



PROVINCIA
AUTONOMA
DI TRENTO

TRENTINO

2021 LARGE CARNIVORES REPORT

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PROVINCIA AUTONOMA DI TRENTO
WILDLIFE DEPARTMENT
Large Carnivores Division

2021 LARGE CARNIVORES REPORT



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Cover page

Bear and wolf filmed by a camera trap on Monte Bondone
M. Vettorazzi, APT Wildlife Department archives

Back cover

Young female bear prepares a bed at her wintering den
M. Zeni, APT Wildlife Department archives

Photos without references

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The information provided in this report is the fruit of contributions from many people, to whom we express our most heartfelt **thanks**: forestry service personnel, staff of the parks, forest wardens, Associazione Cacciatori Trentini personnel, hunters, volunteers and others.

Goodbye Cristiano!



26 April 2021: Cristiano Marcolla, warden at the Casteler centre, who passed away last October, says goodbye to the female bear DJ3, after having taken care of her faithfully since 2011. The bear is sedated, in preparation for transfer to the Schwarzwald Wildlife Park in Germany.

1. MONITORING

1.1 The Brown bear

Monitoring of bears (photo 1) has been carried out continuously by the Autonomous Province of Trento (APT) **since the 1970s**. Over time, traditional survey techniques in the field have been supplemented by **radiotelemetry** (a method first used in Eurasia in 1976), automatic video checks by remote stations, **camera traps** and lastly, since 2002, by **genetic monitoring**.



Photo 1 – Bear drinking at a pool of water (M. Vettorazzi - APT Wildlife Department archives).

Genetic monitoring

Genetic monitoring is based on the collection of organic samples (hairs, scats, urine, saliva and tissues) and takes place using two methods, commonly described as **systematic monitoring**, based on the use of traps with scent bait, designed to “capture” hairs using barbed wire, and **opportunistic monitoring**, based on the collection of

organic samples found in the area during routine activities.

In 2021 genetic testing was carried out for the **19th consecutive year, coordinated by APT’s Wildlife Department, Large Carnivores Division**, with the cooperation of FEM, ISPRA, PNAB, MUSE, Associazione Cacciatori Trentini (ACT) and volunteers. **Genetic testing** was carried out by the Conservation Genetics Research Unit at the **Fondazione Edmund Mach**, for samples from the Province of Trento, the Autonomous Province of Bolzano and other Italian regions in the alpine area. The **laboratory in Vienna** also contributed to genetic testing of bear samples collected in Austria, in coordination with FEM.

2021 saw the adoption of both **systematic monitoring** (generally carried out in alternate years) and **opportunistic monitoring** (carried out annually from 2002 to 2018 and every two years from 2019, with the exception of genetic testing relating to damage sites, problem bears and/or emergencies). Specifically, in 2021, monitoring made it possible to collect **678 organic samples** referring to **bears** in the province, of which **580** were **analysed** and used for estimates (plus others in areas outside the province in the Italian Alps). Other samples were also collected outside Italy, contributing towards determining the total number of bears identified belonging to the alpine brown bear population.

Data from outside the province were kindly provided by the **Lombardy Region, Ersaf Lombardia**, the Autonomous Province of **Bolzano**, the Province of **Verbano-Cusio Ossola** (Piemonte) in cooperation with the Carabinieri Forestali of the **Valgrande National Park**, by the **Friuli - Venezia Giulia** Region, the **Swiss Confederation** (KORA and Amt für Jagd und Fischerei Graubünden), **Land Tirol-Austria** (Amt der Tiroler Landesregierung) and **Bavaria** (Bayerisches Landesamt für Umwelt). Our heartfelt thanks go to all these organisations.

Definitions

- **“Cubs”**: bears aged between 0 and 1;
- **“Young bears”**: males up to the age of 4 and females up to the age of 3;
- **“Adults”**: males aged 4 and over, and females aged 3 and over, considered to be sexually mature and capable of reproducing;
- **“Detected bears”**: bears whose presence has been ascertained during the year, either genetically or on the basis of unequivocal information (associated with radiotelemetry for example) and repeated observations;
- **“Dispersion”**: movement outside the core area where the females are present, coinciding essentially with western Trentino, by bears born in this area, without them reaching the territory habitually frequented by bears belonging to the Dinaric-Balkan population;
- **“Emigration”**: abandonment of the population present in the province by bears reaching the territory habitually frequented by bears belonging to the Dinaric-Balkan population;
- **“Return”**: return to the core area where the females are present, coinciding essentially with western Trentino, by dispersing or emigrating bears;
- **“Immigration”**: arrival of bears from the Dinaric-Balkan bear population in the territory used by bears in western Trentino.

Results

All the **data** collected are processed on an annual basis, with reference to the calendar year (1/1 - 31/12), which effectively coincides with the “biological year” of the bear.

It is implicit that the monitoring techniques cited do not guarantee that **all the bears present** in the area will be detected. However, the application of statistical methods makes it possible to provide the overall estimate of the total population subsequently presented in the report, with the relative confidence intervals.

Processing of the **data** collected in **2021** has provided the information given below in relation to **births, deaths, population size, structure, trends, distribution, use of the space, density and dispersion** for the population.

Demographics: births

In **2021** it was estimated that there were **9-10 new litters** (photo 2), with a total of **12-14 cubs**. This estimate was made based on information coming from genetic tests and their geographical distribution, together with direct observation of females with cubs recorded during the year.

Graph 1 shows the number of litters and cubs estimated to be present each year, from 2002 to 2021. From 2016 onwards the data represent an average of the minimum and maximum number observed.

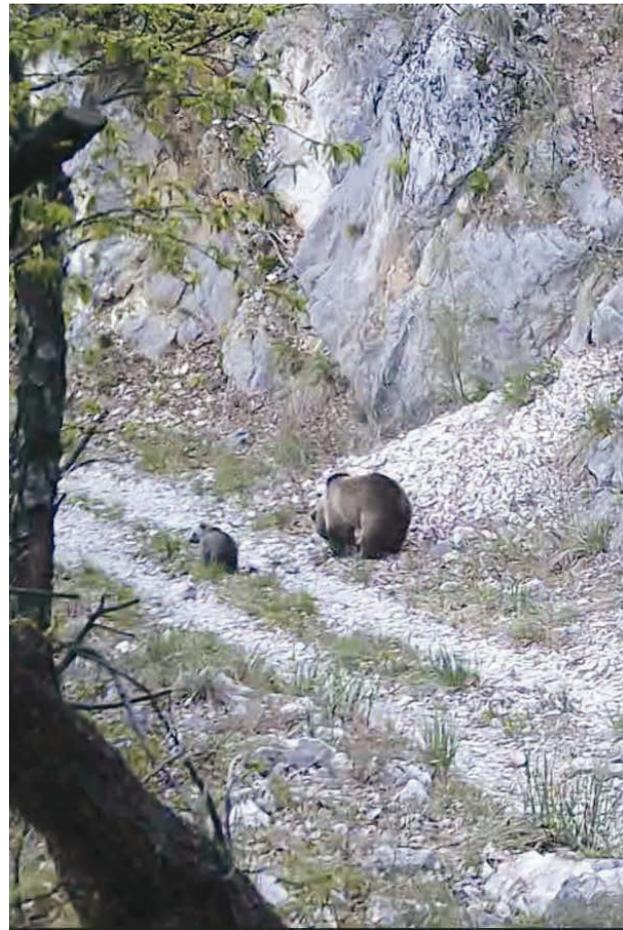
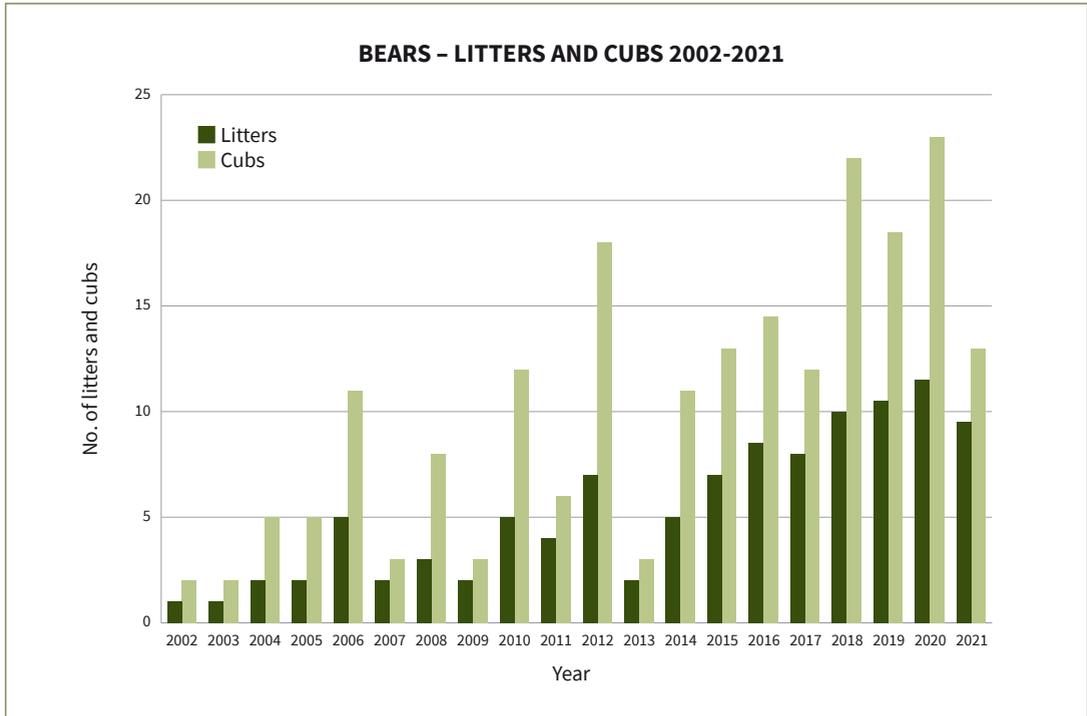


Photo 2 – Female bear with cub of the year (COY) filmed on 5 May 2021 at Bellaria di Cei. There were no further reports in the area during the year. Frame from a camera trap video (G. Bombieri - APT Wildlife Department archives).

Graph 1



Demographics: deaths

In 2021 **the death of 5 bears** was recorded. The relative data is given below, supported by veterinary autopsies and genetic testing (with the exception of the second and last cases, when this was not possible).

- **6 May 2021** at **Viote del Bondone** (mountains of Trento), **M71**, a young male. Cause of death: **preyed on by another bear**, with partial consumption (photo 3);
- **8 August 2021** at Pian del Porcil, **Covelo** in the municipality of Vallelaghi, a few remains of an unknown bear in an advanced state of decomposition. Cause of death: **probably preyed on by another bear**, and consumed;
- **15 August 2021** at Sasso Magno, **Cles mountain, M50**, an adult male born in 2016, found a few hours after his death, resulting from the injuries suffered after **fighting with another bear** (photo 4);
- **15 October 2021** on the SP 34 road near the cemetery of Ragoli, **F9**, an adult female born in 2010. Cause of death: **road accident**;



Photos 3 and 4 – Young bear preyed on and partially consumed by an adult male at Viote, Monte Bondone (APT Wildlife Department Archives). Adult male dying following a fight with another bear (M. Zeni - APT Wildlife Department Archives).

- **25 October 2021** at **Caset a Tione, Trento**, discovery of a left hind leg in an advanced state of decomposition consumed by scavengers, belonging to an **unknown bear**, probably young. Cause of death **unknown**.

Size and structure

Bearing in mind the increasing difficulty of acquiring accurate and reliable data about births and the low probability of “capturing” genetic information for bears under the age of one, it has been decided **not to consider cubs** when determining the **minimum certain number** of bears.

On the basis of this criterion, the **minimum certain number** of young and adult animals (excluding cubs) genetically identified in **2021** was 68 (sex ratio M-F 1:1.03). On adding the male M4 present in Friuli - Venezia Giulia and equipped with a GPS radio collar, the minimum certain number of bears present in 2021 arrives at **69**. This is without considering the bear present in the Ossola/Val Grande area in Piemonte in 2021 (albeit without genetic data, it is considered likely that this is a further bear, probably the male M29).

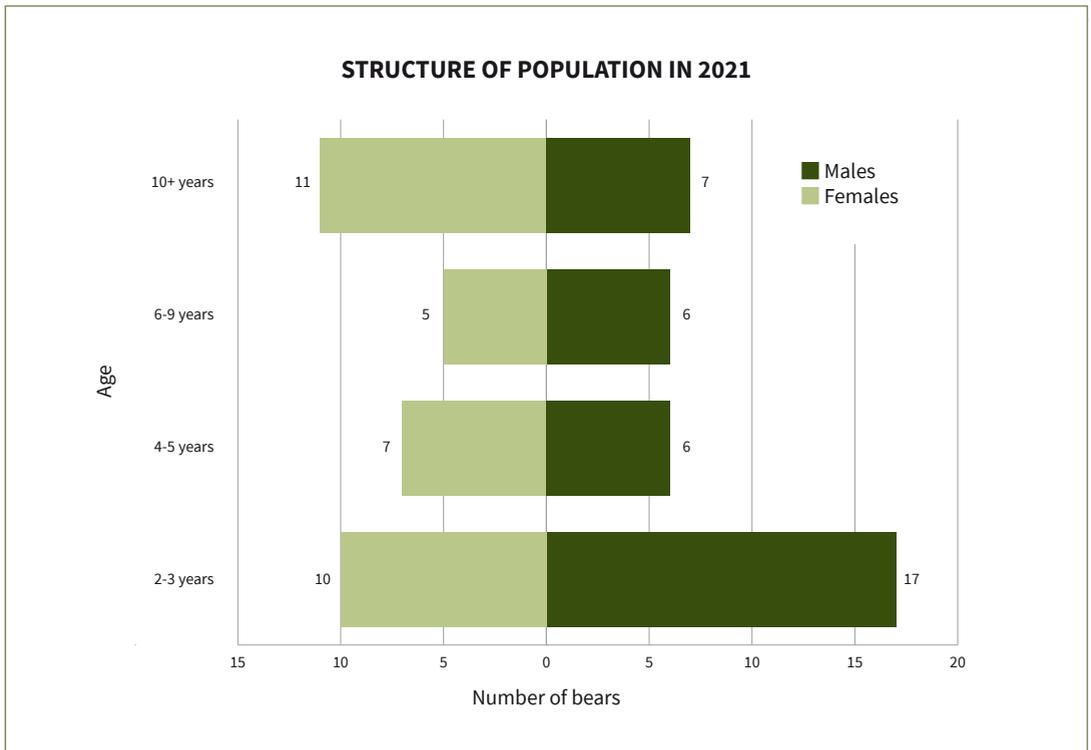
Given the progressive increase in numbers and distribution area of the population, it is becoming increasingly difficult to identify all the genotypes

of the bears present. Extensive genetic monitoring is carried out in alternate years, as already mentioned on page 4. For this reason, the structure of the population is now represented based on age groups (graph 2).

The size of the population is therefore estimated every two years, making use of “**marking and recapture**” (MR) models. Genetic monitoring of alpine bears is therefore a useful tool for estimating the number of bears present in the Alps. This monitoring is based on the collection of organic samples and takes place using two methods, commonly described as **systematic monitoring**, based on the use of traps with scent bait, designed to “capture” hairs using barbed wire, and **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 randomly, depending on the opportunities, systematic monitoring follows a sampling

Graph 2



system that has been planned and standardised in temporal and spatial terms, in such a way as to distribute the samples collected **in a more homogeneous manner** (namely over space and time).

Analysis of the DNA of the samples collected (genotyping) makes it possible to recognise individuals and “give a name” to each bear. In theory, if it were possible to carry out an extensive programme to collect samples throughout the whole alpine area where the bear population is present, we could collect samples for all the bears present and thus have a full census of the population. This was possible in the first 10-15 years of the population’s existence, when the area occupied was smaller and the number of animals more limited.

It is currently not possible to plan an extensive programme enabling collection of samples and genotypes for all the bears. The population has grown, and the area occupied is progressively extending, albeit slowly, making systematic monitoring increasingly demanding.

For this reason, it is necessary to **base current and future population counts on estimates**. These estimates are still based on analysis of the genotyped samples (the DNA of the bears found) and corroborated by solid statistical data (capture, marking and recapture – CMR - models). Monitoring does not permit recording of all the bears present in the area with certainty and the method adopted is based on the assumption that only a part of the population (in this case, their DNA) will be “contacted and counted”, but that it is possible to **reliably estimate the average probability of “finding” each individual** based on the samples collected and the collection programme.

In this way it is thus possible to estimate the number of individuals present without necessarily “capturing” them all through genetic testing. The model starts with the (minimum) number of individuals whose DNA has been recorded and the probability of “capturing” them, to then consider the **number of bears estimated to be present** in each year.

As an **example**, if the individual DNA of 60 different bears is collected during the year, and the probability “p” of capture is 0.8 (equivalent to an 80% probability of genetically capturing a bear in that year), using statistical genetic capture and recapture models, the estimate is given by N, the

minimum certain number of bears “captured” / p, namely $60/0.8 = 75$ bears estimated to be present. Another advantage of the estimates obtained using these models is that the **numerical estimate of population size can be associated with the so-called confidence interval (CI)**, providing information about the accuracy of the estimate. Again as an example, a figure of 75 bears with a CI of between 70 and 88 indicates with a good level of certainty that the estimate of 75 bears lies between the interval’s minimum and maximum figures.

The carrying out of **systematic monitoring over a grid of cells** distributed uniformly over the area, allowing the efforts made to be controlled over space and time, guarantees better accuracy and precision of the estimates. This is because appropriate planning of sampling, according to an established schedule and with homogeneous geographical distribution, allows more effective application of statistical models attempting to quantify the average probability that a bear will be “captured” genetically.

For analysis regarding 2021, **271 samples** collected in an **opportunistic way** (161 relating to males and 114 to females) and **162 samples** collected in the **systematic** monitoring grid (73 relating to males and 89 to females) were analysed and used. Specifically, during 2021, systematic monitoring “captured” 25 females and 17 males and opportunistic monitoring 24 females and 34 males. Opportunistic samples were also collected in the territories of the Autonomous Province of Bolzano, the Lombardy and Friuli - Venezia Giulia regions and in Austria (and kindly supplied).

For **2021**, based on data from both types of monitoring (systematic and opportunistic), given a **minimum certain number of 69 bears**, and bearing in mind bears present in 2021 but dying before the end of the year, it was possible to estimate a **population of 78 bears** (excluding cubs born in 2021), with a **Confidence Interval (CI)** of between **73 and 92**. The estimated number of **females is 40** (CI 37-47), while the **males** are estimated to be **38** (CI 36-45).

The average figure is higher than that estimated for 2019 (N = 73*) and indicates **further growth of the population**. For 2020 comparable estimates are instead not available, as genetic testing was

concentrated on a limited number of individuals (as regards this see also the information provided on page 16 of the 2020 report).

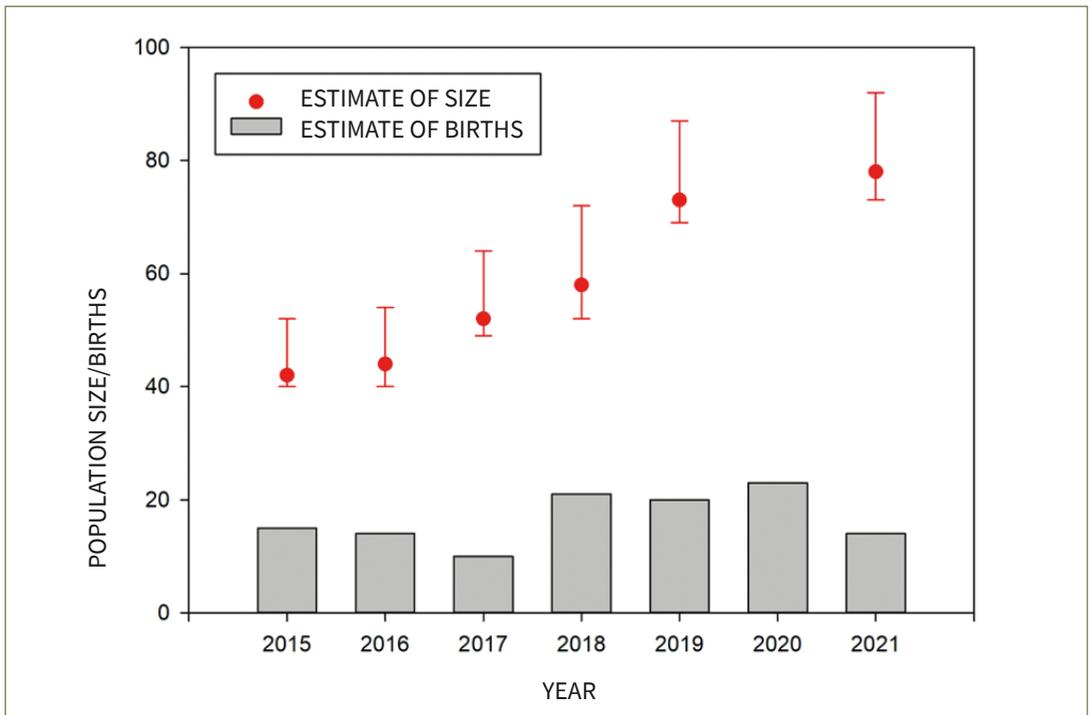
The official data on population size in 2021, processed using the estimation models used in previous years, is therefore **73-92 individuals, without considering cubs of the year** (estimated to be 12-14 as reported above, therefore with a total of around **100 bears**). In **2019** the same model led to an estimate of **69-86 bears*** (see the 2019 report on page 17 and the note below).

Trends

A robust design with a Huggings model was used for the estimate, analysing all the data available

for the 2015-2021 period and providing an estimate of size for each available year. Graph 3 summarises the results of estimates obtained using genetic CMR models between 2015 and 2021 (average estimates and CIs), also showing the estimates for births each year, as reported above. The **trend for population growth over the last 6 years** can therefore be seen, by comparing estimates made using the same method. In short, it can be seen that between 2015 and 2021 the bear population grew further, with different rates of increase depending on the year. The **growth rate** has been **positive** in all six years, with an **average annual figure of 10.3%**, but with considerable annual variations (from 2.3% to 24.4%, moreover probably invalidated by the variation linked to the estimates).

Graph 3 - Trend for the population of young and adult bears estimated using genetic marking-capture-remarking (CMR) models, (right axis, dots with bars representing the confidence intervals in red) and trend for estimates of births (histogram with grey bars).



* In the 2019 report the estimate given was 66-76 young and adult bears. Population estimates with genetic CRM models are carried out on each occasion by considering the data for all years starting from 2015. Hence the estimate made in 2021 also includes an updated (and more robust) population estimate for 2019. Hence the difference between the two figures for that year.

Distribution

7 of the 69 bears recorded with certainty in 2021 were reported **outside the territory of Trentino** (M4 in Friuli V.G., M46 and M65 in Austria, M68 and M78 in Alto Adige-Sudtirolo, and M74 and M76 in the province of Brescia). The bear frequenting the Osola valley/Val Grande should probably be added to these 7, as reported above.

5 of the bears present in Trentino also frequented **neighbouring provinces/regions**, 3 visiting the province of Bolzano (M52, M66 and M75) and 2 the province of Brescia (M74 and M76).

The **983 signs of the presence** of bears collected in the **province of Trento** in 2021 (all those recorded, with the exception of those from satellite monitoring of 2 bears) are shown in Figure 3.

Considering also the longest journeys made by **young males**, on the basis of the data acquired, in 2021 the bear population in the central Alps was **distributed over a theoretical area of 30,550 km²** (Figure 2). In 2021, at the extremes of the polygon regarding male bears, there were reports from the Tyrol region (to the north), the Valgrande National Park area in Piemonte (to the west) and the Carnic foothills in Friuli V.G. (to the east).

The area permanently occupied by the females remains considerably smaller (**2,039 km²**) but is **increasing compared to 2019**.

The data confirms the trend for **slow but constant expansion** by the **females** recorded in the last few years (graph 4), with the by now stable presence of female bears in recently colonised areas such as the upper Lake Garda area and the Val di Ledro, the left-hand side of the lower Val di Sole and the upper Val di Non (photo 5). Moreover, for the first time (with the exception of the brief excursion by Jurka and her cubs in upper Val Camonica in 2006) a **female accompanied by offspring** was recorded **outside the provincial territory**. Indeed, on 22 August 2021, a female bear accompanied by a cub of the year was observed and filmed near **Lake Bos in Val Savio**, in the **Adamello mountains of Brescia**.

The areas occupied were estimated using the **minimum convex polygon (MCP)** method, **applied to**

100% of the validated indicators of presence. This also leads to the inclusion of vast areas which are not suitable and/or not actually used, especially within the macro-area including the movements of young males.

Graph 4 - Trend for expansion of the territory occupied by females

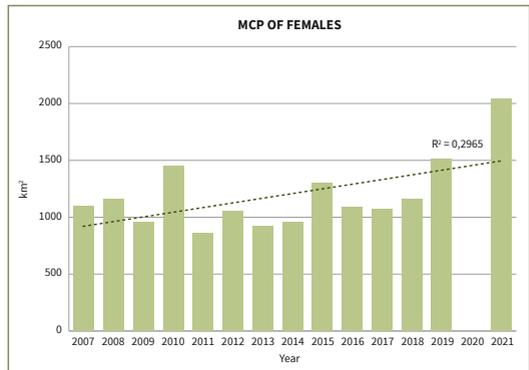


Photo 5 – Female bear and cub of the year photographed between Livo and Bresimo in spring 2021 (APT Wildlife Department Archives).

Figure 1

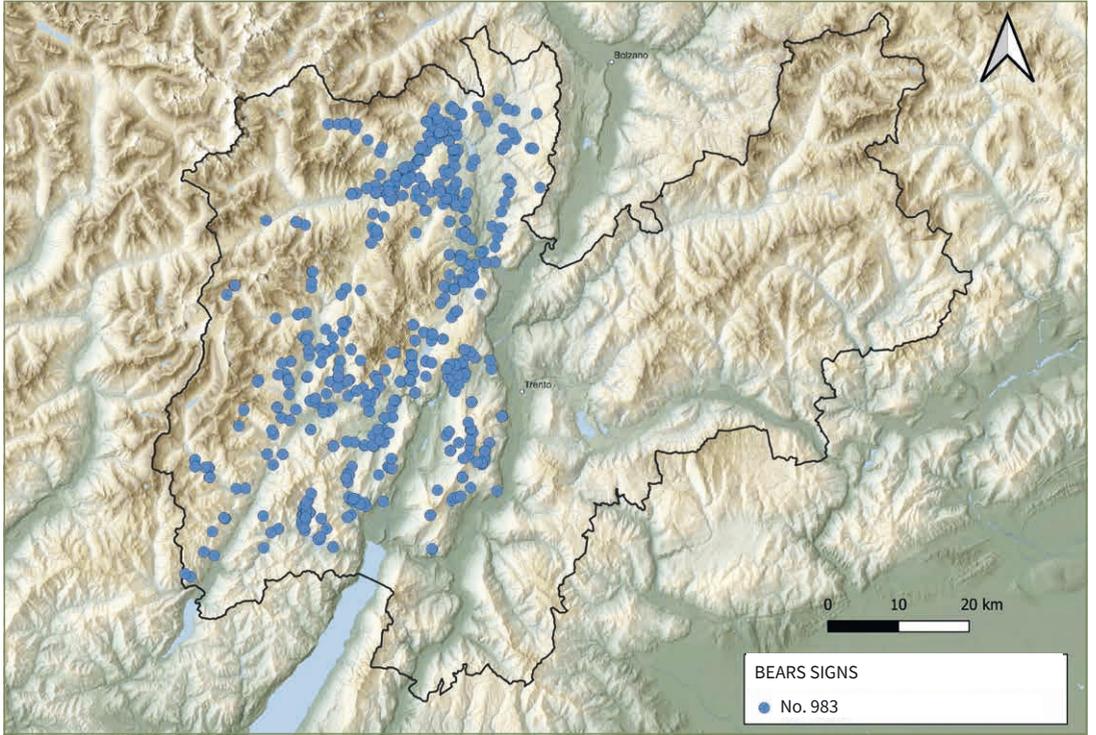
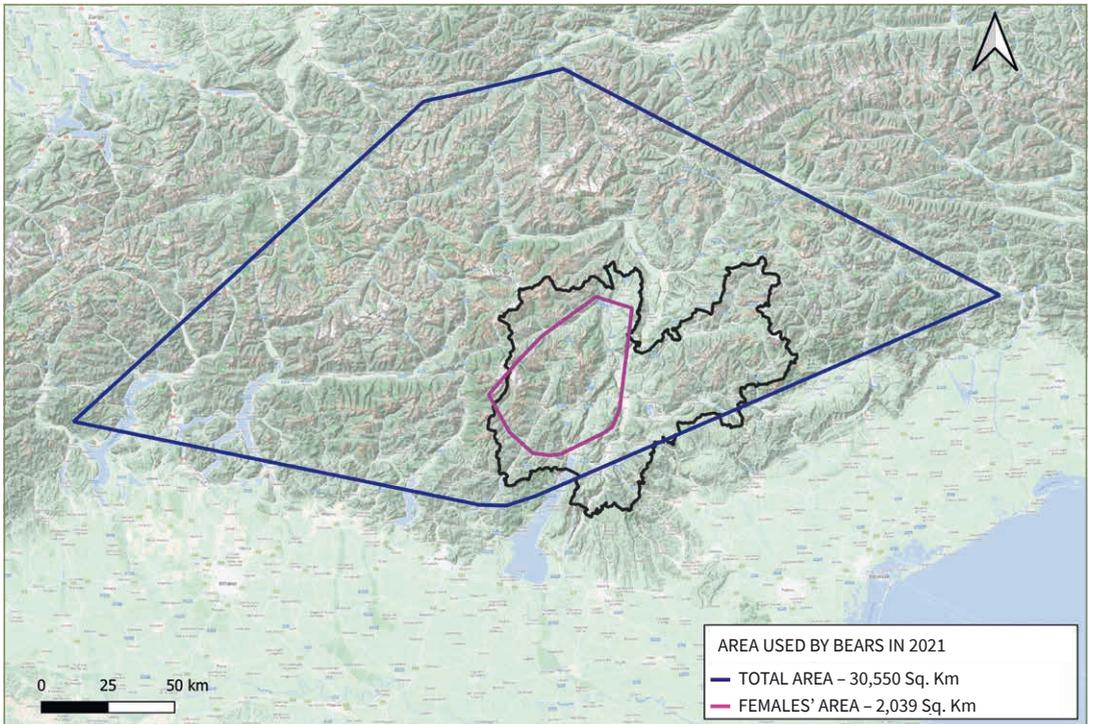


Figure 2



Space use by radiocollared bears

In 2021 **3 bears**, two females (JJ4, aged 15 and F43, aged 3) and a male (M62, aged 3) were monitored with **satellite telemetry**. Their home ranges, calculated using the minimum convex polygon (MCP) method), are shown in Figure 3.

Density

The **density** recorded in the **area occupied by the females** (2,039 km²) **was 2.85 bears/100 km²** (58 bears recorded, excluding cubs of the year). This data should be considered bearing in mind the following:

- the density refers to a dataset collected over an extensive period of time (a calendar year) and thus the number of bears present in the area at a given time, which would represent a figure closer to the real average density, is likely to be lower;

- some bears (males) also frequented areas outside the area occupied by the females in the time considered. This also contributes towards making the effective density lower than reported;
- an increase in the area of reference for density calculation (the area occupied by the females) tends to lead to lower density values compared to previous years, as has in effect been observed.

Density may be different locally, as is partly evident in Figure 4, which shows the **minimum number of bears**, excluding cubs, identified with certainty (genetic tests or radiotelemetry) **in each sector** of western Trentino. It goes without saying that many animals were present in more than one sector, also in relation to different seasonal availability of food, and may therefore have been identified in several of them. It follows that the total minimum number ascertained in the province and in neighbouring areas in 2021 remains 69 bears (excluding cubs) and there is no sense in adding up data from individual sectors.

Figure 3

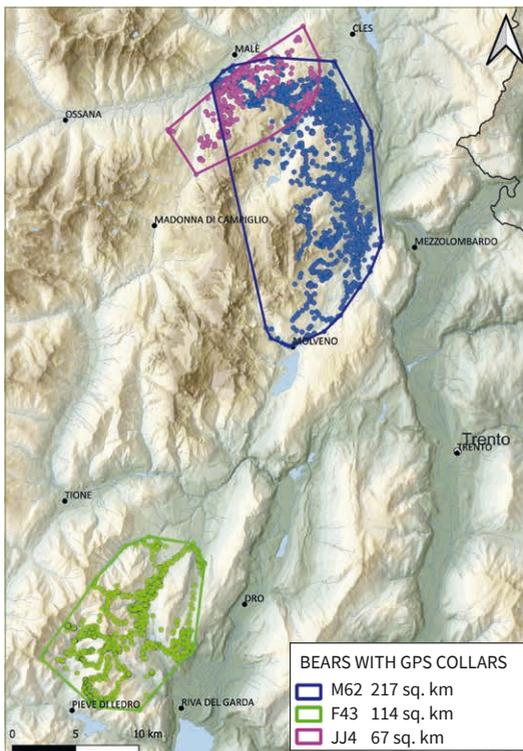
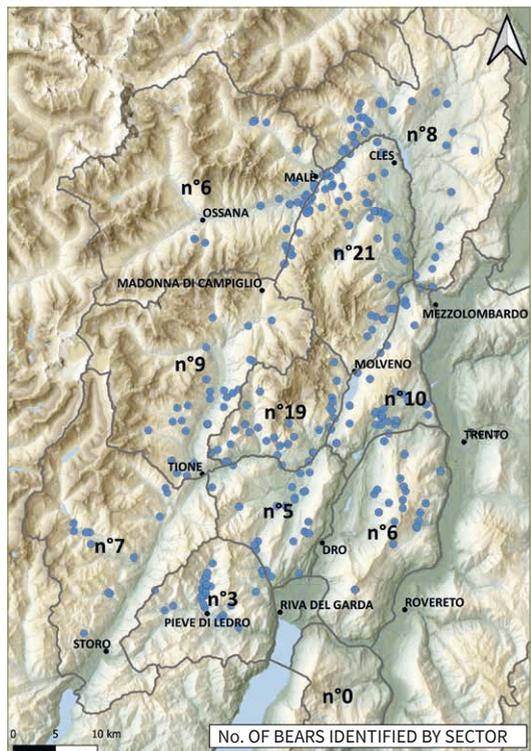


Figure 4

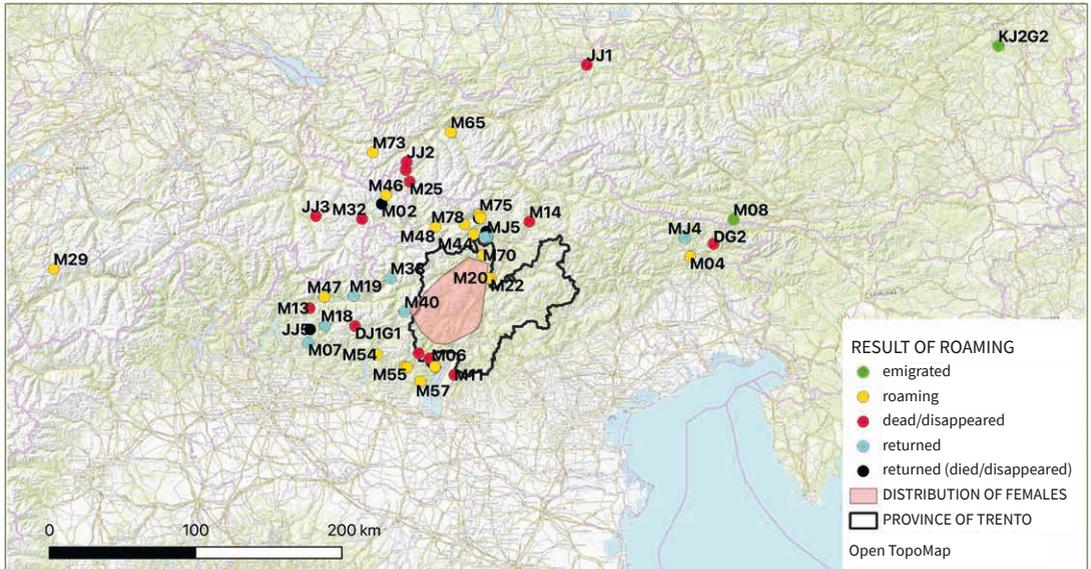


Dispersion

In the **2005-2021** period it was possible to document **dispersion** (namely departure from western Trentino, see the definition on page 6) involving **51 bears** (all males) (Figure 5). **15** of these

(29%) died or disappeared, 6 (12%) dispersed in the last few years and there is no recent information about them, 14 (27%) returned (and 5 of these subsequently died or disappeared), **2 (4%) emigrated, 1 is in captivity and 13 (26%) are still dispersing.**

Figure 5



Box 1 – Systematic monitoring of large mammals with camera traps – update in the seventh year of sampling

By Marco Salvatori (MUSE), Paolo Pedrini (MUSE), and Francesco Rovero (University of Florence)

For the seventh consecutive year MUSE's camera traps have systematically monitored wildlife in the area. The monitoring programme began in 2015, in the context of the agreement between APT and MUSE dedicated to large carnivores, and since 2019 the programme has made recourse to scientific supervision by the University of Florence. The sampling takes place in the summer and involves 60 sites situated in a 220 km² area in the southern part of the Brenta

mountains and the neighbouring Paganella-Gazza massif, for a period of 30 days each. See the reports issued in previous years for details regarding the distribution and positioning of camera traps.

Since **2020** this programme has been essentially replicated, with a similar initiative implemented in **eastern Trentino** and specifically in the **Paneveggio Pale di S. Martino Nature Park** and neighbouring areas.

In line with previous years, in 2021 sampling took place from 9 June to 1 September, with a total of 1,941 camera days (average of 32.35 per camera).

Two camera traps were stolen in the second half of August, but photos of the first two weeks of sampling had already been recovered, thus making it possible to obtain data for all 60 sites. The cameras recorded 94,238 images, of which 18,612 of medium/large wild animals, belonging to 10 species. Once again this year, the extensive presence of people in the study area was recorded and quantified, with a total of 56,532 images of people on foot, vehicles and domestic animals, representing three times the number of images relating to wild mammals. It may be noted that throughout the duration of the project, the number of photos of wild animals has always been a fraction of those relating to humans (Figure A).

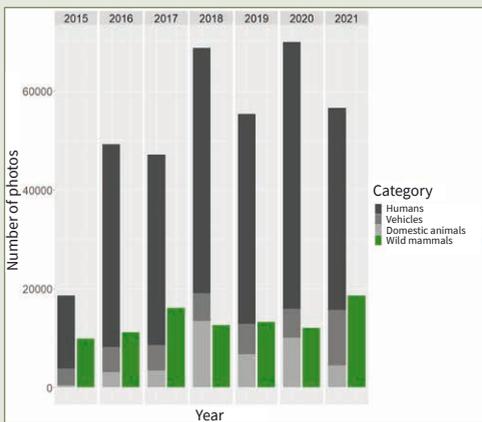


Figure A - Number of photos regarding the presence of man (in grey) and wild animals (in green) over the seven years of monitoring in western Trentino. Photos relating to anthropic disturbance have been divided into three sub-categories: domestic animals in pale grey, vehicles in the intermediate shade of grey and pedestrians and cyclists in dark grey.

The use of the study area by humans was then quantified for each year, in terms of independent events (an event is identified as a group of photos of the same species within a period of fifteen minutes). The data

fluctuate, but are increasing overall (Figure B). In full compliance with the regulations on the protection of personal data, all the images of people are taken into consideration for the sole purpose of obtaining quantitative data on human presence and are subsequently destroyed.

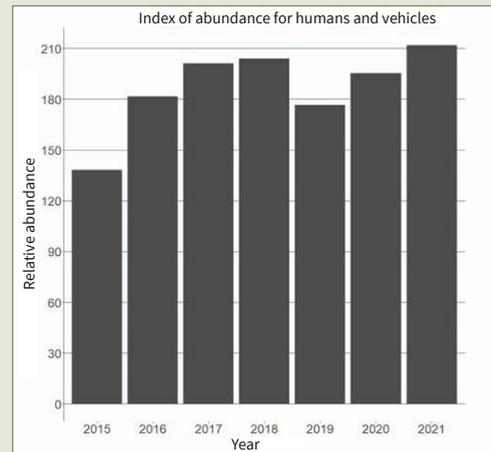


Figure B - Number of independent events for each 100 days of sampling as regards humans and vehicles, calculated for each year of monitoring in western Trentino.

In 2021, the presence of the brown bear was recorded at 31 out of the 60 overall sites, with 87 independent events (Figure C) and a maximum of 11 at a single site. The data show an increase compared to previous years, with 15-28 sites recording the passage of animals and the highest ever number of independent events, which to date have rarely exceeded 60 (39-62). In 2021, for the first time the brown bear was therefore recorded at over half of the sampling sites (Figure D). Overall, the map of events (Figure E) shows a marked variability in the use of sites by the bear over the years, with 9 sites where its presence had never been recorded, concentrated mainly on the left-hand side of the Val Rendena, namely at the western and south-western edge of the study area.

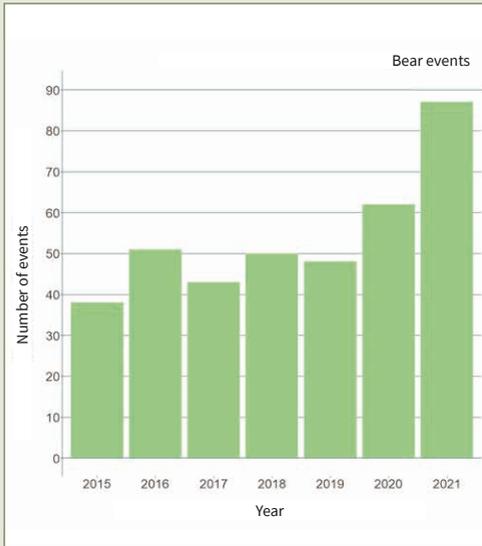


Figure C - Number of independent events (groups of photos divided into 15-minute intervals) related to the brown bear in the study area during the 7 years of monitoring in western Trentino.

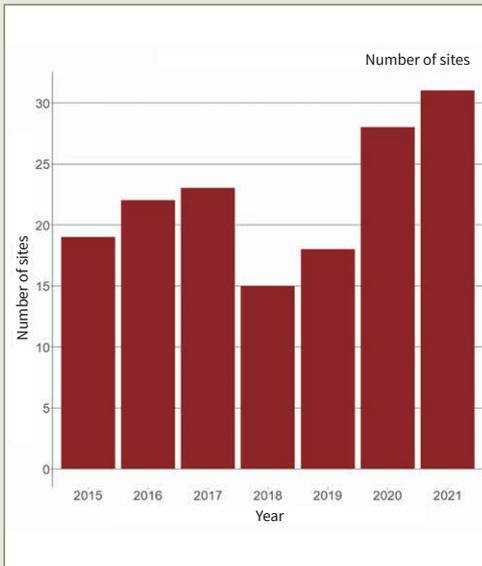


Figure D - Number of sites where the brown bear was recorded by camera traps in the study area during the 7 years of monitoring in western Trentino.

The data regarding the number of events and sites used are in agreement with a general trend for growth of the brown bear population and hence of its related spatial expansion, demonstrating the efficacy of systematic camera trapping in indirectly revealing demographic trends for the species. However, in parallel with the use of the area by bears, it is also important to highlight that use of the area by humans has increased over the years too (Figure B). Lastly, we should mention that although the wolf is currently colonising the study area, in 2021 its presence **was not recorded** during the sampling period, although it was recorded in 2020.



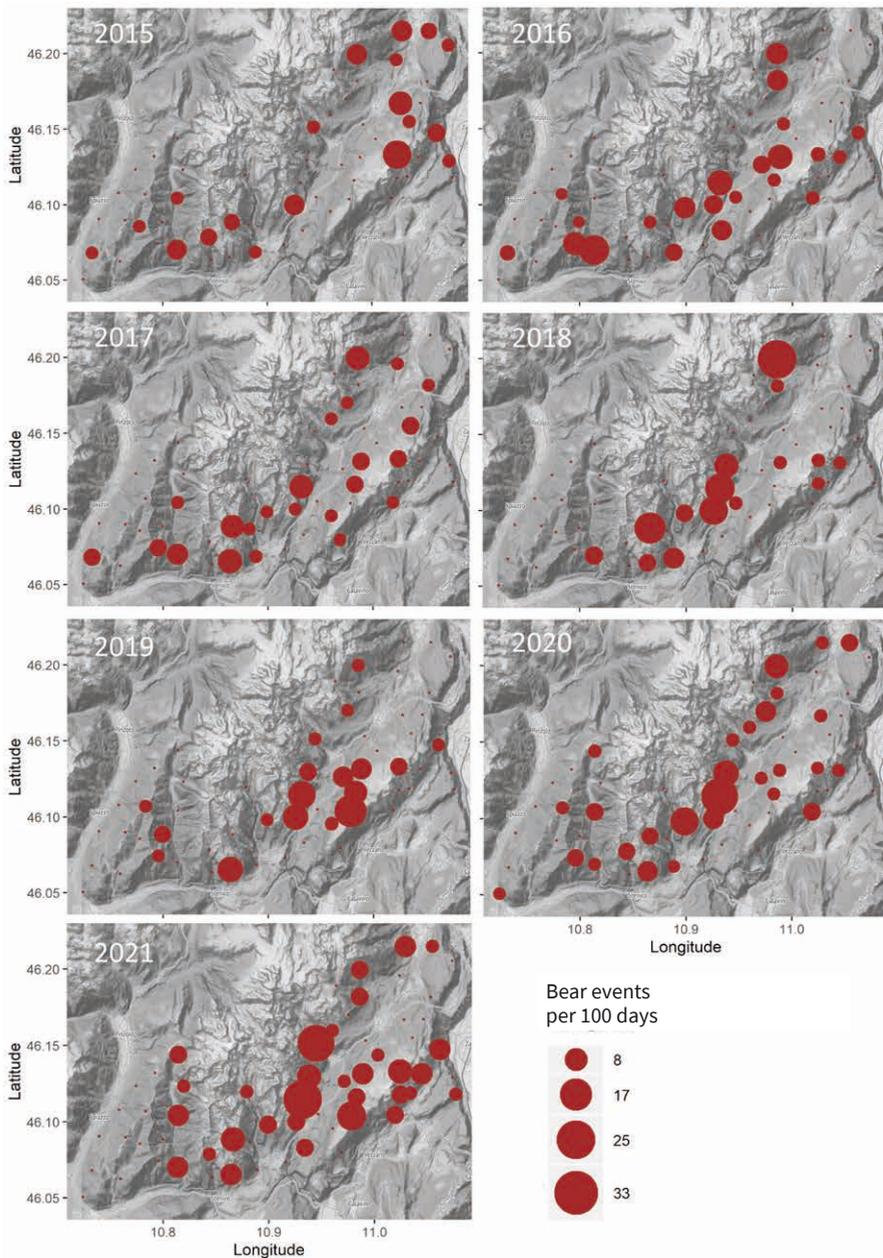


Figure E - Map of camera trap events for the brown bear in the study area during the 7 years of systematic monitoring in western Trentino. The size of the dots is proportional to the number of events during every 100 days of sampling.

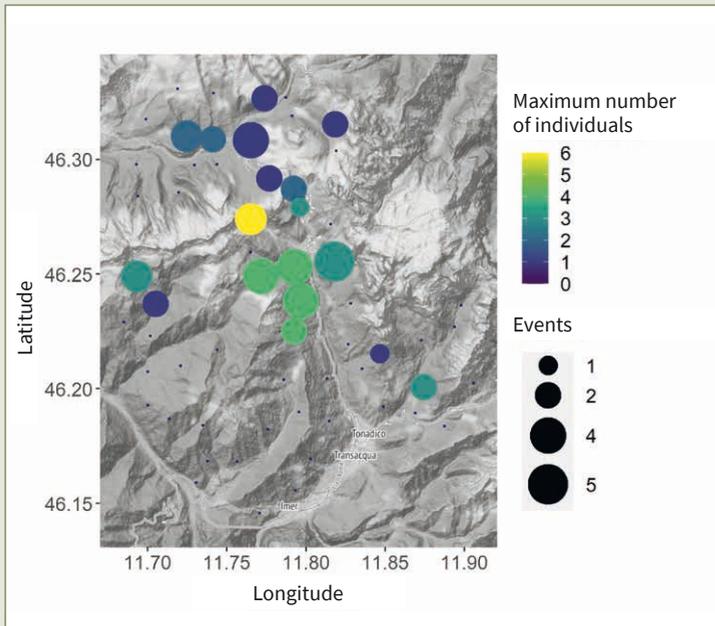


Figure F - Map of events related to the wolf in the study area in eastern Trentino in autumn 2021. The size of each dot is proportional to the number of independent events, whereas the colour indicates the maximum number of individuals photographed during one event.

Furthermore, in autumn 2021, for the second consecutive year, sampling of the mammal community was also carried out in *eastern Trentino*, in cooperation with the *Paneveggio Pale di S. Martino Nature Park* and using the method applied in western Trentino (see the 2020 Large Carnivores Report for details of the positioning of camera traps within this area).

As far as large carnivores are concerned, between 6 September and 24 November, the sampling period in this area, the camera traps captured images of the passage of *wolves* at **18 sites** out of a total of 60 (naive occupancy of 0.30), with a total of **48 independent events** (Figure F). The maximum number of wolves caught on film by the camera trap at a single site was 6. The data are in line with the figures for **2020**, when **50 independent events** related to the wolf were recorded, at **18 sites**.

To conclude, it is important to underline that both monitoring projects are the result



of the efforts of the many people and institutions involved. We thank in particular the staff of the *Paneveggio Pale di S. Martino Nature Park*, the *Vezzano and Ponte Arche Forestry Stations*, the staff of the *Vertebrates Zoology Division at MUSE*, in particular *Valentina Oberosler, Giulia Bombieri and Luca Roner*, and the *MUSE-PAT* volunteers, particularly *Renato Rizzoli*, for their contribution to the monitoring of large carnivores.

1.2 The Wolf

Monitoring of the wolf **began** with the natural return of the first animal recorded in the province in 2010, after its disappearance around the middle of the 19th century.

From the beginning, **genetic** monitoring, traditional **surveys in the field** and **camera traps** (photo 6) were used to monitor the wolf, although genetic monitoring activities for the wolf have been **limited** in comparison to those dedicated to the bear. The latter species remains the priority for a series of reasons (a small isolated population, in contrast with the wolf, which belongs to an “alpine” population making up part of an even larger European metapopulation).

Currently, an **intensive genetic monitoring** project is provided for (with c. 500 samples to be processed) **every 4 years**, starting from 2022.

In winter 2020/2021, monitoring at a national



Photo 6 - Wolf on mount Zugna - camera trap (T. Borghetti – APT Wildlife Department Archives).

level was carried out for the first time, promoted by ISPRA, coming together at alpine level with the activities provided for by the LIFE WolfAlps EU Project. The box below illustrates the main content.

Box 2 – Activities carried out in the province of Trento in the context of national monitoring of the wolf

By *Giulia Bombieri and Paolo Pedrini (MUSE)*

Activities for the systematic collection of data in the context of **national monitoring of the wolf**, according to protocols established and shared by ISPRA with all the Regions and Autonomous Provinces, con-

cluded in 2021, specifically at the end of April. The scope of national monitoring is to provide an up-to-date overview of the situation regarding wolves in Italy, by ensuring territorial data collection that is as homogeneous as possible. Monitoring is coordinated by ISPRA at national level, and by the LIFE WolfAlps EU Project (Figure 1) in the Alps. The Autonomous Province of Trento is also participating in the project and has delegated MUSE to coordinate and carry out the activities.

To verify the presence of the species, 10x10 kilometre monitoring quadrants (cells) have been established, with a total of **33 cells containing wolf packs in Trentino**. These were inspected by following **64 pre-established itineraries** (transects). From October to March, these transects were examined monthly by operators searching for



Figure 1 - Logo of the LIFE WolfAlps EU European project, which coordinates monitoring activities at alpine level.

signs of the presence of the wolf (Figure 2). Systematic collection of these signs of presence has been supplemented with **occasional reports** (suitably verified) and the use of **camera traps**. The latter method includes data obtained from standard monitoring, supplemented by information provided by the operators involved in the activity, who have made their instrumentation and experience available for this purpose (Figure 3). At all events, camera trapping has always taken place without making recourse to chemical or biological lures. For further details regarding the method adopted see the 2020 Large Carnivores Report. Once monitoring had concluded, the national data were supplemented by information collected in an opportunist manner by the Autonomous Province of Trento's forestry service staff and the personnel of the parks in the same period, from October 2020 to April 2021.

In total, **301 signs of presence** were found by the operators involved. Of these signs, reported following systematic and opportunistic monitoring, **136 were excrement, 110 tracks**



Figure 2 - Wolf tracks on the snow followed during one of the systematic monitoring trips. Photo from MUSE archives.



Figure 3 - Frames extracted from videos taken by camera traps during the first phase of wolf monitoring (from top left: M. Vettorazzi, F. Cadonna/F. Limelli, G. Pinter, F. Pizzedaz Trentini, G. Listorti, E. Ferraro).

in the snow, 48 episodes of predation or consumption of wild ungulates and 7 *direct sightings*. Thanks to the camera traps, 126 passages by the wolf were documented, of which 101 from systematic monitoring and 25 from opportunistic reports. Analysis of the data at alpine level is now proceeding, along with preparation of a provincial report, which will complete the alpine report.

Our special *thanks* go to all the operators involved in the activity, including the staff and associates of MUSE, the supervisory staff and technicians of the Associazione Cacciatori Trentini, volunteers from various associations (SAT-CAI, Io non ho paura del lupo, WWF and AIGAE), but also to those who sent in important reports collected occasionally in the area.

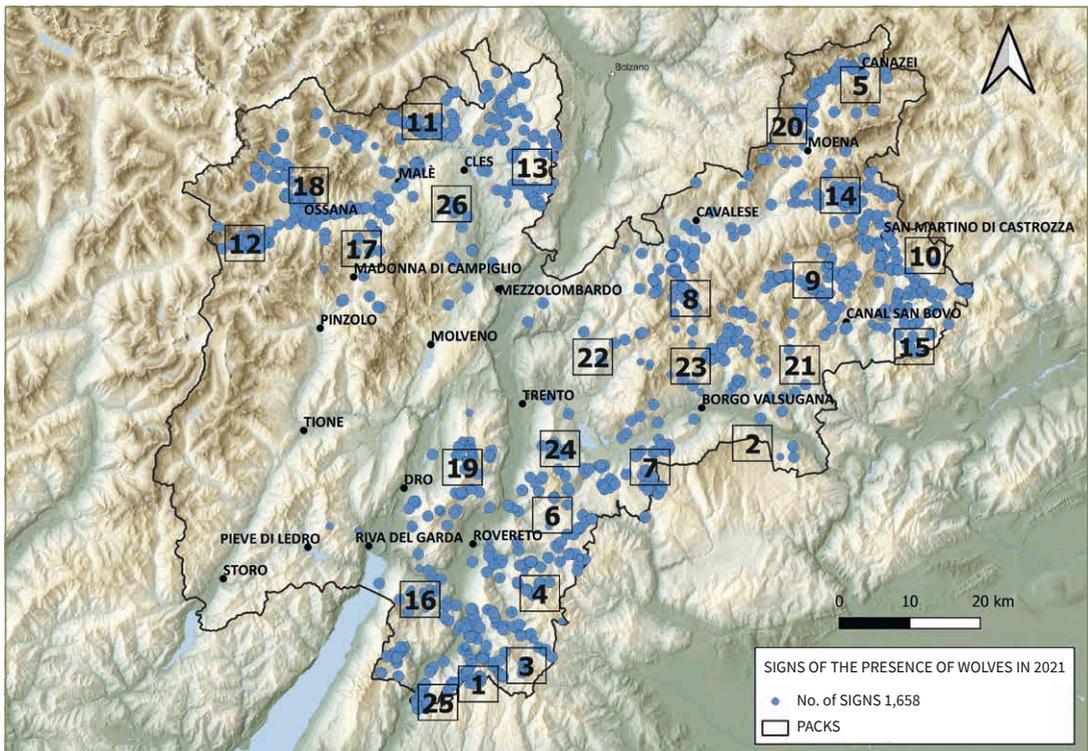
Population, distribution, reproduction, mortality rates, trends and preying on wild animals

During 2021, **1,658** data reports referring to the **wolf** (Figure 6) were recorded in the province, belonging to categories **C1** and **C2** (data defined as “irrefutable” and “confirmed”, on the basis of S.C.A.L.P.-CH criteria), such as sightings, photo-

graphs, prey, tracks, hairs, excrement and urine. Of these, **145** referred to organic samples, **138** of which were analysed by the Conservation Genetics Research Unit of the **Fondazione Edmund Mach (FEM)**.

In 2021, the overall data collected leads to estimation of a **minimum number of 26 packs** (or family groups) whose home range included at least partly the province of Trento in 2021 (Figure 6).

Figure 6



15 of these are believed to also make use of **territory in neighbouring provinces** (Verona, Vicenza, Belluno, Alto Adige/Südtirol and Brescia), at least to some extent, while **11** stayed exclusively within the **territory of Trentino**.

The distribution of the **1,658 data reports** regarding the presence of the **wolf** in the province in **2021** is shown in Figure 6. This also shows the **geographical location of the 26 packs** estimated in 2021. The wolf is permanently present over an area of around **4,000 km²**.

In 2021 a **further possible new pack** was recorded in the central area of Val di Fiemme. However, the data was not confirmed/ascertained, while the presence of other **individual wolves** was also documented in other areas of the province.

It was possible to ascertain that **20 packs** succeeded in **reproducing in 2021**.

The 26 estimated packs are listed in the following



Photo 7 - Wolf photographed in Lessinia (A. Saggi – APT Wildlife Department Archives).

table, with their numbers and the name of the area identifying them, the year the pack was first recorded, and the maximum number of animals ascertained in **2021**, when available (Table 1 and Photo 7). It should be noted that while **10 new**

Table 1

No.	NAME	YEAR FORMED	REPRODUCTION IN 2021	MAX. NO. OF WOLVES SIGHTED IN 2021
1	LESSINIA	2013	YES	11
2	ASIAGO-MARCESINA	2016	NA	6
3	CAREGA	2016	YES	13
4	PASUBIO	2017	NA	7
5	ALTA VAL DI FASSA	2017	NA	5
6	FOLGARIA-COE	2018	YES	7
7	VEZZENE	2019	YES	10
8	VAL CADINO-VALFLORIANA	2019	YES	11
9	VANOI	2019	YES	7
10	PALE DI SAN MARTINO	2019	NA	7
11	MADDALENE	2019	NA	6
12	TONALE	2019	YES	9
13	ROEN	2020	NA	3
14	PANEVEGGIO-BELLAMONTE	2020	YES	4
15	VETTE FELTRINE	2020	YES	5
16	BALDO	2020	YES	9
17	FOLGARIDA	2021	YES	6
18	PEIO-OSSANA	2021	YES	8
19	BONDONE-STIVO	2021	YES	6
20	LATEMAR	2021	YES	7
21	LEFRE-TESINO	2021	YES	5
22	PINÈ-MOCHENI	2021	YES	6
23	CAMPILLE-CALAMENTO	2021	YES	5
24	VIGOLANA-MARZOLA	2021	YES	7
25	SX ADIGE-ALA	2021	YES	4
26	PELLER	2021	YES	4

packs were recorded compared to 2020, it was instead not possible to confirm the presence of another pack (the one in the upper Val di Non, formed in 2017), which suggests that the wolves, or most of them, have died. The number of ascertained

packs therefore goes from **17** in **2020** to **26** in **2021**, with an increase of **53%**. Graph 11 shows the **trend** for the number of ascertained **packs** active in the province of Trento, from 2013, the year the first pack was formed in the province, until 2021.

Graph 11

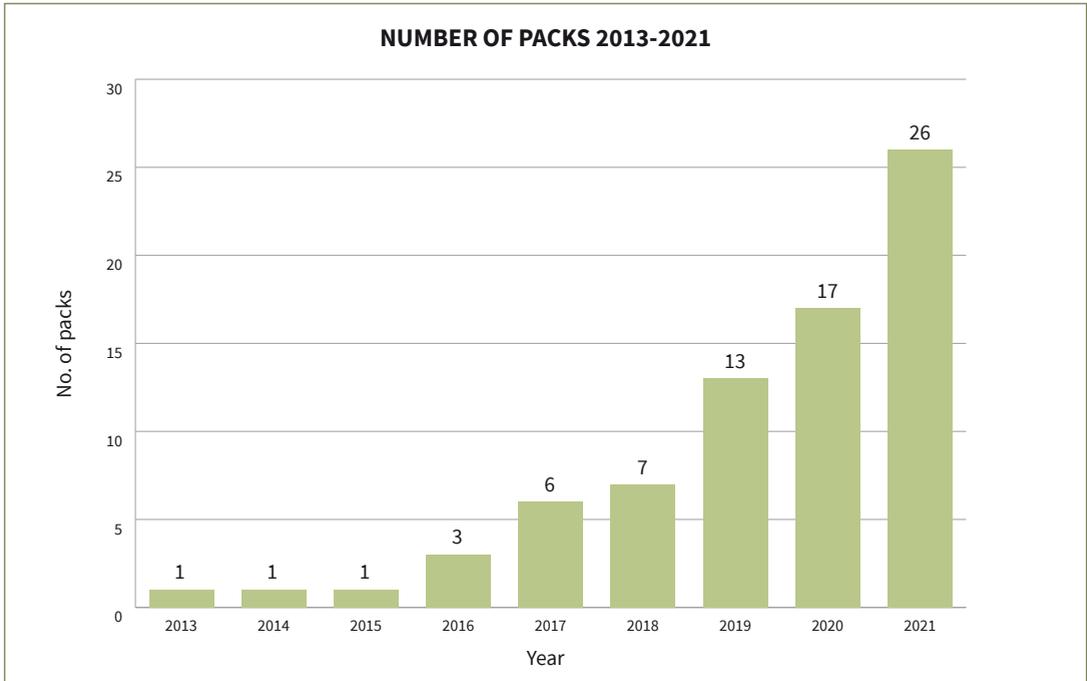


Photo A. Saggi – Lessinia

In 2021 the **deaths of 8 wolves** were recorded. **7** animals died as a result of **road accidents**; for further details see the table on page 41. A **further wolf**, partially consumed by scavengers and for which the **cause of death is unknown**, was found on 31 October near the road with restricted access to traffic linking Selva di Grigno to the Marcesina tableland.

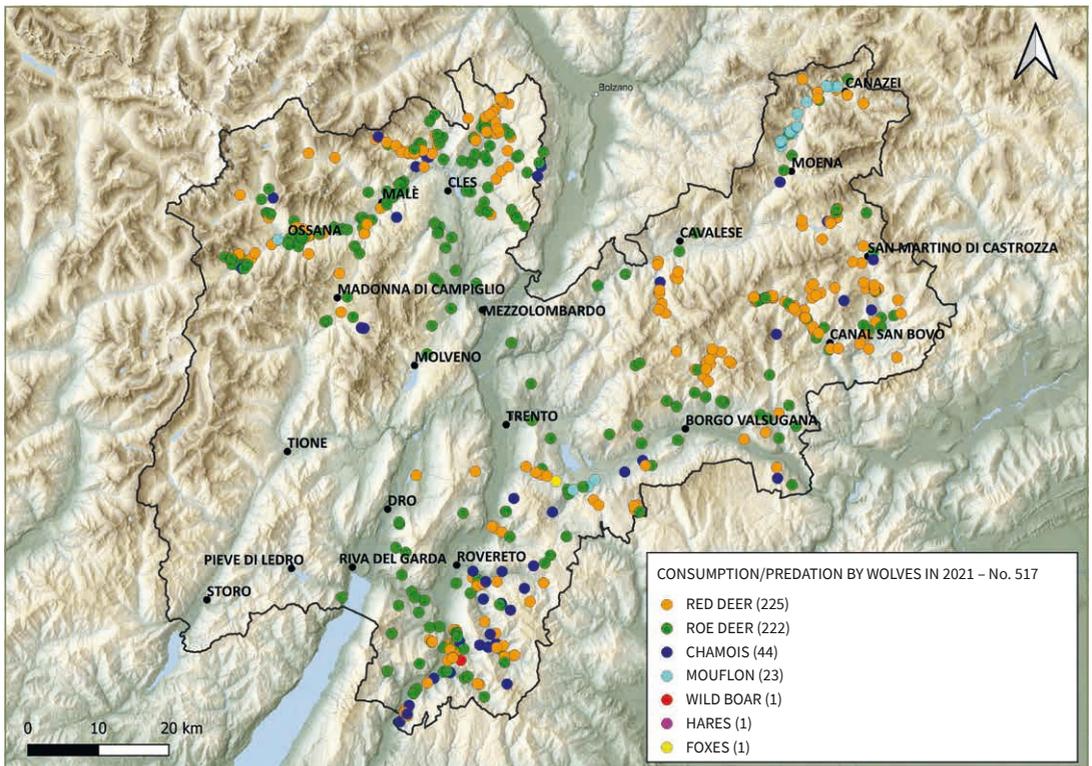
As regards **preying on wild animals** (photo 8), the **517** data reports collected are shown in Figure 7.

It should be recalled that the **carcasses found** (photo 8), clearly represent **only a part of the real number of animals** preyed on. Even the **different proportions of the various species** recorded do not necessarily reflect the real situation, given that the finding of prey by humans can be influenced by different factors (for example the vicinity of the carcass to footpaths, roads or inhabited areas, altitude, level of anthropic development etc.), invalidating the real representativity of the data.



Photo 8 - Deer preyed on by wolves in Val Calamento (L. Sordo - APT Wildlife Department Archives)

Figure 7



1.3 The Lynx

Monitoring of the species began when the **lynx made its return to the province (after disappearing in the 19th century)**, namely in the second half of **the 1980s**, with the appearance of a number of animals in eastern Trentino (presence lasted around 15 years).

Traditional survey methods in the field, camera traps, radio-tracking and genetic monitoring were used also for this species from the beginning.

As is known, **the only lynx certainly present** in the last few years in the province of Trento (since 2008) is the **male** known as **B132** (photo 9), who comes from the small Swiss population reintroduced in the St Gallen Canton, where he was born in Spring 2006 (see **page 45 and subsequent pages of the 2008 Report**, and the appendices and sections relating to the lynx in all subsequent Reports).



Photo 9 - Lynx B132 photographed at Nar di Storo on 8 December 2021. (M. Zontini - APT Wildlife Department Archives)



Photo 10 – Tracks in the snow at Pegol, between Val Lorina and Tremalzo (D. Colotti - APT Wildlife Department Archives)

Since November 2012, B132 has established himself in the south-western part of the province, specifically in the mountains of Val d'Ampola (left-hand slopes of Storo, Tremalzo and Lorina, and right-hand slopes of Monte Stigolo) and the mountains on the right-hand bank of the river Chiese, above Darzo and Lodrone, on the border with Brescia province.

During **2021** it was possible to document the **presence of the lynx with certainty** (photos, videos, tracks in the snow), on the three occasions shown in Table 2.

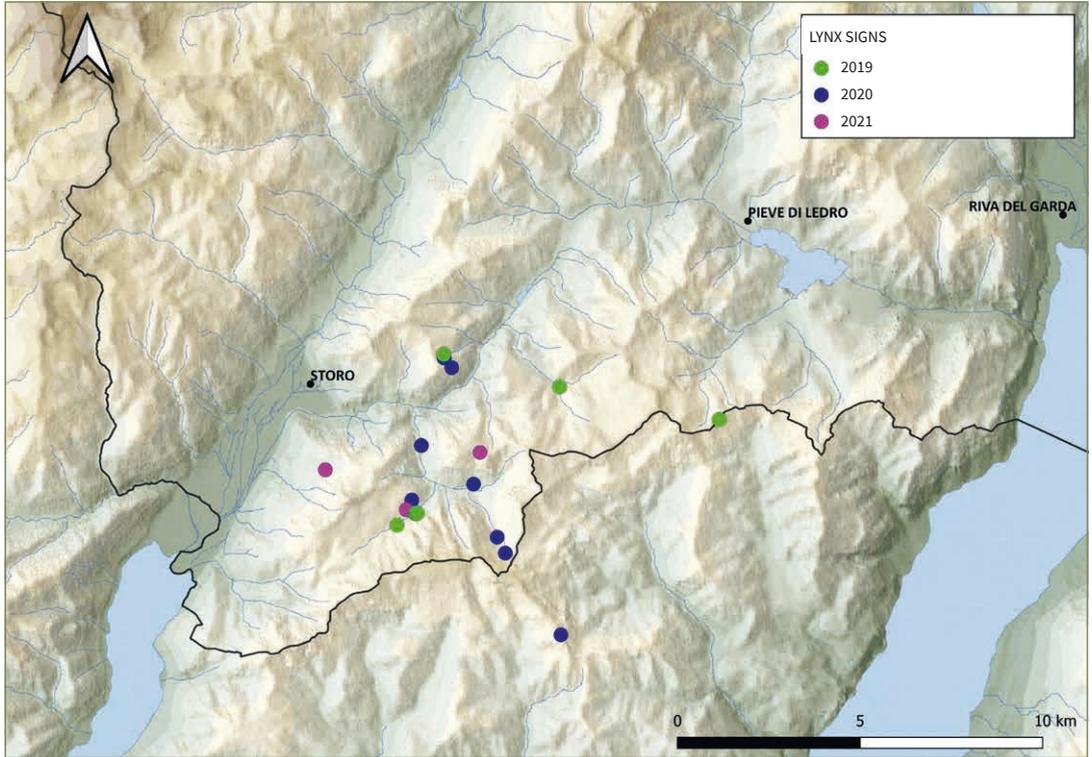
Table 2

No.	DATE	LOCATION	SIGN OF PRESENCE
1	28 March	Val Lorina	Video from camera trap
2	25 April	Val Lorina	Tracks in the snow
3	8 December	Nar di Storo	Sighting and photo

Figure 8 shows localisations for the lynx B132 in the last three years. As can be seen, in 2021 B132 would again appear to have remained in the mountains of **Ampola, Val Lorina and Val di Le-**

dro, without frequenting the mountains on the right-hand side of the River Chiese. B132 remains the only lynx whose presence has been documented with certainty for several years.

Figure 8



1.4 The Golden jackal

With the **first ascertained reproduction** of the species in 2020 in the Fivé area of Lomaso, the jackal can be considered to be permanently present in Trentino. The formation of the first reproducing group has followed other observations and camera trap images of individual animals recorded in the province since 2012 (for further details see pages 28-30 of the 2020 Large Carnivores Report) and is part of a trend of spontaneous and major **geographical expansion of the species in Central Europe** in the last few decades, starting from its area of origin, the Balkan countries and, before that, the Caucasus area.

In 2021 there were further reports in the province:

- on **19 January** above Stenico, camera trap image of a jackal;
- **at the end of June – beginning of July** in the Lomaso area, reports of probable reproduction;
- on **13 December** at Ciago (Vezzano) camera trap image of a jackal;
- on **31 December** in the Lomaso area, camera trap image of a family group made up of 4 animals, thus confirming that the group first reproducing in 2020 had reproduced again in 2021 (photo 12).



Photo 11 – Golden jackal photographed on 4 July 2021 in the Lomaso area (K. Tabarelli De Fatis – MUSE Archives).



Photo 12 – Golden jackals in camera trap image in the Lomaso area (M. Rocca – ACT Archives).

2. DAMAGE COMPENSATION AND PREVENTION

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

In 2021 the regulations were updated; specifically, **provincial government resolution no. 1522 of 10 September 2021 and subsequent resolutions by the manager of the Wildlife Department** have brought the rules into line with **European regulations on state aid**, providing for cases in which the presence of suitable prevention works is necessary so that any damaged parties operating as businesses are entitled to damage compensation (while for hobbyists nothing changes).

Preventive activities continue to take place mainly following two lines of action: **funding** covering up to 90% of the cost of damage prevention works, or **gratuitous loans** of such works.

Damages compensation

In 2021, **463 cases of damage by large carnivores** were ascertained, of which **301 by bears** and **162 by wolves**. There were no cases involving the **lynx** or the **golden jackal**. The details are given in Table 3. Overall, **€337,587.80 of compensation** for damage was paid out, of which **€172,373.94** was for damage caused by bears and **€165,213.86** for damage by wolves. In total, **937** domestic animals were preyed on (killed by the predator or subsequently put down due to injuries), of which **504 by bears** and **433 by wolves**. To these it is necessary to add **196 missing** animals (68 following attacks by bears and 128 after attacks by wolves) and **126 injured animals** (8 after attacks by bears and 118 after attacks by wolves). In **total, 1,259** animals were involved (animals killed, injured and missing, see Table 4). In **94% of cases the reported damage** was followed up with an **inspection** by forestry staff, who drew up a **report**. In the other cases the procedure involved a self-certification statement by the damaged party.

Compared to 2020, the data on damage in 2021 show a percentage increase in the number of events of **+8% for bears** and **+60% for wolves**.

Graph 2 shows the **trend for damage by bears** (photo 13) and the amount of compensation.

Graph 3 shows the **trend for damage by wolves** (photo 14) and the amount of compensation.

With reference to damage by wolves, it is pointed out that **109** events (67%) took place in the **eastern** part of the province and **53** (33%) in the **western** part. The damage by **bears** was instead **all recorded in western Trentino**.

Table 3 – No. of cases of damage by large carnivores

ASSETS	BEARS		WOLVES		TOTAL	
	No. CASES	€ COMPENSATED	No. CASES	€ COMPENSATED	No. CASES	€ COMPENSATED
BEEKEEPING	68	59,103.59	//	//	68	59,103.59
CROPS	68	52,834.18	//	//	68	52,834.18
OTHER	52	16,745.18	//	//	52	16,745.18
LIVESTOCK	113	3,690.99	162	165,213.86	275	208,904.85
TOTAL	301	172,373.94	162	165,213.86	463	337,587.80



Photo 13 – Cow preyed on by a bear (V. Calvetti - APT Wildlife Department Archives)

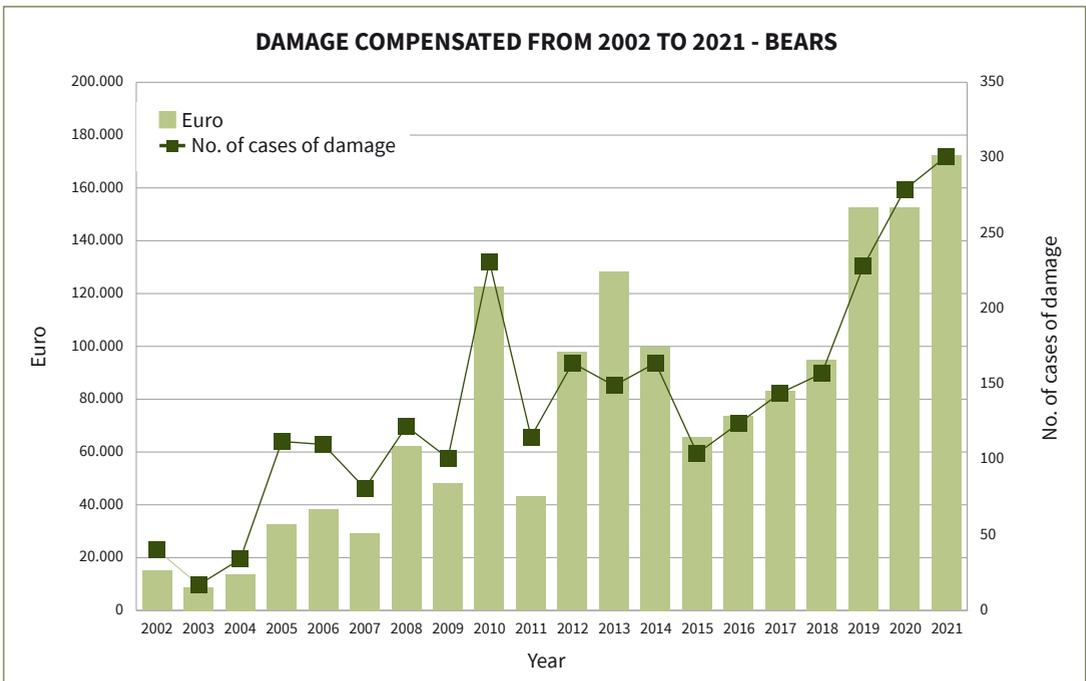


Photo 14 – Adult wolf carries a preyed lamb (camera trap image - M. Vettorazzi - APT Wildlife Department Archives).

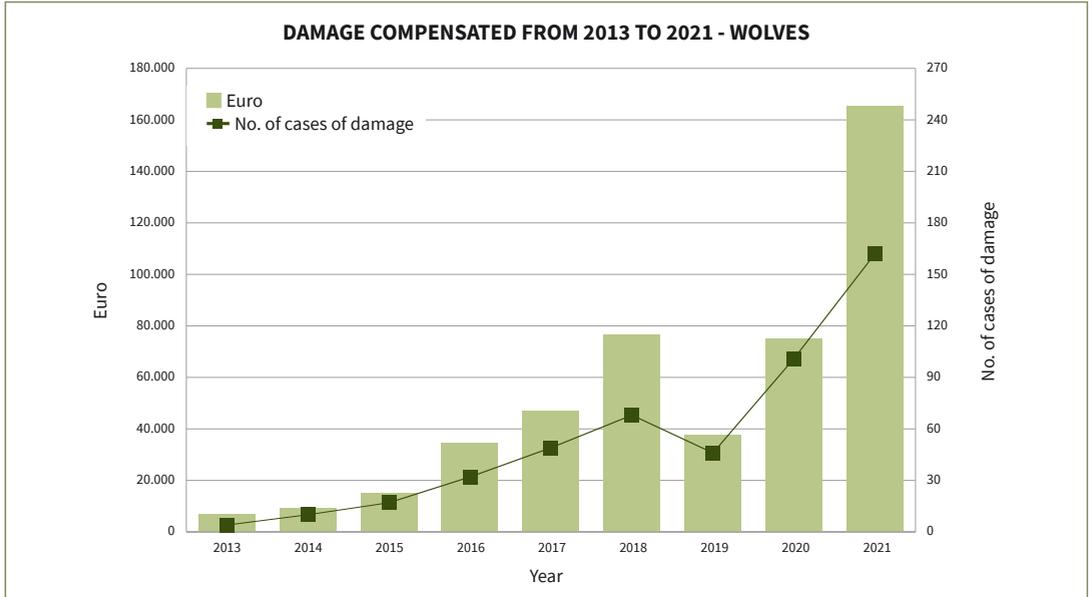
Table 4 – No. of animals preyed on, injured and missing by type and predator

TYPE	BEARS			WOLVES			TOTAL
	DEAD	INJURED	MISSING	DEAD	INJURED	MISSING	
POULTRY	412	1	39	0	0	0	452
RABBITS	10	0	4	0	0	0	14
SHEEP	59	2	22	341	102	102	628
GOATS	9	2	2	37	5	21	76
EQUINES	9	1	1	22	5	3	41
CATTLE	5	2	0	30	5	1	43
OTHER	0	0	0	3	1	1	5
TOTAL	504	8	68	433	118	128	1259

Graph 2



Graph 3



Figures 9 and 10 show the distribution of damage caused in the province by bears and wolves respectively, distinguished on the basis of the main categories of assets affected.

Figure 9

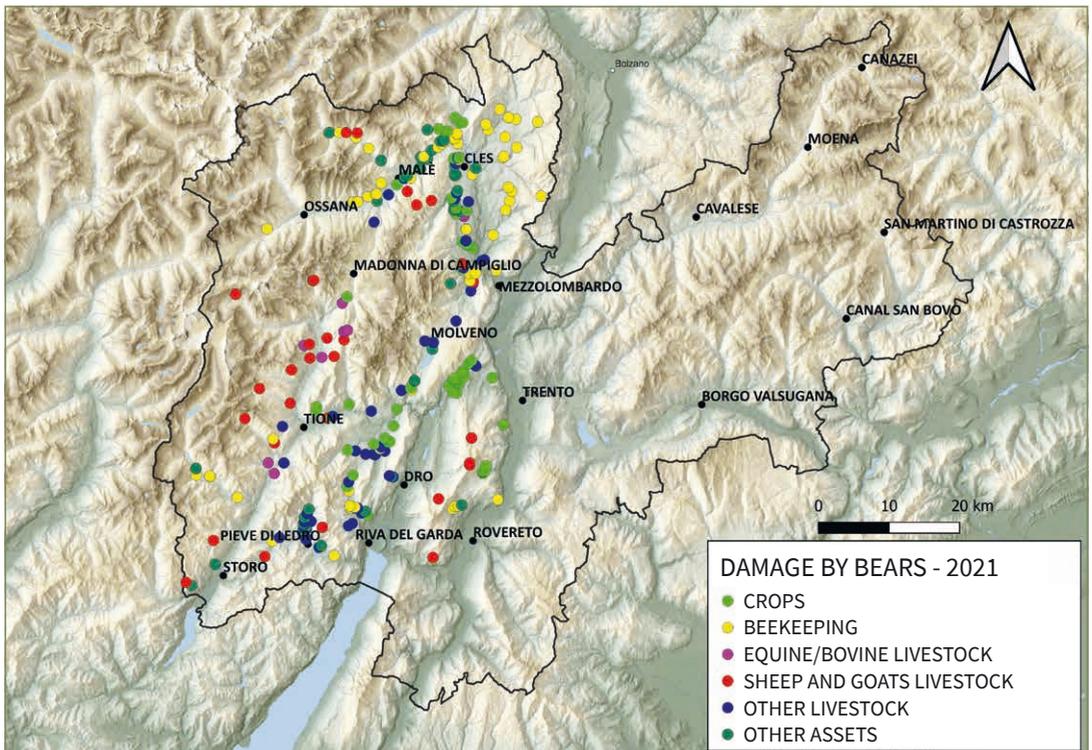
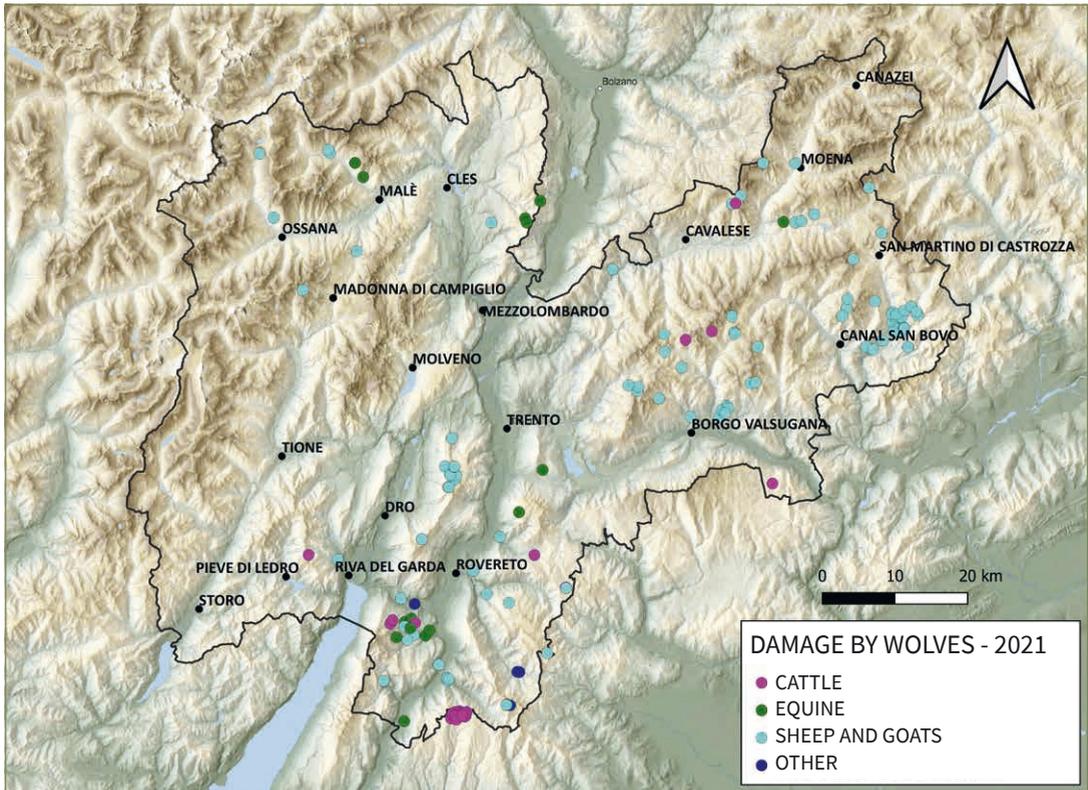


Figure 10



Prevention of damage

The management of prevention measures at provincial level is coordinated by the staff of the Large Carnivores Division, in association with the local **pre-**

vention coordinators. The latter figure was created with the objective of managing activities relating to the supply of prevention measures, through dialogue, support and continuous liaison with users (managers of farms and mountain dairies, shep-

Box 3 – Livestock at alpine pasture in Trentino

In the summer of 2019 and 2020 extensive monitoring of mountain farms and pastures throughout the province was carried out, with the scope of gathering information useful for **assessing the level of vulnerability of mountain pastures to predation by large carnivores**. In total, the investigation made it possible to survey **571 active mountain farms** present in the province.

The monitoring showed that **sheep and goats** were the domestic livestock most commonly

present at alpine pasture in the province, with over **46,000 animals**, followed by **cattle**, with over **22,000 animals** (the vast majority dairy cattle), while a lower number of **equines** (horses and donkeys) were present, with over **1,700 animals**. With reference to cattle, analysis of the data made it possible to identify the percentage of those considered at greater risk of predation (animals under 15 months of age at the time of pasturing): 4141 animals, representing around 22% of the total.

For this category of livestock it is suggested grouping animals together whenever possible, identifying dedicated alpine pastures to be equipped with adequate prevention measures, also in the context of rationalising resources.

The **data** gathered regarding the 2019 – 2020 alpine pasture seasons can also be considered reliable for 2021, given that there are minimal variations from one year to another. The large quantity of data gathered is now useful for the Wildlife Department to best adjust the efforts of forestry staff involved in the management of large carnivores, with particular reference to action in the field of damage **prevention**. Survey activities in the field have already allowed forestry staff to have direct contact with the managers of alpine pasture, exchanging ideas with them on the importance of prevention measures and the possibility/need to reconsider management models for alpine pastures, which in some cases are not compatible with the stable presence of large carnivores.

Moreover, by cross-referencing data regarding the extent of domestic livestock with data on predation, it has been possible to assess the risk of livestock being preyed on. This information has shown that around 1% of the overall number of sheep and goats present in the area are

preyed on (average for the 4-year period 2018–2021). Considering the increasing prevalence of wolves in terms of damage to livestock and their rapid expansion within the province, this percentage appears to be destined to increase over time (0.7% in 2018 – 1.4% in 2021). Another indication useful for management comes from the percentage of predation recorded for equines (largely represented by donkeys), which is on average 3.1% of the overall number present in the area. This data has informed prevention strategies, leading the administration to increase the percentage of funding for works to prevent damage to this category of livestock from 60% to 90%, to encourage widespread use. Here too there has been an increase in the percentage (5% in 2021) of animals preyed on. In this case, bears and wolves are almost equally responsible for predation.

Lastly, but of fundamental importance, monitoring activities have made it possible to identify pastures completely without facilities for **herders to stay at high altitude**, or with inadequate facilities. In these alpine pastures, when requested and possible, work is underway to install **permanent wooden cabins** where herders can stay at high altitude in the summer, the costs being shared with the owners (usually municipalities).

herds, beekeepers and hobbyists) who manage assets in the area susceptible to damage by large carnivores. In order to respond promptly and effectively to these needs, the province has been subdivided into **10 zones**, generally corresponding to the Forest District Offices (FDOs), each of which is managed by a **contact person** and his **assistant/substitute**.

During 2021, **208 applications** for **prevention measures to protect against damage** by large carnivores (electric fences and guarding dogs) were managed by the Forestry Department and Wildlife Department. These are designed to defend livestock and beehives (photo 16).

Of these, **197** were dealt with by the FDOs through **gratuitous loans** of works (mobile fencing and fixed enclosures), at a cost of around **€118,000**, and **11** by the Large Carnivores Division through **capital funding** (mobile fencing, permanent enclosures and guarding dogs), at a cost of around **€12,400**. A **total of €130,390** was thus invested in prevention in **2021**.

The following graph shows the long-term **trend** for the number of **prevention measures** distributed and the relative cost (Graph 4). It is pointed out that until 2012 the provision of preventive measures concerned only bears, and from 2012 to 2017 al-

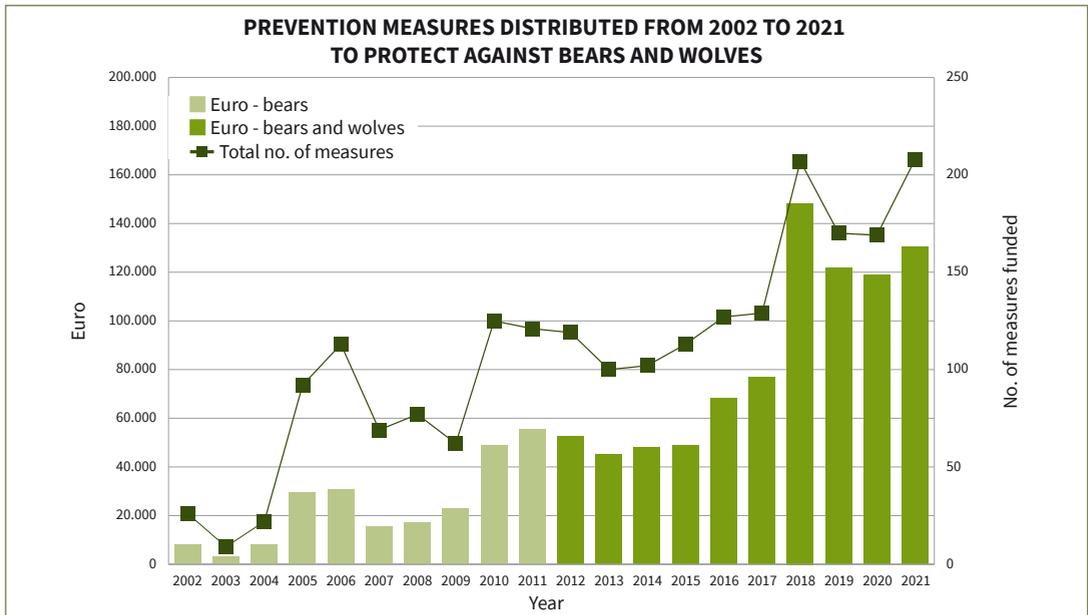


Photo 15 – Summer 2021: technical inspection of an electric fence at alpine pastures (M. Zeni - Wildlife Department Archives)



Photo 16 – Area subjected to digging by a bear in an attempt to access a beehive (Wildlife Department Archives)

Graph 4



most exclusively bears, whereas since 2018 there has also been a considerable increase in preventive measures distributed to protect against wolves.

Livestock guarding dogs (LGD)

Guarding dogs (photo 17) are used to **protect animals at pasture** from attacks by wolves and bears. In Trentino the first two dogs were handed over to a sheep/goat farmer in Val di Non in **2014** (see page 39 of the 2014 Report). Since then, the use of guarding dogs has gradually increased.

In **2021, 11 further dogs** were funded, at a cost of around **€7,850**. When requested by users, the Wildlife Department has provided support in searching for litters produced by reliable parents operating in the field, availing itself of the cooperation and expertise of CPMA, an association dedicated to the Abruzzo-Maremma sheepdog race. Puppies aged between two and six months were purchased from specialist/certified breeders, also from Trentino, belonging to ENCI (Ente Nazionale Cinofilia Italiana), guaranteeing health standards and genetic lines with an aptitude for work.

By the **end of 2021**, a total of **74 dogs had been funded** in the province of Trento. The dogs purchased with financial support from APT have been **supplemented by direct purchases, dogs from farmers' home litters or exchanges between farmers**. These additional ways of acquiring dogs are a sign that the practise of using guarding dogs is by now continuing in an increasingly **independent** manner, as the provincial administration expected and hoped.

In 2021 the Forestry and Wildlife Department continued to distribute **information panels** (photo 18) to farmers adopting guarding dogs funded by the Province. These have the goal of making users of the mountains and pastures aware of the presence of **dogs protecting flocks**, and of advising them how to behave to avoid conflict with these dogs.

Meetings with stakeholders

In 2021 the relations already started up for some time with the stakeholders most affected by the



Photo 18 – Information panel (M. Zeni - APT Wildlife Department Archives).

presence of bears and other large carnivores continued.

The **round table with representatives of farmers and beekeepers** met twice, on **19 May 2021** and **6 December 2021**.

Support for animal husbandry

One of the objectives of the provincial administration is to encourage herders and their flocks/herds to stay at alpine pastures. The presence of the shepherd and adoption of the most appropriate systems for preventing damage, along with fair compensation and constant relationships with local forestry service staff, are the strategic factors in enabling **coexistence between large carnivores and livestock reared in the mountains**.

Since 2018 the Forestry and Wildlife Department, now the Wildlife Department, has promoted **experimentation of electric fences** to protect bovines at high risk of predation by wolves (cattle under the age of 15 months) (see BOX 5, 2018 Large Carnivores Report, pages 32-36).

The practical and operational results of this experimentation are assessed annually, and together with the instructions contained in the policy document **“Management and Prevention of Damage by Wolves in the Province of Trento” (dott. Duccio Berzi, 2018)**, the experience gained from initiatives by bodies owning alpine pastures and/or individual farmers, information collected in a standardised manner on the type of alpine pastures and



Photo 17 - Abruzzo-Maremma sheepdogs at work at alpine pastures in Trentino (M. Zeni - APT Wildlife Department Archives).

their management, and on site checks on the correct use of damage prevention works, represent the basis on which to evaluate initiatives to be taken to improve action to prevent damage by large carnivores.

This information also represents the basis for updating the “**Handbook for the Prevention of Damage by Wolves and Bears**”. The document, which describes prevention measures in detail (type of work, method of construction, type of materials, and method of distribution) and the relative technical characteristics, is a fundamental support tool for prevention coordinators. It is periodically updated in relation to new needs noted when analysing the data gathered. In 2021 an **initial review** was carried out, with the objective of best describing the fields of intervention and operational tools available to prevention coordinators. At the same time, the content of the handbook was summarised in the “**Operating Manual for Prevention Coordinators**”, to provide a shorter version, easier to use for forestry staff in the field.

During 2021, control/support activities by the Forestry Department and Wildlife Department **continued**, with **monitoring of the experimental prevention works implemented in 2018, 2019 and 2020 (all repeated** except one, at Malga delle Buse) and with the planning of further works having the same scope and characteristics. The four enclosures set up starting from 2018 at Malga Viezzena (Municipality of Predazzo), Campobrun (property of the Province), Malga Boldera (Municipality of Ala) and Malga Fratte (Municipality of Levico) **were also recovered and used during the 2021 grazing season** for overnight stabling of young cattle, **with no predation being recorded**.

In 2021 the experimental enclosure set up in 2020 at Malga Agnelezza (Municipality of Castello Molina di Fiemme) to protect dairy goats at alpine pasture was also recovered, with the addition of further technical modifications, after two episodes of predation there in 2020 (one by the wolf and one by the bear). Throughout the grazing season the enclosure was subjected to constant monitoring by forestry service staff with the use of camera traps, thanks to a specific **cooperation project with MUSE**. Intensive monitoring made it possible to confirm the presence of a pack of wolves near

Malga Agnelezza. Despite the efforts of the shepherds to ensure the electric fence was always operating correctly throughout the season, on 30 August there was nevertheless one episode of predation by wolves inside the enclosure, with the loss of 7 goats. Further experimental modifications to the enclosure are being evaluated for the 2022 alpine pasture season.

In the Municipality of Novella (Brez) at **Malga Monte Ori**, a further **two fences were funded by the Rural Development Programme** to protect cattle at mountain pastures (around 100 animals). These will be used in 2022 and may also provide for a **special experimental automatic gate** prepared by a technician from the Wildlife Department.

In the Municipality of Moena (**Passo S. Pellegrino** and the **pastures of Malga Lusìa**), **two additional fences** were funded by the RDP to protect young cattle under the age of 15 months. The first was already operational in 2020 and no predation was recorded, while the second was set up in 2021 but was little used. Using APT funding, in 2021 an electric fence was built for overnight stabling of young cattle at Malga Valbrutta (Municipality of Grigno).

Lastly, it should be highlighted that while the trials carried out above have on the one hand underlined an undeniable **increase in management activities and relative costs** for shepherds to set up/maintain the fencing and manage herds, on the other, in certain contexts, there has been an **improvement in the pastures used by the livestock**, with the effect of improving the quality of the turf.

In 2021, the **prevention coordinators** followed the specific progress of a **total of 68 alpine pastures**, which were provided with damage prevention works in the form of free loans during the grazing season (usually from June to September). The support for summer grazing activities also involved the positioning of **14 accommodation modules** transported by helicopter, to encourage the constant presence and supervision of livestock guardians. In this context, after the initial installation of a **permanent wooden shelter** to substitute a temporary prefabricated unit at Malga Posta near Ala in 2020 (see pages 39-40 of the 2020 Large Carnivores Report), installation of a further two permanent shelters has been planned in 2022.

3. MANAGEMENT OF EMERGENCIES

In the **province of Trento** the management of emergencies represents a field of action in which it has been necessary to operate for some time, given the presence of individual animals described as “problematic” on the basis of current legislation.

The **PACOBACE (Interregional Action Plan for the Conservation of the Brown Bear in the Central-Eastern Alps)** represents the document of reference for the management of emergencies in the province of Trento (as well as in Friuli Venezia Giulia, Veneto, Lombardy and the Autonomous Province of Bolzano), on the basis of which the Forestry and Wildlife Department has identified, trained and equipped special staff.

Action (up to lethal removal) may be taken to control **problem bears** or bears in critical situations, in accordance with the provisions of European regulations (Directive 92/43/EEC – Habitat Directive).

2018 saw the enactment of **Provincial Law No. 9/18**, on the basis of which the **President of the Province is responsible for authorising derogations to the ban on controlling actions such as the removal, capture or killing of bears or wolves, according to the aforementioned European regulations**, after having consulted ISPRA. This law was deemed valid by the Constitutional Court.

In the event that safety and **public security** is at risk, the capture or killing of an animal can be ordered **with an extraordinary emergency order of the President of the Province**, according to articles no. 52.2 of the Decree of the President of the Republic of 31/8/1972, no. 670 and no. 18.2 of the Regional Law of 4/1/1993 no. 1, as specifically also provided for by the **PACOBACE**.

In 2020 **Guidelines for the implementation of the aforementioned provincial law** were drawn up, in relation to both **the bear** and **the wolf**.

Moreover, as regards the management of **problem bears** in the province of Trento, the document produced by **ISPRA (January 2021)** with the technical and scientific support of **MUSE - “Conflict with human activities, public health risks and management problems. An analysis of the cur-**

rent situation and predictions for the future” should be noted.

Operational management is based on the use of staff from the **Provincial Forestry Service (PFS)**, to which the Forestry Department and Wildlife Department make recourse, through a **special unit on call** (emergency team). The system of on-call availability is based on weekly shifts involving a coordinator, and from **1 March to 30 November** two emergency staff (on call 24 h/day), along with **veterinary staff** assigned with the task, whenever necessary, by the **Provincial Health Services (APSS)**. Veterinary support is indispensable for all activities providing for the manipulation of animals (wounded bears or wolves, capture or other operations).

On **7 June 2021** and **22 December 2021**, two meetings of the **Committee for Public Order and Safety**, chaired by the **Government Commissioner**, were dedicated to **management of problem bears and wolves**.

Problem bears

During **2021** the following **problem bears** were monitored intensively (also with fitting of radio collars).

F43, a female born in 2018. She belongs to the litter of four cubs (an exceptionally large litter) that also includes M62, the male described hereafter, and the male bear M57. The latter was removed in 2020 following the development of overconfident behaviour in relation to man, culminating with an attack on a person (see pages 43-44 of the 2020 Report). During 2021, F43 confirmed the tendency for **overconfident behaviour** that had led to close monitoring and deterrent action in an attempt to modify this behaviour.

The **male bear M62**, born in 2018. He belongs to the same litter as F43. In 2020 the animal had already approached human settlements several

times, above all in Val di Sole, where on several occasions he had consumed organic waste. This behaviour was repeated in spring and the beginning of summer 2021, on this occasion particularly on the Paganella plateau, where the bear **entered inhabited areas** several times.

For this reason, M62 was fitted with a radio collar and was the object of specific attention, consisting of repeated aversive action when he manifested undesirable behaviour, such as entry to inhabited areas. The animal also showed marked overconfidence, especially on two occasions.

On 3 October 2021, in the context of a surprise encounter at close quarters with a person at a distance of just a few metres, after an initial reaction of alarm/threat, M62 remained a few steps away from the person encountered, manifesting **particular overconfidence**, instead of moving away as usually takes place.

On 17 November 2021, M62 instead followed the trail of a deer killed and dragged by four hunters in the Municipality of Contà, reaching a minimum distance of 15 metres from the people involved. The interaction continued at length, for around ten minutes, during which time the bear manifested extreme confidence/acceptance of the close presence of the four hunters, despite their efforts to send him away.

The **female bear JJ4**, born in 2006. The animal is considered dangerous, following an episode of aggression leading to the wounding of two people on 22 June 2020 (see pages 44-45 of the 2020 Report). After this attack the President of the Province issued an **extraordinary emergency order** to remove the bear from the area for reasons of **public safety** (specifically in relation to the possibility of other attacks). It was not possible to implement this removal **order**, as the provision was first suspended and then **cancelled** by the judicial authorities to which animal rights organisations had appealed. It should be reiterated that the fact the bear is still fitted with a radio collar and intensively monitored is not enough to adequately contain the risk of further close encounters and possible incidents, given that this instrumentation and monitoring cannot effectively prevent such encounters taking place.



Photo 19 – The bear M62 during one of the encounters described (APT Wildlife Department Archives).

In 2021, the geographical position of the animals fitted with radio collars because they have been identified as problem bears was again made available, through an **online map** (<https://grandicarnivori.provincia.tn.it/Comunicazione/MAPPA-ORSI-RADIOCOLLARATI>), which was **updated regularly** (without being excessively precise, in order to protect the animals) for the benefit of all those visiting the mountains.

Another online map contained reports of female bears accompanied by cubs of the year (<https://grandicarnivori.provincia.tn.it/Orse-con-piccoli/MAPPA-SEGNALAZIONI-2021>), with the scope of offering an additional tool for preventing potential incidents following surprise encounters at close quarters.

It is the **first time** that an information service of this kind has been organised **in Italy**.

Activities of the emergency team

The activities of the emergency team took place from 01/03/2021 to 06/12/2021, with a total of **39 call-outs**, all regarding **bears**, of which 5 given code red status, 30 code yellow and 4 code white (Graph 5). The staff came into **direct and close contact** with bears on **7 occasions** (graph 5). During the **7 cases of direct contact**, a total of **18 deterrent measures** were implemented (up to 5 on a single call-out). **On 4 occasions** deterrent action was carried out by combining the use of **rubber bullets** with subsequent action by **bear dogs**, on **1 occasion** with **dogs** alone and on the remaining **2 occasions** only with **rubber bullets**. In 3 cases the team came into contact with the problem bear M62, in 1 case with the problem bear F43 and in 3 cases with unidentified bears (it is likely that F43 was again involved in 2 cases). In 3 cases the action was linked to damage in inhabited areas, in 2 cases to marked overconfidence, in 1 case the bear was in an urban area and in 1 case it was intercepted while feeding from organic waste bins.

Close encounters between people and bears

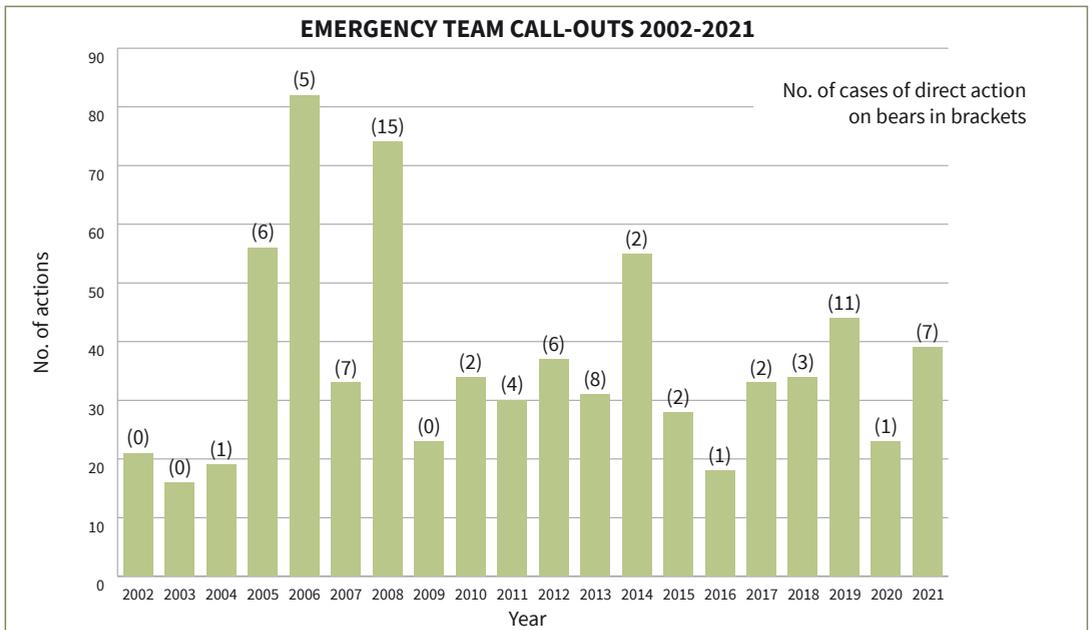
During 2021 there were **24 close encounters between people and bears**. In most cases (on 19

occasions) the bears showed indifference or moved rapidly away from the place where people were encountered. On 5 occasions the bear instead manifested behaviour leading it to approach/come closer to people (3) or display threatening behaviour (1).

None of the close encounters involved females with cubs. In 3 cases a dog was present (two off the leash and one on a leash). In 5 cases it was possible to recover organic material for genetic testing, which on 3 occasions made it possible to identify the female bear F43 (encounters taking place during preying on chicken coops), which displayed marked overconfidence/acceptance of the presence of people close by. In one case the female bear KJ1 was identified, whereas in the last case the organic sample was not suitable for identifying the animal.

One case to be noted, in the Municipality of Cles, involved physical contact due to a collision, at relatively high speed, between a cyclist and a bear (see page 40 of this report), which led to the former falling off his bike, while the bear moved away rapidly. Finally, on at least two occasions, as highlighted on page 37 of this report, the male known as M62 was involved in close encounters.

Graph 5



Capture of bears

4 captures were carried out during **2021**, involving **3 different bears** (photo 20), always using **tube traps**.

All the captures took place in the context of activities involving the problem bears **M62**, **F43** and **JJ4**. They are described briefly below.

1. On **28 June 2021**, at **Maso Toscana** (Municipality of **Andalo**) the **young male** (aged 3) known as **M62** was captured with a tube trap and fitted with a radio collar;
2. On **12 July 2021**, at **Ciuco, Val Concei** (Municipality of **Ledro**), the **young female** (aged 3) known as **F43** was captured with a tube trap and fitted with a radio collar;
3. On **30 August 2021**, on the right-hand side of **Val di Sole** above **Monclassico** (Municipality of **Dimaro Folgarida**), the adult female (aged 15) known as **JJ4** was captured with a tube trap to replace a radio collar about to expire;
4. On **4 November 2021**, at Plauresa di **Monclassico** (Municipality of **Dimaro Folgarida**), the young male **M62** was again captured, to replace his radio collar, which was damaged and no longer working.

The number of **captures** of bears (**32 different animals**) taking place **since 2006** has therefore risen to **49** (28 involving females, 19 males and two of undetermined sex).

33 of these captures were carried out with **tube traps**, **9** on **free-ranging bears**, **4** with an **Aldrich snare** and **3 manually** (for cubs of the year).

Management of bears in the Casteler wildlife area

During 2021, **DJ3** and **M57**, the bears kept in the Casteler area, were moved to **other wildlife areas**. This is in line with policy that has always aimed to transfer animals to larger areas whenever possible (the female bear Jurka was also transferred in the past), also to optimise management costs. The transfers took place on **26 April 2021** for the female bear **DJ3** (her destination being the Alternativer Wolf - und Bärenpark Schwarzwald wildlife



Photo 20 – The male bear M62 during the capture operation on 4 November 2021 (APT Wildlife Department Archives)

park in Bad Rippoldsau-Schapbach, **Germany**) and on **20 December 2021** for the male bear **M57** (destined for the Medveotthon at Veresegyház wildlife park in **Hungary**).

In both cases the provincial administration actively participated in finding possible destinations, their suitability being certified by the relevant CITES authorities (German and Hungarian respectively). The CITES authorities in Italy, Germany and Hungary issued authorisation for the transfers.

Road accidents

During **2021** there were **7 cases of road accidents** involving **bears** in the province of Trento (including the one involving a cyclist), bringing the total number of the accidents in the region **recorded to date to 45** (of which 2 in the province of Bolzano) (Figure 11).

Figure 11

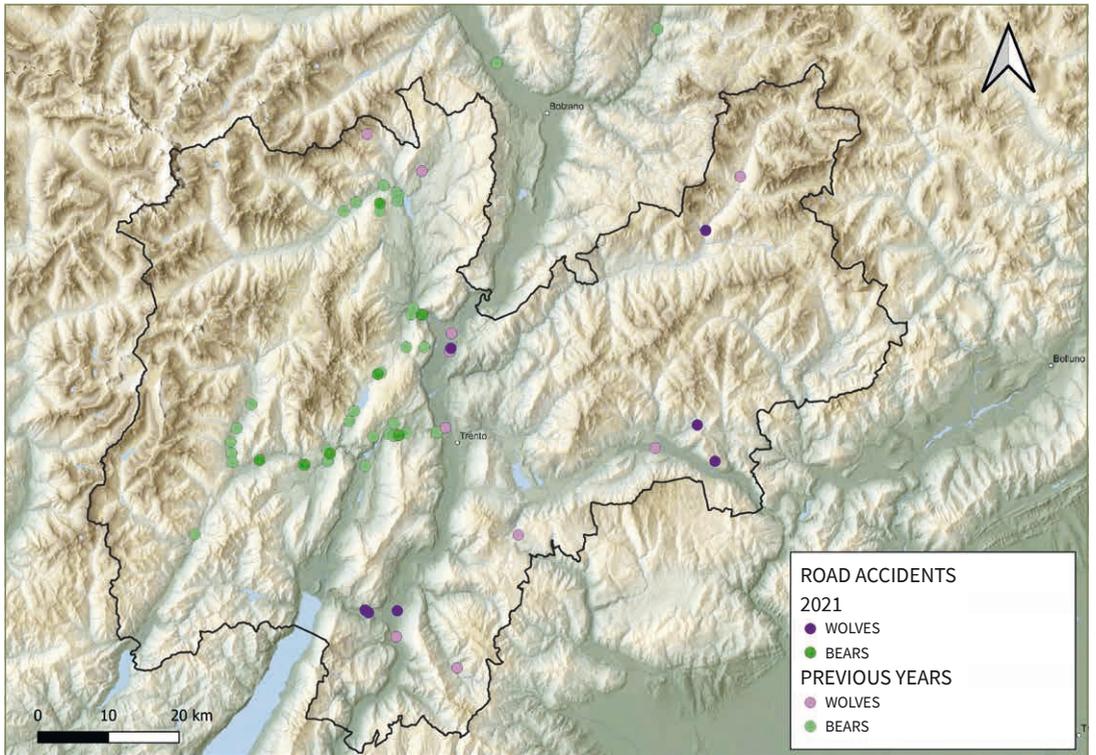


Table 5

DATE	LOCATION	RESULT OF ACCIDENT	GENETIC IDENTIFICATION OF BEAR INVOLVED
9 April 2021	SS 421 between Andalo and Molveno	Very slight impact with a female bear accompanied by a young. No significant damage to the vehicle or consequences for the driver; very probably no consequences for the bear.	No organic samples found
17 July 2021	SS 45 between Vigolo Baselga and Vezzano	Slight impact; little damage to vehicle. No consequences for the driver and probably no consequences for the bear.	Genetic tests provided no results
18 August 2021	Loc. Bonelle, Cles - Monte Peller road	Impact between a cyclist riding downhill and a bear. The cyclist dislocated his shoulder following the impact with the animal and the fall; the bear fled immediately.	No organic samples found
25 August 2021	SS 43 at loc. Rocchetta, Mezzolombardo	Impact between a scooter and a large bear. Slight injuries for the rider and damage to the vehicle. The bear hit fled immediately.	M52, male aged 4.5
8 September 2021	SS 421 at loc. Villa Banale, Stenico	Motor vehicle hit the bear. Damage to the vehicle but no consequences for the driver. The animal moved away.	F50, female aged 3.5
15 October 2021	SP 34 at Ragoli cemetery, Tre Ville	Violent impact; considerable damage to the SUV but no consequences for the driver. The animal died shortly afterwards near the site of the accident.	F9, female aged 11.5
18 October 2021	SS 237 at loc. Ponte Pià in Comano Terme	Violent impact; the van suffered considerable damage but no consequences for the driver. The large bear moved away, but was clearly injured.	M51, male aged 5.5

As far as the **wolf** is concerned, in 2021 a total of **7 road accidents** were recorded, **all fatal** for the animals involved, as already mentioned on page 24.

Table 6

DATE	LOCATION	RESULT OF ACCIDENT	GENETIC IDENTIFICATION OF WOLF INVOLVED
31 March 2021	SS 12 just south of San Michele all'Adige	Road or railway accident involving a female wolf weighing 27.2 kg; the animal died.	Investigations underway
6 May 2021	SS 12 at loc. Polveriera, Marco di Rovereto	Road accident involving a female wolf weighing 27.6 kg; the animal died.	WTN-F024
4 September 2021	Loc. Pradellano, Pieve Tesino	Road accident involving a wolf pup weighing 16.7 kg; the animal died.	WTN-M030
16 September 2021	Col del Latte forest road, Cinte Tesino	Road accident involving a wolf pup weighing 11.7 kg; the animal died.	WTN-F027
11 November 2021	SS 48 at loc. Stalimen, Predazzo	Road accident involving a female wolf weighing 32.1 kg; the animal died.	WTN-F021
24 December 2021	SS 240 at loc. Sano, Mori	Road accident just after midnight involving a young female wolf weighing 19.2 kg; serious injuries to the spinal column; following confirmation with a CAT scan, the animal was put down by the vet.	Investigations underway
24 December 2021	SP 240 at loc. Sano, Mori	Road accident just before midnight involving a young male wolf weighing 29.5 kg; the animal died.	Investigations underway

Box 4 – Veterinary and associated activities

By Roberto Guadagnini (veterinary surgeon responsible for managing healthcare for large carnivores)

In 2021, the veterinary staff responsible for large carnivores in Trentino established **new cooperative relations** with some veterinary medicine divisions in **universities** and **animal healthcare institutes** nationally. Creating a network of knowledge among specialists in different sectors of veterinary medicine has the scope of gaining an ever-increasing awareness of the physiological and metabolic aspects of the bear and other large carnivores in the Alps, to best guarantee the wellbeing of animals in every phase of management and during capture.

In cooperation with the **Veterinary Service of the Provincial Health Services** in Trento and the **Trento branch of the Istituto Zooprofilattico Sperimentale delle Venetie, serological, virological and parasitic tests** are carried out regularly on all bears subjected to anaesthesia, to check for the possible presence of infectious diseases. Many infectious diseases can “jump” from one species to another and thus be transmitted from domestic to wild carnivores or vice-versa. Nor is it possible to exclude possible jumps between other domestic species, such as sheep, goats and cattle, and wild species (even carnivores). For this reason, a constant search for disease antibodies in wild carnivores is a key element in protecting both wild and domestic animal popula-

tions. **Blood chemistry, urinary, coprological and mycological tests** (which are carried out when every animal is captured) allow us to be aware of the general medical conditions of the population. Currently, after two years of investigations, we can affirm that the **bear population** in Trentino enjoys **good health**. None of the bears captured and subjected to anaesthesia have had any anomalies in terms of physiological parameters and/or the presence of pathogens. The good health and **excellent body condition score** (an evaluation showing the body reserves of an individual based on the season) of all the bears anaesthetised suggests that the brown bear population in our area has access to abundant trophic resources and an environment suitable for the species. All bears found dead were subjected to an **autopsy** by a specialist in the field from the University of Parma, to ascertain the **cause and manner of death** and to obtain further medical information on the individual, as well as useful elements of ecological interest, such nutritional style for example. The **causes of death** ascertained for animals subjected to necropsy in the **2020/2021 two-year period** were identified as road accidents or killings by other bears. Killings among bears can be considered part of the standard dynamics for the species. In the scientific literature it has been reported that the cause of death for cubs in the wild can be represented by infanticide in up to 30% of cases.

The **wolves** found dead have also been subjected to **post-mortem investigations** to ascertain the cause. Currently, the most useful examination for immediate assessment appears to be computerised tomography (which is carried out at veterinary facilities), where in the space of a few dozen minutes it is possible to obtain a three-dimensional image of the animal and consequently to identify broken bones and the rupture of internal organs, as well as consequential haemorrhage.



The **ascertained cause of death** for all the **wolves** in the **2020-21 two-year period** was of traumatic origin, due to **impact with cars and trains**. Only one young wolf was rescued while she was still alive. Subjected to a diagnostic scan following general anaesthesia and blood chemistry tests, damage to the spine was ascertained, with consequential irreversible paralysis of the rear quarters that would prevent her being returned to the wild. To avoid further suffering the animal was therefore put down.

As regards the immobilisation necessary for the **capture of bears** in 2021, all the **anaesthetic procedures proceeded smoothly** and there were no problems. All the animals anaesthetised were constantly monitored by veterinary staff with the assistance of specific instrumentation. Once the operation had concluded, the animal was reawakened using drugs acting as antidotes to the anaesthetic. All the bears recovered perfectly and were released into the wild shortly afterwards without any issues.

The Dog Unit

The Bear Dog Unit has now been **operational for 15 years** and in **2021** recorded the **highest ever number of operations** (42) to deal with problems linked to the management of bears in the province.

Road accidents were again shown to be one of the most delicate problems to be managed using the dog units, and last year the involvement of the units also increased in this context. Indeed, in 2021 there were seven inspection and recovery operations following road accidents involving bears (on two occasions the dog units went to the site of the accident to carry out two separate inspections, to better understand the dynamics of the event and the fate of the bear involved). When checking up on a further accident, recourse was made to a dog trained to recover wounded wildlife, handled by a forestry worker from the emergency team, to speed up the procedure. In this last case, the injuries suffered by the bear as a result of impact with the vehicle led to the death of the animal, which was found a few dozen metres away from the road. It was not therefore necessary to intervene with the bear dogs. In all the cases, other dogs made it possible to ascertain that the bears moved away from the place of impact autonomously; only on one occasion is it considered likely that the bear suffered major injury. A further accident involved a cyclist crashing into a bear and in this case it was not considered necessary to carry out recovery operations at the site.

On one occasion, dogs were used to reconstruct the dynamics of **man-bear** interaction on Monte Peller, in relation to a close encounter between a female bear accompanied by two large cubs and a man walking along a SAT footpath.

One very delicate operation carried out by the dog unit in 2021 (Val di Jon, 03/08/2021) involved freeing a bear cub with his paw stuck in the fork of a tree. In this case the dogs were used to guarantee the safety of the staff involved, contributing towards keeping the mother away (the risk was that the mother bear would approach the rescue worker who was proceeding to free the animal by cutting down the trunk, to defend her cub). The logistical collaboration of APT's helicopter unit was fundamental in this operation (photo 21).



Photo 21 – Phase in the freeing of the bear cub stuck between two trees. While one worker cut down a trunk, a second worker and two dog units ensured his safety (frame from video footage filmed from the helicopter – APT Wildlife Department Archives)



Photo 22 – Bear dog involved in deterrent activities - frame from video (M. Baggia - APT Wildlife Department Archives)



Photo 23 – Bear dog during an inspection of predation (APT Wildlife Department Archives)

In addition to the direct action taken in relation to bears reported above, **25 anti-poaching checks** were carried out, along with outings for the purpose of **training** and a number of meetings between staff, including a **veterinary training** day at the Zoolife clinic, the veterinary medicine centre used for the dogs in the Bear Dog Unit.

Bear-proof bins

Organic waste can be very appealing to brown bears. Due to the presence of remains of appetising and easily accessible food, bears may be **encouraged to approach inhabited areas**. Habituation to this trophic resource can lead to food conditioning that over time makes bears more confident in relation to man, resulting in higher risks for the bears involved and potentially also for humans. In 2021, work continued to **replace all the 120 litre organic waste bins** – with or without bear-proof mechanisms. This was started up in 2020 in areas affected by the presence of bears (**Valle dei Laghi, Valle di Cavedine** – for detailed information see pages 55-56 of the 2020 Report) managed by the Azienda Speciale per l'Igiene Ambientale - ASIA. This major change to waste management saw replacement of the previous plastic 120-litre bins, which when situated in hamlets and on the outskirts of towns had

been progressively equipped with bear-resistant mechanisms starting from 2009, with **2,250 and 3,000 litre metal bell-shaped containers** (which are effectively **bear-proof**). The initiative continued in June 2021 in **Spormaggiore**, with replacement of 44 organic waste bins (of which 28 with the bear-resistant mechanisms) with 9 metal bell-shaped containers, to conclude by the end of July in the municipalities of **Andalo, Molveno, Fai della Paganella and Cavedago** thanks to an extraordinary emergency order of the President of the Province, which made the funds necessary for replacement of the organic bins present on site immediately available. With a financial commitment of around **138,000 euro**, 169 organic waste bins (of which 85 with the bear-resistant mechanisms) were replaced with 68 new metal bell-shaped containers. The **results** have been **positive**, with a drastic reduction in visits to the area by the male bear M62 and by bears in general.

The commitment to changing organic waste bins has also been directed at the Val di Sole, where waste management is dealt with by the local **Comunità di Valle**. Continuing a project already started up in 2020, using the internal resources of the Forestry and Wildlife Department, a new prototype **bear-proof “shell”** has been made, based on a model already in use in Slovenia. This structure, in steel and larch wood, is designed to keep the 240 litre **organic waste bins** used in the Val di Sole and other locations in western Trentino out of reach for bears. After appropriate testing, during 2021 the first two modules were initially installed in Dimaro Folgarida. The provincial administration has since invited the local Comunità di Valle to proceed with the replacement of the bins currently in use, guaranteeing that the funds necessary to install the new bear-proof modules will be made available, with the priority being to protect a further **50 waste disposal centres**, where there are currently **95 organic waste bins**. A study is currently underway to analyse the costs to implement the project.

Initiatives such as those described above are targeted at making organic waste disposal methods and/or collection systems throughout western Trentino compatible with the presence of the brown bear.



Photos 24 and 25 – The new bell-shaped bins in use on the Paganella tableland, and the new bear-proof structure (M. Zeni and M. Benvenuti - APT Wildlife Department Archives).



4. COMMUNICATION

The main **activities carried out during 2021** are summarised below.

Communication is the field of action that has been most heavily affected during the year by the continuing **restrictions** linked to the **Covid-19 emergency**.

Evening sessions and meetings

Table 4 lists the **meetings/evenings** organised by the Wildlife Department. The meetings were organised in response to local requests for information and dialogue.

Press releases and council questions

With the support of the Press Office, **53 press releases** were issued, of which **28** regarding **bears**, **10** regarding **wolves** and **15** concerning **large carnivores** in general.

Furthermore, the necessary information was provided in order to respond to **20 questions raised at the Provincial Council** (standard or with an immediate response): **11** regarding **bears**, **3** concerning **wolves** and **6** regarding **both** large carnivores.

Communication activities carried out by SAT – TAM (local Alpine club)

INFORMATION AND TRAINING ON LARGE CARNIVORES:

Courses/visits (in the context of “BiodiversiTAM 2020”):

- **15 and 20 June 2021:** informative evening entitled “Brown Bear, who are you?” and excursion in the context of “The Bear, king of the Brenta” event (organised by the Aldeno branch of SAT).
- **12 June 2021**, Monte Peller: accompanying the excursion “On the trail of the bear”, organised by CAI, Padova cultural and nature group.

Other communication initiatives

- Drawing up and distribution of the **brochure “If an animal dies at alpine pasture”, May 2021.**
- Meeting regarding the wolf with Mayors from the **Primiero area, 20 May 2021.**
- Making and publication of **three educational video clips “Let’s learn to coexist safely with the bear”, June 2021.**
- Drawing up, printing and distribution of the **brochure “How to behave in areas where bears and wolves are present”, August 2021.**
- **26 October 2021**, conference on the management of large carnivores in the province of Trento, in the context of the University of Trento Economics Faculty course on Sustainable Management of Natural Resources.
- Presentation of the work of the Bear Dog Unit in a documentary broadcast on the digital terrestrial channel FOCUS on **11 December 2021**, entitled “The equilibrium of the mountains”.

Table 4

TYPE	DATE	PLACE	NO. OF PARTICIPANTS
Press conference presenting the 2021 Large Carnivores Report	23 April 2021	APT headquarters	Reserved for media
Meeting with farmers in Avio	27 April 2021	Avio	25
Public meeting on wolves and bears	18/05/2021	Brentonico	40
Tuesdays in the Park (Adamello-Brenta)	10/08/2021	Carciato	30
Public meeting on wolves	10/08/2021	Carciato	30
Public meeting on wolves at Rif. Cauriol	28/08/2021	Rif Cauriol - Predazzo	20
Public meeting regarding bears and wolves	06/09/2021	S. Anna di Vallarsa	40

5. TRAINING

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

The following training events were organised during 2021:

- 10 and 12 February 2021, course on **capture from a helicopter** for the **capture team** and at the same time for the **dog unit (NCCO)**, directed at maintaining operating standards for the dogs, and drill for the transportation of assistants by helicopter, the latter activity taking place at APT's Helicopter Centre;
- 24 February 2021, updating and training meeting on large carnivores **for all staff**;
- 30 March 2021, meeting with the **prevention coordinators**;
- 12 April 2021, webinar on damage prevention (Sweden) for **prevention coordinators**;
- 7 May 2021, training session on practical aspects of **capturing wolves** held by dott. Duccio Berzi;
- 28 May 2021, training session on wolves, with particular reference to the problem of managing damage, with **schoolteachers** from all over the province;
- 30 July 2021, meeting with **coordinators and emergency teams**;
- 13 August 2021, training in Tione on the use of radios for **forestry staff**;
- 25 August 2021, training on the management of large carnivores during the course for **new forestry service personnel**;
- 7 September 2021, training for **prevention coordinators** at Marcesina;
- 18 November 2021, training for **capture team operatives** when wolves at the Spormaggiore wildlife centre were subjected to general anaesthetic;

- 14 December 2021, training and coordination session with **emergency teams** at Casteler;
- 21 December 2021, training and coordination session with **damage inspectors and coordinators** at Casteler.



Photo 26 - Training session on captures using helicopters (R. Guadagnini - APT Wildlife Department Archives).

6. NATIONAL AND INTERNATIONAL NETWORKING

Networking with neighbouring regions and countries takes on **strategic importance** in the management of highly mobile species such as the brown bear, wolf and lynx. Bearing this in mind, relationships with other countries and regions have long been established and have been strengthened and consolidated over time. In 2021, national and international networking **activities were again seriously affected by the COVID-19 pandemic**.

The Alpine Convention Large Carnivores Platform

2021 saw continuation of the activities of the **Alpine Convention Large Carnivores Platform (WISO)**, set up in 2009 and where the Autonomous Province of Trento is also represented within the Italian delegation. For the 2021-2022 two-year period, the Platform is chaired by Slovenia and specifically by its Forestry Department. In 2021, the Platform met online, with **videoconference calls on 19 May and 18 November**.

Figure 12



The Large Carnivores Initiative for Europe (L.C.I.E.)

In 2021, the provincial administration once again participated in the activities of **LCIE** with its staff (Figure 13).

LCIE met online, via videoconferencing on **19-20 January 2021**.

Figure 13



The Bear Specialist Group of the International Union for the Conservation of Nature (B.S.G.-I.U.C.N.)

Other opportunities for national and international networking

- Coordination and training session with colleagues from the **Autonomous Province of Bolzano** regarding the **prevention of damage by wolves, Val di Fassa, 12 August 2021**;
- Attendance at the **IBA conference** (International Bear Association) via videoconferencing with Kalispell, Montana (USA), **14-16 September 2021**;



Photo 27 - Meeting in the context of the Euregio (C. Groff, APT Wildlife Department Archives)

- Attendance at the **Euregio meeting** on large carnivores (Tiroler Bildungsinstitut Grillhof), Navis, **27- 28 September 2021** (photo 27);
- Attendance at the **LIFE “AmyBear”** conference (LIFE15NAT/GE/001108) - Final Conference, 16 November 2021
- Visit to the **Abruzzo, Lazio and Molise National Park – PNALM, 19-21 October 2021** for the project to **cooperate in the conservation and management of brown bear populations in the central Alps and Apennines**. Sharing of experience regarding different **monitoring techniques, health monitoring**, anaesthesia techniques and **veterinary aspects** linked to captures, **damage prevention and compensation, management of emergencies** including capture activities, **communication, staff training, promotion of good practice**, and promo-

tion of opportunities for **meeting and exchanging experience at national and international level** (photo 28).

- **Annual meetings** are provided for, to be held alternately in Abruzzo and Trentino.



Photo 28 – Visit to the Abruzzo, Lazio and Molise National Park (C. Groff, APT Wildlife Department Archives)

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AUTONOMOUS PROVINCE OF TRENTO

WILDLIFE DEPARTMENT

Large Carnivores Division

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