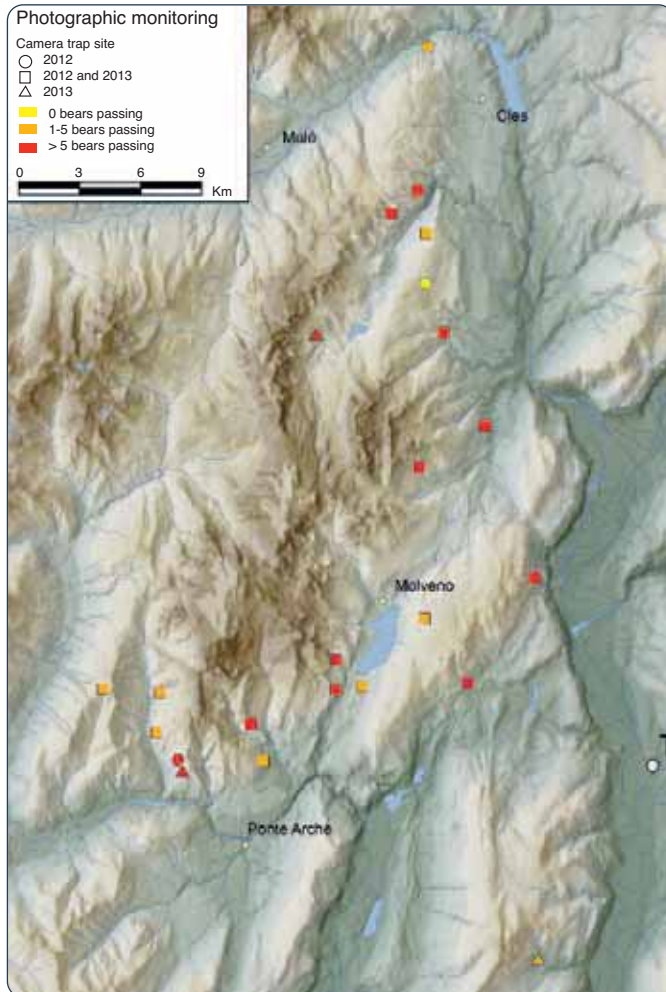


Photo A - Camera trap being positioned on a tree (P Zanghellini - APT Forestry and Wildlife Department archives)

the results in different years, the rub trees chosen for monitoring in 2013 were the same as those used in 2012, with the exception of 3 sites which were changed because the cameras were stolen (2) or because the rub trees were not visited in 2012 (1). Overall, the 20 sites (of the 137 rub trees recorded in 2013) represented a sample uniformly distributed in the area used most regularly by bears (Figure A). The 23 camera traps used in the 2012-2013 two-year period were positioned at an altitude ranging between 650 and 1720 metres a.s.l. (average altitude 1240 m).

Figure A

Location of camera traps and relative number of bears passing



With the exception of one camera trap set up on 1 March 2013, photographic sampling was carried out from 1 April to 25 November 2012, with a total of 3,631 camera days in terms of effective operation (an average of 182 days per camera). The sampling was not quite as extensive as expected, due to reduced operation by some of the cameras because of full memory cards or problems with batteries, and to the theft of two cameras. However, over and beyond this, all the cameras worked effectively and the sampling carried out was nevertheless significant, being more extensive than in 2012 (when it was started up in May) and covering the whole cycle of the bears' activities from April to November.

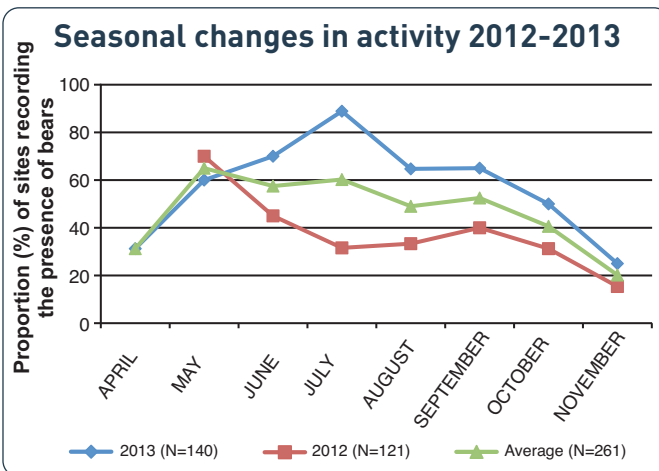
Results (bears)

The cameras recorded a total of **4,962 videos of animals and men**, of which **285 of bears** (Photo B). For the purposes of analysis, “individual events” relating to the passage of bears (or other species) were established, joining together sequential videos because they referred to a single event (such as a bear checking and using a rub tree for example), or in



Photo B - Bear marking a rub tree - Valle dei Laghi (R. Rizzoli - APT Forestry and Wildlife Department archives)

Graph 1 - Seasonal changes in the activity of bears in 2012, 2013 and the average for the two years, as recorded at rub trees monitored with camera traps, expressed as the % of sites recording the presence of bears in relation to the total number of sites monitored with camera traps. N indicates the overall number of working camera traps.



the event that the same animal spent a long time in front of the camera, leading to several videos within a standard time interval (established as 1 hour). In this way 213 “individual events” (or separate events independent of each other) resulted for bears (out of a total of 285 recordings), with an average of 10.7 per camera (from a minimum of 0 to a maximum of 42).

Graph 1 shows the seasonal changes in cameras recording the presence of bears, expressed as the % of cameras capturing images of bears in relation to the total number of cameras.

The trend also provides information about changes in the activity of the species in general, given that the rub trees are situated along paths or forest roads used by bears. The graph clearly shows that there was more activity in 2013 than in 2012, both in general and specifically in the June-September period. Furthermore, given the completeness of the monitoring period in 2013, it was possible to record the starting up of activities at the beginning of April, while the two cameras already functioning in March did not record any activities. Although it is still too early to establish whether these data represent a general trend for the population, the average values show that the activity of the bears at the sites was as its highest in May-July, followed by a slight fall in August and an increase in September, before declining in autumn.

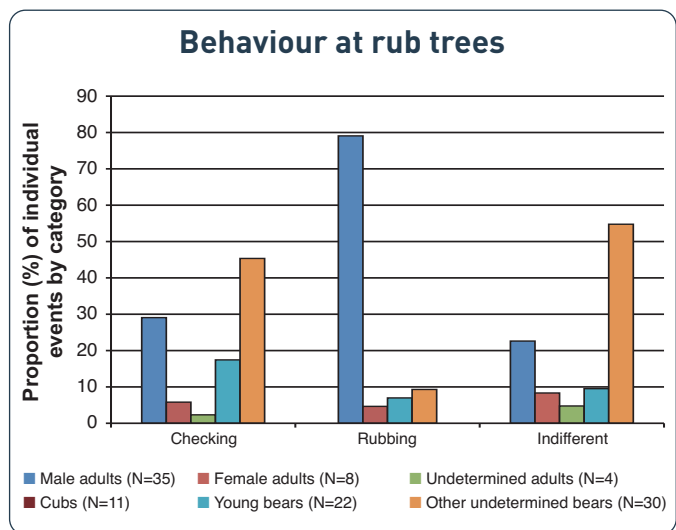
The bears' behaviour at rub trees was assigned to one of 4 categories: (1) indifferent (bear did not stop at tree), (2) checking of tree, (3) checking of tree and rubbing, (4) only rubbing. Graph 2 shows the percentages for these different categories of behaviour in terms of the 213 individual events recorded, overall and by age group and sex. It is interesting to observe that the frequency of the behaviour showed a trend almost identical to that recorded in 2012, but with more data available (213 events as compared to 110), an important aspect because it shows the emergence of a clear pattern in the behaviour studied. Overall, 39% of events involved "indifferent" bears, whereas the remaining 61% involved checking of the tree (40%), checking and rubbing (16%), or just rubbing (5%). As also highlighted in the 2012 data, it was confirmed that most of the bears rubbing themselves against the trees were male adults, as shown in the images (in 34 events out of 43), while the remaining events involved 2 adult females, 3 young bears and 4 adult individuals of unidentified gender (so the effective proportion of males is probably higher). As regards this it should be recalled that classification of individuals by age groups and gender was carried out in a conservative manner (the bears were classified by sex and or age group in 124 events out of 213, 58% of cases), due to objective difficulties in terms of identification.



Photo C - Bear that checking a rub-tree - Valle dello Sporeggio (APT - Forestry and Wildlife Department Archives)

The filming of 2 adult females rubbing on the trees (data confirmed by genetic testing) is interesting and new as compared to 2012. However, the trend previously identified in 2012 remains, with events involving adult females being equally divided between indifference (7 out of 14, namely 50%) and checking alone (5 out of 14), whereas only 24% of adult males were indifferent to the rub trees. As regards differentiation according to age groups, it is interesting to observe that in 69% of cases of passing bears (18 out of 26) the young bears checked the tree, while three of them rubbed against it. The pat-

Graph 2 - % distribution of behavioural categories in terms of the use of rub trees (in relation to individual events recorded by camera traps) by different age groups



tern was therefore similar to 2012, with the difference that cases of cubs rubbing against trees were also recorded in 2012, whereas in 2013 no images of cubs were captured. This was certainly influenced by the low number of cubs present in 2013. In this context it should be underlined that young bears were necessarily identified in an empirical manner, based on the markedly smaller size of “young bears” as compared to adults. They were classified in a “conservative” manner, so it is possible that some young bears were considered to be adults, whereas the opposite is much less likely. The “other undetermined bears” category instead includes those bears whose size did not make it possible to determine either the sex or age group.

This data confirms that active behaviour (“checking and rubbing” + “rubbing” categories) involves above all adult males, also confirming the results of genetic testing and information coming from previous reports and other studies. Analysis of seasonal changes in behaviour at rub trees shows a clear trend for adult male bears, with a marked peak in activity in May, June and part of July, as compared to subsequent months (Graph 3).

This could suggest that the reproductive season for males in 2013 was longer than in 2012, and this is supported by direct sightings of pairs of bears until the middle of July. This result reinforces the theory that rub trees have a fundamental role in inter-specific communication linked to reproduction (Photo D).

In addition to the use of rub trees, the results revealed other interesting aspects regarding the habits of bears. In particular, by plotting events by time bands, it is possible to arrive at a profile for daily activities (Graph 4). Having verified

Graph n. 3 - Behaviour trend for adult male bears at rub trees over the months. Data refers to individual events recording the passage of bears (N=59)

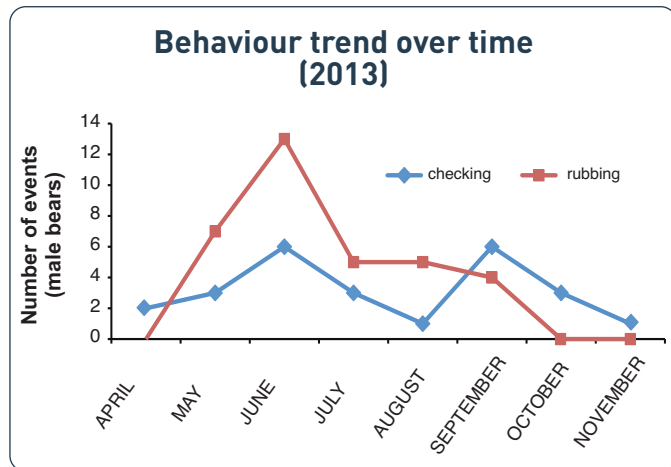
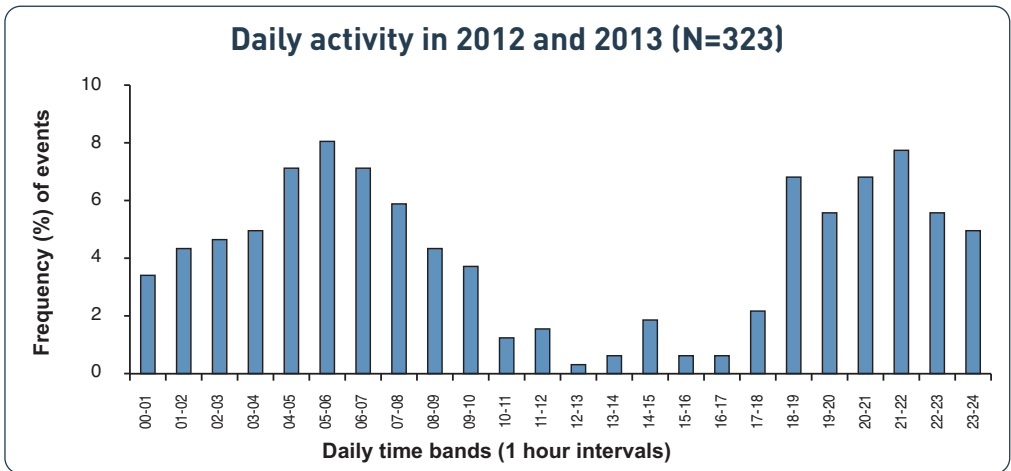


Photo D - Male and female bear near a rub tree - Valle dello Sporeggio (APT Forestry and Wildlife Department archives)

that the profiles were similar in 2012 and 2013 and assuming that the behaviour trend is population-specific and changes little over the years, the graph provides a considerable amount of data for both years. It follows the typical pattern for a nocturnal and crepuscular species, with peaks in terms of passage (and hence activity) early in the morning (4:00-6:00) and in the evening (18:00-22:00).

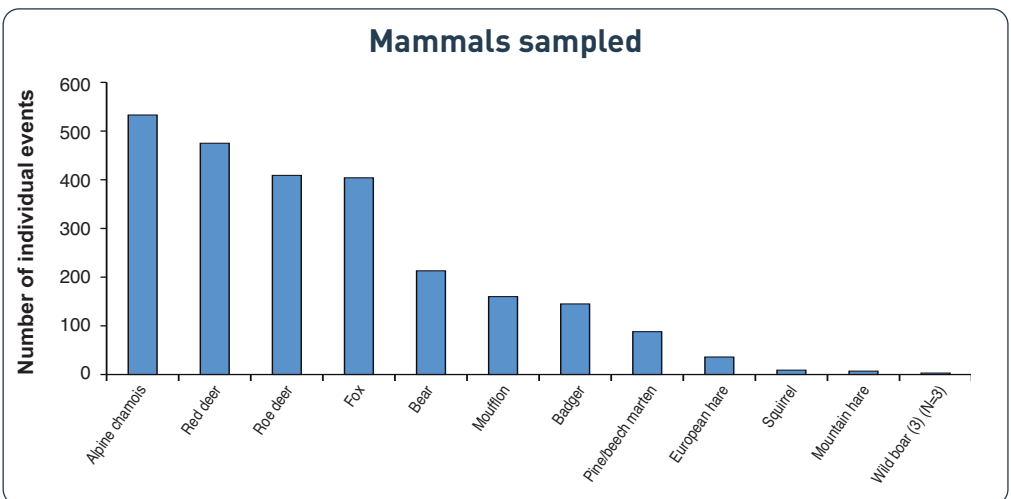
Graph 4 - Daily activity of bears, in terms of events when passing bears were filmed by camera traps (the graph shows the % of events by time band out of the total, N=323)



Results (all species)

In addition to the bear, a further 12 species of “medium-large” mammals were captured on film, including man, with 2600 individual events being related to passing humans (more than 50% of all events), very much in line with the results for 2012. In Graph 5 the species,

Graph 5 - Individual events recorded for all species of medium-large mammals



excluding man, are placed in order of the overall number of events recorded, allowing straightforward comparison of the results for different species. The variety of animals filmed shows the usefulness of camera traps in monitoring a wide range of mammals. Three ungulates (the alpine chamois, red deer and roe deer respectively), were recorded more frequently than the bear, followed by the fox. The only appreciable difference as compared to 2012 was the filming of 3 passing wild boars (at a different station). As in the case of the 2012 data, there was no apparent link between the bear and other species – in terms of either avoidance or association.

Conclusions

The positioning of cameras on rub-trees made it possible to obtain important data on the way such trees are effectively used by bears, along with a range of additional information (changes in coat, beginning and end of activity, daily pattern of activity, interaction between individuals and species, consistency between genetic and morphological data, indications regarding the length of the mating season etc.).

As confirmed by many studies, camera traps are however suitable for individual identification in the case of species with a specific coat, such as felines; recognising individuals on the basis of incidental marks or individual peculiarities is occasionally possible, but this is an exception, meaning that the method cannot be considered as an effective monitoring tool. Even the additional information provided by genetic testing in the specific case of rub trees does not usually allow visual identification of the individual which can also be used on other occasions.

by Francesco Rovero and Natalia Bragalanti (MuSe-Science Museum)



Status of the population in 2013

Definitions

- **“cubs”**: bears aged between 0 and 1;
- **“young bears”**: males between the ages of 1 and 4 and females between the ages of 1 and 3;
- **“adults”**: males over the age of 4 and females over the age of 3.
- **“detected bears”**: bears whose presence has been ascertained during the last year, either genetically or on the basis of unequivocal and repeated observations;
- **“undetected bears”**: bears not detected in the last year alone;
- **“missing bears”**: bears certainly or most likely no longer present within the population, as they have been found dead, killed, emigrated, taken into captivity or for which no genetic evidence has been found in the last two years;
- **“rediscovered bears”**: bears detected genetically after two or more years during which their presence was not recorded;
- **“roaming”**: movement outside western Trentino by bears born in this area, without them reaching the territory habitually frequented by bears belonging to the Dinaric-Balkan bear population;
- **“emigration”**: the abandoning of the population present in the province by bears reaching the territory habitually frequented by bears belonging to the Dinaric-Balkan bear population.
- **“immigration”**: the arrival of bears from the Dinaric-Balkan bear population in the province.

As shown above, the category of **adult males** has been revised this year, reducing the age at which they are considered to have become adult to 4 (as compared to 5 previously). This was decided on the basis of information collected over the years. All the statistics referring to 2013, but also to previous years, have therefore been updated in line with this.

Processing of the data collected has provided the information given subsequently re-

garding the **identification of the bears** sampled, **estimation of the minimum population**, the number of litters during 2013, the **survival rate**, the **trends** in terms of population development and the **use of the area** by the animals.

It should be noted that the **graphs regarding demographic aspects** have been updated not only in relation to 2013, but also on the basis of data regarding **previous years** that monitoring in 2013 has made it possible to recover. This explains the differences which can sometimes be found between the graphs in previous reports and those in this year's report. The **updating of the data available** and the relative graphs is therefore **“ongoing”** and the current graphs must thus be considered to substitute previous ones, bearing in mind the greater reliability of the background information and hence the related analysis.



Results

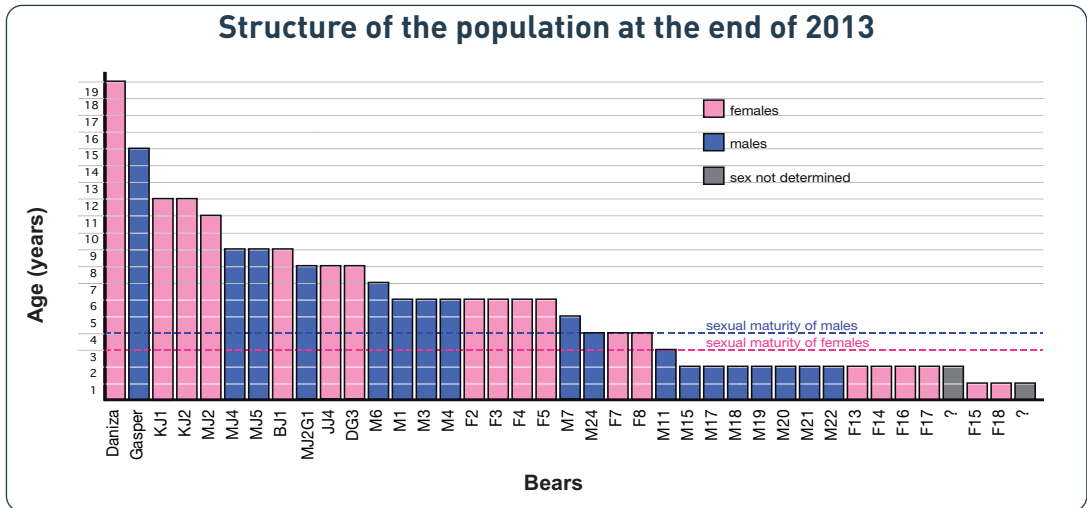
The **minimum number** of animals considered to be present at the end of 2013 was **40**, of which **18 males**, **20 females** and **2 of undetermined sex** (see Graph 2) (M-F sex ratio 1:1.11 - n=38).

However, one of these bears is an adult female which is known to be present, but which has not been identified genetically: it could indeed be F9 or KJ1G1, who are of dif-

ferent ages. Bearing this in mind **all the tables and graphs** in this report (with the exception of **Graphs 5 and 6**) refer to the **39 bears** identified individually, as there are numerous variables which would change on the basis of the (40th) individual taken into consideration.

This last female bear will be included in calculations in the future, if and when its identity will be fully ascertained.

Graph 2



Once again this year it is likely that the genetic monitoring carried out in the province did not detect all the bears making up the population. Considering the presence of individuals not detected in the last year alone (9, including 5 cubs born in 2012 that were not detected in 2013) as possible, and excluding those missing for two or more years (17), **the estimated population in 2013 goes from 40 to 49 bears.**

It should be underlined that the minimum number represents the number of bears certainly present, whereas the maximum is exclusively an evaluation of probability, based on specific criteria shown to be essentially valid to date, but which have intrinsic limitations. The 40 bears therefore represent a **“minimum population estimate”**, which is different from a genuine “population estimate”, requiring the

use of demographic models involving capture, marking and recapture (CMR). It is intended to carry out a **“population estimate”** in 2014, thanks to the scientific support of the Science Museum in Trento (MuSe).

For the first time since the *Life Ursus* project began, the minimum figure highlights a **reversal in the population trend.**

Some considerations regarding the possible reasons for this and in relation to population dynamics follow below:

- As observed in all the last **odd-numbered years** (particularly since 2007) in 2013 there was again a **low number of females reproducing** (only two with certainty, as will be seen subsequently, although some may not have been detected by the monitoring programme).

In this context one can note that the overall increase in the population in the three previous odd-numbered years - 2007, 2009 and 2011 - was relatively limited (+3) if compared with the total recorded in even-numbered years - 2008, 2010 and 2012 (+20). As regards this see Graph 10.

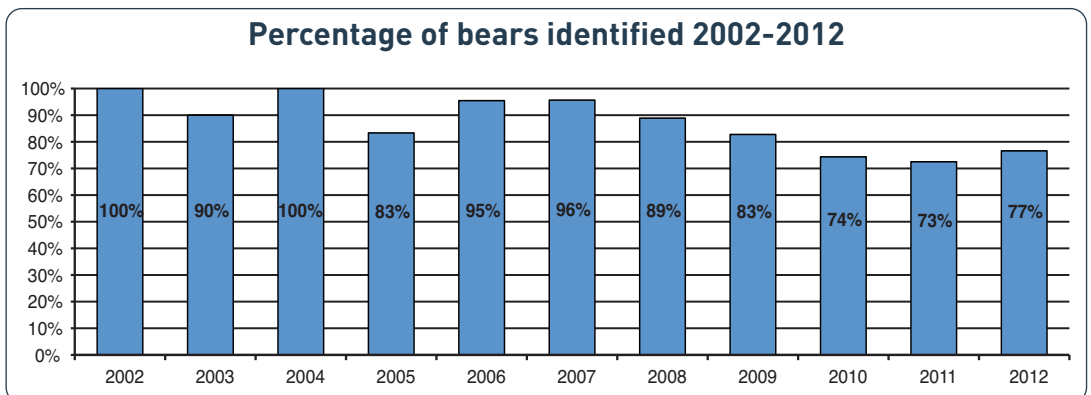
- In 2012 there were a large number of **cubs** (17 including those sighted and detected genetically, plus one which died in the same year, bringing the total to 18), which as expected were **not** easy to **detect again** in the subsequent year (12 out of 17 were detected). This is indeed the age group most difficult to identify (see Graph 4) and with the lowest survival rate (see Graph 15). No less than five of the missing bears since 2013 alone are cubs born in 2012. Thus in 2013 the percentage of bears **present but not detected** could be higher than average.
- On the other hand, it can be observed that the “**effective population**” (N_e), namely the number of sexually mature bears capable of reproducing in that season year, was essentially unchanged in 2013, which is a positive signal (see Graph 16).
- 2013 saw a marked **increase in the average age** of the population; this is also a factor which in this demographic phase is evaluated positively (greater reproduction capacity, higher likelihood of survival, in general a lower tendency to adopt behaviour defined as “problematic”).

- It is also necessary to take into due consideration the first case of **poaching** ascertained (the male bear M2, shot with a rifle in the Val di Rabbi) and the sudden disappearance of M11 from Monte Baldo. These are facts which should not be underestimated and which suggest that the cases of bears found dead for unknown reasons or disappearing, both in Trentino and neighbouring regions, should be viewed in a different light. It would appear possible to surmise a link between these cases (or at least some of them) and the poor social tolerance seen above all in certain environments and as a result of the so-called problematic behaviour of a few bears.
- Ultimately, the demographic data for 2013 would still appear to be insufficient to suggest that there has been a reversal in the trend, despite the figures. However, this new signal will be monitored and reconsidered carefully in the light of the results of forthcoming censuses.

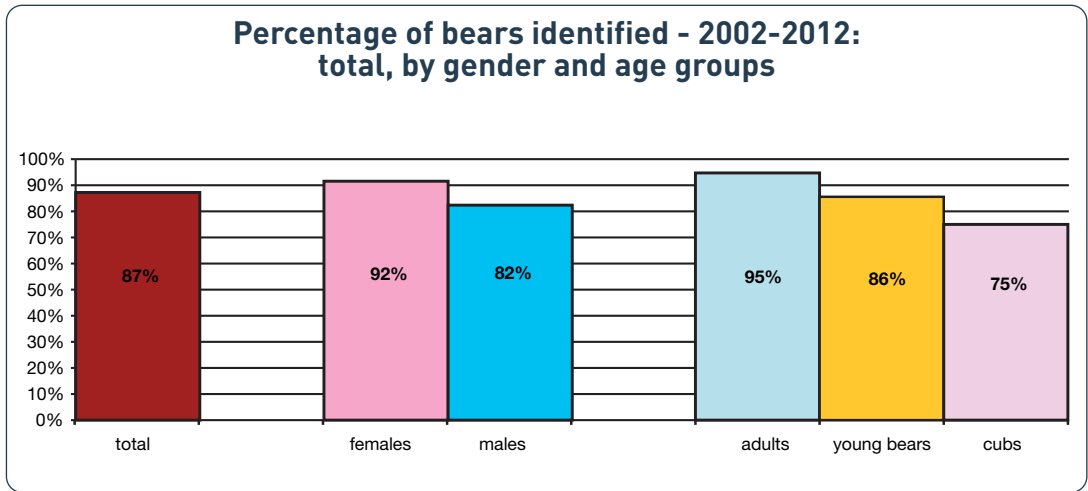
The acquisition of consolidated demographic data over time also makes it possible to evaluate the **efficacy of genetic monitoring** in retrospect, comparing the number of individuals identified year by year with the individuals shown by monitoring in subsequent years to be “actually” present in the same period (see Graph 3).

The **efficacy** of the monitoring was

Graph 3



Graph 4



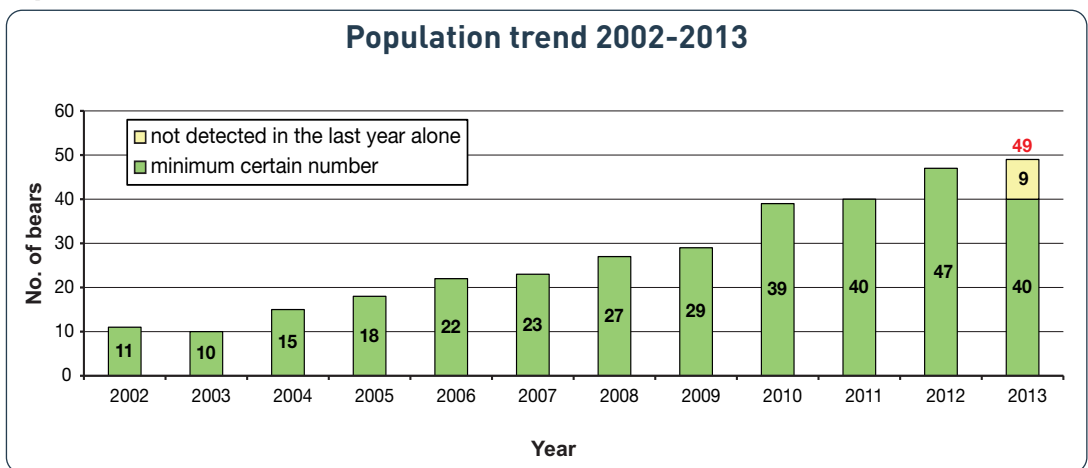
therefore shown to be **good**, but **falling** over time, in relation to the progressive increase in the number of bears present in the area.

Graph 4 shows the average percentage of genetically identified bears in comparison to the bears “actually” present in the 11 years from 2002-2011 period (**contactability**), with reference to the whole population, females and males and to the three **age groups (adults, young bears and cubs)**.

There was therefore a reversal in the population **trend** in 2013 (see Graph 5). In this graph the figures for previous years no longer show the range which characterises 2013, as the relative “minimum certain numbers” have been updated and supplemented using data acquired in subsequent years.

For example in 2012 we now know that the number of bears present, estimated that year as between 43 and 48, was at least 47.

Graph 5



The **average annual growth** in the bear population in the 2002-2013 period, with

reference to the minimum certain population, was **13.8%**.

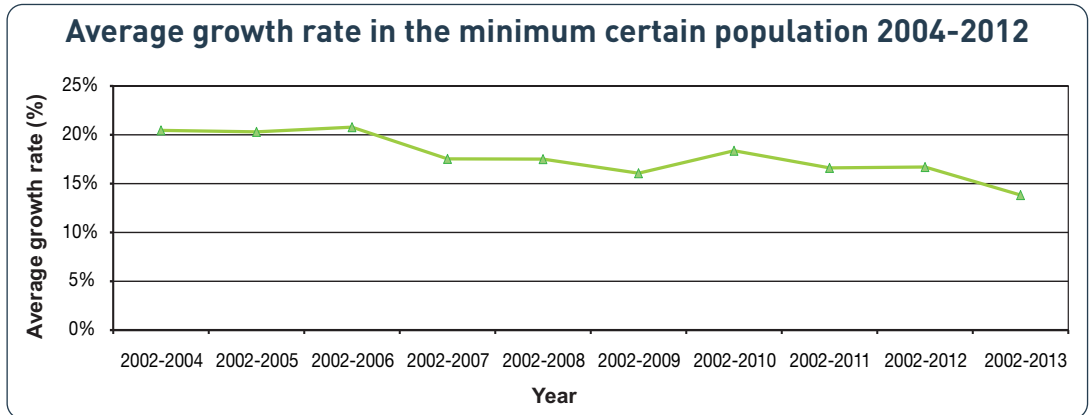


Graph 6 shows the **evolution in the average annual growth rate** in the 2002-2013 period.

Following an initial period, during which the growth rate was even higher than 20%,

the rate has settled down and decreased in the last year, arriving at the current level of 13.8%. This is nevertheless positive when compared with the data on the species in existing reference material.

Graph 6



Reproduction

In 2013 the presence of **2 litters** during the year was ascertained, with a total of **3 cubs**, one litter being made up of two cubs and the other of a single cub. One was observed in the southern Brenta area and the other in the central-eastern Brenta and Paganella-Gazza areas. **Genetic testing** made it possible to identify 2 of the 3 cubs (two females).

It is possible that a **further litter** was present in the northern Brenta area during the year, as suggested by at least a couple of sightings. However, it was not possible to obtain any objective evidence (images or genetic data) and thus it has not been included in this report.

By combing genetic monitoring and camera traps, it was also possible to ascertain that the female bear MJ2 had a further cub in **2012**, in addition to the single cub ascertained

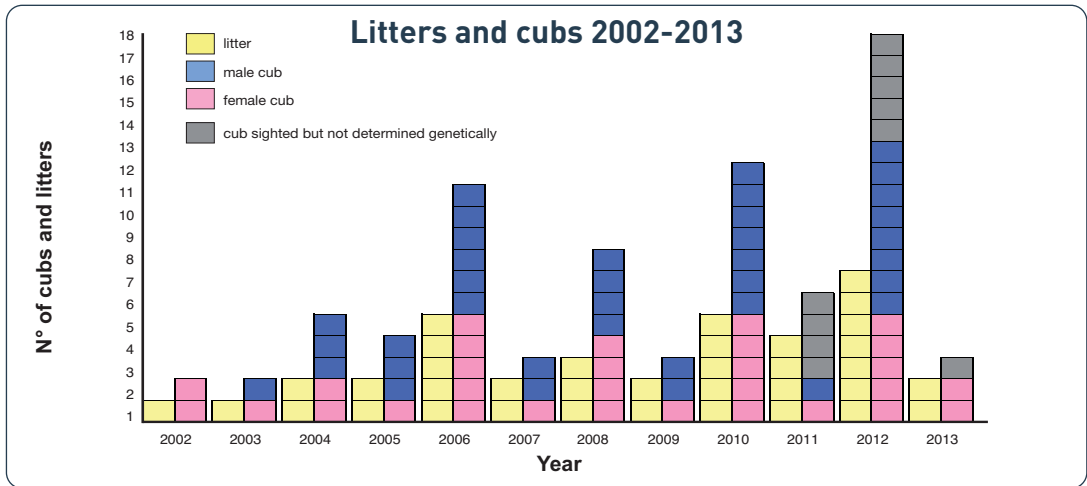


Photo 2 - The female bear MJ2 with two cubs born in 2012, in the Valle dello Sporeggio (Matteo Zeni - APT Forestry and Wildlife Department archives)

genetically in the same year (Photo 2).

36 litters have therefore been ascertained to date in Trentino (34 genetically and 2 only observed, in 2011) in the last **twelve years**, and at least **77 cubs** have been born (37 males, 30 females and 10 of

Graph 7



unknown gender) - (see Graph 7), **M-F sex ratio 1:0.81** (2002-2013, n=67).

In the first four years, from **2002 to 2005**, 6 litters were thus recorded (with an average of **1.5/year**), in **2006-2009** there were 12 litters (an average of **3/year**), while in **2010-2013** there were 18 litters (an average of **4.5/year**). The number of litters per year clearly represents a relatively important indication. It has been observed in other European and North American bear populations that by multiplying the average number of litters/year by 10 one can obtain an estimate of the number of individuals present in the area.

The data collected in Trentino to date would seem to confirm this rule.

6 of the 34 litters (18%) for which both parents have been genetically identified were the result of mating between **blood relatives** (between father and daughter in three cases, between mother and son in one case and between bears with only the father in common in the other two cases).

Reproductive animals

As mentioned above, two **mothers** were identified through genetic testing in 2013. They were **F2**, (aged 6, reproducing for the 2nd time), accompanied by a cub (F15) (Photo 3),



Photo 3 - The mother bear F2 with her cub in the Val delle Seghe (APT Forestry and Wildlife Department - MuSe archives)

while the second female, accompanied by two cubs (F18 and a cub of undetermined sex) was **F8**, with her first litter (Photo 4).

The **fathers** of the two litters were **M6** (with F2), a 7-year-old male for the first time ascertained to have reproduced, and **JJ5** (with F8), reproducing for the second time shortly before dying in June 2012.

To date **15 females** and **7 males** have therefore reproduced (2002-2013).



Photo 4 - The mother bear F8 with her cubs in the Val Doré (A. Caliarì - APT Forestry and Wildlife Department archives)



Photo 5 - Bears during courtship in the southern Brenta area (A. Caliarì - APT Forestry and Wildlife Department archives)

There were **9 sexually mature males** and **13 sexually mature females** present in 2013.

Footage of bears **courting and mating** was filmed for the first time in 2013 (Photos 5 and 6).

The first substantial data coming from sightings and camera traps show that the



Photo 6 - Bears during mating in the southern Brenta area (A. Caliarì - APT Forestry and Wildlife Department archives)

mating season in the alpine environment goes from **April to July**.

It is particularly interesting to note that the female bear **Daniza** and the male **M2** were observed together in spring, during the mating

season in the Val Nambrone. Both bears were equipped with GPS radio collar and this made it possible to document this important phase in the biology of the bear in a way that has not previously been possible (see box 2).

BOX 2 - M2 and Daniza: a “love story” in the Val Nambrone

Since 2002 at least 36 cases of reproduction have been documented in the province of Trento; recording births has by now become a habit. However, never before has it been possible to determine what happens in the mating season, in the spring before the birth of the litter.

In 2013 Daniza and M2, both equipped with GPS radio collars, were in the Val Nambrone in the mating season, spending more than two weeks together and making it possible to document their movements, and to some extent their behaviour, on a daily basis (see Figure A).

Figure A

Movement towards and away from the mating area (in the box) by the two bears



Daniza, a 19-year-old female bear introduced from Slovenia in 2000, normally frequents the area between the Val Rendena and the Giudicarie, whereas M2, a 6-year-old male, has moved between the Val di Sole and the Val di Non for some time, with occasional visits to the southern Brenta and the Paganella-Bondone mountains. The central points of their re-

spective territories lie approximately 25 km away from the location of their “rendezvous” as the crow flies, while thanks to GPS data it is possible to affirm that at least since July 2012 (when M2 was also fitted with a radio collar), the two bears had never come into contact.

On 22 April 2013 the two animals were still distant from one another, with Daniza in the Val Rendena on the slopes of the right-hand bank of the Sarca above Strembo and M2 in the Val d’Algone, specifically in the deep Vallon gorge.

In the next 48 hours Daniza moved north, crossing the river Sarca di Genova at the opening of the valley of the same name, then the Sarca di Nambone, beginning to climb up towards Clèmp, above S. Antonio di Mavignola, in the early hours of 24 April. She travelled around 16 km, always moving at night, in the early hours or at dusk.

On 23 April M2 was still in the Vallon, but in the evening (certainly after 5 pm) in his turn he began to move rapidly towards the north, crossing the upper Val d’Algone, the Bregn de l’Ors pass (“Bear spring” pass, where bears have always passed), the slopes of the Dos del Sabiòn above Pinzolo, up to the confluence of the Sarca di Campiglio and the Sarca di Nambone, which he too crossed in order to climb up towards Clèmp. He also travelled around 16 km, but in a much shorter time than Daniza (around 8 hours).

It is there that he probably smelled Daniza’s presence, following her trail until he encountered her, probably on the slopes above Clèmp, in the early hours of 24 April. From here it is likely that the two animals travelled around 1-2 km together, venturing into the woods on the left-hand side of the valley, stopping at around 8 o’clock in the morning on the wild steep slopes under Dosso del Fò, at an altitude of 1620 m (Photo A).



Photo A - Area frequented by Daniza and M2 during the mating season (C. Groff - APT Forestry and Wildlife Department archives)

From this moment the two bears remained together constantly, mating repeatedly, without ever moving more than a few metres away from one another (Photo B) for 17 days, until 11 May.

During the 17 days in which the two bears were together, they remained in a territory of only 10 hectares, moving frequently but for very short distances (1.3 km in total, namely 76 metres a day on average), at an altitude of between 1620 and 1830 metres (Figure B).

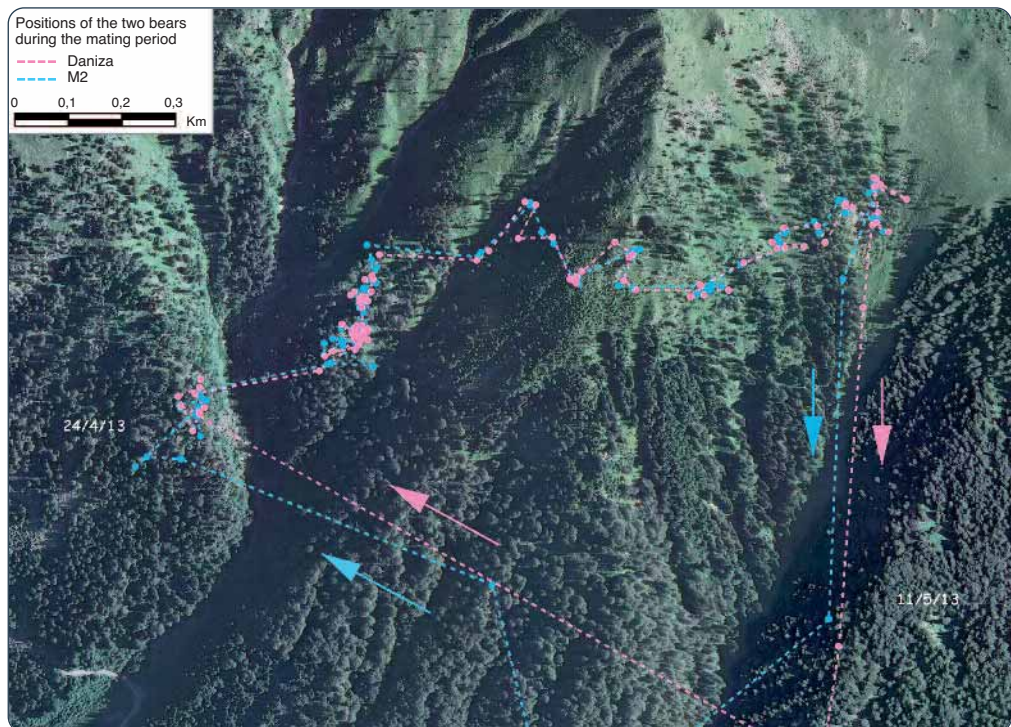
On the afternoon of the 11 May the two bears trav-



Photo B - Daniza and M2 during the mating season (R. Rizzoli - APT Forestry and Wildlife Department archives)

Figure B

Positions of the two bears during the mating period



elled a significant distance, (more than 4 km), for the first time after their meeting, making their way down the slopes from whence they came, up to the confluence of the Sarca di Campiglio and the Sarca di Nambrone, where they arrived around midnight. It is likely that it was M2 who continued to follow Daniza in this period, but it is not possible to establish this with certainty.

At all events, that night the bears separated: in the remaining hours of darkness Daniza climbed up the slopes of the Dos del Sabiòn and headed south. 24 hours later (midnight of 12 May) she was in the Val Algone, on the right-hand side of the slopes above the Ghedina refuge, after having travelled for around 14-15 km. M2 instead headed rapidly towards the north: Valagola, Vallesinella, Passo del Grostè, Val di Tovel, heading down the valley to arrive in the woods of the Val della Roccia after 24 hours (midnight of 12 May), covering around 33 km.

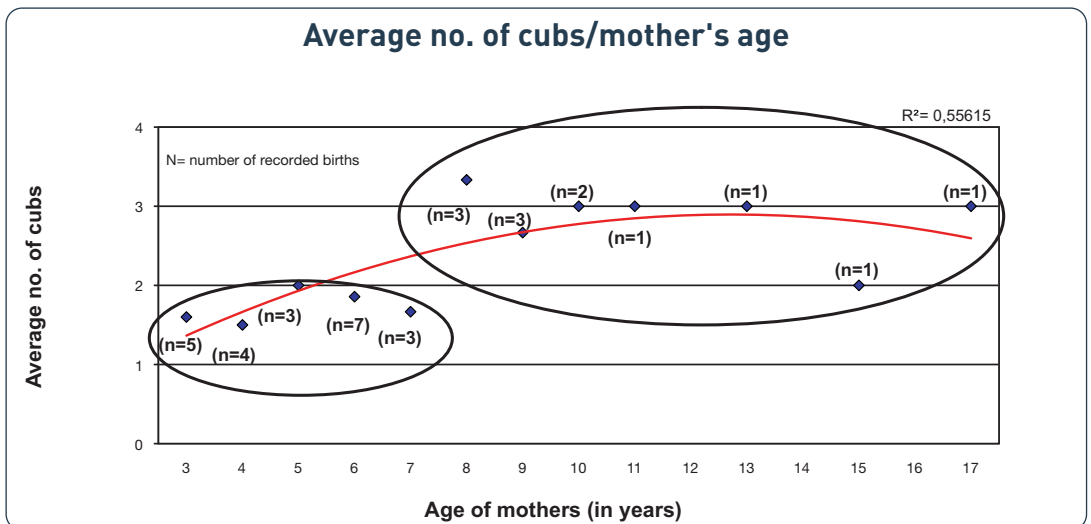
The data is interesting and new for Trentino, but essentially in line with what has been reported in the bibliography regarding this important phase in the biological cycle of the bear. It also offers a chance to take a discreet glimpse at the “bear’s life”, a glimpse which illustrates the major distances covered by these animals, their ability to find each other, although there are only a few of them in a vast area, their elusiveness (almost nobody saw them in this period) and their great knowledge of the area. It also offers new and stimulating questions about the ability of a solitary species which has a very low population density to create a “network” of relations (olfactory first of all) which is probably much more important and complex than one could imagine.

The average age of primiparous females in the period 2006-2013 (n=10) was 3.6.

The average gap between consecutive litters for the same female, recorded in the period 2002-2013 (n=19 gaps, referring to 10 females), is 2.1 years.

The average number of cubs per litter is 2.11. To date the number of cubs per litter has essentially been related to the age of the mother, with 2 or less cubs for females aged 3-7 and 3 for females aged 8-7 and 3 for females aged 8 or over (see Graph 8).

Graph 8

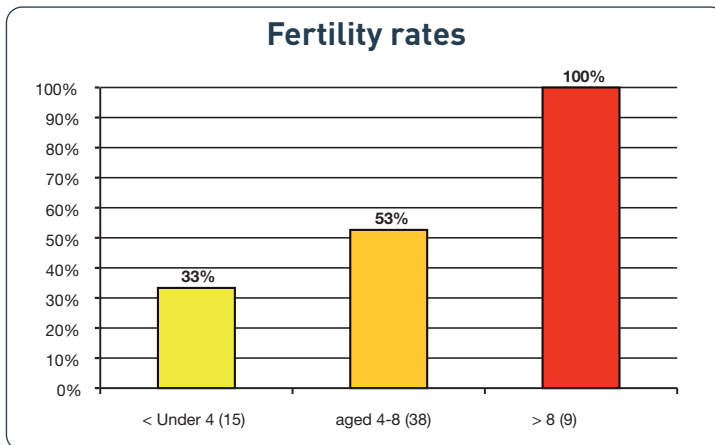


This data refers to 34 litters out of 36, not taking into consideration the two litters in 2011 whose mothers are still not known.

The link between the average number of cubs per litter and the age of the mother is represented with a certain degree of approximation by the red polynomial regression line in the graph, with a coefficient of determination of 0.5562.

Graph 9 shows the **fertility rates** of females by age groups (conception under the age of 4, between the ages of 4 and 8 and over 8) and refers to 62 possible reproductive events, giving rise to 34 ascertained litters.

Graph 9



“Rediscovered” bears

During 2013, **no bears** were “rediscovered” genetically (see definitions in page 18).

However, the presence of a **new male bear (M24)** was detected genetically. This was the son of BJ1, probably born in 2010. The figures assume that this date of birth is valid.

Furthermore it should be recalled that one further bear, already detected genetically in 2012, but not considered in the calculations as there was not sufficient evidence in the field to clarify his mother (see page 16 of the 2012 Bear Report), was also detected again in 2013, once again genetically (namely the male bear **M21**). It was therefore considered appropriate to include him

in the calculations, despite the uncertain attribution as regards his parents.

Bears undetected in 2013 alone

No less than **nine bears** present in 2012 **were undetected for the first year** in 2013: 5 cubs born in 2012 and a further 4 bears (one adult and three young bears). They have not yet been classified as “missing” bears (see definitions on page 18), as there is a concrete possibility that they are still present.

Missing bears

In 2013 it was possible to confirm the **two** known cases of “**emigration**”, with reference to the male bear **KJ2G2**, who has been based in the area of the Dinaric-Balkan bear population (a frontier area between Italy, Austria and Slovenia) since 2011, and **M8**, who instead moved east in 2012 (see Box 4 on page 20 of the 2011 Bear Report for further details).

Both were identified genetically in 2013 in the eastern part of Friuli Venezia Giulia and have probably also moved over the neighbouring Austrian and Slovenian frontiers (2013 genetic data for the two neighbouring countries was not available when this Report was printed).

The **4 bears** born in 2011 but not genetically recorded (four cubs born that year) were again not identified genetically in 2013 (as well as in 2012). They must therefore be considered to be “missing” from this year.

When calculating the number of “missing” bears in 2013 it is also necessary to consider 2 bears that died during the year.

- The male **M13**, aged **3.5**, was **shot down** on **19 February 2013** in the Val Poschiavo by the Swiss authorities (Canton Grigioni - SVI) because he was considered to be dangerous due to over-confident behaviour, despite numerous attempts to scare the bear.

- The male **M2**, aged 5.5 (Photo 7) was found dead in the Val di Rabbi on **28 September 2013**, having been shot by a **poacher** with a rifle. Currently (February 2014) investigations by the Public Prosecutor’s office are underway to identify the person responsible.

During 2013 it was also possible to genetically identify the bear found **dead** due to unknown causes in the province of **Brescia** on

22 September 2012 (see page 16 of the 2012 Bear Report). It was ascertained that this was the **male bear DJ1G1**, who was **5.5 years old** at the time of his death.

Thus by the end of 2013 there were **17 dead bears** (8 found dead and 9 killed accidentally or deliberately), **17 bears undetected genetically for at least the last two years**, **2 taken into captivity** and **two emigrated bears**.

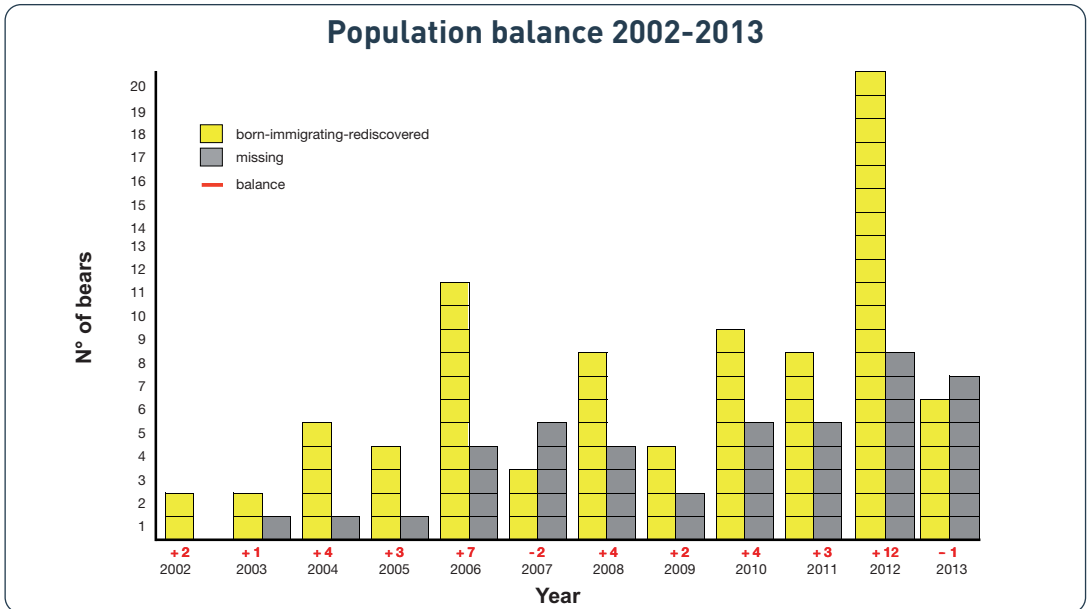
Hence there were a total of **38 missing bears** at the end of 2013. As regards this data, see the considerations in the “survival rates” section on page 32.

Graph 10 shows the **balance between births-rediscovered/missing bears** year by year. In **2013** there was a **negative balance (-1)**. This was the result of 3 births, 3 newly detected bears (M21, M24 and the second cub of MJ2), 3 deaths and 4 new “missing” bears.



Photo 7 - The carcass of the male bear M2 (A. Stringari, APT Forestry and Wildlife Department archives)

Graph 10



In the year of their disappearance the **missing bears** included 13 adults, 20 young bears and 5 cubs (see Graph 11).

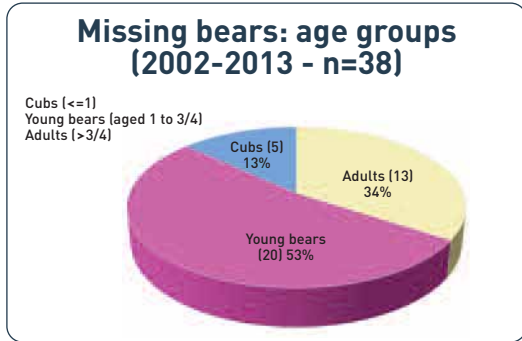
Of the **missing bears** (n=38), 17 have died, 2 have been taken into captivity, 2 have emigrated and 17 have not been detected genetically for at least two years (Graph 12).

The **dead bears** (n=17) belonged to the

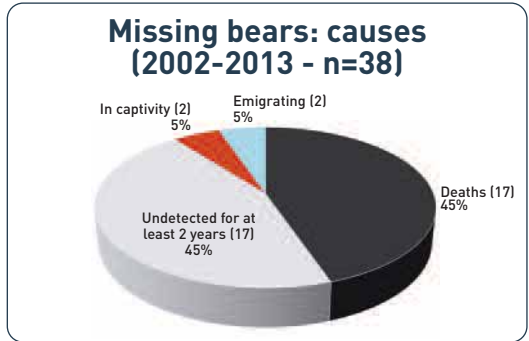
following age groups: cubs (5), young bears (7) and adults (5), the percentages being shown in Graph 13.

The **deaths** (Table A) were the result of natural causes in 4 cases, unknown in 4 cases and the result of action by man in the other 9 cases (Graph 14).

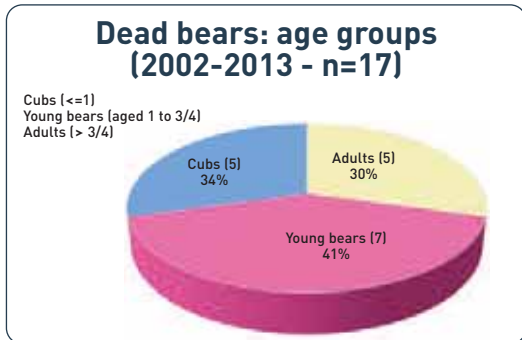
Graph 11



Graph 12



Graph 13



Graph 14

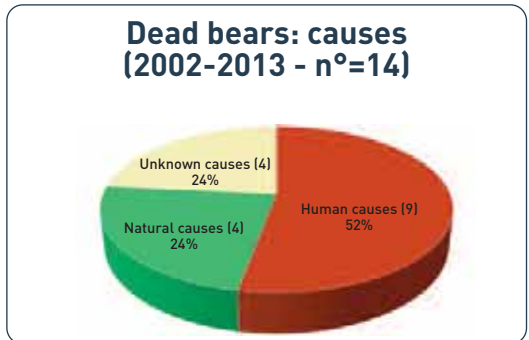


Table 1

Cause of death * in Germany ** in Switzerland, ad=adult, juv=young bear, cuc=cub

year	natural causes	poaching	road accident	shot down for management	management accident	unknown causes	total deaths
2002							0
2003	1 cuc						1
2004							0
2005							0
2006	1 cuc, 1 ad			1 juv*			3
2007							0
2008			1 cuc	1 juv**	1 juv		3
2009							0
2010						1 cuc	1
2011						1 ad	1
2012	1 cuc		2 juv		1 ad	1 juv, 1 ad	6
2013		1 ad		1 juv**			2
TOTAL	4	1	3	3	2	4	17

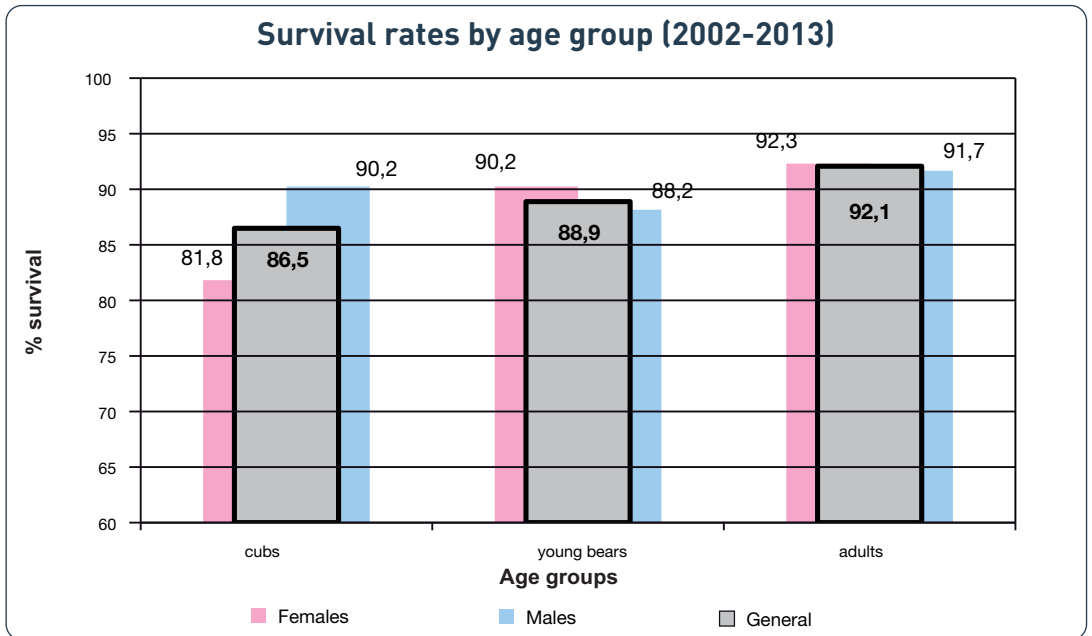
Survival rates

The new data available makes it possible to update the survival rates for the three different age groups (cubs, young bears and adults, according to the definitions on page 18), differentiated for the two sexes (Graph 15).

The data refers to a period of **12 years** (2002-2013), during which it was possible to record the survival or death of **83** different

bears, with 355 passages from one year to another (**355 bear-years**). The “mortalities” category, considered in the broader sense, also includes bears undetected in the last two years or taken into captivity, confirming the criteria used for “missing” bears. The data regarding any emigrating bears is instead only considered up to the time that they leave their original population.

Graph 15



The “**natural**” survival rate, thus excluding any bears killed, dying or removed by choice or due to management accidents, increased slightly for young bears (from 88.9% to 91.0%) and for adults (from 92.1% to 93.9%).

Structure of the population

At the end of 2013 the certain population was made up of **22 adults** (9 males and 13 females), **14 young bears**

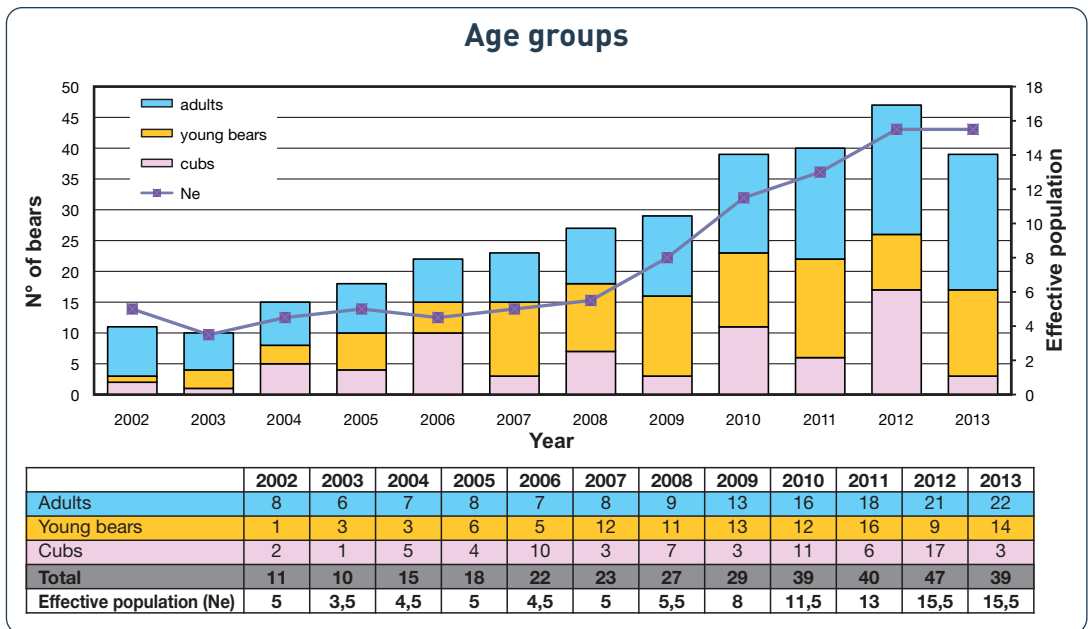


(9 males, 4 females and 1 of undetermined sex) and **3 cubs** (2 females and 1 of undetermined sex).

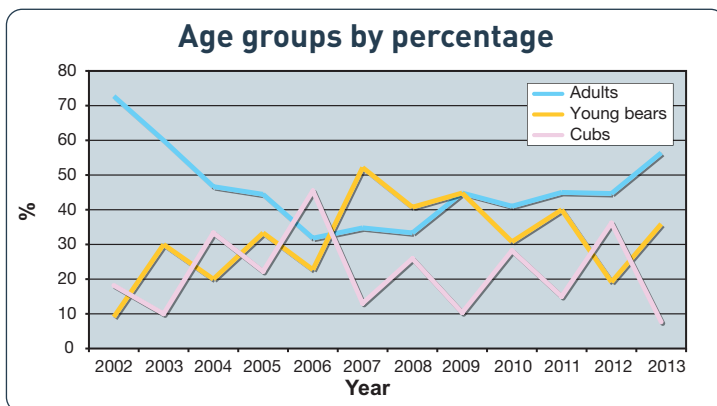
Graph 16 shows the trend for the different age groups in the 2002-2013 period. It should be noted that the figures for each year again include data acquired thanks to monitoring in subsequent years; thus all data, even if relating to previous years, is constantly updated in relation to the new knowledge provided by continuing monitoring. This graph also shows

the **effective population (Ne)** recorded annually, namely the number of bears capable of reproducing in that year. In the case of the bear this is made up of the adult males, plus half of the female bears recorded (given that they generally give birth in alternate years). The data shows that there has been a marked increase in this important demographic parameter since 2008, which has tripled in the last five years, after the first six years in which it was relatively stationary.

Graph 16



Graph 17

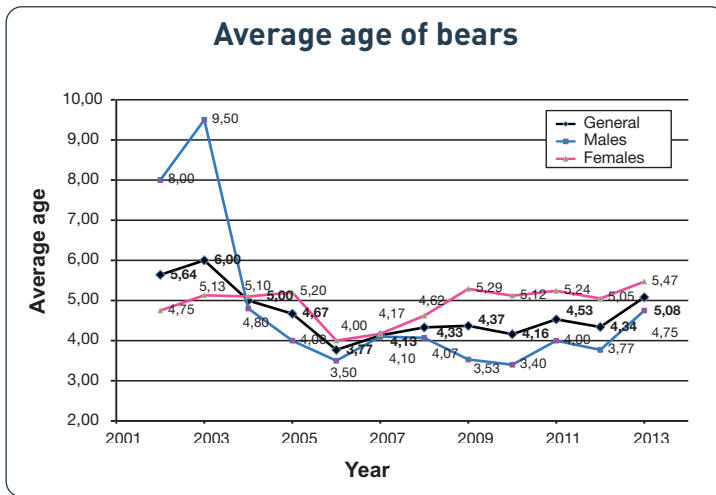


The percentage of bears in the three age groups (adults 56%, young bears 36% and cubs 8%) in the period 2002-2013 is shown in Graph 17.



It is also interesting to note the **evolution in the average age of the bear population** over the 12 year period examined (see Graph 18). In 2013 there was a marked increase in average age (**now 5.08**). This was due above all to the small number of cubs recorded this year, together with a good survival rate.

Graph 18



Finally, it may be noted that the **average age** of bear at the time of their **disappearance** (as a result of their death, disappearance or having been taken into captivity) was significantly lower (3.55 years – 30%) as compared to the average age of the population. This confirms on the one hand the greater vulnerability of younger bears (see Graph 15) and on the other that the increase in average age recorded for some time is a positive factor in this phase.

Use of the territory

All the 39 bears detected and believed to be present at the end of 2013 frequented the territory of **Trentino** (32 Trentino alone, 7 also neighbouring provinces/countries). Thus no bears living entirely outside the province were detected genetically. All the 7 bears also detected outside the province in 2013 were males: 3 adults and 4 young bears.

6 bears also frequented the province of **Bolzano**, all being present on slopes going from the right-hand side of the Val d’Ultimo to the right-hand side of the Adige, up to the border with Trento (M1, M20, M17, MJ4, M22 and MJ2G1), while 1 bear was also present in **Veneto** at Cadore-BL (MJ4) and 1 in **Lombardia**, in the provinces of Sondrio and Bergamo (M7).

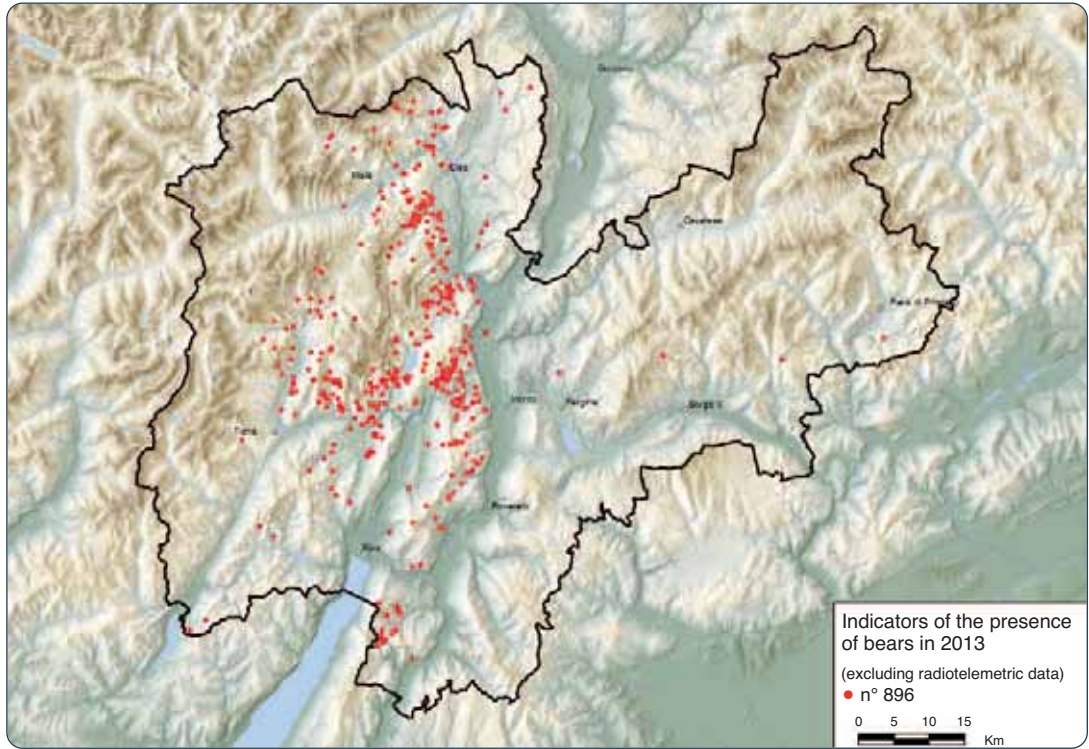


The **896 area fixes** related to the presence of bears collected within the province during 2013 (all recorded indicators of pres-

ence, with the exception of those coming from satellite monitoring of three bears) are shown in Figure 1.

Figure 1

Reports of bears in the province of Trento in 2013



Area occupied by the population

Considering also the longest journeys made by young males during 2013, the **population** of brown bears present in the central Alps, which is mainly centred around western Trentino, **was distributed over a theoretical area stretching out over 14,572 km² in 2013** (Figure 2).

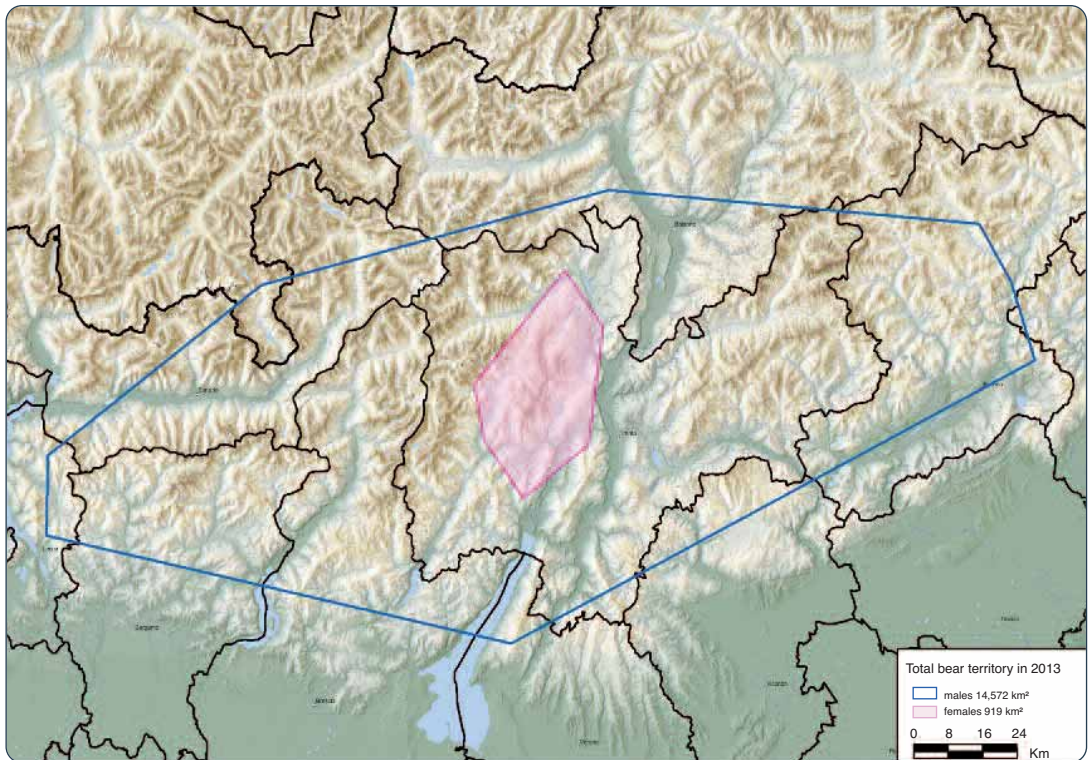
The **area occupied by the females in a sta-**

ble manner is decidedly smaller (**919 km²**), still entirely situated within the province.

The areas occupied were estimated using the minimum convex polygon method, applied to 100% of the fixes available. This also leads to the inclusion of vast areas which are not suitable and/or not actually used, especially within the macro-area including the movements of young males.

Figure 2

Area occupied by bears in the central Alps in 2013 (in light blue), highlighting the area within this occupied by the females (in pink).



Population density

The population density in the area frequented by the bears in a more stable manner in 2013 was 3.9 bears/100 km² (36 bears, including cubs born during the year, within the area occupied by the females, namely 919 km²). This data should be considered bearing in mind the following:

- the territory also includes areas which are unsuitable and effectively used little or not at all (e.g. valley floor with urban develop-

ment and rocky peaks);

- population density is calculated on the basis of the number of bears present in the area over a certain period of time (almost a solar year) and therefore the number of bears present in the area at a certain moment, which would represent a figure closer to the real density, is on average lower;
- no less than 10 out of the 15 males centred around the area taken into consideration have also frequented areas outside it.

Dispersion

In the period **2005-2013** it was possible to document dispersion (understood as movement outside western Trentino, see the definition on page 18) involving 24 bears (all males). However, 4 of these remained in areas straddling the province of Trento (northern border) and thus adjacent to the area frequented by the population in a stable manner.

Therefore **20 bears** are effectively considered to have been involved in **roaming**. **6** of these have died (3 killed following management decisions in Switzerland and Bavaria, 2 run over in the province of Bolzano and 1 found dead in the province of Brescia), **1 disappeared** in 2005 in the frontier area between Switzerland and the province of Bolzano, **2** have been absent since **2013** and **2 have currently emigrated** to the Dinaric-Balkan bear population. Finally, **9** have returned to the area frequented by the females, remaining there in a more or less stable manner.

Thus 9 out of 20 bears (**45%**) **died or disappeared** before being able to return (although 2 have only been missing since 2013) and a further 9 (**45%**) are **still present**. The other **2 (10%)** have emigrated.



Photo 9 – MJ4's footprint close to Nave S. Rocco (APT Forestry and Wildlife Department archives)

In this context it is interesting to recall the case of the male **MJ4**, previously described on page 30 of the 2012 Bear Report. This year, starting once again from the Belluno area (Photo 8) he again returned to western Trentino in May (Paganella area), remaining there at length, probably all year, frequenting all the areas used by the females in a stable manner (data obtained from genetic monitoring).

The tracks found in the in the Adige valley, along the river Adige between Nave S. Rocco and the town of Zambana Nuova, in May very probably belong to this bear (Photo 9).

The bear probably crossed the river at this point (by swimming, given that there are no bridges nearby). He then continued west, heading up the slopes of the Pa-



Photo 8 - MJ4 filmed by a camera trap in the Belluno area before making the journey to Trentino (C. Sacchet -Provincial Police in Belluno)

ganella (Photo 10), having crossed the motorway, either by using the underpass or by climbing over the fence and crossing the

road directly. To date **no dispersion of females** born in Trentino has been documented.



Photo 10 - Journey made by MJ4 to cross the Adige valley (C. Groff APT Forestry and Wildlife Department archives)

Other monitoring activities in 2013

Radiotelemetry and satellite telemetry

During 2013 3 bears were monitored using satellite telemetry: **Daniza, M2 and M6**.

The relative **home ranges (HR)**, calculated using the minimum convex polygon (MCP) method, are given in Table 2 and shown in Figures 3, 4 and 5.

Figure 3
Main telemetry data for 2013

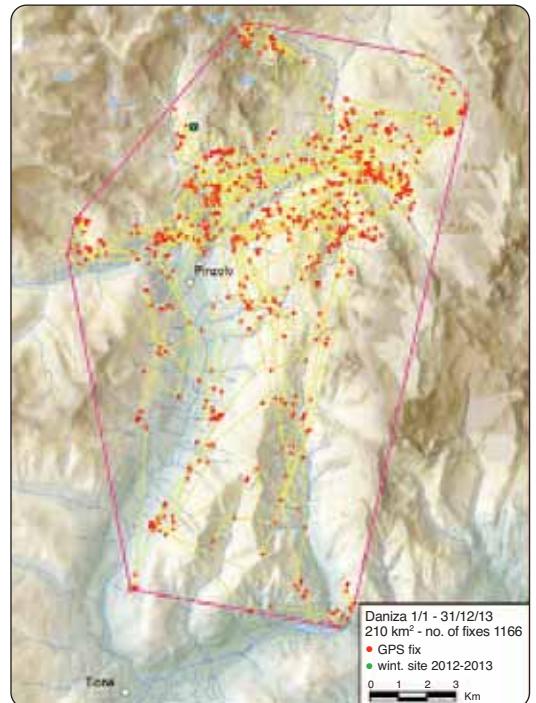


Table 2
Main telemetry data for 2013

Bear	Home range km ²	Monitoring period	No. of fixes
Daniza	210	1/1/2013 - 31/12/2013	1,166
M2	1.493	1/1/2013 - 21/9/2013	1,424
M6	158	27/9/2013 - 31/12/2013	1,011

The genetic monitoring conducted without interruption since 2002 has made it possible to follow most of the bears in a continuing manner, confirming their presence over time and the **home-ranges used**, at least partially. These are recorded year by year for each individual animal. As an example, below we give the home-ranges (MCP) of the male Gasper and the female Daniza from 2004 to 2013 (Figures 6 and 7).

Naturally this data is very approximate and in no way comparable with that obtained from the radiotelemetric monitoring of animals, probably leading to significant underestimation in comparison to telemetric data.

Figure 4
Home-range of M2 in 2013 (MCP)

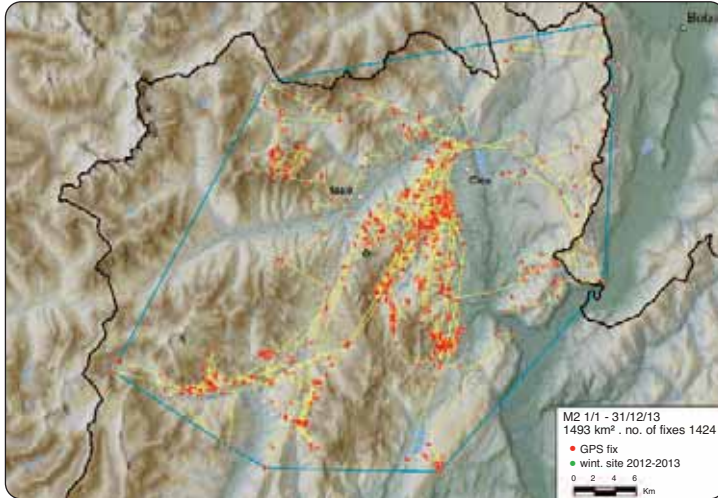


Figure 5
Home-range of M6 in 2013 (MCP)

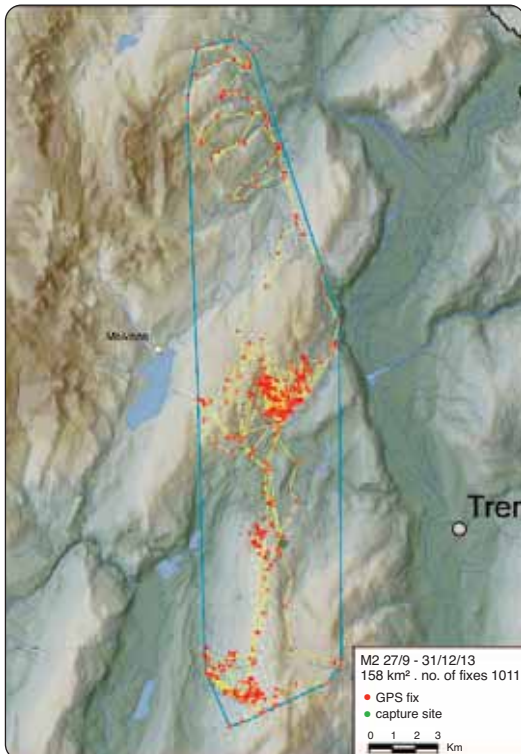


Figure 6
Home-range of Gasper in the 2004-2013 period

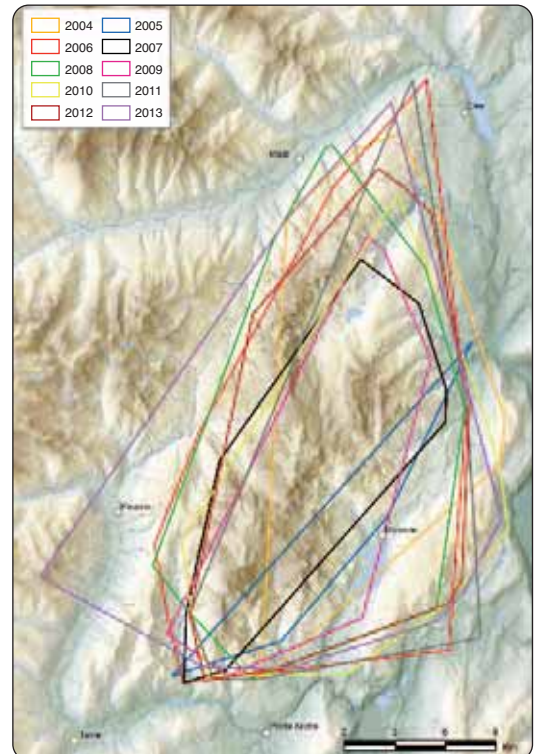
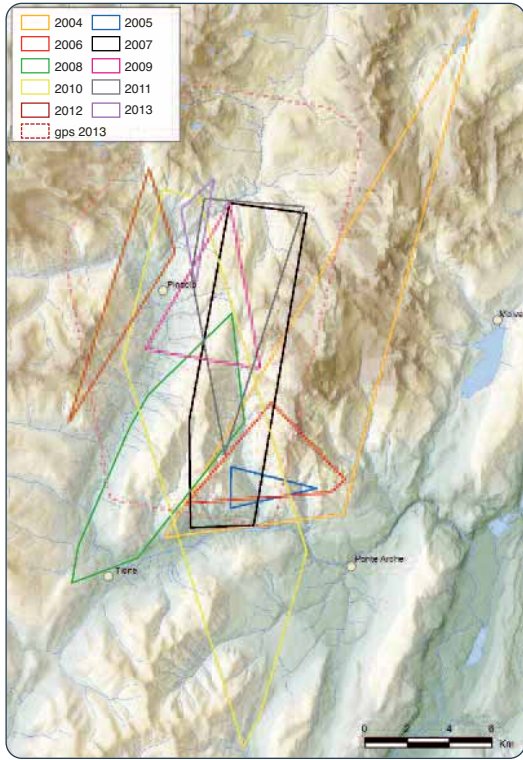


Figure 7

Home-range of Daniza in the 2004-2013 period. The dotted line shows the 2013 home-range resulting from satellite fixes



2. Damage compensation and prevention

By now APT has gained more than thirty years' experience as regards compensation and prevention of damage caused by brown bears. Indeed, since 1976 100% of the material value of assets damaged has been reimbursed and it is possible to acquire prevention works (mostly consisting of electric fences). The relative regulations, dealt with in article 33 of provincial law no.24/91, have been revised and updated several times over the years, also on the basis of directives imposed by the provincial government with the aforementioned resolution no. 1988 of 9 August 2002. With Resolution no. 697 of 8 April 2011 the provincial government further reviewed the regulations for damage compensation, also providing for compensation of ancillary expenses and extending 100% compensation to damage caused by lynx and wolves.

Bearing in mind the provisions of existing regulations, the Forestry and Wildlife Department also promotes the **prevention of damage** to beekeeping and livestock through the adoption of electric fences or other suitable protective measures, with the scope of reducing the damage caused by brown bears. This takes place in two main ways: **funding** covering up to 90% of the cost of works and/or **gratuitous loans** of prevention works, designed mainly to protect sheep and goats or beehives, along with support and consultancy provided to farmers by technical experts such as the **livestock liaison officers**.

Compensation for damage caused by bears

In 2013, 194 reports of damage caused by wild predators were forwarded to the Forestry and Wildlife Department. 173 cases of damage were attributed to **brown bears** (170 in western Trentino and 3 in eastern Trentino). In 4 cases the predator was identified as a **wolf** (Lessinia area), in 5 cases the damage was attributed to foxes, in 1 case to stray dogs and in 2 cases to mustelidae (marten family), whereas in 9 cases the responsibility of pred-

ators was excluded or was not possible to ascertain.

174 claims for compensation were received by the department, of which 156 were accepted (149 regarding bears, 4 wolves, 2 foxes and 1 mustelidae) and 18 rejected (4 regarding bears, 2 foxes, 1 stray dogs, 1 mustelidae, 5 not attributable, 5 no preying involved). The remaining 20 claims were either not followed up by the claimant or a cumulative claim was presented by the damaged party for the damage suffered.

In 87% of cases of damage, **inspections** were carried out by forestry staff, who were responsible for drawing up a report.

Overall, **€ 128,218.65** compensation for damage caused by **brown bears** and **€ 6,930.00** compensation for damage caused by **wolves** was paid out.

As regards the damage caused to livestock by bears, it is underlined that in the last two years there has been an increase in preying on **cattle** and **equines** (see Table 3).

Table 3
Damage to livestock in the last six years

Livestock	Year					
	2008	2009	2010	2011	2012	2013
Sheep and goats	32	31	56	16	36	30
Cattle	1	0	0	0	4	13
Equines	0	2	1	2	7	8

€ 36,505.97 of this damage was caused to cattle (28% of overall compensation) and **€10,338.70** to equines (8% of overall compensation). On analysing the genetic and radiotelemetric data available, it would appear that the aforementioned damage to cattle and equines was caused exclusively by adult male bears (M4, M2 and M6), with the sole exception of the male bear M11 (a young bear) who preyed on two young calves and two newborn calves. As far as the wolf is concerned, the damage concerned cattle (6



animals) and equines (2 animals).

For the sixth consecutive year the **lynx** was present in the province (a single documented individual) without causing any damage.

In 58 cases, namely around 40% of all incidents recorded involving bears, genetic monitoring made it possible to determine the identity of the bear/s involved with certainty.

This data, together with other parameters, such as the areas in which the damage took place, radiotelemetric monitoring of animals with radio collars and camera traps made it possible to identify bears causing a significant amount of damage. These were the adult male **M4**, responsible for 8 cases of damage on the Trentino side of Monte Baldo and 7 incidents on the Verona side, almost all involving cattle, the adult male **M6**, responsible for 6 cases of damage to cattle, equines and crops in the Monte Bondone, Stivo and Paganella area, the adult male **M2** (fitted with a radio collar), who was responsible for at least 5 cases of damage to equines and cattle in the Val Rendena and the Val di Tovel (Photo 11) and the young male **M11**, who was responsi-



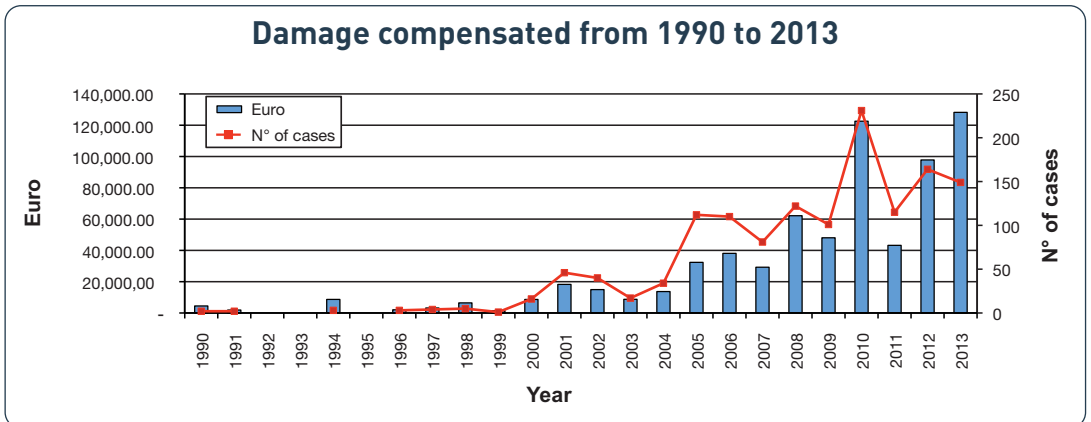
Photo 11 - Donkey preyed on by M2 in the Val di Tovel (C. Groff - APT Forestry and Wildlife Department archives)

ble for at least 4 attacks on cattle and sheep, again on Monte Baldo.

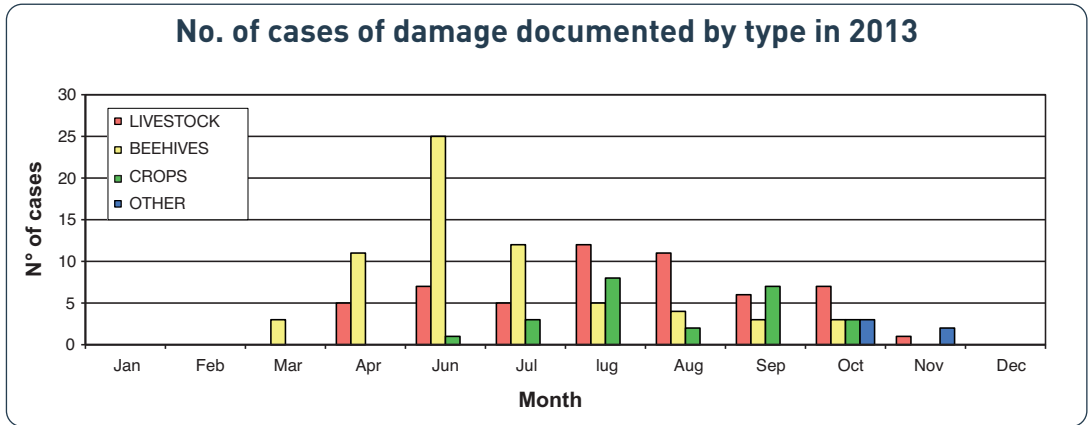
M6 was fitted with a radio collar last September in order to allow more intensive monitoring and possible activities to deter the bear, M2 was killed in the Val di Rabbi, while M11 disappeared suddenly from the Monte Baldo area last spring.

Graph 19 shows the long-term trend in terms of compensation paid for damage caused by brown bears, whereas graphs 20 and 21 show the chronological distribution of this damage in 2013 and in the period 2002-2013.

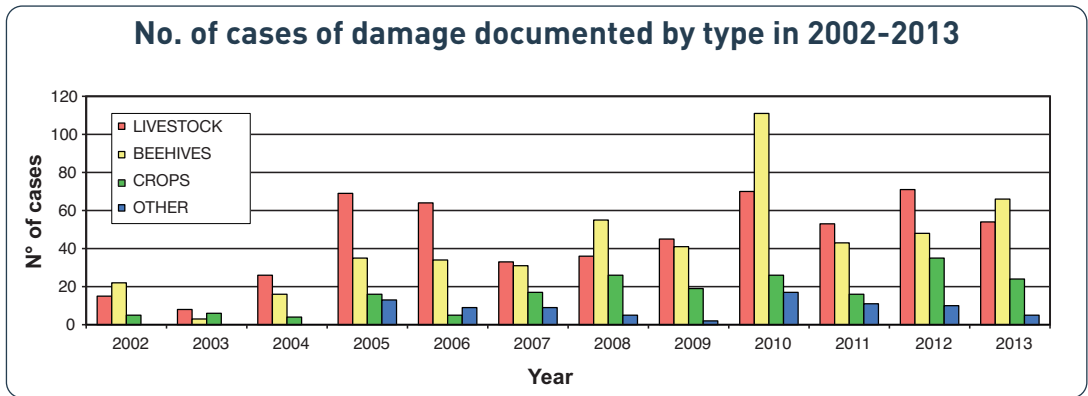
Graph 19



Graph 20



Graph 21



The geographical distribution of reported damage can be seen in Figure 8.

Prevention of damage by bears

As has already been reported, since 2011 the District Forestry Offices have seen to the distribution of prevention works in the form of gratuitous loans, while the Wildlife Office has dealt with applications for the funding of prevention works.

Overall, the new system has made it possible to improve the service and in par-

Figura n. 8
Distribuzione geografica dei danni da orso registrati nel 2013

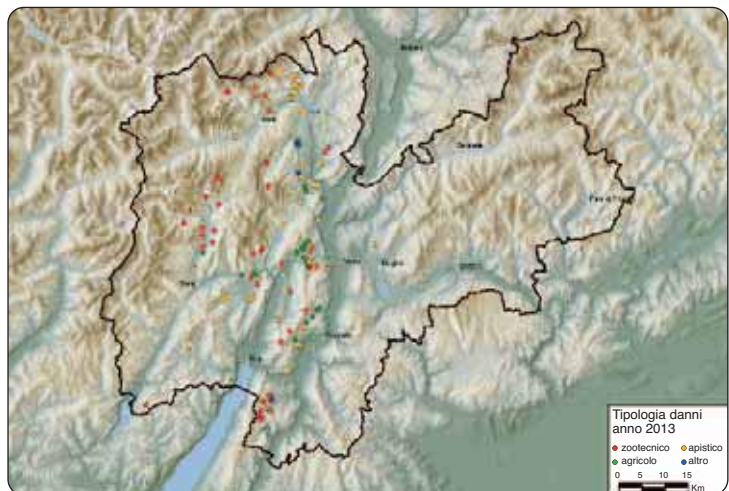




Photo 12 - Electric fence around beehives (P. Zanghellini - APT Forestry and Wildlife Department archives)

an awareness of the siting of prevention works by local forestry staff allows **more effective control** of their use.

During the year, a total of **114 applications** for prevention works to protect assets from damage by brown bears were presented. Of these **100** were provided by the District Forestry Offices in the form of **gratuitous loans** (district offices: Malé 9, Tione 43, Trento 13, Cles 23, Rovereto 12), 65 of which designed to protect beehives (541 in total since 2002) and 35 livestock

particular to improve contact between users and the staff responsible for distributing materials. Indeed, in many cases it is forestry station staff who suggest that applicants request prevention works or ask for consultancy or an inspection before deciding whether to present an application. A preliminary inspection also makes it possible to suggest the type of protection most suitable for the user's needs, to recommend specific measures to improve the efficacy of works and to raise awareness of the various problems linked to the care and maintenance of the works among users.

Close contact with users also allows evaluation of the validity of the materials supplied over time and of whether they respond to the operational needs of users. Last but not least,

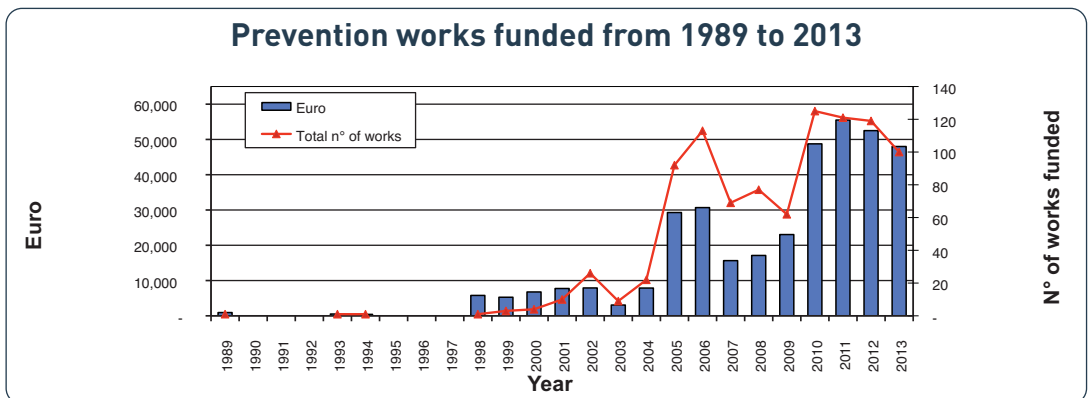
(394 in total since 2002).

The remaining **14 applications** concerned cattle and equines and were dealt with by the Wildlife Office. Of these, 7 were **accepted** with funding of 60% of admissible expenditure, 5 were **rejected** and 2 **cancelled** as the prevention works were not implemented or did not comply with the construction criteria required.

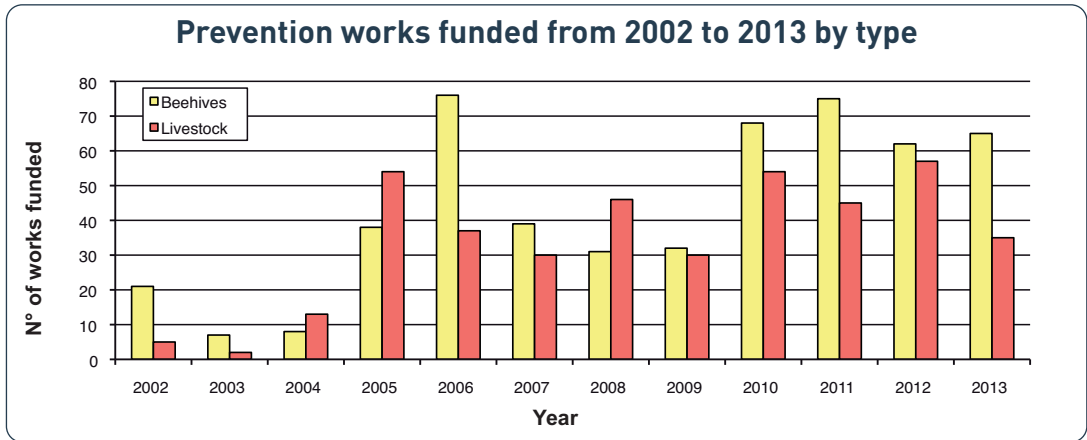
The **overall expenditure** borne by the Department, also thanks to funds from the **"Life Arctos"** project (which covered 60% of expenditure) amounted to a total of around **€ 45,000.00**.

Below it is possible to see the long-term trend for the distribution of prevention works (Graph 22) and the different types of works

Graph 22



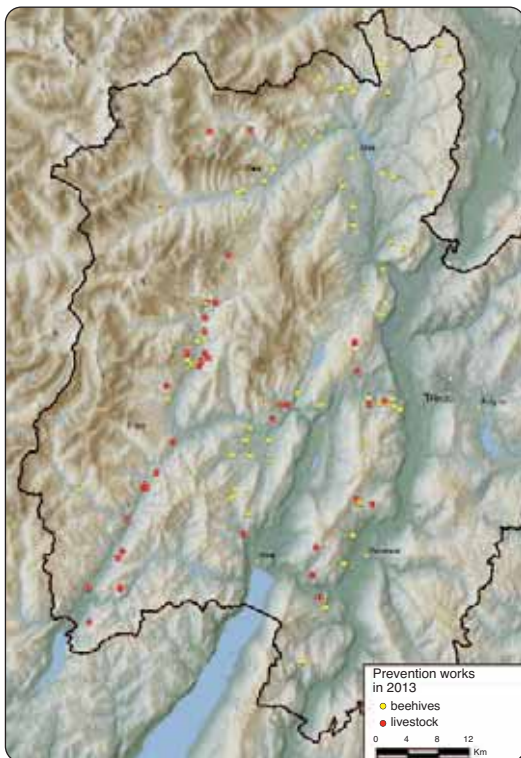
Graph 23



in the period 2002-2013 (Graph 23), with reference to livestock and beekeeping.

The geographical distribution of the works set up in western Trentino in 2012 can be seen in Figure 9.

Figure 9
Location of prevention works distributed in 2013



Checks on prevention works

In order to check that the prevention works were functioning effectively and at the same time to raise the awareness of users as regards the active and correct use of the works, a spot check of **102 works** distributed after 2007 was carried out in 2013. To see whether the electric fences were active during the period of greatest activity for bears, the forestry stations were instructed to carry out checks in the spring-summer, in the evening, at night or early in the morning.

In 69 cases (67%) the electric fence had been installed, whereas the remaining 33 fences (33%) were not present. As regards the electrification of the 69 works installed, 56 fences were active, 4 were without a battery and in 9 cases the battery was flat. Of the 69 works present, 15 had been installed in a manner defined as excellent, 37 good and 10 adequate, whereas in 7 cases the installation was considered to be inadequate in terms of protecting the assets for which funding had been provided.

Thus ultimately only **52 (51%)** of the 102 works checked were **operational** and correctly installed, while the remaining **50 (49%)** were considered to be **unsuitable** for the purpose. It should however be stated that in some cases the failure to use the fence or its temporary unsuitability were partially justified following the explanations given by the bene-



Photo 13 - Checking of an electric fence (C. Groff - APT Forestry and Wildlife Department archives)

ficiaries. At all events, the inspections highlighted once again a lack of awareness and attention with which prevention works are used.

This is a major problem, to which it is necessary to respond in order to alter the current situation.

Meetings with stakeholders

In 2013 the relations already started up for some time with the economic sectors most affected by the presence of bears and other large carnivores continued.

Once again this year, a **Round table with representatives of stakeholders was organised, the meeting being held on 27 November 2013**. During the meeting the provincial administration underlined on the one hand its desire to constantly **inform** and update the relevant categories as regards the system for compensation and prevention of damage currently adopted, and to evaluate the experience of previous years, while on the other it expressed its intention to **listen** to the needs and proposals of those involved and to gather any possible comments and suggestions that may emerge during consultation.

Among other things, the need to promote possible forms of support for the use of preven-

tion works was agreed, also through the use of the Rural Development Plan (**Piano di Sviluppo Rurale - PSR**).

Shepherds support

The presence of the shepherd and the adoption of more appropriate systems for preventing damage, along with fair compensation, are fundamental in guaranteeing coexistence between large carnivores and livestock reared in the mountains. Bearing this in mind, one of the objectives of the provincial administration is to encourage shepherds to stay at high altitude with their flocks, also by providing tempo-

rary shelters. These objectives are also pursued through the activities carried out by the **livestock liaison officers**, which take the form of support and consultancy, mainly during the period of alpine pasture. The main objective of the livestock liaison officer is thus to establish collaborative relations with shepherds and to provide training and information.

The structure of the department currently provides for subdivision of the provincial territory within which brown bears are present in a stable manner into **6 homogeneous areas**, with a contact person being identified for each area.

In **2013** support for shepherds continued and was consolidated, above all in areas with the largest numbers of bears. Overall, a total of **25 flocks** with around **15,000 sheep and goats** were supervised and assisted.

The shepherds requesting assistance were supplied with electric fences and **fence electrifiers** of adequate power (**2.6 joules**), with rechargeable batteries fuelled by solar panels.

Furthermore **four prefabs** (accommodation units) were **transported to the mountains** to allow shepherds to remain close to



Photo 14 - Transport of an accommodation unit to the mountains (R. Calvetti - APT Forestry and Wildlife Department archives)

their flocks at night. In areas not reachable by other means, the material necessary for mountain pasture activities, the prevention works and the accommodation units were

transported to the mountains by the helicopter unit of the Fire and Civil Defence Service (Photo 14).

In 2013 there were a total of **5 attacks** on the aforementioned **protected flocks** (Photo 15), leading to the death of 55 sheep (**0.4% of the livestock protected**). Bears also caused the death of 2 donkeys and injured a third. It should be underlined that 49 sheep died on a single occasion, with 4 being killed directly by the bear, whereas the others died after falling from the rocks in a desperate attempt to flee from the predator.

As in 2012, the systematic adoption of prevention works (electric fences), the expertise of shepherds and the constant consultancy and support provided to shepherds by the livestock liaison officers helped to reduce attacks by bears and respond rapidly to difficult situations. Ultimately, it was confirmed that the support of professional figures such as livestock liaison officers is very useful in terms of guaranteeing the coexistence of livestock and large carnivores in the mountains.



Photo 15 - Flocks of sheep on Monte Valandro (C. Groff - APT Forestry and Wildlife Department archives)

3. Management of emergencies

The Law of 11 February 1992 no. 157 includes the brown bear among the species granted special protection (article 2, paragraph 1).

The D.P.R. of 8 September 1997 no. 357 (subsequently amended and supplemented by D.P.R. 120/03), implementing the 92/43/EEC directive (Habitat Directive) regarding the conservation of natural and semi-natural habitats and wild flora and fauna, includes this species in Annex II (species of community interest, whose conservation requires the designation of special areas of conservation) and Annex IV (species of community interest which require strict protection), thus considering the brown bear as a priority species.

The current national legal framework therefore forbids the disturbing, capture and killing of large predators (D.P.R. 357/97, article 8).

However, action may be taken to control problem bears in critical situations, in accordance with the provisions of national regulations (D.P.R. 357/97, article 11, paragraph 1; L. 157/92, article 19, paragraph 2; L. 394/91, article 11, paragraph 4 and article 22, paragraph 6), and regional and provincial regulations.

Indeed, in order to avoid conflict with human activities and for reasons of public safety or for other compelling reasons of significant public interest, the possibility of an exception to the ban on the capturing or killing of animals is provided for, subject to the authorisation of the Ministry for the Environment, Land and Sea, having consulted ISPRA, on condition that there are no other practicable solutions and that departure from the rules does not prejudice the satisfactory conservation of populations of the protected species, (D.P.R. 357/97, article 11 paragraph 1).

In the **province of Trento** the management of emergencies represents a field of action in which it has been necessary to operate for some time, given the expansion of the bear population and more specifically as a result of

the presence of a few animals considered to be “problematic”.

In July 2003, the Autonomous Province of Trento, in agreement with the Ministry for the Environment, Land and Sea, had already prepared a specific “Protocol for action as regards problem bears and intervention in critical situations”, in accordance with D.P.R. 357/97 and subsequent amendments. Together with PACOBACE, this represents the document of reference for the operational programme.

This protocol provides the technical guidelines on the basis of which the Forestry and Wildlife Department, which represents the provincial organisation of reference, has identified, trained and equipped the staff responsible for intervening in these situations. Operational management in Trentino is based on the use of staff from the Provincial Forestry Service (PFS), to which the Forestry and Wildlife Department makes recourse, through the setting up of a special unit which is on call.

This has been operational since 2004 and is active each year from March to November, availing itself of the support of a coordinator and an **emergency team** made up of two people. When necessary the team is joined by veterinary staff from the provincial health services (given special training since 2008).

In 2013, starting from 1 July, the **system of on-call availability in the forestry and wildlife sector was modified**. The new system of on-call availability supervised by the Forestry and Wildlife Department still involves the staff of the PFS and is based on weekly shifts involving a coordinator, nine staff members (one for each forestry district) and from 1 March to 31 November, two experts on bears. As far as the bear is concerned, the only difference as compared to the previous system of on-call availability regards the increase in the number of coordinators involved, which goes from 8 to 19, while the organisational structure and demands made (in terms of days and hours) remain the same.



Activities of the emergency team

In 2013 the activities of the emergency team took place from 4 March to 2 December.

During this period the coordinators received **392 calls** of various kinds, of which 335 during the day (from 7.00 to 20.00), 34 at night (from 20.00 to 7.00) and 23 at unspecified times. In addition to these, there were an unspecified number of calls received and passed on in order to organise inspections to ascertain damage, set in motion and coordinate the emergency team, inform the department in more critical cases or simply to inform or reassure users.

The calls came from private citizens (177), forestry service staff present in the area (174), forest wardens (5), the Fire Service (13), the Wildlife Office (9), the forest emergency unit (6) or other parties (8).

The calls mainly concerned the reporting of possible damage (214), sightings of bears or the finding of signs of their presence (75), reports of potentially problematical situations (27) or other matters (76).

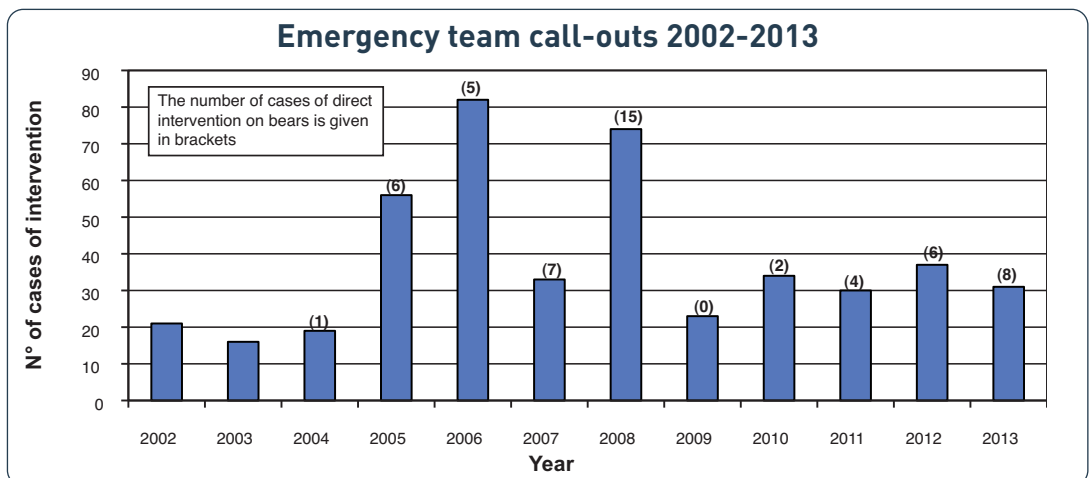
In numerous cases (101) no inspections were necessary, whereas in the other cases intervention was required from forestry service staff responsible for ascertaining damage (in 178 cases), the staff of the relevant forestry stations (63), the staff of the emergency team (31), bear dog handlers (11) or others (6).

In 2013 the **emergency team** was called into action **31 times** (Graph 24), in most cases following reports of damage or the sighting of bears close to facilities frequented by man or inhabited areas (Photo 16). The activities



Photo 16 - Emergency team (C. Groff - APT Forestry and Wildlife Department archives)

Graph 24



of the team were mostly limited to watching over and informing the population, while only 10 cases (32% of call outs) involved visual contact with the bear, during 8 of which the staff carried out **direct intervention to deter the animal** (3 times with rubber bullets and 5 times with a combination of rubber bullets and bear dogs). Intervention to deter bears was related almost exclusively (in 7 out of 8 cases) to attempts to re-educate the young male bear known as M11. In a further 3 cases the team intervened to protect and carry out deterrent activities involving one of the founding members of the bear community, the female Daniza, who insisted on preying on a flock of sheep in the mountains that it was difficult to protect with electric fences.

Close encounters with mother bears defending their cubs

There were no close encounters with female bears manifesting behaviour linked to the defence of their cubs. This was also due to the small number of litters recorded during the year.

Waste management

Following further inspections of the zones most frequented by bears, additional bear-proof bins for organic waste collection were distributed (Photo 17).

Currently 141 bins have been positioned in the municipalities of Fai della Paganella, Spormaggiore, Andalo, Cavedago, Molveno, Vezzano and Terlago.

By georeferencing the points at which the bins have been installed, a map indi-

cating the location of the waste bins has been drawn up, useful for checks and further evaluation regarding the future distribution of materials and for coordination with the company responsible for the collection and disposal of waste in the relevant area: ASIA (Azienda Speciale per l'Igiene Ambientale).

The modifications to the bins were made possible thanks to the funding guaranteed by the *Life Arctos* project.

Figure 10
Location of intervention by the emergency team in 2013

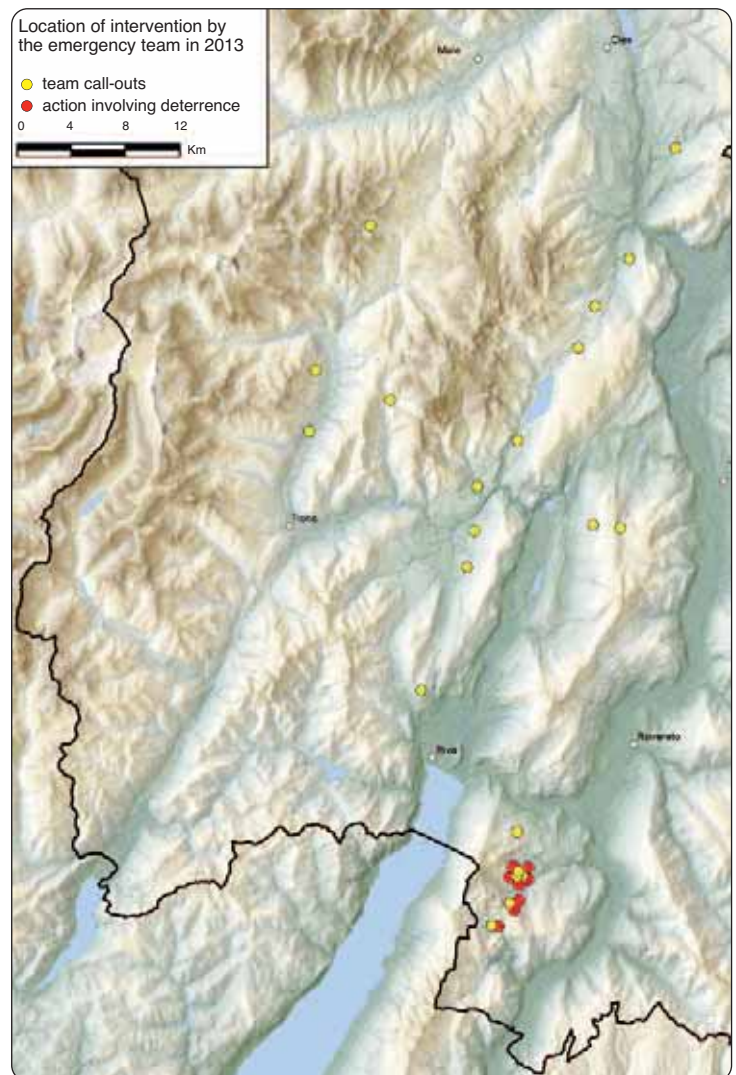




Photo 17 - The new “bear-proof” bins for differentiated collection of organic waste, ready for distribution (N. Bragalanti - APT Forestry and Wildlife Department archives)

Captures

In the context of emergency management, as previously reported, there is a “**capture team**” made up of forestry staff specially trained for such activities. They are supported by two vets from the provincial health services, dealing with health aspects.

During 2013 it was necessary to **capture** two bears (**Daniza** and **M6**, aged 18.5 and 6.5 respectively), who for different reasons displayed problematic or potentially problematic behaviour. For the same reasons it was attempted to capture a further two male bears (M11 and M4) in the Monte Baldo area.

The reasons and situations leading to the activities of the capture team are described below.

On several occasions in the early spring, the young male called **M11** (aged 2.5, see box 3 on page 51 of the 2012 Bear Report for his story) displayed excessive confidence with humans on Monte Baldo. Towards the end of May his behaviour became even more problematical, as he was repeatedly preying on sheep and cattle during the daytime, in

the presence of the shepherd, very close to dwellings and consuming his prey in the presence of numerous curious observers. The attempts to control this situation involved the emergency teams, dog handlers and capture team in an almost continuous manner over a period of around ten days. Action to scare the bear was carried out on at least 7 occasions, combining rubber bullets and the bear dogs, without noting any change in his behaviour. At the same time a request for authorisation to remove the bear and organise capture attempts was made to the Ministry (rapidly obtained). The capture of the animal was not

possible as the bear disappeared suddenly. It was not detected genetically in subsequent months.

There were also attempts to capture the adult male bear called **M4**, who had preyed on numerous cattle, once again in the Monte Baldo area, however the highly suspicious nature of the animal meant that he never returned to sites that had been equipped with snares.

The capture of the female bear called **Daniza** became necessary to substitute the radio collar with which she had been fitted in 2011 and which was coming to the end of its lifespan. The bear has been tracked intensively for several years, both due to the damage that she has caused with a certain regularity and because of the interest in monitoring the last remaining female bear belonging to the original group of founders (she is by now 19 years old).

Having been identified thanks to GPS fixes in the Val Brenta, the area frequented most assiduously by the bear, a tube trap was positioned at the site. This was visited almost immediately by **Daniza**, initially accompa-

nied by a large male bear (Photo 18). It was therefore decided to wait for a few days before activating the trap in order to avoid capturing the latter. Having ascertained that the female bear was no longer accompanied by the male, the trap was activated and that same evening Daniza was captured (Photo 19). Once the procedures for the substitution of the bear's radio-collar had been terminated, she was weighed (90 kg) and freed at

the site without any deterrent action. Throughout the year the monitoring did not show any behaviour that could be described as "problematic" and she caused very little damage.

The **capture** of the adult male bear called **M6** was decided following damage to cattle and equines caused during the year and previous damage to poultry, which in some cases



Photo 18 - Daniza in the company of a male near the tube trap (E. Bonapace - APT Forestry and Wildlife Department archives)



Photo 19 - Daniza during the procedures after capture (V. Calvetti - APT Forestry and Wildlife Department archives)

had led him to approach dwellings.

Once again a suitable site for capture was identified, positioned in the heart of the area that the animal was believed to frequent. Initially the site was monitored without positioning any form of trap and it was possible to observe the passage of two young bears (one of which was very small) and a large adult. At the beginning of August a tube trap was positioned at the site, as in the same month it was possible to ascertain that the young



Photo 20 - M6 at the time of capture (A. Stoffella - APT Forestry and Wildlife Department archives)

bears no longer frequented the area, which was instead still used, albeit occasionally, by the larger animal, which regularly started to enter the trap. Given that it was believed that this bear was likely to be M6, the trap was activated on 28 September, and at 4.40 a.m.

the alarm sounded, confirming the capture of the bear. Once the procedure to fit the radio-collar had been terminated (Photo 20), the bear was weighed (207 kg) and freed at the site, with intense aversive action involving rubber bullets and bear dogs.



Table 4

Captures taking place in the period 2006-2013

No.	Date of capture	Location	Bear	Method of capture	Scope of intervention	Period of radio monitoring	Method	of re-release	Sex	Age	Notes
1	23/08/2006	Malga Grum (Terzolas)	Jurka (1 st)	Free ranging	Fitting of GPS radio-collar	23/08/2006 28/06/2007	On site without deterrence	F	9	140	Weight estimated. Female with 3 cubs
2	28/06/2007	Rifugio Genzianella (Terres)	Jurka (2 nd)	Free ranging	Taken into captivity	-	-	F	10	130	No cubs
3	02/07/2007	Maso Dos (Pinzolo)	Daniza (1 st)	Free ranging	Fitting of GPS radio-collar	02/07/2007 05/05/2008	On site without deterrence	F	12	106	No cubs
4	13/06/2008	Molveno (Molveno)	KJ2G1	Free ranging	Fitting of GPS radio-collar	-	-	F	3	95	Died by drowning in Lake Molveno
5	13/07/2008	Loc. Mangio (Castel Condino)	DJ3 (1 st)	Free ranging	Fitting of GPS radio-collar	13/07/2008 23/06/2010	On site with deterrence (dogs + rubber bullets)	F	5	95	No cubs
6	27/09/2008	Loc. Pineta (Molveno)	KJ1G1	Aldrich snare	Fitting of GPS radio-collar	27/09/2008 05/04/2009	On site with deterrence (dogs + rubber bullets)	F	3	130	No cubs
7	15/10/2009	Val Canali (Tonadico)	M5	Aldrich snare	Fitting of GPS radio-collar	15/10/2009 13/05/2010	On site with deterrence (dogs + rubber bullets)	M	3-5	175	Bear immigrating from the eastern Alps
8	22/10/2010	Malga Pozze (Praso)	DJ3 (2 nd)	Aldrich snare	Fitting of GPS radio-collar	22/10/2010 17/05/2011	On site without deterrence	F	7	130	No cubs
9	16/05/2011	Rodugol (Stenico)	Daniza (2 nd)	Tube trap	Fitting of GPS radio-collar	16/05/2011 22/05/2013	On site without deterrence	F	15	80*	Accompanied by male
10	17/05/2011	Rodugol (Stenico)	DJ3 (3 rd)	Tube trap	Taken into captivity	-	-	F	7	75*	Accompanied by male
11	12/06/2012	Monte Terlago	JJ5	Tube trap	Fitting of GPS radio-collar	-	-	M	6	185	Died following anaesthesia
12	31/07/2012	Malga Polinar	M2	Aldrich snare	Fitting of GPS radio-collar	31/07/2012 28/09/2013	On site with deterrence (dogs + rubber bullets)	M	5	210	
13	10/09/2012	Malga Alpessina	M11	Tube trap	Fitting with RFID ear tags	10/09/2012 -	On site with deterrence (dogs + rubber bullets)	M	1.9	60	
14	22/05/2013	Val Brenta (Ragoli)	Daniza (3 rd)	Tube trap	Fitting of GPS radio-collar	22/05/2013 -	On site without deterrence	F	18	90	No cubs
15	27/09/2013	Monte Bondone (Trento)	M6	Tube trap	Fitting of GPS radio-collar	27/09/2013 -	On site with deterrence (dogs + rubber bullets)	M	6	207	

* estimated weight

Road accidents

During 2013 there were **three recorded cases of road accidents** involving bears, bringing the total number of such accidents reported since 2002 to 22 (see Table 4).

The first accident took place on **27 April** at 6 a.m. at Nembia (on the SP 421 road) in the municipality of San Lorenzo in Banale, at the same place in which another bear was hit by a car in 2008. The driver reported that the accident involved a large bear which moved off immediately after the impact. Two dog handlers intervened immediately at the site, with the support of the emergency team, trying unsuccessfully to locate the bear, which

had moved away from the point of impact. Hairs were collected from the vehicle, but it was not possible to identify the **animal involved** genetically, so it remains **unknown**.

The second accident took place on **18 May** at 3.45 at **Mostizzolo** (SS42 Tonale road) in the municipality of Cis. Once again the dog handlers intervened, following the trail of the animal, which had moved away from the point of impact without apparently having suffered any consequences. Excrement was collected along the route followed by the dogs, making it possible to genetically identify the bear involved as the young male called **M21**.



Once again the animal undoubtedly survived as he was detected genetically again on 3 August and 24 September.

The third accident took place just before midnight on **21 August** on the SP421, shortly after the town of **Andalo**, on the road towards Molveno. The animal involved moved off rapidly after the impact and despite the intervention of dog handlers and

the emergency team it was not possible to ascertain whether the bear suffered any consequences. However, some hair samples were taken from the vehicle, making it possible to identify the animal involved genetically as the adult female called F2. Once again the animal undoubtedly survived as she was again detected genetically on 24 and 25 September. She is one of the two females who gave birth in 2013 (one cub).

Table 5

Road accidents reported in the period 2002-2013 (provinces of Trento and Bolzano)

No	Date	Location	Bear/s involved *	Sex and age	Fate of the bear
1	30 August 2001 at 00.50	Laives (BZ) (A22 motorway)	Vida	Female	Injured quite seriously but survived
2	4 November 2005 at 6.45	Preare (S.P. n° 34)	DJ3	Female	Survived and reproduced
3	28 June 2006 at 00.30	Fai (S.P. n° 64)	MJ2	Female	Survived and reproduced
4	28 October 2006 at 3.00	Caldes (S.S. n° 42)	Unknown	Unknown	Unknown **
5	29 October 2007 at 23.25	Ciogo (S.P.n° 18)	Unknown	Unknown	Unknown **
6	18 July 2008 at 4.00	Villa Rendena (S.P.n° 34)	Daniza + 3 cubs born that year	Female aged 13 with 3 cubs born that year	1 female cub died
7	22 July 2008 at 22.30	Nembia (S.P.n° 421)	KJ1G1	Female aged 2.5	Survived with no consequences
8	16 August 2008 at 23.45	Strembo (S.P.n°236)	Daniza + 2 cubs	Female aged 13 with 2 cubs born that year	1 cub injured, probably survived
9	15 October 2008 at 00.30	Bus de Vela (S.S. n° 45 bis)	Unknown	Unknown	Unknown **
10	9 April 2009 at 23.00	Passo Palade (BZ) (S.S. n° 238)	Unknown	Unknown	Unknown **
11	9 December 2009 at 19.30	Tione (S.P.n° 37)	Unknown	Unknown	Unknown **
12	25 May 2010 at 22.30	Strada del Faè (S.P. n° 43)	Unknown	Unknown	Unknown **
13	22 October 2010 at 6.30	Vicolo Baselga (S.P. n° 84)	Unknown	Unknown	Unknown **
14	21 April 2012	Chiusa (Brenner main road)	M14	Male aged 3	Died
15	4 June 2012 at 22.35	Molino Manzoni (S.S. n° 45 bis)	M3	Male aged 5	Survived
16	8 June 2012 at 00.30	Vilpiano (Mebo)	M12	Male aged 3	Died
17	16 August 2012 at 21.00	Vecchio Mulino (S.S. n° 45 bis)	KJ2 + 3 cubs	Female aged 10 + 3 cubs	Survived
18	15 September 2012 at 20.30	Stenico- Doss da Doa (S.S. n° 45 bis)	Unknown	Unknown	Unknown **
19	1 October 2012 at 6.15	Vecchio Mulino (S.S. n° 45 bis)	KJ2 + 3 cubs	Female aged 10 + 3 cubs	Survived
20	27 April 2013 at 6.00	Nembia (S.P.n° 421)	Unknown	Unknown	Unknown **
21	18 May 2013 at 3.45	Cis (S.S. n° 42 Tonale)	M21	Male aged 1.5	Survived
22	21 August 2013 at 23.30	Andalo (S.P.n° 421)	F2	Female aged 5.5	Survived

* the identity of the bear was ascertained through genetic testing

** an immediate inspection took place with dogs, suggesting that the animal (or animals) hit moved off autonomously



Bear dogs

In 2013 the dogs were put into action on at least **30 occasions**. **8** of these involved operations to deter bears (in 1 case for deterrent action during the release of a captured bear), in 3 cases to look for bears hit in road acci-

dents, while in the remaining cases the dogs were used in procedures linked to checks on damage, to look for traces of presence or check dens.

There were two particularly significant situations involving the bear dogs in 2013. The first saw the involvement of the dogs in the attempt to condition the behaviour of the young male bear M11 (with intervention on 5 occasions), while the second was linked to the action to deter M6 at the time of his liberation (Photo 21).

Once again this year the dogs represented a useful tool, particularly in the management of critical situations, such as deterring problem bears or in the event of accidents. They also made an important contribution to checking damage reports, particularly those involving livestock, and to looking for signs of presence in specific situations.



Photo 21 - Use of bear dogs to deter M6 at the moment of release (C. Gagliano - APT Forestry and Wildlife Department archives)

4. Communication

Communication is considered by the provincial administration to be an aspect of fundamental importance in the management of bears and represents one of the six programmes of action referred to in the previously mentioned resolution of the provincial government no. 1988 of 9 August 2002.

Considering this, starting from 2003 a specific **information campaign** was started up called “**Getting to know the brown bear**”, which has involved numerous initiatives in the past and is still underway. This report, which among other things also has an informative role, is one of the initiatives designed to allow the wider public to better understand this animal, with the conviction that only knowledge can lead to harmonious coexistence with the bear in the medium to long-term.

With regard to these communication activities, the Forestry and Wildlife Department has always been supported by the Adamello Brenta Nature Park, which has been active in this field for many years in its own area, and

by the Science Museum in Trento, which has offered educational activities on bears to schools from the very beginning.

As in past years, informative activities have involved the organisation of evenings with the public, meetings with representatives of the authorities and representative associations, talks at schools, press releases etc.

The main activities undertaken during 2013 are summarised below.

Evening sessions and meetings

Table 6 lists the **meetings/evenings** organised by the Forestry and Wildlife Department within the context of the information campaign “**Getting to know the brown bear**” (**822 participants** overall). Some of these meetings were specifically organised in response to requests for information and the exchanging of ideas, also in relation to situations arising when certain bears caused special concern due to the number of incidents involving damage.

Table 6
Public meetings held within the context of the “Getting to know the brown bear” campaign

Type	Date	Place	In collaboration with	No. of participants
Public meeting	16/1/2013	Bolzano	Science Museum, Bolzano	60
Public meeting	23/1/2013	Mori	Municipality of Mori	220
Public meeting	28/1/2013	Avio	Municipality of Avio	100
Public meeting	19/2/2013	Mezzolombardo	S. Giovanni retirement home	60
Public meeting - presentation of 2012 Bear report	6/3/2013	Science Museum, Trento	Science Museum, Trento	110
Public meeting	12/4/2013	Rovereto	Museo Civico, Rovereto	70
Public meeting	31/5/2013	Brentonico	Municipality of Brentonico	250
Public meeting	24/7/2013	Rabbi	Stelvio National Park	10
Public meeting	27/7/2013	Val d'Ultimo - BZ	Autonomous Province of Bolzano	40
Public meeting	9/8/2013	S. Romedio	Hermitage of S. Romedio	30
Meeting with representative associations	27/11/2013	Trento	Representative associations	12



Additional information and training sessions were promoted by ABNP during 2013.

A detailed list is given in Table 7.

Table 7
Public meetings organised by ABNP

Initiative	Title	Date	Place	No. of participants
Creativity lab for workers in the environmental education sector in certain Italian parks	The park's fauna and wildlife projects	25/2/2013	Villa Santi - Montagne	8
Evening course for adults, Istituto Scolastico Guetti	Large carnivores in the Alps	18/4/2013	Tione	10
2013 Park summer programme - public meeting	ARCTOS - The Brown Bear in the Alps	21/6/2013	Moveno	30
2013 Park summer programme - public meeting	ARCTOS - The Brown Bear in the Alps	5/7/2013	Bocenago	20
2013 Park summer programme - public meeting	ARCTOS - The Brown Bear in the Alps	8/7/2013	Moveno	80
2013 Park summer programme - public meeting	ARCTOS - The Brown Bear in the Alps	18/7/2013	Flavon	40
2013 Park summer programme - public meeting	ARCTOS - The Brown Bear in the Alps	23/7/2013	Cavedago	24
2013 Park summer programme - public meeting	ARCTOS - The Brown Bear in the Alps	1/8/2013	Folgarida	30
2013 Park summer programme - public meeting	ARCTOS - The Brown Bear in the Alps	7/8/2013	S. Lorenzo in Banale	58
2013 Park summer programme - public meeting	ARCTOS - The Brown Bear in the Alps	30/8/2013	Campodenno	9
2013 Park summer programme - public meeting	The animals in the Park - the great return	6/9/2013	Molveno	30
UPT course in Tione, European Social Fund	The park's wildlife	25/9/2013	Tione	25

13 press releases regarding the bear were issued directly or with the support of the Press Office:

- No. 201 of 25 Jan. 2013
An appeal was presented by WWF and the Lega to abolish hunting
CAPTURE OF THE BEAR M2: THE PROVINCE OPPOSES THE APPEAL PRESENTED TO THE TAR
- No. 434 of 20 Feb. 2013
In Val Poschiavo in the Grigioni Canton
THE BEAR M13 WAS SHOT DOWN YESTERDAY IN SWITZERLAND
- No. 563 of 5 Mar. 2013
Presentation of the 2012 Bear Report at 20.45 and update on the presence of the lynx and the wolf
BEARS: AN UPDATE TOMORROW

EVENING AT THE SCIENCE MUSEUM

- No. 588 of 7 Mar. 2013
2012 Bear Report presented
THE BEAR, WOLF AND LYNX: THEIR NUMBERS AND WAY OF LIFE IN TRENTINO
- No. 902 of 5 April 2013
The President will take the requests of the Regions and Autonomous Regions involved in the management of the bear to Rome
BEAR QUESTION: PACHER WRITES TO THE MINISTRY
- No. 914 of 5 April 2013
The new episode broadcast by radio stations in Trento
"TRENTINO COMMUNITY": REORGANISATION OF THE PROVINCE, THE BEAR, PROTECTED AREAS, WW1, DALAI LAMA



- No. 1036 of 17 April 2013
Today in Rome
THE BEAR QUESTION AND STELVIO PARK, POSITIVE MEETING BETWEEN PACHER AND CLINI
- No. 1426 of 23 May 2013
The Forestry and Wildlife Department of the Province: checks intensified and timescales for dealing effectively with the situation established
BEARS ON MONTE BALDO, THE SITUATION AND OVERVIEW OF INTERVENTION
- No. 1475 of 27 May 2013
Meeting with managers at the Ministry of the Environment
BEARS ON MONTE BALDO, PRESIDENT PACHER IN ROME TODAY
- No. 1566 of 31 May 2013
The Ministry of the Environment has authorised President Pacher to capture the young bear on Monte Baldo
M11 GOES TO CASTELLER
- No. 2374 of 21 Aug. 2013
Trentino in the front line in collaborative efforts
ITALIAN/SWISS “DISPUTE” REGARDING THE BEAR
- No. 2775 of 27 Sep. 2013
Operation by the Forestry and Wildlife Department at dawn this morning
BEAR CAPTURED AND FITTED WITH RADIO COLLAR ON MONTE BONDONE
- No. 2796 of 30 Sep. 2013
Identity of the bear and cause of death confirmed
THE DEATH OF THE BEAR M2 IS THE RESULT OF AN ILLICIT ACT

Council questions

The necessary information was provided in order to respond to the following 11 Provincial Council questions raised regarding bears:

- Question for immediate oral reply no. 5940/XIV:
Controls on the presence of the bear in Trentino and safeguarding of public security
- Question for written reply no. 5957/XIV:
Presence of the bear in the Val di Bresimo
- Question for written reply no. 5983/XIV:
Attack by a bear at a mountain hut on Monte Baldo
- Question for written reply no. 6018/XIV:
Incursion of bear at Malga Tret on the Trentino side of Monte Baldo
- Question for immediate oral reply no. 6060/XIV:
Reintroduction of large alpine carnivores in the area and related effects on the security of the population and the tourist system
- Question for written reply no. 6104/XIV:
Presence of the bear on Monte Baldo
- Question for written reply no. 6106/XIV:
Incursion of bear in the municipality of Cis
- Question for immediate oral reply no. 6255/XIV:
Incursion of bear at Sopramonte
- Question for written reply no. 6330/XIV:
Control and prevention activities resulting from the presence of the bear in the area on the right-hand side of the Adige
- Question for written reply no. 6374/XIV:
Presence of the bear at Malga Binasia in the Val di Non
- Question for written reply no. 6472/XIV:
Presence of the bear and risks for the security of visitors

A press review of articles regarding bears and other large carnivores was carried out, filing the material in the archives in order to allow future assessment of the degree of acceptance/appreciation of their presence expressed by local newspapers. **153 articles** about bears were selected, 76 of which judged to be **positive (50%)**, 14 **neutral (9%)** and 63 **negative (41%)** as regards acceptance of the bear.

Communication project for schools: “Getting to know the brown bear”, in collaboration with the Science Museum in Trento

For the tenth consecutive year the museum continued to offer a package of tried



and tested educational activities on the subject of brown bears in Trentino. The activities are kept up-to-date thanks to coordination with the Wildlife Office of APT, which also guarantees consultancy on the content. The 2012-2013 edition of the guide to the educational activities of the museum also contained all the educational initiatives realised in collaboration with the Forestry and Wildlife Department, as has taken place since the 2003-2004 edition.

In the 2012/2013 academic year, the **Science Museum in Trento** organised seven educational activities in schools regarding bears, involving a total of 119 pupils.

Communication project for schools: “Sometimes they return...”, in collaboration with the Fondazione Museo Civico in Rovereto

Since the 2012-2013 school year, in collaboration with the Forestry and Wildlife Department, the Museo Civico in Rovereto has also offered an **educational workshop** to increase knowledge and understanding of large carnivores, entitled “Sometimes they return...”. The workshop dedicated to nursery schools has the objective of raising awareness of large carnivores, starting from one of the many popular stories in which they are the protagonists. With **primary and secondary school** pupils it is also aimed to encourage responsible behaviour, after providing an initial summary of biological and behavioural information regarding the bear, analysing articles taken from the local press to stimulate critical discussion. This was designed to overcome the usual stereotypes and encourage the formation of responsible citizens in the future. 100 pupils attended the workshops on large carnivores during the 2013-2014 school year. After the success of the cycle of zoology meetings in spring 2013 (the first three meetings had the bear, wolf and lynx as their themes), with the participation of around a hundred people on each occasion, opportunities to discuss the large carnivores will be offered again in spring 2014.

Informative material produced and distributed

The sixth “Bear Report” (**2012 Bear Report**) was issued, representing both a valid means of communicating and raising public awareness and a useful working tool for the Wildlife Office.

In 2013 a further **5,000 copies** of the **brochure “In the Land of the Bear”** were printed, updating the text.

A video entitled “**The Bear and Wolf in Trentino in 2013**” was also produced, bringing together the best images recorded in Trentino, above all by camera traps, forestry staff, park wardens and volunteers.

This can be seen at the bear site and via this link: <http://www.orso.provincia.tn.it/novita/pagina195.html>.

Thanks to funds coming from the “*Life Arctos*” project, 30,000 copies of a **brochure** dedicated to **waste management** in the areas where bears are present were produced and printed by **ABNP** in 2013. Furthermore, again using LIFE funds, ABNP produced **educational material for schools** regarding bears, such as: 1,000 “bear games”, 2,000 CD-ROMs about the biology and situation of the species, 14,000 exercise books and 12,000 pencils.

Finally, the Wildlife Office of the protected area supervised the production of a volume in the series “**Documenti del Parco**” entitled “Dal rapporto con l’uomo alle strategie di svernamento: le ultime ricerche del Parco Naturale Adamello Brenta per l’orso”, of which 1500 copies were printed.

Web site

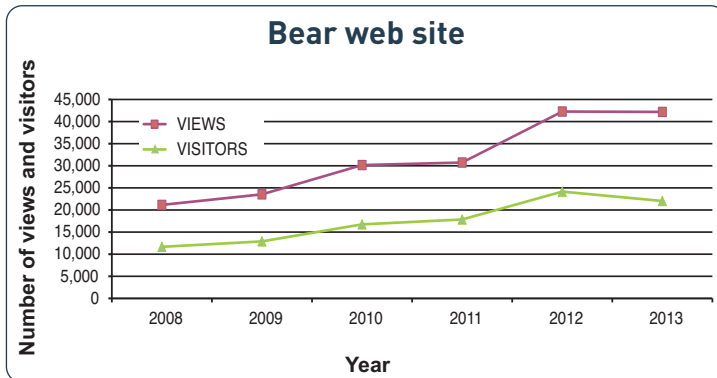
The site www.orso.provincia.tn.it, also in English, was further updated.

It is currently organised into around 250 pages and received **41,182** views by **22,032** visitors in 2013. The site also contains this report and the documents mentioned it.

The site is updated regularly, at least once a month, also giving the main news regarding the presence of the lynx and the wolf in the province.



Graph 25



Graph 25 shows the increase in the number of views and visitors over the last six years.

Other communication initiatives

APT's Forestry and Wildlife Department supervised the production of articles (scientific and informative) and interviews, providing the content and images for the following magazines and radio and television programmes:

- Interview with **Class TV** regional channel on 3 January 2013 regarding management of the bear and large carnivores;
- Interview with **RAI** regional **radio news programme** on 31 January 2013 regarding the bear on Monte Baldo;
- Article in "**IBA news**" - May 2013: *Status of the brown bear population in the central Alps (Trentino - Italy)*;
- Recording of a radio programme for the **Italian Swiss radio channel** (Val di Non, 15 May 2013)
- Support for the production of a documentary on the bear for **German national TV** (5-6 June 2013);
- Recording of material on the bear for the RAI television programme "**Geo&Geo**" on 18 October 2013;
- Article entitled "*Re-introduction of the brown bear in the central Alps, Trentino, Italy*" in the volume "**Global Re-introduction Perspectives: 2013**" in the *Journal of Environmental Science and Engineering*.



5. Personnel training

Conferences and workshops

Correct management of the bear population is inextricably linked to the availability of specially trained staff, prepared to deal with any problems of a technical and non-technical nature that may arise during activities in the field, above all as regards the management of emergencies, dealing with damage and, to a lesser extent, monitoring. Training represents one of the six programmes of action referred to in the previously mentioned resolution of the provincial government no. 1988 of 9 August 2002.

APT's staff are given specific training which is constantly updated. The training initiatives realised during 2013 are illustrated below.

Main training initiatives regarding bears

Per la formazione del personale addetto a The following meetings were held to train staff in various roles responsible for the management of bears:

- meeting to update **staff** of the **forestry service** and provincial parks and the **Associazione Cacciatori Trentino** involved in the management of bears (Casteler, 28 February 2013);
- participation at a day of training and updates for forestry staff and forest wardens promoted by **Rovereto and Riva District Forestry Office** (Riva, 5 February 2013);
- participation at a day of training and updates for forestry staff and forest wardens promoted by **Malé District Forestry Office** (Malé, 11 February 2013);
- participation at a day of training and updates for forestry staff and forest wardens promoted by **Trento District Forestry Office** (Vezzano, 15 February 2013);
- participation at a day of training and updates directed at **new coordinators of the emergency bear teams** (Mattarello, 19 June 2013);



Photo 22 - Training activities for the emergency bear team (P. Zanghellini - APT Forestry and Wildlife Department archives)

6. National and international links

Links with neighbouring regions and countries take on a strategic importance in the management of such a highly mobile species as the brown bear. Bearing this in mind, even before the start of the *Life Ursus* project, official contact was made with neighbouring regions, it being clear that the area of western Trentino was not sufficiently large to house a viable population of bears. Over time these relationships have been strengthened and consolidated, with regard both to the territorial expansion of the small population, which has effectively concerned neighbouring regions and countries, and effective policy coordination implemented by the Provincial Government with the previously mentioned resolution no. 1988 of 9 August 2002. Following this, links transcending provincial boundaries were institutionalised and with the input of the Ministry for the Environment, Land and Sea and the coordination of APT, the **PACOBACE** was approved by all the partners and printed in 2010. In addition to the Autonomous Province of Trento, this also involved the Autonomous Province of Bolzano and the Lombardia, Veneto and Friuli Venezia Giulia Regions.

Activities designed to guarantee transnational coordination have also continued, in the light of the numerous cases of young bears moving into neighbouring areas reported over the last few years.

Updating of PACOBACE

In 2013 the **PACOBACE** was updated, in particular the chapter regarding the management of **problem bears (chapter 3)**, in the light of the experience gained over the years and the changing situation of the bear population, both in terms of population dynamics and territorial expansion.

A more or less definitive version of chapter 3 of the updated **PACOBACE** was drawn up, the most important content regarding the “damaging bear” category, which represents one of the cases in which it possible to pro-

ceed with the removal of animals, as an extreme measure. The formal procedure for the approval of the text by the partners and the Ministry will be begun shortly.

At the moment, the draft agreement between the aforementioned territorial partners regarding the criteria for the removal of problem bears does not on the other hand coincide with the position expressed informally by the Ministry and ISPRA. Further meetings between all the partners in the working group have therefore been provided for.

LIFE+ “ARCTOS” Project (continuation in 2013)

APT’s Forestry and Wildlife Department, together with the Adamello Brenta Nature Park as the other provincial body, is a partner in the *Life Arctos* project. The project, which develops over the period from 1 October 2010 to 31 August 2014, has been implemented within the context of the European Commission LIFE+ Natura funding programme (with funds of € 172,368 available to APT, the EU quota being € 109,013). The initiative is designed to encourage the safeguarding of the brown bear (*Ursus arctos*) population in the Alps and the Apennines and an expansion in numbers, by adopting management measures compatible with the presence of the bear, to promote a reduction in conflict with human activities and to provide information and raise the awareness of the main stakeholders.

Figure 11
Logos of the Natura 2000 network and the LIFE+ Arctos project



In the context of its participation in this project, the staff of the Wildlife Office at-

tended the following meetings with other partners:

- **Verona**, 8 March 2013 (international workshop)
- **Rome**, 9 May 2013 (Life meeting)
- **Pescasseroli (AQ)**, 12 and 13 September 2013 (Life meeting)
- **Verona**, 22 October 2013 (meeting of the Technical Round Table on the Alps)
- **Bergamo**, 19 December 2103 (international workshop)

Alpine Convention Large Carnivores Platform

Starting from the beginning of 2013 the APT's Forestry and Wildlife Department and its staff have also been involved in the **Alpine Convention Large Carnivores Platform**, taking on the task of presidency in the two-year period 2013-2014. Two meetings were organised during 2013 (Cogne-AO, 22-23 April 2013, and Cevo-BS, 28-29 October 2013) (Photo 23). (Cogne-AO, 22 e 23 aprile 2013, e Cevo-BS, 28 e 29 ottobre 2013) (foto n. 23).

Figure 12
Logos of the Alpine Convention



In this context, during the year the procedures to set up the **Bear Alpine Group** were initiated, essentially bringing together repre-



Photo 23 - Meeting of the Alpine Convention Large Carnivores Platform (C. Groff - APT Forestry and Wildlife Department archives)

sentatives of bodies that have shared experience, knowledge and data regarding the presence of the bear over the years (in Italy, Slovenia, Austria, Germany and Switzerland).

The role of the European Commission

In 2013 it is once again necessary to cite the initiative taken by **European Commission of the EU**, which starting from the end of 2012 has concerned itself with **actions** regarding the management of large European carnivores (the brown bear, wolf, Eurasian lynx and wolverine), evaluating the advisability of setting up an **EU Large Carnivores Platform**.

In this context two workshops were organised, the main scope being to consult with the business categories most directly concerned by the presence of large carnivores (animal husbandry sector, farmers and beekeepers), held in Brussels on 25 January and 5 December 2013 (Photo 24). The European Commission intends to draw up **priority actions** for the management of large carnivores for each species, with reference to the population. The work will take place with the support of the *Large Carnivore Initiative for Europe* (LCIE), which has involved APT in drawing up actions for the alpine bear population, also bearing in mind the advisability of undertaking these actions in a coordinated manner, in line with the initiatives promoted in the field for some time by the Alpine Convention.



Photo 24 - Meeting on large carnivores at the European Commission (D. Huber - APT Forestry and Wildlife Department archives)

The Bear Specialist Group of IUCN

Finally, as regards international contacts, it is worth mentioning that an APT representative has participated in the *Bear Specialist Group of IUCN* (a group of specialists on the

bear in the International Union for Conservation of Nature, considered to be the most authoritative international scientific institution dealing with nature conservation) since 2013.

7. Research and conferences

Conferences and workshops

The staff of the Wildlife Office attended the following **conferences**:

- **UNCZA** conference on the return of large carnivores at Bosco Chiesanuova (VR), 29 June 2013);
- **IBA international conference** (*International Bear News*) in Provo - Utah (USA), 16-20 September 2013.

Degree theses/internships

During 2013 the Wildlife Office began activities aimed at reorganising the **photographic archives** on large carnivores, thanks to a three-year **degree thesis** on Natural Sciences, with the collaboration of Claudia Spagnolo.

Figure 13
Logos of the BA Annual Conference



Acknowledgements

The information in this report comes from the large number of organic samples collected during the year by the **people listed** below, to whom our most sincere thanks must go, and as a result of the work of Francesca Davoli, from ISPRA, who materially carried out the genetic testing:

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APPENDIX 1

The lynx

As previously reported, the only lynx certainly present in the province of Trento starting from 2008 is the **male known as B132**, who comes from the small Swiss population in the St Gallen Canton (see page 45 and the following pages of the 2008 report, and subsequent Bear Reports, in order to reconstruct his history).

The last capture (the third) to substitute his radio collar, which had ceased to function, was on 14 February 2012. The animal was caught in the same place as two years previously, using the same method (wooden box trap with lynx urine scent lure) and fitted with a **GPS-GSM radio collar**, capable of transmitting satellite fixes at pre-established intervals through the cellular phone network, as well as functioning using the traditional

VHF radio mode for searching in the field.

B132 was again monitored thanks to the GPS and VHF radio collar, obtaining 176 valid fixes during 2013, up to 15 September. Transmission of the radio signal in VHF mode instead lasted until the end of June. This collar therefore lasted slightly longer (19 months) than those fitted in 2008 and 2010.

As can be seen in the map showing the home range of the lynx during 2013 (Figure 1), B132 spent the whole of the year between the Val Daone and the right-hand bank of the River Chiese in the Giudicarie Esteriori, arriving at the border with the province of Brescia. He therefore remained in the new area reached the previous year (Photo 1).

The **home range** of the lynx from January to 15 September 2013, calculated using



Photo 1 - In the foreground, the slopes of the Valle del Chiese frequented by B132 (C. Groff - APT Forestry and Wildlife Department archives)

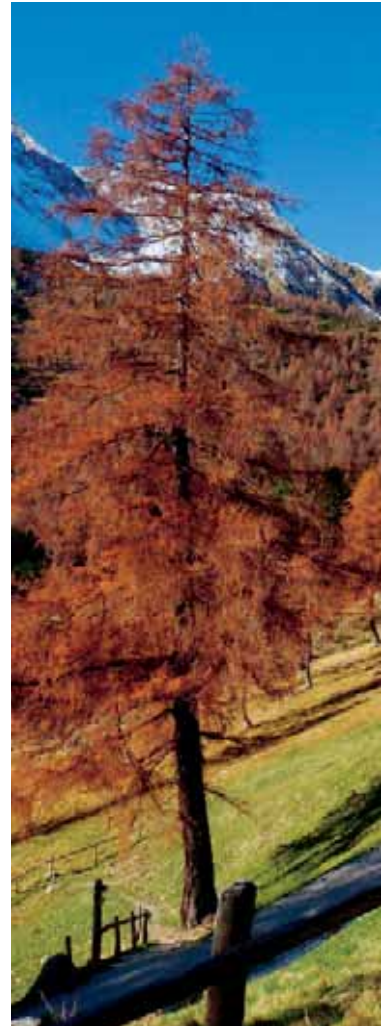
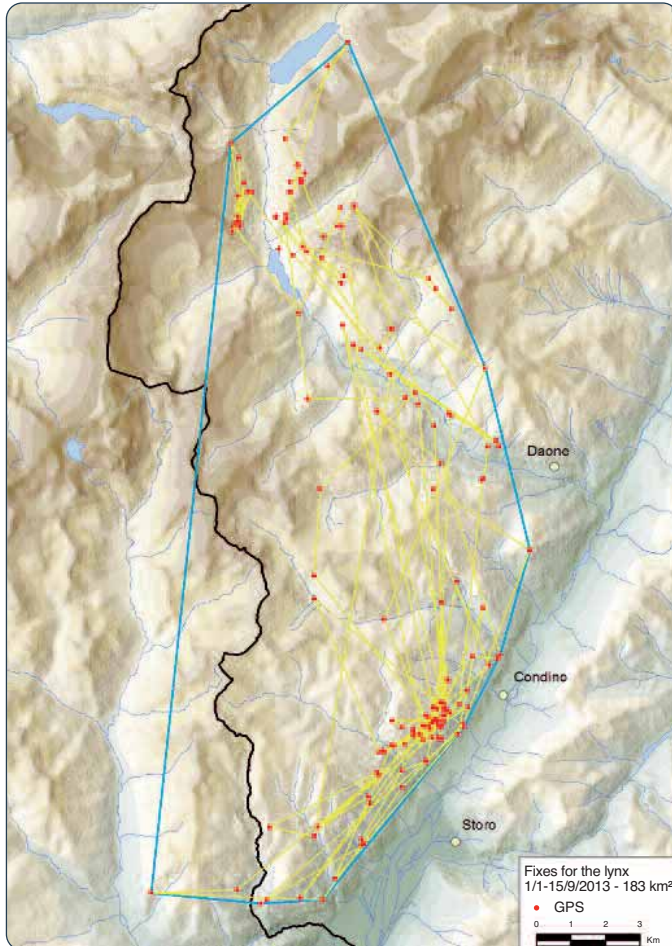
the minimum convex polygon (MCP) method, was thus **183 km²** (Figure 1).

Of the theories put forward to explain the abandoning of the Brenta-Gazza area by the lynx after four years in which the animal had remained there, the most likely would seem to be linked to the presence of the bear. This is thought to have conditioned the hunting activities of the feline, or rather the consumption of his prey, to a considerable extent. Indeed, the kleptoparasitism of the bear is well-known and by feeding on the lynx's prey, the bear would have prevented the cat from fully consuming its prey (recent studies have

documented this phenomenon well, particularly in Slovenia). It is therefore possible that B132 looked for a more “tranquil” area as compared to his original HR, where the density of bears had almost doubled from 2008 to 2012, finding this not far away in the Giudicarie Esteriori, where the presence of the bear in the last two years has been very sporadic.

During 2013 there were practically no reports of the presence of the feline not linked to GPS/VHF monitoring: no images were filmed with video-camera traps and there was only one reliable direct sighting reported (on 22 September near Daone).

Figure 1
Home range of the lynx B132 from 1 January to 15 September 2013 calculated using the minimum convex polygon (MCP) method



The monitoring of **prey** made it possible to identify **6 prey**: all **roe deer** (Photo 2) (1 adult female, 3 males, of which 2 adults and 1 of undetermined age and two other animals of undetermined sex and age).

B132, who belongs to a species which is, if possible, even shyer and more elusive than

the brown bear, remained the **only lynx** whose presence was ascertained within Trentino. Once again this year there were reports of sporadic unconfirmed sightings. If true these would demonstrate the presence of at least one other lynx (Val di Tovel, 16 July 2013, Nembia, 11 November 2013).



Photo 2 - Roe deer preyed on by the lynx (D. Gazzaroli - APT Forestry and Wildlife Department archives)

Figure 2
The DVD on the lynx



As regards communication activities, there was a **public meeting** at the Museo Civico in Rovereto on 19 April 2013, in the context of a cycle of meetings regarding the return of the large carnivores to the Alps.

The documentary “**The Lynx: the Story of its Return**”, produced by the Forestry and Wildlife Department in 2012 with direction by Enrico Costanzo, was also issued as a CD and distributed to numerous bodies/parties (see Figure 2).

APPENDIX 2

The wolf

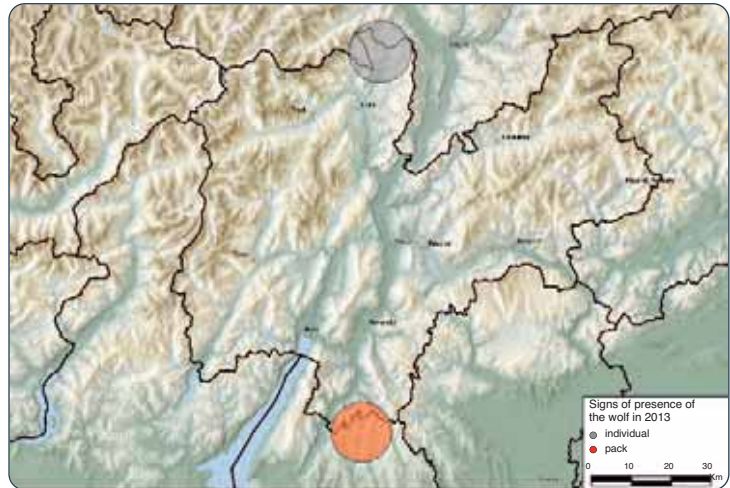
For the fourth consecutive year it was possible to document the presence of the wolf in the province of Trento. Specifically, at least **five wolves** were active in Trentino and/or neighbouring areas during the year (Figure 1).

The wolf M24 in the upper Val di Non

For the fourth consecutive year, there was confirmation of the presence of the male wolf known as **M24**, first reported in Trentino on 13 April 2010 by wardens of the Adamello Brenta Nature Park (in the north-eastern Brenta mountains) and subsequently identified genetically (for his story see the 2010 Bear Report, pages 56-58 and subsequently the 2011 Bear Report, pages 63-65 and the 2012 Bear Report, page 68).

Once again in 2013 the animal's presence was documented objectively (with **genetic**

Figure 1
Presence of the wolf in the province of Trento



tests) on at least two occasions in the province of Trento, specifically in the Madalena mountain chain and the mountains of the upper Val di Non.

The same wolf was also filmed by **camera traps** on the Trentino side of its home range on at least **three** occasions during the year (Photo 1).



Photo 1 - The wolf M24 caught on film by a camera trap, heading towards a wood grouse sand bathing (I. Stochetti - APT Forestry and Wildlife Department archives)

No damage was attributed to this wolf during the course of the year.

The small pack on the Lessinia mountains

In 2013, the most interesting news as regards the presence of the wolf in the province came once again from the southern area, specifically the Lessinia mountains. As previously reported, in 2011 a young **male wolf fitted with a radio collar in Slovenia** entered Austria, crossing Carinthia and heading north until it reached lower Styria, then moving “south-west” until it reached the Isel valley and Alto Adige (Val Pusteria) in eastern Tyrol at the beginning of February 2012.

The wolf, known as “**Slave**”, then continued its long journey in a south-westerly direction until it reached the southern edge of the Alps, in the provinces of Vicenza and Verona.

As reported, this long journey eventually terminated, probably not by chance, in the Lessinia mountains, where a **further wolf** (female, of Italian origin) was present. This wolf probably made an equally long journey, but in the opposite direction, towards the east,

starting from the western Alps, where numerous packs have been present over the last twenty years.

The extraordinary journey made by the young male of Slovenian origin (lasting months and documented daily by the fixes of the GPS collar transmitted to researchers), demonstrated once again, should there be any need to do so, the completely natural nature of the wolf’s return to the Alps.

As predicted in the previous Report (see page 71), the couple produced its first litter (at least 2 pups) in the spring, but only in August 2013 was it possible to ascertain its presence (on **11 August** there was the **first sighting** by the wardens of the Lessinia Regional Nature Park - VR), both through direct sighting and images filmed by the camera trap (Photo 2).

The small pack continued to remain principally in the province of Verona, but also moved regularly into Trentino, up to the end of 2013. Until the beginning of the autumn the wolves fed mostly on **natural prey**, whereas in autumn, as will be seen subsequently, there was an increase in attacks on **domestic livestock**.

Photo 2 - The two wolf pups (P. Parricelli, archives of the Lessinia Regional Nature Park)



Photo 3 shows the remains of a small roe deer preyed on and consumed by wolves at the beginning July at Malga Barognol (Ala), as confirmed by genetic tests carried out on saliva found on the prey.

Photo 3: remains of a yearling chamois preyed and consumed by wolves (C. Groffi - APT Forestry and Wildlife Department archives)



The presence of the pack in Trentino was documented specifically various times in the last ten days of December, with numerous tracks found in the snow (Photo 4), biological samples collected (faeces, hairs and urine) and the first footage of all **four wolves** in the province of Trento on 31 December 2013 (Photo 5).

Photo 4 - Wolf tracks in the snow on the Lessinia mountains (G. Pinter - APT Forestry and Wildlife Department archives)



Photo 5 - Frame shots from the video sequence showing the passage of the four wolves (T. Borghetti - APT Forestry and Wildlife Department archives)



The reproduction of these wolves is a historic event, as it represents the **first litter** (and also the first “**pack**” according to the definition established by the *Wolf Alpine Group*) documented in the **eastern Alps**, around one and a half centuries after the disappearance of the species in the area.

In the autumn there were a series of cases of damage involving cattle (6 animals) and equines (2 animals) present on the Trentino side of the tableland, causing fear and alarm among farmers (Photo 6).

Photo 6 - Operation to ascertain damage by wolves in Lessinia (P. Zanghellini - Lessinia Park archives)



To complete the picture developing in the central-eastern Alps, it is necessary to mention a **second couple** which was apparently formed in 2013 in the province of **Pordenone**, in the Tramonti area, where two wolves have been detected together since last summer.

Genetic tests have shown that once again the two animals are of different origin: Dinaric-Balkan and Italian.

In 2013 it was possible to document the presence of at least a further **four wolves in Austria** in the eastern alpine area, all males. One of these frequented the Gleinalm area in Styria for the whole year (the second year that he has been present), whereas the others were reported in Carinthia, in the Koralm, Gurktaler Alpen and Reisseck areas.

A further animal, present in southern Austria for more than two years (in the Schneeberg area), disappeared at the beginning of 2013. The genetic origin of these wolves is not clear to date (February 2014), although it can already be excluded that they are of “Italian” origin (G. Rauer, *pers. comm.*).

Thus 2013 saw continuation of the **natural expansion of the species in the Alps** within the province and neighbouring areas. In the last few years this has been demonstrated by documentation of individual wolves in Trentino and Alto Adige, but also in neighbouring Lombardia, Friuli Venezia Giulia,

Austria and Bavaria.

During the year a member of the department’s staff prepared an **alarm system** to be applied to traps for the **capture of wolves**, illustrated in the following box.

BOX 1 - First alarm system for monitoring wolf capture sites

Introduction:

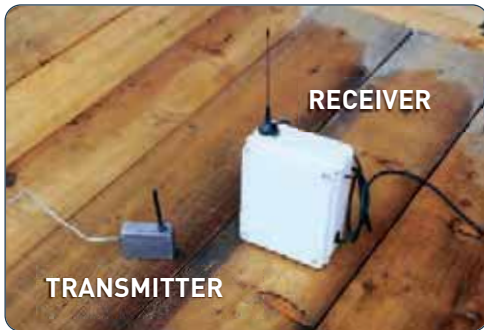
In 2010 the first lynx was captured in Trentino in order to fit it with a GPS collar. On that occasion an electrically operated capture system combined with a GSM monitoring system was used successfully for the first time. After the bear and the lynx, for some years now the province of Trento has seen the stable presence of a certain number of wolves, a notoriously very elusive animal with a very acute sense of smell.

In order to be able to capture animals in the future, with the scope of monitoring the species, it will be necessary to make use of refined techniques which at the same time guarantee the safety of the animal to be captured. On this basis this experimental project was drawn up to create an alarm system for monitoring wolf capture sites.

THE PROJECT

Objectives:

- to construct an effective system that does not interfere with the wolf's senses, hence odourless, robust and designed to be buried, which does not require maintenance during periods in which it is positioned in the field, at times lengthy;
- to construct a system that is simple and easy to put into operation;
- to construct a system with construction and management costs which are as low as possible, a factor which cannot be neglected, above all as it will be necessary to operate at several sites simultaneously.



These considerations gave rise to a finished product constructed using a combination of electronic and mechanical technology at various levels, which when subjected to different types of tests displayed characteristics superior to the few, non-specific systems currently produced and distributed on the market.

The system is essentially made up of a transmitter and a receiver (Photo A).

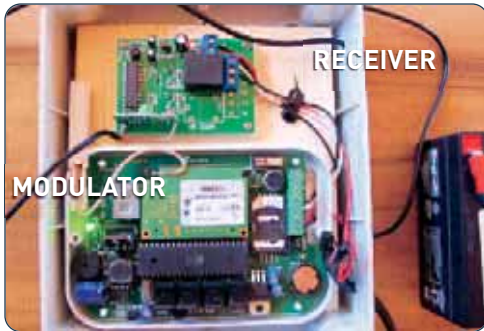
The distinctive feature of the system is the transmitter, which was created using a mini circuit (48x31x8mm), capable of transmitting a signal at a theoretical distance of 3000m in the free atmosphere. This is powered by a 9 volt battery with an autonomy of at least twelve months. The circuit and power unit are housed in a made-to-measure container in die cast aluminium, while the internal components are protected by filling with fast-cast liquid rubber and the lid is sealed with neoprene, in order to guarantee that it is absolutely impermeable to dust and liquids (Photo B).



The receiver, tuned to the receiver's frequency and channel, is also linked to a GSM modulator. Essentially the transmitter can be situated at any point, even in the most difficult conditions, or buried underground, and is triggered by a sensor, which may be mechanical or electronic.

The transmitter will be buried underneath the trap, made up of a special footsnare, also buried, to which the transmitter will be linked. This is triggered by a special sensor with mechanical shutter when it is moved and the trap triggered. The fact that the transmitter is completely waterproof also allows it to be deodorized by immersing it in specific cold treatment products used by trappers in North America.

When the receiver receives the alarm signal from the capture site, it will transfer the information to the GSM modulator, which in its turn will see to sending the information to the pre-set telephone numbers, with a pre-recorded vocal message or text message (Photos C and D).



The GSM receiver and modulator are powered by a 12 volt battery, which is the part of the system requiring most assistance, or rather the periodic substitution of the battery, a problem which can be easily resolved with the installation of a solar panel. As the receiver is capable of receiving the radio signal at a considerable distance from the transmitter, positioned in the sensitive area, this can be situated in a position which is convenient and easily accessible, also using motorised transport. Its distance from the capture sites will allow regular visits to the site, without the risk of contaminating the points in which the traps are situated with odours.



A single receiving system, placed in a strategic position in the area, can operate with an unlimited number of transmitters, on condition that they are all tuned to the same frequency and channel (Figure A).

As an alternative to the GSM modulator, the receiver can also act as a bridge, re-modulating and resending the alarm signal arriving

through a second transmitter. In this way the monitoring of capture sites can be carried out continuously even in areas not covered by the telephone network.

SENSORS AND TRIALS

This alarm system was tested with numerous simulations in order to check its efficiency and operational capacity in difficult situations.

The results were more than satisfactory, the average transmission distance of the TX was between 500 and 2200 metres, depending on its effective position: in the air, on the ground, hidden among the roots of a plant, buried etc.

COSTS AND FUTURE DEVELOPMENT

The construction costs were very limited, despite the fact that high quality components were used,. Currently the system is awaiting use in real situations in the field, to evaluate possible modifications or extension. In this context, contact has been made with research groups abroad interested in testing the system during capture operations, in collaboration with the Forestry and Wildlife Department.

by Alberto Stoffella

The Forestry and Wildlife Department attended two **conferences** on the wolf:

- Meeting of the **Wolf Alpine Group** (WAG) in the French Alps on 19 and 20 March 2013;
- International conference on the wolf within the context of the **Life “Slowolf” project** (Postojna, Slovenia), 25-27 September 2013.

In the context of the alpine area, 2013 was also characterised by the starting up of the **Life “Wolfalps” project** (2013-2018), which directly involves MuSe, in close collaboration with APT, above all as regards communication and monitoring activities.

Other relevant initiatives included the meeting with colleagues in the Veneto Region to reinforce the **agreement regarding the management of wolves in Lessinia** (Rovereto, 14 October 2013), the initiatives carried out in the context of a training course by the **Gruppo Lupo Italia** (Sega di Ala and upper Val di Non, 5 and 6 July 2013), and a **public meeting** on the wolf, held at the **Museo Civico in Rovereto** on 26 April 2013, as part of a cycle of meetings dedicated to the return of large carnivores to the Alps.

APPENDIX 3

The golden jackal

Since 2012 a new addition to the wildlife of Trentino has been present, contributing towards enriching the natural heritage of the province: this is the **golden jackal (*Canis aureus moreoticus*)**. It is not strictly a “large carnivore”, but its considerable interest in terms of wildlife and the natural heritage has led to the decision to include it within this report.

The jackal comes from south-eastern Europe (the Balkans), an area it reached in the late Pleistocene (around 10,000-15,000 years ago) from nearby Anatolia (currently Turkey). Its subsequent distribution was limited, it is believed by climatic conditions and competition with the wolf, to the most arid areas and steppes of the Balkan peninsular. However, in the last few decades there has been a progressive increase in its distribution area, taking the jackal from areas where there were already significant populations (above all Bulgaria and Croatia), across the countries of the former Yugoslavia to the north-west, up to Slovenia, Austria, the Czech Republic, Germany and north-eastern Italy.

It is believed that this expansion has been considerably favoured by the decrease in the presence of the wolf over the last 150 years. The expansion and distribution of the species has been (and probably still is) underestimated, as the species is little known and can be confused with other species of wild and domestic dogs.

Back in 1984 a jackal was captured at San Vito di Cadore (BL), not far from the borders of the province. Since then there have been more or less continuous reports, above all in Friuli Venezia Giulia, but also in the provinces of Belluno, Treviso and Venice. In 2009 a jackal was killed after having been mistaken for a fox in the

Val Pusteria (BZ). This was the first report in the region.

Surveys carried out in the last few years have shown a more consolidated situation, with reproductive groups present in north-eastern Italy, certainly in Friuli Venezia Giulia, where the presence of a number of such groups has been surmised, and probably also in the province of Belluno.

The very first sign of the presence of the species in the province of Trento was reported on 8 April 2012, when the carcass of a jackal hit by a vehicle travelling along the main road was discovered at 6.20 in the morning in the Valsugana. There had been reports of the animal in Trentino in the past which it was not possible to verify, but the animal found at Barricata, in the municipality of Villa Agnedo, was the first certain proof of its presence.

The carcass was noted at the side of the road by a hunter, who advised the district gamekeepers of the Associazione Cacciatori Trentini due to the unusual characteristics of the canid.

The animal was recovered and the incident reported to the forestry station in Strigno. A preliminary examination revealed that it was a **male jackal, weighing 11.4 kg** (Photo 1).

Photo 1 - The jackal hit by a vehicle at Barricata, Villa Agnedo (C. Groff - APT Forestry and Wildlife Department archives /MuSe)



The animal is currently conserved and on display at Trento Science Museum (MuSe). In the context of the cycle of meetings entitled “Wednesdays at the museum: talking about wildlife”, a presentation regarding the history and distribution of the species in Europe was also held at the museum on 2 May 2012.

The **presence** of the species was ascertained for the **second time** in the province, this time on 2 January 2013, through images of a live animal captured by a **camera trap**

positioned on the eastern slopes of Monte Peller, in the Val di Non. This was part of a programme of photographic monitoring of the lynx and other large carnivores in the winter, carried out by APT’s Forestry and Wildlife Department, the Science Museum, the Adamello Brenta Nature Park and a number of volunteers.

The photos are exceptional (Photo 2) as they are the first images of a live golden jackal ever obtained in Trentino, as well as representing evidence of the most north-westerly expansion of the species in Italy.

Photo 2 - The golden jackal photographed on Monte Peller (APT Forestry and Wildlife Department archives/MuSe)



There were no further reports of the animal in question or any others for the rest of the year.

These reports are extremely interesting for the whole national and international scientific

community, which has followed one of the most interesting animal expansion phenomena underway in Europe with considerable attention.

BOX 1 - Technical information sheet

*The golden jackal (*Canis aureus moreoticus*) is a medium-sized canid of mainly greyish-reddish colour, with a particularly slender build, short tail, pointed muzzle and large triangular ears. In general the appearance of its coat changes considerably with the seasons: in the summer it appears lighter and more slender, with a longer neck and shorter tail as compared to its winter coat. The jackal can be confused with a small wolf or thin stray dog. It is easier to distinguish from the fox because it is decidedly bigger, the lateral trunk shape is squarer and less rectangular and its tail, decidedly shorter, has a black rather than a whitish tip.*

It is instead difficult to distinguish between the males and females of this species, as they are similar in terms of size and colour, although the males are slightly larger and the colours of their coat more contrasting as compared to females. They can reach a weight of 15-17 kg as adults whereas younger animals, of more erratic character, tend to weigh 8-10 kg on av-

erage. Their tracks are slightly larger and longer than those of the fox, but in effect cannot be distinguished from those of the dog or a large fox.

Figure A

Image of the golden jackal (Umberto Catalano - INF/S/ Ministry for the Environment, Land and Sea)



The typical habitat of the jackal is made up of hilly territory covered with thick undergrowth or extensive wetland environments with reed thickets and dense floodplain vegetation. In general it avoids woods in the mountains, both due to the extensive permanence of snow, which hinders the capture of small mammals, and to avoid competition with the wolf. However, when roaming or extending its distribution area, it can cross typically alpine environments, exploiting mainly river beds during its journeys. The golden jackal does not usually dig burrows, preferring to use those of badgers or foxes, or else to create a shelter in the midst of impenetrable vegetation.

An omnivorous forager, it prefers small mammals (especially rodents, up to 70-80% of its prey) and birds, alternating these with food of plant origin during the late summer-autumn. It will also feed on waste. Due to the very similar diet, it is often in competition with the fox.

The females reproduce at the age of around nine months, whereas the males become sexually mature at the age of two. The reproductive season is during the February-March period. The gestation period is 60-63 days and in April or May females give birth to litters of between 4 and 7 cubs. The young feed on their mother's milk until July-August, then moving on to semi-solid food regurgitated by the mother in the subsequent period, a process that gradually leads them to feed themselves autonomously. The young usually remain with the mother until the spring of the following year. It is not rare for the young, especially females, to remain with the family to contribute towards rearing the cubs. The life expectancy for this species in captivity is high, around 16 years, whereas in the wild they rarely live beyond the age of 3.

It is believed the bad reputation generally accompanying the jackal originates in the erroneous belief that they only feed on carrion and/or waste, whereas in actual fact they have a very varied diet.

The greatest threat for the species, at least in Europe, would seem to be road accidents, poaching and erroneous killing. In this context it is particularly important to provide correct information about the characteristics of the species, above all in the hunting environment.

The golden jackal effectively contributes towards enriching the biodiversity of the alpine ecosystem, as it is a new species, arriving as a result of natural expansion phenomena.

In Italy the golden jackal is afforded complete protection (Italian Law no. 157/1992) and it does not represent any danger for humans, nor have there been any reports of aggression towards man.

(Information taken from: L. Lapini, 2009-2010. "Lo sciacallo dorato *Canis aureus moreoticus* nell'Italia nord-orientale". Zoology degree thesis, Faculty of Natural Science, University of Trieste).





AUTONOMOUS PROVINCE OF TRENTO

FORESTRY AND WILDLIFE DEPARTMENT

WILDLIFE OFFICE

VIA G. B. TRENER, 3 - 38121 TRENTO



www.orso.provincia.tn.it

mailorso@provincia.tn.it