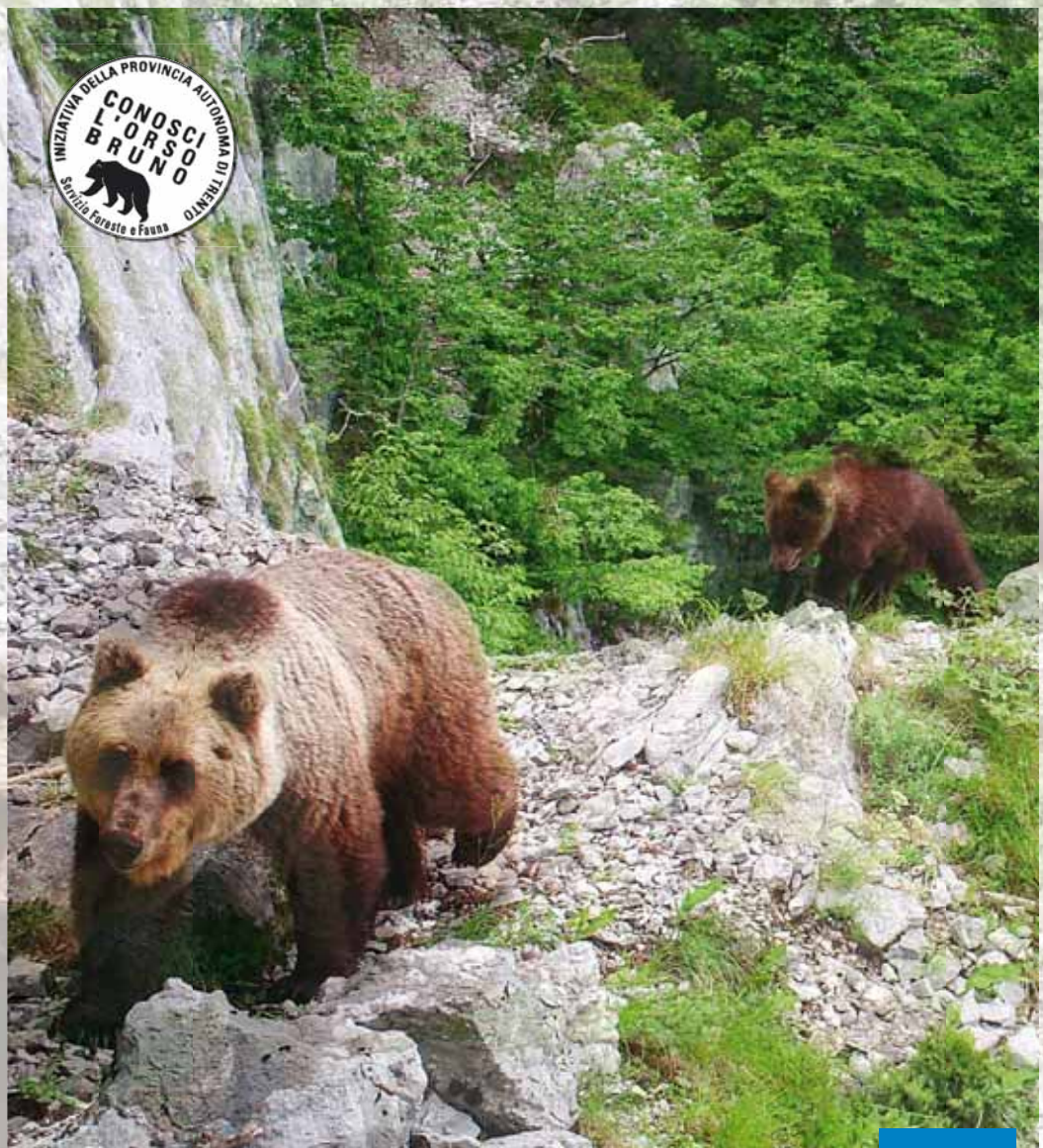
AUTONOMOUS PROVINCE OF TRENTO

TRENTINO

BEAR REPORT 2016

With appendices on the Lynx and the Wolf



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10th Edition

AUTONOMOUS PROVINCE
OF TRENTO

FORESTRY AND WILDLIFE DEPARTMENT
Large Carnivores Division

BEAR REPORT 2016

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Cover page
"Female bear with cub in the southern Brenta region"
Photograph by Massimo Papi - APT Forestry and Wildlife Department Archive (camera trap)

Back cover
"Female bear with yearling in the southern Brenta region"
Photograph by Massimo Papi - APT Forestry and Wildlife Department Archive (camera trap)

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CONTENTS

1. Monitoring pag. 5

Box 1 - Systematic monitoring using camera traps pag. 7

Box 2 - Bear watching pag. 10

2. Damage prevention and compensation pag. 20

3. Management of emergencies pag. 24

4. Communication pag. 27

5. Staff training pag. 31

6. National and international links pag. 32

Appendix 1 - Lynx pag. 34

Appendix 2 - Wolf pag. 35

Conservation and **management** of bears in the province of Trento is carried out within the framework of national and international regulations, on the basis of the operational guidelines set out by the provincial government in resolutions no. 1428 and no. 1988 of 21 June 2002 and 9 August 2002. Specifically, six **programmes of action** have been identified (Monitoring, Damage Management, Management of Emergencies, Staff Training, Communication, National and International Links), which represent the underlying structure followed in this **Report**, now in its **tenth edition**.

The information in this report is the product of the work of many, to whom we address our grateful **thanks**: forestry personnel, park wardens, forest keepers, gamekeepers, volunteer workers, and others.

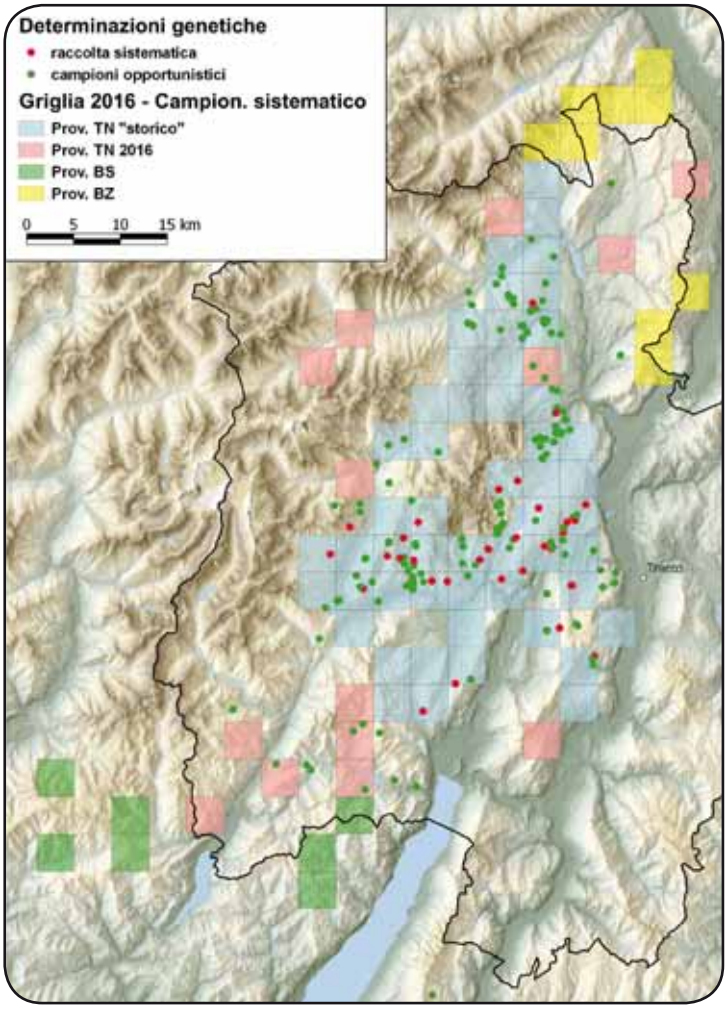
1. Monitoring

The Autonomous Province of Trento (APT) has been monitoring the bear population continuously since the seventies. Over time, traditional field survey techniques have been supplemented by radio tracking (a method first used in Eurasia in 1976), automatic video control from remote stations, camera traps and lastly, since 2002, **genetic monitoring**.

Genetic monitoring is based on collecting organic samples (hair, faeces, urine, saliva, tissue) using two techniques, commonly known as **systematic monitoring**, based on the use of traps with an olfactory bait, designed to "capture" hair with barbed wire, and **opportunistic monitoring**, based on collecting organic samples found in the area during routine activities and when assessing damage. Sample collection for systematic monitoring is planned and standardised in space and time so that the number of individuals can be estimated without necessarily needing to "capture" them individually through genetic testing. The careful planning of the sampling design makes the application of statistical models, that aim to quantify the probability of a bear being "captured" genetically, more effective. In recent years genetic monitoring has been the key technique for collecting information on the bear population present in the province. In 2016 it was carried out for the **fifteenth consecutive year**, coordinated by the APT Forestry and Wildlife Department and with the collaboration of ISPRA, PNAB, MUSE, the Association of Hunters in the Trento Province (ACT) and volunteers.

During 2016 **systematic monitoring** (photo no. 1) was carried out at 79 sites, from 17 May to 27 July. It resulted in 167 organic samples out of a total of 829 collected. Further to the hypothesis that the territory used by the population is gradually expanding, the area in which the systematic monitoring was carried out was extended to the northern and southern parts of western Trentino (with 6 new sites in Val di Sole and Alta Val di Non, and 8 new sites in Val Rendena and Giudicarie). As an experiment, thanks to the collaboration of the Autonomous Province of Bolzano, the Province of Brescia and ESRAF (Ente Regionale per i Servizi all'Agricoltura e alle Foreste - the Regione Lombardia entity for services to agriculture and forestry), the area for systematic monitoring was further extended to the areas neighbouring with Val di Non in the province of Bolzano (10 sites), and in Valcamonica, Valle del Caffaro, Val Trompia and Alto Garda in the prov-

Photo no. 1 - Female bear with cub near a hair trap (M. Zeni - APT Forestry and Fauna Department Archive - Adamello Brenta Natural Park)



ince of Brescia (9 sites) (figure no. 1). In all these new sites no organic sample was collected during this first trial year. As shown in figure no. 1, the majority of the organic samples collected from traps is concentrated in the central part of the sample grid, where the density of bears and their level of presence are highest.

Figure no. 1 - Geographical distribution of the areas (different coloured cells according to which administrative district they belong to) in which traps designed to collect hair were set and checked during 2016. The red dots indicate successful genetic identification following hair collected through systematic monitoring. The green dots indicate successful genetic identification following organic samples collected through opportunistic monitoring (damage assessment, rub trees, occasional finding of samples).

Further samples were collected outside the provincial territory, contributing to determining the **total** number of bears identified belonging to the Central Alps bear population; the relevant data were kindly supplied by **Land Tirol**, the **Autonomous Province of Bolzano**, the **Autonomous Region of Friuli Venezia Giulia**, the Department of Agrarian, Environmental and Animal Science of the **University of Udine**, the **Region of Lombardia** and by the **Provinces of Brescia** and **Sondrio**.

The **data** are collected and analysed on an annual basis, based on the solar year (1.1 -31.12). This coincides with the bear's "biological year" which makes it possible to take stock of the situation just before new cubs are born and during the time of year when the species is least active. It is accepted that all the monitoring techniques that have been mentioned are not guaranteed to detect **all the bears present** in the area. This **intrinsic limitation** must be remembered when interpreting the data in this Report.

In 2016 **genetic analysis** were once again carried out by technicians at the **ISPRA** conservation genetics laboratory. In accordance with the provisions of the Action Plan for the Conservation of the Brown Bear in the Central Alps (PACOBACE - Piano d'Azione per la Conservazione dell'Orso Bruno nelle Alpi Centrali), the study methodology provides for the amplification of **15** different genomic

regions (DNA microsatellites) and the molecular sexing of all organic samples, **amplifying two specific regions (AMG and SRY)**.

The high risk of error inherent in analysing samples collected using non-invasive techniques makes it necessary to optimise laboratory procedures designed to minimise genotyping errors. To this end the method of multiple amplifications was implemented, which consists in repeating tests serially until a genotype that is considered reliable is obtained. Reliability was established by means of statistical evaluation, carried out using the Reliotype programme. This calculates the probability that a specific genotype that has been observed may indeed belong to the population of reference, based on the allele frequency recorded in that population and on the number of repeat tests that have lead to concordant results. If the reliability of the genotype reaches or exceeds 95%, it is accepted, and the sample is added to the database. Once the results of the genetic tests were available, all the identified genotypes were subjected to meticulous post hoc quality control by comparing the genetic and sampling data with that obtained through other activities in the field (telemetry, observations), in a process designed to identify samples that are potentially subject to error. Further tests were carried out on these samples in order to clarify any uncertainty.

As a consequence of the small size of the population and its reproductive isolation, over the years a gradual reduction in the level of heterozygosity has been recorded, dropping from 0,776 (0,020 ES) UHe in 2003 to **0,656 (0,037 ES)** UHe in 2016. However, this **12** percentage point reduction in over ten years of reproductive isolation (four/five generations) is minimal, and the population still shows good levels of genetic variability.

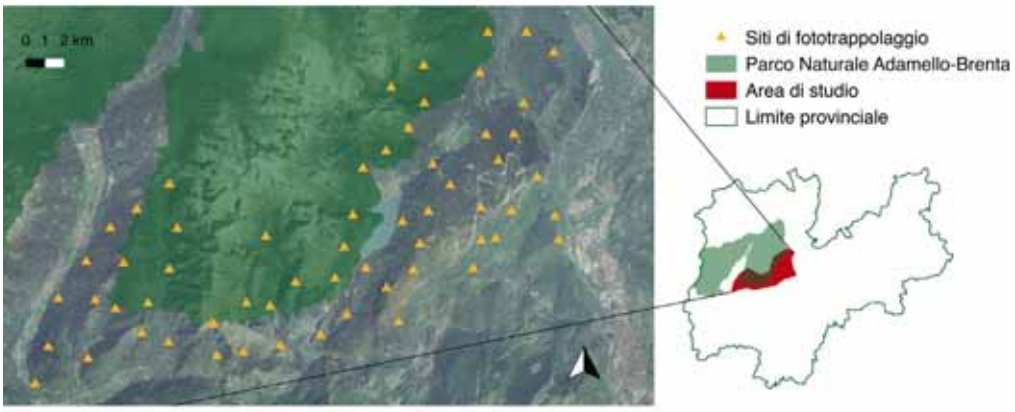
In 2016 two **monitoring** initiatives that had been set up the previous year were continued, based on the use of **camera traps** and on **bear watching**. The latest data are recorded in the following boxes, no. 1 and 2.

BOX 1 – Systematic monitoring of large mammals using camera traps: An update after the second year of sampling

The following box presents some of the results of the long-term programme monitoring wildlife with systematic camera trap monitoring, initiated in summer 2015 and continued in summer 2016. The project is part of the agreement between APT and MUSE for the monitoring of large carnivores and is implemented in collaboration with PNAB. The monitoring protocol which has been adopted is characterised by the systematicity of the sampling and the robust nature of the data it generates. It follows on from the positive experience of using camera traps to study rub trees between 2011-2013, with the general aim of monitoring the entire community of medium-large mammals over time. The study derives a large part of its methodology from experience monitoring mammals in tropical areas by the global TEAM network (Tropical Ecology Assessment and Monitoring Network) of which MUSE is a partner. The aim of the project is to define the spatial and temporal patterns of distribution and the abundance of medium-large mammals present in the study area. Thanks to this standardised approach, it will be possible over the course of years to obtain indices of local biodiversity, such as the WPI (Wildlife Picture Index) that summarises the state of a community of mammals in terms of richness and abundance of species. This index provides information on the temporal variations of mammals in an area. There follows some of the noteworthy results on bears found in 2016, and a comparison with results found in 2015.

The study area (approximately 220 km2), which was defined a priori when the project was started in 2015, was selected in such a way as to represent the elevational gradient and the forest habitats of the area; it overlaps in part the Adamello Brenta National Park (PNAB) and thus the core area of the brown bear population, one of the target species of greatest interest in the study. In accordance with the established protocol, the sites that had been selected the previous year were re-sampled in summer 2016. The only difference was that the same camera model (Reconyx HC500) was used for all the traps, whereas in 2015 two different models had been used for logistical reasons. The use of a single model ensures greater uniformity in the results. Distributed over 60 points (figure A) and active for 30 consecutive days each, the cameras were initially used at 30 sites for a month and subsequently moved to the remaining 30 sites for a further month of sampling. The sampling stations are located approximately 1.5 – 2.5 km apart, along paths or forest roads, so that they are representative of all elevation bands between 500m and 1900m above sea level. The cameras were attached to trees opposite the path/road, at a distance of 2-4m and were set to photo mode (3 consecutive shots per passage) with continuous operation and a memory card of at least 4 GB, capable of archiving several thousand pictures.

Figure A - Map of the 60 camera trap sites in the 2016 study area. The territory covered by the Adamello Brenta Natural Park is shown in green.

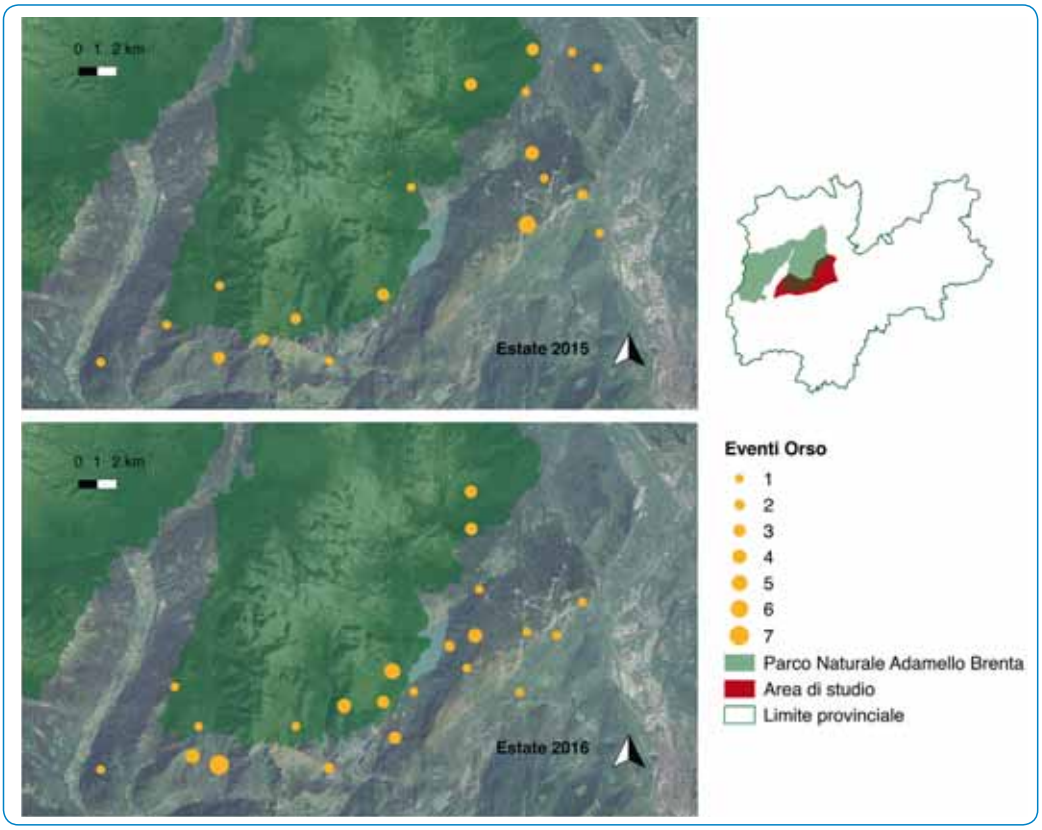


Similarly to 2015, sampling in 2016 took place between 22 June and 23 September, with a total of 2,153 camera-days (35.9 on average). Two camera traps were stolen during the sampling period. However a large part of the data was saved, and used, at least in part, in the analysis. The cameras recorded a total of 77,506 images, of which 11,129 images of wild animals belonging to 11 species. This year again the presence of domestic species and man (on foot and in vehicles) was recorded and quantified. The number of "independent events" for each species was catalogued, eliminating sequential images from the calculation because they referred to a single event (as when an animal stopped for some time in front of the camera generating many images), considering a standard interval of time (defined as 15 minutes).

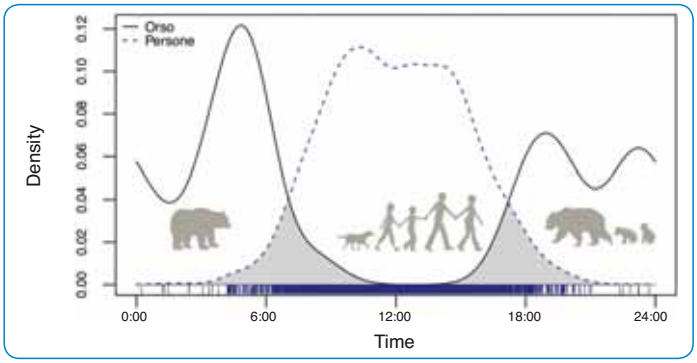
In 2016 the presence of the brown bear was recorded in 22 out of the 60 sites (photo A and figure B), with 51 independent events and a maximum of 7 in a single site near Iron (entrance of Val Algone). The result is comparable to that of 2015. Then the bear was "captured" in 20 sites, in 39 independent events and a maximum of 6 events in a single site. There are 9 passage sites in common between both years.

Photo A - Two pictures of brown bear taken by camera traps in 2016 (MUSE Archive)

Figure B - Map of camera trap sites and events capturing the brown bear in the study area, in 2015 and 2016 respectively, within the framework of the systematic monitoring project



Analysis of daily activity patterns confirms the trend, revealed by 2015 data, of maximum bear activity during the hours around dawn (3:00 – 6:00) with secondary peaks around sunset/dusk and during the early night (18:00 – 23:00 pm). Graph A compares daily activity recorded for bears with that for humans, showing clear complementarity and little overlap between both curves. Analysis of the probability of the species being present in the study area (occupancy) produced results very similar to 2015, with an average value of probability of presence of 0.54 (0.52 in 2015). In other words, 54% of the sites were estimated to be positive in terms of the presence of bears. Furthermore, the results of the "countability" analysis (a parameter which indicates the ease with each animals are recorded and which is affected by behavioural and/or environmental factors) show that in 2016 again, distance from inhabited areas has a positive effect and tourist and pedestrian traffic have a negative effect. So these analyses clearly confirm the elusive nature of bears' behaviour in the presence of anthropic disturbances, as also recorded in the analysis of activity rhythms described above.



Graph A - Graph showing the relationship between the number of events recorded, for man and bears respectively, in the study area during summer 2016, according to the time of day (expressed in hours 0-24). The grey area above both curves indicates overlapping activity

As well as bears, the presence of other mammals was recorded, as in 2015: fox, roe deer, red deer, chamois, hare, badger, stone marten, squirrel, hedgehog (in decreasing order of capture events). Of these, the hedgehog was not recorded in 2015. And there is an absence of events involving the wolf, which had been captured by camera trap on a single occasion in 2015 in Val Algone.

Valentina Oberosler and Francesco Rovero, MUSE - Science Museum

BOX 2 – Bear-watching

In 2016 again during spring and summer data were collected from bear watching from vantage points, using appropriate optical instruments (binoculars and telescopes), made in an opportunistic manner by volunteers.

The results are summarised below.

The monitoring took place during the three months of April, May and June 2016, from panoramic observation points, in 8 different areas, 4 of which were monitored with some regularity. In total 83 sighting outings were recorded, with approximately 200 hours of observation by 1-5 observers per site.

Photo A - Female bear with two cubs observed through binoculars - (M. Vettorazzi - APT Forestry and Wildlife Department Archive)

In most cases, the observations took place from the valley floor or from one side of the valley to the other, from distances between 1,000 and 2,000 metres.

22 outings out of 83 (27%) were positive in that they led to the sighting of one or more bears. The areas in which most sightings were made were the Valle dello Sporeggio, Val Ambiez, Val Algone, and the areas between these last two valleys.

There were a total of 24 sightings, understood as individual events in which single bears, pairs or independent family units were observed. They involved:

- *3 sightings of a female bear with a cub born during the year*
- *6 sightings of a female bear with a juvenile born the previous year*
- *1 sighting of a female bear with 2 juveniles born the previous year*
- *6 sightings of a male and a female bear together (in one case a male with two females, in another, a female with two males)*
- *4 sightings attributable to at least one adult bear*
- *4 sightings attributable to at least one young bear*

Status of the population in 2016

Definitions

- **"Cubs"**: bears aged between 0 and 1;
- **"Juveniles"**: males aged between 1 and 4 and females aged between 1 and 3;
- **"Adults"**: males over the age of 4 and females over the age of 3, considered sexually mature and able to reproduce;
- **"Recorded bears"**: bears whose presence was verified genetically or on the basis of unequivocal (because they were combined with telemetry for example) or repeated observations;
- **"Non-recorded bears"**: bears that were not detected in the last year alone;
- **"Missing bears"**: bears that are certainly or probably no longer present, because they have been found dead, killed, emigrated, taken into captivity or have not been recorded genetically in the last two years;
- **"Rediscovered bears"**: bears that are genetically recorded after two or more years during which they weren't;

- **"Dispersion"**: bears born within western Trentino moving outside it but not reaching the territory habitually frequented by bears belonging to the Dinaric-Balkan population;
- **"Emigration"**: bears abandoning the population present in the Central Alps and moving to the territory that is habitually frequented by bears belonging to the Dinaric-Balkan population;
- **"Return"**: return to western Trentino of bears who were dispersed or had emigrated;
- **"Immigration"**: the arrival into the territory habitually frequented by bears from the western Trentino population of bears from the Dinaric-Balkan population.

The analysis of the collected data provides the information reported below on the identification of bears, the minimum size of the population, an estimate of the size of the population, an estimate of the number of litters present in 2016, rates of survival, trends of the development of the population, and the use of the territory by the animals.

It should be noted that the graphs on demographic aspects have been updated not only by adding data for last year, but also by modifying the data **of previous years** for subjects that have been relocating during 2016 monitoring. This explains the differences that can be found with the graphs in previous Reports. There is indeed an **ongoing progress of updating available data** and the graphs created from it. These must therefore be understood as substituting previous ones.

Births

Photo no. 2 - Female bear with three cubs aged about 7 months (F. Cadonna - APT Forestry and Wildlife Department Archive)

In **2016 6-11 new litters** have been estmated, with a total of **11-18 cubs**. These figures are based on a series of data, mainly direct observation, and the study of the bears' home ranges.

Genetic evidence has only led to the identification of one cub and her mother (F27, daughter of DG3).

"Rediscovered" bears

During 2016 **three bears** were genetically "rediscovered" (see definition on page 11): two males and one female, all adults.

Bears not recorded during 2016

Ten bears that were present in 2015 **were not detected** in 2016. They account for the differential in the estimate of the number of juveniles and adults this year, in view of the strong probability that at least some of them are indeed present.

Missing bears

One new bear is considered missing, as his presence has not been genetically recorded in the last two years.

2016 also saw the death of four bears.

Photo no. 3 - Bear M21 poisoned in spring in Val di Non (M. Baggia - APT Forestry and Wildlife Department Archive)

- **M21**, a male aged 4.5 years,, found dead on 21 March at Lover (TN) as a result of poisoning (photo no. 3)
- **M32**, male aged 2.5 years, died 8 April in Switzerland, in the Inn valley near the residential area of Ramosch (canton of Grisons), following collision with a train (photo no. 4)
- **F5**, female bear aged 7.5 years, found dead on 12 October near Lover (TN), as a result of poisoning (photo no. 5)

Photo no. 4 - Bear M32 hit by a train in the canton of Grisons (CH)

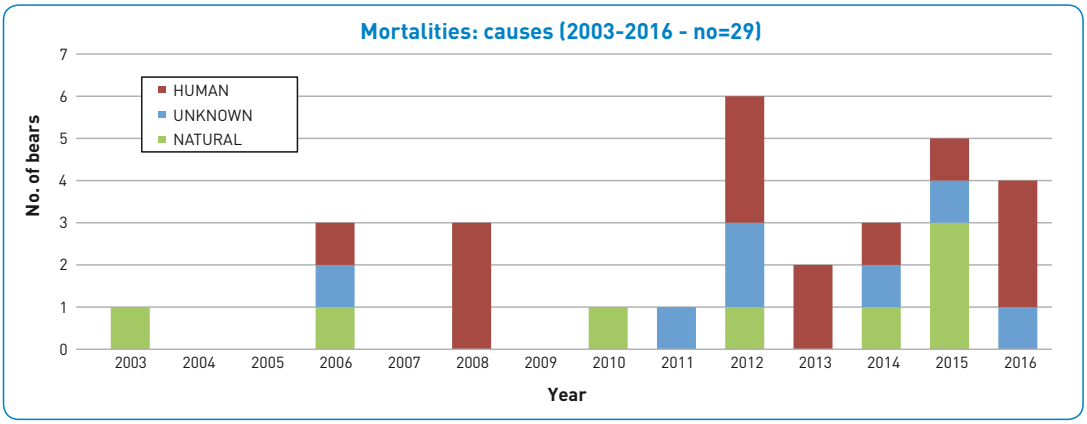
Photo no. 5 - Female bear F5 poisoned in autumn in Val di Non (R. Calvetti - APT Forestry and Wildlife Department Archive)

- In the month of April, the remains of a bear (a paw), apparently still young (perhaps a cub), were found in the area of Montagne di Ragoli; it was not possible to determine the cause of death, but the time of discovery suggests it may be a case of infanticide.

From 2003 to today **29** bears have been ascertained as dead. The deaths were due to **natural causes** in 8 cases (28%), **unknown causes** in 7 (24%) and **anthropic reasons** in the remaining 14 cases (48%). It must be remembered that these figures do not reflect either the total number of deaths, or the true ratio between the causes of death, because of the different probability of their being recorded (for example it is easier to find bears hit by vehicles along roads than those which died from natural causes).

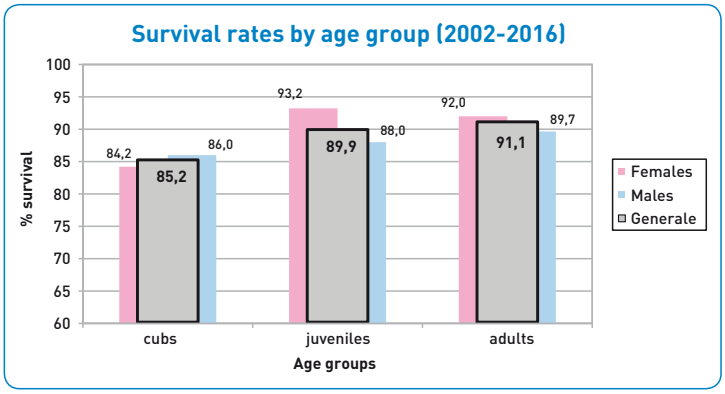
14 of the 22 **mortalities** for which the cause of death is known were **because of man**: 29% **illegally killing**, 50% **accidental killing** and 21% **authorised culling** (in Switzerland and Germany). The incidence of mortality caused by human activity has become increasingly significant in recent years (see graph no.1 on this subject). It is believed to be a factor which has a significant impact on the population trend, especially bearing in mind that it is extremely likely that the recorded cases do not constitute the totality of cases. It is to be noted that in the last four years four bears have been found illegally killed.

Graph no. 1



Survival rates

Graph no. 2



The availability of new data makes it possible to update the survival rates for three different age groups, differentiated for the two sexes (graph no.2) The data refer to a period of **15 years** (2002-2016) and to **99 different bears**, for which it was possible to ascertain their death or survival in 484 passages from one year to another (**484 bear-years**).

The "mortalities" category, here considered in broad terms, includes not only ascertained deaths but also bears that have not been recorded in the last two years or taken into captivity, according to the criteria used to define "missing" bears. The data on bears which eventually emigrated are considered until the time they leave their population of origin.

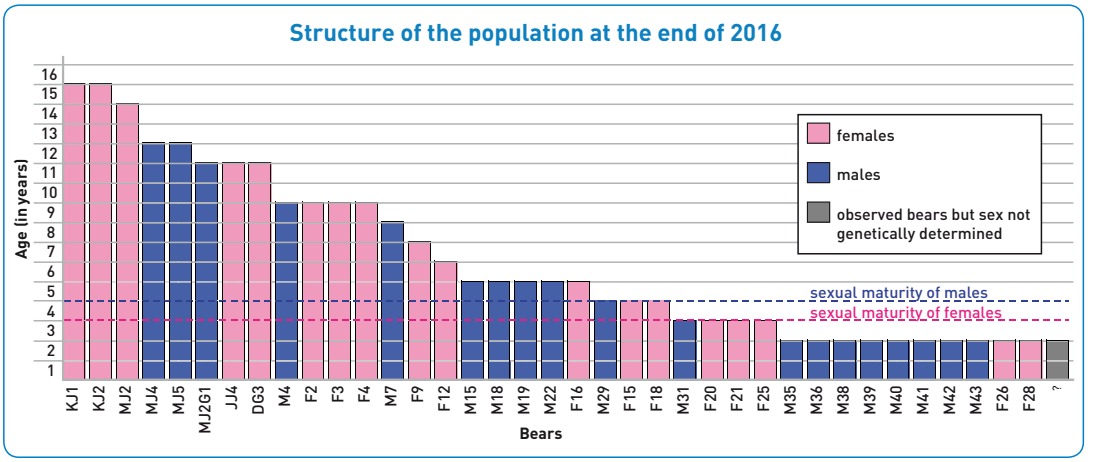
Status

Considering the lack of certainty of the data on births in 2016 (data which is becoming increasingly difficult to collect with each passing year – see data for 2015 where 7 cubs remained uncer-

tain), it has been decided that this year **cubs are not considered** in determining the **minimum certain number** of bears.

Based on this criteria the **minimum certain number** of juvenile and adult bears considered alive in 2016 is **38**, of which **19 males, 18 females** and **1 of undermined sex** (graph no. 3) (***sex ratio* M-F 1.05:1** - no = 37).

Graph no. 3



At the end of 2016 the population **structure based on** the ascertained individuals (excepting cubs) was as follows: **22 adults** (**58%** - 9 males and 13 females) and **16 juveniles** (**42%** - 10 males, 5 females and 1 of undetermined sex).

The **average age** of known bears (excepting cubs) is **5.97 years**, with a significant difference between **males** (**5.00** years) and **females** (**6.95** years).

As it is considered possible that there are individuals present that have not been recorded genetically in the past year alone (10), **the estimated number of juveniles and adults** in 2016 varies **between 38 and 48 bears**.

The overall **estimate of the population**, necessarily taking into account **the number of 2016 cubs** (11-18 as reported above), is thus defined in a wider range of **49 - 66 bears**.

An experimental estimate of the number of juvenile and adult bears that were on average present in 2016 in the western Trentino area was also made, combining the use of genetic “capture” data obtained from systematic monitoring and opportunistic monitoring. In this way it was possible to combine information that can provide different samples of various “segments” of the population in a more efficient way.

Assuming that any dispersion events to and from western Trentino can be considered negligible over the year, the best **estimate model of the abundance of juvenile and adult subjects** (still net of cubs born during 2016) provides a value of **42 bears**, with a **confidence interval** in the estimate going **from 38 to 55**. The model takes into account the difference in the probability of genetic capture between both sexes and the different methods of sample collecting.

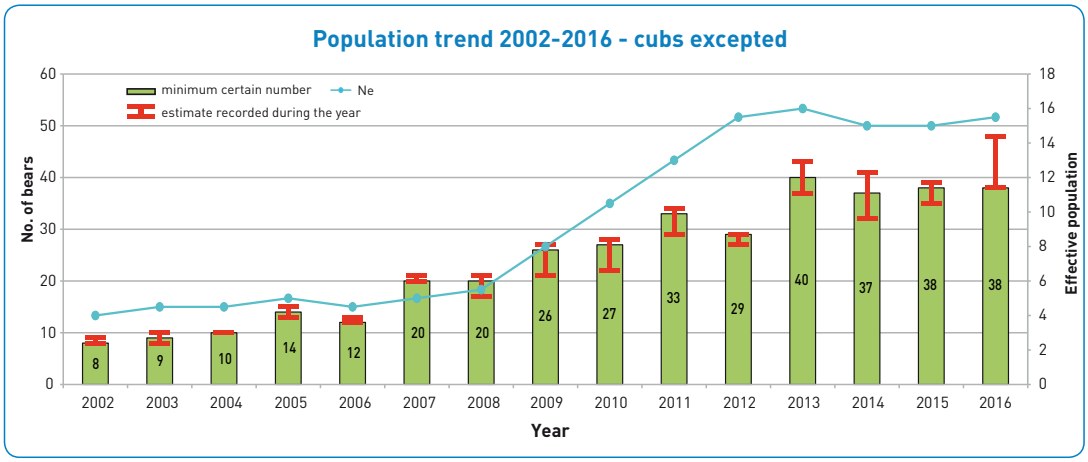
Trend

The **trend** of bear population (**cubs excluded** still) is shown in graph no. 4. The columns indicate **minimum certain numbers** of adults and juveniles reported year by year, updated and revised with data acquired in subsequent years.

The graph also shows the **estimates made in the past**, recorded for each year, and shown in the **red** interval (minimum certain number and estimated number also taking into account bears absent for only one year, cubs still excepted); the respective values effectively create a snapshot of each season, unmodified by the adjustments made possible by subsequent monitoring.

It also reports the trend of the so called **"effective population" (Ne)**, calculated by taking the **number of sexually mature males**, and **adding the number of sexually mature females, divided by two** (as they generally reproduce only every second year).

Graph no. 4



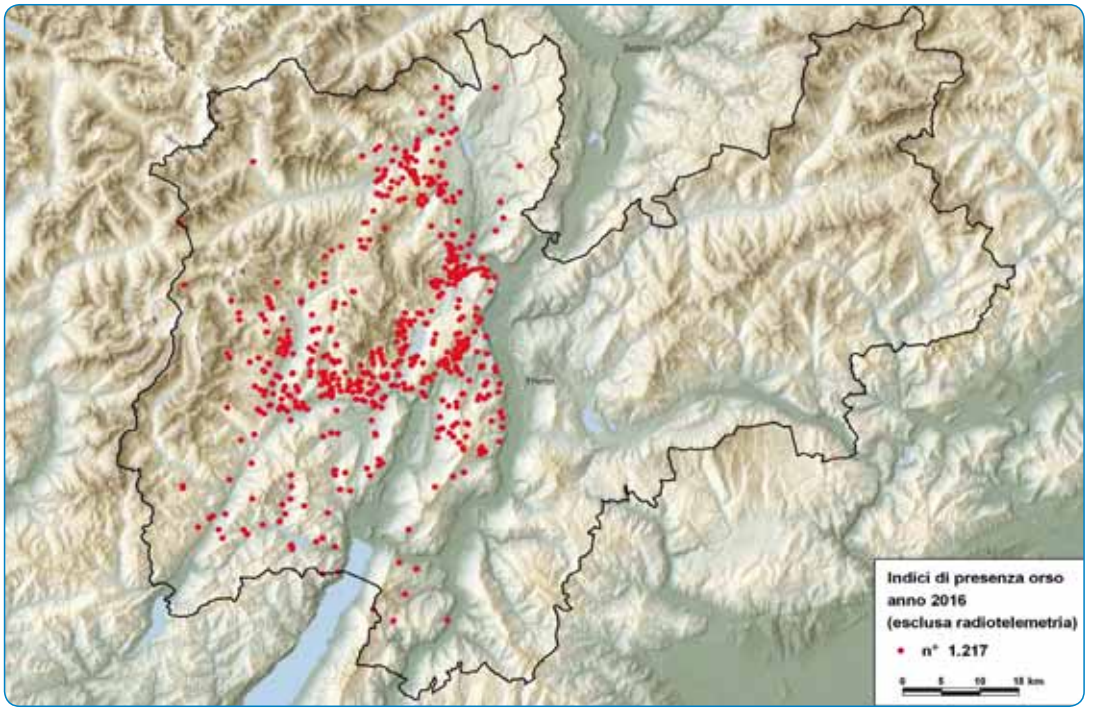
Data for 2016 confirm the substantial stability of the juvenile and adult components of the population recorded over the last four years.

Use of the territory

35 of the **38** bears recorded in 2016 were observed **in the territory of Trentino**. **Three** adult males were only observed outside the province: **M29** in **Lombardia**, **M4** in **Friuli Venezia Giulia** and **M19** in **Veneto**. Three of the bears present in Trentino have also gravitated towards neighbouring provinces/regions, in particular the province of **Bolzano** (M22) and in **Lombardy** (M18 and M31).

The **1,217 data of bear presence** collected in **the province of Trento** during 2016 (all recorded data, with the exception of that derived from the satellite monitoring of two bears) are shown in figure no. 2. No data were collected in **eastern Trentino**.

Figure 2 - Reports of bears in the province of Trento in 2016



In 2016 two female bears, F15 and F26, an adult and a juvenile respectively, were monitored by **satellite telemetry**. Their home ranges were calculated using the minimum convex polygon (MCP) method, and are shown in figures nos. 3 and 4 (respectively in Paganella - Gazza and Monte Bondone).

Figure no. 3 - *Home range* of F15 in 2016

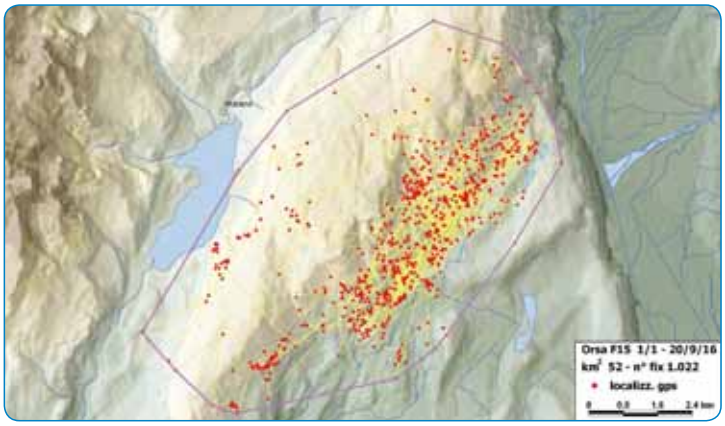
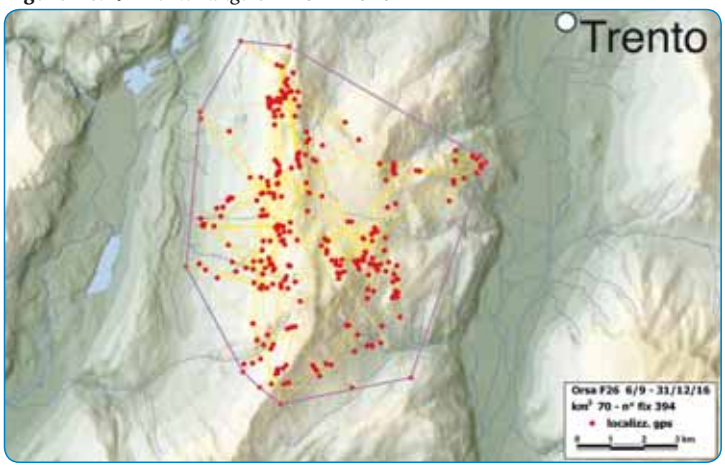


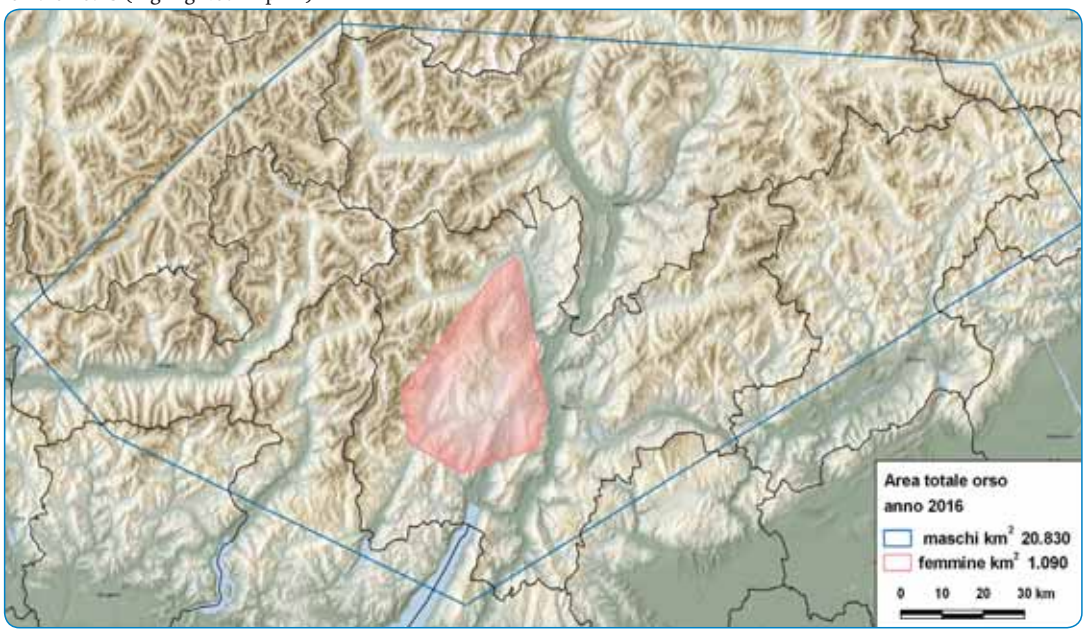
Figure no. 4 - *Home range* of F26 in 2016



Area occupied by the population

Including the wider movements made by juvenile bears, on the basis of collected data, in 2016 the bear population of the central Alps was **distributed over a theoretical area of 20,830 km²** (figure no. 5). **The territory permanently occupied by the female bears** is smaller (1,090 km2) and situated entirely within the province (western Trentino). The size of the occupied area was estimated using the minimum convex polygon method, applied to 100% of the validated proofs of presence. This leads to vast areas that are not suitable and/or not actually used being included, especially in the macro-area covered by the movements of the juvenile bears.

Figure no. 5 - Area occupied by bears in the central Alps in 2016 (shown in blue) and, within it, the area occupied by female bears (highlighted in pink)



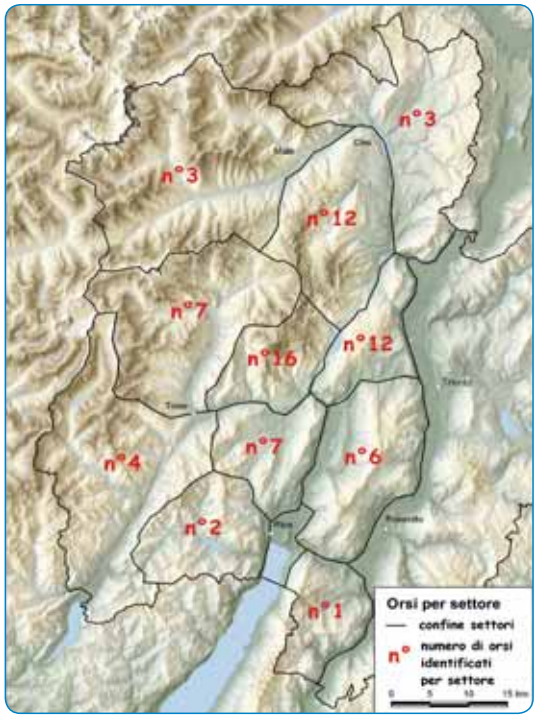
Population density

The **population density** in the **area occupied by female bears** (1,090 km²) is **3.2 bears/100 km²** (34 bears, excluding cubs born during the year). When interpreting this figure, it must be remembered that:

- density is calculated on the basis of a data set collected over a wide period of time (a solar year) and therefore the number of bears present in the area at any given time, which would be a figure closer to the true average density, is likely to be lower;
- some bears (males) have also frequented areas outside the area occupied by females during the period of time being considered.

This density can vary locally, as is in part shown in figure no. 6. This shows the number of bears, excluding cubs, that were identified with certainty (through genetics, radiotelemetry, photographs) in each sector of western Trentino. It goes without saying that many animals have frequented more than one sector, also because of seasonal variations in the availability of food, and may thus have been identified in several of them. As a consequence, the total minimum number ascertained in the province and neighbouring areas in 2016 is still 38 bears, and there would be no sense in adding up the numbers of the individual sectors.

Figure no. 6 - Number of bears identified in each sector of western Trentino during 2016



Dispersion

During the period **2005-2016** it has been possible to document the **dispersion** (see definition on page 11) of **28 bears** (all males). **12** of these **(43%) died** or **disappeared**, a further **11 (39%) returned**, **2 (7%) emigrated** and **3 (11%)** are **still dispersing. No dispersion** by females born in Trentino has been recorded to date.

2. Damage prevention and compensation

APT has gained over forty years' experience in managing the prevention and compensation of damages caused by brown bears. Since **1976** damage is awarded **compensation** amounting to 100% of the material value of the asset and it is possible to acquire **prevention** meaures (generally electric fencing or guard dogs). The regulations governing this issue, established in article 33 of Provincial Law no. 24/91, have been revised and updated several times over the years, also on the basis of regulations drawn up by the provincial government with Resolution no. 1988 of 9 August 2002. With Resolution no. 697 of 8 April **2011** the provincial government further reviewed regulation on damage compensation, adding compensation for ancillary expenses and extending 100% compensation to damage caused by **wolf** and **lynx**.

Prevention primarily follows two lines of intervention: **grants** of up to 90% of costs sustained or **free loans of use**. Support/advisory services for farmers is also available with **animal husbandry experts**, as described below.

Compensation for damages caused by bears

In 2016 the Forestry and Wildlife Department received **185 reports of damage allegedly caused by bears**.

The department received **136 claims for compensation**. In the remaining cases, either cumulative claims for compensation were made covering several reports of damage, or no claim was made for the following reasons:

- in 5 cases, although damage was caused by bears, the reporting party had not implemented prevention measures financed by APT;
- in 14 cases, although damage was created by bears, the reporting party did not request compensation for various reasons (e.g.: because the financial impact of the damage was low);
- in 12 cases the cause of damage could not be proved or it was ascertained that it could not be ascribed to large carnivores.

124 of the 136 claims were accepted, 10 were rejected (in 2 cases prevention had not been implemented; in 2 cases the deadline had lapsed; and in the remaining 6 cases the damage was not attributable to bears), the remaining 2 claims were still being processed when this Report was being prepared.

Photo no. 6 - Damage to a beehive (N. Parisi - APT Forestry and Wildlife Department Archive)

In 93% of cases of the report of damage was followed up by an **inspection** by forestry staff who drew up a report.

In total **73,394.23 €** was paid in compensation for damage caused by brown bears, of which 31,472.84 € for assets associated with beekeeping (photo no. 6), 21,793.09 € for agricultural assets, 19,633.30 € for livestock assets (photo no. 7) and 495.00 € for other damage.

In 52 cases (28% of the total of ascertained cases of damage), it was possible to determine with certainty the identity of the bear involved, thanks to genetic testing of organic samples (hair of faeces) found at the site of the damage.

Overall **15 different genotypes** have been identified (8 males and 7 females), representing 40% of the population that was recorded genetically in 2016. Of these, **5** (4 females and 1 male) were recorded at only one damage site, **2** (1 male and 1 female) at two damage sites, **2** (1 male and 1 female) at three damage sites, **2** (1 male and 1 female) at four damage sites, 2 (males M22 e M7) at six damage sites, **1** (male MJ5) at seven damage sites and **1** (male M31) at ten damage sites.

Photo no. 7 - Predation of a llama (V. Calvetti - APT Forestry and Wildlife Department Archive)

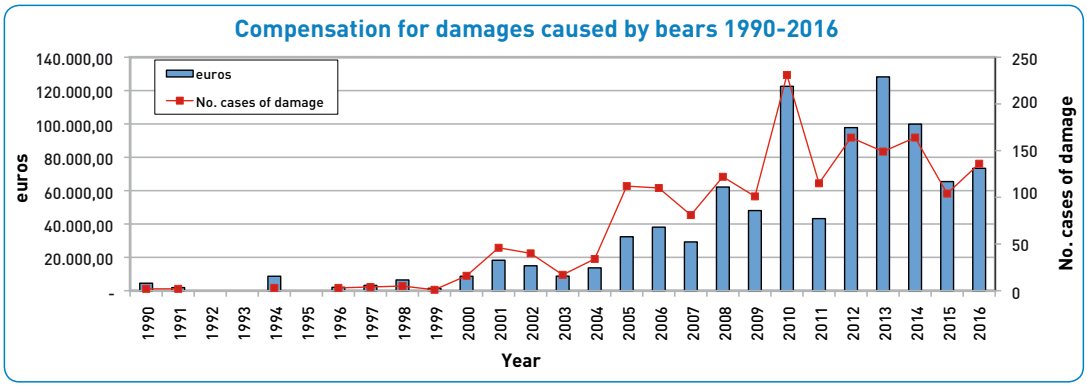
Only one truly critical situation was recorded in 2016 relating to damage, concerning seven occurrences of predation on donkeys (6 donkeys killed and 1 injured) in Val Rendena. From the genetic testing of biological samples collected from three of the seven occurrences of predation, the damage appears to be attributable to one single adult male bear (aged 11) named MJ5, which until now had not caused significant damage.

The ten cases of damage caused by M31 (young male) were predominantly aimed at beehives, did not cause particular social issues, and occurred mainly in southern Trentino (Ledro area)

It should be noted that thanks to camera traps for the first time a wolf was recorded feeding on a llama carcass that had earlier been preyed on by a bear.

Graph no. 5 shows the trend of the number of cases of damage by bears and the amount paid in compensation.

Graph no. 5



Prevention of damages caused bears

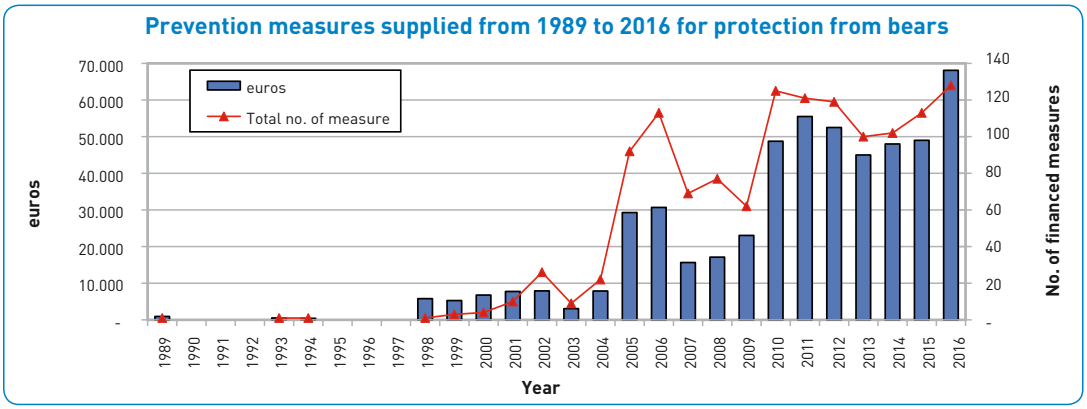
In 2016 the Forestry and Wildlife Department received **136 applications** for prevention measures (electric fencing and guard dogs) aimed at protecting livestock assets (bovine, equine, ovine and caprine) and beekeeping assets. Of these, **117** were processed by the Forestry District Offices (FDO) with a free loan; **83** were aimed at beekeeping assets, **34** at livestock assets (photo no. 8). The overall expenditure is of approximately **60,000.00 €**.

The remaining **19 applications** were processed by the Large Carnivores Division (10 accepted, 3 rejected, 4 cancelled and 2 withdrawn by the applicant) with the allocation of grants. The financing amounts to approximately **8,100.00 €.**

The following graphs shows the long-term trend of the number of prevention measures supplied and their cost (graph no.6)

Photo no. 8 - Prevention measure for the protection of livestock (N. Parisi - APT Forestry and Wildlife Department Archive)

Graph no. 6



In 2016, an additional mechanism was put in place to award grants for prevention measures: the **Rural Development Plan (RDP)**, by means of **Measure 442 "Traditional wood fencing, renovation of stone enclosures, prevention of damage by wolves and bears"** (photo no. 9). This measure makes it possible to provide grants for fencing or enclosures to manage livestock and structures to protect beehives (Bienenhaus) and electrified fences to protect against large carnivores. The nature of the protection system is essentially the same as the one adopted by the Province for measures delivered through loans or grants: 5 electrified wires for bears, and 7 wires for wolves.

This mechanism has made it possible to finance 4 enclosures (for a total of **2,200** m approximately of wooden fencing or stone enclosure, with electrification) to protect against wolves and bears amounting to **87,000 €** of financing (73,000 € for the fencing and enclosures and 12,000.00 € for electrification). These will be finished in 2017.

Photo no. 9 - Prevention measure for livestock financed by RDP (D. Asson - APT Forestry and Wildlife Department Archive)

Guarding dogs

Guarding dogs are used **to protect animals at pasture** from wolf and bear attacks. The first two dogs in Trentino were handed over to a sheep and goat farmer in Val di Non in 2014 (see 2014 Report, page 43) and in 2015, 5 more dogs were provided (see 2015 Report, page 21). In 2016 3 applications were received for 4 dogs; of these 1 was accepted, 1 was rejected and 1 was withdrawn by the applicant. In total 1,317.00 € were paid to purchase 2 dogs (Val di Cavedine). The dogs were bought from specialist certified breeders that belong to ENCI (Ente Nazionale Cinofilia Italiana, the Italian Kennel Club), guaranteeing health standards and breeds with an aptitude for work. During 2016, with the help of a specialised vet and thanks to a financial contribution from the LIFE DINALP BEAR project (photos nos. 10 and 11), a number of **behavioural check-ups** were made on the dogs which had been delivered, to not only evaluate the health of the dogs and their success in training, but also to provide useful advice to the farmers.

Photos nos. 10 and 11 - Veterinary check-ups on guard dogs (D. Asson and C. Groff - APT Forestry and Wildlife Department Archive)

Meetings with farmers

In 2016 meeting were organised, as has happened for some time, with the people who are most affected by the presence of bears and other large carnivores.

The **meeting (round table) with representatives of livestock farmers, beekeepers** and **crop farmers** took place on **5 May 2016**.

Support for livestock breeders

Supporting the presence of shepherds and of flocks/herds on alpine pastures is one of the objectives of the provincial administration. The presence of the shepherd and the use of the most appropriate damage prevention systems, along with fair compensation, are fundamental to allow large carnivores and livestock to coexist in the mountains. This objective is also pursued through the work of **animal husbandry experts**; the territory in which there is a stable presence of brown bear has thus been divided into 6 homogeneous areas, with a person named responsible for each. In 2016 shepherds were given further support, especially in the areas with the largest presence of bears. Overall **39 pasture sites** were followed, with a total of **12,615 ovines and caprines, 237 equines** and **1,243 bovines**.

The shepherds were supplied with netting (105 cm high) with **electrifiers** of appropriate **power *(2.6 Joules)*** and rechargeable batteries charged by solar panels.

In addition **6 accommodation units were brought to the pastures** (accommodation units, photo no. 12) to enable the shepherds to stay close to the flock at night.

Once again **the results** were **positive**: during the entire year and on all the monitored pastures, there were a total of only **6 attacks** on **protected livestock**, which lead to an overall ascertained loss of **20 sheep, 0,14%** of the protected pastured flock;a low incidence, especially in the areas most frequented by bears.

Photo no. 12 - Area of work of the animal husbandry experts (D. Asson - APT Forestry and Wildlife Department Archive)

As in previous years it is thus confirmed that the correct use of prevention measures (electric fences and guard dogs), the presence and professionalism of shepherds, and the advice and support of animal husbandry experts, lead to an important **reduction of damage**.

3. Management of emergencies

In the **province of Trento** the management of emergencies is an area which has required action for some time, and especially because of individual animals considered to be “problematic”.

A **problem bear** or one that is in a critical situation can be the object of **aversive conditioning**, in accordance with the provisions of European legislation (Directive 92/43/CEE – Habitat Directive) and national legislation (D.P.R. 357/97, art. 11 comma 1; L. 157/92, art. 19 comma 2; L. 394/91, art. 11 comma 4 and art. 22 comma 6).

These laws allow for the possibility of exceptions to the ban on capturing or killing animals, subject to **authorisation from the Ministry of the Environment** and Protection of Land and Sea (MATTM), and with guidance from ISPRA, in order to minimise conflict with human activities or for the safety of the general public or for other reasons of general public interest, on condition that there are no other practicable solutions and that the exception does not jeopardise the conservation status of the population of the protected species (D.P.R. 357/97, art. 11.1). In the event that public safety is at risk, the animal’s capture or shot can be ordered by means of **an extraordinary emergency order from the President of the Province**, in accordance with articles no. 52.2 of D.P.R. 31/8/1972, no. 670 and no. 18.2 of L.R. 4/1/1993 no. 1, as expressly allowed by **PACOBACE**. With resolution no. 1523 of **7 September 2015** the provincial government has created a **Technical Commission** with MATTM, ISPRA and APT and a **Operative Technical Group** (with PAT, MUSE and PNAB) to manage bears and other large carnivores that are present in the province’s territory (for all fields of action, and not only for the management of emergencies). Both operated with positive results in 2016.

The Technical Commission makes it possible to share action plans with the various levels of responsibility, with an advisory role, guiding and supporting decision-making and, in particular, provides guidance for a common and shared strategy for the management and conservation of large carnivores, in coherence with the relevant planning tools, including proposing potential im-

provement measures, precisions and additions. It is also called to identify the criteria and the best solutions that the relevant authorities will implement when faced with potential emergencies.

The Operative Technical Group's role is to implement the actions and the measures that have been decided upon by the relevant planning authorities and the relevant decisional authorities, on the basis of shared operational programmes with optimum potentiality and skills, even when faced with potentially critical situations.

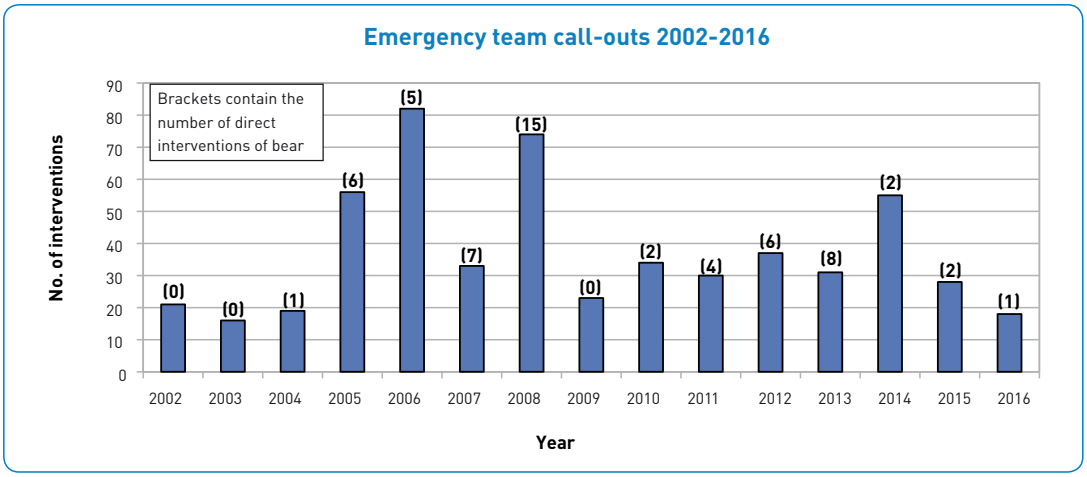
PACOBACE (the interregional action plan for the conservation of the brown bear in the central-eastern Alps) is the document of reference for the management of emergencies in the province of Trento (and of in the rest of the Italian Alps). It is on its basis that the Forestry and Wildlife Department has identified, trained and equipped its staff. Operationally, organisation is based on staff of the **Trentino Forestry Service (TFS)**, of which the Forestry and Wildlife Department avails itself through the creation of a **special on-call unit**. The on-call system is based on week-long shifts involving a coordinator, and from 1 March to 30 November, two emergency people (on-call 24 hours a day). These can be joined, should the need arise, by veterinary staff from the **Provincial Health Services (APSS)**. A vet must be present whenever animals are handled (injured bears, capturing animals, other).

During 2016 the coordinators received **759 calls** reporting possible **damage by bears** or **wolves**, direct **sightings** or the discovery of potential **proof of presence**, wild **prey** of wolves, potentially **critical situations** or **other**. Only a small number (21) concerned potentially critical situations.

Activities of the emergency team

The emergency team was active from 29 February to 28 November 2016 with a total of 1**8 call-outs** (graph no. 7). There was only one case in which staff carried out actions of active deterrence on bear (with rubber bullets).

Graph no. 7



Close encounters between man and bear

Three cases of **false attacks** from bears were recorded:

- on 13 June in a dense wood with clearings, near Monte Soprasasso (Cadine - Trento), along the military road – two bears were involved, one of which was larger;
- on 12 July in a beech wood in Pian dei Vigoi (Monte Bondone - Trento) – female bear accompanied by two-three cubs born in 2015; genetic testing made it possible to ascribe the event to the bear named KJ2;
- on 24 September in a spruce wood, along a forest path in Sasso Magno (Caldes) – a female bear accompanied by at least two cubs.

Captures

The "Capture Team", consisting of specially trained forestry staff with the support of APSS vets for health aspects, play an important role in the management of emergencies.

In **2016** activities aimed at capturing the **female bear KJ2 continued**, in accordance with the decision to remove her following the attack on a man in 2015. At the beginning of spring the female bear lost her radio collar which made the operation considerably more difficult. Despite significant efforts during the entire season, the technical conditions needed to allow her capture never came about.

But **two bears** were captured and fitted with radio collars within the framework of the *LIFE DINALP BEAR* project. In both cases the bear was captured with a tube trap:

- a **young female** (F26), captured on **6 September 2016** in the woods above **Garniga** (photo no. 13);
- an **adult female** (F4), captured on **9 September 2016** in the woods above **Lasino** (photo no. 14).

Photo no. 13 - Phases of the capture of F26 (F. Angeli - APT Forestry and Wildlife Department Archive)

Photo no. 14 - Phases of the capture of F4 (F. Angeli - APT Forestry and Wildlife Department Archive)

On 21 September 2016 the collar of female bear F15, captured on 21 August 2015 also within the framework of the *LIFE DINALP BEAR* project, was removed as it was malfunctioning. It was removed using the "drop off" system whereby the collar can be detached remotely using a radio signal.

Road accidents

During 2016 there were **no cases recorded** of road accidents in the province of Trento.

The case of bear M32 should be recalled, hit and killed by a train in Switzerland, as reported above in the section on "Missing bears".

So the number of incidents recorded since 2002 is still 27 (of which 2 in the province of Bolzano).

Bear dogs

The "bear dogs" project was started 10 years ago. In 2016 **two further puppies**, were bought in Germany, originally from Belarus (photos nos. 15 and 16), bringing the number of dogs units to 6.

Photo no. 15 - New recruits in the bear dogs (D. Asson - APT Forestry and Wildlife Department Archive)

Photo no. 16 - Bear dogs during training (D. Asson - APT Forestry and Wildlife Department Archive)

A vet with particular expertise in Nordic dogs provided useful support in the difficult selection of the right individual dog. Two new dogs were assigned to two handlers, who had received training with a specific course, to perfect their operational ability in deterrence and tracking. The goal is obtain a quality certification, which would be a first in Europe.

In 2016 the dogs were put into action on **27 occasions**: 1 attempt at deterrence, 3 inspections after close encounters between man and bear, 1 recovery of a radio collar, and 22 direct interventions to check for damage or look for proofs of presence.

4. Communication

The provincial government considers communication to be of fundamental importance in the management of the bear population. It is one of the six programs of action in the aforementioned provincial government resolution no. 1988 of 9 August 2002.

In view of this, in **2003**, a specific **information campaign** was launched entitled **"Getting to know the brown bear"**. It has been fulfilled in numerous and varied initiatives, and continues to be so. One of the functions of this Report is educational, and as such it is part of the initiatives aimed at making the bear better known by the wider public, with the firm belief that only knowledge can lead, in the medium and long term, to better coexistence with the bear.

In these activities the Forestry and Wildlife Department is constantly supported by the **Adamello Brenta Natural Park**, which has been as very active in this territory for many years and by the **Trento Science Museum**.

Since **2015**, communications on bears and large carnivores have also benefited from another new tool the **"Participation and Information Working Group for the Management of Large Carnivores"**, which has started its work, with two meetings on 26 April 2016 and 12 December 2016.

During 2016 the **Communications Working Group**, continued its work regularly, coordinated by the **APT Press Office**, and with the participation of representatives of the **Forestry and Wildlife Department**, of **Trentino Marketing**, of the **Adamello Brenta Natural Park**, of **MUSE** and **SAT (Società degli Alpinisti Tridentini – the Society of Trentino Montaineers)**.

Also in 2016, in collaboration with the Press Office of the Province, the **official website on bears and large carnivores (www.orso.provincia.tn.it)**, which has been live since 2003, was updated, with a new look and above all new content. One of the most important new additions to the site is the section entitled "True or false?" where incorrect information reported by the media is adressed.

Finally in 2016, the original (2003) **Communications on the Bear Project**, was updated, edited by the Trento Science Museum and the Adamello Brenta Natural Park, under the guidance of APT and especially its Press Office.

The main activities that took place in 2016 are summarised below.

Evening talks and public meetings

Table no. 1 lists the meetings/evening talks organised by the Forestry and Wildlife Department as part of the information campaign on "Getting to know the brown bear" (approximately 1,350 participants in total). Most of these meetings were organised in response to local requests for information and discussion.

Table no. 1

Type	Date	Venue	In collaboration with	n. partecipants
Public meeting	04/02/2016	Villazzano (TN)	Local association	40
Meeting with university students	18/02/2016	Polytechnic of Milan	Polytechnic of Milan	20
Presentation of the Bear Report 2016	09/03/2016	MUSE		180
Public meeting	12/04/2016	Arco	Comune di Arco	100
Meeting with students	19/04/2016	San Michele all'Adige	Ist. Agrario San Michele all'Adige	700
San Michele all'Adige Agricultural College	04/05/2016	Cei (Villalagarina)	Associazione cacciatori trentini	40
Public meeting	06/05/2016	Ravina (TN)	Circoscrizione	30
Public meeting	23/06/2016	Pomarolo	Amministrazione comunale	90
Public meeting	26/07/2016	Brentonico	Amministrazione comunale	50
Public meeting	05/08/2016	Candriai (TN)	Circoscrizione e APT Trento-Valle dei Laghi	100
Public meeting	02/11/2016	Università di Padova	Università di Padova	40

16 press releases concerning bears were issued, with the support of the Press Office. Also information was supplied to provide answers to **11 questions raised by the provincial council**.

Communication activities led by SAT

- 22 January 2016: evening talk on large carnivores at SAT San Michele all'Adige.
- 4 March 2016: evening talk on large carnivores at CAI Laives.
- 1 April 2016: evening talk on large carnivores at SAT Aldeno.
- 18 May 2016: evening talk on large carnivores at SAT Rovereto.
- 23 May 2016: evening talk on large carnivores at SAT Folgaria.
- 17 June 2016: evening talk on large carnivores at Rifugio SAT Riva del Garda.
- 6 September 2016: evening talk on large carnivores at Campo Lomaso (Pro loco Piana del Lomaso).
- 18 October 2016: evening talk on large carnivores at SAT Mori.
- 24-25 September 2016: course on "Bears and Large Carnivores: Coexistence is Possible" in collaboration with the APT Forestry and Wildlife Department, the CAI Large Carnivores Group and PNAB.

These events were organised as part of the activities of the Large Carnivores Group of the CAI. Those focussed on wolves were organised with the support of *LIFE WOLFALPS*.

Informative materials

- **Publication of the "Bear Report 2015"** (1.000 copies);
- **Leaflet *"The Brown Bear in the Dinarides and the Alps"*** produced by the partners of the *LIFE DINALP BEAR* project in March 2016 in three languages (2,000 copies in Italian, figure no. 7);

Figure no. 7 - Booklet *"A Guide to the Management of Conflict between Man and Large Carnivores"*

Figure no. 8 - Leaflet *"The Brown Bear in the Dinarides and the Alps"*

- **Booklet** ***"A Guide to the Management of Conflict between Man and Large Carnivores"*** produced by the partners of the *LIFE DINALP BEAR* project in March 2016 in three languages (300 copies in Italian, figure no. 8);
- **Leaflet** ***"Keeping Wild Bears away from Human Food"*** produced by the partners of the *LIFE DINALP BEAR* project in August 2016 in three languages (2,000 copies in Italian).

Other communication activities

The Forestry and Wildlife Department has contributed to scientific and informational articles and interviews, with direct contributions and / or by contributing data and material in the following cases:

- Interview about bears on **Sereno Variabile - TV RAI 2** - 25 January 2016.
- Training on large carnivores for aspiring hunters, as part of the **hunting license course** organised by the Forestry and Wildlife Academy of Trentino - Mezzolombardo - 3 February 2016.
- Recording of a show for the TV programme **"Obiettivo Trekking"** on the subject of the presence of bears- Trento - 8 February 2016.
- Article for the magazine **"Terra Trentina"** - 25 February 2016.
- Article for the online magazine **"Repubblica.it"** - 3 March 2016.
- Training on large carnivores for aspiring hunters as part of the **hunting license course** organised by the Forestry and Wildlife Academy of Trentino- Tione di Trento - 31 March 2016.
- Training on large carnivores for aspiring hunters as part of the **hunting license course** organised by the Forestry and Wildlife Academy of Trentino - Predazzo - 18 April 2016.
- Training on large carnivores for aspiring hunters as part of the **hunting license course** organised by the Forestry and Wildlife Academy of Trentino - Borgo Valsugana - 20 April 2016.
- Training on large carnivores for aspiring hunters as part of the **hunting license course** organised by the Forestry and Wildlife Academy of Trentino - Rovereto - 26 April 2016.
- Interview on the subject of bears for the TV programme **Zimbar Erde - Trentino TV** - 3 May 2016.
- Interview on the subject of bears for **Radio Svizzera** - 3 May 2016.
- Training on large carnivores for aspiring hunters as part of the **hunting license course** organised by the Forestry and Wildlife Academy of Trentino - Tuenno - 4 May 2016.
- Interview on the subject of bears for TV **RTTR** - 20 May 2016.
- Interview for the online magazine **"Il Dolomiti"** - 16 August 2016.
- Article *"Evaluating mortality rates with a novel integrated framework for non-monogamous species"* - **Conservation Biology**, Volume 0, No. 0, 1-13 (MUSE, University of Grenoble, ISPRA, PAT e IMEDEA).
- Article *"Investigating the potential of opportunistic sighting data to inform wildlife conservation strategies"* - **Biorxiv**.
- Interview for the TV show **"A tambur battente show"** - 15 September 2016.
- Interview for **RAI di Bolzano** for a documentary on the relationship between man and large carnivores 28 October 2016.
- Article for the online magazine **"Il Fatto Quotidiano"** - 8 November 2016.
- Interview for the TV programme **Geo & Geo** on **RAI 3** - 30 November 2016.

5. Staff training

The correct management of a bear population is inextricably linked to the availability of staff that has been specially trained and prepared to face the technical and other problems that may arise in the field, especially with regards to managing emergencies, damage, and to a lesser extent, monitoring. Training is one of the six Programmes of Action described in the aforementioned Resolution no. 1988 of 9 August 2002 of the provincial government.

The training events carried out during 2016 are listed below.

- Meeting to update and **train forestry staff** on the management of large carnivores with particular focus on critical situations (Casteller, 3 March 2016).
- Participation as speakers in the **Training Course on the Management of Critical Situations and Problem Bears** organised by the Veneto region as part of the activities within the *LIFE DINALP BEAR* project (Paluzza, 4 -8 April 2016).
- Meeting to update and train forestry staff on the monitoring of large carnivore and ascertaining any damage they cause (Casteller, 18 April 2016).

Photo no. 17 - Training meeting for forestry staff (D. Asson - APT Forestry and Wildlife Department Archive)

- Practical **training of forestry staff** in charge of ascertaining damage, in particular to bee-keeping activities (Mezzolombardo 3-4 May 2016).
- Meeting to **train forestry staff** on the management of conflict between humans and large carnivore (speaker dr. Seth M. Wilson) and on prevention measures (speaker Giovanni Ghislandi) from bear and wolf damage (Casteller, 28 June 2016, photos nos. 17, 18 and 19).
- Meeting to **train forestry staff** of the Rovereto-Riva District Office on administrative requirements when ascertaining damage by large carnivores (Malga Dossioli, 9 September 2016).

Photo no. 18 and no. 19 - Training of forestry staff (D. Asson - APT Forestry and Wildlife Department Archive)

- **Course for journalists** (80) as part of the training activities designed for journalists - Palazzo della Regione - 2 February 2016.
- **Field trip for journalists** in collaboration with the Adamello Brenta Natural Park - Villa Santi - 15 April 2016.
- **SAT course** on large carnivores at Villa Santi, in collaboration with the Adamello Brenta Natural Park- 24-25 September 2016.

6. National and international links

Links with neighbouring regions and countries have a strategic importance in the management of a highly mobile species such as the brown bear. Because of this, even before the start of the Life Ursus project, official contact was made with the neighbouring regions, as it was clear that the area of western Trentino is not sufficient for a viable population of bears. Over time these links have been strengthened and consolidated, with regard to both the territorial expansion of the small population which effectively concerned neighbouring regions and countries, and also the clear focus on coordination emanated by the provincial government with Resolution no. 1988 of 9 August 2002. As a result, links outside the province were institutionalised, and following a proposal of the Ministry for the Environment and the Protection of Land and Sea, and with the coordination of APT, in 2010 the PACOBACE (Plan of Action for the Conservation of the Brown Bear in the Central-Eastern Alps) was approved by all partners. In addition to the Autonomous Provinces of Trento and Bolzano, it also involves the regions of Lombardy, Veneto and Friuli Venezia Giulia.

The *LIFE + "DINALP BEAR"* (2014-2019)

APT has subscribed to the ***LIFE "DINALP BEAR"*** project (figure no. 9) as part of the LIFE + Natura European Commission financial plan (with funds of 248,011 euro available to APT, including a EU quota of 173,608 euro). The objective of the project, running from 1 July 2014 – 30 June 2019, is the management and the conservation of the brown bear population on the north Dinarides and on the Alps, with the involvement of partners from Italy, Austria, Slovenia and Croatia.

Figure no. 9 - Logos of the Natura 2000 Network and the *LIFE+ "DINALP BEAR"* project.

LIFE DINALP BEAR

Life

NATURA 2000

LIFE13 NAT/SI/000550

As part of the LIFE + "DINALP BEAR"project, in order to **monitor the effectiveness of prevention measures** supplied to users, during 2016 30 camera traps with their accessories were purchased.

Photo no. 20 - Monitoring of prevention measures with camera traps (D. Asson - APT Forestry and Wildlife Department Archive)

During summer, forestry staff carried out random checks of a number of prevention measures. This provided useful information on their ability to protect assets and on their interaction with wildlife (photo no. 20).

In accordance with the project, **the capture of bears** continued to take place in order to fit them with radio collars (see the section on "captures"), as did initiatives aimed at enabling the project's various partners to share their experiences.

The large carnivores platform of the Alpine Convention

The **Large Carnivores Platform of the Alpine Convention** (figure no. 10), set up in 2009, continued its work in 2016. The Autonomous Province of Trento is represented within the Italian delegation. The 2016 meeting was held in Valdieri in the province of Cuneo on 20-21 January.

Figure no. 10 - Logo of the Alpine Convention

alpenkonvention • convention alpine

Conferences

The provincial administration took part in the following international conferences, with presentations on its management of bears and large carnivores:

- participation in a **conference on Large Carnivore**s organised by the delegation of the **Bavarian State** at the **EU - Brussels (B)** - 15 February 2016;
- participation in the **international conference on bears** held in **Landquart (CH)** - 29 April 2016, organised in association with the Pronatura association and the WWF from Switzerland;
- participation in the **International Bear Association Conference in Alaska (USA)** - 12-18 June 2016 (figure no. 11), presenting a paper on "Monitoring the brown bear in Trentino - Italian Alps";
- participation in the **Conference on Large Carnivores' Protection in the Carpathians**, organised by the **Carpathian Convention** at Roznov pod Radhostem (CZ) - 18-21 October 2016 (figure no. 12).

Figure no. - IBA 2016 logo 2016

IBA 2016 Anchorage, AK

Figure no. 12 - Logo of the Carpathian Convention

CARPATHIAN CONVENTION

APPENDIX I
Lynx

(C. Frapporti - APT Forestry and Wildlife Department Archive

The **monitoring** of the species **began** when lynx returned to the province, in the second half of the 1980s, with the appearance of several cats in **eastern Trentino** (they were present for about a decade).

For this species as well, traditional field survey methods were used alongside camera traps, radio-tracking and genetic monitoring.

As is known, the only lynx still definitely present in the province of Trento in recent years (since 2008) is the **male known as B132**, originally from the small reintroduced population in the Swiss canton St. Gallen (see page 45 and following of the 2008 Report, and the "Linx" appendix in all subsequent reports).

During **2016**, for the first time since 2008, it was not possible to document the lynx's presence with certainty. But on **14 March**, Ledro forestry staff spotted **paw-prints on the snow** that could be attributed to the lynx in the area of Tremalzo (photos nos. 1 and 2). It could be confirmation of the presence of B132 in the area even though, as has been said above, there is no definitive proof.

Photos nos. 1 and 2 - Single paw-print and track on snow photographed by staff of Ledro Single forestry station D. Zanetti - APT Forestry and Wildlife Department Archive)

This year as well there were no cases of damage to livestock attributable to the lynx in the province.

APPENDIX II
Wolf

Monitoring **began** when the first wolf reappeared in the province, in **2010**. For wolves too, genetic monitoring, traditional sample collection in the field and camera traps were all used from the beginning. In 2016, for the first time, organic samples collected in the province of Trento were analysed by the genetics and conservation laboratory of the **Edmund Mach Foundation (FEM)**.

During 2016 **144 data** ascribable to **wolf** have been detected (figure n. 1), leading to the collection of 202 organic samples.

Figure no. 1 - Spatial distribution of signs of presence attributable to wolves in the province during 2016, distinguishing between packs, pairs and solitary individuals

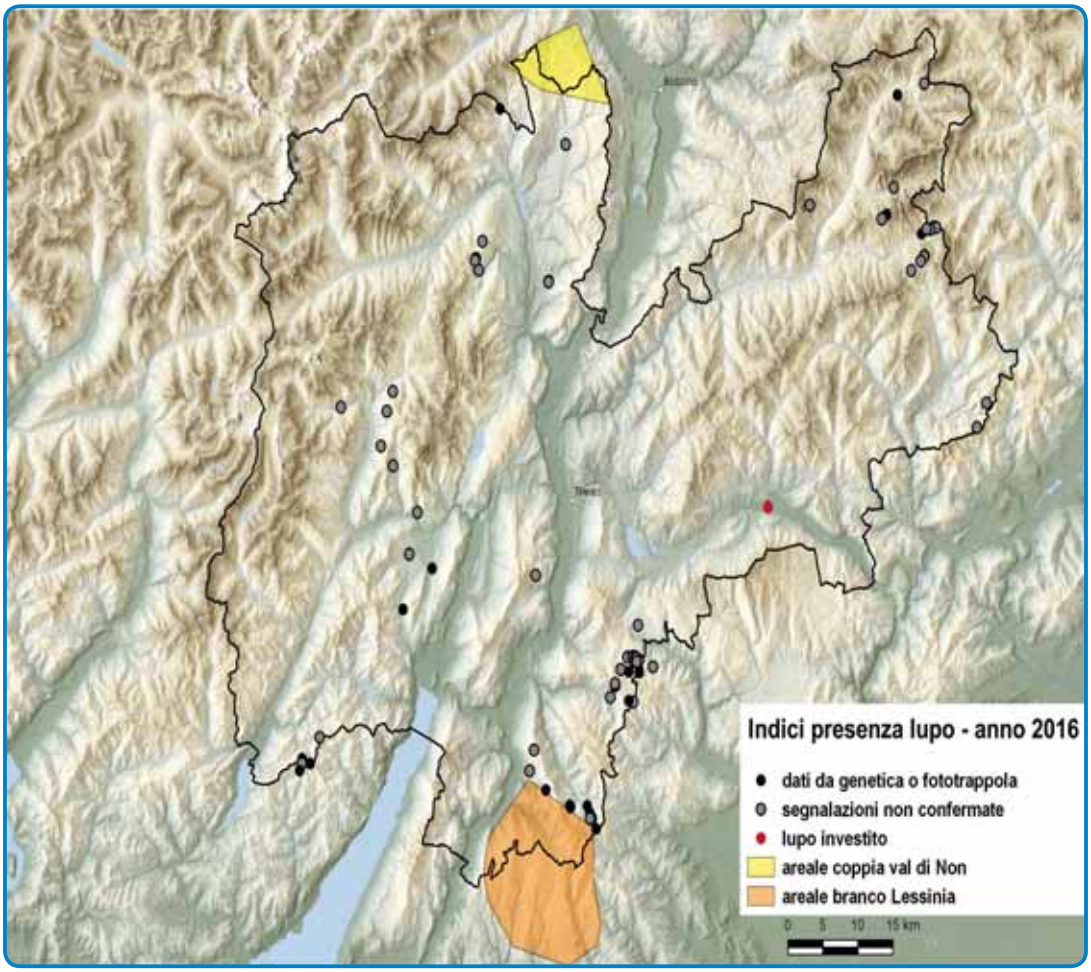


Photo no. 1 - 2016 cubs in Lessinia (M. and D. Peterlini)

It is known (see the appendices on wolves of previous reports) that a pair of wolves has been present since 2012 on the **Lessini**, mountains, in the border area between the provinces of Trento and Verona. They produced their first two cubs in spring 2013. A further 7 cubs were born in 2014, and the same number again in 2015. This year staff of the CFS and of the Regional Natural Park of Lessnia – VR ascertained the presence of **another litter of 6 cubs** in the province of Verona, through direct observation and with photographs (photo no. 1).

Based on tracks found on snow, pictures captured by the camera traps and sightings, the **pack** appears to be made up of 10-12 wolves (6 cubs + 4-6 adults) at the end of 2016.

Photo no. 2 - Pair of wolves in the upper Val di Non (Archive of the Hunting and Fishing Office of the Autonomous Province of Bolzano)

In **2016** the area of the **upper Val di Non** saw the formation of a **pair** (see the area map in figure no. 1 and photo no. 2), whose genetic identity has not yet been established. It is possible that this pair may reproduce in spring 2017, thus creating a second pack which would also affect the province.

Other sightings of wolves, confirmed by genetic testing, took place in the **Val di Ledro** on the border with the regional park of Alto Garda Bresciano, an area in which the presence of a single male was documented during the summer, near the **Ballino Pass** and in **Val Lomasona** where the same individual preyed on domestic animals in autumn.

In the same area, it was possible to document for the first time in Trentino, on the carcass of a llama that had been preyed upon by bears, the presence of both wolf and bear (at different times - photos nos. 3 and 4).

Photo nos. 3 and 4 - Wolf and bear captured by camera trap near the Ballino Pass (V. Calvetti - APT Forestry and Wildlife Department Archive)

Also in **Valsugana**, in the area bordering the Asiago plateau, the presence of wolves was reported a the beginning of 2017. A not very clear photograph and some tracks on the snow would prove its presence, as we await genetic confirmation. Genetic testing made it possible to identify **the wolf that was hit by a vehicle** in Valsugana on **21 April 2016** (photo no. 5); it is a young male that was born in 2015 in Lessinia. The death of this wolf, 50 km from its birth place as the crow flies, is further proof of the species well-known ability to disperse.

Once again the presence of wolves was documented during the year, with lesser or greater regularity, in the areas of **Vallarsa, Folgaria, Monte Bondone, Val Rendena, the Brenta - Nord group, Primiero, Fiemme e Fassa** (figure no. 1); these appear to be individual wolves who could have originated from the Lessinia pack, but naturally other provenances are possible.

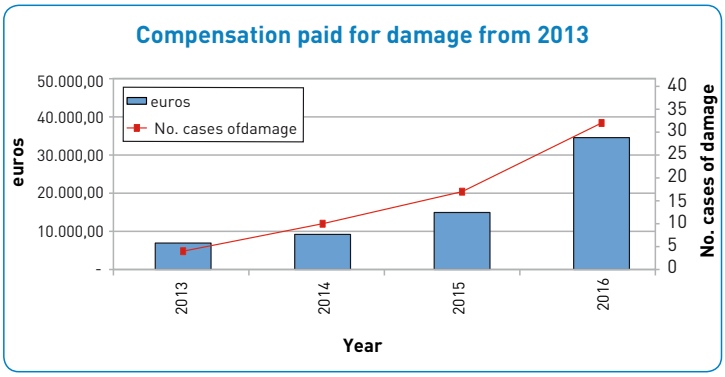
More recently (January 2017) the area around **Val di Rabbi** also saw predation of cattle by wolf. It is probable that this is a different individual from the pair present in Val di Non.

Photo no. 5 - Wolf hit by a vehicle in Valsugana (R. Deville - APT Forestry and Wildlife Department Archive)

Damage management

In 2016 the Forestry and Fauna Department received **32 reports of alleged damage by wolves**. **30 requests for compensation** were received; all were accepted. In all cases the report of damage was followed up by an inspection by forestry staff, who wrote the report. Overall **34,567.93 €** were paid for damage to cattle (18,180.85 €) and sheep and goats (16,387.08 €). It is the third consecutive year in which there is a rise in the cases of damage caused by wolves (graph no. 1).

Graph no.1



Nearly all cases of damage in 2016 **(29)** was recorded in eastern Trentino, 14 in the area of Lessinia, 6 on the range of the Piccole Dolomiti - Carega, 1 in Vallarsa and 8 in the area of Primiero -Val di Fiemme. In **western Trentino** only 1 case of damage was recorded. Overall predation affected 14 cases of cattle (14 dead animals and 2 injured), and in 16 sheep or goats (107 dead animals and 3 injured).

For the Lessini pack, also taking into account damage (photo no. 6) on the Verona side, in total 95 predatory events were recorded, 69 on cattle (64 dead and 5 injured, 22 on sheep and goats (131 dead and 5 injured) and 4 on equines (2 dead and 2 injured). Data on the Verona side of the Lessini mountains were supplied by the Regional Natural Park of Lessinia (VR).

Photo no. 6 - Remains of a cow predated on by the pack of wolves of Lessinia (T. Borghetti - APT Forestry and Wildlife Department Archive)

Photo no. 7 - Transport of an accommodation unit for shepherds to the Carega (D. Asson - APT Forestry and Wildlife Department Archive)

In 2016, in order to mitigate the impact of predation by wolves on livestock, at Malga Vallorsara (Folgaria) an **electrified fence** (140 cm high, with 7 strands of galvanised wire) was funded, and in Lessinia (Malga Riondera) and the Piccole Dolomiti (Malga Posta) a total of **3 guard dogs** of the Pastore Maremmano-Abruzzese breed were handed over.

The activity of the **animal husbandry experts** was mainly focussed on 3 pastures in the areas of Lessinia and the Piccole Dolomiti where wolves are present constantly. The manager of a mountain farmstead was provided with 1 box (accommodation unit, photo no. 7) on loan to enable the shepherds to remain in proximity of the flock during the night, and electrified fences (140cm high) with electrifiers and rechargeable batteries charged with solar panels.

The **results** in this case were **satisfactory**: overall **4 attacks** by wolves on the protected livestock (approximately 630 heads) were ascertained, causing the total loss of **5 sheep** representing **0.8%** of the animals at pasture.

Communication

Communications activities that involved the department's staff in 2016:

- Public meeting at **Ala** - 15 January 2016.
- Course on wolf in collaboration with the SAT - **Monti Lessini** - 13 February 2016.
- Course on wolf for colleagues from South Tyrol (Hunting and Fishing Office, Museum, others) - **Monti Lessini** - 24 March 2016.
- Public meeting at **Margone di Vezzano** - 7 April 2016.

- Public meeting at **Ala** as part of the Categories Group *(LIFE WOLFALPS* project*)*, promoted by MUSE - 21 April 2016.
- Meeting with livestock farmers at **Paneveggio** - 30 June 2016.
- Presentation to the management committee of the **Paneveggio Pale di S. Martino Natural Park** - 4 October 2016.
- Public meeting on wolves at **Trambileno** - 18 November 2016.
- Public meeting on wolves at **Brez** - 1 December 2016.

In addition new information **leaflets** were produced and distributed **"The Wolf in Trentino"** (1,000 copies) and **posters** (1.000 copies).

Finally it should also be noted that the APT has been involved as a supporter in the **LIFE WOLFALPS** project (figure no. 2). Specifically, staff of the Forestry and Wildlife Department contributes to monitoring and communications activities on the presence of the wolf in collaboration with MUSE (project partner) and with the Adamello Brenta Natural Park and the Stelvio National Park.

Communication activities on wolf carried out by MUSE in 2016

In 2016 MUSE focussed particular attention on communications on the subject of large carnivores, in part thanks to its involvement in the *communications activities of the* ***LIFE WOLFALPS*** project *(LIFE12 NAT/IT/000807)*.

Communications in schools was addressed in 2016 with the creation and promotion of a new-workshop entitled "Men, Bears and Wolves", a joint project within the EU LIFE WOLFALPS projects and *LIFE DINALP BEAR - LIFE 13 NAT/SI/000550*. The new workshop addresses the delicate topic of a possible coexistence between men and large carnivores. 210 students took part during the year. In February a continuing education course was held for teachers. 28 people attended. All the activities around large carnivores were presented during "2 days for school", an event held at MUSE in September every year for teachers, gathering hundreds of teachers, including from neighbouring regions. Also as part of the *LIFE WOLFALPS* project, a ***board game, "It's a Wolf's Life"*** was created. It was presented and tested in various occasions by teachers and the general public and at the sector conference "Innovation in Teaching Science in Primary and Infant School: at the Crossroads between Sciences and Humanities" (2-3 December 2016, University of Modena and Reggio Emilia).

3 evening meetings/ conferences were organised to provide information for the general public. A total of 480 people attended. The second local platform of *LIFE WOLFALPS* for sector associations and people involved in the natural return of wolves in Central Alps, organised at Ala in April, had 30 participants.

MUSE had a *LIFE WOLFALPS* stand within the larger stand of the booth APT Forestry and Wildlife Department at **Expo Riva Caccia Pesca Ambiente** (the Riva Hunting, Fishing and Environment Exhibition).

Activities aimed at the general public and families included the creation of an Exhibition at MUSE of the photographs taken by the winners and finalists of the *LIFE WOLFALPS* photograhy competition **"#Postidalupi"** (18 March-29 May); 12 s**ummer workshops in Val di Tovel** (in collaboration with PNAB) on the subject of large carnivores, with a total of 79 participants; the début of the *LIFE WOLFALPS* stage show ***"Rendez-vous 2200"***, with a total audience of 320 in two shows at the Teatro Cuminetti in Trento on 25 November; the show "Peo e l'orso" (Peo and the Bear) performed in front of an audience of 67 on 24 December.

Communication activities on wolves by SAT

- 12 March 2016: participation in the conference “Incontro con il lupo” (Meeting the Wolf), Palamonti CAI Bergamo.
- 13-14 and 27-28 February 2016: course “San Valentino tra i lupi - due giorni in Lessinia sulle tracce del lupo” (San Valentino among the wolves - two days in Lessinia on the traces of the wolf) in collaboration with the APT Forestry and Wildlife Department, the CAI Large Carnivores Sector, the Regional Natural Park of Lessinia, the State Forestry Corps, Amici del Revoltel and the support of the *LIFE WOLFALPS* project.

Figure no. 2 - Logos of the Natura 2000 network and the *LIFE WOLFALPS* project.

NOTES

AUTONOMOUS PROVINCE OF TRENTO

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