



PROVINCIA
AUTONOMA
DI TRENTO

TRENTINO

LARGE CARNIVORES REPORT 2018







PROVINCIA AUTONOMA
DI TRENTO



APT FORESTRY AND WILDLIFE DEPARTMENT
Large Carnivores Division

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LARGE CARNIVORES REPORT 2018

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Cover page

“Female bear with cubs in the Brenta Range”

Photo Franco Cadonna - APT Forestry and Wildlife Department Archives

Back cover

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The informations provided in this Report are the result of the work of many people, all of whom we would like to **thank**, and namely: the officials of the Servizio Foreste e Fauna (Forestry and Wildlife Department), the foresters, the staff of the Adamello Brenta and Paneveggio Pale di S. Martino Nature Parks, the staff of the Azienda Provinciale per i Servizi Sanitari (Provincial Health Services Company), the forest wardens, the gamekeepers of the Associazione Cacciatori Trentini (Association of Trentino Hunters), the volunteers and many others.

1. MONITORING

1.1 Bear

The Autonomous Province of Trento (PAT) has been **monitoring** bears (photo 1) continuously since the **1970's**. The traditional field detection techniques have been joined over the years by new ones, such as **radio-telemetry** (method used for the first time in Eurasia in 1976), automatic video-surveillance from remote stations, **camera -trapping** and, as of 2002, **genetic monitoring**.



Photo No. 1 - Bear scats on the Ghez peak - 2715 m a.s.l. (M. Zeni - Archives of Servizio Foreste e Fauna, PAT)

Genetic monitoring is based on the collection of organic samples (hairs, scats, urine, saliva, organic tissue) carried out in two ways, commonly defined as **systematic** monitoring, based on the use of traps with olfactory bait aimed at ‘capturing’ the animal’s body hair using barbed wire, and **opportunistic** monitoring, based on the collection of organic samples found on the ground during ordinary service activities and when detecting damage and checking **rub trees**.

In 2018, monitoring was performed for the **17th consecutive year** under the **coordination of the Servizio Foreste e Fauna of the Autonomous province of Trento (PAT) - Settore Grandi carnivori** (PAT Forestry and Wildlife Service – Large Carnivores Division) and with the assistance of the Edmund Mach foundation (FEM), of ISPRA - Istituto superiore per la protezione e la ricerca ambientale (Italian Institute for Environmental Protection and Research), of the Adamello Brenta nature park (PNAB), of the Science Museum (MUSE), of the Association of Trentino Hunters (ACT) and of many volunteers. The **genetic tests** have been performed by the Genetic Conservation Research Unit of FEM on the samples taken in the province of Trento and by **ISPRA** on the samples from the rest of the Italian Alps, and by the Lausanne laboratory for Switzerland, all in full coordination one with the other.



In **2018** it was decided to stop systematic monitoring and to base the reports only on the data collected via **opportunistic monitoring**. This approach may provide less accurate estimates in terms of entity and geographic distribution of the samples collected but, with regard to the continuing increase in effort required to achieve adequate systematic monitoring, it was decided to concentrate the effort in alternate years, so as to have greater certainty of accuracy.

In the course of the year 2018, in particular, **opportunistic monitoring** resulted in the collection on the provincial territory of **524** organic bear samples (Photo No. 2), **403** of which were analysed and used for estimation. Other samples have been collected opportunistically also outside the province, thereby helping to define the **total** number of bears identified belonging to the **Alpine brown bear population**. The relating data have been kindly supplied by the **Autonomous Province of Bolzano**, by the **Autonomous Region of Friuli Venezia Giulia**, by the **University of Udine** – Department of Agro-Food, Environmental and Animal Sciences, by the **Lombardy Region**, by the **Veneto Region**, by the **Provinces of Brescia and Sondrio** and by the **Swiss Confederation (KORA – Carnivore Ecology and Wildlife Management)**.

The collected **data** are processed on a yearly basis, reference being made to the solar year (1 January – 31 December) which actually coincides with the bear's 'biological year'.



Photo n. 2 - Hair caught on barbed wire (D. Asson – Archives of Servizio Foreste e Fauna, PAT)

Obviously, all of the monitoring techniques mentioned above cannot guarantee that one will detect with **certainty all of the bears living in the territory**. The retrospective reconstruction of the population and the application of statistical methods, however, do allow to generate an estimate of the total population, with the relating confidence intervals, that will be illustrated further below.

The processing of the **data** collected in **2018** has resulted in the information given below regarding **demographics, survival rates, population consistency and structure, population trends, distribution, density and dispersion**.

It should be noted that the graphs relating to the demographic aspects have been updated not only by adding the data of the last year but also by retrospectively changing the data of the **previous years** for those subjects that the 2018 monitoring allowed to be rediscovered and that are therefore considered to be present in previous years also. This explains the differences that may be found with respect to the graphs of previous Reports. This means that a **in progress updating of the available data** and of the related processing has been performed and therefore should be considered as replacing the previous data.

Definitions

- **“Cubs”**: bears aged between 0 and 1 year;
- **“Juveniles”**: males up to the completion of their 4th year and females up to the completion of their 3rd year;
- **“Adults”**: males from the completion of their 4th year and females from the completion of their 3rd year, deemed sexually mature and capable of reproduction;
- **“Bears detected”**: bears whose presence has been ascertained during the course of the year genetically or based on unequivocal (via radio-telemetry, for example) and repeated observation;
- **“Bears not detected”**: bears not detected genetically in the last year only;
- **“Rediscovered bears”**: bears detected genetically after not being detected for two or more consecutive years;
- **“Dispersion”**: moving out of the core area featuring the presence of the females, that basically coincides with Western Trentino, by bears born in the core area but without them reaching the area stably inhabited by specimens belonging to the Dinaric-Balkan population;
- **“Emigration”**: abandonment of the provincial population by bears that reach the area stably inhabited by specimens belonging to the Dinaric-Balkan population;
- **“Return”**: return to the core area featuring the presence of females, that basically coincides with Western Trentino, by dispersed or emigrated bears;
- **“Immigration”**: entry into the area stably inhabited by bears in Western Trentino by bears coming from the Dinaric-Balkan population.

BOX 1 – Systematic monitoring of large mammals using camera traps – Update with the fourth year of sampling

In 2018, the **systematic monitoring of large mammals** based on the use of **camera traps placed at 60 sites in a total area of 220 km²**, the updates of which are illustrated hereafter, continued for the fourth consecutive year. The project, started in the summer of 2015, is being carried out as part of the convention between PAT and MUSE (Science Museum of Trento) on the monitoring of large carnivores. Greater details about the monitoring characteristics and the field protocol can be found in the previous editions of the “Rapporto Grandi Carnivori” (Large Carnivores Report).

As in previous years, the **2018** sampling was carried out from the 13th of June to the 17th of September for a total of 2,039 days/camera (average per camera: 34 days). All 60 sites can be used for statistical purposes in 2018. The camera traps recorded a total of **97,640 images**, of which **12,646 showed wild mammals** belonging to 9 species.

Moreover, the presence of domestic species and of humans (on foot and in vehicles) has been recorded. Besides registering the number of sites in which each species was detected and the ratio with the total of the surveyed sites (naive occupancy), the “independent events” for each species were calculated, eliminating the sequential images from the count since they are referred to a single passage (such as the case of an animal standing in front of a camera for a long time and thereby generating many images), considering a 15 minute time interval as standard.

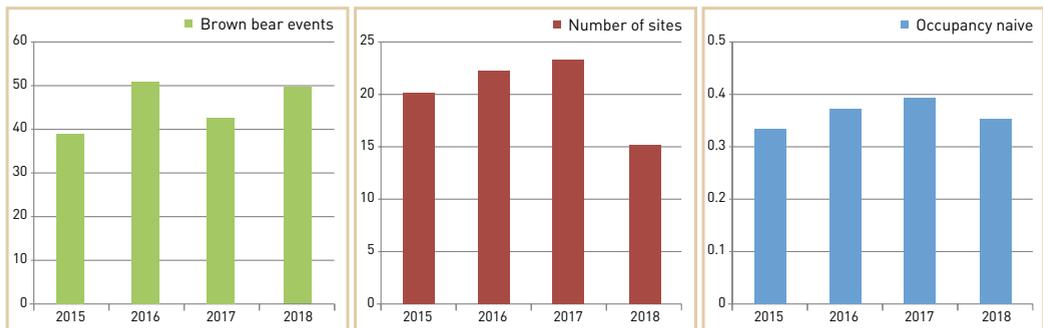


The presence of the **bear** was recorded at 15 of the total 60 sites (photo A, graphs A, B, C, figure A), in 50 independent events, with a maximum of 11 at a single site.



Photo A - Brown bear images taken by Photo-traps in 2018 (MUSE Archive)

This result is partially in line with previous years, which in the three-year period 2015-2017 recorded at 20, 22 and 23 sites 39, 51 and 43 independent events, respectively, with a maximum of 6, 7 and 4 events at a single site in 2015, 2016 and 2017. During the last monitoring season there has been a reduction in the number of sites where the bear has been recorded as compared to the average of the previous years and as compared to the positive trend recorded in those years (graph B). However, this has not affected the number of passage events recorded which are higher than in 2017. This means that despite the decrease in sites, the average number of events per site during the summer of 2018 is higher than in previous years. In this respect, it is indicative that the site registering the largest number of events in 2018 has 11 events. Seven passage sites are common to the four years, in perfect continuity with the previous year (graph C).



Graphs A, B and C - Number of independent bear events, number of camera traps and naïve occupancy (ratio between sites where the species was camera trapped and the number of surveyed sites). The comparison of the results over the 4 years is merely indicative and is not aimed at identifying temporal trends.

Besides the bear, the presence of 8 other species of medium-large mammals has been recorded: roe deer, fox, red deer, chamois, hare, badger, marten and squirrel (in decreasing order of capture events). Again, in 2018 **there were no events related to wolves**, camera trapped up to now only in the summer of 2015 in val Algone and on only one occasion. As in previous years, the images of the passage of domestic dogs in the monitored areas were analyzed. This is a very topical issue in view of the possible association of the presence of **loose dogs** and the increased risk of (potentially dangerous) encounters with bears. The results show a constant increase in the number of dog passage events and, as in previous years, a distinct prevalence (73%) of loose dogs (Graph D). Lastly, researchers and collaborators from the Science Museum of Trento are now analyzing both the effects that the presence of humans has on bears and on the “co-occurrence” between wild species, i.e. the effect that the presence of given species has on the distribution of the other species.

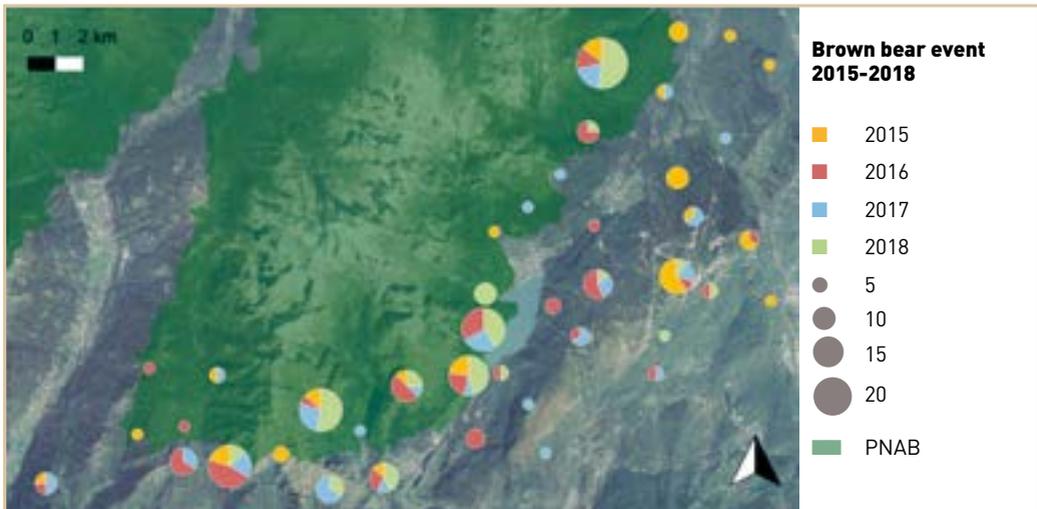
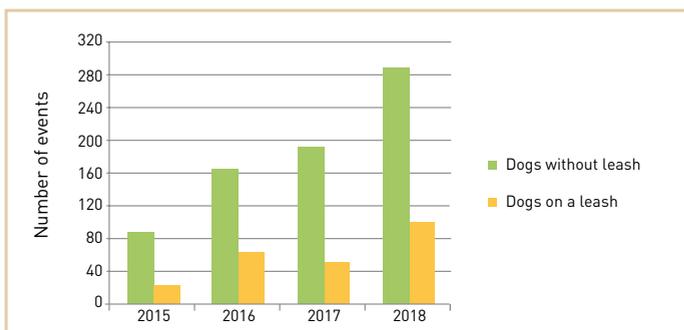


Figure A - Map of camera trapping sites and events of the brown bear in the study area during the four-year period 2015-2018. The size of the circle is proportional to the number of total events; the slices indicate the percentage of events for each year of monitoring.



Graph D - Graph illustrating the number of events related to the passage of dogs at the camera trap sites during the four-year period 2015-2018, loose and on leash respectively.

By Valentina Oberosler and Francesco Rovero
MUSE - Museo delle Scienze (Science Museum of Trento)



Demographics: bears born and rediscovered

In **2018**, the presence of **9-11 new litters** was estimated, amounting to a total of **21-23 cubs**. The estimate was made based on the information coming from genetic analysis and from their geographical distribution, together with the direct observation of females with cubs recorded during the course of the year (Photo No. 3).



Photo No. 3 - Female bear with four cubs (A. Hueller - Archives of Servizio Foreste e Fauna, PAT)

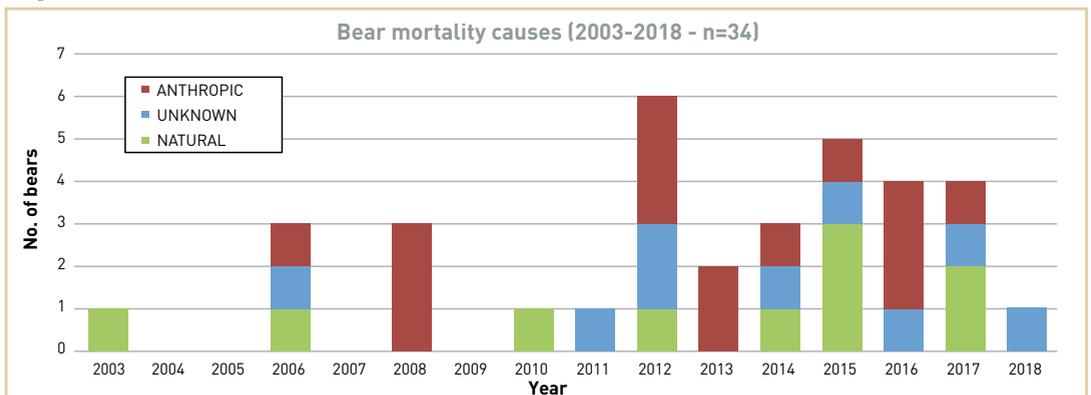
Moreover, in 2018, **4 bears** have been “**rediscovered**” (see the definition on Page 7) thanks to genetic analysis.

Demographics: dead bears

In 2018, the **death** of **one** bear was recorded. The remains of the bear were found and recovered in the lower **val di Sole** valley, not far from **Mostizzolo**, on **16 June 2018**. As yet, it has not been possible to genetically identify the animal.

From 2003 to date, **34** certified bear **deaths** have been recorded among the population of brown bears living in the central Alps (and therefore outside Trentino too). The causes of death have been classified as being **natural** in 10 cases (29%), **anthropic** in 15 cases (44%) and **unknown** in 9 cases (27%) (Graph No. 1). It should be noted that these values do not indicate the actual number of bears that have died nor the real proportions between the various causes of death, considering the different chances of observation (e.g.: it is easier to find specimens hit

Graph No. 1



by vehicles on roads than specimens that have died in the wilderness due to natural causes).

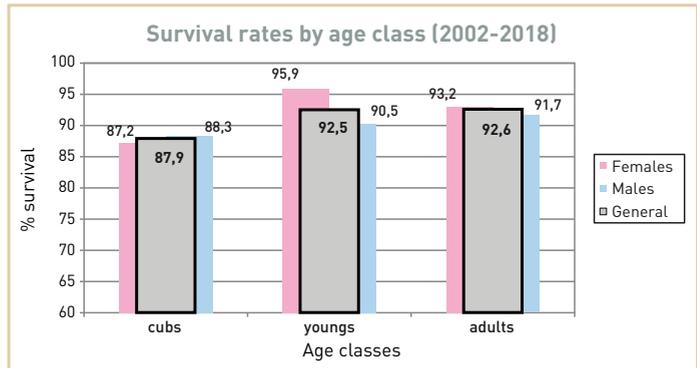
15 of the 25 **bears that died** due to known causes therefore died **because of man**: 27% by **illegal killing (4)**, 46% by **accident (7)** and 27% by **authorised culling (4)**, of which one in Germany, two in Switzerland and one in Trentino.

Survival rates

The new data available allow to update the survival rates for the three different age categories, differentiating them by gender (Graph No. 2). The data refer to a **17-year period (2002-2018)** and to **116 different bears**, regarding which it was possible to ascertain their death or survival in 606 passages from one year to the next (**606 bear-years**).

Under the ‘mortality’ category in general fall, along with ascertained death, also the non-detection in at least the last two years, and the forcing into captivity. The data regarding bears that may have emigrated are instead considered only up until the time they leave their population of origin.

Graph No. 2



BOX 2 - The survival of motherless cubs, first data

Both in the case of the removal of the female bear KJ2 (2017) and of the female bear Daniza (2014), it was decided to **leave the cubs in their habitat** in order to allow their growth in natural conditions. This is in line with what stated by the “**Linee guida per la gestione dei cuccioli di orso privi della madre**” (Guidelines for the management of bear motherless cubs) drawn up in 2014 by the **Large Carnivore division of PAT** with the contribution of **ISPRA** – (Italian Institute for Environmental Protection and Research) and the support of many national and international technical and scientific studies. Bear cubs can also be deprived of their mothers due to **natural causes** (death of the mother or abandonment of the cubs).

According to the specifications of the above-mentioned “guidelines”, cubs were dealt with in the following way:

1. by starting up specific **monitoring** actions, both systematic and opportunistic, to detect and track the presence of cubs and their conditions;
2. by **avoiding all direct or indirect contact between cubs and humans**, by all staff personnell and other people, if not strictly necessary and authorized;
3. by **avoiding** or reducing to a minimum the use of **artificial feeding**;
4. by implementing **ad hoc communication**, contemplating the constant updating of the situation with the public, as well as the spreading of specific information about the behaviour to be avoided or to be adopted to keep down to a minimum the risk of the cubs’ habituation to humans;

5. checking the suitability of the signage on stretches of highly trafficked roads in areas featuring the presence of cubs, in relation to the necessity to **reduce the risks connected to road accidents**.

All the above activities were adopted in both cases under consideration, defining a network of standard monitoring points set up with minimum food baits (corn, fruit, wild animal carcasses), aiming to attract the cubs without substituting their active search for food. Each site was equipped with one or two camera traps recording the passage of the cubs to observe the evolution over time of their growth in order to evaluate their increase in weight. The genetic identification of the cubs was actively performed via the organic material collected by means of a hair collection system (small fence with single barbed wire) set up at each site. As regards the reporting and control of the occasional detections, special attention was taken by the forestry staff in activities carried out in the area where the bear cubs could be.

In fact, this monitoring effort guaranteed the **constant assessment of the cubs' presence and condition**, immediately and up to the following season in which the cubs become "**juveniles**" (males between 1 and 4 years of age and females between 1 to 3 years of age). In this regard, it is necessary to remember that when the young bears in Alpine habitats reach 16-17 months of age they usually leave their mothers definitely and undertake the stage of life that will take them in a short time (2-3 years) to the condition of being able to reproduce. Starting from the beginning of this stage, the presence/absence of the mother is no longer a factor that influence the survival rate of the young bears. This is also true for the young bears under observation, which from that point of view become comparable to all bears of the same age.

The documentation (particularly the genetic and photographic documentation) collected over the years has confirmed the **live presence of all four juveniles**. Two of them (the bears from KJ2) had become "**juveniles**" in 2018, an age that anyhow envisages the definite detachment from the mother, whereas the Daniza cubs, the presence of which was also confirmed during the year 2018, have reached the "**adult**" age (in fact at the end of 2018 they are 5 years old).

In three cases out of four (female bear F20, daughter of Daniza, is an exception) they proved to be extremely **shy** of humans and of human-related activities.

In conclusion, it was also possible to confirm their **good physical condition** and a growth rate in line with the other bears of the same age.

This can be considered a very favourable **management success** due to the courageous decisions made by the Administration at that time, supported by the above-mentioned guidelines and by many National and International technical and scientific studies.



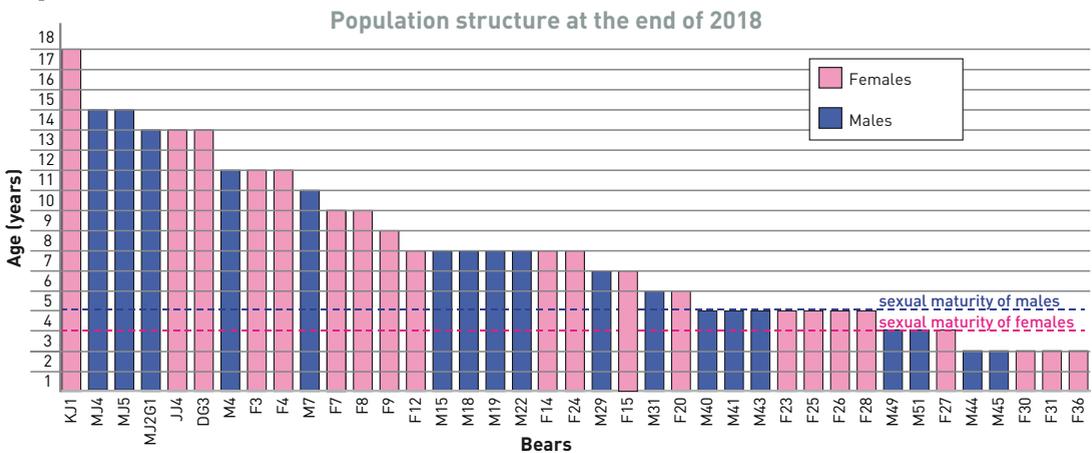
Photo A and B - Motherless cubs photographed during specific monitoring campaigns (Archives of Servizio Foreste e Fauna, PAT)

Consistency and structure

Seeing that it is becoming increasingly difficult to acquire a complete and firm datum regarding birth rates, it has been decided **not to take into account the cub category** when defining the **lowest ascertained number** of bears.

Based on this criterion, the **lowest ascertained number** of juveniles and adults considered to be present in 2018 equals **39**, of which **18** are male and **21** female (Graph No. 3) (**sex ratio M-F 1:1.17** - $n = 39$). With reference to this number, that is lower than that recorded in 2017 (43), it should be remembered that, as said before, no systematic monitoring was conducted in 2018 (because it is performed in alternate years) and therefore the monitoring effort has been lower than that performed in the previous year.

Graph No. 3



At the end of 2018, therefore, the **structure** of the quota of ascertained specimens (cubs excluded) is as follows: **28 adults** (72% - 11 males and 17 females) and **11 juveniles** (28% - 7 males and 4 females). The **average age** of the ascertained bears (cubs excluded) is **5.9 years**, with a slight difference between the **males** (**5.8 years**) and the **females** (**6.1 years**).

The **estimated total population**, taking into account **also the number of cubs observed in 2018** (21-23, as mentioned above) and of the individuals not genetically detected only in the last year (16), is therefore defined in a wider range of **60 - 78 bears**. **This is therefore considered to be the official consistency data for the year 2018**, processed using the same system used in previous years.

Without prejudice to this datum, the Administration is aware that the estimate of the bear population consistency should be obtained in perspective using '(genetic) capture - mark - recapture' (CMR) models.

The following box shows the assumptions of this method, the motivations that support it and a simulation relating to the last four years.

BOX 3 - Consistency estimates of the bear population by means of (genetic) capture – marking – recapture (CMR) models

Genetic monitoring of the bear population has been carried out by the Autonomous Province of Trento on a continuous basis since 2002. This type of **monitoring** is based on the collection of organic samples (hairs, excrements, saliva, urine, tissues) by means of two methods: **systematic** monitoring, carried out using traps with scent baits for “capturing” hairs on barbed wire; **opportunistic** monitoring, based on the collection of organic samples found in the area during routine activities, at damage sites and by checking **rub trees**.

Whereas this second type of monitoring collects samples on a random basis, according to chance, systematic monitoring follows a planned and **standardized sampling protocol** organized on a spatial and temporal scale in order to distribute the collected samples more uniformly (in space and time).

As mentioned above, in 2018 only **opportunistic monitoring** was carried out. This made it possible to collect from the provincial territory **524** organic samples attributed to bears, of which **403** were analyzed and utilized for the estimates. Other samples were collected opportunistically outside the province, which contributed to determine the **total** number of bears identified belonging to the Central Alps **brown bear population**. DNA analysis of the collected samples (genotyping) makes it possible to recognize and “give a name” to each bear individually. Theoretically, if we could carry out a large collection, distributed over the entire territory, we could collect samples from all the bears present and thus have a complete census of the population. This was possible during the first 10-15 years of existence of the population, when the occupied area and the number of animals was limited. At present, it is not possible to plan such a wide-spread effort for collecting the samples and genotypes of all the bears present. The population has grown and the occupied area is slowly increasing in size, thus making it more difficult to perform monitoring.

For this reason, it is necessary to **estimate present and future counts of the population**. Said estimates are always based on the analysis of genotyped samples (i.e. the DNA of the bears) and are supported by a solid statistic base (**CMR genetic models - capture – mark – recapture**). This monitoring cannot guarantee the certain detection of all the bears present on the territory and the method used is based on the assumption that only a part of the population (and its DNA) will be “captured and recaptured”; however, based on the data collected and the effort carried out for the collection, it is possible to make a reliable estimate of the average probability of “finding” each individual.

In this way, one can estimate the number of individuals present without necessarily “capturing” all of them by means of genetic analysis; starting with the (minimum) number of individuals whose DNA has been detected and their probability of being “captured” it is then possible to define the number of bears estimated to be present in each year. Genetic monitoring has been the preeminent technique for the collection of information about the bear population in the province in the last 15 years and represents the recognized scientific standard for obtaining reliable data.

Another advantage of the estimates obtained by these models is the possibility to associate the so-called **interval of confidence (IC)** to the number estimate of the population’s consistency. The IC tell us about the exactness of our estimate. For example, a value of 48 bears with an IC between 42 and 78 indicates that our estimate of 48 bears oscillates with a good degree of certainty between the minimum and maximum values of the interval.



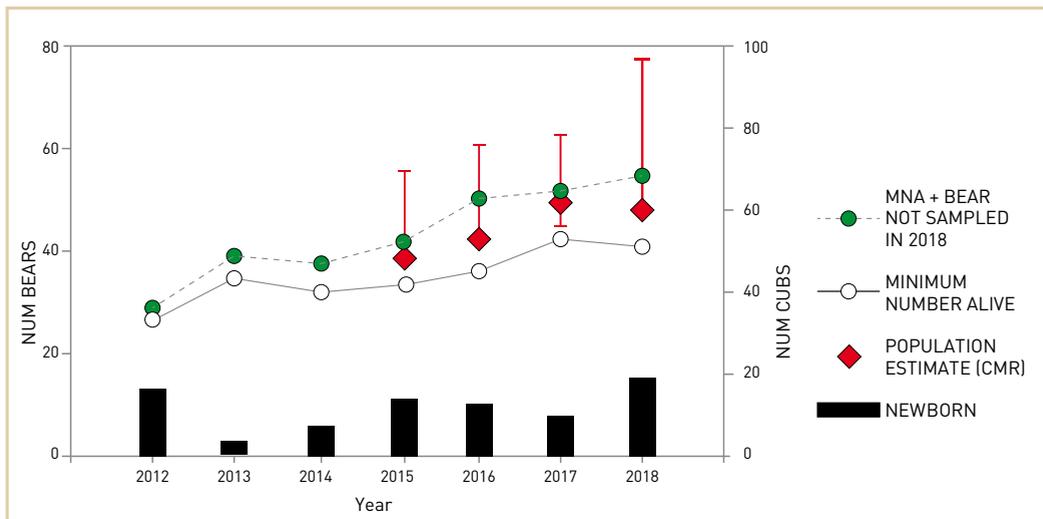
Systematic monitoring guarantees better accuracy and precision of the estimates because the timely planning of the sampling, according to definite times and a homogeneous geographical distribution, makes it possible to apply more effectively the statistical models aimed at quantifying the average probability of a bear being genetically "captured" and thus to have narrower ICs.

For the year 2018, based exclusively on the opportunistic monitoring data, it was possible to estimate the presence of a number of 48 juvenile and adult bears (thus excluding the cubs born in 2018), with an IC between 42 and 78. The average value is substantially similar than the number estimated in 2017 (N = 50). The estimate with the same methods, carried out taking into consideration the number of genotyped cubs, is **58 bears**, with an IC between **52 and 72**.

Graph A summarizes the results of the estimates carried out by means of genetic CMR between 2015 and 2018 and compares them with the definite minimum number of bears captured yearly by genetic analysis (NMC – definite minimum number) and with the maximum number possible which adds to the NMC the number of bears which are missing but were detected in the previous year.

The graph shows how the difference between the definite minimum number and the maximum number possible tend to grow and how the use of CMR estimates is useful for obtaining more complete and reliable information.

Graph A - Estimate of the trend in the consistency of the bear population since 2012. The estimates by genetic CMR are shown in red complete with confidence intervals; in white numbers referring to the definite minimum number of bears singled out yearly by genetics; in green numbers referring to the same minimum number with the addition of bears that are absent but were detected the previous year; the black bars show the estimate of new cubs born in 2015 – 2018.



Trend

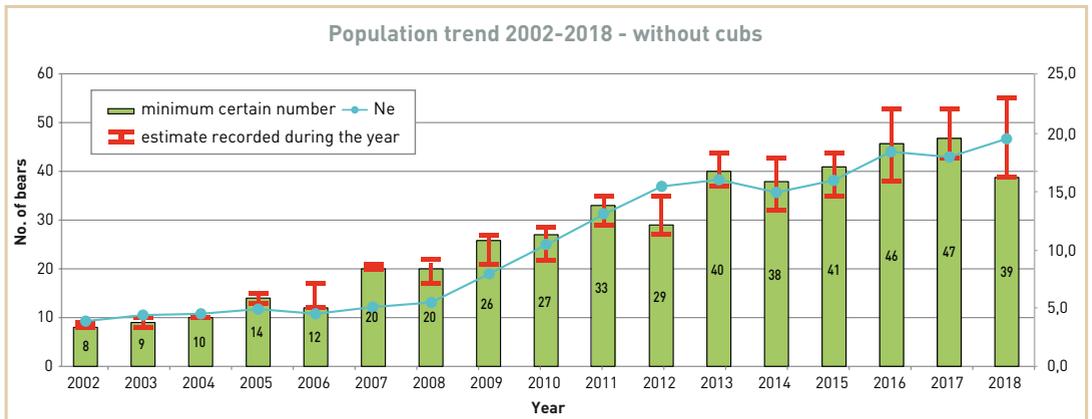
The trend of the population in the juvenile and adult components (once again **leaving out the cubs**) is shown in Graph No. 4. The columns indicate the **lowest ascertained number** of adults and juveniles defined year per year, updated and integrated based on the data acquired in successive years.

The graph also shows the **historical estimation data** recorded year per year, represented by the **red-coloured interval** (that also considers the bears who have not been detected only in the last year, cubs once again excluded). The relating values actually generate snapshots of each season, not changed by the integrations made possible by subsequent monitoring.

It also shows the trend of the so-called “**effective population**” (Ne), calculated considering **the number of reproductive males, plus the number of reproductive females, divided by two** (because normally they reproduce every second year).

Another information shown by the graph is how **the bear population was slightly growing even over the last 5 years**, although not as much as that over the previous 10 years. The data for the year 2018, too, considering the high birth rate observed (21-23 cubs), appears to confirm this trend, although this is not yet visible since the graph does not take these cubs into consideration.

Graph No. 4

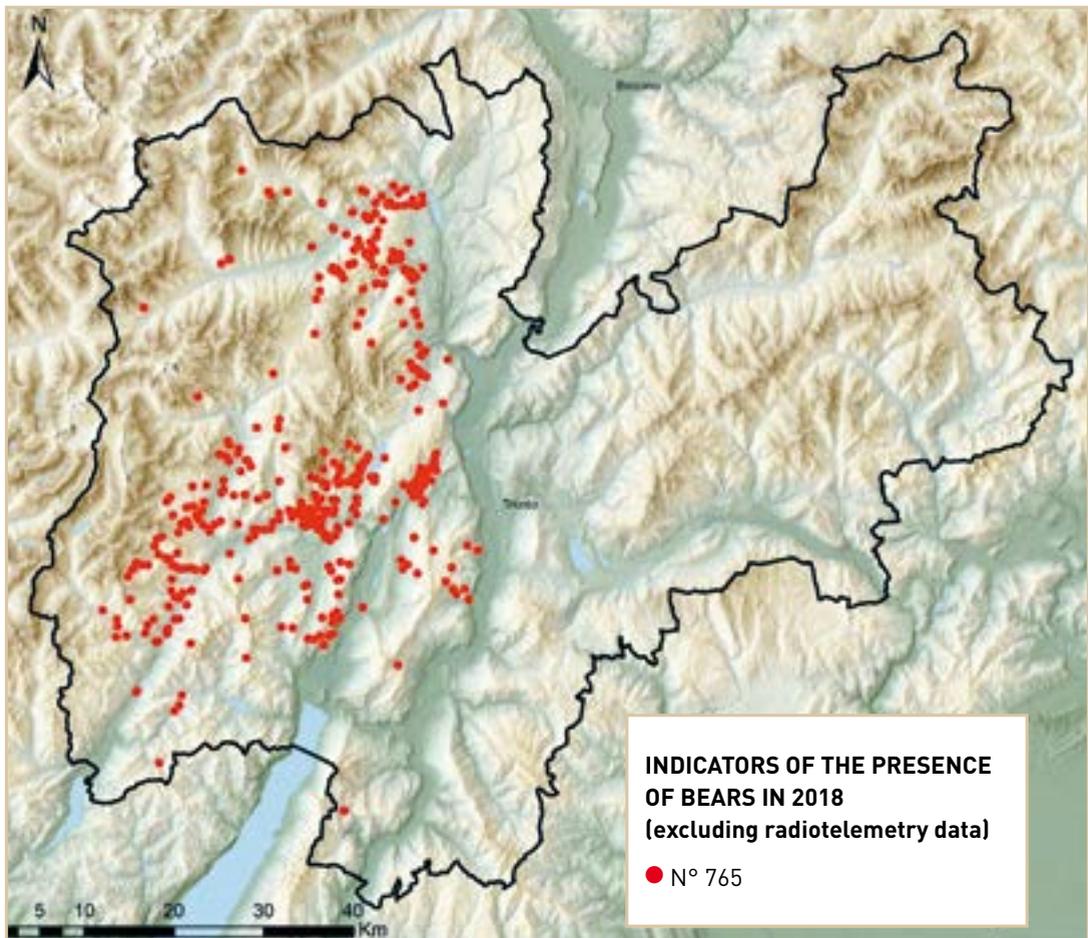


Distribution

36 of the 39 bears observed in 2018 were detected on **Trentino**. 3 adult males were observed **outside the provincial territory**: M29 in **Switzerland**, M4 in **Friuli V.G.**, M40 in the province of **Brescia**. One of the bears present in Trentino, M19, roamed also to **adjacent provinces/regions**, especially Bolzano, Verona, Brescia and Sondrio.

The 765 **indexes of presence** of bears collected in the **province of Trento** in 2018 (all those recorded, with the exception of those deriving from the satellite monitoring of 6 bears) are shown in Figure No. 1. No data has been observed in **eastern Trentino** (for the third consecutive year).

Figure No. 1



Considering also the longer movements accomplished by male juveniles, based on the data acquired, the bear populations in the central Alps has **distributed in 2018 over a theoretical area of 38,700 km²** (Figure No. 2). **The area stably occupied by the females is smaller (1,160 km²)** and is entirely located inside the province (western Trentino). The areas occupied have

been estimated using the minimum convex polygon method, applied to 100% of the validated indexes of presence. This leads to the inclusion, especially in the macro-area that includes the moving of the juvenile males, also of vast areas that are not suitable and/or not actually used.

Figure No. 2



Use of space of the radio-collared bears

In 2018, satellite telemetry was used to monitor 6 bears, four females (DG3, F4, F20, F36, respectively 11, 9, 3 and 1 year old) and two males (M18 and M49, respectively 5 and 2 years old), whose home ranges, calculated using the Minimum Convex Polygon method (MCP), are shown in Figures 3 and 4.

The GPS collar of F4 was removed in September 2018 due to partial malfunction. The GPS collar of M18 was removed in the same month, after one and a half years of operation, to avoid any problems due to neck growth.

Figure No. 3

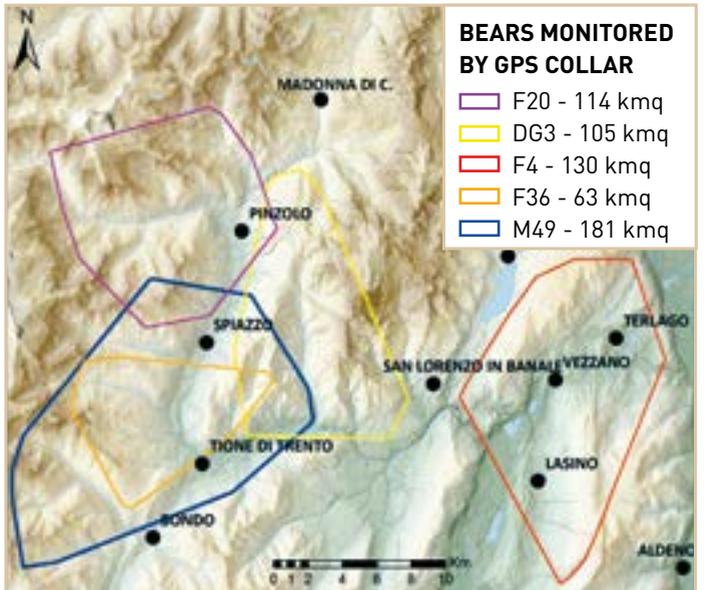
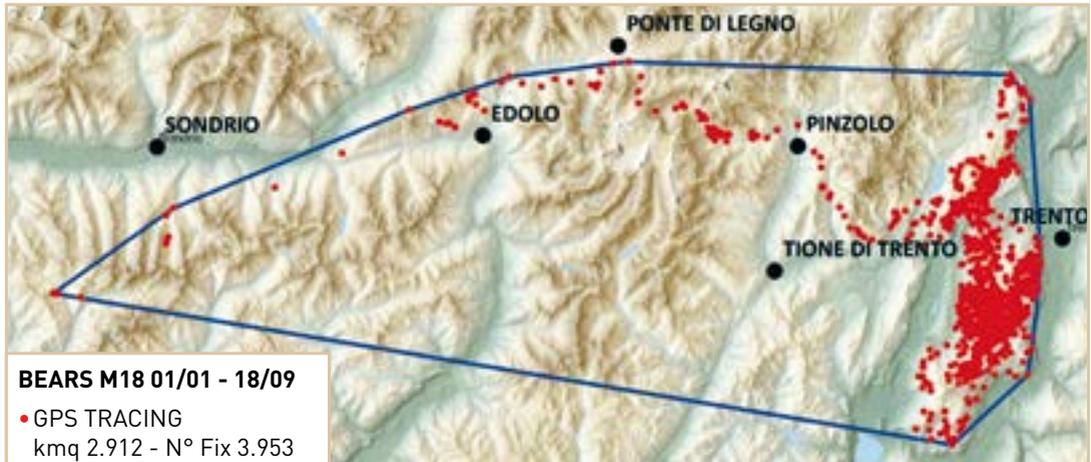


Figure No. 4



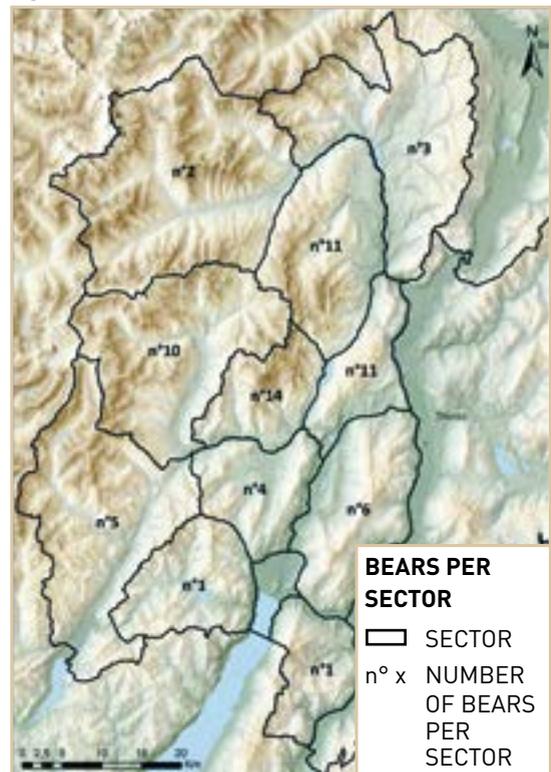
Density

The **density** recorded in the **core area occupied by the females** (1,160 km²) equals **3.1 bears/100 km²** (36 individuals, excluding the cubs). This datum is to be considered keeping in mind the following facts:

- density is referred to a set of data collected over a long period of time (one solar year) and therefore the number of individuals present in the area at a given time, that would offer a datum that is closer to the real average density, would be smaller;
- some (male) individuals have also stayed in areas external to the area occupied by the females over the period of time considered. This datum too contributes to making the actual density lower than that given.

Density can be locally different, as partially shown in Figure No. 5 that shows the **lowest number of bears**, cubs excluded, identified with certainty (genetics, radio-telemetry) **in every sector** of western Trentino. Needless to say, many bears stayed in several sectors, also in relation to the varying seasonal availability of food, and therefore they may have been identified in several of them. This means that the total minimum number ascertained in the province and in adjacent areas in 2018 is still 36 bears (cubs excluded) and it would be nonsensical to add up the data from the various sectors.

Figure No. 5



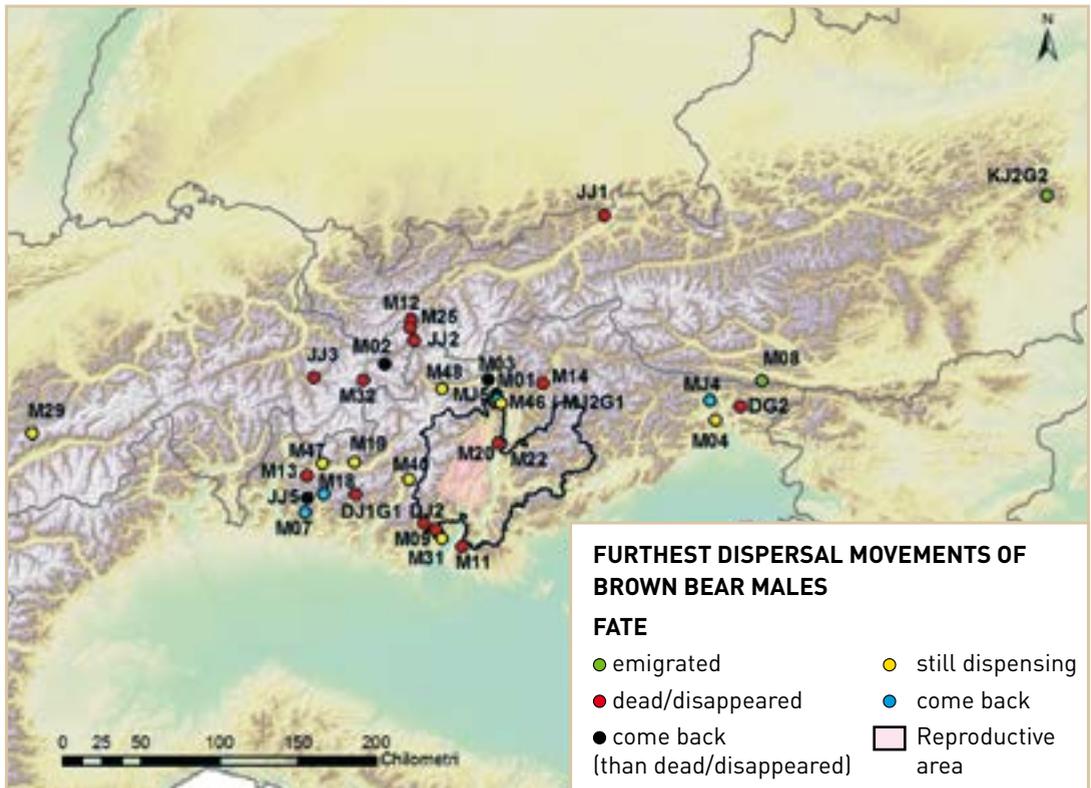
Dispersion

In the **2005-2018** period, it was possible to document the **dispersion** (see the definition given on page 7) of **36 bears** (all males). **15 of these (41.7%) died or disappeared** before returning, **10 (27.8%) returned** (and 5 of these subsequently died or disappeared), **2 (5.6%) emigrated** and **9 (25%) are still dispersing**. **No dispersion females** so far has been observed.

The maximum linear distance of dispersion totals $100.1 \text{ Km} \pm 73.9$, with a minimum value of 27 Km and a maximum value of 405 Km. It is possible to break down the dispersing males into short range and long-range dispersers. The former are individuals that have moved a short distance, probably in order just to exit the reproductive area of the females and dominant males. In this case also, the linear distances covered are given, since for most individuals the analysis is based on the genotyping of a very small sample population. As confirmed by the data of the individuals monitored by GPS radio-collar, the routes of the distances actually travelled are much longer.

Dispersers	Number	Average linear distance (Km)	Max. linear distance (Km)
Short range	13	$44,8 \pm 12,7$	73
Long range	23	$131,3 \pm 75,8$	405

Figure No. 6



1.2 Wolf

Wolf **monitoring began** with the natural return of the first individuals to the province in **2010**, after the disappearance of the species around the middle of the 19th century. Genetic monitoring, traditional field surveys and camera-trapping have been used since the beginning (Photo No. 4).

During 2018 **864 data** referable to the **wolf** (sightings, pictures, prey, footprints, hairs, scats, urine, howling) have been recorded in the province. Of these, **227** refer to organic samples, **104** of which have been analysed by the Unit of Genetic Research for Conservation of the **Fondazione Edmund Mach (FEM)** foundation.



Photo No. 4 - Wolf (T. Borghetti – Archives of Servizio Foreste e Fauna, PAT)



Consistency and distribution

The data collected overall refer for 2018 to a **consistency** of 7 packs (or family groups) whose home range, in the course of 2018, have involved the provincial territory. Moreover, the presence of **other individuals** has been recorded during the year, more or less regularly, especially in the **Peio** and **Rabbi** valleys, in the Mount **Bondone** area, in the **Vigolana** and **Lagorai** areas and in the **Tonale** pass area.

Figure No. 7 shows the **distribution** of the 7 packs (one of which is still uncertain) and of the data referable to other individuals monitored in the course of 2018.

Figure No. 7

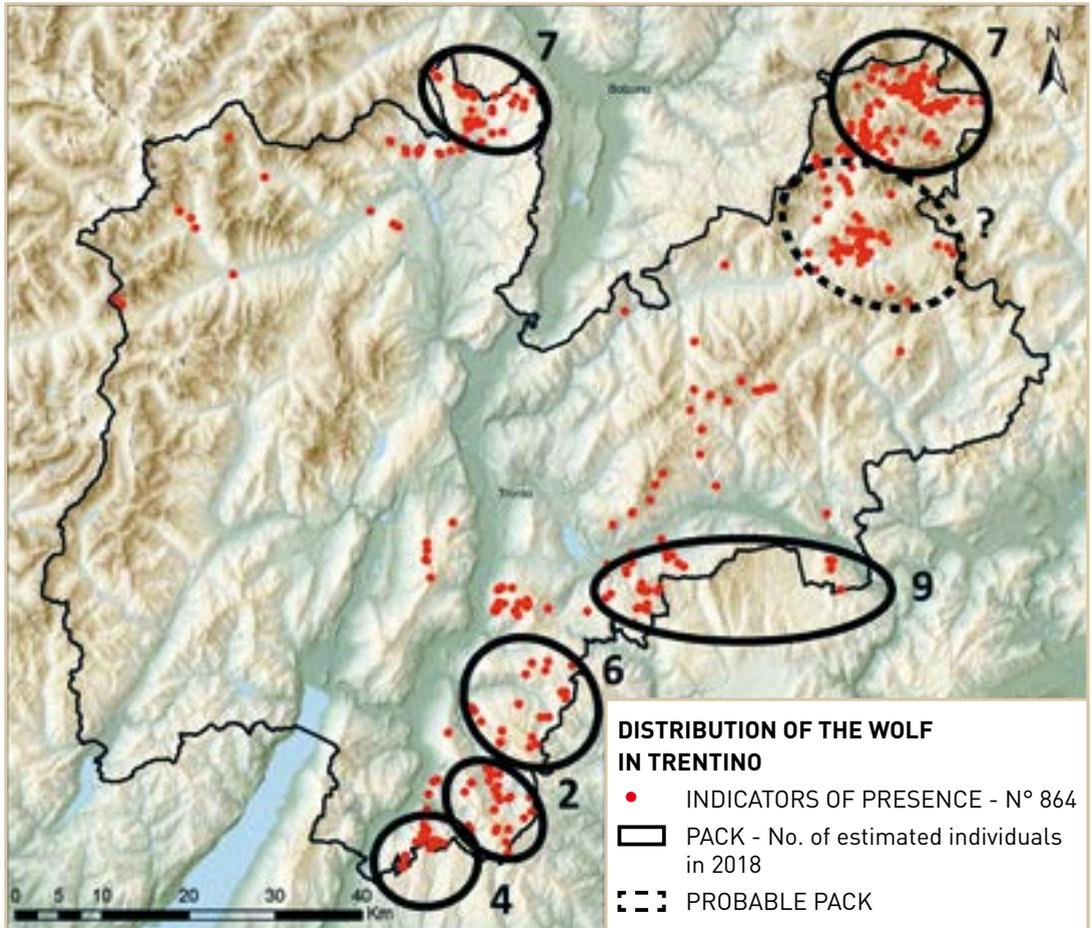
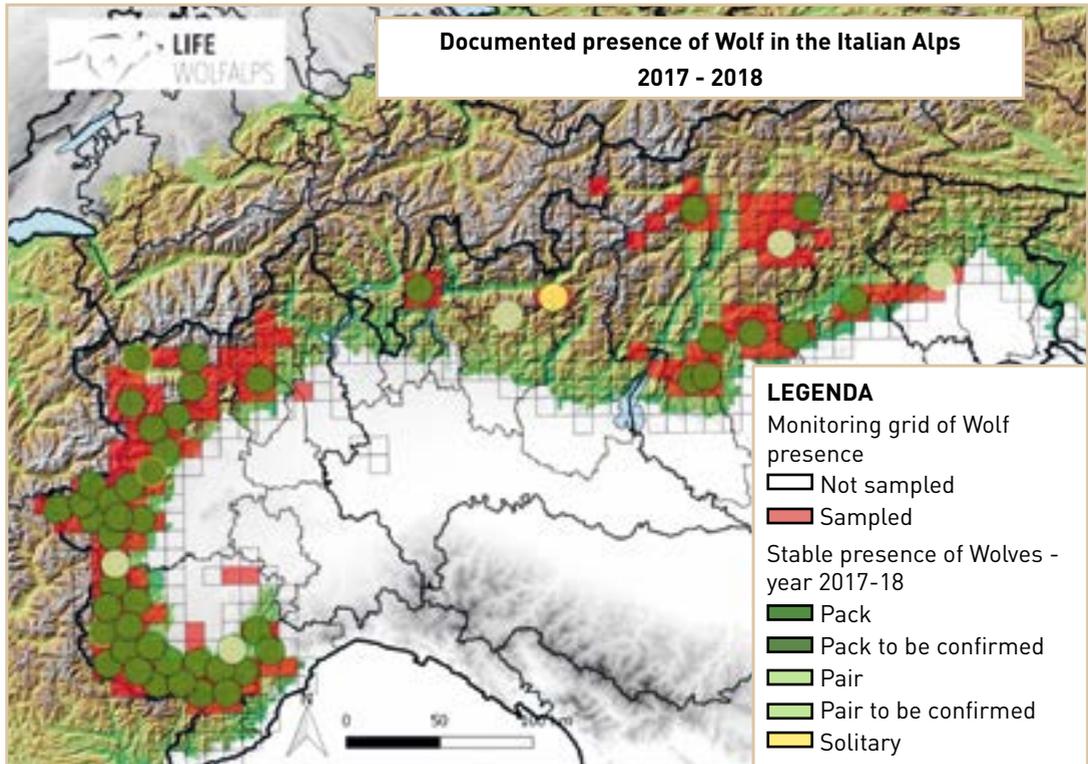


Figure No. 8 produced for the *Life Wolfalps Project* following the monitoring conducted in the **2017-18 winter season**, gives a wider picture of the **distribution of the wolf in the Italian Alps**, that helps in understanding better a **phenomenon that is much larger than the one affecting the province of Trento**.

Figure No. 8



Reproduction

For the fifth year running, the **Lessini pack** has reproduced (two cubs at least). At the end of 2018 4 individuals were present.

It was not possible to ascertain the actual reproduction of the **Carega pack** that at the end of the year therefore consisted of at least 2 individuals.

As regards the **Pasubio-Folgaria pack**, that in 2018 reproduced with at least 4 cubs, the last estimate refers to November and amounts to 6 individuals.

Reproduction in 2018 was also observed in the **Altopiano di Asiago pack** (9 cubs), that in December amounted to at least 9 individuals.

The **Alta val di Fassa pack** produced at least 9 cubs and in the month of November consisted of at least 7 individuals. Regarding this pack, it should be noted that an application was made to the Ministry of the Environment, and its authorization was obtained, to perform **acts of dissuasion** against the wolves because some of them showed a **degree of friendliness** towards human beings.

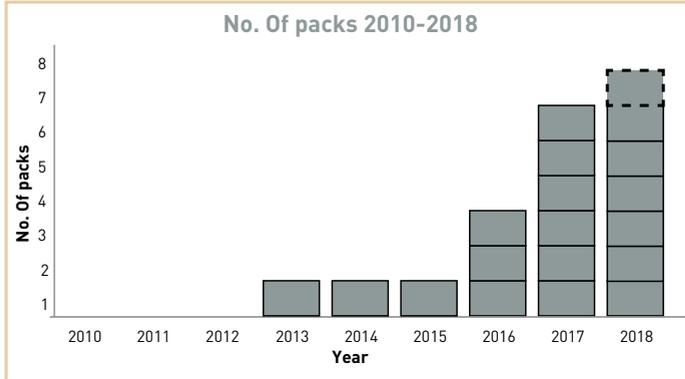
As regards the western portion of the province, to date the only pack present there is the **Alta val di Non pack**, where the birth of 4 cubs was documented using camera-trapping. At the end of the year, there were 7 individuals in the pack.

Finally, it proved impossible to determine with certainty whether the couple that last year inhabited the **San Pellegrino-Paneveggio** area reproduced, although the observation of cubs in geographically distant areas of val di Fassa allow to suppose the formation of a second

pack. This could be - but this is just speculation at the moment - the seventh pack living into the provincial territory in 2018.

Trend

Graph No. 5



Graph No. 5 shows the trend of the number of **packs** in the province of Trento from when the presence of the wolf was first documented (2010) to 2018.

BOX 4 - Activity of capture and radio marking of wolves in Alta val di Non - Deutschnonsberg

The area of Alta val di Non - Deutschnonsberg was affected by the **presence in succession of several specimens of wolves starting in 2010-2011**, most of which coming from the Swiss area and most probably originating from the western side of the Alpine area (I-F). For this reason, the Autonomous Province of Bolzano and the Autonomous Province of Trento worked closely to draft a **common monitoring plan** based on the use of camera traps and the collection of organic samples, in order to maintain a good level of awareness of the status of the species, considering the high level of anthropization and the presence of breeding farms in the area.

The first wolf to settle in the area (M24, present from 2010 to 2014) was subsequently replaced by a **second male**, CHM41. With the arrival of a female, named WBZ_F01, between 2014 and 2015, the **formation of a couple** was verified. In 2017 the inter-provincial work team was able to ascertain the **first reproduction**, with the birth of at least one pup.

In the same year, the Province of Bolzano obtained the required ministerial authorizations to make captures for research and monitoring purposes by means of marking wolves with GPS radio collars. The intervention, veterinary and communication protocols were examined by and shared with ISPRA. In the spring of 2018, the inter-provincial team intensified the monitoring in order to understand the movements of the pack. This made possible the positioning of 3 traps, adapted to maximise shutter speed and increase the safety levels to prevent trauma and injury to the wolves. Each trap was equipped with an independent GSM alarm. The stationing of the operating team guaranteed a maximum 10-15 minute intervention interval from the moment of the snapshot to the arrival on the spot.

On the 19th of August 2018, at 9:04 pm, the capture systems were set into operation and at 10:52 pm of the same day the alarm system signaled the capture of a wolf. The bad weather conditions (heavy rain made it difficult to carry out the handling operations) made it necessary to speed up all the detection activities to avoid temperature stress to the animal. The narcotic was injected by a jab-stick and the result of the narcosis was monitored from a safe distance. After checking the adequate state of sedation, the veterinarian did all the necessary checks to assess health conditions, the physiological conditions of the captured leg and joints and the pharmacological response of the animal. Then he carried out the basic biometric measurements and proceeded with the placement of a microchip and of a GPS/GSM radio collar equipped with drop-off (photo A). The collar was initially programmed to emit a position every 30 minutes. The captured animal was a female weighing 25.7 kg., 103 cm long from head to tail base and a 34 cm long tail. Besides these, other quick biometric measurements were taken. 20 minutes after induction of sedation the first signs of awakening appeared (without the need of pharmacological antagonists) and, shortly thereafter, the wolf began to stand on its front feet and move its head visibly, until it calmly walked away from the release area. There followed a first phase of intensive remote control by means of radio receivers and VHF antennas, without staying in contact with the animal (> 500 m). The female wolf moved quickly deeper into a forested area, a few kilometers away from the capture site.



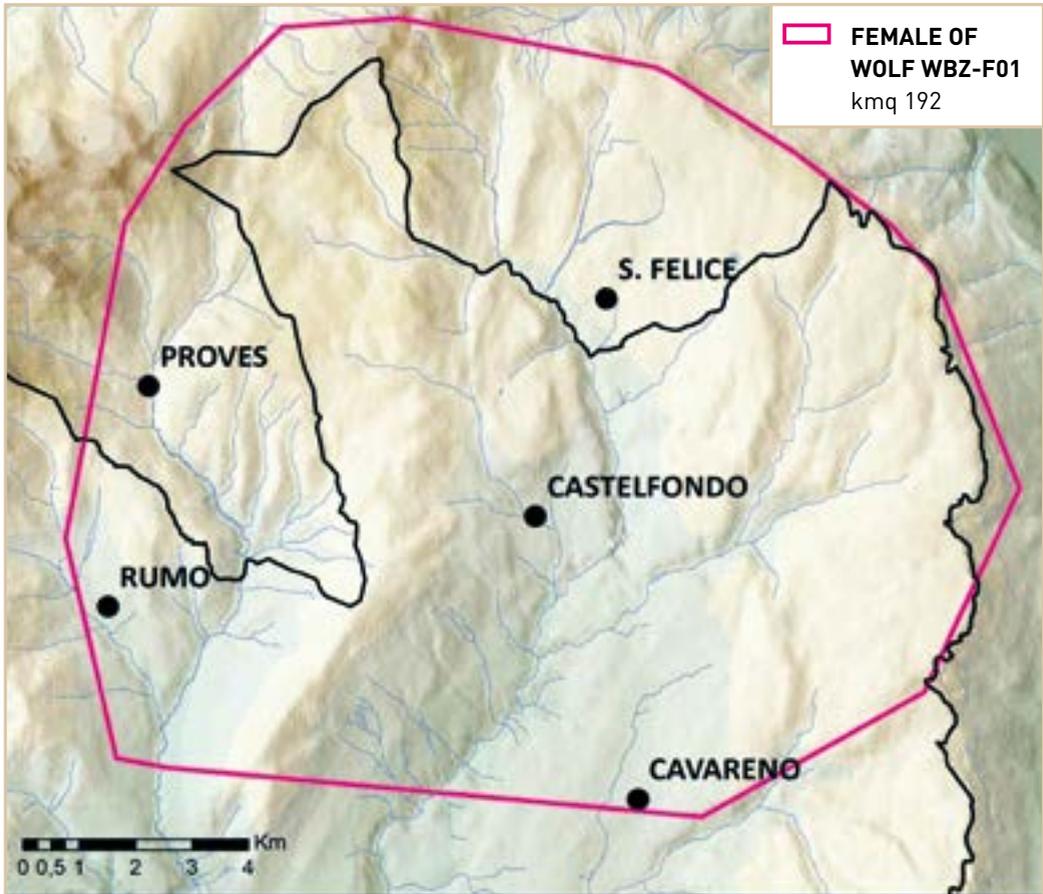
Photo A - Phases of the capture of the female wolf in Alta val di Non (D. Righetti - Hunting and Fishing Office - Autonomous Province of Bolzano)

Thanks to the monitoring the inter-provincial team was able to immediately start intense data collection activity, aimed at furthering the knowledge of the ecology of this species and the dynamics of the pack in terms of its habitual movements, use of the territory and activity patterns. This is useful for better monitoring the behaviour of the pack, for improving the prevention and protection work in order to reduce damage to livestock and anthropic activities, especially agricultural and rural activities.

The specific data collection will make it possible in the future to further the knowledge on prey-predator dynamics and on the possible impact on the wild ungulates the hunting world is interested in. Based on the first three months of work first deductions are possible. In the territory occupied by the pack, in which there are about 7 grazing mountain pastures with calves, up to now there have been no predations on livestock. All cases of preying detected until now, both by satellite data and occasional checks, were on wild ungulates, especially red deer and roe deer. More specifically, in the 90 days between the 22nd of October and the 20th of January, 29 animals were preyed upon, of which 25 red deer (9 females, 4 males, 12 undetermined), of which 10 adults and 9 youngs, and 4 roe deers (1 adult female and 3 undetermined). At this time, it is not possible to exclude that some of the carcasses were the product of scavenging.

The extension of the territory occupied by the pack, calculated using the MPC (Minimum Convex Polygon) method at 100% is 192 km². The average hourly distances covered in the

first 156 days of monitoring are 1.4 km an hour (median 1.2 km/h). Particularly fast hourly speeds, up to 6.3 km/h, have also been observed, rising to 33.4 km over the 24-hour period. Altogether, the pack has covered about 2,715 km in this first time interval of 156 days.



The monitoring activity has been possible thanks to the involvement of the two provincial Administrations (Bolzano and Trento) and to the intense work of their staff who communicated with each other constantly in order to coordinate the research interventions; in addition, our thanks go out to the Forestry and hunting protection staff, such as the gamekeepers and forest wardens as well as the hunters' Associations, for the indispensable supporting field work and signaling of informations. The following people participated in the activities:

Giovanni Lorenzi, Andreas Agreiter, Luigi Spagnolli, Ass. For. Ruben Clara, JAS Oswald Perger, C.F. Marco Lorenzoni, C.F. Matteo Coraiola, C.F. Sabrina Prevedel, C.F. Ivan Morten, C.F. Bruno Larcher.

By D. Righetti*, M. Stadler*, E. Moncher**

* Hunting and Fishing Office, Autonomous Province of Bolzano •

Forestry Station of Fondo, Forestry and Wildlife Service, Autonomous Province of Trento

1.3 Lynx

The **monitoring** of this species **began** with the return of the lynx to the province, namely in the second half of the 1980's, in relation to the appearance in **eastern Trentino** of a few individuals (the presence lasted for 15 years). Once again, to monitor even this species, traditional field observation methods, camera-trapping, radio-tracking and genetic monitoring have been performed since the beginning.

It is a well-known fact that the only specimen certainly present in the last years in the province of Trento (starting in 2008) is the **male called B132**, coming from the small, reintroduced Swiss population of the S. Gallo Canton (see Report 2008, pages 45 and following, as well as all of the subsequent Reports in the Annexes 'Lynx'). Since **November 2012**, B132 settled in the south-western portion of the province, and in detail in the mountains of **val d'Ampola** (the Tremalzo and Lorina slopes on the left bank and slope of Mount Stigolo on the right bank) and in those in **destra Chiese**, above Darzo and Lodrone on the border with Brescia province. During **2018** it was possible to document its **presence with** certainty of this specimen (photos or videos) on 9 March in **Brione**, on 14 March in **val Lorina**, on 28 August on **Alpo di Storo** (Photo No. 5) and on 21 September in the **Stigolo** locality in val d'Ampola.

Figure No. 9

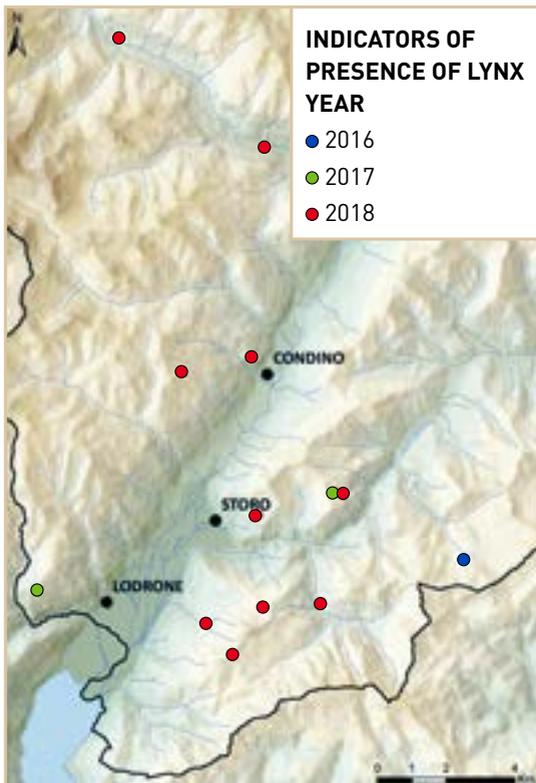


Photo No. 5 - Photo taken by a local hunter on 21 September in Alpo di Storo locality (Archives of Servizio Foreste e Fauna, PAT)

Sightings of what is probably the same animal were documented also on 5 April and on 27 September in **val Daone**, on 20 April above **Condino** and, in the first half of November, on three occasions in the mountains **above Storo** (Spessa, Nar/Piola and Terra-monte localities).

Figure No. 9 shows the locations where the lynx B132 has been in the last three years.

Several **sightings** have been reported too in other parts of the province in 2018, although **they cannot be verified** in any way. The reports refer to alleged sightings of lynxes near Nomi (15 January), in Musiera locality (Telve - Valsugana) in October, near Andalo (in Autumn) and in val di Cembra between Lases and Segonzano in December.

2. DAMAGE COMPENSATION AND PREVENTION

The Autonomous Province of Trento has over forty years of experience in compensation and damage prevention. **Since 1976**, damages caused by bears in fact are **compensated** at 100% of the material value of the goods, and people can purchase **prevention** structures (consisting mainly in electric fences or livestock guarding dogs). The specific regulations, governed under article 33 of Prov. Law No. 24/91, have been repeatedly revised and amended over the years, based also on the directives issued by the Provincial Government through resolution No. 1988 of 9 August 2002. With resolution No. 697 of 8 April **2011**, the Provincial Government has further changed the compensation for damage regulations by adding the refund of accessory charges and by extending to the **wolf** and **lynx** 100% compensation for the damage they cause.

Damage prevention basically consists in two types of intervention: **funding** up to a maximum of 90% of the cost of installation, or their granting under a **loan for use** agreement.

Claims for damages

In 2018, **222 cases of damage caused by large carnivores** were reported, of which **157** caused by **bears** and **65** by **wolves**. None by **lynxes**. In **97% of the cases**, the claims for damage were followed by an **on-site visit/control** by forestry personnel that drafted the assessment report.

In 2018 the compensation paid out totalled **171,567.46 €**, of which **94,977.52 €** for damages caused by **bears** and **76,589.94 €** for damages caused by **wolves**.

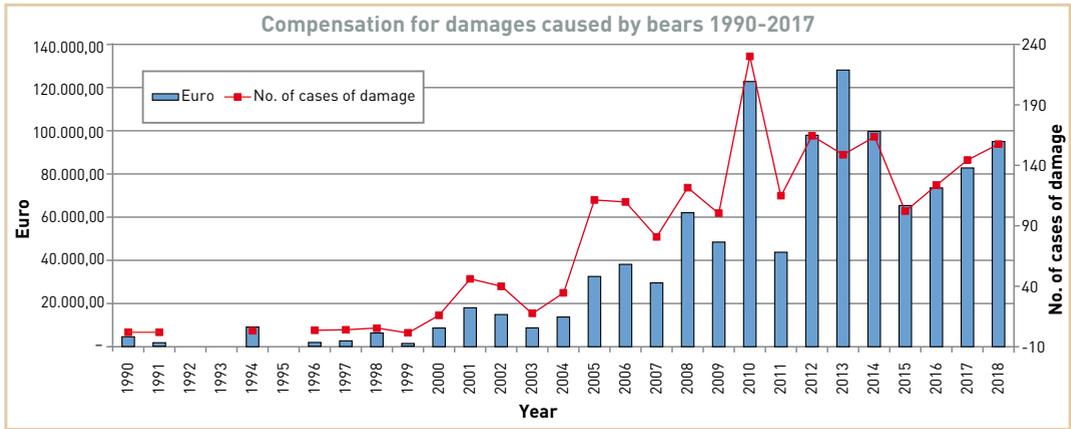


Photo No. 6 - Bear predation (G. Ghezzi - Archives of Servizio Foreste e Fauna, PAT)

As regards damages caused by bears, 46,993.33 € were paid for damage to livestock, 31,191.10 € to honey crops, 13,058.19 € for damage to crops and 3,734.90 € for damage to “other” assets. With reference to loss or injury of livestock only, compensation amounting to 17,516.94 € for damage to cattle, 19,914.70 € for damage to sheep and goats, 5,792.19 € for damage to equids, 1,232 € for damage to pigs (Photo No. 6), 1,662.50 € for damage to lamas and 875 € for damage to poultry and rabbits.

In 53 cases (24% of overall damage certified to be caused by bears) it was possible to ascertain the identity of the bear involved thanks to **genetic analysis** of the organic samples collected. In total, damage was caused by **15 different bears**, cubs excluded (9 males and 6 females).

Graph No. 6



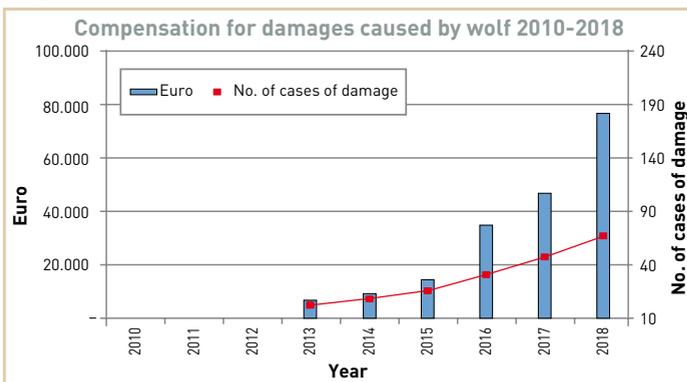
The analysis showed that **7 bears** were responsible for one damage, 2 for two damages, 1 for three damages, 3 for five damages (MJ2G1, M22 and F9), 1 for ten damages (M31) and 1 for eleven damages (M49).

With reference to damages caused by **wolves**, **38,115 €** were paid for damages to cattle (photo No. 7), **36,015.94 €** for damages to **sheep and goats**, **2,409 €** for damages to **equids** and **50 €** for damages to **poultry**. Out of all wolf damage episodes, **67 cases (89%)** occurred in the eastern part of the province (16 in Lagorai, 15 in Lessinia, 13 in Fassa, 9 in Valsugana right bank, 6 in Paneveggio, 5 in Vallarsa/Folgaria and 4 in Carega) while the remaining **8 (11%)** occurred in the western part (5 in Bondone and 3 in Peio/Rabbi).



Photo No. 7 - Head of cattle preyed and consumed by wolves (Archives of Servizio Foreste e Fauna, PAT)

Graph No. 7



Graph No. 7 shows the trend in damages caused by wolves and the amount of compensation paid.

Figures n. 10 and n. 11 show the distribution over the territory of damages caused by bears and wolves respectively, distinguished based on the main categories.

Figure No. 10

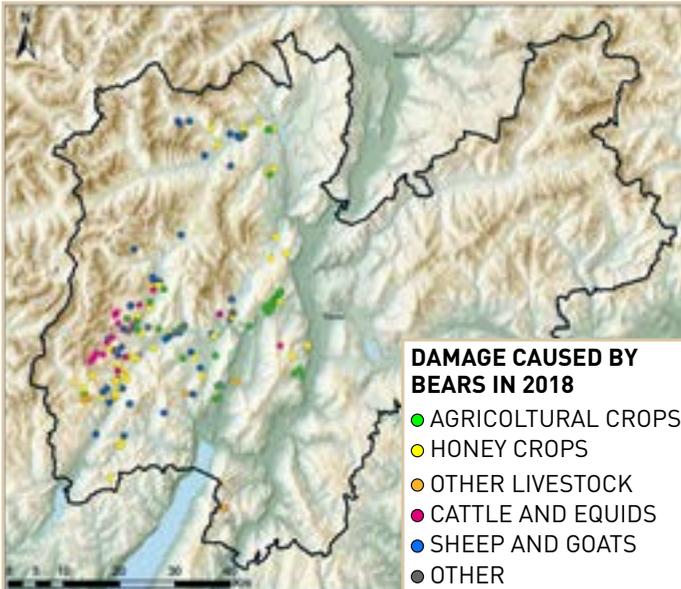
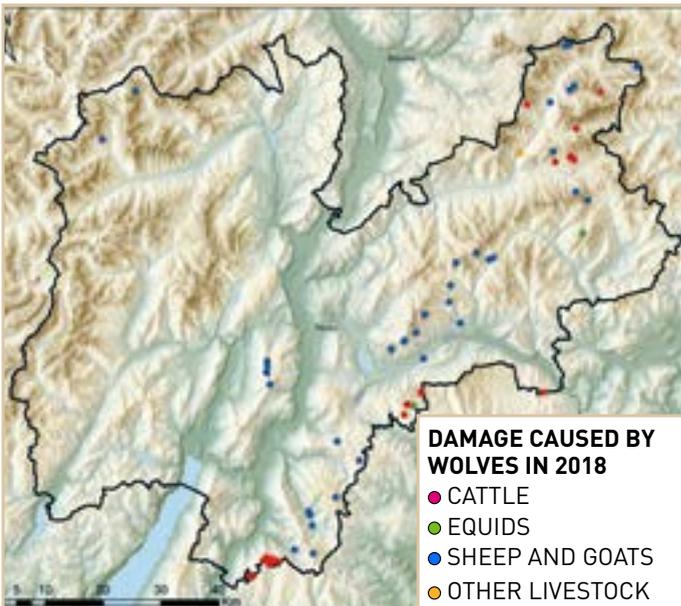


Figure No. 11



Damage prevention

The management of prevention structures at provincial level is coordinated by the staff of the Large Carnivores division liaising with the local **responsible for prevention**. The latter figure was created to manage the activities regarding the supply of prevention measures, via the dialogue, support and continuous interfacing with the users (the operators of mountain farms, shepherds, bee keepers, hobbyists) that locally manage assets that may suffer damage by large carnivores. In order to be able to respond promptly and effectively to these needs, the territory of the PAT has been subdivided into **10 zones**, in principle corresponding to the Forest District Offices (UDF), each one of which is run by a **responsible** and by an **assistant**.

In 2018, the Forest and Wildlife department prepared, with the help of an external expert, the guidelines *“Gestione e prevenzione dei danni da lupo in provincia di Trento”* (Management and prevention of damages caused by wolves in the province of Trento).

In 2018 the Forest and Wildlife department received **207 applications** for means of prevention (electric fences and livestock guarding dogs), intended to protect livestock (Photo No. 8) and honey crops.

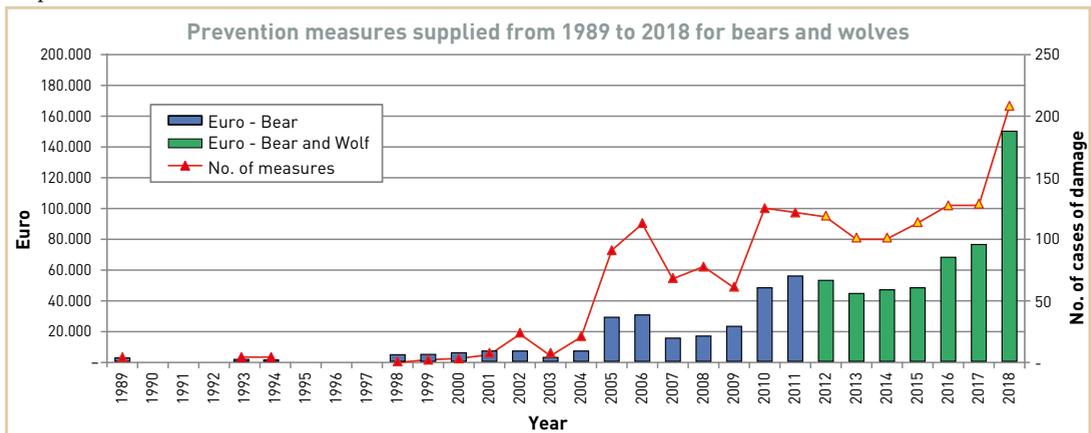


Photo No. 8 - Means of prevention of livestock against damage caused by bears and wolves (D. Asson - Archives of Servizio Foreste e Fauna, PAT)

Of these, **162** were executed by the UDF via the supply under a **loan for use agreement** for an amount totalling **114,200 €**, and **45** by the Large Carnivore division via **capital grants** for an amount totalling **34,130 €**. **Overall**, the amount paid out totalled **148,330 €**.

By observing the multi-annual trend in the number of **means of prevention** supplied and their cost (Graph No. 8), it will be noticed that up until 2012, the

Graph No. 8



distribution of means of prevention exclusively concerned bears, and from 2012 to 2017 almost exclusively concerned bears, while from 2018 onwards there has been a significant increase in means of prevention distributed for wolves.

Since 2016, an additional tool for the granting of means of prevention by means of loans consists in the **Piano di Sviluppo Rurale (PSR)** (Rural Development Plan), via **Measure 442 “Traditional wooden fencing, restoration of stone fences, prevention of damages caused by bears and wolves”**. With this measure, it is possible to finance, among other things, fixed structures for the defence of bee hives (Bienenhaus) and electrification systems for the defence of livestock against the attacks of large carnivores. The construction type of the protection system is substantially the same as that used by the Province for the structures distributed under loan for use/loan: 5 electrified wires for bears and 7 electrified wires for wolves. In **2018, three fenced enclosures** have been funded and will be completed in the course of 2019 (totalling approx. **3,000 m** of electric fencing), amounting to **17,300 €** in contributions and **three Bienenhaus** protections amounting to **21,860 €** in contributions.

In 2018, the Province launched a set of **experimental projects** aimed at creating **electric fencing for the protection of cattle** (Box 5). These structures were built with the funding of Forest and Wildlife department and were supplied based on the loan formula and on the lease of the materials. The overall expense for these structures amounted to **66,900 €**.

Considering, therefore, the structures implemented under the PSR and the experimental ones, the **total investment in 2018 in means of prevention in the province of Trento** has amounted to **254,390 €**.

BOX 5 - Pilot project for the testing of electric fences to protect cattle

*The project was launched first of all to respond to the sudden and significant spread of the **wolf** population in the province of Trento that in turn caused an exponential increase in predation events concerning livestock. Predation seems to have focused on cattle, in particular. This phenomenon can be attributed most probably to the widespread presence of cattle in these parts of the Alps and to a process of specialisation in and cultural transmission of predation habits and methods against cattle by the Lessinia pack from which come most of the individuals who in subsequent years went to form the packs present today in eastern Trentino and in Veneto.*

*During the course of the 2018 summer pasture season, it also became necessary to perform several urgent actions in Val di Breguzzo for the protection of cattle from the predatory attacks of a young male **bear**.*

The experiment consisted in the erection of electrified enclosures for the protection of the livestock during the night. Its objectives were the following:

- 1. application of different solutions in terms of assess complexity, strength and costs;*
- 2. testing of different orders of magnitude in terms of surface areas in which to enclose the herds during the night; this so as to also assess the incidence of treading on the damage to the turf;*
- 3. assessing the logistic and economic feasibility of each solution, also in terms of cost-benefit ratio.*

*With the financial help of the Province, **eight electric fences** were erected, **4** for the protection against wolf attacks and **4** for the protection from **bears**.*

The fences for wolves were placed in the summer mountain pasture areas of Viezzena in the Predazzo area, property of the Magnifica Comunità di Fiemme (2 fences) and those of Campobrun (State property) and Boldera, both in the Ala area (1 fence each).

The other four fences were placed in western Trentino, in the area of the Giudicarie (malga Maggiasone and malga Arnò in the Sella Giudicarie area) that in the 2018 season suffered the intense predatory activity of a young male bear, M49 (Figure A).

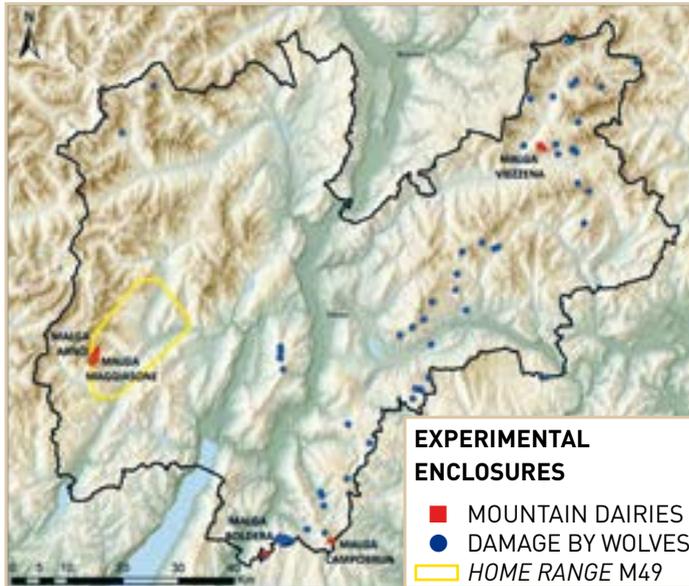


Figure A

The following table describes the main **technical characteristics of the fences**.

Mountain summer pasture name	Altitude	ha	Days of use	Number of animals	Fence type	Degree of damage to turf	Surf. Area per animal in m ² /day	Cost per m €	
VIEZZENA 1	1600	8.1	45	41	Conductor wires	0%	44	15.0	
VIEZZENA 2	900	5.2	29	41	Conductor wires	0%			
CAMPOBRUN	420	0.8	96	15	Conductor wires	30%	5.5	29.3	
BOLDERA	820	3.6	61	60	Conductor wires	30%	5.7	7.1	
MAGGIASONE 1	450	1.4	20	97	Electric fencing	50%	4.9	7.6	
MAGGIASONE 2	520	1.2	20	97	Conductor wires	-			6.3
MAGGIASONE 3	250	0.5	10	97	Electric fencing	-			10.1
ARNÒ	200	0.3	50	24	Electric fencing	70%	1.4	10.4	

In all of the sites in which the prevention structures were erected, **no subsequent predation actions by bears or wolves were observed** against the protected animals (heifers aged < 15 months) or against the unprotected ones (aged > 15 months).

The experiment also showed the opportunity to use **areas for the night-time housing** of the animals under protection instead of protecting whole grazing areas, that for obvious reasons was not possible.

Night-time enclosure areas usually must meet the following requirements:

- **size sufficient to ensure animal welfare** and the reduction, as much as possible, of damage to the turf;
- **adequate size so as to avoid the chance of the animals knocking it down from the inside;**
- **environmental, structural and dimensional characteristics** (width, slope, tree coverage, presence of water and/or feeding troughs) **suitable for animal husbandry** for the period for which the enclosure was sized.

The fences used for the experiment can be classified as follows:

- **“HEAVY” semi-permanent fences** (Viezzena and Campobrun); structures consisting of chestnut or larch wooden posts with diameter equal to or larger than 10 cm, fairly closely spaced (basically from 3 to 8 m), height above ground 140 cm, electric wires with adequate mechanical strength, good electric conductivity and adequate power supply unit (photo A);



Photo A - ‘Heavy’ experimental fencing (D. Asson - Archives of Servizio Foreste e Fauna, PAT)

- **“LIGHT” semi-permanent fences** (Boldera, Arnò and Maggiasone I); structures consisting of chestnut or larch wooden posts with diameter less than 10 cm, height above ground 140 cm, less closely spaced (basically from 10 to 20 m) and adequate power supply unit. In between one pole and the next other supports are erected to support the conductors (glass fiber or plastic posts) or electric fencing tape (photo B);



Photo B - 'Light' experimental fencing (V. Calveti - Archives of Servizio Foreste e Fauna, PAT)

- **Mobile fences** (*Maggiasone II*) consisting only of plastic and/or glass fiber posts and/or electric fences reinforced with wooden posts only in sections with change in slope or direction, if necessary. The latter are especially useful for reducing installation costs and for quickly solving critical situations or in logistically difficult contexts due to the lack of access roads to the mountain huts and/or pastures at high altitudes, or in areas suitable as pastures for very short periods of time (photo C).



Photo C - Mobile fences (G. Vettori - Archives of Servizio Foreste e Fauna, PAT)

The fencing is defined as semi-permanent because at the end of the summer pasture season the conductor wires and plastic or glass fiber posts are dismantled. The protection fences are made using **conductor wires or electric fencing placed at least up to 120 cm above ground**, a height that is increased, when necessary, to 140 cm on the upstream side on steeply sloped fields and an adequate number of gates to facilitate entry/exit management of the animals. When the fences are made using **conductor wires**, they are set up in **5 or 6 rows** (6 in the sections of the enclosure above the slope) placed at cm 15–35–60–90–120–140 above ground. Considering the fact that the presence of the wires could cause problems if accidentally impacted by wild ungulates and birds (*Tetraogallus* especially), in one case the wires were made more visible by tying **coloured ribbons** to them.

In order to guarantee their effectiveness against predators, special attention was focused on the materials used to make the fences, and especially on the **energizers** (the chargers that generate a short and intense electric pulse that lasts about 0.1/0.3 thousandths of a second and is repeated every 1/1.4 seconds), by verifying that their power is suited, in terms of energy output, to the length of the fence it must electrify.

The experiments conducted show, with data that will have to be confirmed over time, that in general the protection fences made for **cattle** against attacks from bears and from wolves should be used mainly for the **protection of young animals aged = < 15 months** (age at the start of the mountain pasture period) or to protect weak or helpless animals or cows that are about to or have recently given birth. As regards animals such as **sheep, goats or equids** (mainly asses), **all animals should be protected** regardless of age.

It should also be noted that the need to enclose the animals during the night leads to a **significant change in how the summer pastures are managed**. With **sheep and goats**, when the herds are large (from 1000 to 2000 animals), the erection of fencing for a night-time enclosure to be used stably for the entire summer pasture period seems impracticable because the latter would be too large. Smaller enclosures should be preferred, to be moved frequently. For this purpose, mobile fences made with electric fencing at least 120 cm tall are ideal in terms of practicality and of level of protection. To calculate the size of the night-time enclosure fences, it is better to refer to the living space each animal requires (m² day) instead of to linear metres of fence. The living space to be assigned to each head of **cattle and equid** is indicatively **5 m² day**, and **2 m² day** for sheep and goats.

In choosing the location of the enclosures, **steeply sloped areas should be avoided or reduced to a minimum** because they do not allow for adequate night-time rest of the animals. An element that should be included, where possible, is an area providing at least 30% of tree coverage, while **drinking troughs** and **feeding points** (in numbers sufficient for the size of the enclosure and for the number of animals) should be created. The latter must not replace the external grazing of the animals, as they are only an element of attraction for making the animals' re-entry easier in the evening.

Lastly, one should deem **acceptable** and inevitable a 30% degree of damage to the turf (with the creation of trodden paths only in the transit areas of entrance and exit of the animals, close to the attraction points such as water and/or food troughs, and presence of scattered excreta).

In conclusion, it should be noted that **more time and the collection of more data and knowledge are required in order to understand to what extent these changes in management practices can actually be sustained by livestock breeders**.

Livestock guarding dogs

Livestock guarding dogs (LGD) are used to protect grazing livestock from the attack of wolves and bears. The first two dogs in Trentino were given in 2014 to a sheep and goat breeder of Val di Non (see Report 2014, page 43) and the use of guarding dogs has increased ever since (Graph No. 9).

In 2018, 24 dogs were financed and assigned, for a total value of 14,566 €. The dogs, of Maremmano-Abruzzese breed, were purchased from specialised and certified breeders, some of which in Trentino, all members of ENCI (Italian National Cynophilist Association) so as to guarantee valid health standards and genetic lines for this purpose. By the end of 2018, the LGD present in the province (including those financed by PAT, those purchased directly by the farmers and those bred by the farmers themselves) total 57, distributed among 23 farms.

Graph No. 9

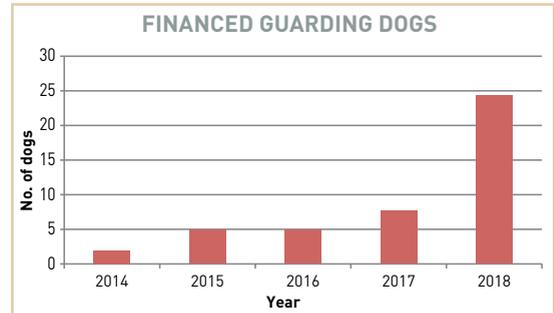


Photo No. 9 - Vets visiting livestock guarding dogs (D. Asson - Archives of Servizio Foreste e Fauna, PAT)



Photo No. 10 - Information billboard (D. Asson - Archives of Servizio Foreste e Fauna, PAT)

During the course of 2018, with the help of a veterinarian specialised in ethology and animal wellbeing, and thanks to the financial contribution of the *LIFE DINALP BEAR* project (Photo No. 9), a series of **behavioural examinations** were conducted on the dogs assigned, in order not only to check their health and degree of learning but also to provide the livestock breeders with useful advice. Moreover, during 2018, once again thanks to the financial help provided by the *LIFE DINALP BEAR* project, the Forest and Wildlife Department created a new **information billboard** (Photo No. 10) to alert people about the presence of the dogs guarding the livestock and about how to behave near them. The year 2018 also witnessed the establishment of **ADGP (Association for the defence of livestock from large predators)**, an association based on volunteering created by the owners of LGD with the aim of creating a group capable of jointly

addressing the various aspects linked to the keeping of guarding dogs (training, health checks, exchange of experiences). This initiative has brought benefits to the members of the association, such as the chance to receive veterinary examinations at an advantageous price, loans from bodies or associations and the free supply of dry dog food (Photo No. 11).



Photo No. 11 - Supply of dry dog food to ADGP members (B. Viola - Archives of Servizio Foreste e Fauna, PAT)

Dialogue with the economic stakeholders

In 2018, the dialogue (that had been started in past years) continued with the economic stakeholders most threatened by the presence of bears and of other large carnivores.

The Round table with the representatives of breeders, bee keepers and farmers met on 4 June 2018.

An information workshop was also held in relation to the repeated damages caused by bear M49, organised for the **livestock breeders of the Giudicarie**, held in **Bondo on 30 June 2018**.

Another **meeting** with the **breeders** was held on 27 July 2018 at **Malga Juribello** (Primerio - San Martino).

These are important and indispensable opportunities for dialogue in which the Provincial Administration feels it necessary to continue investing.

Support to livestock breeding activities

The Provincial Administration has among its objectives that of encouraging shepherds and their herds of livestock to stay in the high-altitude mountain pastures in summer. The presence of the shepherds and the use of the most suitable damage prevention systems, along with fair compensation and their continuous interfacing with the local forestry staff, are all strategic elements that favour the cohabitation of large carnivores and livestock in the mountains.

In 2018, the **responsibles for prevention** monitored **52 mountain pastures**, to which measures were supplied during the period of transhumance of the animals (usually from June to September). Overall, prevention concerned about **20,400 sheep and goats, 900 heads of cattle and 15 equids**. The activity of supporting grazing activities also envisaged the installation in the pastures of **16 cabins (box)** transported by helicopter so as to encourage the shepherds' constant presence and custody of the animals (Photo No. 12).



Photo No. 12 - Box as support to high altitude livestock breeding activities (R. Dalledonne - Archives of Servizio Foreste e Fauna, PAT)

The **results** proved **satisfactory**: among the pastures equipped with prevention structures (located in areas featuring the constant presence of bears and wolves), **6 attacks on the protected livestock** were reported overall, causing the total ascertained loss of 27 sheep and goats, that is to say **0.13 %** of the animals protected.

Activities conducted at the Paneveggio Pale di S. Martino Nature Park

In the course of 2018, the Paneveggio Pale di San Martino Nature Park, working together with the Forest and Wildlife Department of APT, launched a project aimed to **increase knowledge regarding the livestock breeding system and the possible impacts deriving from the presence of wolves** within the Park and in areas adjacent to it.

The aim of the work was to gather detailed information in order to:

Il lavoro ha l'obiettivo di ottenere informazioni di dettaglio necessarie per:

- analyse the impact the wolves may have on livestock breeding (identification of the areas most at risk, of those that can be defended using means of damage prevention and those that, on the contrary, appear to be indefensible);
- identify, for the realistically defensible areas, the prevention system that are actually applicable to the single area or farm;
- identify, for the areas in which it is possible to implement forms of prevention, the costs to be charged to the breeders or to the mountain pasture operators resulting from the implementation of the prevention structures, with verification of economic sustainability for the farms involved.

The data collection was performed thanks to the assistance of the trainees working at the Nature Park within the context of the 1st level Master in “Management and protection of the environment and of wildlife”, promoted by the University of Parma.

In a **first phase**, several subjects featuring detailed knowledge in the livestock breeding system in the area concerned were contacted, such as the Provincial Federation of Breeders of Trento and the respective local contact persons, the Social dairy of Primiero, the operators of the mountain pastures, the veterinary services, the freelance veterinarians, the forest wardens of the Municipalities in which the mountain huts or pastures are located and the corresponding Forest Stations.

In a **second phase**, a more in-depth activity was conducted, consisting in directly contacting most of the breeders in order to collect data regarding the breeding systems, management methods, areas and length of grazing time. Special focus was placed on the transhumance shepherds via individual interviews, as well as on the small breeders of sheep, goats and asses, as well as to cattle breeders, with special reference to the management of young animals (calves, steers, heifers).

In the **third phase**, the data acquired were crossed with those taken from the APSS database regarding breeding, so as to double check them.

Based on the data acquired, the **University of Padua** recently has been asked to conduct a **study** that, starting with the data collected up to now, will define the objectively defensible areas and the prevention systems concretely applicable to each single area, as well as the locations in which it is impossible to implement effective and applicable forms of prevention.

Another activity that has continued with the Province is that of **monitoring** the species, with the acquisition of two transects for conducting snow-tracking, as well as with the performance of outings intended to certify the presence of the specie during the whole year. To this end, a dozen camera traps have been positioned and checked.

3. MANAGEMENT OF EMERGENCIES

In the **province of Trento**, the management of emergencies is a sector that has required action for some time because of the presence of specific animals that have proven to be “problematic”.

A **bear** that is **problematic** or that finds itself in a critical situation may be subjected to **control measures**, in compliance with the provisions of European (Directive 92/43/EEC – Habitat Directive) and national regulations (Pres. Decree No. 357/97, art. 11 § 1; Law No. 157/92, art. 19 § 2; Law No. 394/91, art. 11 § 4 and art. 22 § 6).

In order to reduce conflicts with anthropic activities, as well as for public safety reasons or for other reasons of overriding public interest, it is possible to derogate from the prohibition to capture or kill the animals, subject to obtaining the **authorization of the Ministry for the Environment and Protection of Land and Sea (MATTM)**, having heard the opinion of ISPRA, and provided there is no satisfactory alternative and that the derogation is not detrimental to the maintenance of the populations under protection in a favourable conservation status (Pres. Decree No. 357/97, art. 11.1).

In the course of 2018 the **Provincial Law No. 9/18** was issued, based on which the President of the Province may authorise in derogation the capture or killing of bears or wolves, after hearing the opinion of ISPRA and without prejudice to the conditions set down by the European Union. This regulation is currently being analysed by the Constitutional Court.

In the event of threat to public safety, the capture or killing of an animal may also be authorised by the **extraordinary emergency order of the President of the Province**, pursuant to article No. 52.2 of Pres. Decree No. 670 of 31/8/1972 and article No. 18.2 of Regional Law No. 1 of 4/1/1993, as also expressly envisaged by the PACOBACE action plan.

With resolution n. 1523 dated 7 **September 2015** the Provincial Government has created for the management of bears and of the other large carnivores living in the province (and therefore for all actions, not just those related to the management of emergencies) a **Technical Committee** among MATTM, ISPRA and PAT and a **Technical operational Group** (among PAT, MUSE and PNAB). Both have worked effectively in the course of the year 2018, too.

PACOBACE (Inter-regional action plan for the protection and management of the brown bear in the Central-Eastern Alps) is a document of reference also for the management of emergencies in the province of Trento (as well as in the rest of the Italian Alps), based on which the Forest and Wildlife Department has hired, trained and fitted the specific staff.

The operational organization is based on the deployment of the staff members of the **Trentino Forest Corps (CFT)** that the Forest and Wildlife Department avails itself of via the **‘Special on-call team’** – that is on stand-by according to weekly shifts and that includes a coordinator and, from the 1st of March to the 30th of November, of two emergency operators on call 24/7. When necessary, this team can be joined by the veterinarians of the **Provincial Unit for Provincial Health Services (APSS)**. The latter is indispensable in all of those activities involving the handling of the animals (injured bears, capture operations, other).

In 2018 the coordinators of the Special on-call forest and fauna team received over **900 calls** alleged **damage, sightings, predation, detection of presence and issues with bears or wolves**.



Photo No. 13 - Head of cattle predated and eaten by a bear (R. Amistadi - Archives of Servizio Foreste e Fauna, PAT)

Special importance was assigned to the problems caused by the **young bear** (born in 2016) called **M49**, an individual with an elusive attitude that, however, in 2018 carried out a large number of predations on cattle (Photo No. 13) and equids, raids on a mountain hut dairy and other attempts to enter stables/shelters containing domestic livestock. This occurred mainly in the valleys of Breguzzo and of S. Valentino, in the Giudicarie.

In 2018, the bear M49 was thought to be the author of **49** damage events, equivalent to 27% of all bear-related damages reported in the

province. Of these events, 31 are **attributed to this individual with certainty** (63%), 12 **probably** (24%) and 6 **possibly** (12%). In detail, 29 damage events caused by M49 involved livestock, equivalent to **42%** of all bear-related damage of this kind reported in the province. M49 also carried out 7 attacks on **beehives**, 4 on **agricultural crops** and 9 on **other assets**.

To compensate for the damage caused by **M49**, € 31,285.29 were paid out. This sum accounts for **33%** of the overall compensation paid out in 2018 for **damage caused by bears**.

Following the repeated predation on cattle, it was decided to **capture** and **radio-collar** this bear, so as to improve its monitoring, the prevention of damages and the performance of dissuasive measures. To this end, tube traps were positioned in the areas the bear visited more often. On **27 August** a young male was captured and genetic analysis subsequently proved it was **M49**.

Following the capture and radio-collaring of M49, an intense **monitoring** activity was organised in order to intercept the bear and perform dissuasive measures. Another aim of monitoring was also to prevent further damages through the 'real time' alerting of the farmers about the bear's presence in their area. The attempts to intercept him allowed the operators to act on **4 different occasions** with **dissuasive measures** (rubber bullets, bear dogs and/or light and acoustic stimuli). The intensive monitoring and the surveillance of the area he was present in was protracted until mid-November, when the bear started slowing down although he continued to be active until the end of the year.

This activity highlighted how enormously **difficult it is to intervene effectively** with actions effected directly on the animal that can actually affect its troublesome behaviour. In this specific case (predation on large grazing animals) it is indeed very difficult to act dissuasively at exactly the right time in which the bear is preying, although this is an indispensable condition in transmitting the negative message to the animal. In actual fact, the dissuasive measures proved to be **ineffective**.

Prevention was also actively pursued: in July, **4 experimental enclosures** were set up in order to protect dry cows (animals of various ages) during the night grazing the mountain

pastures of Malga Maggiassone and Malga Arnò, located in the municipality of Sella Giudicarie (see Box No. 4). These costly prevention structures are not applicable on a large scale, namely everywhere throughout the province. In August it also became necessary to perform an urgent intervention at a dairy located at malga Rosa (municipality of Porte di Rendena), because the bear had broken in to eat milk and cream.

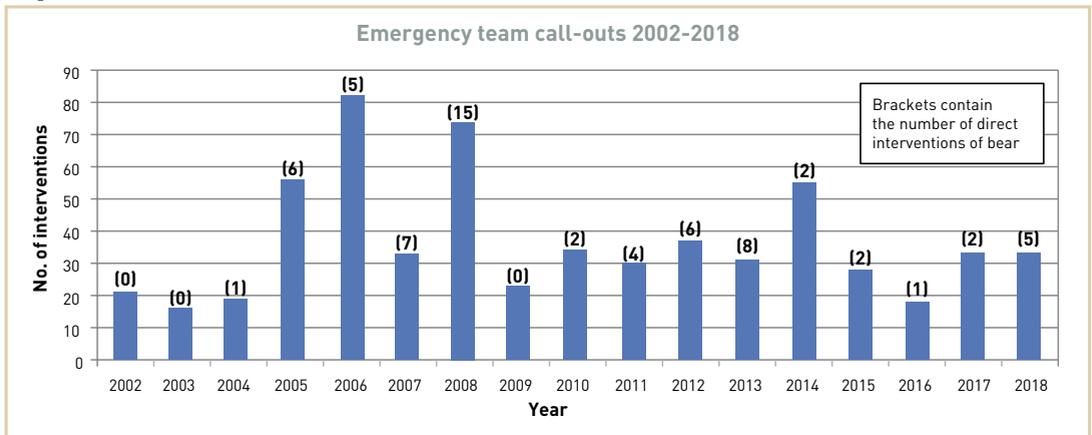
The female bear **F20**, an individual that is quite unafraid of humans, in 2018 paid some visits to several public venues in val Genova and to adjacent hamlets, and also featured in several close encounters although she never showed aggressive behaviour against the humans she approached.

As regards **M31**, a 4 year old male that in 2016 and 2017 proved to be troublesome due to the number of damage events he seemed to have caused (10 and 5 events, respectively, mostly concerning beehives), in 2018 he was detected in a total of 10 damage events, 2 against agricultural crops, 6 against livestock (5 sheep and 1 lama) and 2 against beehives.

Emergency team activities

The work of the emergency team was conducted from 5 March to 3 December 2018 and consisted in **34 call-outs**, 3 of which assigned priority code red, 15 code yellow and 16 code white (Graph No. 10). In 11 cases, the team was called to handle situations linked to the bear called M49, in 3 cases for bear F20, in 3 cases for bear F36 and in 1 case for bear KJ1, while in 13 cases the individuals were unidentified. In another 3 cases, the team was called to handle situations concerning a wolf. The team operators carried out direct dissuasion actions on the bear in 4 cases, 3 of which using rubber bullets (2 against M49 and 1 against F20) and 1 with lights and noise (M49). An additional dissuasion effort on M49 was performed by the dog unit using bear dogs.

Graph No. 10



Close encounters between humans and bears

During the year there were **three** episodes featuring threatening conduct, qualifiable as ‘**false attacks**’. They are briefly described here under.

On **6 June 2018**, around 8:20 p.m., close to the **hamlet of Villa Banale**, a person walking along a small country road was chased for a short stretch by a light-coloured bear. While fleeing, the person suffered light abrasions. Based on the person’s description, the bear seems to have emitted a low rumble and moved decisively a few feet in the person’s direction. The samples discovered during the inspection performed by the dog unit on the following day allowed to identify the bear as the female KJ1 accompanied by cubs.

On **15 August 2018**, at **Dossi Redondi** in the Municipality of **Vallelaghi**, a person transporting salt to a salt block station for chamois sighted two bears. One of the two immediately rumbled and came within 20 metres, while the man fled down the slope, getting bruised in the process. The samples collected by the dog unit inspecting the scene allowed to confirm the presence of the female bear F12.

On **21 novembre 2018**, at **Boiara Alta** in the Municipality of **Cles**, a couple who habitually walked that section of forest, heard a sudden noise of alarm above the forest road they were walking along. As they stopped to listen, a bear appeared from the road below running in their direction and hissing. The woman fled up the mountain slope, tripping in the undergrowth and falling down. The husband let the dog loose and the dog ran towards the bear. The bear fled up the slope and disappeared. The inspection performed on the following day revealed traces of an adult female bear followed by at least one cub. She was not identified because the extraction of DNA from the organic samples taken failed.

Captures

In emergency management, an important role is played by the ‘Capture Team’ consisting of forestry service personnel specifically trained for this purpose and assisted by **APSS veterinarians**, who see to the health aspects.

In **2018**, **3 bears** were captured and fitted with radio collars. All of the captures were performed using **tube traps**, within the context of the **LIFE DINALP BEAR** project and intended for problem bears such as F20, the confident animal, and M49, the damaging animal.

The three bears captured in 2018 bring up to 31 (22 females and 9 males) the number of bears **captured since 2006**. Out of these, **18** were captured using **tube traps**, **8** using the **free ranging** technique, **4** using **Aldrich foot snares** and, in **1** case (cub born in the year) **by hand**.

Following is a brief description of the captures performed in 2018.

- On **21 June** in val Genova, the adult 4.5 year old female **F20** was captured and collared (Photo No. 14). Her capture was made necessary by her confident behaviour that frequently leads her to



Photo No. 14 - Stages in the capture of F36 (Archives of Servizio Foreste e Fauna, PAT)

stop for food foraging near mountain huts and/or dwellings.

- On **12 August**, in the course of the activities concerning the problem bear M49, in the vicinity of malga Rosa (Municipality of Porte di Rendena), the young 1.5 year old female called **F36** was captured and collared (Photo No. 15).
- Once again in the vicinity of malga Rosa, on **27 August**, was captured the young 2.5 year old male **M49** (Photo No. 16).



Photo No. 15 - Stages in the capture of F36 (Archives of Servizio Foreste e Fauna, PAT)



Photo No. 16 - Stage in the capture of M49 (Archives of Servizio Foreste e Fauna, PAT)

Road accidents

In 2018, 4 bears were accidentally hit by vehicles on the roads of the province of Trento, making the number of **road accidents reported up to now** rise to **33** (3 of which in the province of Bolzano). The vehicle drivers involved were not injured.

The first accident occurred on **7 June** at **Vecchio Mulino (Vezzano, valle dei Laghi)** and involved the female bear **F30**, as determined by the genetic analysis performed on the hairs collected at the site of the accident. The inspection promptly performed by the specialised dog unit established that the bear had moved away from the collision site. The animal was later detected in the late summer/early autumn via genetic analysis.

The second accident occurred on **9 June** on the provincial road that connects **Praso** with **Agrone** in the **Giudicarie**, level with the fork leading to the Sevror locality, and involved the male bear **M31**, identified via genetic analysis conducted on the hair collected at the site of the accident. The inspection promptly performed by the specialised dog unit established that the bear had moved away from the collision site. The animal was later detected several times in the course of the year via genetic analysis.

The third accident happened on **20 June** on the provincial road **between Cles and Caldes** and involved the female bear **F24**, identified via genetic analysis conducted on the hair collected at the site of the accident. The inspection promptly performed by the specialised dog unit established that the bear had moved away from the collision site. The animal was later detected via genetic analysis in October near Caldes (accompanied by 3 cubs).

The fourth and last accident occurred on **26 September** in val Rendena involving the bear **M49**, identified thanks to the radio-collar it wears. Around midnight, M49 was hit by a van on the national road SS 239, in the vicinity of **Pelugo** (a Tione - Madonna di Campiglio valley bottom road). Based on the initial elements collected, the animal did not seem to have been

seriously injured, and the driver of the vehicle confirmed that the bear, after being hit, had fled upstream from the road. As procedure imposes, the emergency team immediately came into action and reached the site to inspect it. The bear, during that same night and in the early morning, had climbed up the slope on the left bank of val di Borzago, reaching an altitude of about 1200 m a.s.l. where it stayed, substantially still, for 24 hours. On the following day it progressively started moving again.

On 30 September 2018, the animal was sighted from a short distance by a hunter who says it was limping on a front paw.

On 29 December 2018, M49 was sighted again by forest personnel who verified that he was walking correctly and thereby confirming that he had not suffered permanent damages.

Wildlife silhouette on roadside project

Working together with the Roads Management Service, with the Provincial agency for public forests, with MUSE and with WWF Trentino, the Forest and Wildlife Department has created an experimental project for the manufacture and installation of **roadside wildlife silhouettes** throughout the province of Trentino so as to alert vehicle drivers about the **risk of hitting** wildlife on specific stretches of road.



Photo No. 17 - Roadside cut-out (C. Groff - Archives of Servizio Foreste e Fauna, PAT)

The first 4 cut-outs depict a male roe deer of natural size and colour. The cut-outs are made of corten and are positioned in spots where wild animals, ungulates especially but bears too, frequently cross the road (Photo No. 17). Two cut-outs are located **between Vezzano and Vigolo Baselga**, and another two in the vicinity of Nembia, between **S. Lorenzo in Banale and Molveno**.

The aim is to remind people in a direct and immediate manner about the presence of wildlife in those areas and about the possibility of their crossing, giving them the opportunity to slow down and pay attention.

The use of cut-outs depicting wildlife is a type of signing already in use in other European countries, such as Slovenia and Austria, for example.

The results of this experiment will be verified in the next few years and may lead to the installation of other cut-outs.

The dog unit

The news in 2018 for the Dog unit – Bear dogs consisted in the arrival from Sweden of **two puppies** who will replace the two older dogs who will be retired after 12 years of work. After about a year of contacting and mediation, Björn and Fjäll, a male and a female of the “**Jamthund**” dog breed, arrived in the first weeks of June (Photo No. 18), selected by the expert Scandinavian bear dog selector, Rasmus Bostrom. The two new individuals will be trained to be **anti-poison dogs** as well.



Photo No. 18 - The two newly arrived Jamthund puppies (L. Pedrotti - Archives of Servizio Foreste e Fauna, PAT)

Specific **GPS equipment** for dogs and handlers was also purchased so as to participate in the experimentation of the Base Station (coordination and control unit) capable of georeferencing and of coordinating in real time even complex operations in critical situations.

With the new GPS devices it was possible to perform repeated tracking of radio-collared bears in order to assess the dog's work by overlapping the data.

During 2018, the dog units were called out **43** times. The more important cases involved **four road accidents** and **three fake attacks**. In seven cases, a **surveillance** post was set up with the aim of **dissuading** bears that had repeatedly caused damage to assets of various kinds; an actual dissuasion action was carried out after the capture of a confident bear, and further dissuasion was conducted during the various attempts to recondition the problem bear called M49. There were many **specific searches for genetic material**, and in the course of the year other types of operations were conducted too, such as anti-poaching, search for injured or deceased animals, and support in capture operations. Finally, the retrieval of the collar of M18 provided a training opportunity for the two Jamthund puppies (searching for the collar on the ground).

4. COMMUNICATION

The Provincial Administration considers communication to be an element of fundamental importance in bear and large carnivores management and is one of the six Action Programs indicated in the Provincial Government's resolution No. 1988 of 9 August 2002.

Hence, as from **2003**, a specific **information campaign** called "**Conosci l'orso bruno**" (Get to know the brown bear) was launched and is still ongoing in many diverse initiatives. The present Report, that also plays an informative role, among others, is one of the initiatives designed to make the general public aware of this animal, certain of the fact that only knowledge can lead to cohabitation with the bear over the medium and long term.

With regard to communication activities, the Forest and Wildlife Department has always been supported by the **Adamello Brenta Nature Park** (PNAB), which has been active in this field for many years in its own area of competence, and the **Museo delle Scienze** (MUSE Science Museum) in Trento.

Furthermore, since **2015** communication activities regarding bears and large carnivores have counted on a new tool, the '**Consultation and Information Round Table for the Management of Large Carnivores**', which has met 2018 on two occasions, on **12 June** and on **17 December**.

Another ongoing initiative is the '**Communication Round Table**', coordinated by the **PAT's Press Office** and made up of the representatives of **Servizio Foreste e Fauna, Trentino Marketing, Adamello Brenta Nature Park, MUSE** and of **Association of Trentino Mountaineers (SAT)**.

In 2018, moreover, in collaboration with the Province's Press Office, the **institutional web site on the brown bear and large carnivores** (www.grandicarnivori.provincia.tn.it), active since 2003, was updated with the year's news.

The main communication activities carried out in 2018 are summarized below.

Evening talks and public meetings

Table 1 lists the **public meetings/evening talks** organized by the Forest and Wildlife Department within the information campaign "Get to know the brown bear" (**approx. 1,850 participants overall**). Most of these meetings were organized in response to local requests for information and for dialogue.

Table No.1

Type	Date	Location	Participants
Public meeting - the Wolf	12/2/2018	Vallarsa	240
Presentation of LC Report for 2017	6/3/2018	Trento c/o Muse	140
Meeting with administrators - the Wolf	14/3/2018	Canazei	20



Type	Date	Location	Participants
Public meeting – the Wolf	26/3/2018	Castelfondo	150
Public meeting – the Wolf	27/3/2018	Rumo	150
Public meeting – the Wolf	9/4/2018	Lavarone	140
Public meeting – the Wolf	23/4/2018	Villa Agnedo	150
Public meeting – the Wolf	31/5/2018	Ronchi Valsugana	200
Public meeting – Large Carnivores	4/6/2018	Fondo	80
Public meeting – the Wolf	6/6/2018	Pergine	150
Public meeting – the Wolf	21/6/2018	Tonadico	120
Public meeting – the Wolf	2/7/2018	Borgo Valsugana	70
Public meeting – the Bear	7/8/2018	Malé	30
Public meeting – the Wolf	9/8/2018	Luserna	70
Public meeting – the Bear	21/8/2018	Covelo (Vallelaghi)	60
Public meeting – the Wolf	2/10/2018	Malè	30

With the support of the Press Office, **7 press releases** were issued regarding the **bear**, **2** regarding the **wolf** and **11** regarding both **large carnivores (20 in toto)**.

Furthermore, **18 Council queries**, 3 regarding the bear and 15 regarding the wolf, were answered.

Communication activities carried out by SAT (Alpine Club of Trentino)

Information evenings with the title: “**Orso bruno chi sei? - Suggerimenti per un’equilibrata convivenza con l’Orso e gli altri Grandi Carnivori delle Alpi**”* (Brown Bear, who are you? Suggestions for peaceful cohabitation with the Bear and the other Large Carnivores of the Alps):

- 15 marzo 2018: Sezione **SAT Povo** - Rassegna A. Nicheletti (con patrocinio Circostrizione Povo)
- 13 April 2018: **SAT** section in **Mattarello** (with the support of Circostrizione Mattarello)
- 19 April 2018: at **S.U.S.A.T.**
- 18 May 2018: **SAT** section in **Caldonazzo**
- 27 June 2018: head **Scouts of Pergine Valsugana**
- 05 October 2018: **SAT** section in **Arco**
- 19 October 2018: **SAT** section in **Ledrense**
- 26 October 2018: **SAT** section in **Sardagna**

*The evenings are organised within the context of the Italian Alpine Club - Large Carnivores Group.

Other activities:

- **18 March 2018:** participation in the Pre-conference of the **Life Wolfalps Final Conference** (together with Gruppo Grandi Carnivori CAI, Stand and Speakers' Corner)
- **14 April 2018:** seminar at **Longarone Fiere: Il ritorno del lupo sulle Alpi orientali - Un mondo che cambia** - gestione delle problematiche economiche e sociali dei grandi carnivori; l'esempio di Trento (The return of the wolf to the Western Alps – A changing world – management of the economic and social issues regarding large carnivores; the example of Trento)
- **18 May 2018:** seminar at **Belluno: Il ritorno del lupo sulle Alpi. Esperienze di gestione in Provincia di Trento** (The return to the Alps of the wolf. Management experience in the Province of Trento) Within the sphere of the Conference “Gestire il ritorno del lupo - esperienze a confronto nei Parchi Nazionali”, organised by **Parco Nazionale delle Dolomiti Bellunesi**
- **25 and 27 September 2018:** “**Lupo, chi sei?**” (Wolf, who are you?) The wolf in school, meeting in the classroom and in nature with the primary school children of Vallarsa (at the invitation of the SAT section of Vallarsa)
- **27 October 2018:** Conference “**Orsi e lupi: la sfida sociale di un ritorno**” (Bears and wolves: the social challenge of their return) Centro Congressi Fiera of Bolzano (collaboration with the organization of CAI Alto Adige, AVS and Gruppo Grandi Carnivori CAI)
- **18 November 2018:** Outing for the refresher course “**Accompagnatori escursionismo giovanile SAT**” (SAT youth excursion guides) (Malga Revoltel, Lessinia).

Information material produced

- Publication of the “**RAPPORTO GRANDI CARNIVORI 2018**” (2018 LARGE CARNIVORES REPORT) (1,000 copies printed in Italian and 150 in English)
- Updating and reprinting of 3,000 copies of the **brochure “L'orso bruno in Trentino”** (The brown bear in Trentino)
- Updating and reprinting of 5,000 copies of the brochure “**Orso: come comportarsi in caso di incontro ravvicinato**” (Bear: how to behave in case of close encounters)
- Reprinting of 4,000 **posters about the bear**
- Updating and distribution of the new information **brochures “Il lupo in Trentino”** (The wolf in Trentino) (2,000 copies)
- Printing of 1,000 **new posters about the wolf**.

Other communication initiatives

The Forest and Wildlife Department has supervised the drafting of **informative and scientific articles** and of interviews or **presentations**, issuing the content directly and/or supplying information and material, on the following occasions:

- Interview on **TG Cimbri** news channel on LC - 18 January 2018
- Interview with **National Geographic Germany** - 24 January 2018
- Interview with **Istituto Pavoniano Artigianelli per le arti grafiche** (Bear kit) - February 2018
- Interview on **RTTR** on Large carnivores - 29 June 2018
- Interview with the **German railways magazine “DB-Mobile”** - 29 August 2018



- Interview on **Radio Popolare** on Large carnivores - 7 September 2018
- Stand on Large Carnivores on the **Giornata sulle aree protette** (Protected Areas Day) - 15 September 2018

Theses, internships, co-working

In 2018, work projects were started or continued with **Research Bodies** for the in-depth study of themes regarding ecology and the solving of conflicts with large carnivores, as well as in support of the monitoring and experimental activities.

PhD thesis - Fondazione Edmund Mach, Department of Civil, Environmental and Mechanical Engineering of the University of Trento, Stelvio National Park. The general project concerns the in-depth study of the aspects and any weak and strong points of the functional connectivity and of the environmental sustainability of the European environmental network as regards a species having such vast space requirements as the bear. The aim of the 3-year PhD program is to analyse the future possible scenarios for the conservation of the brown bear in the Alps, through the analysis of the genetic, demographic, spatial and man-bear interaction data collected over the last twenty years, so as to assess the possibility and **mechanisms of dispersion and of expansion** of the population currently living in western Trentino.

Bachelor's Degree thesis – University of Padua, together with the **Genetics Lab of ISPRA**. The work supports the monitoring and experimentation activities and is aimed at experimenting **new techniques for the collection and conservation of bear excreta samples for genetic analysis**. The results obtained, presented at the latest congress of the *International Bear Association*, have allowed to define a new and more efficient sample collection method.

International Project “Bearconnect” (Georg-August University of Goettingen, Centre National de la Recherche Scientifique, University of the Alps of Grenoble Alpes, Institute of Nature Conservation, Polish Science Academy). Cooperation for the sharing of information and data regarding the alpine population and for analyses aimed at **assessing the direct and indirect impact of changes in the climate and in the use of the land** on the distribution of the bear population and of spatial connectivity.

PhD thesis - Centre d'Écologie et des Sciences de la Conservation, La Sorbonne University of Paris. The aim of the work is to identify the **main risk factors associated with livestock predation by bears** in the Alps and in the Pyrenees.

Post-Doctoral project - Centre d'Écologie Fonctionnelle et Evolutive – University of Montpellier (France). The aim of the work is to analyse on a European scale the patterns and **methods of sheep and goat predation by bears**.

Master's Degree thesis - Paul Sabatier University of Toulouse (France), with internship via Erasmus with the Servizio Foreste e Fauna. The aim of the work is to acquire skills in the conservation and management of large carnivores and in the in-depth study of two specific topics: **characterization of the ability to move of bears in relation to gender and season and analysis of the evolution in social acceptance of large carnivores in the province of Trento**.

Master's Degree thesis - Faculty of Life and Environmental Science – University of Reykjavik (Iceland). The aim of the work is to apply and explore **genetic capture-marking-recapture models for the abundance estimation of the Alpine brown bear population**.

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 management of damage events and, to a lesser extent, the monitoring. Training represents one of the six Action Programs mentioned in the Provincial Government's resolution No. 1988 of 9 August 2002.

The training activities conducted in 2018 are the following:

- Training on **the wolf** (Casteler, 17 January 2018)
- Training on **Large Carnivores** for the staff of **UDF of Trento** (Casteler, 19 February 2018)
- Training of new **Damage assessors** - Trento, 26 February 2018
- Course for the staff working on **Large Carnivores** (Casteler, 2 March 2018)
- Training on Large Carnivores for the staff working at the **Paneveggio Pale di S. Martino nature park** (29 March 2018)
- Training on Large Carnivores for the staff of **Canton Ticino (Switzerland)** (29 March 2018)
- Training for the **Damage prevention responsables** – Trento, 3 August 2018
- Training for the **Damage prevention responsables** – Trento, 13 November 2018
- Training for the **Damage prevention responsables** – Trento, 10 December 2018 (c/o Federazione Allevatori Trentini) (Photo No. 19)
- Training of the **staff of Muse** (17 December 2018)



Photo No. 19 - Training activity for forestry personnel and for the technicians of the Trentino Breeders' Association FAT (P. Zanghellini - Servizio Foreste e Fauna, PAT)

6. NETWORKING

Networking with neighbouring regions and countries gains strategic importance for the management of a highly dynamic species such as the brown bear. Considering this, even before the launching of the *Life Ursus Project*, official contacts with neighbouring regions were established, as it was clear that the area of Western Trentino would not have been large enough for a viable population of bears. Over time, these relationships have been strengthened and consolidated, with regard both to the territorial expansion of the small population that has in fact expanded to neighbouring 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.

Subsequently, 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 **PACOBACE** (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 Plan was updated in 2015 (Chapter 3).

The LIFE + “DINALP BEAR” project (2014-2019)

La PAT ha aderito al Progetto *Life “DINALP BEAR”* (Figure No. 12) nell’ambito del programma finanziario della Commissione Europea LIFE + Natura (fondi a disposizione della PAT pari ad euro 248.011, con quota di finanziamento UE pari ad euro 173.608).

Figure No. 12 - Logos of Rete Natura 2000 and of the LIFE+ “DINALP BEAR” project



The project, running from 1 July 2014 to 30 June 2019, has the aim 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.

The work meetings in 2018 were held in **Lubiana** on 5-6 February and on 10-11 September. Another meeting was held concerning the activities for the **management of emergen-**

cies, via an educational workshop for the staffs of project partners, held in **Trento**, at the Casteler on 23 November 2018.

As foreseen by the LIFE project, **capture activities** (photo No. 20) for the application of radio collars continued in 2018 (see the “Captures” section), together with initiatives for sharing experience with the various project partners.



Photo No. 20 - Collar application financed by the project Life Dinalp Bear (Archives of Servizio Foreste e Fauna, PAT)

The Large Carnivores Platform of the Alpine Convention (WISO)

Figure No. 13



The activity of the **Large Carnivores Platform of the Alpine Convention (WISO)** (Figure No. 13, Photo No. 21), established in 2009, and currently having a representative of the Autonomous Province of Trento within the Italian delegation, continued during 2018.

The meetings of the year were held in **Domodossola** on **27-28 February** and in **Berchtesgaden (Germany)** on **26-28 September**.

Finally, technical meetings were held with the colleagues of the **Autonomous Province of Bolzano (PAB)** on 6 July 2018 in Trento and on 31 October 2018 in Monticolo (Bolzano) (Photo No. 22).



Photo No. 21 - Meeting of the Large Carnivores Platform (C. Groff - Archives of Servizio Foreste e Fauna, PAT)



Photo No. 22 - Technical meeting with the colleagues of the Province of Bolzano (Archives of the Ufficio Caccia e Pesca, PAB)

Conferences and Congresses

The provincial Administration attended the following international conferences, reporting on its activities concerning the management of bears and of large carnivores.

- Meeting of the *Large Carnivore Initiative for Europe - LCIE* in Trento (21 - 23 February 2018) in the course of which the basis was created for, among other things, the **Technical document on the management of bears in Trentino**, requested by the provincial administration as a document of address to the major European experts in large carnivores.
- Conference of the *International Bear Association (IBA)* in Lubiana (SLOVENIA) - 16-21 September 2018 (Figure No. 14)

Figure No. 14 - Logo of the IBA conference 2018



- Congress on human-wildlife conflicts - EURAC Bolzano - 26-27 November 2018
- Conference on the **Wolf** organised by the **Ministry for the Environment** and by **ISPRA** in Rome - 3-4 December 2018





PROVINCIA AUTONOMA DI TRENTO

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