REPORT

2017 LARGE CARNIVORES

**PROVINCIA AUTONOMA
DI TRENTO**

APT FORESTRY AND WILDLIFE DEPARTMENT
Large Carnivores Division

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2017 LARGE CARNIVORES REPORT

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CONTENTS

THE BEAR

Concerning the bear, the provincial Government sets out the operational guidelines in Resolutions no. 1428 and no. 1988 of 21 June 2002 and 9 August 2002. Specifically, six **Programmes of Action** were identified (Monitoring, Management of Damages, Management of Emergencies, Staff Training, Communication and National and International Networking), to which this section refers.

1. Monitoring

Photo 1 - Monitoring activity (C. Groff - APT Forestry and Wildlife Department Archive)

Bear Monitoring (photo 1) has been continuously carried out by the Autonomous Province of Trento (APT) since the **1970s**. Over the years, together with the traditional survey techniques in the field, radiotelemetry (a method first used in Eurasia in 1976), automatic video controls by remote stations, camera traps and finally, since 2002, genetic monitoring have started to be used.

Genetic monitoring is based on the collection of organic samples (hairs, scats, saliva and

Photo 2 - Monitoring of rub trees (C. Groff - APT Forestry and Wildlife Department Archive)

tissues) and is implemented using two methodologies.

Systematic monitoring is based on the use of traps made with barbed wires and scent bait, designed to "capture" bear hairs, while **opportunistic monitoring** is based on the collection of organic samples found in the area during routine activities, at damage sites and by checking **rub trees** (photo 2).

Systematic monitoring follows a planned and standardized sampling protocol organized at a spatial and temporal scale, with the purpose to estimate the number of individuals present in the area without necessarily "capturing" all of them through genetic testing. A correct sampling protocol allows to apply statistical models able to quantify the average probability of a bear being genetically "captured" in the most effective way. In the last few years, genetic monitoring has represented the key technique for collecting information on the
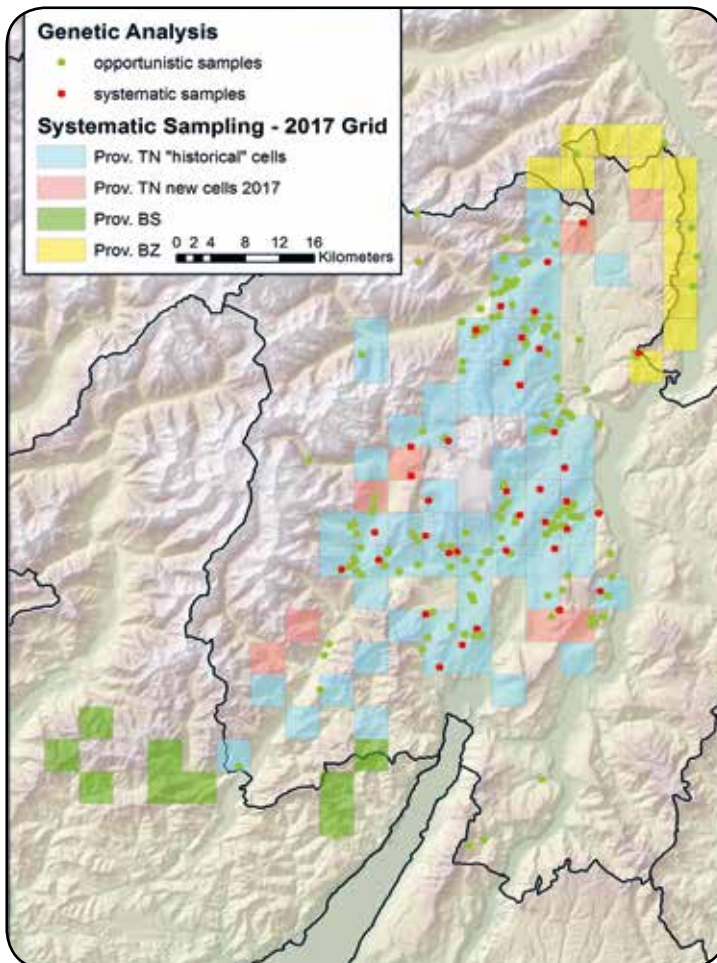
bear population inside the province of Trento. The monitoring was conducted in 2017 as well, for the **sixteenth consecutive year**, coordinated by APT Forestry and Wildlife Department, with the collaboration of FEM, ISPRA, PNAB, MUSE, Trentino Hunters Association (ACT) and volunteers.

In particular, during 2017 **systematic monitoring** was carried out at **78 sites**, from 23 May to 17 October. This provided **241** organic samples out of a **total of 749** samples collected; of these, **466** were analyzed. According to the theory of a progressive extension of the area used by the population, the sampling area of the systematic monitoring was extended, including the northern and southern parts of western Trentino (respectively a new site in Sole valley, one in the upper part of Non valley and four new sites in Rendena valley and in the Giudicarie).

For the second year, thanks to the collaboration of the **Autonomous Province of Bolzano**, the **Province of Brescia** and **ERSAF** (Regional Institution for Agriculture and Forestry), the systematic monitoring area was extended to areas adjacent to the Non valley in the province of BZ (14 sites), Valcamonica, Caffaro valley, Trompia valley and the upper Lake Garda area (9 sites) (Figure 1). 6 further samples were collected at the new sites. As shown in Figure 1, most of the organic samples collected using hair snare traps are concentrated in the central part of the sampling grid, where density and level of presence of the bears are higher.

Further samples were collected in an opportunistic manner outside the province, contributing to determine the **total** number of bears identified belonging to the central Alps **brown bear population**; the relative data were kindly provided by the **Autonomous Province of Bolzano**, the **Autonomous Region of Friuli Venezia Giulia**, the **University of Udine**, Department of Agrarian, Environmental and Animal Science, the **Lombardy** and **Veneto Regions** and the **Provinces of Brescia** and **Sondrio**.

The **data were** yearly collected and processed, with reference to the **solar year** (1/1 – 31/12), which effectively coincides with the "biological

Figure 1 - Geographical distribution of the areas in which the hair snares were set and checked in 2017; red circles show successful genetic determination for hairs collected using systematic monitoring; green circles represent successful genetic determination of organic samples collected in the context of opportunistic monitoring

year" of the bear, allowing to get an overview of the situation just before the new births and during the period of bears least activity.

It is nevertheless implicit that the cited monitoring techniques do not guarantee the detection of **all the bears present** in the area. However, retrospective reconstruction of the population and the application of statistical methods to systematic and opportunistic monitoring, allow to provide population estimates.

In 2017 **genetic testing** was carried out in a fully coordinated manner by the Conservation Genetics Research Unit of the **Fondazione Edmund Mach** for samples collected within the Province of Trento and by **ISPRA** for some fast analyses of samples from the Province of Trento and for samples collected in the remaining territory.

In 2017 systematic monitoring based on **the use of camera traps** continued, the updates being illustrated in the following Box 1.

BOX 1 – Systematic monitoring of large mammals using camera traps. Update of the third year of sampling

*This box presents some of the results, with particular reference to those on brown bears, of the long-term wildlife monitoring program through the **systematic use of camera traps**, begun in summer 2015 and repeated in 2016 and 2017. The project is included in the agreement between APT and MUSE for the monitoring of large carnivores. The monitoring protocol adopted, which is characterised by the systematic nature of the sampling and the reliability of the data generated, derives from the positive experience gained from the use of camera traps to study the use of rub trees by bears, carried out in 2011, 2012 and 2013, with the more general objective to monitor the whole community of medium-sized and large mammals over time. Here we provide some results on brown bears obtained in 2017, with purely descriptive report of the results obtained in previous years.*

The study area (around 220 km², defined during the starting phase of the project in 2015, was selected in order to represent the elevation gradient and the forest habitats of the area, and overlaps partially with the Parco Naturale Adamello-Brenta (PNAB) and the core area of the brown bear population, the target species of greatest interest in the study. In accordance with the protocol, in summer 2017 the sites chosen in 2015 were sampled again, using Reconyx HC500 camera traps. Set at over 60 points (Figure A) and active for at least 30 consecutive days each, the cameras were originally used at 30 sites for a month and then subsequently transferred to the remaining 30 sites for a further month. The sampling stations were at around 1.5-2.5 km from one another, on footpaths or forest roads, in order to be representative of all the elevation bands between 500 m and 1900 m. The cameras were attached to trees opposite to the footpath/road, at a distance of 2-4 metres. They were set to photo mode (3 consecutive shots per passage), continuously working mode, and equipped with a memory card of at least 4 GB, which can store several thousand images.

According with previous years, in 2017 the sampling was carried out from 4 June to 24 August, with a total of 2001 camera days (average of 33.9). Two camera traps were stolen during the sampling period. One of the stolen camera traps was replaced, because it was stolen before the routine monitoring surveys. This allowed to include the site in the analysis, with a total of 59 sites usable for statistical purposes in 2017. The cameras recorded a total of

Figure A - Map of the 60 camera trap sites in the study area in 2017. The territory of the Parco Naturale Adamello-Brenta is shown in green
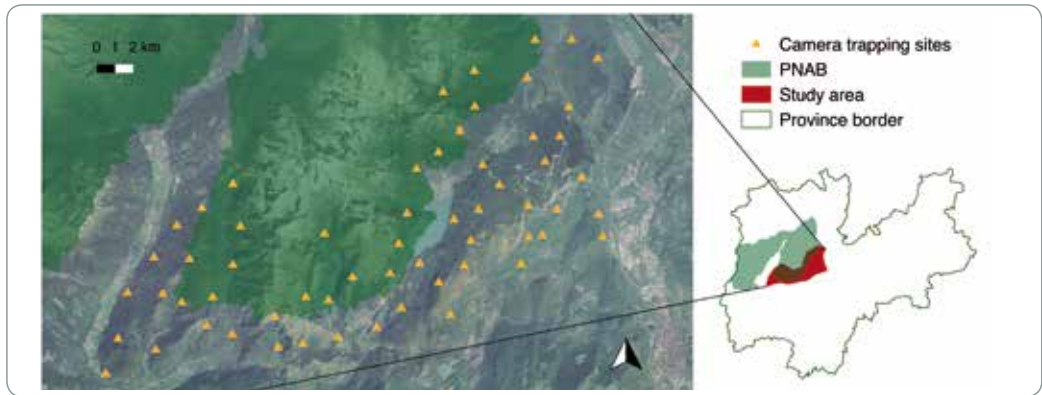
70,547 images, of which 16,059 were images of wild mammals belonging to 9 species. Once again, the presence of domestic species and of man (on foot and in vehicles) was recorded and quantified as well. In addition, to register the number of sites where each species was recorded, and the ratio with the total number of surveyed sites (naïve occupancy), the number of "independent events" for each species was calculated. This was obtained eliminating sequential images from the calculation, because they refer to a single event (as in the case of an animal remaining in front of the camera and generating several images), considering a standard interval of time (15 minutes). Events are, therefore, a more informative and comparable measurement of the frequency of passage than the number of images. In 2017 the presence of the brown bear was recorded at 23 out of the 59 overall sites, with 43 independent events

Photos A and B - Images of brown bears taken by camera traps in 2017

and a maximum of 4 at a single site. 4 camera traps recorded 4 events, distributed over the two positioning grids. The results were consistent with those for both 2016 and 2015, which recorded 22 and 20 sites respectively, with 51 and 39 independent events, with a maximum of 7 events at a single site in 2016 and 6 in 2015. There were 7 sites of passage identified in allthe three years (Figure B and Graphs A, B and C).

Besides the bear, the presence of a number of other mammals was recorded: fox, roe deer, red deer, chamois, hare, marten, badger and squirrel (in descending order in terms of events). Once again there were no events involving the wolf, photographed only by a camera trap in summer 2015 in the Val Algone, in a single occasion.

Finally, it should be pointed out that, while representing a significant amount of data, three years of sampling do not allow to obtain temporal trends for the presence of the studied spe-

Figure B - Map of camera trap sites and events involving brown bears in the study area in the 2015-2017 three-year period, within the systematic monitoring project
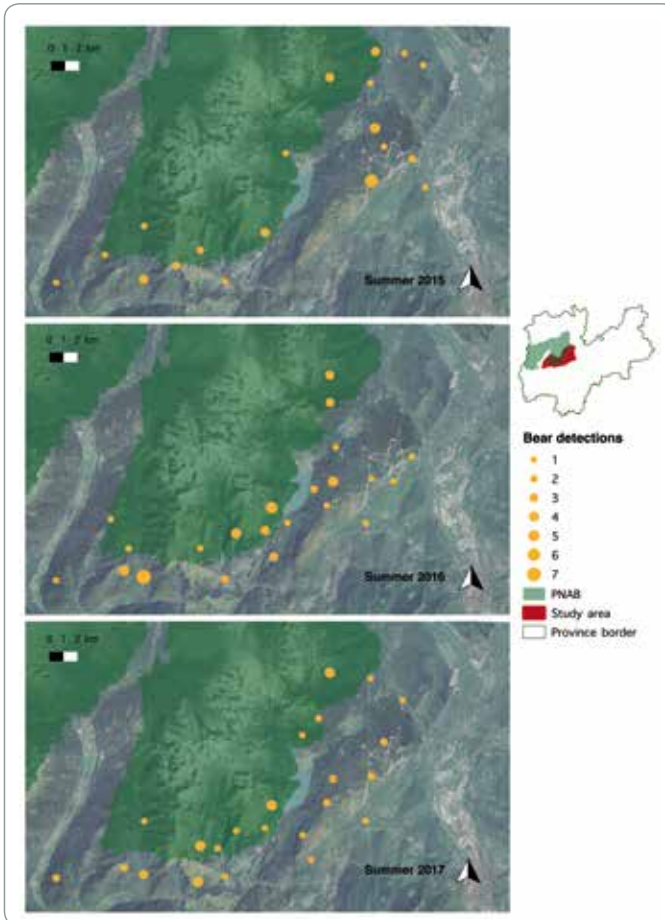
cies, including the bear. With at least five consecutive years of data, it will be possible to begin investigating temporal dynamics for the populations, thus distinguishing between real trends and normal annual oscillations.

During 2017 a study showing the results of the analysis on the data collected in the first year of systematic monitoring (2015) was published, and described distribution and rate of daily activities of the species photographed with camera traps. The study investigated in particular the response of different wild species to different types of anthropogenic disturbance in terms of distribution in space and time. One interesting result for the bear, already noted in the 2016 Bear Report, concerns the "contactability" of the species, namely the ease with which the species can be recorded. The results show that the probability of detecting the "presence" of
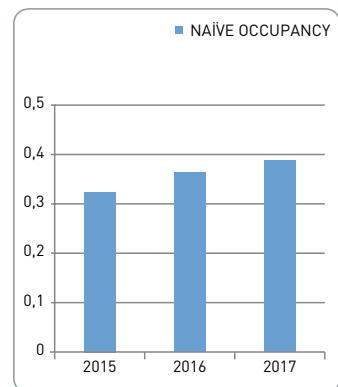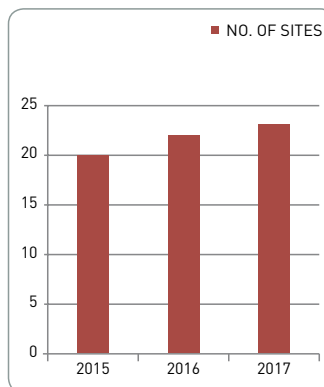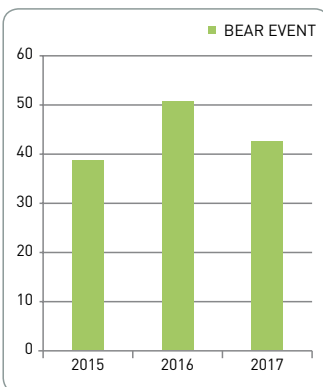
Graphs A, B and C - Camera trap events involving brown bears in the period 2015-2017 : respectively, number of independent events, number of camera trap sites and naïve occupancy (ratio between sites where the species was caught on camera and the number of sampled sites)

the brown bear increases with the increase of the distance from inhabited areas and decreases with the increase of human passages, confirming that the bear tends to avoid men. Further analysis of the effect that the presence of men has on bear presence, and more generally on competition between wild species, namely the effect that the presence of certain species has on the distribution of others, is currently under analyses by MUSE researchers and staff.

For further information: **Oberosler V., Groff C., Iemma A., Pedrini P. and Rovero F., 2017. The influence of human disturbance on occupancy and activity patterns of mammals in the Italian Alps from systematic camera trapping.** *Mammalian Biology-Zeitschrift für Säugetierkunde.*

Preliminary data on the presence of dogs in the area used by bears

A brief analysis of data regarding the presence of people accompanied by dogs in the areas systematically monitored with camera traps is presented here. The subject is interesting, given the relevance that the presence of dogs can have in relation to the risk of aggressive behaviour by bears.
All the images showing dogs obtained during the three-year period 2015-2017 (645) were considered in the study, distinguishing between dogs on and off the leash. Thus the rare cases of free ranging dogs not accompanied by men were excluded, considering only dogs photographed together with their owners or at a short distance from them.

The results showed a clear prevalence (78%) of cases involving loose dogs as compared to dogs on the leash (22%) (Graph D).
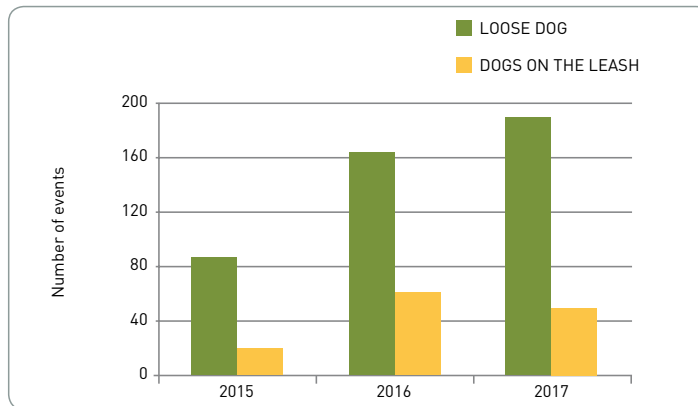
Graph D - Number of events involving the passage of dogs at camera trap sites during the three-year period 2015-2017, respectively loose and on the leash.

The presence of dogs off the leash represents a risk factor in the event of close encounters with a bear, something that should be limited as much as possible. It should also be considered that free-ranging dogs are more likely to disturb wildlife in general.

By **Valentina Oberosler, Aaron Lemma and Francesco Rovero MUSE - Museo delle Scienze**

Status of the bear population in 2017

Definitions

- **"Cubs"**: bears between 0 and 1 year of age;
- **"Young bears"**: males between 1 and 4 years of age and females between 1 and 3 years of age;
- **"Adults"**: males with more than 4 years of age and females with more than 3 years of age, considered sexually mature and capable of reproducing;
- **"Effective population"**: portion of the population capable of participating in reproduction;
- **"Detected bears"**: bears whose presence has been assessed during the last year, either genetically or on the basis of repeated and unequivocal observations (for example linked to telemetry data);
- **"Undetected bears"**: bears not detected only in the last year;
- **"Dispersal"**: movements by bears born in this territory (western Trentino) outside their core area. The dispersal movements are concentrated parcticularly in the western part of Trentino, without reaching the territory usually frequented by bears belonging from the Dinaric-Balkan bear population;
- **"Emigration"**: the movements by bears present in Trentino, towards the territory usually frequented by bears belonging to the Dinaric-Balkan bear population;
- **"Immigration"**: the arrival of bears from the Dinaric-Balkan bear population in the territory where the Trentino bear population permanently live.

Data processing for the **2017** have provided the following information about the identification of bears, the minimum population size, the population size estimate, the estimate of the number of litters, the survival rate, the population dynamics and the habitat use.

It has to be highlighted that the graphs regarding bear demography have been updated not only by entering data for the last year, but also by adding and elaborated data of the previous years on bears that were not detected in the past years but were identified again in 2017 and which, thus, are considered "present" in the previous years as well. This explains the differences that can sometimes

be found comparing graphs of previous Reports. The data updates published every year in the official Report are therefore constantly ongoing, this meaning that the new graphs and data analyses have necessarily to be considered as the new overview, replacing the old ones.

Bear cubs

In **2017** the presence of **8 new litters** during the year was estimated, with a total of **11-13 cubs**. The estimate was obtained through genetic analyses and through their geographic distribution, together with data from direct observations of female bears with cubs recorded during the year (photo 3). Nine of these cubs, were genetically determined and assigned to the cub category on the basis of paternal analysis, while one was observed in images from a camera trap, associated with genetic identification of the mother, one on the basis of direct observation, and two were observed during an infanticide. Thus the estimate of alive cubs at the end of autumn 2017 is **9-11**.

Furthermore, thanks to genetic analyses, **17 bears** not detected in the past years were detected, during 2017, one of which was found dead. Of these, **8 bears** were identified as one-year-old individuals, thus born in 2016.

Photo 3 - Female bear with cubs (APT Forestry and Wildlife Department Archive)

Dead bears

In 2017 the death of four bears was recorded.

Two cubs (perhaps three) were killed by a male bear in Val Ceda on 11 April 2017 (photo 4).

The female bear **KJ2** (aged 15) was shot on 12 August 2017, in compliance with an extraordinary emergency order for public safety reasons.

Photo 4 - Male bear with a cub in its mouth (A. Caliari - APT Forestry and Wildlife Department Archive)

Photo 5 - Bear found dead between Fai della Paganella and Mezzolombardo (D. Asson - APT Forestry and Wildlife Department Archive)

Finally, the female bear **F19** (aged 5) was found dead between Fai and Mezzolombardo on 18 August 2017, the cause of death being unknown (photo 5).

Thus from 2003 up to the present day, **33** bears belonging to the central alpine population (thus including those outside Trentino) **died**. In 10 cases they died for **natural causes (30%)**, in 15 cases the cause of death was **human-induced (45%)** and in 8 cases the cause is **unknown (25%)**. It should be underlined that these figures do not reflect either the total number of dead bears, nor the real ratios in terms of death cause, considering the different likelihood of retrieval (for example, it is much easier to find bears hit by vehicles on roads than those dying from natural causes).

Thus, the deaths of 15 of the 25 bears dead for known causes, can be **attributed to man**: 27% died for **illegal killings (4)**, 46% died **accidentally (7)** and 27% due to **authorised shooting** (4, of which one in Germany, two in Switzerland and one in Trentino).

Graph 1
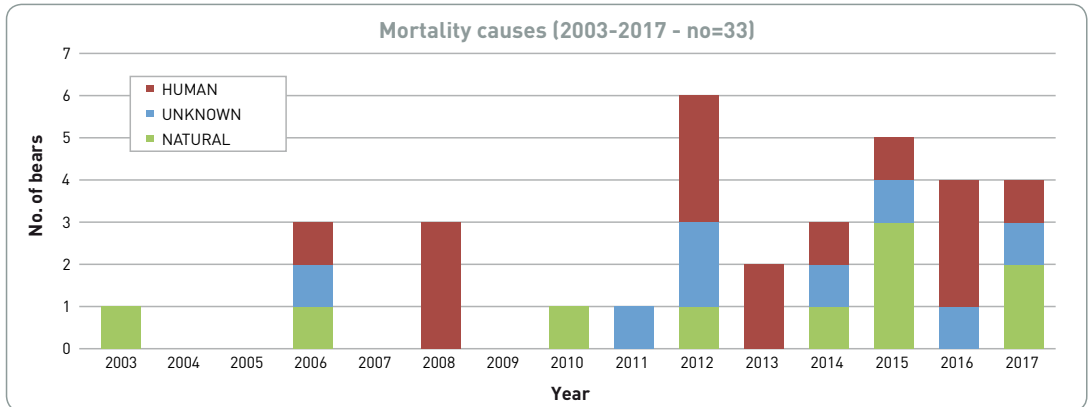
Survival rates

The new data available allow the update of the survival rates for the three different age classes, for the two sexes (Graph 2). The data refer to a **16 years** (2002-2017) period during which it was possible to record survival or death of **110** different **bears**, with 549 passages from one year to another **(549 bear-years)**.

Graph 2

Status

Considering the difficulty of acquiring complete and reliable data on births, it is appropriate **not to include the cubs** in the estimate of the **minimum certain number** of bears.

Based on this criterion, the **minimum certain number** of young and adult animals present in 2017 was **43**, of which **20 males and 23 females** (Graph 3) (*sex ratio* M-F 0.87:1 - n = 43).

Graph 3

Population structure at the end of 2017
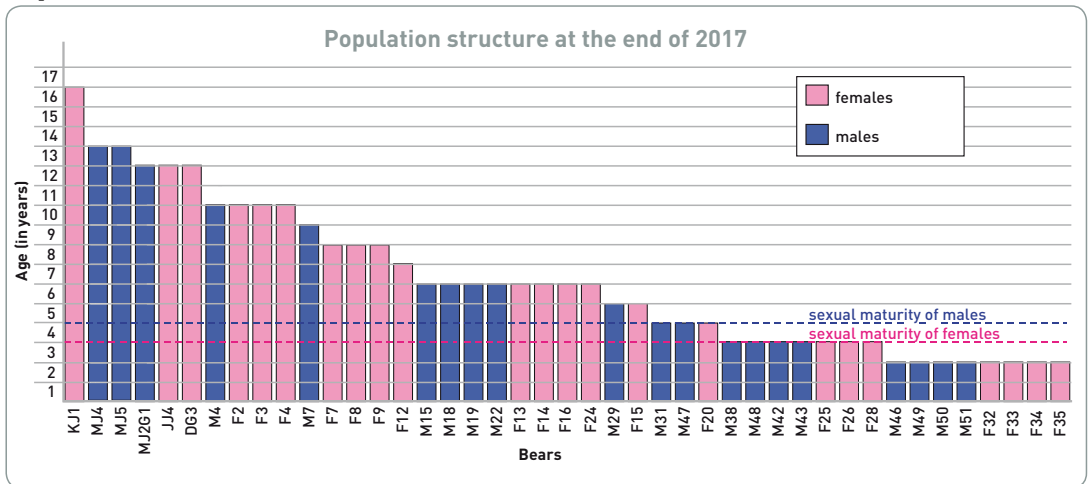
At the end of 2017 the population **structure** (excluding cubs) was, thus, as follows: **26 adults** (**60%** - 10 males and 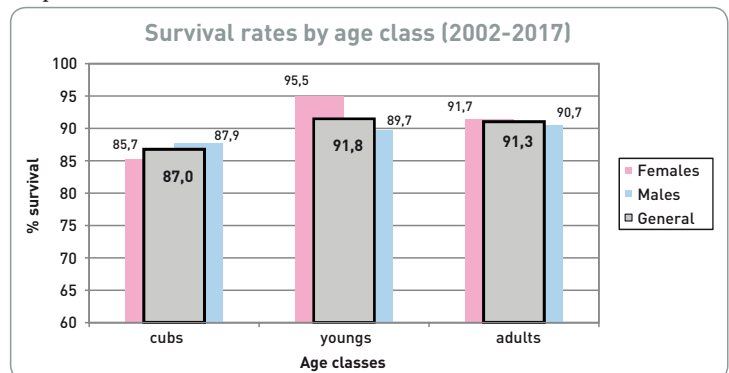16 females) and **17 young bears** (**40%** - 10 males and 7 females). The average age of known bears (excluding cubs) was **5.17**, with a significant difference between **males (4.7)** and **females (5.6)**.

Taking into account the **number of cubs born in 2017** (9 - 11, as reported above), and the individuals not genetically detected only in the last year (9), the **overall population estimate**, thus, is within a range of **52 - 63 bears**.

Estimate of the number of young and adult bears is also calculated by applying capture, marking and recapture **(CMR)** models deriving from systematic and opportunistic monitoring. The relative data significantly contribute to increase the knowledge on the bear population status and trend.

Trend

The population **trend** for young and adult bears (again **excluding cubs**) is shown in Graph 4. The columns show the **minimum certain numbers** of young and adult bears determined year by year, updated and supplemented on the basis of data acquired in subsequent years.

The graph also shows the **past estimates** recorded year by year, represented by the **red interval** (minimum certain number and estimated number, also considering bears absent for only one year, again excluding cubs); the respective figures effectively provide a "snapshot" of each season, not modified by the supplementary data of the following monitoring.

It also shows the trend for the so-called **"effective population" (Ne)**, calculated by considering

the **number of reproductive males**, **plus the number of reproductive females**, **divided by two** (as they can usually reproduce in alternate years).

Graph 4

Population trend 2002-2017 without cubs
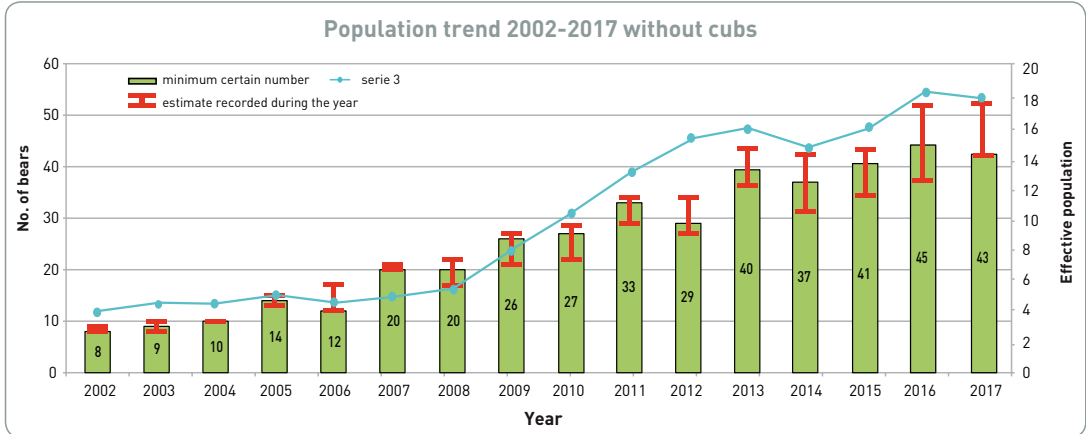
BOX 2 – The ecology of the brown bear population: the usefulness of the various types of available data

Reliable estimates of the density of individuals and the space use (size of the home range) helps to understand processes regulating ecological dynamics for the brown bear in the central Alps in terms of space and time. Understanding these processes is in its turn highly relevant for improving and adjusting actions for the management and conservation of the species.

Obtaining reliable estimates of density and the space use is notoriously difficult for an elusive species such as the brown bear. Its elusiveness and the limited funding for monitoring can have a negative effect on the quality of the data collected. The possibility of supplementing information from different sources mathematically is particularly interesting for investigating the aforementioned processes at population level. Furthermore, opportunistic data, i.e. collected outside sampling standard protocols, can represent a further source of information, whose reliability however has not been investigated for the species. In the case of the brown bear, this regards opportunistic data coming from the collection of organic samples, allowing the identification of individuals through DNA testing.

In 2017 the MUSE-APT collaboration led to the publication of an article* presenting an analytical approach able to integrate (i) spatial capture-recapture data systematically collected (from hair traps and rub trees), (ii) spatial capture-recapture data opportunistically collected and (iii) telemetry data. The framework was applied for the first time to data collected in 2013 for the brown bear population in the central Alps, and was used to check the extent of the information collected through the three aforementioned techniques. In other words, the analytical approach developed by MUSE-APT allowed to test the compatibility

of different types of data, quantitatively checking whether the different methods provide consistent information about density and extent of the brown bear home range.

The results of the study show that simultaneous analysis of the three types of data can increase precision, that is reduce uncertainty, when estimating density and space use by the brown bear. In particular, even if referred to a few individuals, the addition of telemetry and/ or opportunistic data to systematic capture-recapture data (from hair traps and rub trees) can improve density estimates, as long as the telemetry and/or opportunistic data contain information about space use, similar to those provided by data coming from hair traps and rub trees. Although telemetry provides more informative data on space use, in terms of multiple georeferenced locations for each collared animal, it is often applied to a very limited number of individuals. Therefore, opportunistic data from organic samples, appropriately supplemented by systematic data from hair traps (and eventually rub trees) can represent an important source of information for estimating space use and density of animals, even in the absence of telemetry data. Indeed, compared to telemetry data, systematic and opportunistic data are generally characterised by a smaller number of georeferenced locations per individual, but have the advantage of belonging from a much higher number of animals compared to those usually fitted with a collar. Each data source, thus, has advantages and disadvantages, but data systematically collected (for example with hair traps) are the basis of the analyses that allow to estimate the population size, and on a long-term basis, the demographic parameters that regulate the population, although these data can be affected by the behaviour of each individual, which make the location data not representative of the real space use.

* Tenan S., Pedrini P., Bragalanti N., Groff C., Sutherland C. (2017), Data integration for inference about spatial processes: A model-based approach to test and account for data inconsistency. PLOS ONE 12(10): e0185588. https://doi.org/10.1371/journal. pone.0185588

Territory use

39 of the **43** bears recorded in 2017 were detected in the **territory of Trentino**. **4** adult males were only detected outside the province: **M29** in **Switzerland**, **M4** in **Friuli V.G.**, **M47** in **Lombardy** and **M48** in the **province of Bolzano**. 4 of the bears present in Trentino were also present in neighbouring provinces/regions, particularly M18 and M31 in Lombardy, M19 in Veneto and M22 in the province of Bolzano.

The **1,093 signs of presence** of bears collected in the **province of Trento** during 2017 (all recorded signs, with the exception of those from GPS monitoring of 3 collared bears) are shown

Figure 2 - Reports of bears in the province of Trento in 2017
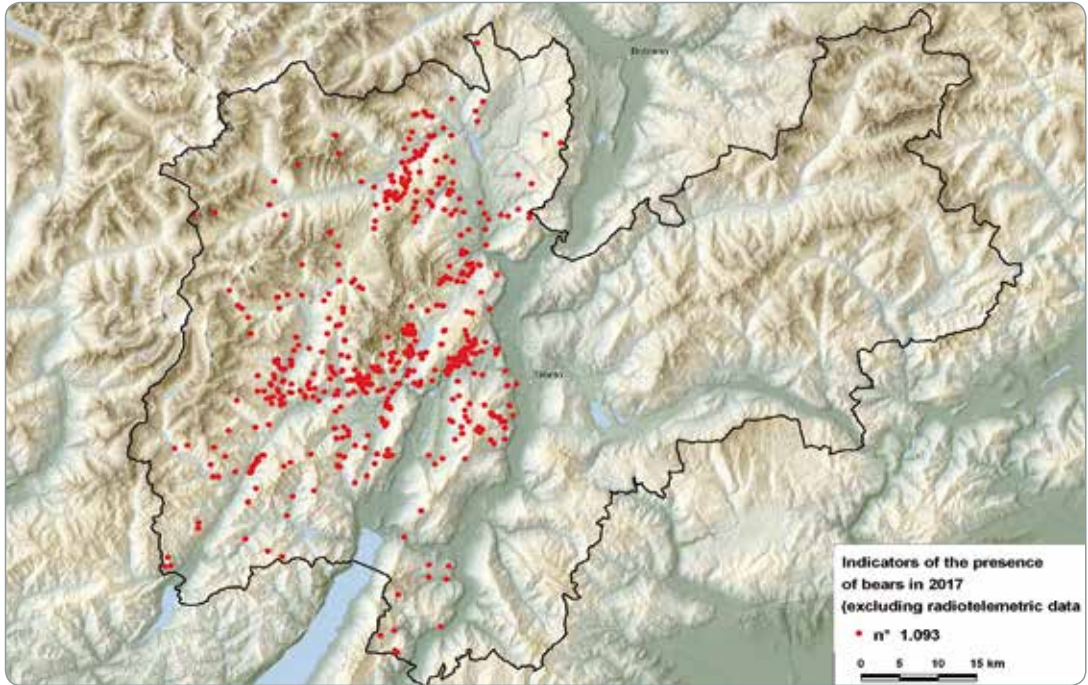
Figures 3, 4 and 5 *Home range* of F4, DG3 and M18 in 2017
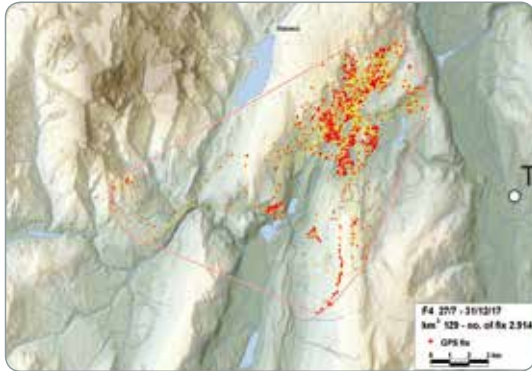
in Figure 2. No data were collected for eastern Trentino (for the second consecutive year).

In 2017 3 adult bears - F4, DG3 and M18 – were monitored using **satellite telemetry**. Their home ranges, calculated using the minimum convex polygon (MCP) method, are shown in Figures 3, 4 and 5 (respectively between the Paganella and Monte Bondone for F4, in the southern Brenta area for DG3, and again in the Paganella-Bondone area, with a wide movement westward, during autumn, up to the Bergamo Alps for M18).
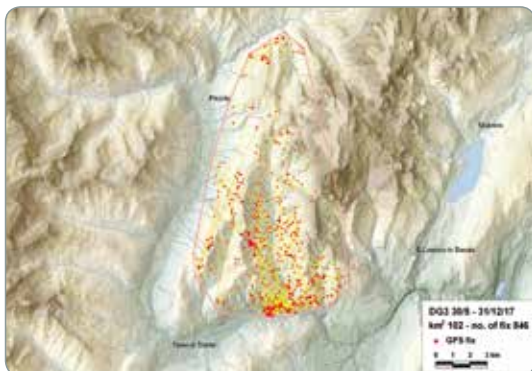
Area occupied by the bear population

Considering also the longest journeys made by young males, the population of brown bears in the central Alps was **distributed over a theoretical area of 24,360 km² in 2017** (Figure 6). The **area permanently occupied by the female bears** is considerably smaller **(1,068 km²)** and entirely situated within the province (western Trentino). The occupied areas were estimated using the minimum convex polygon method, applied to 100% of the validated signs of presence. This leads also to include large areas not suitable and/or not actually used, especially within the macro-area covering the movements of young male bears.

Figure 6 Area occupied by bears in the central Alps in 2017 (shown in blue) and, within it, the area occupied by female bears (highlighted in pink)

Area frequented by bears 2017

☐ TOTAL AREA: 24,360 km²
☐ AREA OCCUPIED BY FEMALES: 1,070 km²
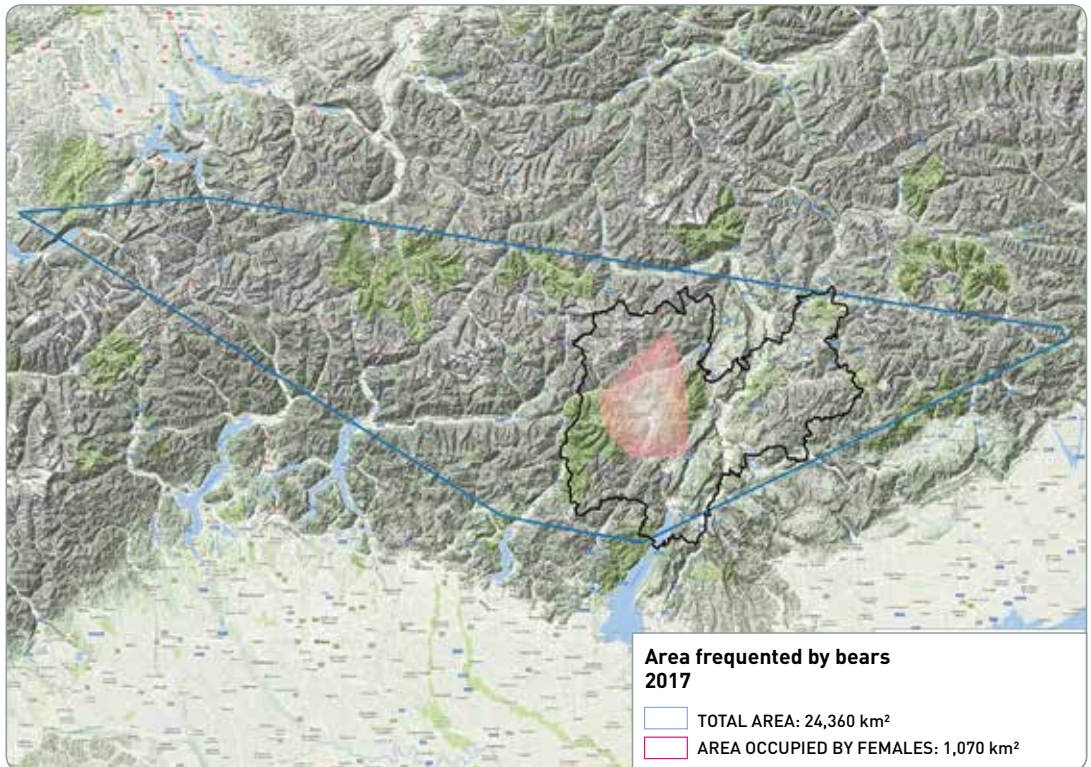
Population density

The population **density** of the area **occupied by the females** (1,068 km²) was **3.3 bears/100 km²** (35 bears, excluding the cubs of the year). This data should be read according to the following:
- the density refers to a dataset collected over a long period of time (a solar year), therefore, the number of bears present in the area at a certain moment, which would provide a datum closer to the real average density, would likely be lower;
- some bears (males) frequented also areas outside the range occupied by the females in the considered time interval. This also makes the effective density lower than the indicated one.

Figure 7 Number of bears identified in each sector of western Trentino during 2017

This density may be locally different, as it is partly evident in Figure 7, which shows the minimum number of bears, excluding cubs, identified with certainty (through genetic analyses or telemetry) in each sector of western Trentino. Many animals were present in more than one sector, also depending on the different seasonal trophic availability, and therefore, may have been identified in several of them. Consequently, the total minimum number assessed inside the province and neighbouring areas in 2017 remains 39 bears (excluding cubs) and, thus, summing data from the individual sectors would make no sense.

Dispersal

During the years **2005-2017** episodes of **dispersal** (see the definition on page 11) were documented, involving **34** bears (all of them males). **16** of them **(47%) died or disappeared**, **9 (26.5%) returned**, **2 (6%) emigrated** and **7 (20.5%)** are **still roaming**. **No dispersal by females** born in Trentino has yet been documented.

2. Damage compensation and prevention

With a forty-years experience on compensation and prevention of damages caused by brown bears, the APT **since 1976** has reimbursed damages by bears up to the 100% of the material value. It is also possible to acquire **prevention tools** (mostly electric fences or livestock guarding dogs). The relative regulations (article 33 of provincial law no.24/91), have been revised and updated several times over the years, also on the basis of rules imposed by the provincial government with the resolution no. 1988 of 9 August 2002.

With resolution no. 697 of 8 April **2011**, the provincial government further reviewed the regulations for damage compensations, foreseeing the compensation of ancillary expenses as well, and extending the compensation tho damages caused by **lynx and wolf** up to the 100% of their value.

Prevention is implemented mostly following two main lines of action: **funding** covering up to 90% of the cost of the prevention tools or **gratuitous loans**. The support/consultancy given to farmers through the activities of **zootechnical officers**, mentioned below, should also be mentioned.

Compensation for damages caused by bears

In 2017, **216 reports of presumed damage caused by bears** were forwarded to the Forestry and Wildlife Department.

154 claims for compensation were received by the department. In the remaining cases the claims for compensation were cumulative claims for several damage reports (48) or compensation was not claimed (14).

Of the **154** claims, **144** were accepted and **10** were rejected (in 3 cases the preventions tools were not used, while in 7 cases the deadline for claiming compensation was not respected).

In **95% of cases** the damage claim was followed by an **inspection** by forestry staff, who drew up a report.

The total amount for the compensation of damages caused by brown bears in 2017 was **€ 82,979.54**, of which € 22,708.44 for damages to apiaries, € 43,421.32 for damages to crops, € 15,544.65 for damages to livestock (photo 6) and € 1,305.13 for other damages.

Photo 6 - Sheep preyed upon and eaten by a bear (V. Calvetti - APT Forestry and Wildlife Department Archive)

In 99 cases (46% of the overall assessed damages), it was possible to identify with certainty the bear involved, thanks to genetic analyses of the organic samples collected. Generally, **30 different genotypes** were identified (15 males and 15 females), representing 58% of the population detected in 2017. Considering only bears with more than one year of age, **12** (6 females and 6 males) were detected at a single damage site,

5 (4 females and 1 males) at 2 damage sites, **2** (male M49 and female JJ4) at 3 damage sites, **3** (males M7, MJ4 and MJ4 and female F7) at 4 damage sites, **3** (female KJ2 and males M31 and M43) at 5 damage sites, **1** (male MJ2G1) at 6 damage sites, **1** (male MJ5) at 9 damage sites and 1 (female KJ1) at 12 damage sites.

The **damages to vineyards** (consumption of products) and **cherry orchards** (consumption of products and damage to plants) was financially significant. It seems that some areas and assets are more exposed to damage risk, by their nature or due to their location. The protection of assets damaged by bear, when technically possible, will be a focus priority in these areas.

Graph 5 shows the trend of damags caused by bears and the amount of compensations.

Graph 5
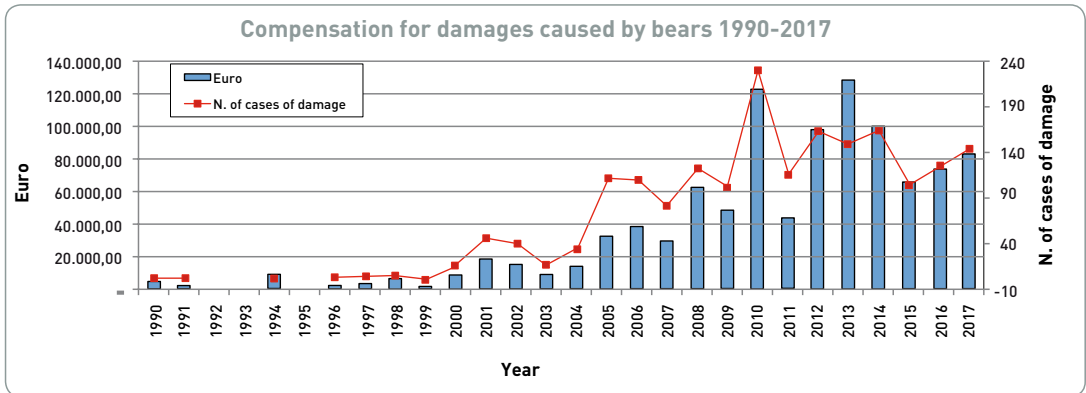
BOX 3 – Damages by bears: types and trends

After 19 years from the first release of bears in the province it is possible to draw up a concise balance sheet of the damages caused by bears, their intensity and the total compensations paid.

A correct and constant collection of data over time is crucial for the Province administration, to ensure a prompt and efficient support and compensation. The constant work and dialogue with the people whose crops, apiairies or livestock have been damaged by brown bears must have the aim of improving the conditions for a human-bear coexistence.
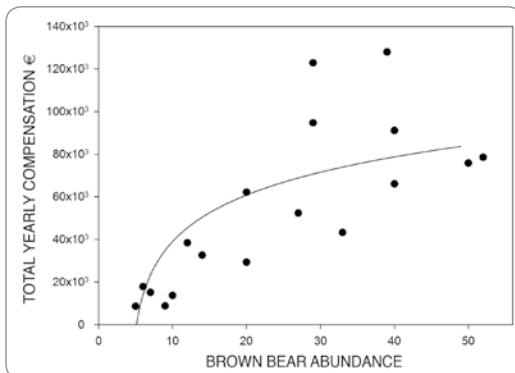
Graph A - Relationship between the total amount of damage compensations annually paid and the estimate of the number of bears in the population.

The costs annually covered by the Province administration for damage compensations have clearly risen with the progressive increase of bears in the area (Graph A). However, the relationship between the

increase of damage compensations and the increase of the bear population size does not seem to be consistent.

Over time, the "average cost" in terms of damage per bear has, indeed, progressively decreased. The graph also highlights some irregular annual peaks in terms of damage, due to several factors, including the presence of particularly damaging bears in some years (which have a noticeable effect in a small population) and the different availability of natural food (e.g. beech tree nuts) in the years.

It is interesting to compare what was foreseen by the Feasibility Study, carried out to support the reintroduction project, and what has effectively occurred in terms of damages. In the cited study, a quantitative framework of the damage amount that could have occured in relation to the population growth and to different scenarios in terms of population "harmfulness" was provided, estimated on the basis of real data regarding other European bear populations. The study provided trends for minimum, medium and maximum scenarios of possible damages; Graph B shows the minimum and medium scenario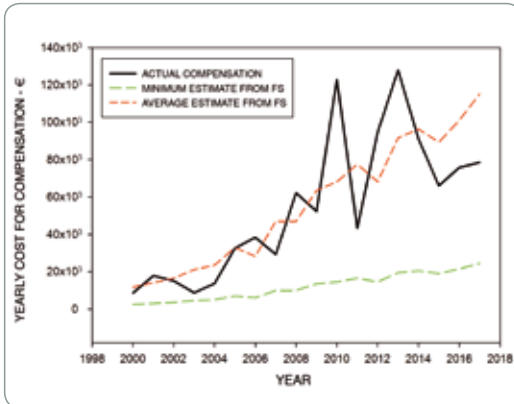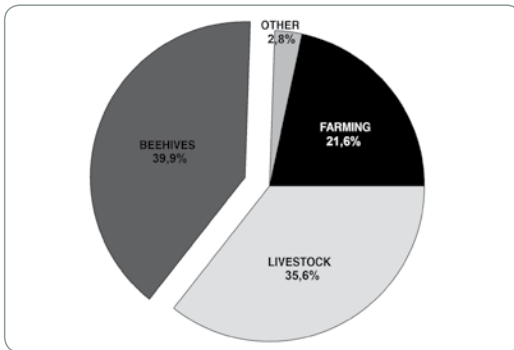s of the Feasibility Study with the real numerical evolution of the Trentino population in terms of compensation, demonstrating that it is close to the medium scenario of the Study (Graph B).

Graph B - Evolution of the amount of bear damage compensation paid over the years

Graph C - Percentage distribution of the amount of damage compensations, divided by the main types of assets affected

When representing the economic impact percentage of the main assets damaged in the last 18 years, beekeeping, livestock and crops, in this order, represent almost all the events (Graph C). It is also worth pointing out that for beekeeping and livestock, the concept of a predatory event is usually well-defined in terms of time and space, and is individually assessed and recorded, whereas for crops, the damage usually consists of several events that are summed up and recorded as a single event at the time of the inspection. Overall, 38% of predatory events were linked to apiaries, 35.4% to livestock, 19.9% to crops and 6.5% to other categories. The "others" category includes all the events in which the main damage was to facilities and materials.

In terms of predatory events causing damage to livestock, 49% of them concerned sheep, 11.2% goats, 3.8% cattle, 5.7% equines and 25.5% poultry, confirming that sheep and goats are the domestic animals with major predation risk (Graph D).
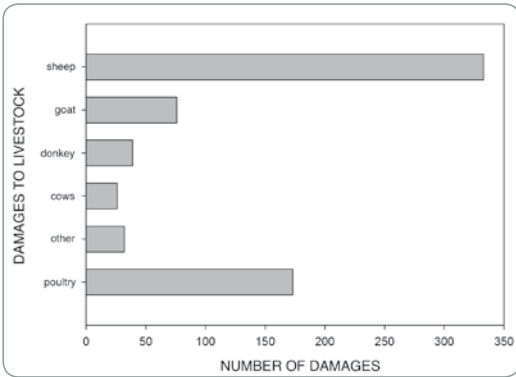
Graph D - Number of events involving damages to livestock
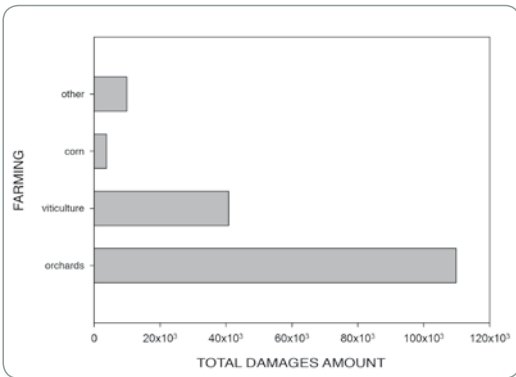
Graph E - Amount of compensations for damages to crops

In terms of financial compensation, damages to sheep and goats represents the most significant category (57.2%), although the number of predatory events is lower than that for other categories, damage to cattle represents 16.4% of the total and damage to equines 12%.

When considering crops, orchards are the mostly damaged category (51.9%), followed by vineyards (28.6%), maize (10.4%) and damage to other crops (9.1%). Concerning the amount of compensations paid, orchards are even more significant (66.8%), because, sometimes the bears damage the plants (Graph E).

Prevention of damages by bears

In 2017, **129 applications to ask** for prevention measures (electric fences and guarding dogs) to protect livestock (cattle, equines, sheep and goats) and beekeeping assets from brown bears were sent to the Forestry and Wildlife Department. Of these, **112** were processed by the District Forestry Offices by **gratuitous loans**: 78 were designed to protect beehives and 34 for livestock custody (photo 7). The overall cost amounted to **€ 65,000**.

The remaining **17** applications were processed by the Large Carnivores Division through capital grants. The total amount was around **€ 7,150** and mainly concerned electric nets and fences, along with guarding dogs.

The long-term trend for the number of prevention measures provided and the relative costs are shown below (Graph 6).

Photo 7 - Prevention measures (D. Asson - APT Forestry and Wildlife Department Archive)

Graph 6
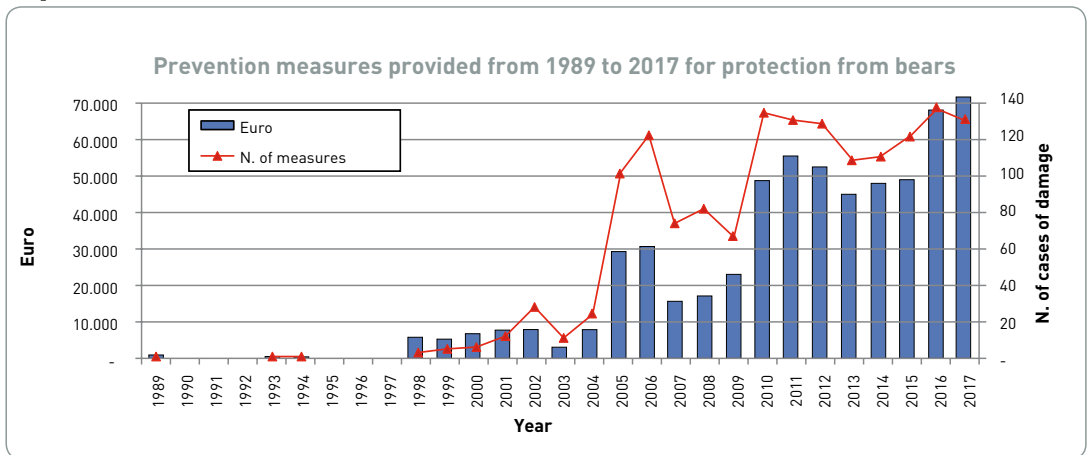
Since 2016 a further financial instrument allowing the provision of prevention measures through funding is the **Rural Development Plan (PSR)**, **Measure 442 "Traditional fences in wood**, **restoration of stone walls and prevention of damage by wolves and bears"**. Through this measure, it is possible to fund, among other things, fixed structures to defend beehives (Bienenhaus) and electrification systems for damage prevention. The protection system typology is essentially the same adopted by the Province of Trento for prevention tools provided through loans/funding. In 2017 two fences were funded, they will be completed during 2018 (total of c. 1660 m of electric fence), with a total cost of € 58,800.

Livestock guarding dogs

Guarding dogs are used to **protect livestock** from attacks by wolves and bears; the first two dogs in Trentino were delivered to a sheep and goat farmer in Val di Non in 2014 (see the 2014 Report, page 43). Since then, the use of guarding dogs has steadily increased.

In **2017** 6 applications for the provision of 7 dogs were presented to the Forestry and Wildlife Department; of these, 5 applications were accepted and 1 was rejected. In total, funding of around **€ 3,500** was provided to purchase **6 dogs** (2 of these will be delivered in the first few months of 2018). The animals provided were purchased from specialist/certified breeders belonging to ENCI (Ente Nazionale Cinofilia Italiana), guaranteeing health standards and genetic lines with an attitude for the job. By the end of 2017 a total of **13** guard dogs, used mainly to defend against bears, had been delivered by the APT.

Photo 8 - A vet examines a guarding dog (D. Asson - APT Forestry and Wildlife Department Archive)

Once again in 2017, with the assistance of a specialised vet and thanks to funding from the project LIFE DINALP BEAR (photo 8), a series of **behavioural assessment visits** were carried out on the delivered dogs, aiming at evaluating their health and learning progress, but also to provide useful information to the farmers.

Furthermore, during 2017, thanks to funding from the LIFE DINALP BEAR Project the Forestry and Wildlife Department produced a **sign** (photo 9), created to provide information about the guarding dogs protecting flocks and about the correct behaviors to keep in their presence.

Photo 9 - Informative sign (D. Asson - APT Forestry and Wildlife Department Archive)

Meetings with the interested economic categories

In 2017 the dialogue already started in the past years with the economic categories most affected by the presence of bears and other large carnivores in the territory continued.

The **Round Table with representatives of breeders**, **farmers and beekeepers** met twice, on **8 May** and on **21 November 2017**.

Support to livestock farms

Supporting the presence of shepherds and of flocks/heards on alpine pastures is one of the objectives of the provincial administration. The presence of the shepherd and the adoption of the most appropriate damage prevention systems, along with fair compensation and constant dialogue with the Forestry personnel in the area, are fundamental to guarantee coexistence between large carnivores and livestock in the mountains. These objectives are also pursued through the activities carried out by the **zootechnical officers**.

In 2017 support to shepherds continued and was consolidated, and they were provided with fences (105 cm high) and **fence electrifiers** of adequate **power (2.6 joules)**, with rechargeable batteries fuelled by solar panels.

Overall, a total of **50 Alpine pastures**, **25** of which agreed to get prevention measure (photo 10) during the grazing period (usually from June to September), were supervised and supported by the zootechnical officers. In total, the initiative concerned **12,842 sheep and goats**, **62 equines** and **124 cattle**.

Furthermore 4 prefabs were transported up to the mountains to enable the shepherds to stay close to the flock at night.

The **results** were once again **good**: for mountain pastures equipped with prevention measures only **3 attacks on protected livestock** were recorded, leading to an overall assessed loss of **4 sheep**, namely **0.03%** of protected livestock at alpine pastures.

As it was in the previous years, it was thus confirmed that the correct use of prevention measures (electric fences and guarding dogs), the presence and expertise of shepherds and the constant consultancy and support provided by the zootechnical officers allow to **reduce damages**.

Photo 10 - Alpine pasture equipped with electric fence and prefab for the shepherd (D. Asson - APT Forestry and Wildlife Department Archive)

3. Management of emergencies

In the **province of Trento** the management of emergencies is a field of action in which it has been necessary to work since long ago, and more specifically in relation to the presence of bears considered "problematic".

A problem bear or a bear in critical situations, can be subject of control actions, in accordance with the European rules (Directive 92/43/EEC – Habitat Directive) and 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).

Indeed, in order to reduce the 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 to capture or kill wild protected animals is foreseen, **with the authorisation of the Ministry for the Environment, Land and Sea** (MATTM), having consulted ISPRA, if there are no other practicable solutions and if the exception to the ban does not affect the favourable conservation status of the populations of the protected species (D.P.R. 357/97, article 11.1). If the public safety is at risk, capturing or killing an animal can also be ordered by the President of the Province, with an **extraordinary emergency order**, according to articles no. 52.2 of the DPR of 31/8/1972, no. 670 and no. 18.2 of the L.R. of 4/1/1993 no. 1, as specifically allowed by the **PACOBACE**.

With resolution no. 1.523 of **7 September 2015** the provincial government set up a **Technical Committee** including representatives of MATTM, ISPRA and APT and a **Technical Operations Group** (with APT, MUSE and PNAB) to manage the bear and other large carnivores within the province (hence in relation to all fields of action, not just for the management of emergencies). Both have continued to operate profitably during 2017.

The **PACOBACE (Interregional Action Plan for the Conservation of the Brown Bear in the Central-Eastern Alps)** represents the reference document for the management of emergencies in the province of Trento (and in the rest of the Italian Alpine region), on the basis of which the Forestry and Wildlife Department has identified, trained and equipped the responsible personnel. Operational organization is carried out by the **Provincial Forestry Service (PFS)**, of the Forestry and Wildlife Department, through an **On-call Special Unit**, included in the official availability system, according to weekly turns involving a coordinator and, from 1 March to 30 November one emergency team with two people involved (on-call 24 h/day), along with veterinary personnel from the Azienda Provinciale per i Servizi Sanitari (APSS) – the Provincial Health Services Office– whenever necessary. The latter are essential for all the activities involving bear handling (injured bears, captures etc.).

During 2017 the coordinators received **830 calls** regarding possible **damages by bears** (225) or **wolves** (68), direct **sighting** or evidences of possible **signs of presence** (191 for bears, 54 for wolves and 2 for lynx), **predations on wild animals** (44 for wolves, 2 for bears), potentially **problematic situations** (40) or **other issues** (204).

In 2017 there were no real problems linked to **confident animals**, with the exception of one **case** in the Municipality of **Comano Terme**, where a male bear insistently frequented farming areas in the immediate vicinity of the towns of Lundo, Poia and Comano, to feed on cherry and peach trees or beehives.

Activity of the Emergency Team

The activities of the Emergency Team were carried out from 6 March to 27 November 2017 with a total of **33 call-outs** (Graph 7). Only in two cases the team members implemented direct aversive actions to discourage the animal (use of rubber bullets).

Graph 7

Emergency team call-outs 2002-2017

Brackets contain the number of direct interventions on bear

(Bar chart, No. of interventions by Year:)
- 2002: ~21 (0)
- 2003: ~16 (0)
- 2004: ~19 (1)
- 2005: ~56 (6)
- 2006: ~83 (5)
- 2007: ~33 (7)
- 2008: ~75 (15)
- 2009: ~23 (0)
- 2010: ~34 (2)
- 2011: ~31 (4)
- 2012: ~37 (6)
- 2013: ~31 (8)
- 2014: ~55 (2)
- 2015: ~28 (2)
- 2016: ~18 (1)
- 2017: ~34 (2)
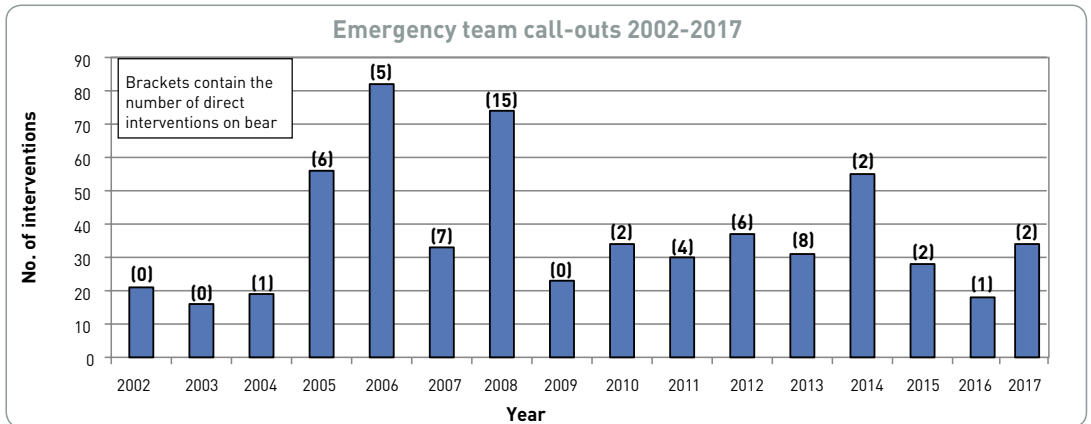
Close encounters between men and bears

During the year there was one **attack on humans** and two cases of **aggressive behaviour**.

On **22 July 2017** a man was **attacked**; he was out, walking, accompanied by his dogs at a place called **"Predara"**, about two km away from **Terlago** and had a close encounter with a female bear which attacked him. The man was pawed and bitten, he got injuries to his arms and legs requiring hospitalisation. On the following day, the President of the Autonomous Province of Trento issued an extraordinary emergency order for reasons of public safety, in accordance with the provisions of the PACOBACE, which provided for:

- intensive monitoring of the area where the incident took place;
- genetic identification of the bear responsible for the attack and its recognition by fitting it with a radio collar;
- removal of the animal.

Collection of organic samples (saliva taken from the clothes of the attacked person) allowed to determine that the aggression was certainly carried out by KJ2, a 15-year-old female bear having two cubs and which had already attacked a man during summer 2015. A capture session, to identify the bear and enable recognition of the animal was implemented and was successful on 1 August 2017; subsequent genetic testing confirmed that the animal captured, fitted with a collar and released was KJ2.

In compliance with the provisions of the extraordinary emergency order, issued for reasons of public safety by the President of the Autonomous Province of Trento, the bear was shot on Monte Bondone on 12 August 2017.

According to the application of the guidelines drawn up by APT, in collaboration with ISPRA in 2014, **specific monitoring** with camera traps and hair traps was organised for KJ2's two cubs, their identity having been genetically confirmed. The cubs were detected several times, up to the

Photo 11 - Monitoring of KJ2 cubs using a camera trap (APT Forestry and Wildlife Department Archive)

second half of October, always in the Monte Bondone area and showing good physical conditions (photo 11).

From last November the two cubs probably reduced their activities as winter approached. The monitoring will continue also during 2018.

On 2 **July 2017**, at **Briadel** in the **Vigo Rendena** area (right side of the Sarca river) a mushroom picker sighted a bear at a distance of 6/7 metres. After standing up on its hind legs for a moment, the bear bounded towards him, snoring. At this point the man ran towards his mountain hut, at the same time becoming aware of the presence of a **cub**. After having covered around thirty metres the man stopped and, turning around, discovered that the **bear**, accompanied by the cub, moved away. It was not possible to find organic samples to identify the bear.

On **21 July 2017**, at **Vallene** in the **Terlago** area, a woman, doing jogging along a path though thick vegetation, came across a bear at a distance of around 30 metres. The bear turned around and galloped towards her. The woman then did an about-face and moved away; however, hearing that the bear was still following her, she left the path, moving rapidly over the slope covered with vegetation. The chase continued for around 50 metres. No cubs were observed on this occasion and it was not possible to collect organic samples to identify the bear, but the vicinity of Vallene to the place in which KJ2 attacked the man the day after, bring to the hypothesis that the bear would have been the same.

Captures

Within the emergency management, a significant role is played by the "Capture Team", formed by the personnel of the Forestry Service trained for such activities and supported by the **vets from the APSS** for the sanitary aspects.

Within the *LIFE DINALP BEAR* project, in **2017** capture sessions were organized and other **four bears** (in addition to the previously cited KJ2) were fitted with GPS collars. All the bears were captured using tube traps:
• an adult **male** (photo 12), 5.5 years old

Photo 12 - A phase in the capture of M18 (APT Forestry and Wildlife Department Archive)

Photo 13 - A phase in the capture of DG3 (APT Forestry and Wildlife Department Archive)

Photo 14 - The capture of female bear F4 (APT Forestry and Wildlife Department Archive)

Photo 15 - The capture of female bear F20 (APT Forestry and Wildlife Department Archive)

Photo 16 - Retrieval of a collar with a bear dog (C. Groff - APT Forestry and Wildlife Department Archive)

(M18), captured on **5 April** in the woods above **Lasino**; when captured, the male was accompanied by the young female **F26**. This confirms that mating interactions can start at the beginning of spring and can involve also females of only 2.5 years of age.

- an adult **female** aged 11.5 years **(DG3)**, captured on **30 May** in **Val Algone** (photo 13).

- an adult **female** aged 9.5 years **(F4)**, captured on **27 July** in the woods above **Lasino** (photo 14).

- an adult **female** aged 3.5 years **(F20)**, captured on **18 September** in **Val Genova** (photo 15). In this case, the collar was equipped with an innovative system for automatic deterrent measures, but the bear managed to slip out of it a few days after the capture.

On **9 April 2017** action was taken to **detach the collar** of the female bear **F26**, captured on 9 September 2016, again within the *LIFE DI-NALP BEAR* project, because of malfunctioning (photo 16). It was detached using the "drop off", system, which allows to unlock the collar from a distance and let it drop from the bear, using a radio signal.

At the end of 2017, in order to minimize the risk of capturing females with cubs of the year, the **tube traps** were slightly modified (photo 17), in order to improve the reliability of the closing mechanism, when the entrance is not free (due for example to the presence of cubs).

The tube traps were modified by the **Fondazione Bruno Kessler (FBK)**, Materials and Microsystems Center, MNF (MicroNanoFacility) Unit, Area Testing.

The main modifications to the traps are described below:

- Addition of an electromechanical release mechanism to the existing system;
- Addition of an electrical sensor (capable of adjusting the tensile force necessary to trigger

Photo 17 - Operations to modify tube traps (A.Collini - APT Forestry and Wildlife Department Archive)

the trap) to the mechanical system to activate the trap;
- Addition of an infrared barrier and an electronic barrier to block the triggering of the trap, when some obstacles are detected in the doorway.

Road accidents

During 2017 there were **two cases of road accidents** in the province of Trento, for a total of 29 reported cases (of which 3 inside the province of Bolzano).

The first, involving a motorbike, took place on 18 **July 2017** on provincial road 37, near the town of **Darè**, concerning a female bear (identified as **F3**, thanks to samples collected at the site) with two cubs. After the accident the animals rapidly moved away, and despite subsequent research carried out with bear dogs, their fate is unknown. On the basis of genetic tests of paternity and maternity the two cubs were however detected at the end of September 2017.

The second accident happened on **10 October 2017** on a secondary road in the Municipality of **Cles**, on the namesake mountain; in this case, the bear involved was presumably adult, thus, considering the dynamics of the accident (limited speed of the car and the bear hit by a glancing blow), should not have suffered serious injuries.

Bear dogs

Photo 18 - Bear dog (A. Stoffella - APT Forestry and Wildlife Department Archive)

In **2017** the Bear Dog Team took action on 37 occasions, of which **4** for deterrent activities, **2** in relation to road accidents, **11** to serach for genetic samples and signs of presence, activity linked to critical situations or emergencies, 4 for training activities and 16 to monitor critical areas, for surveillance or other purposes.

In the last few years the fields of intervention of the **Dog Unit** have notably increased, requiring specific education and training programmes. In

this context the specific training activities for the last two dogs, Mizar and Aska (photo 18), purchased in spring 2016, continued positively in 2017. Compared to the first years, activities to deter confident bears have decreased, also thanks to the decreased number of such bears. The Bear dogs played an important role during the **searching for genetic samples** to identify bears responsible for emergency situations (true and/or false attacks) or bears in critical situations (accidents), this, also because the search often has to be implemented in harsh or however difficult terrains, or sometimes to map the movements of bears over very large areas.

Furthermore, during 2017 a collaboration with the Scandinavian Brown Bears Project started, with the aim of buying two new puppies in 2018, which will substitute the two older dogs, being at the end of their career. The objective is to look for new dogs among the best genealogies of working dogs with a particular attitude in working with large carnivores.

Anti-poison dogs

Photo 19 - Anti-poison dog (M. Baggia - APT Forestry and Wildlife Department Archive)

Considering the death of 3 bears in 2015 and 2016 in the Val di Non area, due to poisoning, the collaboration with the *LIFE WOLFALPS* **Anti-poison Unit of the Belluno Police Service** (photo 19) continued in 2017 as well. The unit was put into action on four occasions, on 17 March, 11 August, 10 November and 27 December. On the first three occasions, the activity was linked to prevention rather than to specific cases of poisoning, whereas the action on 27 December was specifically requested because of cases of poisoned dogs. During this last occasion two possible baits were found, then sent to the Istituto Zooprofilattico di Trento to be analyzed.

4. Communication

Communication is considered by the provincial administration an aspect of fundamental importance in the management of bears and represents one of the six Programmes of Action includid in the previously mentioned provincial government resolution no. 1988 of 9 August 2002.

Considering this, starting from **2003,** a specific **information campaign** started and was called "Let's know the brown bear", which involved numerous different initiatives in the past and that is still active. The present report, among other things, has also an informative role, and is one of the initiatives designed to allow the wider public a better understanding of this animal, firmly believing that only knowledge can lead to an harmonious human-bear coexistence in the medium and long-term.

With regard to the communication activities, the Forestry and Wildlife Department has always been supported by the **Parco Naturale Adamello Brenta** (PNAB), which has been active in this field for many years in its own area, and the **Museo delle Scienze** (MUSE) **in Trento**.

Furthermore, since **2015** communication activities regarding bears and large carnivores have included a new tool, the **Consultation and Information Committee for the Management of Large Carnivores**, which met on two occasions, on **May 15** and **November 4**.

In 2017 the **Communications Round Table**, coordinated by the APT's **Press Office** and including representatives of the **Forestry and Wildlife Department**, **Trentino Marketing**, **PNAB**, **MUSE** and **SAT**, also continued its activities, organizing 4 meetings.

Furthermore, in collaboration with the APT Press Office, the **institutional web site on brown bear and large carnivores (www.grandicarnivori.provincia. tn.it)**, active since 2003, continued to be updated in 2017, with restyling and renewal of the contents (e.g. a new **map** with localizations **of female bears with cubs**).

The main communication activities carried out in 2017 are summarized below.

Evening talks and Public Meetings

Table 1 lists the **public meetings/evening talks** organized by the Forestry and Wildlife Department within the information campaign "Let's know the brown bear" (**around 480 participants** overall). Most of these meetings were organized in response to requests for information updating and dialogue.

Table 1

Type	Date	Location	No. of participants
Public meeting	10/01/2017	Ciago	60
Meeting with beekeepers	10/03/2017	Malè	40
Presentation of the 2016 Bear Report	07/03/2017	MUSE - TN	230
Public meeting	17/03/2017	Terragnolo	80
Meeting with beekeepers	20/06/2017	Rovereto	40
Meeting with farmers	09/09/2017	Malga di Coredo	30

37 press releases regarding the brown bear were realized with the support of the APT Press Office.

Furthermore, answers to **8 questions from the Council** were provided (6 further questions were sent both about the bear and the wolf).

## Communication activities carried out by SAT (Committee for Protection of the Mountain Environment)

21 April 2017: information evening on large carnivores at SAT Denno*
6 May 2017: information evening on large carnivores at Rifugio San Pietro (SAT Riva del Garda)*
7 September 2017: information evening on large carnivores at CAI Caprino Veronese (Vr)*
7-8 October 2017: National Conference on the Brown Bear "Possible coexistence" (for CAI and SAT members) in collaboration with CAI (Large Carnivores Group), Central Scientific Committee, APT, PNAB and MUSE (100 seats/sold out)

*The initiatives related to large carnivores were carried out within the activities of the CAI's Large Carnivores Group.

Informative materials

- Publication of the "2016 Bear Report" (1000 copies in Italian and 150 in English);
- Brochure "How should you behave in areas where bears are present?" produced in three languages (3,000 copies);

Figure 8 Cover page of the brochure "BEARS: how to behave in the event of close encounters"
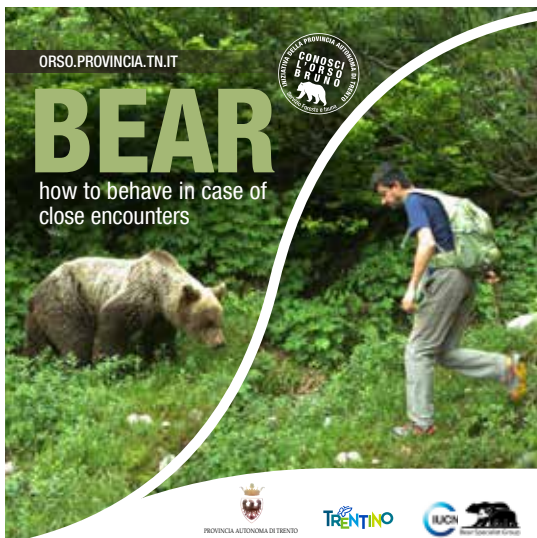
- Brochure: "BEARS: how to behave in the event of close encounters" (2,500 copies in Italian and English), in collaboration with IUCN's *Bear Specialist Group* (Figure 8).

Other communication initiatives

The Forestry and Wildlife Department supervised the production of articles (scientific and informative) and **interviews** or **presentations**, issuing the content directly and/or supplying information and images, on the following occasions:

- Article in the German monthly magazine **"Greenpeace magazin"** (Special issue on the Alps - "Where wild bears live") no. 1/17 January 2017
- Lecture on "Large carnivores" at the Liceo **Artistico Vittoria in Trento** - 9 February 2017

- Interview on the **Rete4** programme **"Terra"** - 1 March 2017
- Interview on **Radio in Blu** - 6 March 2017
- Interview on **Rai Regione** - 7 March 2017
- Presentation of the **"Bear and Large Carnivores Report"** at MUSE - 7 March 2017
- Interview on **RTTR** - 10 March 2017
- Seminar at the **University of Trento** on social aspects regarding coexistence with the bear (19 April 2017)
- Interview on **Swiss national TV** (9 May 2017)
- Interview with the newspaper **"La Repubblica"** (11 May 2017)
- Meeting with students of the **Free University of Bolzano** (Trento, 6 June 2017)
- Interview on **Radio Capital** (24 July 2017)
- Interview on **Radio 3 Scienza** (31 July 2017)
- Interview with **CIPRA** magazine (24 August 2017)
- Article in **IBA News**, Fall 2017, Vol. 26 n. 6 (autumn 2017)
- Article for the magazine **"Allevatore trentino"** (1 September 2017)
- Interview for the German magazine **"Bergsteiger"** (10 November 2017)
- Interview for the newspaper **"Il Manifesto"** (27 November 2017)
- Collaboration to the production of scientific articles:
  - Oberosler V., Groff C., Iemma A., Pedrini P. and Rovero F., 2017. *The influence of human disturbance on occupancy and activity patterns of mammals in the Italian Alps from systematic camera trapping*. Mammalian Biology-Zeitschrift für Säugetierkunde.
  - Tenan S., Pedrini P., Bragalanti N., Groff C., Sutherland C. (2017), *Data integration for inference about spatial processes: A model-based approach to test and account for data inconsistency*. PLOS ONE 12(10): e0185588. https://doi.org/10.1371/journal.pone.0185588

5. Staff training

The correct management of the bear population is necessarily linked to the availability of **specially trained staff**, prepared to deal with any technical and non-technical problem that may arise during activities in the field, especially regarding the management of emergencies, the damage management and, to a lesser extent, the monitoring. Training represents one of the six Programmes of Action mentioned in the provincial government resolution no. 1988 of 9 August 2002.

The training initiatives carried out during 2017 are listed below.
- Training for new **on-call forestry and wildlife coordinators** about activities relating to the management of large carnivores (Casteler, 23 January 2017);
- Training and updating Meeting **for Forestry staff** on large carnivore management (Casteler, 22 February 2017);
- Training on large carnivores for **DFO** Forestry staff and wardens from **Tione** (24 March 2017);
- Training on large carnivores for **DFO** Forestry staff and wardens from **Trento** and **Rovereto/Riva** (13 April 2017);
- Training on large carnivores for **DFO** Forestry staff and wardens from **Malè** and **Cles** (19 April 2017);

- Training for **farmers** on large carnivores and the use of guarding dogs (3 May 2017, at the premises of the Federazione Allevatori Trentini);
- Training on large carnivores for **DFO** Forestry staff and wardens from **Borgo** (23 May 2017);
- Training on large carnivores for **DFO** Forestry staff and wardens from **Cavalese** (30 May 2017);
- Training on large carnivores for **DFO** Forestry staff and wardens from **Primiero** (6 June 2017);
- Training on large carnivores for **DFO** Forestry staff and wardens from **Pergine** (13 June 2017);
- Training for the **staff working at the MUSE (exhibition halls)** (9 October 2017);
- **Course for journalists** from the local press (29 November 2017).

Photo 20 - Training session (C. Groff - APT Forestry and Wildlife Department Archive)

In 2017 **a post-graduate master's degree internship and a degree thesis** on monitoring and experimental activities started as well.

Concerning the internship, Antonio Vareschi, who has not yet concluded, has worked to reorganize and standardize in a single database all the information on **damages** caused by **large carnivores** in the province and on the compensation procedures. The first analysed data for the 2000-2017 period are presented in the box about damages by bears.

The thesis, produced by Nicola Mazzoni in collaboration with ISPRA - genetics laboratory, had the aim of testing **new techniques to collect and store samples of bear scats** for genetic analyses. The experimental study started because of the insufficient results obtained during the last few years trying to extract DNA from the collected scats. The study, carried out between August and October, tried to analyze the influence of parameters as the different methods of scat collection, the use of different preservation liquids and intervals of time from the scat deposition to its collection can influence the success ratio of DNA extraction from samples. The collected material was put inside test tubes containing four different preserving solutions, at previously set time intervals. Bear DNA was subsequently extracted at the ISPRA Centre for Conservation Genetics, to evaluate the success ratio of DNA extraction in relation to different conservation conditions. The preliminary results (the data are still under analyses) confirm that the new method of scat collection and conservation significantly increases the percentage of DNA extraction and its positive identification, indicate one of the preserving solution as better than the other for the purpose and demonstrate that scat freshness is a fundamental factor for DNA testing success.

After the beginning of the **International "Bearconnect" Project**, the Fondazione Edmund Mach and the Department of Civil, Environmental and Mechanical Engineering of the University of Trento, in collaboration with the Parco Nazionale dello Stelvio, the MUSE and the Autonomous Province of Trento - Large Carnivores Division started a research PhD project to support the afore-

mentioned project at the Alpine scale. The general project aims at deepening some aspects, and eventual strength and weakness points of the functional connectivity and ecological sustainability of the European environmental network for a species with wide spatial needs as the bear. The PhD programme, lasting three years, has the aim of investigating possible future scenarios for the conservation of the brown bear in the Alps, analysing genetic, demographic, spatial and human dimension data collected during the last twenty years. This, to assess population dispersal and expansion possibilities and mechanisms for the brown bear, currently still anchored to western Trentino.

6. National and international networking

The networking with neighboring regions and countries assumes a strategic importance for the management of a highly dynamic species as the brown bear. Considering this, even before the beginning of the Life Ursus Project, official contacts with neighboring regions were established, as it was clear that the area of western Trentino would not have been sufficiently wide for a viable population of bears. During time these relationships have been strengthened and consolidated, with regard both to the territorial expansion of the small population, which has in fact concerned neighboring regions and countries, and to the strong coordination policy implemented by the provincial government with the previously mentioned resolution no. 1988 of 9 August 2002.

Following this, the international and national networking was institutionalized and with the input of the Ministry for the Environment, Land and Sea and the coordination of APT, the **PACO-BACE** (Plan of Action for the Conservation of the Brown Bear in the Central-Eastern Alps) was approved by all the partners in 2010. In addition to the Autonomous Provinces of Trento and Bolzano, this also involved Lombardy, Veneto and Friuli Venezia Giulia Regions.

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

APT is a partner of the *LIFE "DINALP BEAR"* project (Figure 9) financed by the European Commission LIFE+ Natura funding program (with funds of € 248,011 available for the APT, and the EU quota being € 173,608).

Figure 9 - Logos of Natura 2000 network and the *LIFE + "DINALP BEAR" project*

The project, running from 1 July 2014 - 30 June 2019, has the objective of managing and conserving the brown bear population in the North Dinaric Mountains and in the Alps, through the involvement of partners in Italy, Austria, Slovenia and Croatia.

Photo 21 - Monitoring of prevention measures (APT Forestry and Wildlife Department Archive)

In 2017 the project meetings were held in Venice (6-7 February), Graz in Carinthia (12-14 September 2017), **Abruzzo** (18-23 September) and **Tarvisio** (UD) 18-19 October (Workshop on the management of problem bears).

Within the *LIFE + "DINALP BEAR"* project, the **monitoring of the effectiveness of prevention measures (electric fences)** continued in 2017.

In order to assess the efficiency and possible weakness points of traditional systems for bear damage prevention (fences with wooden poles and 5 wires) a specific prevention tools was set up, continuously monitored with camera traps and provided with a lure inside it. The experimentation foresaw a step by step procedure, starting from the weakest situation, with relatively easy access for the bear (wires incorrectly set, absence of electricity), and gradually arriving to the most secure situation (correct set up of the wire and adequate electricity running) (photo 21). During the season the fence was visited by at least 5-6 different bears. From the time at which the prevention measure was set up correctly (correct set up of the wire and adequate electricity running) no animal succeeded in entering the fence, despite the presence of different lures inside it, in significant quantities.

This monitoring has confirmed that prevention measures properly set and equipped with adequate electricity allow to reduce the risk of damages to a very low level.

Photo 22 - A bear fitted with a collar within the capture session (Forestry and Wildlife Department Archive)

As foreseen by the **LIFE DINALP BEAR** project, **capture activities** (photo 22) for the application of radio collars continued in 2017 (see the "Captures" section), together with initiatives for sharing experience with the various project partners.

Alpine Convention Large Carnivores Platform

The activities of the **Alpine Convention Large Carnivores Platform** (photo 23), established in 2009, and currently having a representative of the Autonomous Province of Trento within the Italian delegation, continued during 2017. Meetings were held in **Innsbruck (Austria)** on **15** and **16 March 2017** and in **Vaduz (Liechtenstein)** on **25** and **26 September 2017**.

Staff of the Alpine Convention were also welcomed to **Trentino** on **May 8** and **9, 2017**, and for them a visit to the bear territory was organized as well (Paganella tableland, Valle dello Sporeggio).

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

Conferences and meetings

The provincial administration attended at the following international conferences, reporting on its activities abaut the management of bears and large carnivores (with oral presentations):

• **National Bear Day organised by C.A.I., Trento, 7-8 October 2017**;
• Workshop organized by theEuropean Large Carnivores Platform, **Venzone (UD)**, **12-13 October 2017**;
• Conference in Salzburg on communication (in the context of **Arge Alp**, with the participation of MUSE staff), **16-17 October 2017**;

• Conference of the **International Bear Association (IBA) in Quito (ECUADOR)**, **12-17 November 2017** (Figure 10);
• Participation to the **Conference on the management of large carnivores** organized by the

Figure 10 - Logo of the IBA 2017 conference

• Association of Agronomists and Forestry Workers in the Province of Vicenza **(Solagna VI - 1 December 2017)**.

THE WOLF

1. Monitoring

Monitoring of the species began with the natural return of the wolf in Trentino territory in **2010**, after its disappearance around the middle of the 19th century. From the beginning, genetic monitoring, traditional surveys in the field and camera traps were used.
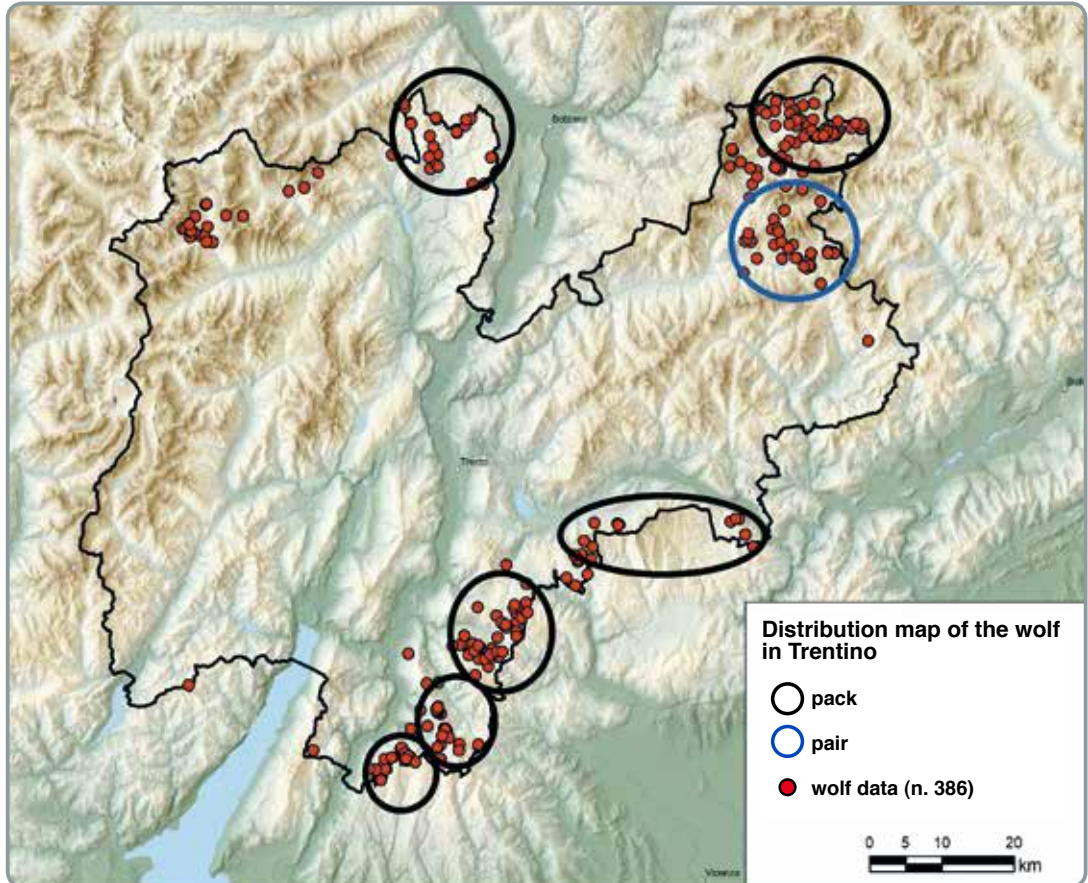

Photo 1 - A wolf photographed with a camera trap in the Pasubio mountains (M. Papi - APT Forestry and Wildlife Department Archive)

During the year, **406 signs** of the presence of the **wolf** were recorded in the province (Figure 1); these including 205 organic samples, 95 of which were analyzed by the Conservation Genetics Research Unit at the **Fondazione Edmund Mach (FEM)**.
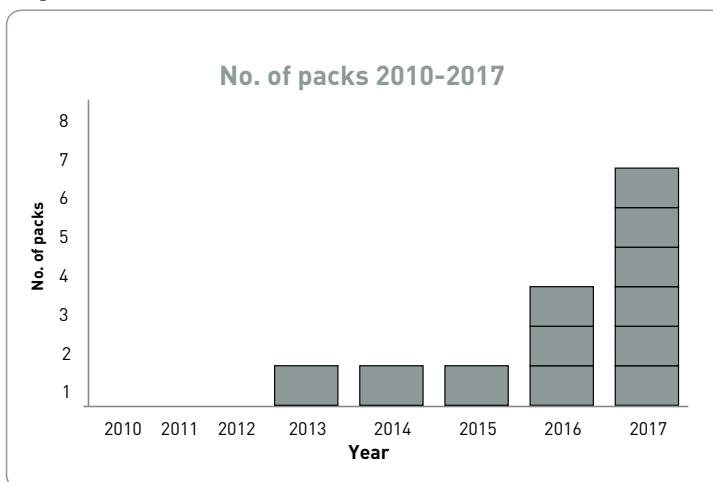
The data collected refers to **6 packs** (or family groups) and 1 couple, whose home ranges were partially or totally within the provincial territory during 2017, as shown in Figure 1.

In particular, for the fifth consecutive year, the **Lessini pack** had a new litter, with 5 pups; at the end of 2017 the "Lessini pack counted an estimate of 7 wolves. Thanks to following surveys and monitoring activities carried out in the early months of 2017, it was possible to identify a **second** and **third packs**, already established in 2016, respectively in the **Carega** mountains and on the **Asiago upland**, but also frequenting the right hand side of the Valsugana. It is estimated that both packs, having their second litters in 2017, were formed by about 8 individuals before the winter. In spring other three packs established within the province: in the **upper Val di Fassa** (pack with an estimate of 6 wolves), in the **upper Val di Non** (3 wolves estimated) and in the **Pasubio-Folgaria** area (6 wolves estimated).

Figure 1 - Spatial distribution of signs of presence attributable to wolves in the province during 2016, distinguishing between packs, pairs and solitary individuals

Distribution map of the wolf in Trentino

○ pack
○ pair
● wolf data (n. 386)

0 5 10 20 km

Graph1

No. of packs 2010–2017

Graph 1 shows the **trend** of the number of detected packs having their territories totally or partially within the province of Trento, from 2010, when the presence of the wolf was documented, up to 2017.

Once again, the presence of wolves was documented during the year, more or less regularly, in the **San Pellegrino – Paneveggio** valley, where **a couple** was detected, and in the **Peio** and **Rabbi** valleys, frequented by a single individual.

Figure 2 shows the most up-to-date overview of the known wolf packs in the **Central-Eastern Alps** at the end of 2017.

Figure 2 - Distribution map of wolf packs and couples in the Central-Eastern Alps.
The information regarding Swiss and transboundary packs were provided by KORA (http://www.kora.ch/index.php?id=90&L=0) and by the Lombardy Region - Environment, Energy and Sustainable Development General Directorate; information regarding wolf packs present in Veneto derives from the report "Lo status del lupo in Veneto (2014-2016)", (edited by E. Avanzinelli et al., 2017 - Veneto Region - LIFE 12 NAT/IT/000807 WOLFALPS project - and refers to 2016.
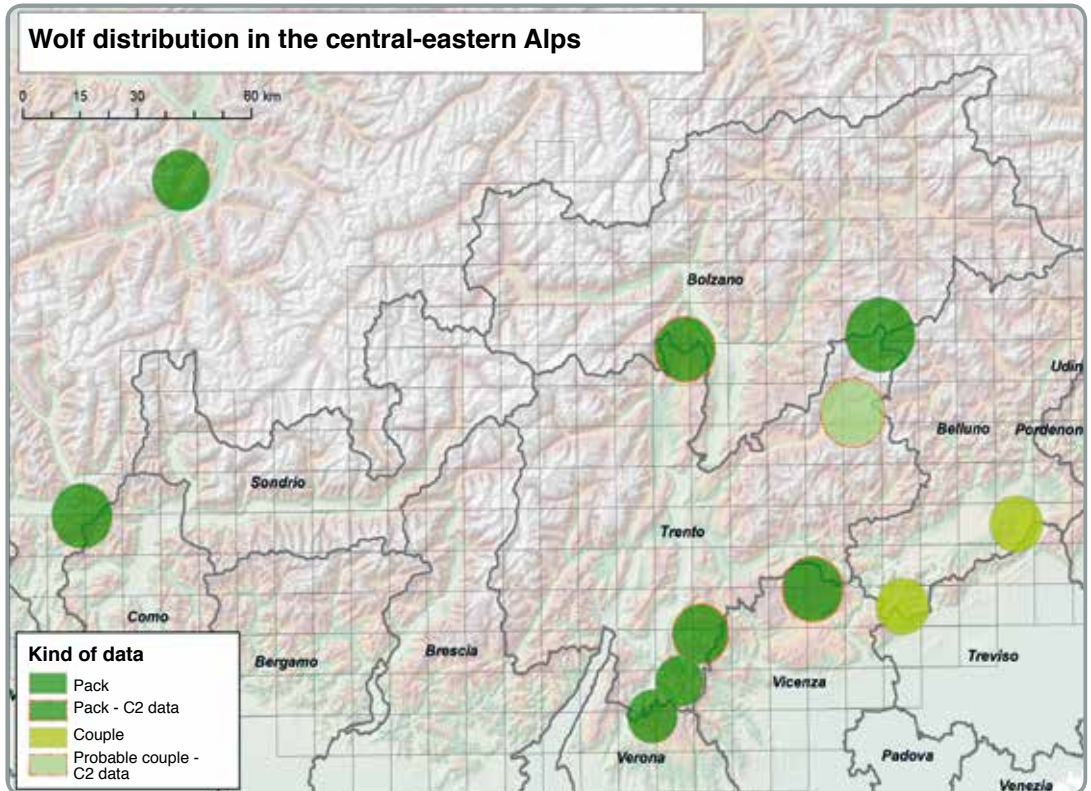
2. Compensation and damage prevention

Compensation for damages caused by wolves

In **2017**, **57 reports** of presumed **damages caused by wolves** were forwarded to the Forestry and Wildlife Department. **53 claims for compensation** were received (in 4 cases no application was sent); of these, **49** claims were accepted and 4 were rejected (the death of the animals was not attributable to a predatory action by wolves).

The damage claim was always followed by an inspection by Forestry staff (except in one case), preferably accompanied by a vet, who drew up a report. Overall, **53 predatory events** were thus recorded; in **20** cases the attacks involved cattle (20 animals killed), in **26** cases sheep and goats (75

Photo 2 - Predation by wolves (G. Vettori - APT Forestry and Wildlife Department Archive)

animals killed, 44 lost following scattering and 1 injured) and in 7 cases equines (4 animals killed and 5 injured) (photo 2).

In total, **€ 46,925.59** were paid for damages to **cattle** (€ 22,965.42), **sheep-goats** (€ 20,429.96) and **equines** (€ 3,530.21).

Graph 2 shows the trend for the damages by wolves recorded in the province in the last few years (Graph 2).

Of the **53** predatory events, **45** were recorded in **eastern Trentino** (15 in the Lessinia area, 20 in Fiemme/Fassa, 1 in Primiero, 4 in Vallarsa/ Folgaria and 3 in the upper Valsugana) and 8 in **western Trentino** (Peio/Rabbi area).

Graph 2
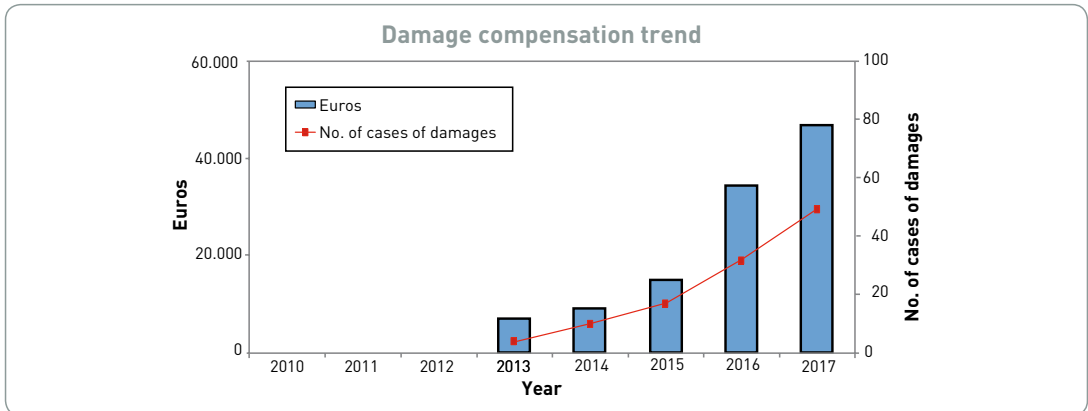
Damage prevention

In 2017, **7 applications** for prevention measures (electric fences and guarding dogs) designed to protect livestock (cattle, equines, sheep and goats) were presented to the Forestry and Wildlife Department. Of these, **3** were processed by the District Forestry Offices (DFOs) by providing gratuitous loans.

Photo 3 - Prevention measures protecting against damages caused by wolves (D. Asson - APT Forestry and Wildlife Department Archive)

The remaining **4** applications were processed by the Large Carnivores Division (2 electric fences and 2 guarding dogs). The overall amount funded was **€ 4,550** (photo 3). In 2017, **4** guarding dogs were used specifically against wolves.

The activities of the **zootechnical officers** were carried out mainly for those managing grazing livestock (shepherds, managers of mountain dairies) and were targeted at providing information and prevention measures. This activity was implemented mostly in the south-eastern part of Trentino, where wolves are constantly present, and in the Fiemme and Fassa valleys.

Generally, **30 Alpine pastures** were supervised by the zootechnical officers, **4** of them were equipped with prevention measures (electric fences, battery powered fence energisers, a prefabricated box unit) during the grazing period (usually from June to September). In total, the initiative concerned **1,753 sheep and goats and 3 equines**.

The **results** were **satisfactory**: at mountain pastures equipped with prevention tools, a total of **3 attacks on protected livestock** were recorded, leading to the assessed loss of **16 sheep** and **1 equine**, the **0.9%** of protected livestock at Alpine pastures.

The management of prevention measures of domestic livestock by the shepherd at Malga Posta (Carega mountains) was particularly interesting. Here a prefab (accommodation unit, photo 4) and

Photo 4 - Transport of a prefab accommodation unit for shepherds in the Carega mountains (D. Asson - APT Forestry and Wildlife Department Archive)

electric fences (140 cm high), along with fence electrifiers and rechargeable solar powered batteries, were again provided on gratuitous loan in 2017, as done in 2016.

3. Communication

Communication initiatives involving the staff of the Forestry and Wildlife Department in 2017:

- **Terragnolo** (on Large Carnivores) (17 March) - 80 participants;
- Interview on **RTTR** (23 March 2017);
- Evening talk on the wolf at **Moena** (27 April 2017) - 120 participants;
- Evening talk on the wolf at **Peio** (2 May 2017) - 120 participants;
- Interview on **Radio in Blu** - (22 May 2017);
- Evening talk on the wolf at **Folgaria** (6 June 2017);
- Public meeting in **Levico** directed at farmers (14 June 2017) - 60 participants;
- Evening talk on the wolf at **Lagolo** (3 August 2017) - 50 participants;
- Evening talk on the wolf at **Canazei** (9 October 2017) - 250 participants;
- Evening talk on the wolf at **Cavalese** (13 October 2017) - 300 participants;
- Evening talk on the wolf at **Rovereto-Museo Civico** (27 October 2017) 50 participants.

New informative **leaflets** on **"The Wolf in Trentino"** were also produced and distributed (3,000 copies).

Finally, it should be mentioned that in 2013 APT joined the *LIFE WOLFALPS* project as a supporter. Specifically, the staff of the Forestry and Wildlife Department contributes to the monitoring and communication activities, in collaboration with MUSE, one of the project partner.

10 press releases regarding the wolf were prepared with the support of the APT Press Office.

Furthermore, information answers to **17 questions raised by the Council** were provided.

Communication activities on wolf and large carnivores carried out by MUSE

MUSE has participated in the *LIFE WOLFALPS* project since 2013. Specifically, it contributes to carry out **communication** activities, and, to a lesser extent, to wolf monitoring, in collaboration with APT's Forestry and Wildlife Department (an external project supporter). In 2017 two meetings were organised during the "*LIFE WOLFALPS* **Platform** for participation and dialogue with representative associations and stakeholders concerning the natural return of the wolf to the Alps", held on 24 May in Cles and 25 May in Primiero. During the "Wolf Week", involving a series of events for schools, the general public and enthusiasts, promoted by the Fair "ExpoRiva Hunting, Fishing and the Environment" from 21 to 26 March, a wide range of communication activities were proposed: educational workshops for primary and secondary schools, meetings with experts, teacher training sessions, a theatre performance, a conference dedicated to the impact of the wolf on hunting practices and an episode of "Trentino in diretta" (RTTR) dedicated to the wolf. During the two days of the fair, an information point on the return of the wolf to the Alps was set up, together with a "large carnivores" corner for children.

In terms of educational initiatives for schools, MUSE offers a number of activities specifically dedicated to **large carnivores**. In particular: the educational lab "Men, Bears and Wolves", developed thanks to the Life Wolfalps and Life Dinalp Bear projects; an activity in the field named "Following the tracks of brown bear on Monte Bondone", in collaboration with APT Forestry and Wildlife Department; and, since September 2017, the game "A wolf's life", on the ecology and conservation of the wolf, developed within the Life Wolfalps project. In 2017, these activities were requested on **25 occasions**, with a total of **613 participants**.

In the framework of **M'Ammalia**, the week dedicated to mammals promoted by the Associazione Italiana di Teriologia (ATIt) in collaboration with the Associazione Nazionale Musei Scientifici (ANMS), MUSE organised a day of meetings with experts and researchers directed to the secondary schools in 2017. Among the scheduled events 3 were dedicated to the knowledge of the brown bear and the wolf, particularly their ecology, the research and monitoring activities, the actions aimed at favouring the coexistence between men and bears.

Finally, as summer activities, once again this year the initiatives proposed by MUSE at **Lake Tovel** included an outdoor version of the activity "Men, Bears and Wolves", weekly scheduled. The seven meetings saw the participation of 112 tourists.

The following table summarises the initiatives mentioned above.

Date	Location	Title	Type	Users
21 March 2017	PalaExpo, Riva del Garda (TN)	LIFE WOLFALPS game "A Wolf's Life"	"A Wolf's Life" board game with: Scuola Media "Sighele", Riva del Garda; Liceo Scientifico Linguistico "R.Rosani", Verona; Istituto comprensivo Valle dei laghi Dro; Molina di Ledro secondary school	224
21 March 2017	PalaExpo, Riva del Garda (TN)	Educational workshops for primary schools "Science and narration regarding the wolf"	5 workshops with: Cavedine di Molina di Ledro Primary school, "Nino Pernici" primary school, Riva del Garda, and at the conference hall in Riva del Garda in the context of "Wolf Week" at ExpoRiva Hunting, Fishing, Environment	109
21 March 2017	PalaExpo, Riva del Garda (TN)	Schools-experts meetings	3 schools-experts meetings at: Istituto Agrario "A. Parolini", Bassano del Grappa, and at the conference hall in Riva del Garda in the context of "Wolf Week" at ExpoRiva Hunting, Fishing, Environment	69
21 March 2017	PalaExpo, Riva del Garda (TN)	Tea with teachers	Teacher training session in the context of "Wolf Week" at ExpoRiva Hunting, Fishing, Environment	7
24 March 2017	Museo Civico di Rovereto (TN)	"Prey, fangs and rifles. The wolf and hunters: coexistence and competition in nature"	Meeting during "Wolf Week" at ExpoRiva Hunting, Fishing, Environment, during which the photography exhibition LIFE WOLFALPS #PostiDaLupi was also presented again	C. 100
25 March 2017	PalaExpo, Riva del Garda (TN)	Rendez. Vous 2200	LIFE WOLFALPS theatre performance, In the context of "Wolf Week" at ExpoRiva Hunting, Fishing, Environment	C. 60

Date	Location	Title	Type	Users
25-26 March 2017	ExpoRiva Hunting, Fishing, Environment Riva del Garda (TN)	LIFE WOLFALPS stand	LIFE WOLFALPS information point hosted by the stand of APT's Forestry and Wildlife Dept. at ExpoRiva Hunting, Fishing, Environment	C. 200
25-26 March 2017	ExpoRiva Hunting, Fishing, Environment Riva del Garda (TN)	Discovery room	Children's corner with educational activities and collection of drawings for the LIFE WOLFALPS competition "Stories of Wolves" set up at ExpoRiva Hunting, Fishing, Environment	C. 100
25-26 March 2017	ExpoRiva Hunting, Fishing, Environment Riva del Garda (TN)	#PostidaLupi	LIFE WOLFALPS photography exhibition set up at ExpoRiva Hunting, Fishing, Environment	n. a.
24 May 2017	Cles	TRENTINO PLATFORM FOR I PARTICIPATION AND DIALOGUE with representative groups and stakeholders involved in the natural return of the wolf to the Alps	Third meeting of the local LIFE WOLFALPS PLATFORM for dialogue with stakeholders	4
24 May 2017	Primiero	TRENTINO PLATFORM FOR I PARTICIPATION AND DIALOGUE with representative groups and stakeholders involved in the natural return of the wolf to the Alps	Third meeting of the local LIFE WOLFALPS PLATFORM for dialogue with stakeholders	15
24-27 October 2017	MUSE, Trento	Waiting for... M'ammalia	Week dedicated to mammals, promoted by the Associazione Italiana di Teriologia (ATIt) in collaboration with the Associazione Nazionale Musei Scientifici (ANMS)	n.a.

Communication activities about the wolf carried out by SAT (Committee for Protection of the Mountain Environment)

11-12 February 2017: "St Valentine among the wolves – two days in Lessinia on the trail of the wolf" (3rd edition) in collaboration with APT, CAI Large Carnivores group, Parco Naturale Regionale della Lessinia, Corpo Forestale dello Stato and Amici del Revoltel, with the support of *LIFE WOLFALPS* (25 participants).

4. Training

• Joint meeting for **Trentino-Veneto staff** (Lavarone, 14 March 2017);
• Training for **ACT staff** at Casteler regarding wolf predation on wild ungulates (1 August 2017);
• Trip to Switzerland (Grisons Canton) by **staff from the Large Carnivores Division** to study prevention systems with fences and dogs (15-17 September 2017)

THE LYNX

Monitoring of the lynx began with the return of the species to the province of Trento, in the second half of the **1980s**, with the arrival of some animals in **eastern Trentino** (they remained in Trentino for about a decade). From the beginning, traditional survey methods in the field, camera traps, radio-tracking and genetic monitoring were used for this species.

The only lynx surely present in the province of Trento (since 2008) is the **male known as B132**, which comes from the small Swiss population reintroduced in the St Gallen Canton (see page 45 and following pages of the 2008 Bear Report, and all the appendices on the "Lynx" in subsequent Bear Reports). From **November 2012**, B132 established in the south-western part of the province, specifically between the mountains of **Val d'Ampola** (on the left-hand side of the Tremalzo and Lorina mountains, with Monte Stigolo on the right) and on the right-hand side of the **Chiese** valley above Darzo and Lodrone, on the border with Brescia (photo 1).

Photo 1 - Slopes of Val d'Ampola with the mountains of the Val del Chiese in the background (C. Groff - APT Forestry and Wildlife Department Archive)

During 2017, his presence was documented again; firstly on **11 March** when **tracks in the snow** and **scat** attributable to the lynx were found by the staff of the Ledro Forestry Station on the wooded hillsides above Lake Ampola (photos 2 and 3).

This was thought to confirm the presence of B132, in an area he has used for several years, although there were no elements allowing the animal identification with certainty.
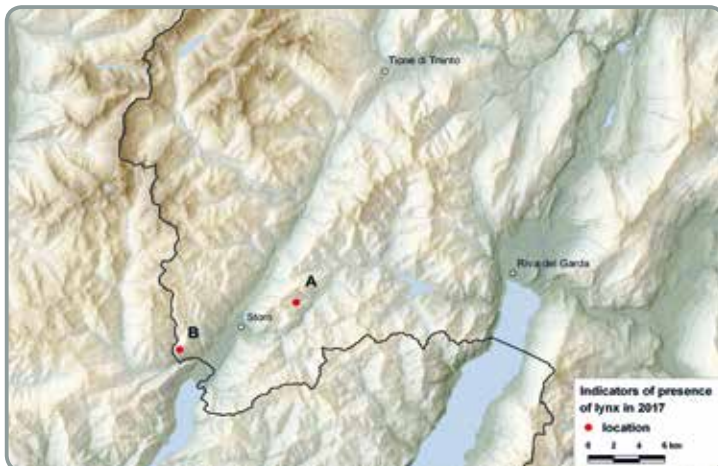
Photo 2 and 3 - Signs of presence of the lynx (D. Colotti, C. Groff - APT Forestry and Wildlife Department Archive)

Photo 4 - The lynx B132 photographed by a camera trap near Storo (T. Balduzzi - Forestry and Wildlife Department Archive)

Another confirmation that this lynx was still present in Trentino was instead obtained at 20.30 on the evening of **17 November**, when a hunter from Storo took a picture of him with a camera trap on the slopes above the town, on the right-hand side of the Chiese valley (photo 4). The radio collar, which is no longer working, can be seen in the photo.

Figure 1 shows the location of the lynx respectively in March (A) and November (B).

Once again this year, there were no cases of **damages** attributable to the lynx in the province.

Figure 1

NOTES

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