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TRENTINO

LARGE CARNIVORES REPORT 2022

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AUTONOMOUS PROVINCE OF TRENTO
WILDLIFE DEPARTMENT
Large Carnivores Division

LARGE CARNIVORES REPORT 2022

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Cover page
Photo: wolf cub aged 4-5 months photographed on Monte Baldo in Trentino (L. Thijs, APT Wildlife Department archives)
Back cover
Photo: Brown bear photographed by camera trap in the Brenta Dolomites (M. Zeni, Wildlife Department archives)
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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 (ACT) personnel, hunters, volunteers and many others.
Our special thanks go to Giulia Bombieri (MUSE) and Enrico Ferraro (ACT) for their important support in managing the data regarding monitoring.

1. MONITORING

1.1 The Bear

Monitoring of bears 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 already adopted in Trentino in 1976, for the first time in Eurasia), automatic video checks by remote stations, **camera traps** (photo 1) and lastly, since 2002, by **genetic monitoring**.

Photo 1 - Autumn 2001: bear immortalised in Valle dello Sporeggio with an experimental camera trap. This old male, who died in 2002 and was almost blind at the time of the photo, was very probably the last of the original bears indigenous to the Alps. The last releases in the LIFE Ursus project instead took place in 2002. (C. Groff - APT Wildlife Department Archives)

Since the 1970s a group of volunteers has continued to remain active (now making up the "**Large Carnivores Monitoring Volunteer Group**" coordinated by MUSE and PAT – see Box 2). Established to support the monitoring of the relict population of **bears native to the Alps**, it gradually developed, following the progressive appearance of other large carnivores in the province, represented, in chronological order, by the **lynx** (since the 1980s), the **wolf** (since 2010) and the **golden jackal** (since 2012).

Genetic monitoring

Genetic monitoring is based on the collection of organic samples (hairs, excrement, 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, when ascertaining damage and by checking **rub trees**.
In **2022 genetic monitoring of the bear** was limited to **organic samples considered to be particularly important** (for example relating to female bears with cubs born during the year, problem bears and animals found dead, and in general to damage sites - photo 2). Indeed, since 2020 **intensive genetic monitoring**, designed to determine the main demographic parameters of the population, has been carried out **in alternate years**. This decision was made on the basis of the need to **optimise the work** and costs involved in this activity in the medium-long-term while however maintaining a **good level of monitoring**.

In 2022 genetic testing was carried out for the **21st consecutive year, coordinated by APT's Wildlife Department**, with the cooperation of FEM, ISPRA, PNAB, MUSE, Associazione Cacciatori Trentini (ACT) and volunteers. The latter have now been brought together in a **group coordinated by MUSE** and APT's **Wildlife Department (Large Carnivores Division)**.

In 2022 **genetic testing** was again carried out by the Conservation Genetics Research Unit at the **Fondazione Edmund Mach** in San Michele all'Adige (Trento), coordinated by **ISPRA's** laboratories, for samples from the Province of Trento, the Autonomous Province of Bolzano, the Veneto and Lombardia regions and the Autonomous Region of Friuli Venezia Giulia.

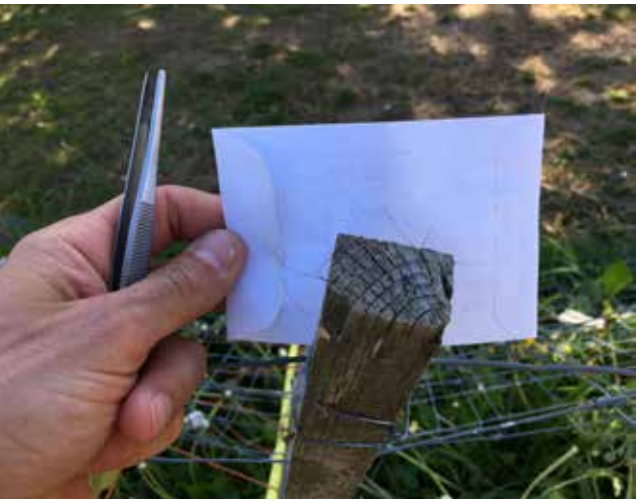


Photo 2 - Bear hairs, damage to a henhouse (M. Zeni - APT Wildlife Department Archives)

Definitions

- **"Cubs"**: bears aged between 0 and 1;
- **"Young bears"**: males up to the age of 4 and females up to the age 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;
- **"Roaming"**: movement outside western Trentino, by bears born in this area, without them reaching the territory habitually frequented by bears belonging to the Dinaric-Balkan 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 western Trentino by roaming or emigrating bears;
- **"Immigration"**: arrival of bears from the Dinaric-Balkan bear population in western Trentino, in the territory used in a stable manner by bears.

Results

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.

Processing of the **data** collected in **2022**, a year in which **genetic monitoring was limited mainly to organic samples** necessary to identify **problem bears**, as highlighted above, provided the information given below.

Demographics: births

In **2022** it was estimated there were at least **14 new litters**, the highest number recorded to date (photo 3), with **25 cubs** (maximum number). This estimate was made based on **direct observation** of females with cubs recorded during the year, on videos and images from **camera traps**, and to a lesser extent **on genetic data**. One cub born during the year then died in a road accident (see section below) and another went missing for unknown reasons (at the beginning of the season the mother, recognisable thanks to her ear tags, was accompanied by two cubs, whereas in subsequent months there was only one).

Demographics: deaths

In 2022, **the deaths of 3 bears** were recorded.

- On **22 April 2022**, at **Poz, in the municipality of Novella**, a few remains **in an advanced state of decomposition** were found (skull and backbone, consumed by carrion birds), belonging to **M83**, a young male who probably died as a result of **aggression** by **another bear** (bite marks with perforation of the skull) (photo 4);
- On **1 September 2022** on the SS 42 road at **Vermiglio**, the female cub **F71** was **hit** by an unknown vehicle during the night (photo 5);
- On **5 September 2022** at **Malga Trat (municipality of Ledro), the female bear F43 died** while anaesthetised during a capture operation with a tube trap to replace her radio collar.

Photo 3 - Female bear with 3 cubs born during the year, filmed in spring 2022 in the southern Brenta mountains (frame from video footage - F. Romito - APT Wildlife Department Archives)

Population estimate

Monitoring in **2022**, carried out in the context of a framework providing for intensive genetic monitoring in alternate years, as explained in the section on "genetic monitoring" on page 5, **does not allow a population estimate to be calculated using the criteria adopted in other years**.
However, the large number of litters suggests **possible continuation of the positive trend** recorded to date (last estimate available: **73-92 animals, excluding cubs born during the year, at the end of 2021** – see pages 8-10 of the 2021 Report).
Intensive genetic monitoring, which will be carried out again in **2023**, will be able to **confirm this hypothesis**.

Distribtion

Photos 4 and 5 - Remains of M83, a young male probably killed by another bear at Novella and F71, a female cub born during the year hit at Vermiglio (APT Wildlife Department Archives)

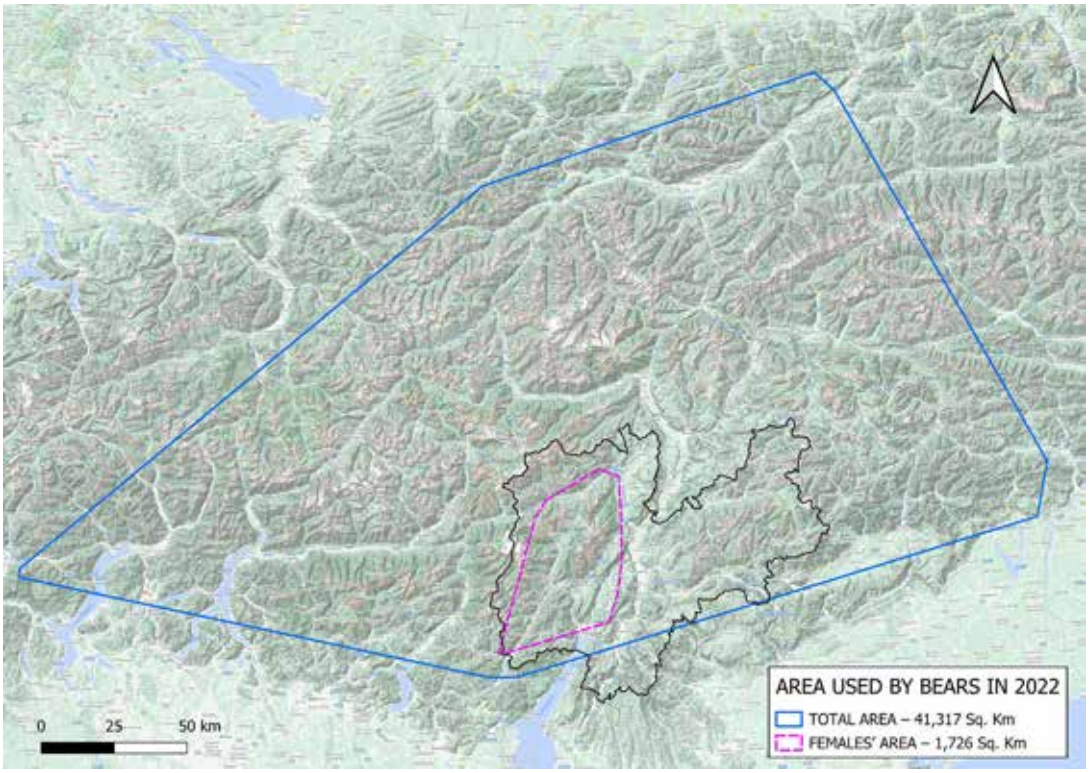
In **2022** the data collected would again **seem** to confirm the growth of the **territory occupied by females** in **western Trentino** over the last few years. As took place for the first time in 2021 (see page 11 of the 2021 Large Carnivores Report), in 2022, the presence of a female, accompanied by a

cub born during the year, was again recorded at least in part outside the province. This was **F46**, a bear who together with her cub spent the whole of the last year in the lower Chiese valley, moving around the area on the border between the province of Trento (Storo and neighbouring area) and the Lombardia Region (Bagolino, province of Brescia). Reports relating to at least one other female accompanied by cubs, ascertained in the upper Val di Sole on the right-hand bank of the Noce (Vermiglio and Pellizzano), and at least 2 females on the left-hand bank of the Noce in Val di Sole are also significant.
It is recalled that definition of the area occupied by females (area in pink, covering **1,726 km²** shown in Figure 1) must be considered **partial** for 2022, as it was determined **without information from intensive genetic monitoring**.

Photo 6 - Bear (probably M73) filmed in Tyrol with a camera trap by Serfaus hunters (Jagd Serfaus)

Considering also the longest journeys made by

Figure 1



young males (photo 6), in 2022 the bear population in the central Alps was **distributed over a theoretical area of 41,317 km²** (blue polygon in Figure 1).
The relative data were kindly provided by the **Autonomous Region of Friuli Venezia Giulia**, the **Autonomous Province of Bolzano, Brescia Provincial Police Service**, the **Carabinieri Unit of the "Val Grande" National Park, Verbano Cusio Ossola Provincial Police Service**, the **Swiss Confederation** (KORA & LBC - Laboratoire de Biologie de la Conservation, Lausanne), **Land Tirolo - Austria** (Amt der Tiroler Landesre- gierung) and **Bavaria** (Bayerisches Landesamt fuer Umwelt - LfU).

Use of the space by bears with radio collars

In 2022, **4 bears (F43, JJ4, M78 and M62)**, were monitored for part of the year using **satellite telemetry**. Their home ranges, calculated using the minimum convex polygon (MCP) method), are shown in Figure 2.

Roaming

In the **2005-2022** period it was possible to document **roaming** (see definition on page 6) involving **53 bears** (all males) (Figure 3).

19 of these (**36%**) **died** or **went missing** (before returning), a further **17 (32%) returned** (and 6 of these subsequently died or went missing), **2 (4%) emigrated** and **15 (28%)** are **still roaming. No roaming by females** born in Trentino has been documented to date.

Figure 2

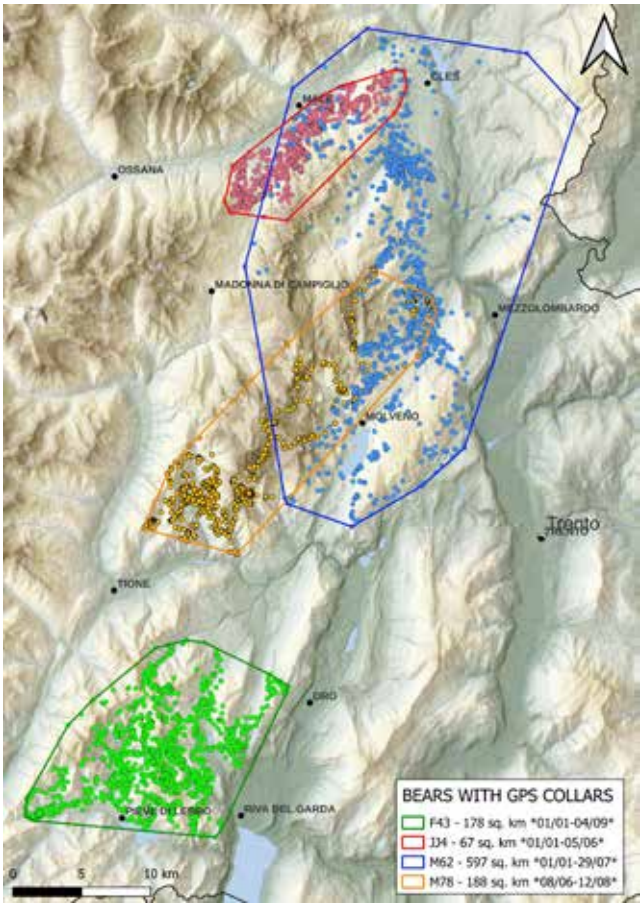
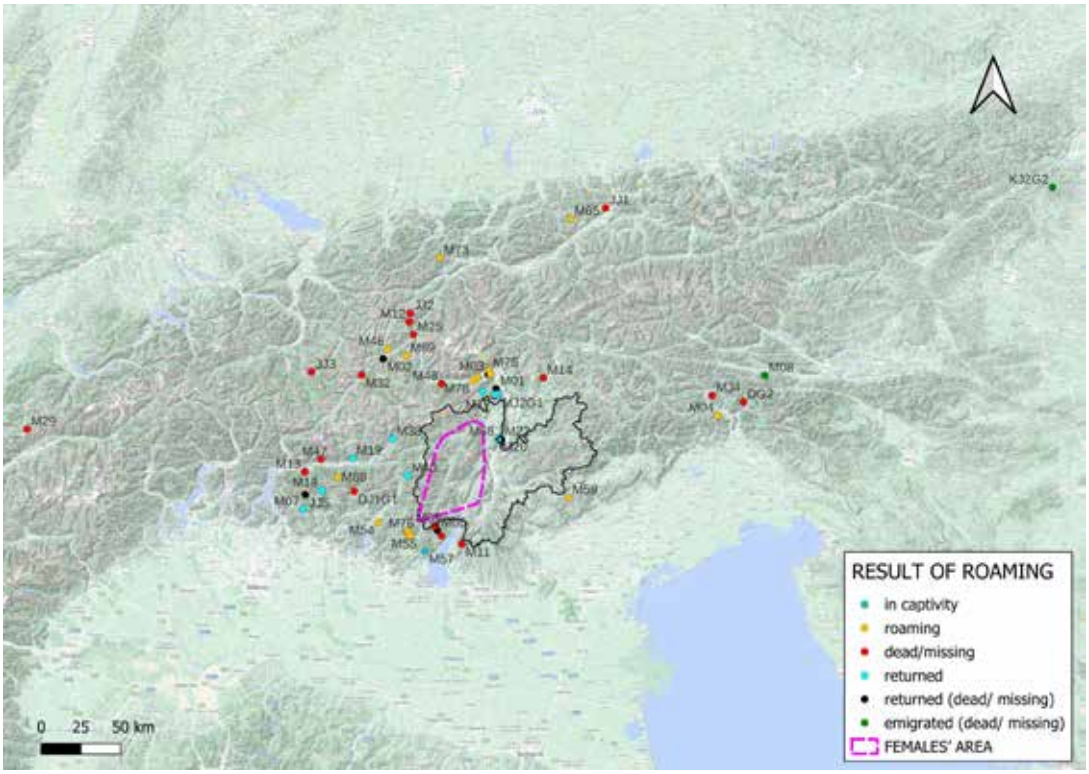


Figure 3



Box 1 - Systematic monitoring of mammals with camera traps – update in the eighth year of sampling

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

Since 2015, MUSE has systematically studied the community of wild mammals using camera traps, in cooperation with the University of Florence and APT's Wildlife Department. The camera traps are positioned at 60 sites that have not changed over the years, situated in a 220 km2 area in the southern part of the Brenta mountains and the neighbouring Paganella-Gazza massif, remaining operational for 35 days between June and August each year. The project aims to determine spatial and temporal changes in the community of medium-sized and large mammals, and especially to understand how they react to the extensive and widespread presence of humans in natural habitats and protected areas. A recent scientific study published by MUSE and the University of Florence in the scientific journal AMBIO, based on data collected in this area of western Trentino up to 2021 (the first seven years of sampling) shed light on these particular aspects. Recreational activities such as trekking and cycling in natural areas are

expanding rapidly at global level, also in the mountains of Trentino, with a potential effect on wildlife. The camera traps recorded a clear increase in the presence of man in the study area over the 7 years taken into consideration, with an increase in photographic events (photos snapped with an interval of at least 15 minutes) 7 times greater than for the fox, which is the wildlife species most frequently recorded on average, and 50 times higher than for the bear (Figure A). No statistically significant difference was observed in the frequency of passing humans (including cyclists and motor vehicles) at camera trap sites falling within the Adamello Brenta Nature Park and those not within the protected area.

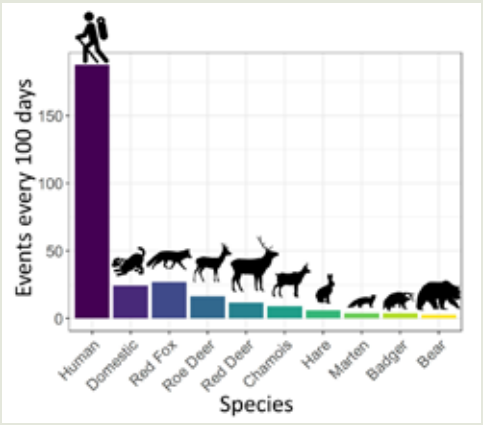


Figure A - Bar chart illustrating the average normalised events recorded in the sampling programme for 8 wild mammals, domestic animals and human beings (including vehicles) over the 7 years of systematic camera trap research in western Trentino. Each species/category is shown with its silhouette and a different bar colour. Taken from Salvatori et al. (2023).

The statistical models provided a clear response regarding the behaviour of all the mammals considered, which concentrated their activities at night, with a general increase in nocturnality in response to human presence and the vicinity to built-up areas (Figure B). The nocturnality index of mammals (see key) increased by around 30% at sites with rare human presence compared to sites with frequent passage by humans.

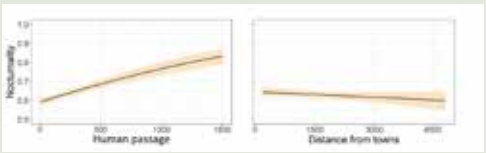


Figure B - Model estimates of the nocturnality index for the mammal community in relation to the rate of passage by man (in metres; left-hand panel) and the distance from the nearest built-up area (in metres: right-hand panel). A site-specific nocturnality index of 0.7 means that 70% of the mammals recorded at the site were recorded during the night. The coloured band represents the standard error of the estimate. Taken from Salvatori et al. (2023).

While temporal avoidance of human presence, greatest in the central hours of the day, was shown to be a strategy widely adopted by all the species studied, larger animals such as the bear, chamois and deer also adopted spatial avoidance. Indeed, these species also respond to human presence in the mountains by reducing their passage in places where there is a greater presence of humans, thus concentrating their activities at less disturbed sites (Figure C).

Despite the extensive and widespread presence of man in the study area, the strategies adopted by the community of species studied would nevertheless seem to guarantee them a good rate of survival and bree-

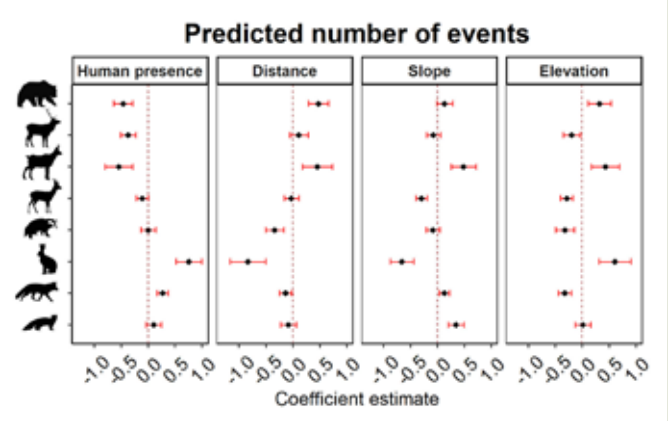


Figure C - The graph shows the regression coefficient estimates in relation to human presence, distance from settlements, slope of the terrain and altitude of independent photographic events for 8 species of mammals, shown with their silhouettes on axis y. In each panel the dotted vertical line corresponds to zero, the average estimates are shown with a black rhombus and standard errors by red intervals. Taken from Salvatori et al. (2023).

ding, given that the probability of occupancy trends estimated by the models were stable or positive over the 7 years, both for individual species and for the community as a whole (WPI, Wildlife Picture Index > 1; Figure D). As regards bears, it is interesting to note that the probability of occurrence trend in the study area is in agreement with a more general trend for growth in the size of the entire population estimated by genetic marking-recapture.

The study thus shows that bears adopt all strategies at their disposal to minimise the likelihood of encounters with human beings, not only concentrating their activities at night at the busiest sites, as did all the species of mammals studied, but also by avoiding the areas most used by people. Although the presence of bears in the study area increased in the period considered, and the presence of other medium-sized species of mammals was stable or growing, the extensive and widespread presence of man, also inside the protected area, is an important factor, also worth considering in terms of management. This is because continuing and “forced” nocturnality, and pressure to use areas potentially not ideal could lead to changes in behaviour and vital functions, resulting for example in lesser efficiency in terms of thermoregulation, diet, movement and orientation, and in a change to natural predator-prey dynamics, as suggested by other studies. Limiting human access to some areas and/or at some times of the year could thus be evaluated, as has already been applied and verified in many cases at international level.

As regards the sampling carried out in summer 2022, the results of which are not included in the aforementioned study, brown bears were recorded at 32 out of a total of 60 sites, with a slight increase compared to 2021 and representing the highest figure for the period 2015-2022. There were 4.5 independent events for every 100 sampling days, broadly equivalent to 2021 (Figure E).

As regards other large carnivores in the study area in western Trentino, the presence of wolves was not recorded in summer 2022, despite the fact that the species is currently colonising the area. For the first time, the presence of the golden jackal was instead recorded at a site on the slopes of Monte Gazza, with four events involving a single animal, an interesting fact suggesting possible expansion of the species starting from the breeding group located on the Fiavè plain.

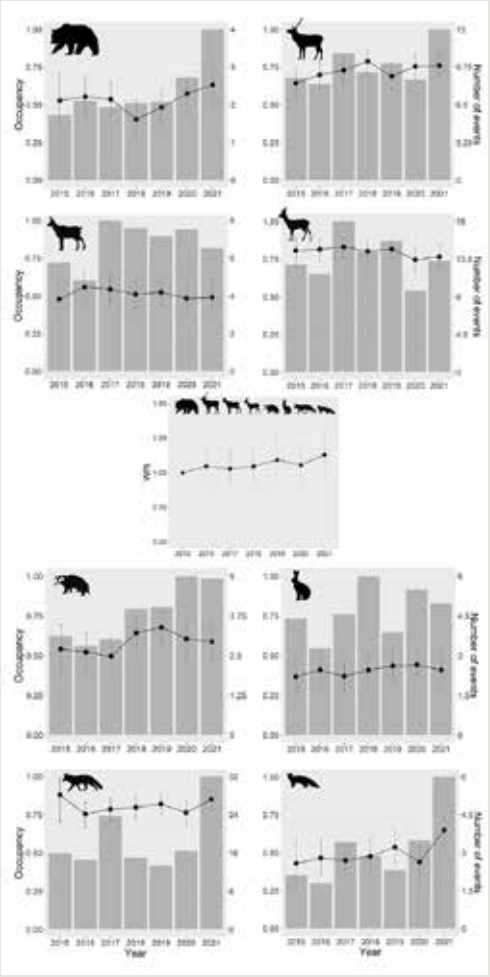


Figure D - Annual occupancy estimates (black dots) with confidence intervals of 90% (grey segments) for the eight species of mammals, shown with their silhouettes. The bars in the background show the number of events recorded daily over 100 days for each year (right-hand y axis). The central panel gives the estimate of the Wildlife Picture Index (WPI) for the whole community of mammals each year. The species are presented in order of body mass, from the top right to the bottom left. Taken from Salvatori et al. (2023).

In autumn 2022, for the third 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 same method applied in western Trentino. As far as large carnivores are concerned, the camera traps captured images of the passage of wolves at 22 sites out of a total of 60 (corresponding with 37%), with a total of 58 independent events. These data show a slight increase both in the area used (18 sites recorded the presence of wolves in 2020, as in 2021) and the number of events recorded (50 events in2020 and 48 in 2021).

To conclude, we thank the staff of Vezzano Forestry Station, personnel from the Biology Department at MUSE, in particular Giulia Bombieri and Luca Roner, the Adamello-Brenta Nature Park, especially Michele Zeni, the staff of Paneveggio Pale di S. Marti-

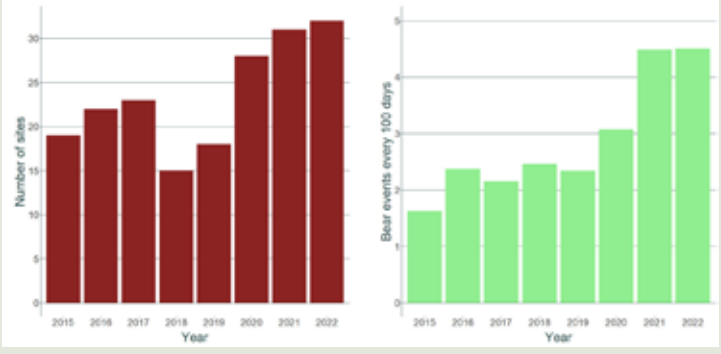


Figure E -Number of sites where the presence of the brown bear was recorded in the study area from 2015 to 2022, out of the total 60 sampling sites (in red, left-hand panel), and number of photographic events recorded, normalised for every 100 days of sampling (in green, right-hand panel).

no Nature Park, in particular Piergiovanni Partel, Enrico Dorigatti, Gilberto Volcan and Alessandro Forti, for their assistance, and the MUSE-PAT volunteer group, especially Renato Rizzoli, for their contribution to the monitoring of large carnivores.

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Salvatori, M., Oberosler, V., Rinaldi, M., Franceschini, A., Truschi, S., Pedrini, P. and Rovero, F. (2023) Crowded mountains: Long-term effects of human outdoor recreation on a community of wild mammals monitored with systematic camera-trapping. Ambio https://doi.org/10.1007/s13280-022-01825-wori*, *Claudia Pellegrini*, Paolo Pedrini* and Francesco Rovero** (*MUSE – **University of Florence)*

1.2 The Wolf

Monitoring of the wolf **began** with the **natural return of the first animals** recorded in the province in 2010, although the remains of a dead wolf were previously found in 2008 (see the 2009 Report, pages 57-60). The species had **disappeared** from Trentino around the **middle of the 19th century**.

From the beginning, **genetic** monitoring, traditional **surveys in the field** and **camera traps** (photo 7) were also used to monitor the wolf (photo 7).

Photo 7 - Wolf filmed on 23 January 2023 on Monte Bondone (frame from camera trap video footage - M. Vettorazzi - APT Wildlife Department Archives)

As is well-known, the **return of wolves to Trentino is part of a phenomenon on a much larger scale** than the provincial territory. For at least four decades the wolf has been **expanding throughout Europe**. All the wolf populations present in continental Europe are effectively linked (except perhaps the population in north-west Spain), making up a single **European metapopulation of around 21,500 animals**, without considering Russia and Belarus (Source: L.C.I.E. - Large Carnivore Initiative for Europe 2022 - "Assessment of the conservation status of the Wolf - Canis lupus - in Europe").

Genetic and camera trap monitoring

Genetic monitoring activities for the species take place alongside those put into effect for bears, which however remain the priority as they represent a small, isolated population resulting from a reintroduction project, rather than from spontaneous recolonisation of much of continental Europe, as in the case of the wolf.

Intensive genetic monitoring at periodic intervals (every 4 years) is also provided for in relation to the wolf. This helps to follow the evolution of the population present in the province in the **medium/long-term** and in **association with other alpine areas**, given that as recalled above, the "Trentino wolf population" is simply a small part of a **single alpine, or rather European metapopulation**.
Intensive genetic monitoring took place in 2022, with the expectation of gathering around 500 samples for genetic testing. However, the lack of snowfall in the last two winters did not make it possible to collect the expected number of organic samples. The collection period was therefore extended up to 31 March 2023, in order to better exploit the winter of 2022-2023. Consequently, the definitive results of the tests carried out by the Conservation Genetics Research Unit at the **Fondazione Edmund Mach (FEM)** in San Michele all'Adige will be available subsequently.
Collection of organic samples is supplemented by the use of **camera traps**, helpful in ascertaining unequivocally the **presence** of the species in a specific area, assisting with **minimum estimates of the size of packs**, documenting **breeding**, identifying the formation of new **couples** and potentially **anomalous phenotypes**.
For this species, the range of **information** made available by the **Large Carnivores Monitoring Volunteer Group** is particularly important ; as regards this see Box 2.

Box 2 – Support for the monitoring of large carnivores by volunteers

By the MUSE-APT Large Carnivores Monitoring Volunteer Group

The **Large Carnivores Monitoring Volunteer Group**, which works together with MUSE in Trento and APT's Wildlife Department - Large Carnivores Division, has its origins in the longstanding **"Bear Group"**, promoted from the 1970s by Fabio Osti (who passed away in 2010), a figure of reference in the study and safeguarding of the last native population of brown bears in Trentino.
With the same spirit, the group continues to provide support in the monitoring of large carnivore using **new techniques** as compared to the past, such as camera traps, operating with respect for privacy regulations, collection of signs of presence, genetic sampling and direct observations. It participates directly in research projects promoted by MUSE and other bodies, always with the coordination of APT.

Carried out in a coordinated manner, these activities **supplement** institutional actions involving the **provincial forestry service**, forest wardens, the **staff of the parks** and those of the **Associazione Cacciatori Trentini** in the monitoring of large carnivores.
In 2022, the group continued to work with enthusiasm, covering hundreds of kilometres of footpaths throughout the year, in search of signs of the presence of bears, wolves, lynx and golden jackals.

The data gathered by the group regarding **breeding** has been particularly important, for example. As regards **bears**, numerous litters were sighted starting from the spring, in particular with reporting of an unknown litter and around fifteen confirmation reports, which in some cases made it possible to identify the mother bear with certainty, due to the presence of ear tags or distinctive physical characteristics. As regards **wolves**, there were no less than nine first reports of litters, often then monitored by members of the group for the whole season.

One interesting piece of information concerns the **Carega wolves**, which succeeded in breeding, with the birth of at least five cubs ascertained in August. During the course of the year, the volunteers' camera traps made it possible to observe the presence of symptoms typical of **sarcoptic mange** in almost all the members of the pack, particular-

ly evident in the cubs. With the passing of the months, the symptoms intensified, and the number of cubs observed with the camera traps diminished, until November, when they disappeared.
In 2022, another interesting item of data from the ethological point of view regards the images, unique in Trentino, showing the **transfer from one den to another** of six **wolf cubs** born to the dominant female just a few days earlier, between 3 and 7 June, in the **central Lagorai mountains**, probably to look for a safer place to raise the new cubs. Thanks to subsequent monitoring, it was possible to ascertain that all the cubs survived until the beginning of the winter.
The volunteers' camera traps also contributed towards confirming the presence of the **golden jackal in Val di Fiemme**, specifically with the camera trap image of a single animal in March (the first data for this area). Subsequent reports, both from the group and third parties, made it possible to ascertain the existence of new breeding group in Trentino (see the relevant section in this report).

Figure 1 - Frames from videos filmed with the camera traps of a number of group members. From the top: transfer of cubs by the breeding female in the central Lagoria mountains (F. Romito); cubs from the Carega wolf pack with clear signs of mange (V. Cozza); pair of bears in the Brenta Dolomites during the mating season (M. Vettorazzi); pair of jackals at a marking point in Val di Fiemme (G. Listorti).

Population, breeding, mortality rates, distribution and trends

In 2022, **1769** data reports belonging to categories **C1 and C2** (data defined respectively as "irrefutable" and "confirmed by experts", on the basis of Kora-CH criteria), such as sightings, photographs, prey, tracks, hairs, excrement, urine and damage, referring to the **wolf** were recorded in the province. Of these, **254** referred to organic samples, **251** of which were analysed by the Conservation Genetics Research Unit of the **Fondazione Edmund Mach (FEM)**.

In **2022**, the overall data collected leads to **estimation** of a **minimum number of 29 packs** (or family groups) whose home range included at least partly the province of Trento. The **known packs** are listed in the following **table** (Table 1), with the **name** of the area identifying them, **the year the pack was first recorded, breeding** in 2022, if ascertained (18 cases this year) and the **maximum number of animals ascertained from the summer onwards**, when available.
5 of these **packs** (nos. 12, 15, 25, 28 and 29 in Table 1) made **marginal use of territory in Trentino**. These were family groups present in the **Campobrun** area and eastern **Lessinia** (mostly moving around the nearby provinces of **Vicenza** and **Verona**), in the **Agordino-Cereda** and **Vette Feltrine-Val Noana** areas (centred mostly in the neighbouring province of **Belluno**) and in the **Baldo-Novezza** area (mostly in the neighbouring province of **Verona**).
In 2022 **at least 3 new couples** were also recorded, respectively in the **Paganella-Gazza, eastern Brenta** and **Passo Lavazè-Passo S. Lugano** areas.
The data given above do not take into consideration **wolves that do not belong to packs**, namely **solitary animals**, usually roaming in search of new territories and partners. According to recent evaluations, these represent around an additional 20% compared to the wolves living in packs.

Table 1 - Packs recorded in the Province of Trento in 2022

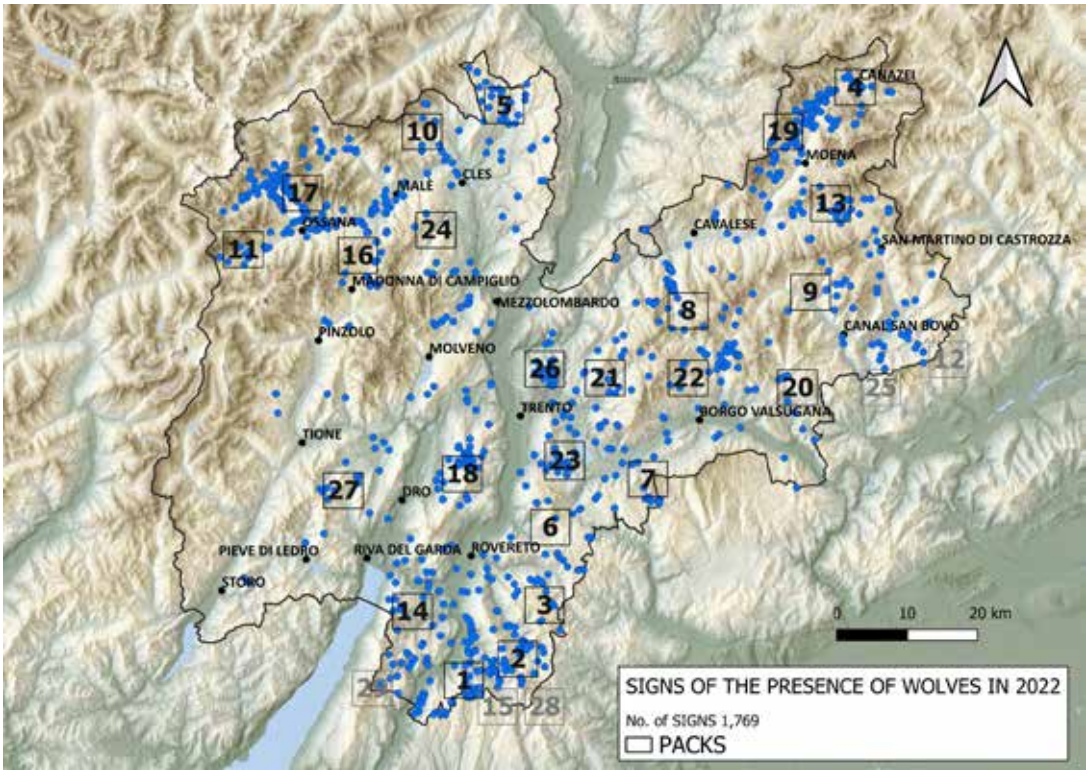
No.	NAME	YEAR FIRST RECORDED	BREEDING IN 2022	MAX NO. OF ANIMALS 2022
1	LESSINIA	2013	YES	9
2	CAREGA	2016	YES	9
3	PASUBIO	2017	YES	7
4	ALTA VAL DI FASSA	2017	NA	3
5	ALTA VAL DI NON	2017	YES	8
6	FOLGARIA-COE	2018	YES	6
7	VEZZENE	2019	YES	8
8	VAL CADINO-VALFLORIANA	2019	YES	6
9	VANOI	2019	NA	4
10	MADDALENE	2019	NA	6
11	TONALE	2019	YES	10
12	AGORDINO-CEREDA	2020	YES	5
13	PANEVEGGIO-BELLAMONTE	2020	YES	4
14	BALDO	2020	YES	8
15	LESSINIA ORIENTALE	2020	YES	11
16	FOLGARIDA	2021	NA	3
17	PEIO-OSSANA	2021	YES	8
18	BONDONE-STIVO	2021	YES	10
19	LATEMAR	2021	YES	11
20	LEFRE-TESINO	2021	YES	5
21	PINÈ-MOCHENI	2021	NA	3
22	CAMPELLE-CALAMENTO	2021	YES	10
23	VIGOLANA-MARZOLA	2021	YES	9
24	PELLER-TOVEL	2021	NA	3
25	VETTE FELTRINE	2021	YES	6
26	ARGENTARIO-CEMBRA	2022	YES	3
27	BLEGGIO-LOMASO	2022	YES	8
28	CAMPOBRUN	2022	YES	6
29	BALDO-NOVEZZA	2022	NA	5

The **geographical location of the packs** is shown in Figure 4, together with the location of individual reports. This geographical **location** should generally be considered approximate. Intensive genetic monitoring data will be able to guarantee greater and more precise knowledge regarding the areas occupied by the packs (as reported above, the intensive genetic monitoring data for 2022-beginning of 2023 will be available subsequently). The packs present in the province only marginally are highlighted with paler graphics (packs 12, 15, 25, 28 and 29). In 2022, the **Argentario-Cembra** and **Bleggio-Lomaso** areas were occupied by new packs.

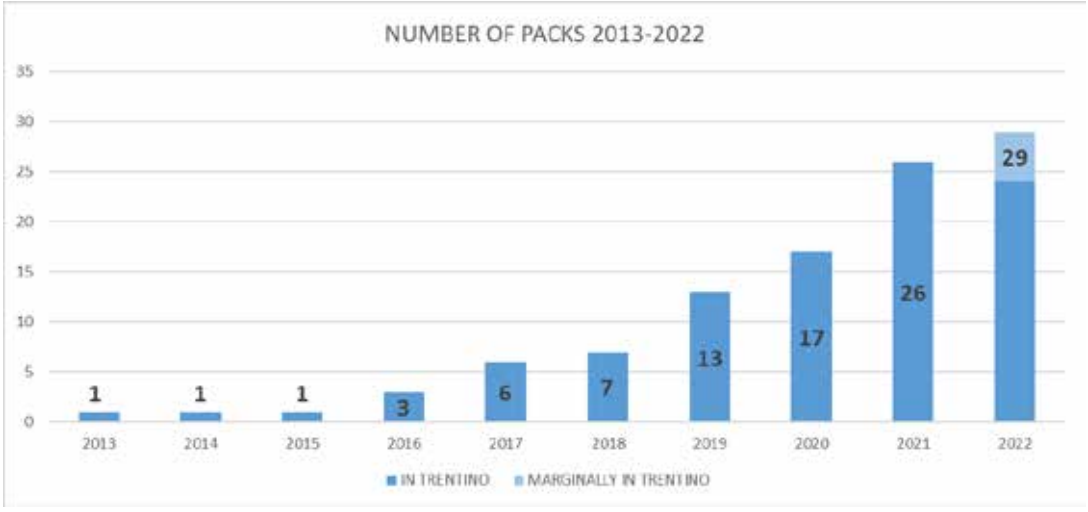
Graph 1 shows the trend for the number of **packs** recorded in the province of Trento, from 2013, the year the first pack was formed in the province, until 2022. **Packs** present in the province only **marginally (5)** in 2022 are highlighted with a paler colour in the **column for 2022**.

The reports collected confirm that the phase of **recolonisation of Trentino** by the species is still underway, both in terms of population and the area occupied.

Figure 4



Graph 1



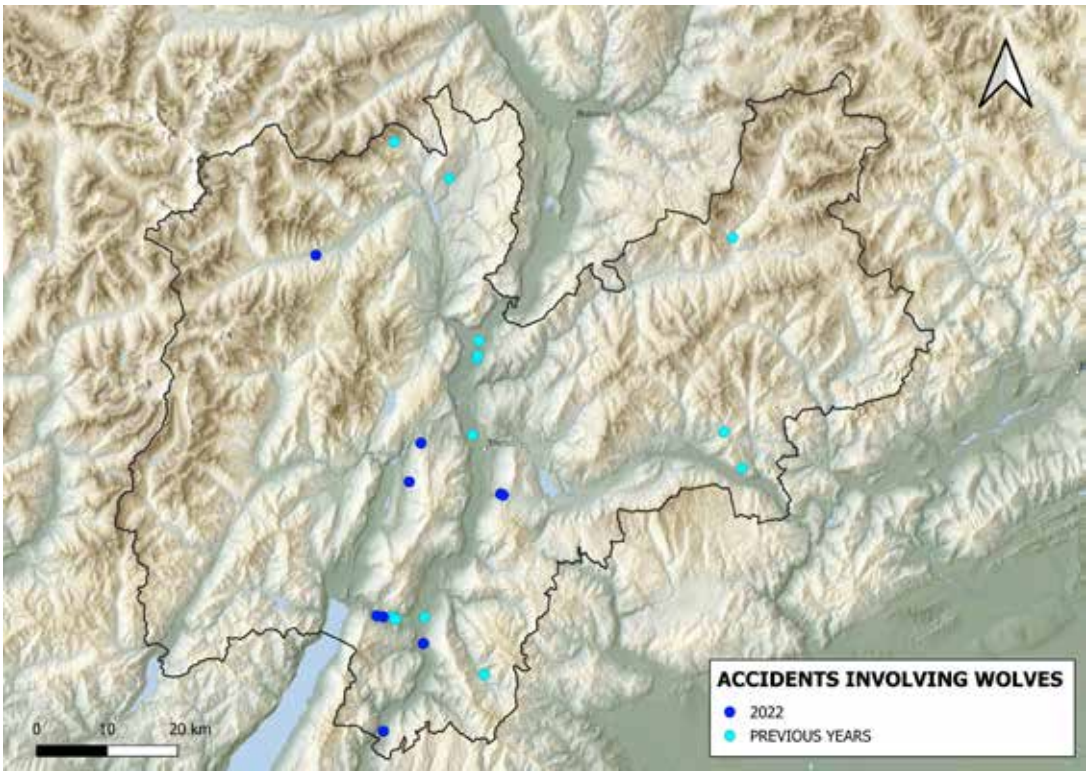
In 2022 the **deaths of 14 wolves** were recorded (**6 male, 7 females** and **1 undetermined** – see Table 2). The deaths were the result of **road/rail accidents** (8 cases - photo 8 and Figure 5), **natural causes** (4 cases), an accident occurring during an attempt to prey on domestic livestock (wolf caught up in an electric fence) and in one case to **unknown causes** (finding of only a few remains of bones).
A **further finding** (jawbone) of a canid found in the upper Val di Non, **compatible with a wolf**, is currently being analysed.
The deaths recorded represent only a part of the real number. In the context of what is by now a relatively large population, **death from natural causes** is in its turn relatively significant, but for evident reasons is **more difficult to detect and report**.

Photo 8 - Young wolf hit by a vehicle and killed on 7 November 2022 at Vecchio Mulino in Vallelaghi (APT Wildlife Department Archives)

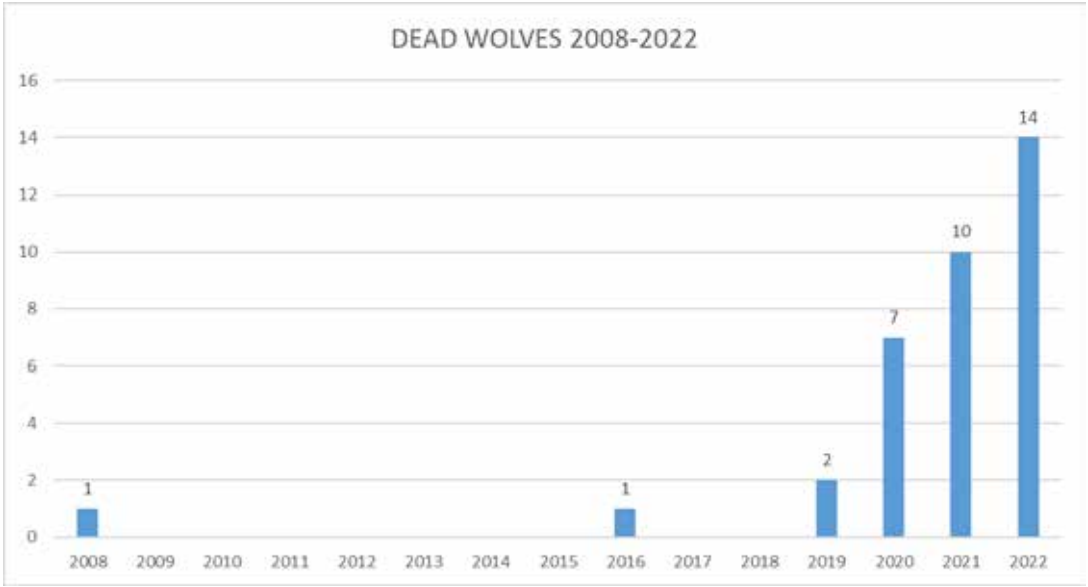
Table 2 - Wolves found dead in the Province of Trento in 2022

DATE	LOCATION	CAUSE OF DEATH	GENETIC IDENTIFICATION
3 January 2022	Serravalle all'Adige	Rail accident	WTN-M048
21 January 2022	S.S.240, loc. Loppio, Mori	Road accident	WTN-F033
29 January 2022	S.P. 85, loc. Lasino, Madruzzo	Road accident	WTN-M050
21 February 2022	Loc. Piano, Commezzadura	Rail accident	WBS-M003
17 March 2022	Loc. S. Leonardo, Avio	Rail accident	WTN-M036
10 March 2022	Loc. Regana, Castello Tesino	Unknown causes	Testing did not lead to results
21 March 2022	Loc. Laste di Crosano, Brentonico	Road accident	WTN-M049
26 July 2022	Fraz. Speccheri, Vallarsa	Put down humanely – last stage of sarcoptic mange	WTN-F041
29 October 2022	Loc. Fornaci, Pergine Valsugana	Died during an attempt to prey on domestic livestock	Testing underway
7 November 2022	S.S. 45 bis, Loc. Vecchio Mulino, Vallelaghi	Road accident (photo 8)	Testing underway
28 November 2022	Loc. San Valentino, Ala	Sarcoptic mange	Testing underway
21 December 2022	S.S. 249, Loc. Cà da Ronch, Altopiano della Vigolana	Road accident	Testing underway
30 December 2022	Loc. Perobia, Ala	Sarcoptic mange	Testing underway
31 December 2022	Loc. Gran Fontane, San Giovanni di Fassa	Probably died during a wildlife hunting expedition	Testing underway

Figure 5 - Location of accidents involving wolves in 2022 and previous years.



Graph 2 – The following graph shows the trend for wolves found dead in recent years



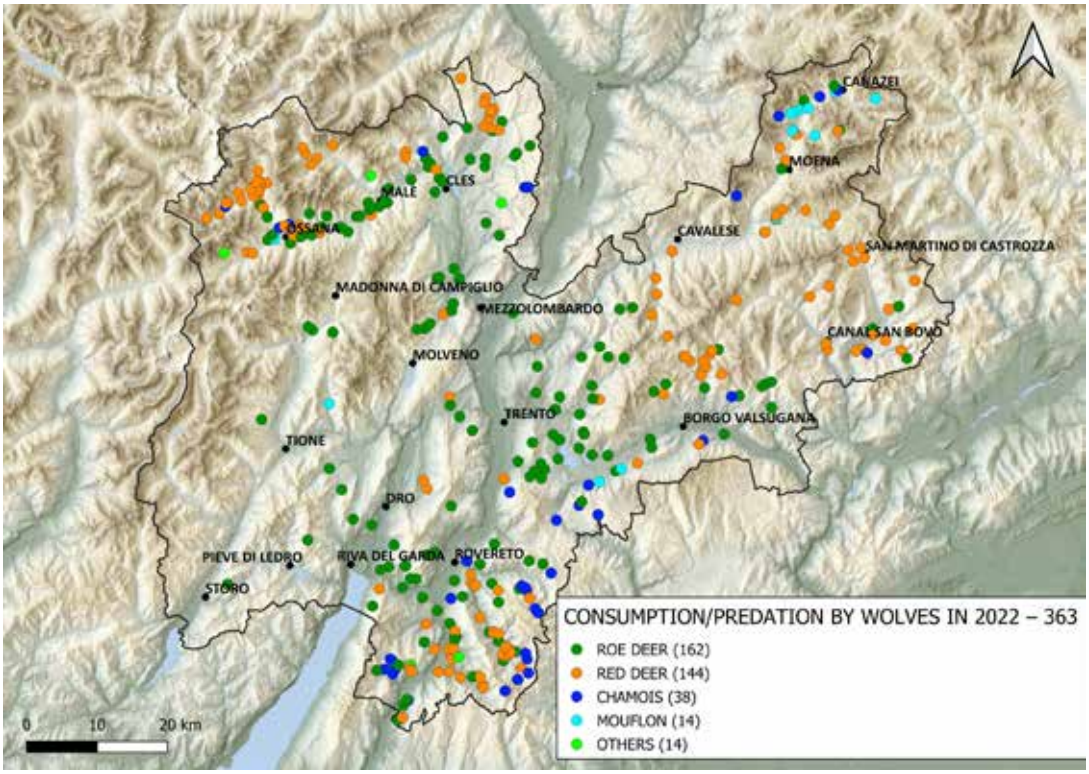
Preying on wild animals

363 cases of **preying/consumption of wild animals** were found and recorded (photos 9 and 10). The data is given in Figure 6, which shows the **distribution and the species preyed on/consumed**.
It should be recalled that the carcasses found represent **only a small part of the real number** of animals preyed on, most of which remain undetected. Even the **different proportions of the various species recorded** do not necessarily reflect the real situation, given that the finding of prey by man can be influenced by different factors (for example the vicinity of the carcass to footpaths, roads or inhabited areas, altitude, level of anthropic development, size of the prey etc.), invalidating the real representativity of the data.

Photo 9 – Deer preyed on near Avio, on the valley floor (T. Borghetti - APT Wildlife Department Archives)

Photo 10 – Ibex preyed on in Val di Strino-Vermiglio (APT Wildlife Department Archives)

Figure 6



1.3 The Lynx

Monitoring of the species began when the **lynx made its return to the province**, namely in the second half of **the 1980s**, with the appearance of a number of animals in **eastern Trentino in the Lagorai mountains** (present for around 15 years). Traditional survey methods in the field, **camera traps, radio-tracking** and **genetic monitoring** were also used for this species from the beginning.

Photo 11 – B132 filmed at loc. Corda-Stigolo in broad daylight on 7 January 2022 (photo from camera trap - D. Colotti - APT Wildlife Department Archives)

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**, who comes from the small Swiss population reintroduced in the St Gallen Canton (see **page 45 and subsequent pages of the 2008 report**, along with the appendices and sections relating to the lynx in all subsequent reports). 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.

Photo 12 – The last image for the lynx B132 in 2022, on 15 March in Val Lorina (frame from camera trap video – C. Groff -APT Wildlife Department Archives)

During **2022** it was possible to document the **presence of the lynx** (photos 11 and 12) **with certainty** (photos and videos), on the occasions shown in Table 3.

Figure 7

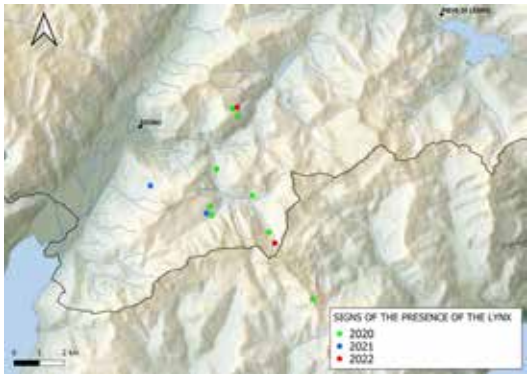


Figure 7 shows localisations for B132 in the last three years. As can be seen, in 2022 B132 would again appear to have remained in the mountains of Val Lorina and Val di Ledro, without frequenting the mountains on the right-hand side of the River Chiese.
B132 remains the only lynx whose presence has been documented with certainty for several years. It has never been possible to obtain certain and objective confirmation of other reports.

Table 3 – Localisation of the lynx in 2022

No	DATE	LOCALITION	SIGNS OF PRESENCE
1	7 January	Loc. Corda - Stigolo	camera trap photo
2	23 February	Loc. Corda - Stigolo	camera trap photo
3	15 march	Bocca di Lorina	camera trap video
4	22 march	Bassa val Lorina	video

1.4 The Golden Jackal

The presence of this canid species was also confirmed in the province during 2022.
The most significant data regarding confirmation of a **second breeding group**, after the first in the Lomaso area (as regards this see pages 28-30 of the 2020 Large Carnivores Report, which contains the first report of a breeding group in Trentino and a technical fact sheet on the species). Both family groups reproduced in 2022.
Figure 9 shows the **territorial distribution** of the 2022 data.

- 15 March 2022, 1 animal caught by a camera trap above Varena, Ville di Fiemme (G. Listorti - MUSE-APT volunteer group);
- 19 July 2022, characteristic howling of the species heard by ACT technical staff at Bleggio Superiore;
- 19 November, family group of 4 animals captured by a camera trap in the Municipality of Tesero (photo 13);
- 16 December, 1 animal caught by a camera trap in the countryside near Volano;
- 22 December, family group of 3 animals caught by a camera trap in Val di Stava, Tesero;
- 26 December, family group of 3 animals caught by a camera trap in Val di Stava, Tesero;
- 8 December, 1 animal caught by a camera trap at Cavedine.

Photo 13 – Family group of golden jackals filmed with a camera trap at Tesero (APT Wildlife Department Archives)

Figure 8

Box 3 – The activities of the Associazione Cacciatori Trentini-APS to monitor large carnivores

By Enrico Ferraro and Alessandro Brugnoli

From the beginning of the LIFE Ursus project (1997- 2004) the association has contributed to monitoring the bears released. Over time, this has been followed by various forms of cooperation, culminating with a specific agreement with the former Forests and Wildlife Department (2015). Over the course of the last few years, with the return of the wolf, the association's activities have increased.
In 2021, it published a document about the wolf (https://www.cacciatori-trentini.it/il-lupo/32-85/), subsequently signing a cooperation agreement with MUSE leading to publication of 5 different articles regarding wolves in "Il Cacciatore Trentino" in 2021 and 2022. As regards monitoring, the association made use of its own staff (19 gamekeepers and 5 technical staff) in the national wolf monitoring project, and was co-author of the Trentino Report (https://www.lifewolfalps.eu/wp-content/uploads/2022/07/Report-Lupo_PAT_2020_21.pdf). In spring 2022, again with MUSE, work began to monitor the level of frequentation of ungulate foraging sites by wolves in Val di Fassa (https://www.lifewolfalps.eu/wp-content/uplo-ads/2022/08/Report_attivita- mangiatoie_2022_MUSE_ACT_STEWARDSHIP.pdf), and 5 informative evening sessions were also organised (Cis, Primiero, Levico, Pozza and Predazzo).
Cooperation with the Fondazione Edmund Mach (FEM) began during 2022, with the scope of collecting wolf excrement, in order to understand which species are preyed on by different packs: to date over 50 samples have been collected. Lastly, activities to monitor the signs of presence of large carnivores continued, carried out both directly by the association's staff (photo 14) and by hunters, leading to the cataloguing of over 213 signs of presence in 2022, with many other reports referred to the staff of the Trentino Forestry Service. In 2022, breeding by 7 wolfpacks was reported by the ACT, along with some female bears with cubs and both golden jackal packs present in the province.
The association's work to monitor large carnivores will continue over the next few years. It is considered to be important for the future to establish more systematic and standardised monitoring for this species, also hoping to capture some wolves in order to better understand predator-prey interaction in greater detail.

Figure A – Wolf photographed on 8 November 2022 at loc. Peniola, Moena/San Giovanni di Fassa border - E. Ferraro, Associazione Cacciatori Trentini 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 guard 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 **resolution no. 2021-S186-00231 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). This **resolution was followed by three resolutions by the Manager of the Wildlife Department** (one on **16 February 2022** and two on **5 May 2022**), which regulated in detail the criteria for **quantification of damage** and provincial aid in the field of damage prevention, along with the **technical characteristics of such measures**.

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

Compensation for damage

In 2022, **440 cases of damage by large carnivores** were ascertained (there were **461 reports** of damage), of which **301 by bears** (photo 16) and **139 by wolves** (photo 15). There were no cases involving the **lynx** or the **golden jackal**.

In relation to the 461 reports of damage, **345 applications for compensation were presented**, whereas in **116** cases **the damaged party made no application for compensation**. As regards this, it should be considered that much of the damage is relatively limited, that over time people have become more accustomed/tolerant of large carnivores and lastly that the administrative procedures necessary may in some cases discourage the damaged parties from presenting an application for compensation, especially if the damage is limited.

The damage concerned **275 farms** (60% of cases), for which the compensation was paid out according to the de minimis principle, and **187 private citizens** (40% of cases).

When this report was drawn up, the **results of 268 applications for compensation had been determined (224 accepted** and **44 rejected**), while the other **77**

Table 4 – Damage by large carnivores - 2022

ASSETS	BEARS		WOLVES		TOTAL	
	No. CASES	AMOUNT	No. CASES	AMOUNT	No. CASES	AMOUNT
BEEKEEPING	46	34.519,40 €	//	//	46	34.519,40 €
CROPS	31	22.471,71 €	//	//	31	22.471,71 €
OTHER	24	6.135,60 €	//	//	24	6.135,60 €
LIVESTOCK	49	13.659,80 €	74	68.893,01 €	123	82.552,81 €
TOTAL	150	76.786,51 €	74	68.893,01 €	224	145.679,52 €

applications are **being evaluated**.
At the time this report was drawn up, **€145,679.52 of compensation** for damage had been paid out, of which **€76,786.51** was for damage caused by **bears** and **€68,893.01** for damage by **wolves**. Detailed data is given in **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.
In total, **625 domestic animals were preyed on** (killed by the predator or subsequently put down due to injuries), of which **300** by **bears** and **325** by **wolves**. It should be highlighted that this number includes **260** small farmyard animals (**chickens** and **rabbits**) preyed on by bears. To these it is necessary to add **144 missing** animals (64 following attacks by bears and 80 after attacks by wolves) and **56 injured animals** (6 after attacks by bears and 50 after attacks by wolves). In **total** (bears and wolves), **825** animals were involved (animals killed, injured or missing).
Table 5 shows the livestock preyed on, missing or injured by bears and wolves, divided into the various categories.

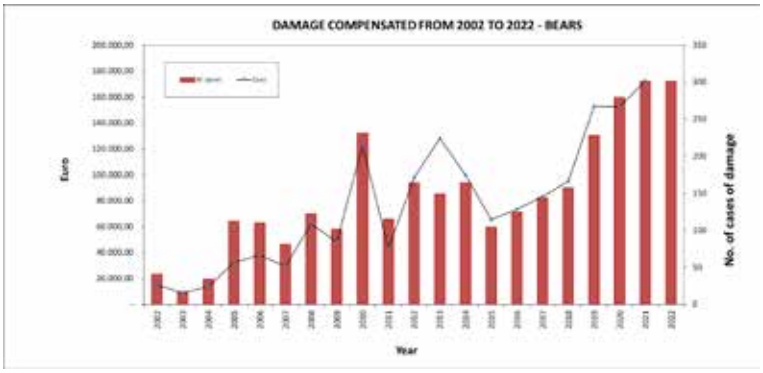
Photo 14 – Goat preyed on by wolves (L. Sordo, APT Wildlife Department Archives)

Table 5 – Damage to livestock - 2022

TYPE	BEARS			WOLVES			TOTAL
	DEAD	INJURED	MISSING	DEAD	INJURED	MISSING	
POULTRY/RABBITS	260	2	58	0	0	0	320
SHEEP/GOATS	27	2	6	278	33	80	426
EQUINES	8	1	0	10	0	0	19
CATTLE	4	1	0	36	12	0	53
CAMELIDS	1	0	0	0	0	0	1
DOMESTIC DOGS	0	0	0	1	5	0	6

Graph 3

Graph 3 shows the **trend** for **damage by bears** and the amount of related compensation (the data regarding compensation paid out in 2022 is not yet definitive).



Graph 4 shows the **trend** for **damage by wolves** and the amount of related compensation (data regarding the compensation paid in 2022 is not yet definitive).

Graph 4

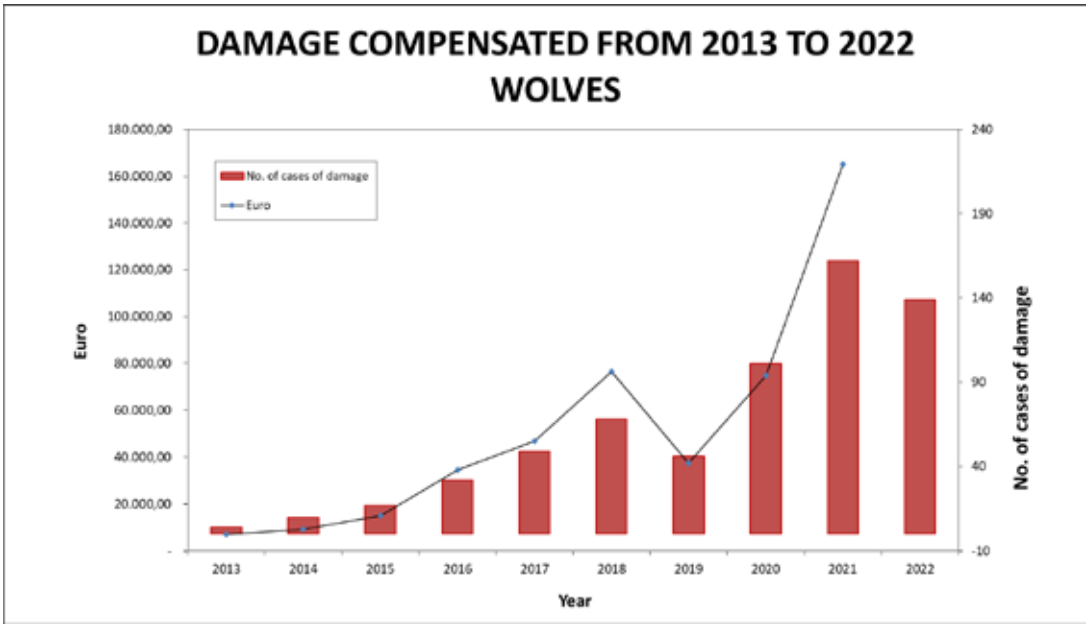


Photo 15 – Door damaged by a bear in Val Giudicarie (V. Calvetti, APT Wildlife Department Archives)

Compared to 2021, the number of cases of damage in 2022 was essentially stable for **bears** (Graph 3), while there was a fall of **15%** for **wolves** (Graph 4).

With reference to damage by wolves, it is pointed out that **86** events (62%) took place in the **eastern** part of the province and **53** (38%) in the **western** part. The damage by **bears** was instead **all recorded in western Trentino.**

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

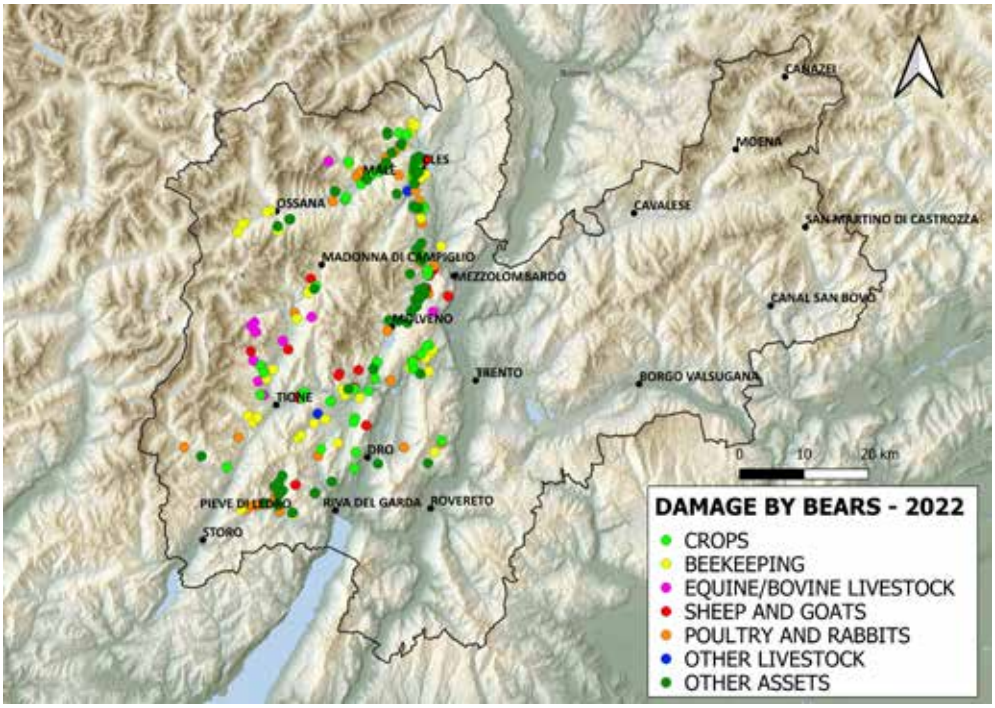
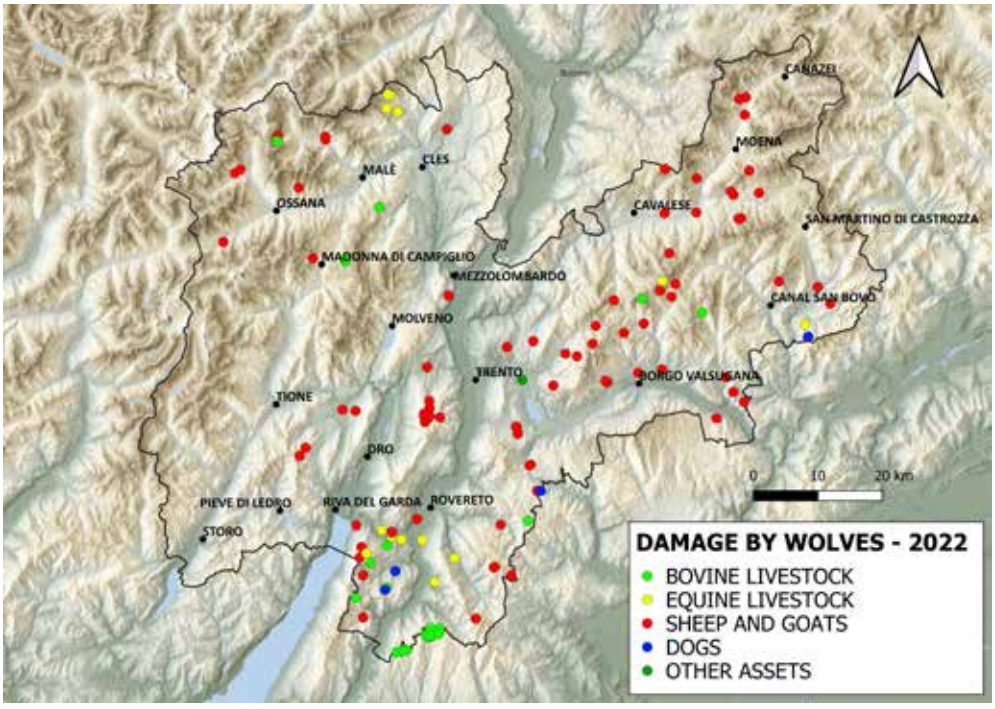


Figure 10



Prevention of damage

The management of **prevention measures** at provincial level is coordinated by the staff of the Wildlife Department, in association with the local **prevention coordinators**. The latter figure was created with the objective of guaranteeing **technical support** for the prevention of damage by large carnivores, and managing activities relating to the **supply of prevention measures** in the form of gratuitous loans (or short-term loans for emergencies). This takes place through dialogue, support and continuous liaison with users (managers of farms and mountain dairies, shepherds, beekeepers and hobbyists etc.) 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 figure** and their **assistant/stand-in**.

In 2022, **230 applications** were processed in relation to **prevention measures to protect against damage** by large carnivores (electric fences and guard dogs). These are designed mainly to defend livestock and beehives (photo 16), but also other property (photo 17).

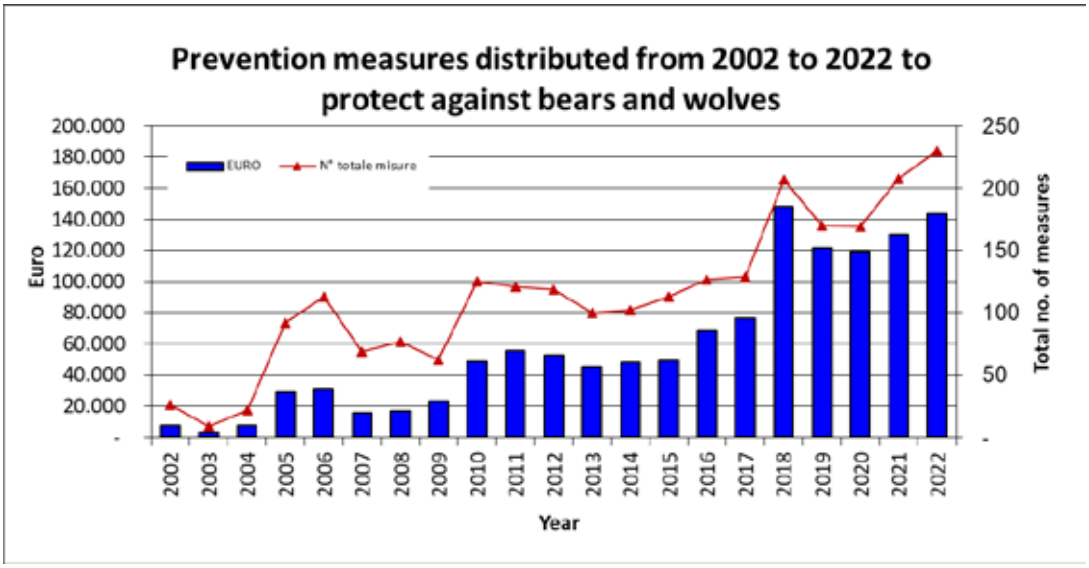
Photo 16 – Beehives protected by an electric fence in Val di Sole (M. Benvenuti, APT Wildlife Department Archives)

Photo 17 – Summer 2022: new anti-bear electrification of a waste disposal centre in Val di Tovel, Ville d'Anaunia (M. Pasquin, APT Wildlife Department Archives)

Of these, **214** were dealt with by Forestry District Offices (FDOs) through **gratuitous loans** of works (mobile fencing and fixed enclosures), at a cost of around **€128,400**, and **16** by the Large Carnivores Division through **capital funding** (mobile fencing, permanent enclosures and guard dogs), at a cost of around **€15,200**. A **total of €143,600** was thus invested in prevention in **2022**.

The following graph shows the long-term **trend** for the number of **prevention measures** distributed and the relative costs (Graph 5). It is pointed out that **until 2012** the provision of preventive measures concerned **only bears**, whereas **since 2013** there has also been a progressive increase in preventive measures requested and distributed to protect against **wolves**.

Graph 5



Guard dogs

Guard dogs (photo 18) 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 guard dogs has gradually increased.

In **2022, 12 further dogs** were funded, at a cost of around **€8,200**. 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 - Circolo del Pastore Maremmano Abruzzese**, an association dedicated to this sheepdog race. Puppies aged between two and six months were purchased from 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 2022**, a total of **86 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 guard dogs is by now **well-established**, as the provincial administration expected and hoped. This having been noted, an **update to public aid policy** is currently being studied. Given the current widespread use of guard dogs, it is likely that in future the focus of the **provincial administration's support** will shift, at least in part, from merely purchasing puppies to the **training of dogs and owners**. An initial step in this direction was made on **8 March 2022**, when a **training day on how to raise and manage guard dogs** was held at the headquarters of the Federazione Allevatori Trentini by **dott. Alberto Stern**, a Swiss veterinary surgeon and sheep breeder specialising in this type of dog. The initiative, open to the owners of such dogs and other interested parties, but also to forestry staff dealing with damage prevention, met with **participation and interest**. A similar event is being organised for the beginning of spring 2023, with the support of specialists from Piemonte, aregion where the wolf has been present in a stable manner for thirty years and where the use of guard dogs has been widespread for some time.

Photo 18 - Maremmano Abruzzese sheepdog guarding livestock at Malga Riondera, Ala (M. Zeni, APT Wildlife Department Archives)

In 2022 the Forestry and Wildlife Department continued to distribute **information panels** to farmers adopting guard dogs funded by the Province (photo 19). These have the scope of making users of the mountains and pastures aware of the presence of **dogs protecting flocks**, advising them how to behave to avoid conflict with these dogs.
Lastly, in summer 2022 a study of **guard dogs' activities and their use of space at alpine pastures** was initiated, by fitting GPS collars to two Maremmano Abruzzese sheepdogs at pastures in Val de Grépa, in Val di Fassa. The data gathered is in the process of being analysed. This preliminary study **will continue in 2023** at a further area of alpine pasture.

Photo 19 - Panel in Italian, English and German warning visitors of the presence of guard dogs and explaining how to behave to avoid conflict with the dogs. (L. Redi - APT Wildlife Department Archives)

Meetings with representatives of economic interest groups

In 2022, the dialogue already established for some time with the economic interest groups most affected by the presence of bears and other large carnivores continued.

Photo 20 – Meeting of round table with representatives of economic interest groups (C. Groff - APT Wildlife Department Archives)

The **round table with representatives of farmers and beekeepers** met twice, on **19 April 2022** and **28 November 2022** (photo20).

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 liaison 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).
In 2022, verification/support activities by the For-

estry Department and the Wildlife Department **continued**, with **monitoring of the experimental prevention works implemented in 2018, 2019, 2020** and **2021** (see the 2021 Large Carnivores Report, pages 34-35) and with the planning of further works having the same scope and characteristics.
In **2022** a new 7-wire electrified enclosure funded by the Wildlife Department came into operation at **Malga Dossioli (Avio)**, on the Trentino side of Monte Baldo (photo 22). During the year in question there was **only one attack on livestock protected by the aforementioned enclosures**, namely a young cow preyed on at the beginning of the alpine grazing season at Malga Boldera (Ala), perhaps due to the drought and high temperatures recorded from May onwards, reducing the humidity of the terrain and compromising the efficacy of electrical conduction, normally guaranteed by grounding.
In 2022, intensive monitoring of the experimental enclosure set up in 2020 at **Malga Agnelezza** (Castello Molina di Fiemme) to protect dairy goats at alpine pastures also continued. 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 also made it possible to confirm the presence of a pack of wolves near Malga Agnelezza in 2022. Despite the stable presence of the wolves, no predation was recorded, however some goats died during the season when they got caught up in the electric fence.
The experimentation described above has 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, but on the other, in certain contexts, also an **improvement in the pastures used by the animals**, with effects on the quality of the turf. With this in mind, it is to be hope that in the future electrified enclosures will be set up at other alpine pastures in Trentino to protect livestock at risk of predation, particularly where there have been **repeated episodes** of wolves preying on livestock. The data indeed shows that a **chronic spiral of attacks** by wolves on livestock at alpine pastures tends to take place when **livestock graze unattended** and where **shelters** for shepherds and livestock and the grazing methods are **inadequate for the current context**.

Foto n. 21 - Recinzione tradizionale in legno elettrificata, realizzata nel 2022 per proteggere il bestiame più a rischio di predazione presso Malga Dossioli, Avio (T. Borghetti - Archivio Servizio Faunistico PAT)

In 2021, the **prevention coordinators** specifically followed the progress of a **total of 38 alpine pastures**, which were provided with damage prevention works in the form of short loans during the animals' grazing period (usually from June to September). When possible, this temporary and/or emergency measure was replaced with the **assignment of gratuitous long-term loans** (with the works being lent to the user for a duration of 8 years) or by **funding** to acquire such works.
The support for summer grazing activities also involved the supplying of **16 accommodation modules transported by helicopter**, to encourage the constant presence and supervision of livestock by herders where there are no alternative shelters (for further information see Box 4).

Lastly, the successful first experience in Trentino in the context of the **"Pasturs" project** should be mentioned (for further details see the website pasturs.org) at **Malga Tuena (Val di Tovel)** in summer 2022, when for a certain period a **volunteer** assisted the managers of the mountain farm with **activities to supervise livestock**. These initial trials of volunteer work to support the activities of shepherds/farmers, developing spontaneously from the matching of projects such as the one mentioned with the interests of those managing livestock at alpine pastures, would appear to have positive feedback and could also experience a certain level of development in Trentino in the near future.

Box 4 - Prevention of damage by large carnivores: wooden shelters for shepherds

By Stella Liberi – Forestry Department

The recent return of large carnivores has once again led to the need to guarantee the constant **presence of shepherds alongside their herds**, as was the case in the past. The first warning signs became evident in the first few years following the implementation of the Life Ursus project, when herds with little supervision were targeted by some bears who were involved in **repeated predation**. A triggering factor in this problem was the **presence of herds at high altitude without constant human supervision**, often aggravated by the **lack of shelters for shepherds**. Having taken note of this the Forestry and Wildlife Department, as it was called at the time, decided to **transport small portable units to alpine pastures** with the assistance of **helicopters**, to **allow shepherds to remain at high altitude** and to keep sheep inside enclosures with **electric fences**, supplied free of charge, during the night. The first unit was used during the **2008** grazing season.

This action made it possible to **solve some emergency situations**, and over the years the practice was consolidated, being extended to other alpine pastures throughout the province, above all following the **return of wolves**. In **2022, 16** units were transported to alpine grazing sites.

However, the repeated use of portable units has highlighted several weak points: the **cost of transport and demands in terms of personnel** resulting from each request every year, both in the field and at administrative level; the risk of **damage to the units** or **accidents** (for example when the units are particularly exposed to the wind; the **environmental impact** of structures that do not fit in with the surrounding landscape, albeit on a temporary basis; and last but not least, the **poor comfort** offered by such structures.

Having taken note of these disadvantages, the provincial administration wishes to ensure that such units, by now adopted for several years at pastures where there are no alternative structures and access routes, are whenever possible **gradually replaced with permanent wooden shelters**. These can be built on **publicly owned land, when the owners (Municipalities and ASUC administrative bodies) participate in the initiative, also financially**. The funding of the shelters indeed takes place by means of quotas paid by all the public bodies owning forests, which flow into the provincial budget item earmarked for so-called **"Forest Improvements."** Shelters for shepherds fall fully within the context of forest/pastural infrastructures, as they have the scope of preserving the rural environment and a balanced landscape of forests and pastures. Once completed, they are handed over to the public bodies funding and authorising their construction.

Assessment of whether it is appropriate to build such facilities takes into account various factors, including the distribution of large carnivores and the damage they cause in the area, the correct use of mobile units and the rational management of pastures by herders in previous years, the location of the units with reference to the provisions of the Hazard Map, and the presence of mountain springs.

The shelters are small (around 4m x 4m), made using the ***Blockbau*** construction technique, which involves the use of logs stacked horizontally on top of each other, interlocked with notches in the wood (Figure A). The timber trunks can be left **round** or **squared off**, depending on **traditional local methods of construction** or on the Planning and Environmental Protection Department regulations.

The wooden structure, consisting of a **single room equipped with chimney**, stands on a concrete base covered with local stone, on a reinforced concrete foundation. The pitched roof is covered with galvanised sheet metal or larch

Figure A – Detail of corner joints used in the construction of the shelter at "Sette Laghi", Torcegno. (S. Liberi, APT Forestry Department Archives)

shingle. The building fits pleasantly into the landscape.

Work to build **the first shelter for shepherds** began in **2020**, to conclude in 2021, in the area of the former **Malga Posta**, in the Municipality of Ala. The work was carried out in part directly by Rovereto and Riva del Garda Forestry District Office and in part be external firms.

In **2021** a second shelter was built at **"Prato della Madonna"**, in the Municipality of Pieve Tesino (Figure B) and in **October 2022**, construction of

Figure B – Shelter built by Borgo Valsugana FDO at Prato della Madonna, Pieve Tesino. (R. Dalledonne, APT Forestry Department Archives)

the shelter at **"Sette Laghi"**, in the Municipality of Torcegno (Figure C) was completed. Both shelters were constructed by the Borgo Valsugana Forestry District Office (FDO).

In summer **2022**, work also began on the construction of a shelter at **"Fontanelle-Prada"**, in

Figure C – Shelter built by Borgo Valsugana FDO at Sette Laghi, Torcegno. (R. Dalledonne, APT Forestry Department Archives

Figure D – Shelter in the process of construction by Tione FDO at Fontanelle-Prada, San Lorenzo Dorsino. Work will be completed in 2023. (G. Antolini, APT Forestry Department Archives)

the Municipality of San Lorenzo Dorsino, by Tione FDO (Figure D), and a shelter at **"Socede di Sopra"**, in the Municipality of Castello Tesino, by Primiero FDO (Figure E). These are expected to be **completed in spring-summer 2023**, with a galvanised metal roof in the first case and wooden windows and doors for both.

Figure E – Shelter in the process of construction by Primiero UDF at Socede di Sopra, Castello Tesino. Work will be completed in 2023. (M. Zotta, APT Forestry Department Archives)

In **2023**, it is also expected to start up work on the following new structures:

1. shelter at **"Cunelle"**, Torcegno;
2. shelter at **"Val d'Ambiez"**, San Lorenzo Dorsino;
3. shelter at **"Fornasa"**, Valfloriana.

Lastly, on the basis of the plans to date, the following shelters will be prepared in the next few years:

1. shelter at **"Portela-Val d'Ilba"**, Roncegno Terme;
2. shelter at **"Orena"**, Castello Tesino;
3. shelter at **"Pian dei Cavai"**, Telve di Sopra.

Box 5 – Activities carried out by the Paneveggio Pale di San Martino Nature Park

By the Paneveggio Pale di San Martino Nature Park

In addition to the usual cooperation in the **monitoring of wolves**, in 2022, the Paneveggio Pale di San Martino Nature Park published the 17th issue of Quaderni del Parco, entitled "SmartAlp: a project to enhance the alpine grazing system" (Figure A).
In this context, Chapter V, edited by Professors Maurizio Ramanzin and Enrico Sturaro from the University of Padua's Department of Agronomy, Animals, Food, Natural Resources and the Environment (DAF-NAE) and the Manager of the Conservation, Research and Monitoring Division of the Park Authority, Piergiovanni Partel, deals with the **relationship between animal husbandry and wolves**.

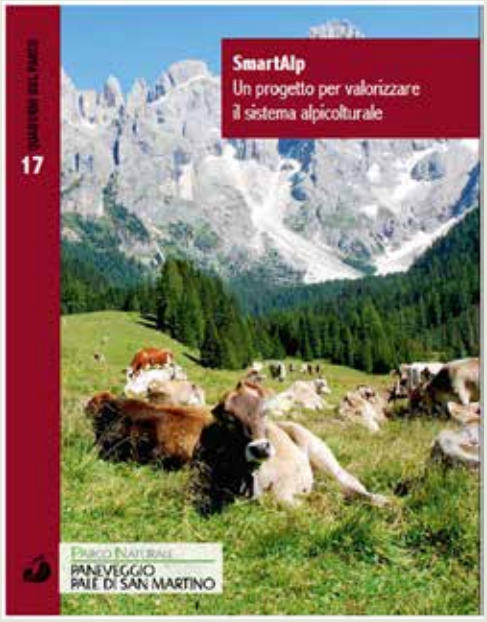


Figure A - Quaderno del Parco no. 17

The study deals with the return of the wolf to the Italian Alps and the problems of coexistence with animal husbandry, particularly due to predation on grazing animals. The publication draws on work carried out in the 2017-2019 period, with the intention of extending knowledge regarding the foreseeable **impact of wolves on farming systems** in the Paneveggio - Pale di San Martino Nature Park, identifying a methodological approach for estimating the feasibility and costs of damage prevention within the local area.

In order to identify areas that can be defended with damage prevention measures and those which on the contrary do not objectively appear to be defensible, **457 grazing units** managed by **229 tenants** were surveyed and analysed. Problems linked to compatibility and the work involved for farms were quantified, along with the added costs of applying the different protection systems, in so far as this was possible.

The analysis showed that **protection is possible** in most cases, through the use of various types of electric fences, while the costs and commitment are highly variable. It was also highlighted that support for protection from attacks by wolves should take place within a broader framework of support for the **multiple aspects involved in the sector**, bearing in mind all the interaction with other productive and non-productive sectors. The chapter also reports on the first local experiences of adopting protection systems. The Quaderno, an initiative funded by the Autonomous Province of Trento's 2014-2020 Rural Development Programme, is available free of charge on request.

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 Plan of Action 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.

Controlling action (including killing of the animal) may be taken to deal with **problem bears** or bears in critical situations, in accordance with the provisions of European regulations (Directive 92/43/EEC – Habitat Directive). On the basis of **Provincial Law No. 9/18**, the **President of the Province is responsible for authorising exceptions 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 has been 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**.

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** - **"Problem bears in the Province of Trento - conflict with human activities, public health risks and management problems. An analysis of the current situation and predictions for the future"** should be noted.

In the case of emergencies, operational management is based on the use of specialist staff from the **Provincial Forestry Service (PFS)** making up of a **special unit on call**. The system of on-call availability involves weekly shifts and is operational from **1 March to 30 November**. The team comprises a coordinator and two emergency staff (on call 24 h/day), along with **veterinary staff assigned by the Provincial Health Services (APSS)** whenever necessary. Veterinary support is indispensable for all activities providing for the manipulation of animals (wounded bears or wolves, capture operations etc.).

On **19 January 2022** and **3 August 202**2, the meetings of the **Committee for Public Order and Safety**, chaired by the **Government Commissioner**, were dedicated to the **management of problem bears and wolves**.

Problem bears

Bearing in mind the importance of promptly identifying any problem bears, in 2022 **109 organic samples** were collected from **bear damage sites**, making it possible to genetically identify **25 different animals** (12 males and 13 females).

Analysis of the 2022 data showed that **males** were more frequently involved in damage to **livestock** and in **most cases linked to food of anthropogenic origin** (compost or organic waste bins), whereas females were most linked to **damage to crops**.

In **11** cases bears were only detected at damage sites **once**, in **8** cases **twice**, and in **3** cases **three**

times, while single bears were identified **four** times (MJ2G1), **five** times (M43) and **eight** times (M62).

In **2022**, the **problem bears** M62 and F43, already carefully supervised during 2021, were monitored intensively, as specified below.
F43 (photo 23), a female born in 2018, belonged

Photo 23 - 25 July 2022: F43 photographed on the balcony of a house in the Ledro area while feeding on fruit. (APT Wildlife Department Archives)

to the same (exceptionally large) litter of four cubs as M57, removed in 2020 due to excessive confidence with man culminating with a person being attacked (see 2020 Report, pages 43-44) and M62, the male bear described below. In **2022**, F43 confirmed her tendency for **overconfident behaviour** and was thus closely monitored and subjected to dissuasive measures in an attempt to modify this behaviour. Specifically, during the summer the bear was frequently present in inhabited areas or in their vicinity in search of food (especially poultry and rabbits), showing marked overconfidence with man on several occasions. The **negative conditioning** measures put into practice had little effect (13 expeditions, mainly concentrated in the month of July, resulting in the team taking **direct dissuasive action on the bear on 18 occasions, 11** with **rubber bullets, 2** with **bear dogs** and **5** with **lights and noise**). This action was carried out systematically by the staff of Trentino Forestry Service with the scope of protecting inhabited areas and in an attempt to make the bear wary of man and human settlements. It should also be recalled that in 2021 and 2022, around 50 **electric fences** were distributed, mainly to defend **poultry and rabbits**, but also some **beehives**, with the intention of preventing damage by F43.
On **5 September 2022**, during an operation to capture the bear to replace her radio collar, **the bear died** while anaesthetised, despite the attempts of the veterinary team present to revive her. Examination of the corpse by the **Istituto Zooprofilattico delle Venezie** in Trento led to the conclusion that the probable cause of death was **suffocation** following **compression of the respiratory tract** due to her position inside the tube trap when the narcotic took effect.
M62 (photo 24), is a **male bear** born in 2018. In 2020 and 2021 the animal had already approached human settlements several times, above all in Val di Sole, Val di Non and the Paganella tableland, where the bear **entered built-up areas** on several occasions (case no. 13 in

Photo 24 - M62 filmed by a camera trap in the eastern Brenta mountains (M. Zeni/M.Vettorazzi - APT Wildlife Department Archives)

Table 3.1 of the PACOBACE). For this reason, M62 was fitted with a radio collar, carefully monitored and subject to repeated aversive action when he manifested undesirable behaviour, such as entering inhabited areas. These dissuasive measures do not appear to have had the desired effect and in **2022** his undesirable **behaviour was confirmed**.
The female bear **JJ4** is considered to be dan-

gerous, following an attack resulting in the wounding of two people on 22 June 2020 (see pages 44-45 of the 2020 Report). After this aggression 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.

On **22 June 2022** the bear, accompanied by a new litter, carried out a threatening **false charge**, reported by a cyclist in the Monte Peller area in Val di Sole.

In contact with ISPRA, the provincial administration reiterated the **risk** of future close encounters with JJ4 leading to further **incidents, requesting re-evaluation** of the level of risk and an advisory opinion for the purpose of removing the animal. The institute, while recognising the potentially dangerous behaviour of the bear, once again **did not consider there was sufficient justification for her removal**.

The bear's **radio collar stopped working** in the second part of the season and will therefore be replaced.

The fact however remains that a **radio collar cannot contain the risk** of further close encounters and possible **incidents**, given that knowledge of the animal's movements after the event (when the collar can download them) cannot effectively prevent such incidents taking place.

In 2022, the geographical position of problem bears fitted with radio collars was again made available, through the **online map (https://grandicarnivori.provincia.tn.it/Comunicazione/MAPPA-ORSI-RADIOCOLLARATI)**. This was **updated regularly** (without being excessively precise, in order to protect the animals) for the benefit of all those visiting the mountains and interested in knowing where such animals are present.

Another online map contained reports of female bears **accompanied by cubs born during the year**, with the scope of offering an additional tool for preventing potential incidents following surprise encounters at close quarters.

Lastly, as regards bears in captivity, **M49** was monitored by veterinary staff during the year, showing that he was in **good health** and displayed no stereotypical behaviour.

Activities of the emergency response team

In 2022, the **emergency response team** was **sent into action 40 times** from 07/03/2021 to 27/11/2022, always in relation to **bears**, with 6 occasions given code red status, 22 code yellow and 12 code white. The staff came into **direct and close contact** with bears on **7 occasions** (graph 6), carrying out a total of 10 deterrent operations.

To improve the response of the emergency response teams, a **new vehicle** was purchased and equipped.

Close encounters between people and bears

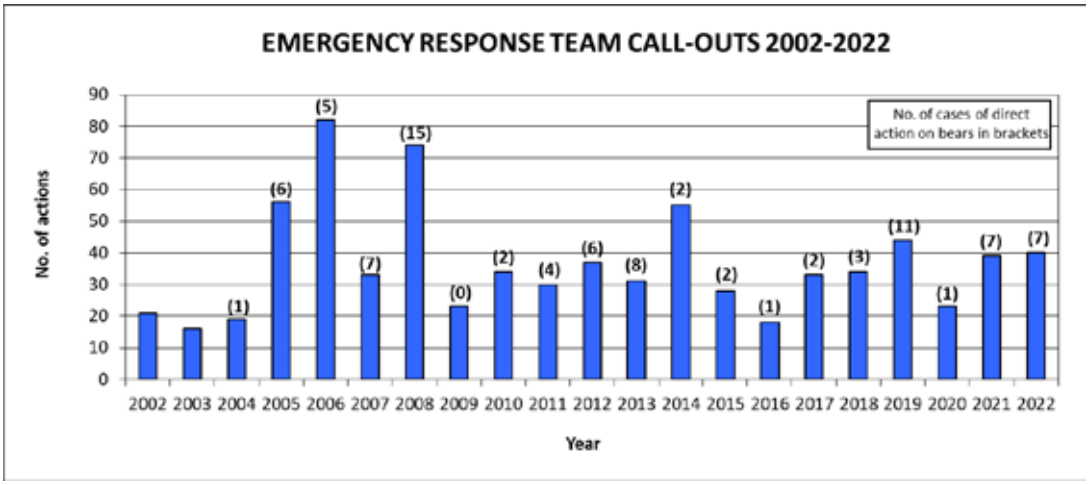
In 2022 there were **19 close encounters between people and bears**:

- in **12** cases the bear showed indifference or moved away rapidly;
- in **3** cases the bear approached people without manifesting threatening behaviour;
- in **2** cases the bear exhibited **threatening behaviour** (puffing, growling or pawing the ground);
- in **2** cases the bear carried out a **false attack** (charging up close to the person in a threatening manner but without physical contact).

On **6 occasions** there were **cubs** present: these encounters gave rise to **two false charges, two cases of threatening behaviour** and **one case of a bear briefly approaching without threatening behaviour**, in the last case followed by immediate flight.

In **2 of the reported encounters a dog** was also present. In one of these cases (female bear with

Graph 6



On one occasion the emergency response team was sent into action to recover and rehabilitate a bear hit by a car (see Box 7 on page 44).

cubs and dog off the leash) this gave rise to a false charge, whereas in the other case (dog on the leash) the bear showed indifference.

Capture of bears

2 captures were carried out during **2022**, involving **2 different bears** (photo 25).

1. On **14 May 2022**, at **Crescino** (Municipality of **Campodenno**) the **young male** known as **M78** (aged 2) was captured while freely ranging. The animal had been seriously injured following a road accident and was thus transferred to the facilities dedicated to bears at Casteler to aid his recovery, with the scope of then releasing him into the wild (for further details see Box 7).
2. On **5 September**, at Malga Trat (Municipality of **Ledro**), during a capture operation to replace her radio collar, the **young female bear F43 died** while anaesthetised (see section on "problem bears).

The number of **captures** of bears (**33 different animals**) taking place **since 2006** has therefore risen to **51** (29 involving females, 20 males and two of undetermined sex).

Photo 25 – The young bear M78, sedated after the road accident taking place at Crescino (Campodenno) on 14 May 2022 (M. Zeni, APT Wildlife Department Archives)

34 of these 51 captures were carried out with **tube traps, 10** on **free-ranging bears, 4** with an **Aldrich snare** and **3 manually** (for cubs born that year).

Box 6 – The health of large carnivores in Trentino

By Roberto Guadagnini

Captures of bears for management purposes and post-mortem examinations of bears and wolves found in Trentino provide useful information regarding the **health of wild animal populations**, in the context of overall healthiness according to the so-called "one health" approach.
Following captures, blood, serological, coprological and skin **tests** are carried out to highlight **any** infestation and infectious **pathologies** underway, also at sub-clinical level. Over the **three years of the study (2020-2022) over thirty animals** have been tested, including both bears and wolves. All the animals subjected to serological screening, carried out in cooperation with Trento APSS and IZSVe, **have shown negative results for infectious pathologies**. The pathologies taken into consideration can concern both wild carnivores (bears, wolves, lynx, foxes, badgers, etc.) and domestic carnivores (cats and dogs). Furthermore, the blood samples taken were also tested for pathologies potentially relevant to other domestic animals (sheep, goats and cows). In the latter case the results again showed no pathogens of infectious diseases that can be transmitted to domestic livestock.
All the animals, whether alive or dead, were subjected to screening for faecal and cutaneous **parasites**. In the case of bears, no parasites have ever been found at cutaneous or coprological level, whereas in **wolves** ascarids have occasionally been found in faeces, and in a few but significant cases, sarcoptes scabiei mites have been found on the skin. In two cases this gave rise to serious systemic damage also contributing to the death of the individual. The disease, known as **"sarcoptic mange"**, diagnosed with clinical tests and skin scraping, was subsequently also confirmed by histopathological examination.
The infectious skin disease in question is usually limited to a few animals in the pack (but in some cases can affect all its members) and generally affects the weakest animals with the poorest immune defences. In general, animals in good health but with sarcoptes scabiei parasites tend to coexist with the parasite without suffering excessive physiological damage. However, due to the continuous scratching, infestation can apparently also lead to serious damage in originally strong and healthy individuals, but who manifest an excessive reaction (inflammatory) of the immune system to the pathogen. Generally speaking, in wolves the pathology is self-limiting, as seriously ill animals perish, without the disease spreading to animals in other packs.

Road accidents involving bears

Road accidents involving bears represent **potential emergency situations**, as injured bears remaining close to roads can be dangerous. For this reason, reports of accidents require immediate verification by the emergency response team and the dog unit.

In **2022** there were **7 cases of road accidents** involving **bears** in the province of Trento (Table 6), one of which fatal, bringing the total number of such accidents in the region **recorded to date** to **52** (of which 2 in the province of Bolzano) (Figure 11).

Table 6 – Road accidents involving bears in 2022

DATE	LOCTION	BRIEF DESCRIPTION OF EVENT AND OUTCOME OF ACCIDENT	GENETIC IDENTIFICATION OF BEAR INVOLVED
14 May 2022	S.P. 73 between Crescino and Maso S. Angelo, Campodenno	Collision involving unknown persons. Young male bear seriously wounded (multiple injuries) Captured, rehabilitated and released into the wild.	M78, male aged 2 i
4 July 2022	S.S. 239 between Folgarida and Passo Campo Carlo Magno	Vehicle damaged; the bear hit moved away.	Unidentified
12 July 2022	S.S. 241, half-way down Lake Molveno	Probable cub born during the year, who moved away after the accident. Traces of blood found at the accident site.	M84
1 September 2022	S.S. 42, just below Vermiglio	Female cub born during the year hit by unknown persons, died after the accident.	F71
13 September 2022	S.S. 43 at Dres, in the Municipality of Cles	Vehicle damaged. The animal moved away.	F42, female aged 4
11 October 2022	S.P. 64 between Fai della Paganella and Andalo	Vehicle damaged. Traces of blood and tissues at the accident site. The animal moved away.	F72
17 October 2022	S.S.421 between Tavodo and Ponte Arche	Animal moved away. Fresh excrement found a short distance away related to F63, a female aged 1.5 years. No results from samples taken from the vehicle.	Unidentified

Figure 11

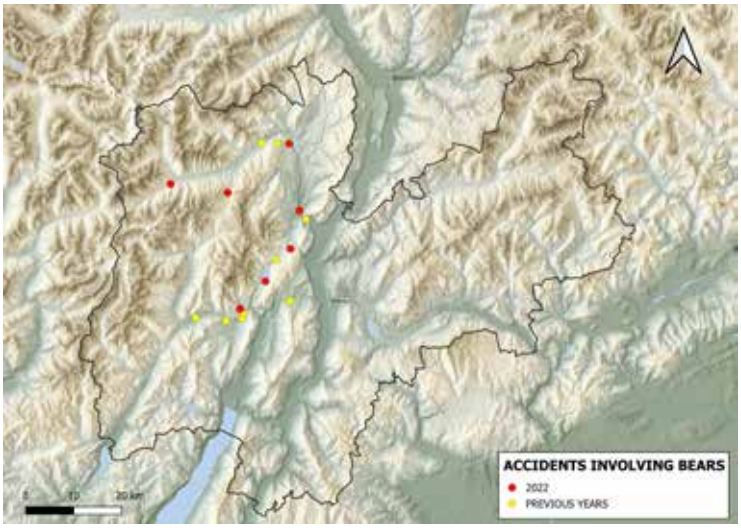


Figure 11 shows the locations of road accidents involving bears recorded in 2022 and previous years.

Box 7 – The recovery, rehabilitation and release into the wild of M78

On the night of **14 May 2022**, the 115 operations centre received a report of an **injured bear on the side of the road** (hit by persons unknown), spotted by a driver travelling along Val di Non provincial road 73 **between Crescino and Maso S. Angelo**, in the Municipality of Campodenno. The **emergency response team** was thus sent to the site. They were assisted by **volunteer firefighters from Campodenno**, to guarantee road safety, and the **vet** responsible for dealing with large carnivores. The bear hit by the vehicle was young, apparently exhausted and dragging itself along with evident difficulty. It was close to a **busy road**, in an area with various infrastructures. Having ascertained the situation, the young animal was **sedated and transported to a suitable site for the appropriate veterinary checks**, which highlighted minor **pleural effusion** and a **clean break of the right humerus and left femur**. The bear was thus **transported to the forestry nursery centre of Casteler**, where he was **kept under observation** with the scope of restoring his health so he could subsequently be **released into the wild**.

Genetic testing identified the animal as **M78**, just over two years old, born in 2020 between the lower Val di Non and Valle dello Sporeggio. Over the following **23 days** the young bear, weighing **74 kg** at the time of capture, was fed very discreetly through a narrow opening in the wall of his den, in such a way as to **minimise contact with man**. There was indeed a risk that the bear could develop excessive **familiarity with humans**, which could prejudice the **outcome of his release into the wild**.

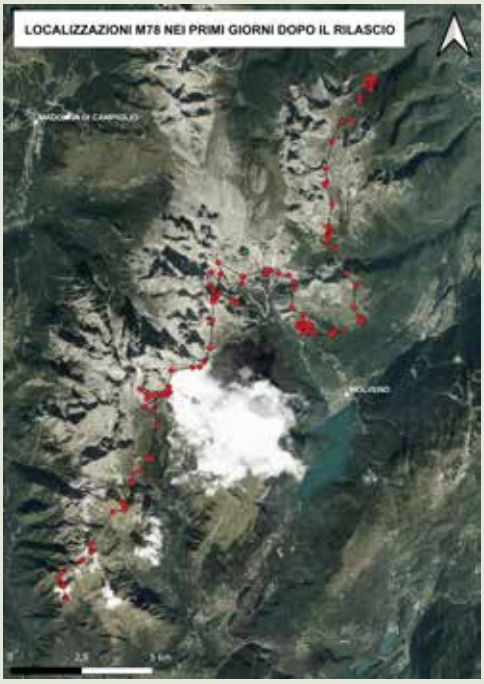
Throughout the period of rehabilitation M78 continued to remain wary of man. On **6 June 2022**, having consulted the vet, the bear was released into the wild in Val Cadin di Campodenno in the **Brenta Dolomites**, equipped with a radio collar and ear tags. On his release he weighed **92.5 kg**

14 May 2022: M78, retrieved at Crescino (Campodenno), and in the den where he was kept in Casteler, still sedated. (M. Zeni, APT Wildlife Department Archives)

A couple of days after his release, **M78 made his first major journey**, travelling up Val Cadìn, crossing the Montòz pass during the night and spending the next day in the midst of pine trees in a steep area between Val dei Cavai and Malga Spora. That night the bear crossed the Dagnola pass, continuing his journey over subsequent nights until he reached the

6 June 2022: M78 on his release in Val Cadin, Campodenno. (M. Zeni, APT Wildlife Department Archives)

southern Brenta mountains (map).



M78 spent the summer in Val d'Algone, Val Manez and the Valandro/Asbelz area, **always staying at medium-high altitude, often in steep areas**. As far as is known, **he was never sighted**. At the beginning of August the bear moved rapidly towards the north, across Val d'Ambiez, Val Dalun and Val di Ceda, up to the wooded slopes of Spormaggiore, where he had spent time with his mother and sister in the first year of his life.

On **9 August** the bear was **sighted, for the first time after his release**, by a hunter from Sporminore, through a telescope; examination of the brief video filmed by the observer showed that the bear had fully **recovered his physical abilities**. On **14 August he managed to free himself of the radio collar** on the Sporminore mountain and all trace of him was lost.

9 August 2022: M78, fully recovered, sighted on Sporminore mountain. (Frame from smartphone video - S. Valentinelli - APT Wildlife Department Archives)

This concluded the phase of intensive monitoring of the animal, whose presence may in the future be confirmed by **genetic** and/or **visual identification** (the ear tags make him recognisable). M78's full physical rehabilitation and above all the **extremely elusive behaviour** displayed after his release confirm the fully successful outcome of the operation.

The Dog Unit

The Bear Dog Unit has now been **active for sixteen years** and in **2022** recorded **24 operations** linked to the management of bears in the province.

Road accidents involving bears were again shown to be one of the most delicate problems to be managed using the dog units. Last year there were **8** inspection and recovery operations carried out following 7 road accidents involving vehicles and bears (in one case the dog units went to the same accident site to carry out two separate inspections, to better understand the dynamics of the event and the fate of the bear involved). On one occasion the dog unit also intervened following a **road accident involving a wolf**, making it possible to ascertain that the animal had moved away without suffering serious consequences.

In one case, following the impact a **wounded bear** moved a short distance away from the place of impact and was subsequently found thanks to the use of a bear dog in the emergency response team (see Box 5).

In 2022, the dog unit was only required to intervene once to reconstruct the dynamics of **man-bear** interaction. This took place in Spormaggiore and concerned a close encounter between a female bear accompanied by at least one cub and a man.

Photo 26 - Jamthund bear dog. (APT Forestry Department Archives)

In 2022, **four dissuasion** operations were carried out, all directed at the female bear F43. On three further occasions it was not possible for the dogs to make contact with the bears.

In August the dog unit was involved in a special operation as part of an investigation due to the finding of domestic livestock carcasses at pastures high in the mountains. In this case it was possible to exclude the involvement of large carnivores in the death of the animals.

In addition to the above, there were **20 anti-poaching inspections** regarding different species, routine outings for the purpose of **training** and a number of meetings, including a **veterinary training** day and

another training session aimed at training the dogs to look for organic samples along bear trails specifically created by handlers.

Waste management

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.

A demanding operation involved the replacement (2020-2021) of all the organic waste bins situated in **Valle dei Laghi, Valle di Cavedine** and the **Paganella tableland**, in the latter case with the financial support of the provincial administration for the local waste management body, in order to purchase new bins (photos 27 and 28), thanks to an extraordinary emergency order (for details see page 44 of the 2021 Report).

The attention then shifted to the **Val di Sole**, an area also experiencing episodes of bears accessing organic waste.

Photos 27 and 28 – Bin in its entirety and detail of the new type of bin for the collection of organic waste adopted by ASIA on the Paganella tableland. (M. Zeni, APT Wildlife Department Archives)

Indeed, in **2022** the provincial administration **transferred** the funds necessary to the local **Comunità di Valle** responsible for waste management, in order to proceed with **protection of the bins currently in use**. Priority will be given to around **50 waste disposal centres** where there are currently around a hundred organic waste bins, which will be made inaccessible to bears by using **bear-proof structures** (photo 29).

Photo 29 – The first two bear-proof structure prototypes initially positioned in Val di Sole to protect organic waste bins. (M. Benvenuti, APT Wildlife Department Archives)

At the end of 2022, the provincial government decided to include the question of possible interaction between wildlife and management of organic waste within the **provincial waste management plan**. Specifically, the Province provided for the need for waste disposal managers to plan and implement **adaptation of the current systems for organic waste collection** in the presence of large carnivores (and other wild species such as boars for example) within certain time frames, preparing specific plans. In order to draw up such plans, the relevant bodies will be able to make recourse to **technical support from the Wildlife Department**.

4. COMMUNICATION

The main **activities carried out during 2022** are summarised below.

Evening sessions and meetings

Table 7 lists the **meetings/evening**s 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, **36 press releases** were issued, of which **12** regarding **bears, 20** regarding **wolves** and **4** concerning **large carnivores** in general.

Furthermore, the necessary information was provided in order to respond to **6 questions raised at the Provincial Council** (standard or with an immediate response): **3** regarding **bears, 2** concerning **wolves** and **1** regarding large carnivores in general.

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

INFORMATION AND TRAINING ON LARGE CARNIVORES:

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

- **25 February 2022**: information evening entitled "Bears and wolves, should we be afraid?" (organised by the Municipality of **Dimaro** - SAT branch);
- **1 May 2022**: session on large carnivores for the Alpinismo Giovanile group in **Lessinia**;.
- **6 May 2022**: evening on the bear for the SAT MontagnAmica festival in **Lavis**;

Table 7 – Communication initiatives in 2022

TYPE	DATE	PLACE	NO. PARTICIPANTS
Public meeting on wolves at Brentonico	10 February 2022	Brentonico	c. 100
Meeting with the Municipal Council of Mori about large carnivores	15 February 2022	Mori	c. 20 (with live streaming)
Video conference on wolves with Mayors (Consortium of Municipalities)	22 February 2022	Trento	-
Public meeting on large carnivores with local farmers at Brentonico	2 May 2022	Brentonico	c. 40
Information evening at MUSE – research regarding bears (FEM and monitoring volunteers group)	11 May 2022	Trento, c/o Muse	c. 50
Public meeting on wolves at Cavedine	7 June 2022	Cavedine	c. 70
Public meeting on wolves at Fornace	8 June 2022	Fornace	c. 60
Public meeting on bears in the Municipality of Novella (followed by the film "La frequentazione dell'orso")	20 November 2022	Cloz	c. 100
Public meeting on wolves in the Municipality of Novella (followed by a documentary about wolves)	4 December 2022	Cloz	c. 50

- **23 June** and **26 June**: guided walk at **Ledro Land Art** on the trail of bears and wolves;
- **28 July**: guided walk at **Ledro Land Art** on the trail of bears and wolves;
- **11 August** and **25 August**: guided walk at **Ledro Land Art** on the trail of bears and wolves.

Other activities:

4 July 2022: Interview on large carnivores with **Rai Radio 1** (in the context of the programme "Sentiero 150" to celebrate SAT's 150th anniversary).

Other communication initiatives

- 2 February 2022: presentation of update on the **Life Lynx project**, Dr. Miha Krofel-SLO), at MUSE;
- February 2022: printing and distribution of **new updated brochures "The wolf in Trentino"** (1,000 copies);
- 26 May 2022: lecture on **wolves** at the **Istituto Agrario di S. Michele all'Adige** (for students);
- 28 May 2022: attendance at **presentation of the book "Storie per Ursus"** in Ala;
- 30 May 2022: interview about **bears** with **Web-TV Voce 24 News**;
- 1 June 2022: interview about **large carnivores** with **TV RTTR**;
- 10 June 2022: interview about **large carnivores** with **Trentino TV**;
- 15 June 2022: interview about **large carnivore**s with the magazine **Trentino Mese**;
- 22 June 2022: interview about **large carnivores** with the magazine **Agricoltura Trentina**;
- 23 June 2022: **field trip** (on the subject of bears, prevention and management) with Jay Honeyman, an **expert from Canada**;
- 8 July 2022: lecture on large carnivores in the context of the **Master Fauna HD course** in **Mezzolombardo**;
- 30 August 2022: **field trip** (on the subject of bears), parish of **Fai della Paganella** (photo 30);
- 4 September 2022: participation at the **Coesistenza Festival** in **Lessinia** regarding coexistence with large carnivores;
- 12 October 2022: **field trip** (on bears) with two classes attending **vocational courses at FEM**;
- 16 October 2022: participation at the **Fair in S. Luca in Vallarsa** with a **stand about wolves**;
- 8 November 2022: lecture **on large carnivores** at the **University of Trento's Faculty of Economics and Commerce**;
- 8 November 2022: lecture **on large carnivores** at the **University of Trento's Faculty of Economics and Commerce**;
- 14 November 2022: lecture **on large carnivores** at the **Liceo Rosmini** high school in **Trento**;
- 15 December 2022: interview on the management of **bears** with **Mi Manda RAI 3**;
- 19 December 2022: lecture on **large carnivores** at the **Istituto Agrario di S. Michele all'Adige** (for students from farming families).

Photo 30 – Collection of bear hairs from a rub tree during the field trip on 30 August 2022. (M. Zeni, APT Wildlife Department Archives)

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 2022:

- 27 January 2022, updating of **emergency response team coordinators** at Casteler;
- 2 February 2022, training of new **damage inspectors** (procedures) at Casteler;
- 2 March 2022, updating for all **provincial staff involved in the management of large carnivores** c/o Casteler;
- 8 March 2022, training session on **guard dogs**, at the **Associazione Provinciale Allevatori** (lecturer dott. Alberto Stern);
- 14 - 15 March 2022, lectures in the classroom and support in the field with staff from the Tuscany and Friuli Venezia Giulia regions, dedicated to prevention and the management of overconfident large carnivores (photo 31);
- 16 March 2022, lecture via Google Meet, in the context of the educational project “wolves: getting to know our neighbours”, Istituto Salesiano S. Croce di Mezzano (TN);
- 12 April 2022, training on ascertaining damage to livestock for the new **damage inspectors** via video conference;
- 12 May 2022, presentation for webinar dedicated to guard dogs, organised by the website capre.it;
- 17 May 2022, training for **damage inspectors** at Casteler;
- 27 May 2022, training for **damage inspectors** regarding ascertaining damage to crops, via video conference;
- 31 May 2022, meeting to update the staff of the **emergency response teams**, at Casteler;
- 1 June 2022, training session with the expert **J. Honeyman (Canada)** on the **management of problem bears**, at Casteler;
- 13 September 2022, training session at **malga Tuena (Tovel)** concerning **guard dogs**;
- 3 November 2022, meeting to update **emergency response team coordinators**, at Casteler.
-

Photo 31 – Training session on the management of overconfident large carnivores, staff from Tuscany and Friuli Venezia Giulia. (C. Groff - 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.

The Alpine Convention Large Carnivores Platform

2022 saw continuation of the activities of the **Alpine Convention Large Carnivores Platform (WISO)**, set up in 2009, 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 2022, the Platform met online, with a **videoconference call** on **15 February**.

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The Large Carnivores Initiative for Europe (LCIE) and the Bear Specialist Group of the International Union for the Conservation of Nature (IUCN)

In 2022 the staff of the provincial administration again participated in the activities of **LCIE and IUCN's Bear Specialist Group**.

Large Carnivore Initiative for Europe
IUCN/SSC Specialist Group

Bear Specialist Group

Other opportunities for national and international networking

- 4 March 2022, **seminar at the University of Chieti-Pescara** on "The technical and scientific contribution to political and administrative decisions for the **conservation of large mammals**";
- 9-10 March 2022, meeting on large carnivores in the context of **Arge-Alp** in **Innsbruck**;
- 14 March 2022, technical meeting on **dissuasion** with staff of the **Tuscany, Friuli Venezia-Giulia** and **Veneto regions** and the **Autonomous Province of Bolzano**, at **Casteler**;
- 17-19 June 2022, **international workshop on problem bears** at the **Abruzzo, Lazio and Molise National Park** (photo 32);
- 23 September 2022, annual meeting with the exchanging of ideas and experience with colleagues from the **Autonomous Province of Bolzano's Hunting and Fishing Office** at **Tel** (Val Venosta - BZ).
-

Photo 32 – Scanno (Aquila): international workshop on problem bears, 17-19 June 2022 (M. Zeni - APT Wildlife Department Archives)

7. SUMMARY

- **Status of bear population**: at least 14 litters recorded in 2022, with at least 25 cubs. 3 died (1 from natural causes, 1 in a road accident and 1 during a capture operation. Possible continuation of the **positive trend** for the population (last estimate available: 73-92 bears, excluding cubs born during the year, at the end of 2021; see pages 8-10 of the 2021 Report). Intensive genetic monitoring to be carried out again in 2023 will be able to confirm this hypothesis.
- **Distribution of bears**: individual males over a vast distribution area (41,317 km2) from Piedmont to Bavaria and Friuli VG. Females over an area of 1,726 km2) (approximate data while awaiting intensive monitoring in 2023), the females' distribution area is probably still growing.
- **Status of wolf population**: at least 29 packs estimated to be present, 5 of which mainly outside the province; at least 18 packs breeding in 2022; 14 wolves found dead, 8 of which due to accidents, 4 due to natural causes, 1 following an accident occurring in an attempt to prey on domestic livestock and 1 for unknown causes. The **trend** is still for growth, in terms of both numbers and spatial expansion.
- **Distribution of wolves**: 19 packs in eastern Trentino and 10 in western Trentino; no packs as yet ascertained in south-western Trentino (Rendena-Giudicarie esteriori-Ledro).
- **Predation/consumption of wild animals by wolves**: 363 prey found (144 red deer, 162 roe deer, 38 chamois, 14 mouflons, 5 others).
- **Status of the lynx population**: still only one animal present: B132 (15th year in Trentino), recorded a few times in the Ledro/Storo area.
- **Status of the golden jackal population**: reports on the increase, second breeding group ascertained (in the territory of Tesero in val di Fiemme), in addition to the known group in the Fiavè/Lomaso area.
- **Damage by bears**: 301 cases for a total of around 172,000 euro compensated (partial data).
- **Damage by wolves**: 162 cases for a total of around 165,000 euro compensated (partial data).
- **Trend for damage by large carnivores**: stable for bears, decreasing for wolves (-15% compared to 2021). No damage by lynx or golden jackals.
- **Prevention works**: 230 works distributed/funded, with an investment of around 143,600 euro.
- **Guard dogs**: 12 new dogs distributed, with 8,200 euro invested; in total 86 dogs have been provided by APT, while additional dogs have been "self-produced"; new information panels about the dogs produced and positioned in the province.
- **Support for animal husbandry**: new trials of electric fences, 38 mountain pastures followed directly by the prevention coordinators, 16 portable units taken to the mountains for the summer and 3 wooden shelters built.
- **Management of problem bears**: intensive monitoring of the problem bears F43 (deceased), M62 and JJ4.
- **Action by emergency response team in relation to bears**: 40 call-outs, 7 occasions involving direct contact with bears, 10 operations to deter bears (with dogs and/or rubber bullets).
- **Close encounters between bears and people**: 19 cases recorded, with 2 false charges.
- **Capture of bears**: 2 operations carried out: one to fit a radio collar to the female bear F43 (who died during the process), and one for the recovery, rehabilitation and subsequent release into the wild of the male bear M78, injured as the result of an accident.
- **Road/rail accidents**: 7 involving bears (all road accidents) and 8 involving wolves (3 rail and 4 road accidents); no drivers or passen-

gers were injured. The bears moved away, except in two cases, with one dying and one treated and then freed. The wolves instead all died as a result of the impact, except in two cases.

- **Activities of the bear dog units**: 24 operations carried out, 8 of which to follow up road accidents involving bears and 4 for deterrent activities; a further 20 operations were carried out to combat poaching of various species.
- **Bear-proof bins**: a new phase in the distribution of bear-proof bins was started up in Val di Sole, along with a review of the provincial waste management plan, to provide for progressively equipping the whole of Trentino with organic waste collection systems taking into acount interaction with wild animals.
- **Communication**: 9 public evenings, 36 press releases (12 on bears, 20 on wolves and 4 on large carnivores); 6 council questions (3 on bears, 2 on wolves and 1 on large carnivores); new informative material produced (several brochures and articles); activities with SAT.
- **Staff training**: 14 initiatives carried out.
- **National and international networking**: continuation of activities with the Alpine Convention (Large Carnivores Platform); cooperation with the Province of Bolzano and in the context of the Euroregion; second meeting in the context of the new cooperative agreement on bears with the Abruzzo, Lazio and Molise National Park. Further activities carried out with LCIE (Large Carnivores Initiative for Europe) and IUCN's Bear Specialist Group.

NOTES

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