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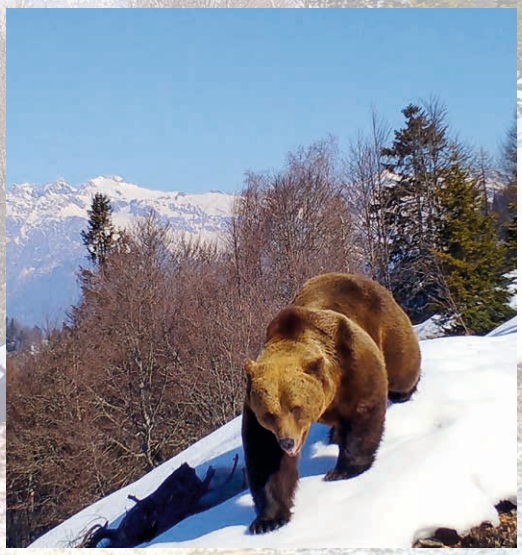
2020 LARGE CARNIVORES REPORT



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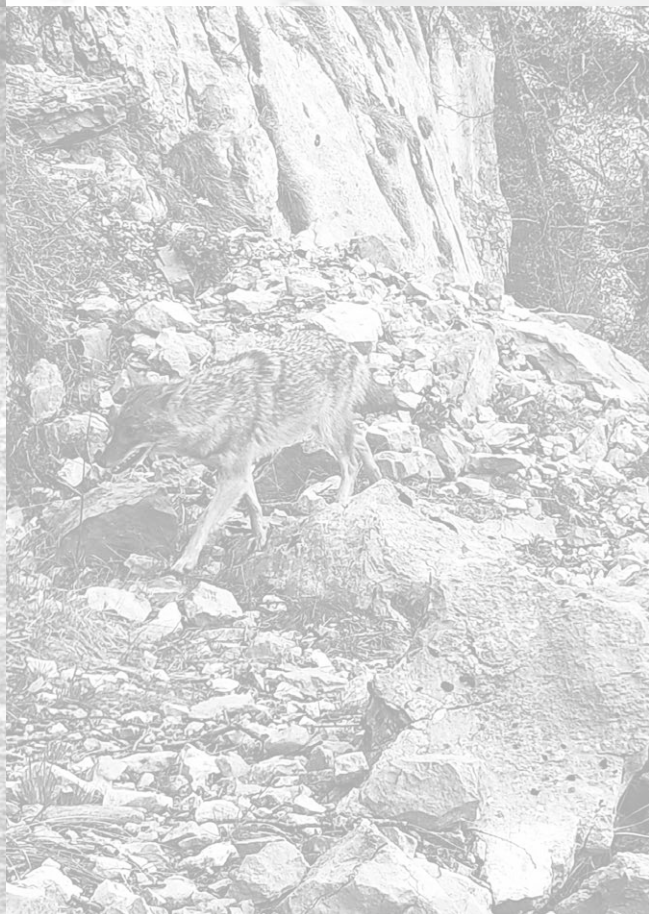

PROVINCIA AUTONOMA DI TRENTO

WILDLIFE DEPARTMENT
Large Carnivores Division

2020 LARGE CARNIVORES REPORT

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CONTENTS

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1. MONITORING

1.1 Brown Bear

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

Photo 1 - Adult male bear captured on film by a camera trap in the Brenta Dolomites (M. Papi - APT Wildlife Department Archives)

Genetic monitoring

Genetic monitoring is based on the collection of organic samples (hairs, scats, urine, saliva and tissues) and takes place using two methods, commonly described as **systematic** monitoring, based on the use of traps with scent bait, designed to "capture" hairs using barbed wire, and **opportunistic** monitoring, based on the collection of organic samples found in the area during routine activities, at damage sites and by checking **rub trees** (Photo 2).

In **2020 genetic monitoring of the bear** was limited to **organic samples considered to be strictly necessary** (e.g. emergencies and problem bears, dead animals, samples collected at damage sites of uncertain attribution, and other specific cases). Indeed, in 2020 it was decided to carry out **intensive genetic monitoring,** designed to determine the main demographic parameters of the population, **every second year.** This decision was made both on the basis of the need, already considered for several years, to **optimise the effort** and costs involved in this

Photo 2 - Bear hairs on a rub tree equipped with barbed wire (M. Zeni - Wildlife Department Archives)

activity **in the medium-long-term** while maintaining a **good level of monitoring,** and of the specific economic/social situation of this year, which has demanded **rationalisation of expenditure** in all sectors.

In **2021** it is therefore expected to again carry out **intensive monitoring (opportunistic** and **systematic),** which will make it possible to obtain up-to-date information on the extent and structure of the population, survival rates, trends, distribution and dispersion.

In 2020 **genetic testing** of bear samples was carried out for the **19th consecutive year, coordinated by APT's Forestry and Wildlife Department, Large Carnivores Division**, with the collaboration of FEM, ISPRA, PNAB, MUSE, Associazione Cacciatori Trentini (ACT) and volunteers. **Genetic testing** was carried out in a coordinated manner by the Conservation Genetics Research Unit at the **Fondazione Edmund Mach**, for samples from the Province of Trento and some samples from the Autonomous Province of Bolzano and the Veneto and Lombardy Regions.

In 2020, the **Regions and Autonomous Provinces hosting bears in the Italian Alps** (Trentino, Friuli Venezia Giulia, Veneto, Alto Adige/Sud-Tirol and Lombardy) signed an **agreement with the Fondazione Edmund Mach,** on the basis of which **all organic samples relating to bears in the Italian Alps** will be analysed at **FEM** in S. Michele all'Adige, instead of at ISPRA (Istituto Superiore per la Protezione e la Ricerca Ambientale) in Bologna, as took place up to the previous year. The agreement specifies methods of **cooperation**, the **coordinating role of ISPRA,** which remains significant, exchanging of information, the use of data etc. For this reason, **APT also participated in the agreement,** having promoted the carrying out of genetic testing of large carnivores for many years, along with FEM, and specifically the Conservation Genetics Research Unit at the Foundation.

BOX 1 - The activities of FEM's genetics laboratory

By the Fondazione Edmund Mach's **Conservation Genetics Research Unit (CONGEN)**

2020 concluded the first **five years of genetic monitoring of the wolf and the bear** by the Fondazione Edmund Mach's **Conservation Genetics Research Unit (CONGEN),** supporting the Autonomous Province of Trento. During 2020, the services provided by the CONGEN unit mainly related to solving cases of a forensic nature: predation on livestock of uncertain attribution, attacks towards people or damage involving various assets. Furthermore, the tests made it possible to identify wolves involved in road accidents and young bears found dead after having been killed by adults.
The CONGEN unit analysed a total of **66 samples**, of which **10 attributable to wolves** and/or dogs and **56 to bears**. Genetic testing made it possible to genetically characterise four

wolves, three of which never previously identified (one male and two females) and 16 bears, of which five new (two males and three females).
The CONGEN unit also applied its resources to deal with **two bear attacks towards people,** taking place respectively on 22 June 2020 in the Municipality of Cles, and on 22 August 2020 in the Municipality of Andalo. Procedures and methods commonly used in forensic genetics were applied, designed to preserve and protect possible traces of an organic nature from environmental contamination. The findings provided for analysis, especially the clothes worn at the time of the attack, were the object of careful inspection. In both cases the investigation resulted in the finding of hairs attributable to a bear and traces of saliva. The biological samples were processed according to the Pacobace protocol and the genetic profile obtained was compared with the database containing the genotypes of all known bears present in the area. In both cases genetic testing was decisive in **attributing the event to specific individuals.**
Furthermore, the CONGEN unit recently identified a number of biological samples collected in Trentino and surrounding areas as belonging to a species of Canidae rapidly expanding throughout Europe, the **golden jackal (*Canis aureus*)**. In order to provide scientific support to APT, the CONGEN unit is in the process of optimising the methods necessary to apply conservation genetics to this species as well.

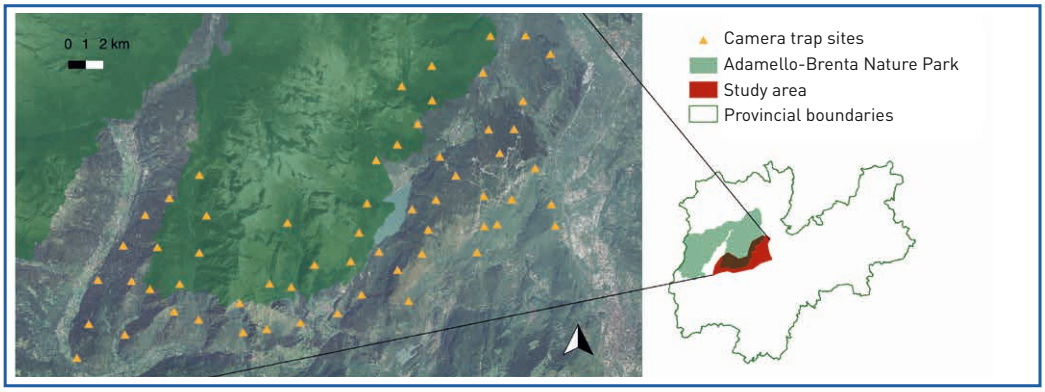
BOX 2 - Systematic monitoring of large mammals with camera traps – update in the sixth year of sampling

By Valentina Oberosler, Marco Salvatori, Paolo Pedrini, and Francesco Rovero (**Muse-University of Florence**)

In **2020** the **long-term programme of wildlife monitoring** through the systematic use of **camera traps** continued. Started up in 2015, the project takes place in the context of the agreement between APT and MUSE dedicated to large carnivores, and since 2019 the programme has made recourse to scientific supervision provided by the University of Florence. The project provides for the monitoring of **60 sites** in a 220 km^2 area in the southern part of the **Brenta mountains** and the neighbouring Paganella-Gazza massif (Figure A) in summer. See the reports issued in previous years for details regarding the distribution and positioning of camera traps.

In line with previous years, in 2020 sampling took place **from 10 June to 3 September**, with a total of 2,032 camera days (average of 35.03 per camera). The total number of operational sites in the area in 2020 returned to 60, following recovery of the site not sampled during summer 2019 because it was inaccessible following the Vaia storm. One camera trap was stolen, whereas at one site the camera's memory card was removed, so a total of 58 sites were therefore usable for the purpose of analysis. The cameras recorded **81,420 images**, of which **12,082 of medium/large wild animals**, belonging to **10 species**. Once again this year, the extensive **presence of man** in the study area was recorded and quantified, with a total of **59,960 images of people on foot, vehicles and domestic animals**: this is **almost 5 times the number of images relating to wild mammals**.

Figure A - Map of the 60 camera trap sites in the study area in western Trentino. The territory of the Adamello-Brenta Nature Park is shown in green



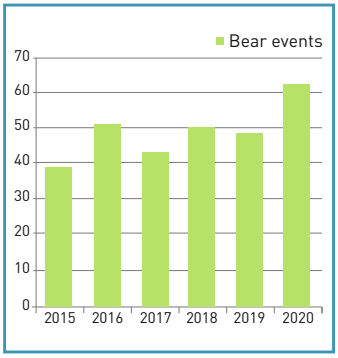
As regards domestic animals, the photographs showed that by far the largest number related to the passage of **dogs** (**12,634**), subdivided as follows: 3.966 were of **dogs on the leash (31.4 %)**, 8,593 of **dogs off the leash (68%)** and 75 of **wandering dogs** or not directly relatable to the presence of an owner **(0.6 %)**. The presence of dogs in the area is a topical subject given the possible increase in the **risk of encounters (potentially dangerous) with the brown bear** and also considering that freely roaming dogs can disturb wildlife in general. Indeed, this high percentage of dogs off the leash was recorded **precisely in the bear's core area** and on footpaths/roads where the **special signs** installed some time ago by APT clearly indicate that **dogs must be kept on a leash**.

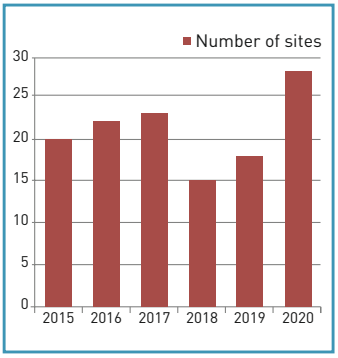
All the **images of people** are taken into consideration for the sole purpose of obtaining quantitative date on human presence and are subsequently **destroyed,** in compliance with the provisions of the privacy regulations in force.

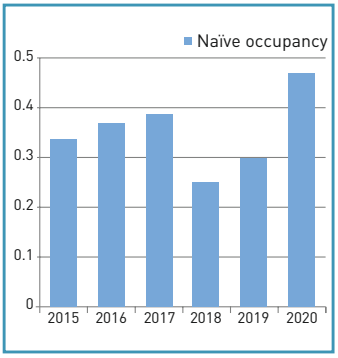
In 2020, the presence of the **brown bear** was recorded at **28** out of the 60 overall sites (58 operational; Figures 2, 3 and 4), with **62 independent events** (considering as one event all images of the species obtained within a 15 minute period of time), with a maximum of 11 at a single site.

The data show an **increase** compared to **previous years** (Graphs A, B and C), characterised by 15-23 sites with the passage of animals and the highest ever number of independent events, which to date have rarely exceeded 50 (39-51).

Graphs A, B, C - Camera trap events involving brown bears in the 2015-2020 period illustrating respectively the number of independent events, the number of camera trap sites and *naïve occupancy* (ratio between sites where the species was captured on camera and the number of sites sampled). The comparison between the results of the last 6 years is purely descriptive and does not aim to identify temporal trends







It is possible that this increase was partly due to the lockdown imposed in spring 2020 as a result of the COVID-19 pandemic, leading to much lower than average levels of anthropic disturbance in the months immediately preceding the sampling. At all events, **only with appropriate statistical analysis** will it be possible to ascertain whether this change reflects a **real increase** in numbers and/or the distribution of the population. As regards the maximum number of bear events at a single site (11) on the other hand, this number was also reached once before, during summer 2018, albeit at a different location. Despite the considerable variability in the distribution of sites of passage for bears in the different years (Figure B), there are still 4 sites where the bear has always been present, distributed uniformly between the first and second monitoring grids.

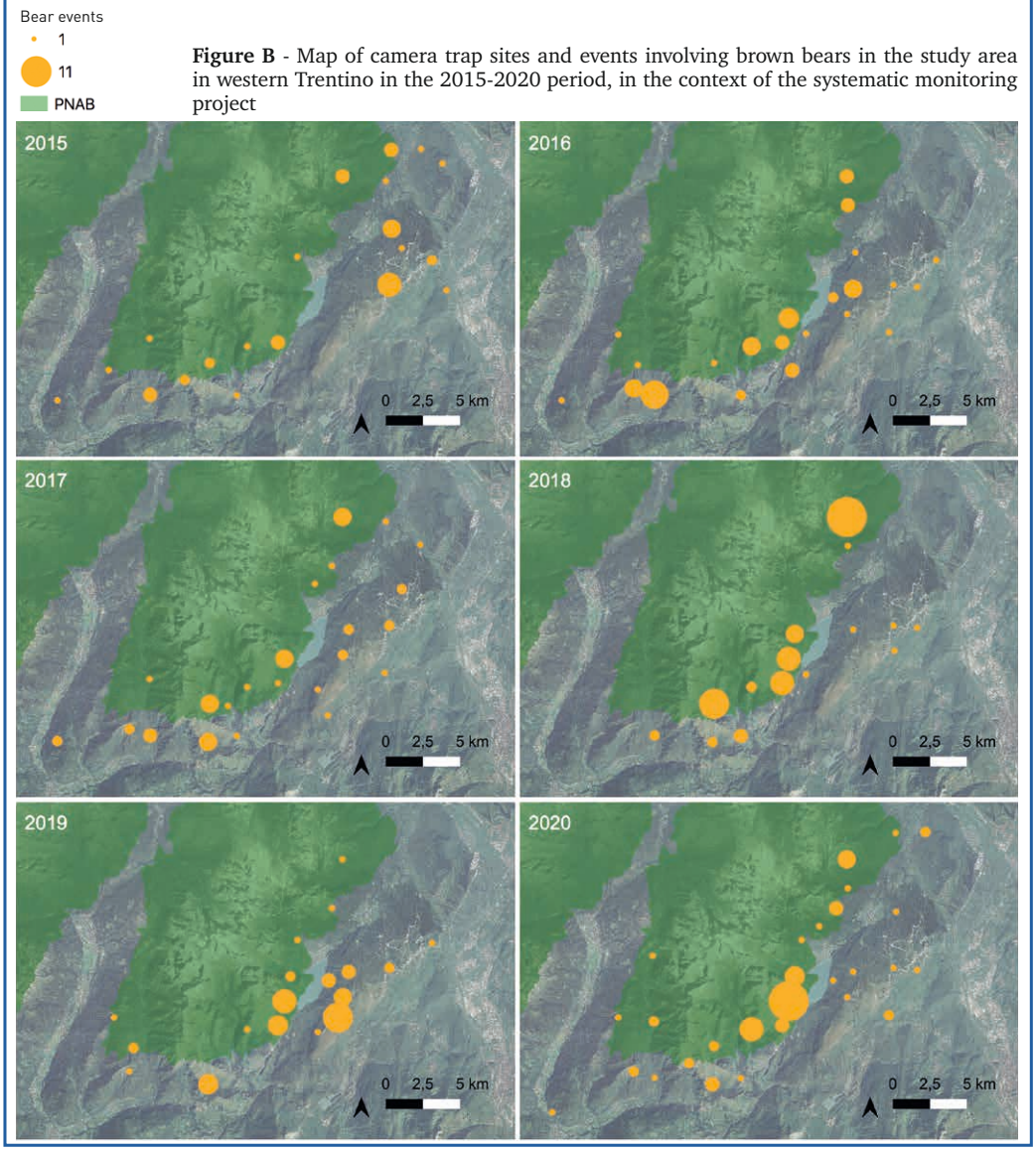


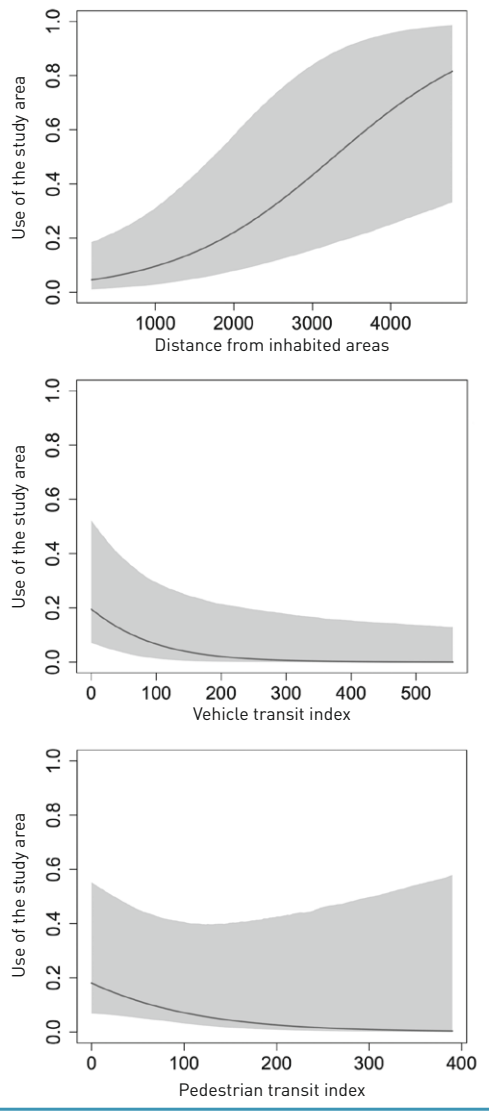
Figure B - Map of camera trap sites and events involving brown bears in the study area in western Trentino in the 2015-2020 period, in the context of the systematic monitoring project

2020 saw the return of the **wolf** among the species photographed. Previously it had only been caught on camera on a single occasion, during the first sampling season in 2015, in Val Algone. The carnivore was photographed at **four sites,** all in the **Paganella-Gazza area**, with a total of **10 independent events.** All the events referred to a **single individual.** For the first time since the beginning of systematic monitoring, in 2020 the brown bear and the wolf were photographed at the same sites (three of the four concerned by the passage of the wolf) during the same season (Photos A, B, C and D).

Photos A, B, C, D - Images of the bear and wolf captured by camera traps in 2020. The pairs of photos relate to the same site and document the passage of both large carnivores

The renewed presence of the wolf in the study area reflects a more general trend throughout the province and the Alps in general, where for several years now there has been a phase of rapid **natural recolonisation** by this species.
In addition to the bear and the wolf, eight other species of medium-large mammals were recorded: the fox, red deer, roe deer, chamois, hare (*Lepus* spp.), badger, stone/pine marten (*Martes* spp.) and squirrel (in descending order in terms of images 'captured'), in line with the previous year. The type of images obtained did not make it possible to distinguish with certainty between the European and the mountain hare, or between the beech and pine marten. It is worth noting that **six years of sampling,** while representing a significant amount of data, **is still insufficient** for the purpose of investigating the **temporal dynamics** of populations, and thus distinguishing **real trends** from normal **annual oscillations.** For this purpose, to follow up on initial exploratory temporal analysis in the context of a master's degree thesis, in autumn 2019 a research doctorate was started up, funded by MUSE

and APT, in partnership with the University of Florence.
During 2020, the analysis of the **relationship between the brown bear and anthropogenic disturbance** contained in the previous edition of this Report was **supplemented and published**. Using data obtained in the first four years of monitoring (2015-2018), analysis of **rates of daily activities** and the **spatial use of the study area** by the brown bear in relation to anthropogenic disturbance was carried out. The research exploits one of the potential advantages of this monitoring, namely the possibility of also quantifying the rates of human disturbance (people on foot and vehicles), in parallel with the passage of wildlife. The passage of people/vehicles is recorded simultaneously together with the passage of wild species, on the same spatial scale and with the same sampling method. Quantification of this disturbance is in its turn exploited to attempt to explain the variability in the distribution of



Graphs D, E, F, G, H - Significant effects obtained from spatial analysis of data on brown bears in the 2015-2018 period, estimated for half-light time bands (05:00-10:00 and 17:00-22:00). The green lines show the average, whereas the polygons show the 95% credible interval. Image adapted from Oberosler et al. (2020)

the fauna, in this case the bear. The results of this work suggest that in the study area the brown bear **adapts** its **rate of activities** and **spatial distribution** in order to **avoid sources of anthropogenic disturbance**. Temporal analysis has confirmed previous results, showing that brown bears were active during the **night and twilight hours** in the study area, with **peaks of activity before dawn** and **after sundown,** and thus with a time lag compared to human activities, typically concentrated in daylight hours (see graph on page 10 of the previous Report). On the basis of these results, spatial analysis was only carried out for time bands with the greatest superimposition of activity by humans and bears (in the 05:00-10:00 and 17:00-22:00 time bands respectively), testing in greater detail the effect of different disturbance variables on use of the area by bears and their contactability. The results show that **vicinity to inhabited areas** and the **transit of humans**, especially using **motor vehicles**, are the most significant factors negatively influencing used of the study area by bears (Graphs D, E F, G, H).

The shift in daily activities from daytime to night-time/twilight, presumably to avoid anthropogenic disturbance, along with the tendency to spatially avoid encounters with man, has also been documented for **other bear populations in Europe**. In contrast, in **North America**, where the areas occupied by brown bears are generally characterised by **low intensity of use by man**, brown bears are **largely active during the day** and less timid than European bear populations. In general, it is interesting to note that in the monitoring phase, **no significant differences were recorded** between **areas inside and outside the boundaries of the Adamello-Brenta Nature Park,** in terms of **anthropogenic disturbance** of any kind.

For further information: Oberosler V., Tenan S., Rovero F. (2020). Spatial and temporal patterns of human avoidance by brown bears in a reintroduced population. Hystrix, the Italian Journal of Mammalogy, 31(2). https://doi.org/10.4404/hystrix-00327-2020

2020 also saw the starting up of systematic photographic monitoring in **eastern Trentino**, hence regardless of the bear population, similar to the consolidated experience in the southern Brenta /Paganella-Gazza mountains and structured in the same way, with 60 camera trap sites active within the **Paneveggio Pale di S. Martino Nature Park** and neighbouring areas (Figure C).

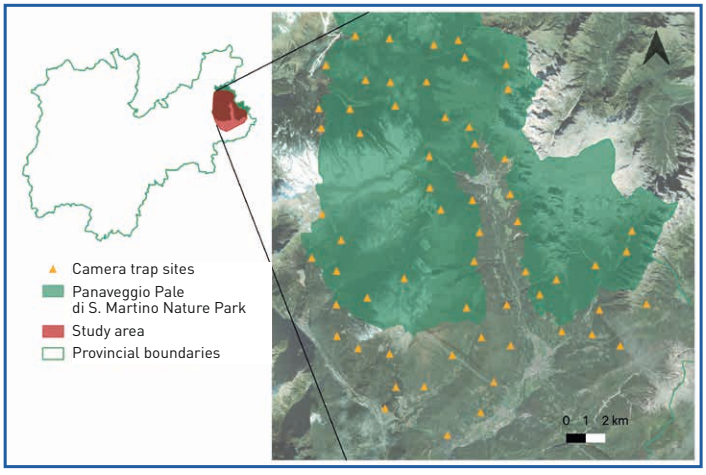


Figure C - Map of the 60 camera trap sites in the new study area in eastern Trentino. The territory of the Paneveggio Pale di S. Martino Nature Park is shown in green

Sampling took place in partnership with the Research Division of the Park authorities and will hopefully be repeated in future years. The objectives of the project are **similar** to those of the programme in **western Trentino** and include: (1) **monitoring** of the species present, with the possibility of recording the arrival in the area of **new species** of conservation significance reported not far away, such as the golden jackal and/or the wild cat for example; (2) analysis of **spatial distribution** and **activity rates** for the species, particularly in relation to **anthropogenic disturbance**; (3) the possibility of quantifying **variations in the relative abundance** of individual species or significant changes in **biodiversity** at the level of the whole community of medium-large mammals, with a multi-year dataset; (4) monitoring of the **wolf** in the study area, complementing the data collection and reporting underway, as a species of particular interest given the rapid evolution of its presence in this area (with recently formed packs).
For logistical reasons (the camera traps used are the same ones adopted in western Trentino), monitoring was carried out in the September-November three-month period. Specifically, this first sampling season took place between **8 September and 25 November**, with a total of 2,070 camera days (average of 34.5 per camera). Two camera traps were stolen during the monitoring period. The camera traps obtained **86,154 images**, of which **15,124** of **medium-large wildlife.** The number of images relating to people on foot, vehicles and domestic animals amounted to **56,699**.
The presence of the **wolf** was recorded at **18** out of the 60 overall **sites** (60 with data available despite the thefts, thanks to multiple changes of the SD cards; Photos E and F), with **50 independent events**, and a maximum of 6 at a single site.

Photos E, F - Images of wolves captured by camera traps in 2020 in the new study area in eastern Trentino (Paneveggio Pale di S. Martino Nature Park and neighbouring areas)

In addition to the wolf, eight other species of medium-large mammals were recorded: the red deer, fox, roe deer, hare (*Lepus* spp.), squirrel, badger, chamois, and beech/pine marten (*Martes* spp.), in descending order in terms of images 'captured'. Preliminary analysis of this first monitoring season is currently underway, with the involvement of an undergraduate thesis student at the University of Florence.

Both monitoring projects are the result of the efforts of the many people and institutions involved. We **thank** the **Vezzano and Ponte Arche Forestry Stations,** the staff of the **Paneveggio Pale di S. Martino Nature Park** and the **Vertebrates Zoology Division of MUSE**, and MUSE-PAT **volunteers** for their contribution to the monitoring of large carnivores.

Definitions

- **"Cubs"**: bears aged between 0 and 1;
- **"Youngs"**: males up to the age of 4 and females up to the age of 3;
- **"Adults"**: males aged 4 and over, and females aged 3 and over, considered to be sexually mature and capable of reproducing;
- **"Detected bears"**: bears whose presence has been ascertained during the year, either genetically or on the basis of unequivocal information (associated with radiotelemetry for example) and repeated observation;
- **"Undetected bears"**: bears not detected in the last year alone;
- **"Rediscovered bears"**: bears detected genetically after two or more consecutive years during which their presence was not recorded;
- **"Dispersion"**: movement outside the core area where the females are present, coinciding essentially with western Trentino, by bears born in this area, without them reaching the territory habitually frequented by bears belonging to the Dinaric-Balkan population;
- **"Emigration"**: abandonment of the population present in the province by bears reaching the territory habitually frequented by bears belonging to the Dinaric-Balkan population;
- **"Return"**: return to the core area where the females are present, coinciding essentially with western Trentino, by dispersing bears;
- **"Immigration"**: arrival of bears from the Dinaric-Balkan bear population in the territory used by bears in western Trentino.

Results

The **data** are collected and 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.

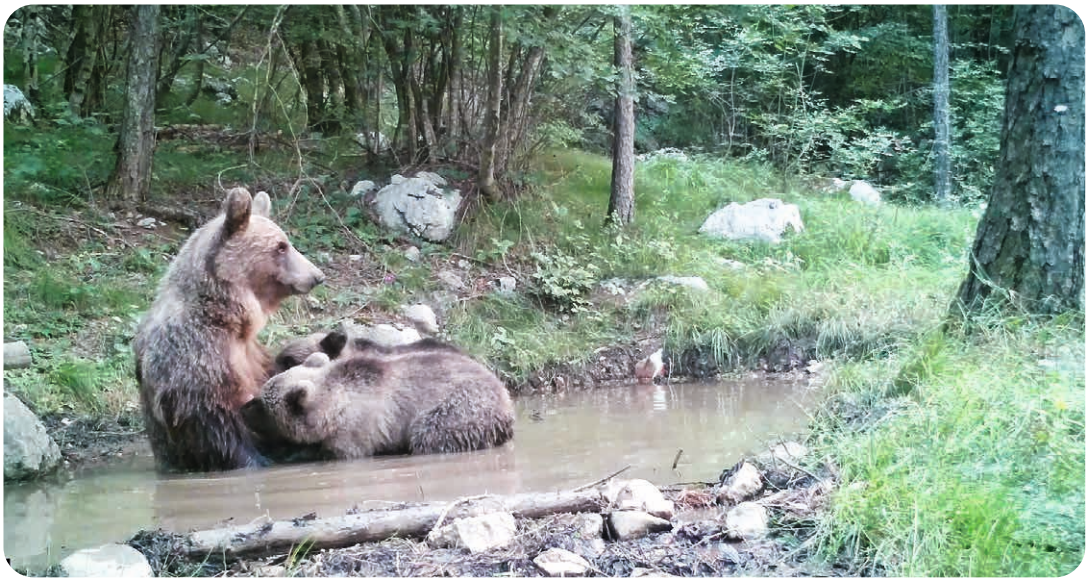


Photo 3 - Female bear suckling two cubs in a pool of water on Monte Gazza – photogram from a camera trap video (F. Limelli and F. Cadonna - APT Wildlife Department Archives)

Processing of the **data** collected in **2020**, a season in which **genetic monitoring was limited to strictly necessary organic samples,** has provided the information given below.

Demographics: births

In 2**020** it was estimated that there were **11-12 new litters** (Photo 3), with a total of **22-24 cubs**. This estimate was made based on information coming from **direct observation** of females with cubs recorded during the course of the year and on videos and images coming from **camera traps**.

Demographics: dead bears

In 2020 **the death of 2 bears** was recorded.

- **On 1 April 2020** at **Pler** in **Strembo**, the remains of M67, a **male young** born in 2019, were found; cause of death: **preyed** on by an adult male bear, and partially consumed (Photo 4);
- **On 29 May 2020** in **Val d'Ambiez,** San Lorenzo Dorsino, the remains of **F55**, a female young probably born in 2019 (detailed genetic investigations are currently being concluded at FEM) were found; cause of death: **preyed** on by an adult male bear, and partially consumed (Photo 5).

Among brown bears, **intraspecific predation** is an occasional but well-known phenomenon. It tends to be directed at **cubs-of-the year** (in this case it is described as **infanticide**) but can also concern **youngs** born the previous year, as in the cases described above, and even **other age groups.** These incidents are usually linked to sexually mature male bears and mostly take place from the beginning of spring until the beginning of summer, before and during the **mating season**.

A further individual (a **cub-of-the-year) disappeared** for unknown reasons in spring from a repeatedly observed litter, which went from three to two cubs; the mortality rate for cubs in the first year, and above all in the first few months of life, is relatively high and probably largely not recorded (and not recordable, except in a sporadic and casual manner).

Photo 4 - Young preyed on at Strembo (V. Calvetti - APT Wildlife Department Archives)

Photo 5 - Young preyed on in Val d'Ambiez, San Lorenzo Dorsino (T. Bagatoli - APT Wildlife Department Archives)

Population estimate

Monitoring in **2020,** 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**; this will be again possible in 2021.

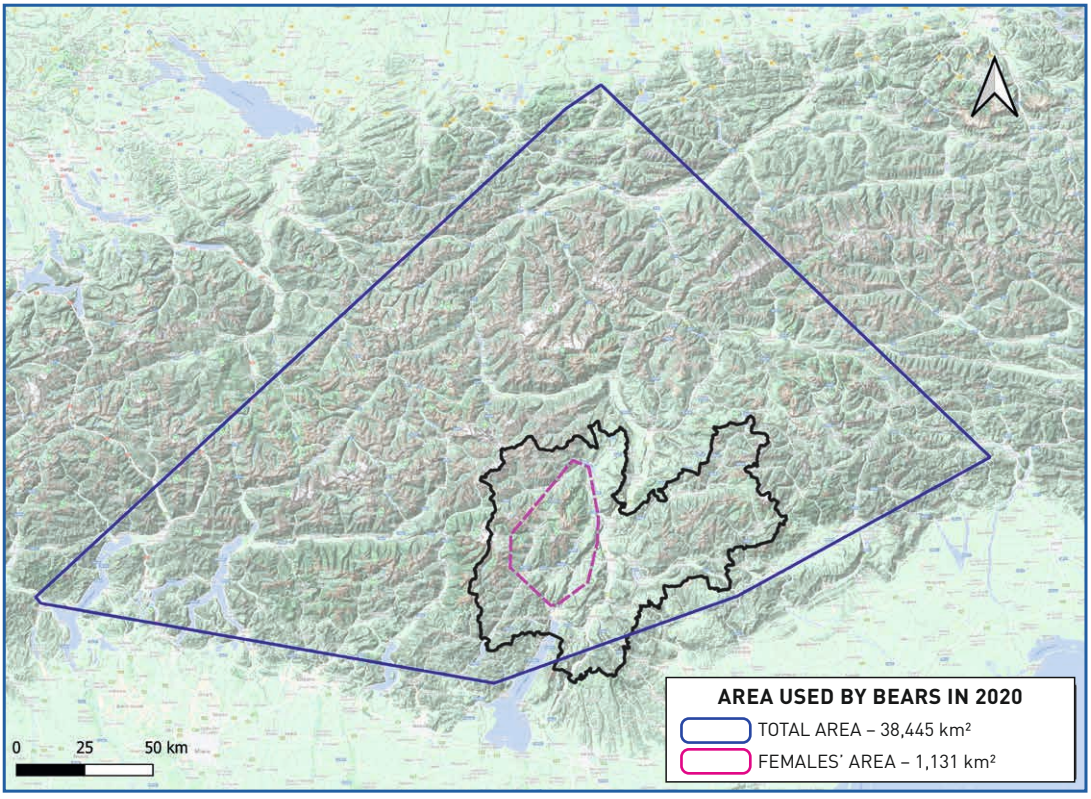
However, considering the aforementioned **birth** and **death rates** recorded in 2**020** and assuming survival rates similar to those recorded in previous years, it is believed that the bear **population** in the central Alps, which in 2019 was estimated at between 82 and 93 animals, may this year have **exceeded the threshold of 100,** including cubs-of-the-year.

Intensive genetic monitoring, which will be carried out again in **2021** will be able to **confirm this hypothesis**.

Distribution

In **2020** there were again no reports of **female bears** outside **western Trentino** (the pink area covering **1,131 km²** shown in Figure 1). As regards this, it is recalled that the area occupied by females should be considered only partially established for 2020, as it has been determined without the information usually coming from intensive genetic monitoring.

Figure 1



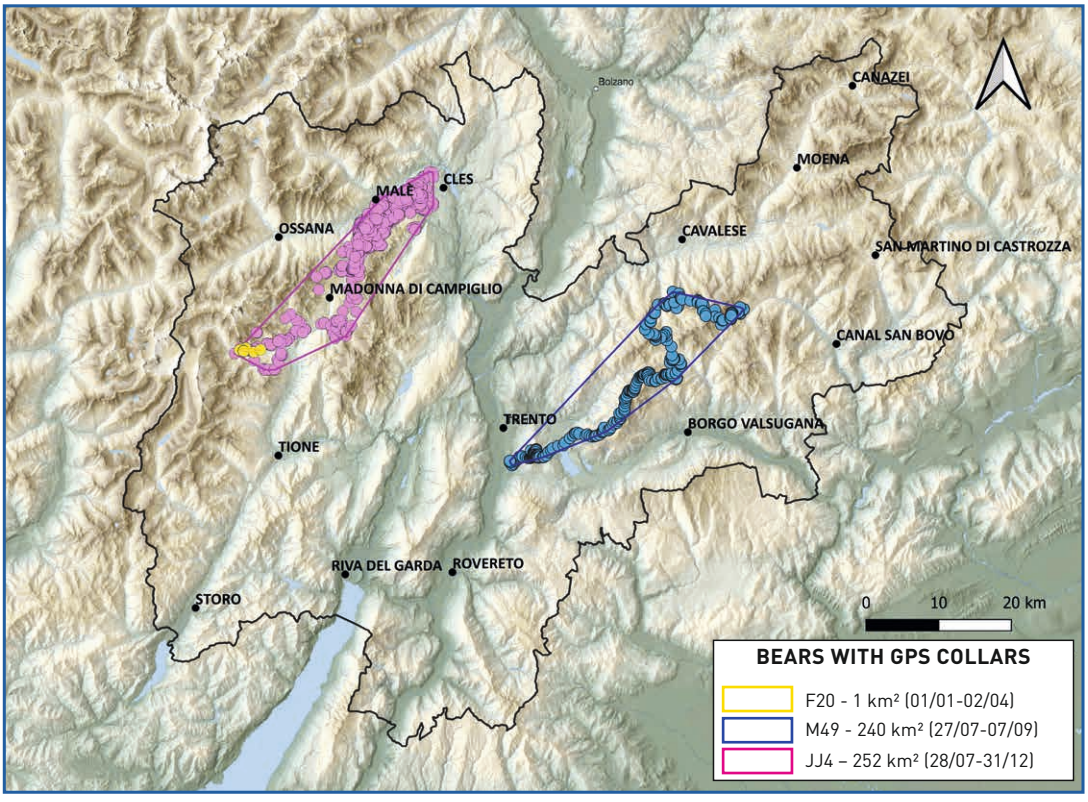
Considering the longest journeys made by **young males**, in 2020 the bear population in the central Alps was distributed over a theoretical area stretching out over **38,445 km²** (blue polygon in Figure 1). Specifically, there was confirmation of the presence of a bear on the **border between Bavaria and Tyrol**, one bear in the **lower Val d'Ossola - Piemonte**, **M4** in the **Carnian foothills in Friuli V.G**. and three further bears, respectively in the provinces of **Brescia (M54), Sondrio (M54** and **M38)** and **Vicenza (M59)**.

The data were kindly provided by the **Veneto Region** (Agri-environment, Fisheries and Wildlife/Hunting Planning and Management Directorate – Wildlife/Hunting Planning and Management Operations Unit), the **Autonomous Province of Bolzano** (Hunting and Fishing Office), the **University of Udine** (Department of Agrifood, Environmental and Animal Science), the **provincial police of Verbano Cusio Ossola**, the **Swiss Confederation** (KORA & LBC - Laboratoire de Biologie de la Conservation, Lausanne), **Land Tirol - Austria** (AMT der Tiroler Landesregierung) and **Bavaria** (Bayerisches Landesamt für Umwelt (LfU).

Use of the space by bears with radio collars

In 2020 **3 bears**, **F20**, **JJ4** and **M49** were monitored with **satellite telemetry.** Their home ranges, calculated using the minimum convex polygon (MCP) method), are shown in Figure 2.

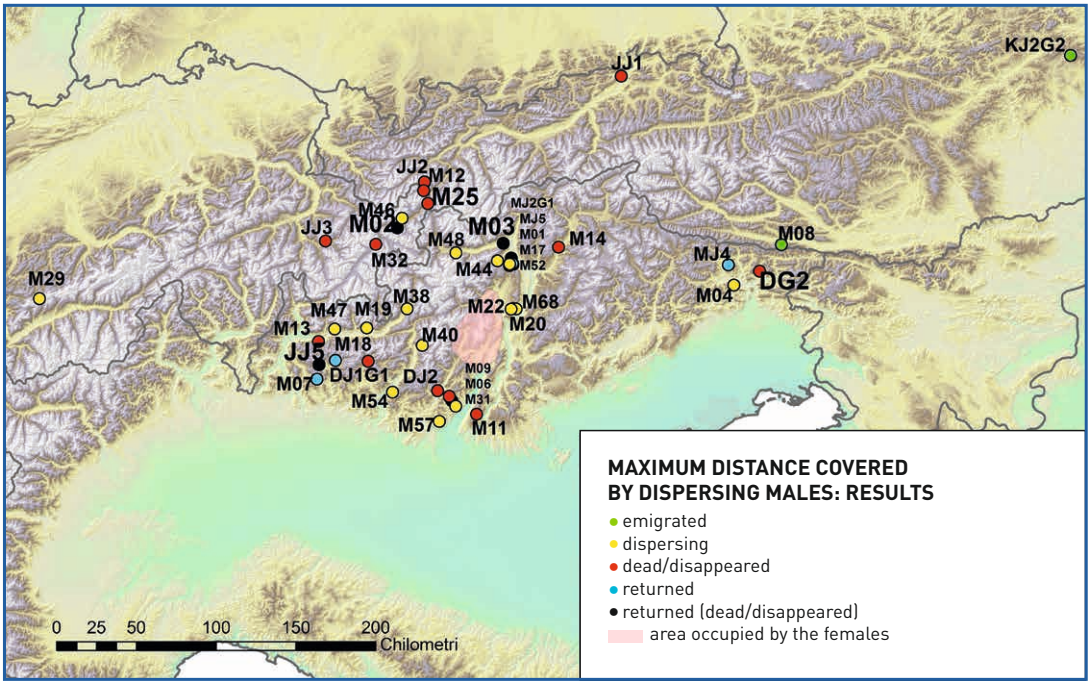
Figure 2



Dispersion

In the **2005-2020** period it was possible to document **dispersion** (see the definition on page 14) involving **42 bears** (all males) (Figure 3). **15** of these **(36%) died** or **disappeared** (before returning), a further **10 (24%) returned** (and five of these subsequently died or disappeared), **two (5%) emigrated** and **15** (**11**) **(36%)** are **still dispersing. No dispersion by females** born in Trentino has yet been documented.

Figure 3 - Map of dispersion updated to 2020



(M. Vettorazzi)

1.2 The Wolf

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

From the beginning, **genetic** monitoring, traditional **surveys in the field** and **camera traps** (Photo 6) were also used to monitor the wolf.

Photo 6 - Camera trap image of a wolf in Val Cadino-Fiemme (M. Vettorazzi - APT Wildlife Department Archives)

Genetic monitoring

To date, genetic monitoring activities for the wolf have been significantly **more limited** in comparison to those dedicated to the bear. The latter species remains the priority, given that there is a small, isolated population resulting from a reintroduction project, in contrast with the spontaneous recolonisation of much of the European continent in the case of the wolf.

Nevertheless, it has been decided to proceed with **intensive genetic monitoring** of wolves at **periodic intervals,** making it possible to follow the evolution of the population living in the province in the **medium-long-term,** again in **association with other alpine areas,** given that the "Trentino wolf population" is only a small part of a **single alpine** or rather **European metapopulation.** In **2021** an **increase** in the number of **genetic samples** to be analysed has already been provided for.

National monitoring on transects

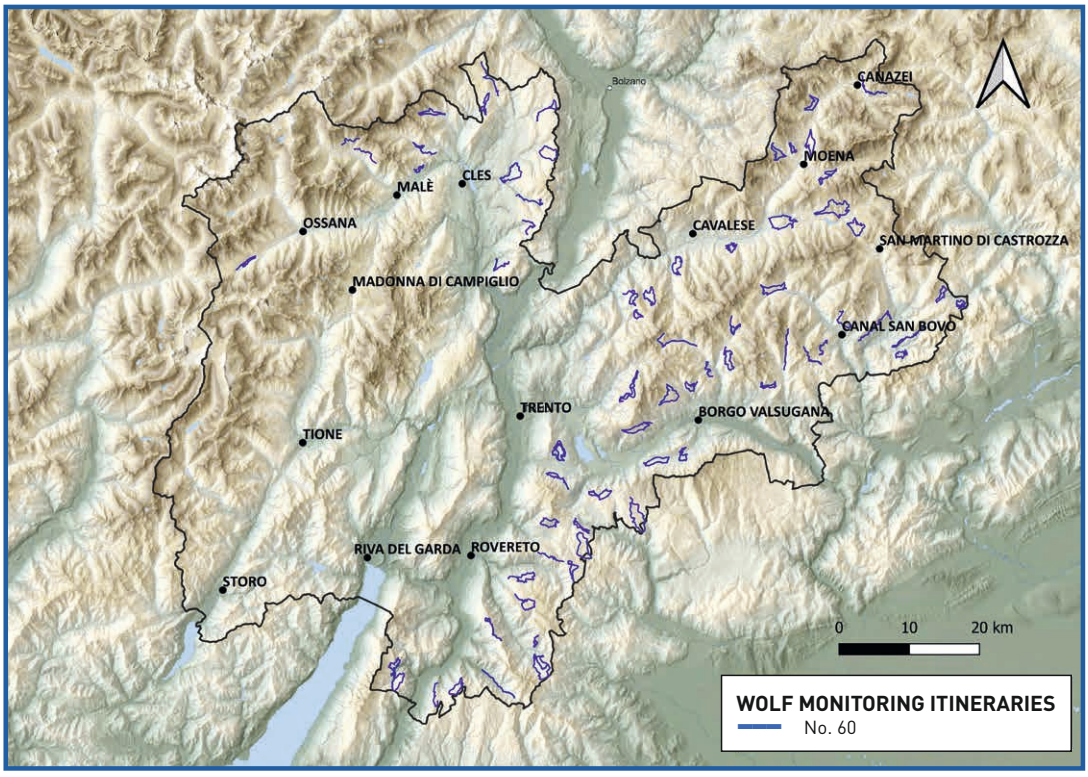
2020 saw the beginning of activities to **monitor the wolf on a national scale**, according to protocols established and shared by **ISPRA** with all the **Regions and Autonomous Provinces**. The scope of national monitoring is to provide an up-to-date overview of the situation regarding wolves in Italy, by collecting data in different local areas that is as homogeneous as possible. Monitoring is coordinated by ISPRA at national level, and by the **LIFE WolfAlps EU Project (Figure 4)** in the Alps, with activities in the field taking place between October 2020 and March 2021. The

Figure 4 - LIFE WolfAlps EU logo

Autonomous Province of Trento (Wildlife Department – Large Carnivores Division) is also indirectly participating in the project and has delegated **Muse** to coordinate the activities. For this scope, **around 80 operators** have been recruited and trained, including MUSE staff and contract workers, wardens and technicians from the **Associazione Cacciatori Trentini** and volunteers belonging to various **associations** (SAT-CAI, "Io non ho paura del lupo", WWF and AIGAE).

To verify the presence of the species, **10x10** kilometre **monitoring quadrants (cells)** have been established, with a total of **32 cells containing wolf packs** in Trentino. These are inspected by following around **60** predefined **itineraries** (transects, Figure 5).

Figure 5



From October to March, the routes identified are examined monthly by operators searching for **signs of the presence of wolves,** mostly represented by **excrement** and **tracks** (a continuous series of prints); Photos 7, 8 and 9).

Along with collection of these signs of presence, monitoring also takes place through the complementary use of **camera traps.** The technique is useful for various purposes in this context: ascertaining the unequivocal presence of the species in a determined area, arriving at minimum es-

timates of the extent of packs, documenting reproduction, and identifying individuals with potentially anomalous phenotypes. For this purpose, videos and/or photos (obtained in the monitoring time frame: Photos 10, 11, 12, 13, 14, and 15) of different origin will be taken into consideration, with reports obtained via standard monitoring supplemented by those from technicians and volunteers who have made their instrumentation and experience available for this purpose. The camera traps are preferably positioned close to intersections, stopping places or essential places of transit along the routes potentially most extensively used by wolves, at marking sites or where the remains of prey have been found, but always avoiding the use of chemical or biological lures.

Photos 7, 8, 9 -Transect, tracks in the snow and wolf excrement (Photo: MUSE archives)

Photos 10, 11, 12 ,13, 14, 15 - (Photo: MUSE archives)

The data gathered during this **systematic sampling**, together with equally important occasional data (collected away from the predefined routes), will **supplement the data gathered by the Province through the Forestry Service** and will be used to estimate the extent and distribution of the species in the province of Trento, contributing towards outlining the distribution pattern at national level. Sampling of biological material will also make it possible to proceed with genetic testing at the **Fondazione Edmund Mach (FEM)** in San Michele all'Adige, testing that will enable genotyping of some of the individuals present in the area and increase understanding of family relationships and origin.

Numbers, reproduction, mortality rates, distribution and trends

During 2020, **612** data reports referring to the **wolf** were recorded in the province, belonging to categories **C1 and C2** (data defined as "sure" and "confirmed by experts" respectively, on the basis of Kora-CH criteria), such as sightings, photographs, prey, footprints, hairs, scats and urine. Of these, **50** referred to organic samples, **10** of which were analysed by the Conservation Genetics Research Unit of the **Fondazione Edmund Mach (FEM)**.

In **2020,** the overall data collected leads to estimation of a **minimum number of 17 packs** (or family groups) whose home range are partly or completely included in the province of Trento. No less than 14 of these are believed to also make use of **territory in neighbouring provinces** (Verona, Vicenza, Belluno, Alto Adige/Südtirol and Brescia)**,** at least to some extent.

These are listed in the following **table**, with the number and **name** of the area identifying them, **the year the pack was first recorded** and the **maximum number of animals** ascertained in **2020** (Table 1).

Table 1

No.	NAME	YEAR FIRST RECORDED	MAXIMUM NO. OF ANIMALS IN 2020
1	LESSINIA	2013	7
2	MARCESINA-ASIAGO	2016	5
3	CAREGA	2016	10
4	PASUBIO	2017	4
5	ALTA VAL DI FASSA	2017	5
6	ALTA VAL DI NON	2017	3
7	FOLGARIA-VIGOLANA	2018	5
8	VAL DI SELLA-VEZZENE	2019	6
9	CALAMENTO-CADINO (EX "MANGHEN" 2019)	2019	7
10	VANOI	2019	7
11	VAL CANALI (EX "VETTE FELTRINE" 2019)	2019	5
12	MADDALENE	2019	7
13	TONALE	2019	6
14	ROEN	2020	4
15	PANEVEGGIO - BELLAMONTE	2020	3
16	VETTE FELTRINE	2020	3
17	BALDO	2020	4

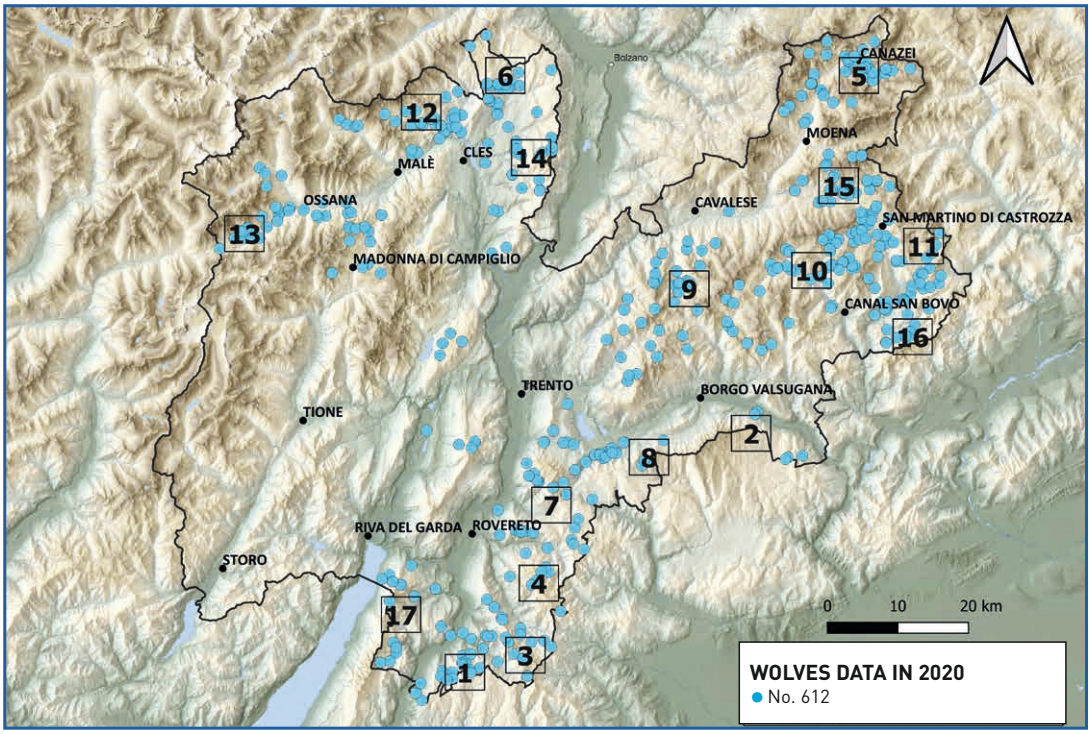
In 2020 **3** possible **new couples** were also recorded in the **Campo Carlo Magno** area, in **Val Campelle** and in the **Bedollo** zone. The presence of **other individual wolves** was again documented sporadically during the year in the following areas: **Paganella, Bondone.**

The distribution of the **612 data reports** regarding the presence of the **wolf** in the province in **2020** is shown in **Figure** 6.

This also shows the **geographical location of the 17 packs** recorded (minimum number) in 2020.

It should be underlined that the framework described above provides a **generic description,** also bearing in mind the limited recourse to genetic monitoring in 2020. The monitoring currently underway since autumn 2020 by following transects, organised by MUSE in association with APT in the context of the **Life Wolfalps EU project**, along with genetic monitoring activities already destined to increase during 2021, will make it possible to obtain more detailed

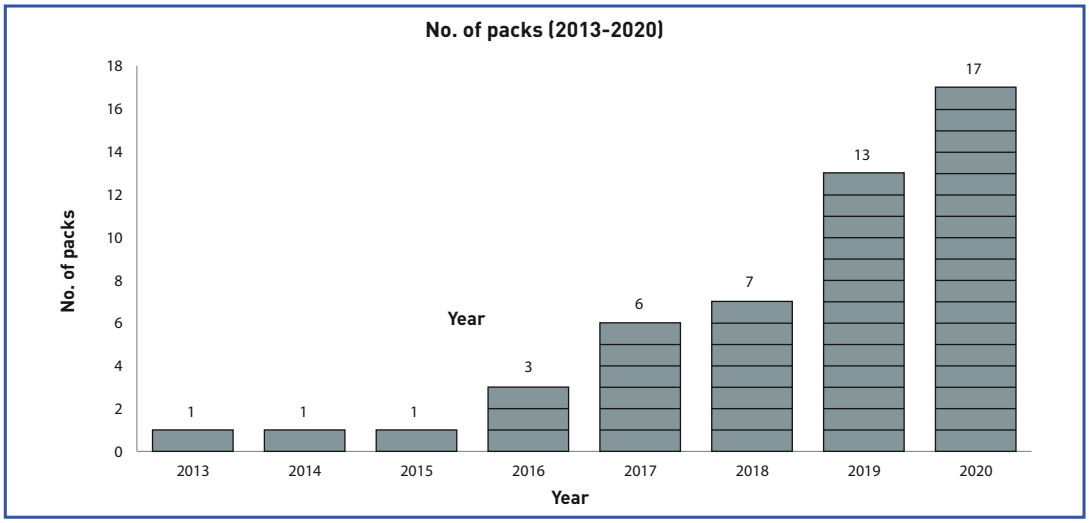
Figure 6



knowledge. In the future it is expected to carry out a **multy-year frequency/basis intensive genetic monitoring,** which will supplement routine annual monitoring.

Graph 1 shows the **trend** for the **minimum number of packs detected** in the province of Trento, from 2013, the year the first pack was formed in the province, until 2020.

Graph 1



The current **trend** confirms that **rapid recolonisation of the province of Trento** by the species is underway.

In 2020 the **deaths of seven wolves (4 males and 3 females)** were recorded. These were the result of **road accidents (Photo 16)** and in one case, **a railway accident**. For further details see the section “Accidents” on page 51.

These deaths follow the first finding of wolf remains (a few bones in autumn 2008 not far from Passo degli Oclini in Fiemme, 2009 Bear Report, page 57) and three subsequent deaths: a wolf hit by a vehicle in Valsugana on 21 April 2016 (2016 Bear Report, page 37), the remains of a wolf with multiple injuries found in the Avisio stream in Soraga on 19 March 2019, and a pregnant wolf (cause of death unknown) found at Virti di Carbonare, Folgaria on 16 May 2019 (for details of both, see the 2019 Bear Report, page 26).

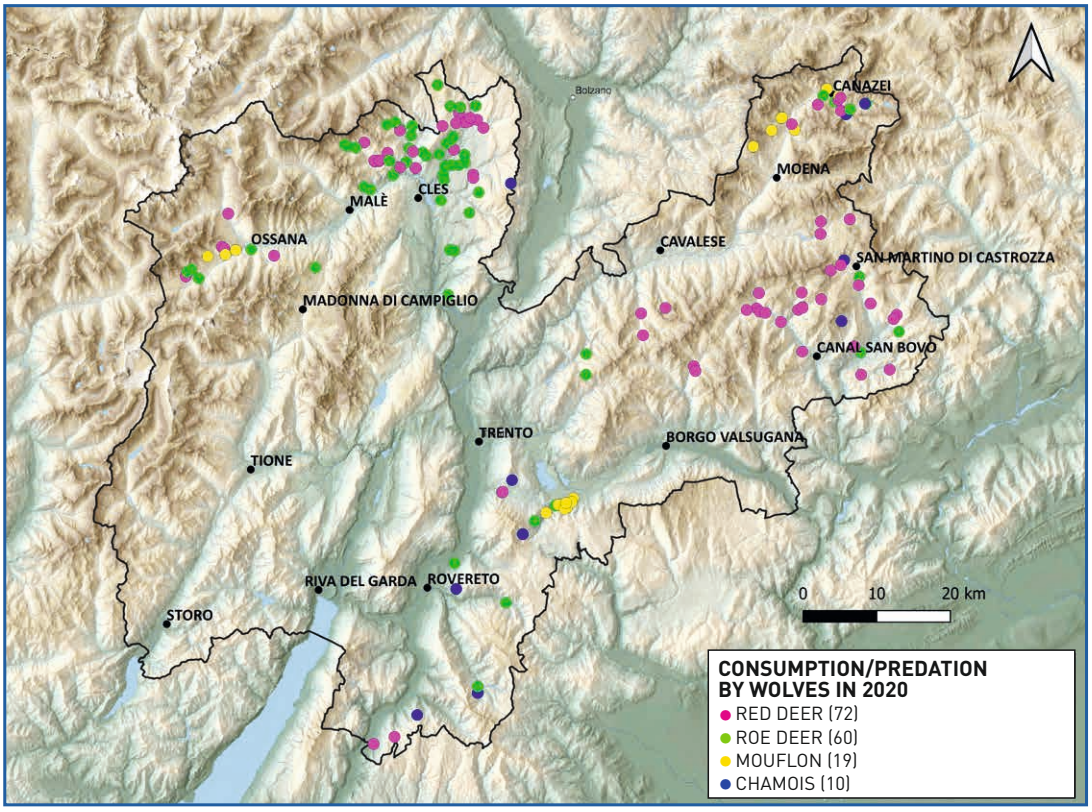
In **total** the **deaths of 11** wolves have been ascertained since the return of the species to the province.

Photo 16 - Wolf hit by a motor vehicle at Serravalle all’Adige (T. Borghetti - APT Wildlife Department archives)

Photo 17 - Predation and consumption of a roe deer by a wolf in Val di Sole (A. Caldera - APT Wildlife Department Archives)

As regards **preying on wildlife** (Photo 17), the **161** data reports presented in Figure 7 show the **distribution.** It has been observed that **predation** essentially takes place **in relation to the abundance and distribution of wild preys in the Trento province**, confirming the opportunistic dietary behaviour of the wolf.

Figure 7



It should be recalled that the carcasses found clearly represent **only a small part of the real number of animals** preyed on, most of which remain unknown. 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 etc.), invalidating the real representativity of the data.

Finally, it should be recalled that the **presence of the wolf in Trentino is part of a phenomenon taking place on a much broader scale than the provincial territory**. Indeed, almost all the wolf populations of Europe are now connected to each other, making up a single European **metapopulation of around 17,000 animals** (source: LCIE 2018).

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 some individuals in eastern Trentino (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.

As is known, **the only lynx certainly present** in the last few years in the province of Trento (since 2008) is the **male** known as **B132** (Photo 18), who comes from the small Swiss population reintroduced in the St Gallen Canton (see **page 45 and subsequent pages of the 2008 report**, and 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 (Tremalzo and Lorina slopes on the left-hand bank and Monte Stigolo on the right) and the mountains on the right-hand bank of the River Chiese, above Darzo and Lodrone, on the border with Brescia.

Photo 18 - Lynx B132 in Val Lorina (F. Limelli and F. Cadonna - APT Wildlife Department Archives)

During **2020** it was possible to repeatedly document the **presence of the lynx** (Photo 19) **with certainty** (photos, videos, tracks in the snow), on the occasions listed in Table 2.

Photo 19 - Lynx tracks in the snow in Val d'Ampola (S. Oradini - APT Wildlife Department Archives)

Table 2

No.	DATE	LOCATION	INDICATOR OF PRESENCE
1	2 January	Stigolo (Val Ampola)	Video from camera trap
2	14 January	Cime del Costone (BS)	Video from camera trap
3	13 February	Val Lorina, Val Verde (Ampola)	Video from camera trap
4	22 February	Val Lorina, Val Verde (Ampola)	Photo from camera trap
5	10 March	Val Lorina, (Ampola)	Tracks on snow
6	11 March	Stigolo (Ampola)	Video from camera trap
7	13 March	Col Val di Betò – above Lake Ampola	Tracks on snow
8	16 March	Val Lorina, Val Verde (Ampola)	Photo from camera trap
9	22 March	Val Lorina, Val Verde (Ampola)	Photo from camera trap
10	24 March	Val Lorina (Ampola)	Tracks on snow and prey (chamois)
11	25 March	Val Lorina, Rio Torto road (Ampola)	Tracks on snow
12	26 March	Val Lorina, Val Verde (Ampola)	Photo from camera trap
13	02-apr	Val Lorina, Val Verde (Ampola)	Photo from camera trap
14	04-apr	Val Lorina, Val Verde (Ampola)	Photo from camera trap
15	07-apr	Val Lorina, Val Verde (Ampola)	Photo from camera trap
16	29 July	Val Lorina, Val Verde (Ampola)	Photo from camera trap
17	21 August	Upper Val Lorina (Ampola)	Video from camera trap
18	3 December	Val Lorina (Ampola)	Tracks on snow
19	19 December	Cord-Stigolo (Ampola)	Tracks on snow

Figure 8

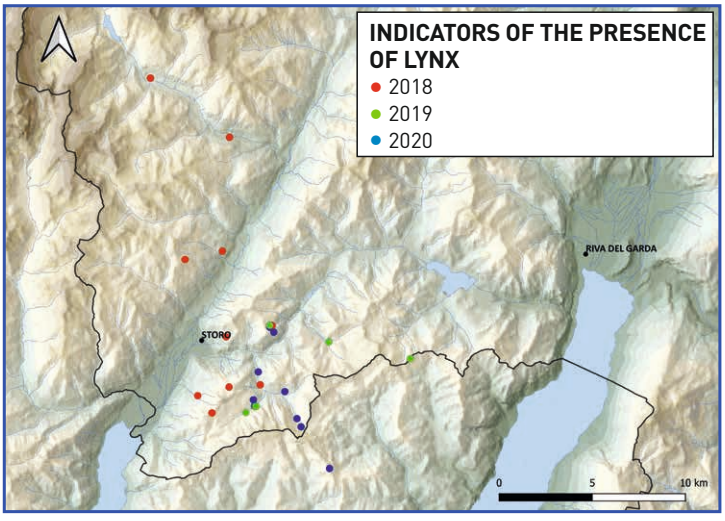


Figure 8 shows localisations for the lynx B132 in the last three years. As can be seen, in 2020 B132 would again appear to have remained in the mountains of Val Lorina and Val di Ledro, without frequenting the mountains on the right-hand side of the River Chiese.

B132 is still the only lynx whose presence has been documented with certainty for several years.

1.4 The Golden Jackal

After several years (see the **2013 Report, pages 76-78**, which contains the very first reports of its presence in the province and a technical information sheet on the species), the Large Carnivores Report once again dedicates space to the **golden jackal** (*Canis aureus moreoticus*).

On the one hand, this is because in 2020 the **Large Carnivore Initiative for Europe** (**LCIE**) decided that the species should be considered to **belong to "large carnivores of Europe"**, in the full sense of the term, and on the other hand as a result of important **new evidences** emerging in the field.

Indeed, between December 2020 and **January 2021**, following reports regarding presumed sightings in the **Fiavé** area during 2020, technical staff from the **Associazione Cacciatori Trentini** (Photo 20) succeeded first in capturing an image of one golden jackal with a camera trap, confirming the presence of the species, then two animals together, and subsequently, in January 2021, in proving that **reproduction** had taken place. The new group contains at least three animals (sighted directly), but following checks carried out with acoustic stimulation, the vocal responses of the group of canids suggest that it is more likely that there are three-five animals in total.

Photo 20 - Two golden jackals filmed by a camera trap at Fiavé (M. Rocca - Associazione Cacciatori Trentini archives)

This represents the **first certain reproduction of the golden jackal recorded in Trentino**. It follows other observations and camera trap images of individual animals recorded in the last few years in the province and is part of a spontaneous and major **geographical expansion of the species in Central Europe** in the last few decades, starting from its area of origin, Balkan countries and, before that, Caucasus.

Specifically, the very **first data report** regarding the presence of the golden jackal in the province dates back to **8 April 2012**, with the finding of a young male hit and killed by a vehicle in Valsugana, at Villa Agnedo. The **second data report**, and the first evidence of a living animal present within Trentino, instead dates back to **2 January 2013**, when a golden jackal was captured on film by a camera trap situated between Peller and the left-orographic side of Val di Tovel. In **May 2016** a jackal was filmed by a camera trap on the eastern slopes of **Monte Gazza**. In **2017** there were again sightings of individual animals between **Levico Terme** and **Caldonazzo**, and a single animal was captured by a camera trap on Monte Baldo; on **28 April 2019**, a further individual was photographed in the **Brenta area**, between San Lorenzo Dorsino and Lake Molveno. Lastly, and most recently, single animals were photographed by camera traps on **10 November 2020** at Ciago, on **14 and 15 December 2020** in Cavedine and on **19 January 2021** in the **southern Brenta mountains**, above Seo (Stenico).

A **technical information sheet** is provided below on the biology of the species, still little known to the public, at least in the context of Trentino and the Alps.

Technical information sheet on the golden jackal (Canis aureus moreoticus)

The golden jackal (*Canis aureus moreoticus*) (Photo A) is a **canid**, whose European populations are of **Caucasian origin.** It is medium-sized, with a particularly slender build, short tail, pointed muzzle and large triangular ears, and a predominantly grey-reddish colour. In general, the appearance of its coat changes considerably with the seasons: in the summer it is lighter in colour and the animal appears more streamlined, with a longer neck and shorter tail as compared to its winter coat. The jackal can be confused with a small wolf or a thin stray dog. It is easier to discern from the fox because it is quite bigger, the lateral profile being squarer rather than rectangular, while its tail, considerably shorter, has a black rather than a whitish tip. It is instead difficult to distinguish between the males and females of this species, as they are similar in terms of size and colour, although the males are slightly larger and the colours of their coat show a greater contrast than those of the females.

Photo A - Southern Brenta mountains, 2019. Photo by M. Papi (Wildlife Department Archives)

They can reach a weight of **15 kg** as adults whereas younger animals, of a more erratic nature, tend to weigh 8-10 kg on average. Their tracks are usually slightly larger and longer than those of the fox, but in effect cannot be distinguished from those of a dog or large fox. The typical habitat of the jackal is made up of hilly territory covered with thick undergrowth, or extensive wetland environments with reed thickets and dense floodplain vegetation. In general, it avoids mountain forests, due both to the extensive permanence of snow, which hinders the capture of small mammals, and to avoid competition with the wolf. However, when dispersing or extending its distribution area, it can cross typically alpine environments, mainly exploiting riverbeds during its journeys. The golden jackal does not usually dig burrows, preferring to use those of badgers or foxes, or else to create a shelter in the middle of impenetrable vegetation.

An omnivorous forager, it prefers small mammals (especially rodents, up to 70-80% of its prey) and birds, alternating these with food of plant origin during the late summer-autumn. It does not reject waste or carcasses. Due to the very similar diet, it is often in competition with the fox.

The females reproduce at the age of around nine months, whereas the males become sexually mature at the age of two years. The reproductive season is during the February-March period. The gestation period is 60-63 days and in April or May females give birth to litters of between four and seven cubs. The young feed on their mother's milk until July-August, then move on to semi-solid food regurgitated by the mother in the subsequent

period, a process that gradually leads them to feed themselves autonomously. The young usually remain with the mother until spring of the following year. It is not rare for the young, especially females, to remain with the family to contribute towards rearing the cubs. The life expectancy for this species in captivity is high, around 16 years, whereas in the wild they rarely live beyond the age of 3.
The **negative reputation** generally accompanying the jackal would appear to originate in the erroneous belief that it only feeds on carrion and/or waste, whereas in actual fact it has a very varied diet.
The greatest **threats** for the species, at least in Europe, would seem to be road accidents, poaching and erroneous killing. In this context it is particularly important to provide correct information about the characteristics of the species, above all in the hunting environment.
The golden jackal effectively contributes towards enriching the **biodiversity of the alpine ecosystem**, as it is a **new species**, arriving as a result of **natural expansion**. In Italy it is afforded complete protection (Italian Law no. 157/1992) and it does not represent any danger for humans, nor have there been any reports of aggression towards man.

Information taken from: *L. Lapini, 2009-2010 "Lo sciacallo dorato Canis aureus moreoticus nell'Italia nordorientale". Degree thesis in Zoology, Faculty of Natural Science, University of Trieste.*

(M. Zeni)

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 **compensated** and it is possible to acquire **damage prevention works** (mostly consisting of electric fences or guarding dogs). The relative regulations, covered by article 33 of provincial law no. 24/91, have been revised and updated several times over the years, also on the basis of directives imposed by the provincial government with resolution no. 1988 of 9 August 2002. With Resolution no. 697 of 8 April 2011, the provincial government further revised the regulations for damage compensation, also providing for compensation of ancillary expenses and extending 100% compensation to damage caused by **lynx and wolves**.

Preventive activities take place 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 2020, **380 cases of damage by large carnivores** were ascertained, of which **279 by bears** and **101 by wolves**. There were no cases involving the **lynx**.

There were **415 reports of damage** by large carnivores (some single attacks caused more than one damage). In **91% of cases** (376), these were followed up with an **inspection** by forestry staff, who drew up a report.

Table 3

ASSETS	BEARS	WOLVES	TOTAL
BEEKEEPING	€ 54.443,00	-	€ 54.443,00
CROPS	€ 21.404,00	-	€ 21.404,00
OTHER	€ 26.641,00	-	€ 26.641,00
LIVESTOCK	€ 49.864,00	€ 74.972,00	€ 124.836,00
TOTAL	€ 152.352,00	€ 74.972,00	€ 227.324,00

Overall, € **227,324.00** of compensation for damage was paid out, of which € **152,352.00** was for damage caused by bears and €**74,972.00** by wolves. The details are given in Table 3.

With reference to compensation for **damage to "other" assets,** it is noted that €14,068.14 of the damage (**53% of the total**) can be attributed to the problem bear **M49,** for doors, windows and furniture damaged after **forced entry to buildings**.

€16,453.00 was paid out following predation by wolves for damage to cattle livestock, **€ 54,251.00** for sheep and goats and **€4,268.00** for equines.

Compared to 2019, the data for damage in 2020 show a percentage change in the number of events of +22% for bears (Graph 2) and + **119.6%** for **wolves.**

It should be highlighted that as regards damage by **bears,** in December 2020 no less than 14 events were recorded (three in 2019), of which six involving beekeeping assets, five livestock (two sheep/goats, two poultry and one bovine) and three other assets.

Graph2 shows the **trend** for **damage by bears** (Photo 21) and the amount of compensation.

Graph 2

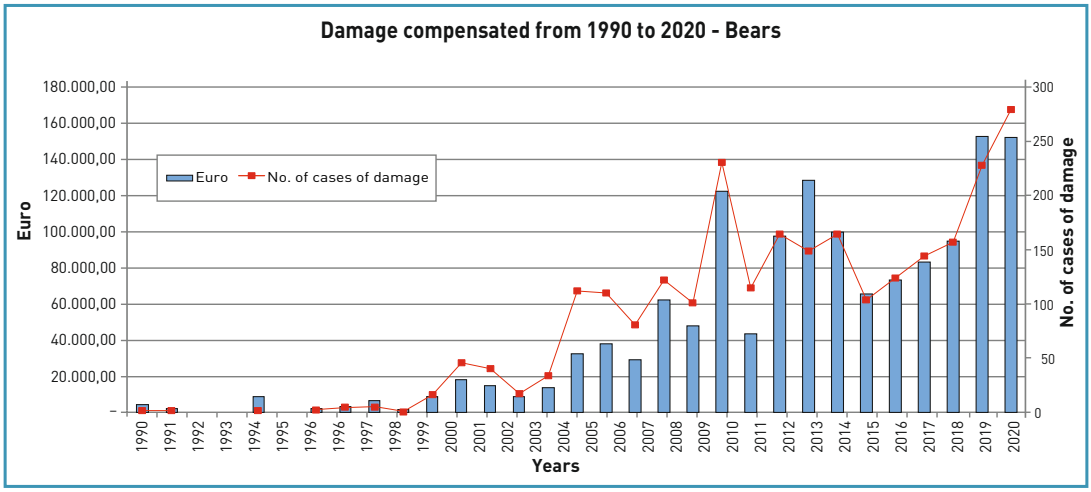
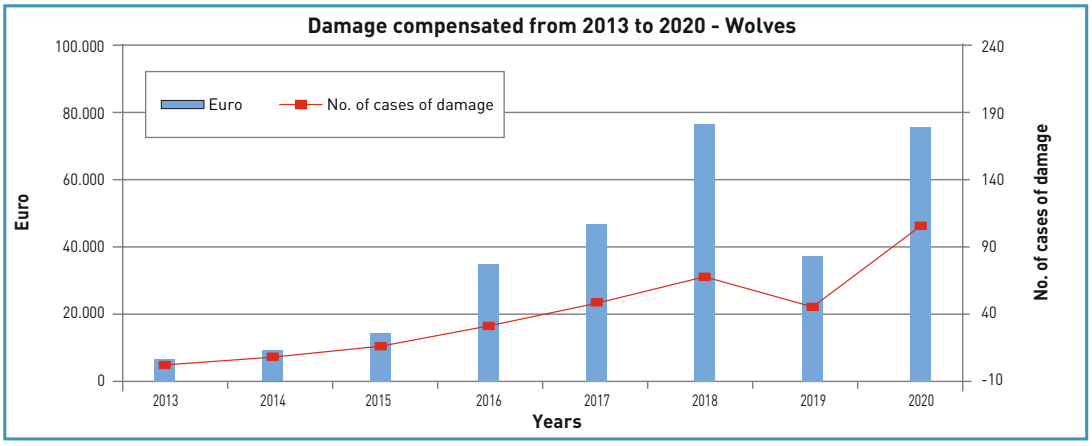


Photo 21 - Inspection of damage caused by bears (APT Forestry and Wildlife Archives)

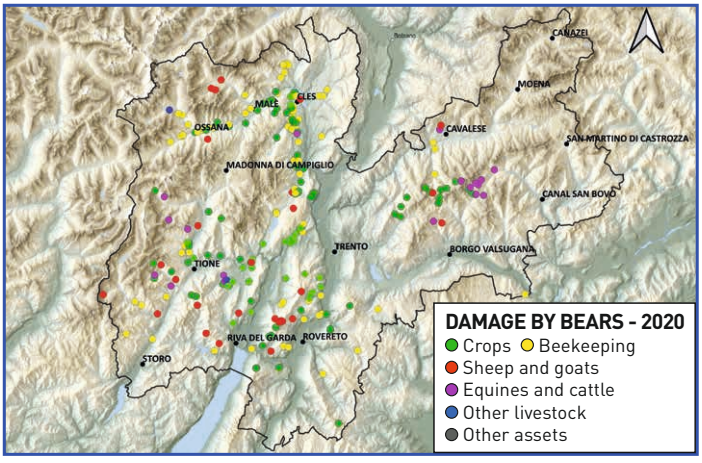
Photo 22 - Donkey preyed on by wolves in Marzola (G. Vettori - APT Wildlife Department Archives)

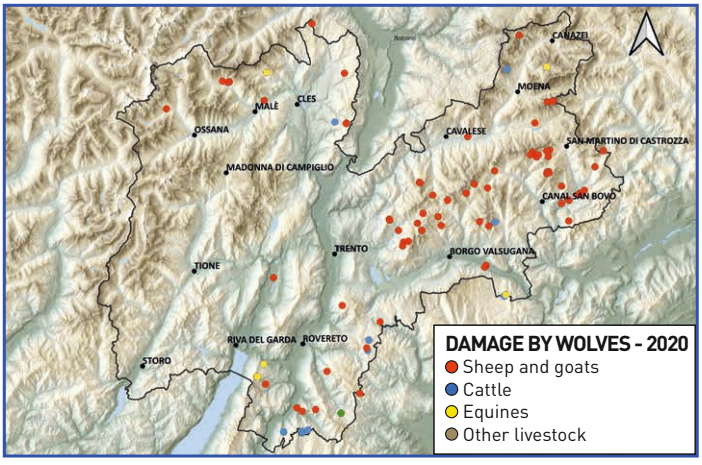
Graph 3 shows the **trend** for **damage by wolves** (Photo 22) and the amount of compensation.

Graph 3



Figures 9 and 10





(M. Vettorazzi)

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. In the **map relating to bears** practically all the damage in the **eastern part** of the province can be attributed to **M49.**

With reference to damage by wolves, it is pointed out that **80** events (79%) took place in the **eastern** part of the province and **22** (21%) in the **western** part.

Prevention of damages

The management of prevention measures at provincial level is coordinated by the staff of the Large Carnivores Division, in association with the local **prevention coordinators**. The latter figure was created with the objective of managing activities relating to the supply of prevention measures, through dialogue, support and continuous liaison with users (managers of farms and mountain dairies, shepherds, beekeepers and hobbyists) who manage assets in the area susceptible to damage by large carnivores. In order to respond promptly and effectively to these needs, the province has been subdivided into **10 zones**, generally corresponding to the Forest District Offices (FDOs), each of which is managed by a **contact figure** and their **assistant/substitute**.

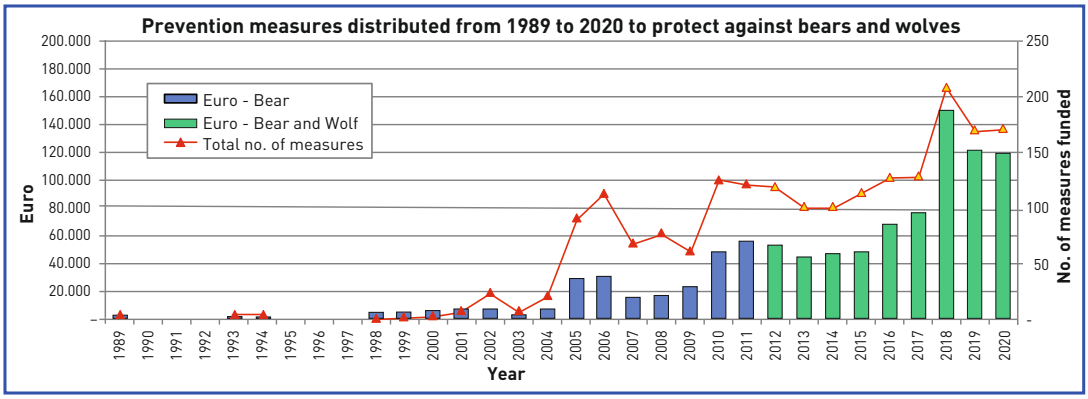
Photo 23 - Damage prevention measures protecting beehives in Valle dello Sporeggio (M. Zeni - APT Wildlife Department archives)

During 2020, **172 applications** were presented to the Forestry and Wildlife Department (there were 170 in 2019) for prevention measures to protect against damage by large carnivores (electric fences and guard dogs), designed to defend livestock and beehives (Photo 23).

Of these, **154** were dealt with by the FDOs through **gratuitous loans** of works (mobile fencing and fixed enclosures), at a cost of around **€108,000**, and **15** by the Large Carnivores Division through 60-90% **capital funding** (mobile fencing, fixed enclosures and guarding dogs), at a cost of around **€11,000**. A **total of €119,000** was thus invested in prevention in **2020.**

The following graph shows the long-term **trend** for the number of **prevention measures** distributed and the relative cost (Graph 4). It is pointed out that until 2012 the provision of preventive measures concerned only bears, and from 2012 to 2017 almost exclusively bears, whereas since 2018 there has also been a considerable increase in preventive measures distributed to protect against wolves.

Graph 4



Guarding dogs

Photo 24 - LGD (Maremmano Abruzzese) funded by the Forestry and Wildlife Department (L. Redi - APT Wildlife Department Archives)

Livestock Guarding Dogs (LGD) (Photo 24) are used to **protect livestock** from attacks by wolves and bears. In Trentino the first two dogs were handed over to a goat farmer in Val di Non in **2014** (see the 2014 Report, page 43). Since then the use of LGD has gradually increased (Graph 15).

In **2020**, **8 further dogs** were funded and handed over, at a total cost of **€6,150**. The animals, belonging to the Abruzzo-Maremma sheepdog race, were purchased from specialist/certified breeders, also from Trentino, belonging to ENCI (Ente Nazionale Cinofilia Italiana), guaranteeing health standards and genetic lines with an aptitude for work.

By the **end of 2020**, a total of **63 dogs had been funded** by the Forestry and Wildlife Division 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 continuing in an increasingly **independent** manner, as the provincial administration expected and hoped.

Furthermore, continuing an activity begun in 2017, in 2020 the Forestry and Wildlife Department designed, ordered and began the distribution of **200 new information panels** (Photo 25). These have the purpose of making users of the mountains and pastures aware of the presence of **dogs protecting flocks**, and of advising them how to behave when they are present.

Photo 25 - Information panel (M. Zeni. - APT Wildlife Department Archives)

Assessment of the vulnerability of alpine pastures

In the summer of 2019 and 2020, also bearing in mind the provisions of the policy document "*Management and prevention of conflict between wolves and animal husbandry in the province of Trento*" drawn up by Duccio Berzi in 2018, extensive monitoring of mountain farms and pastures throughout the province was carried out, with the scope of gathering information useful for **assessing the level of vulnerability of mountain pastures to predation by large carnivores**.

This activity was undertaken by the **prevention coordinators**, who completed **questionnaires** with the managers of mountain pastures in order to collect data about alpine pastures. The investigation made it possible to survey **571** mountain pastures in the province.

Specifically, the questionnaire recorded general data (e.g. name of the farm, municipality, ownership, accessibility, physical and environmental characteristics of the pasture etc.) and above all **specific data** providing information useful for investigating the **vulnerability of mountain pastures to predation** by large carnivores, such as methods of supervision, presence of infrastructures where shepherds can stay overnight (i.e. huts), type of management, presence of **structures (i.e. stables) to shelter** the animals and their use, number and type of grazing animals, and the **use of damage prevention works.** In the event the latter were not used, the questionnaire also explored the farmer's **willingness to adopt them,** exploring the types of measures generating **most interest** among those working in the sector.

The large amount of data gathered is currently being processed. The information obtained will be useful to the Wildlife Department in order to best assign resources and adjust action in the field of prevention, and to the prevention coordinators working in the area, in terms of increasing knowledge of the various mountain pastures in their areas of jurisdiction, giving a detailed picture of the situation, **strong and weak points, needs and opportunities for intervention**.

Over and beyond the processing of the data obtained, the survey activities in the field have also allowed forestry staff responsible to have **direct contact with the managers of alpine pasture**, exchanging ideas with them on the importance of prevention measures and informing them of the opportunities to obtain them directly through gratuitous use, loans or funding.

Checks on damage prevention works

During 2020, the prevention coordinators carried out **spot checks** (Photo 26) on some of the **damage prevention works** designed to prevent damage by large carnivores (electric nets and multi wire electrified enclosures) assigned with gratuitous loans between 2012 and 2019, with the support of other staff from the forestry stations. The inspections concerned **219 damage prevention works** out of the 944 distributed in the period in question, representing **23%** of the total.

During checks in the field, a special **sheet** was completed for each of the works and **photographic documentation** was acquired when considered appropriate. The inspection in the field was targeted at establishing the situation at the time of the check and specifically at assessing strong and weak points in terms of both the installation and maintenance of the works, in relation to preventing damage by large carnivores. In the case of works **installed inadequately** or found to be in a **poor state of maintenance,** the staff of the Trentino Forestry Service proceeded to **report the problem** to the user assigned the work, at the same time providing **information and consultancy** on the improvements to be made.

Analysis of the data gathered made it possible to establish that:

- **81%** of the works were **installed** at the time of the check. The **uninstalled works** were partly not operational for **justifiable reasons** (e.g. temporary use, with electric fences not adopted in meadows on the valley floor when the livestock was summering on alpine pastures; or used elsewhere, for example due to seasonal transfer of beehives to flowering zones), and partly **without appropriate justification** (e.g. failure to use the damage prevention work, or termination of activities without communication and return of the work);
- The **state of the works installed** (set up and maintenance) was **adequate in 66% of cases** (25% excellent, 30% good, 11% sufficient). **If works not installed for unjustified reasons are included** in the calculation, the percentages change as follows: **adequate state in 60% of cases** (23% excellent, 27% good, 10% adequate), inadequate in the remaining 40% of cases;

- The biggest problems found were, in decreasing order: **battery charge level** (30%), general **maintenance** (29%), inadequate set up/maintenance of **structural elements** (28%), inappropriate **positioning** of the work (13%).

During **similar spot checks** carried out in 2**013** on 102 damage prevention works (see 2013 Bear Report, page 45), at the time **67% of the works were installed**; **51%** of the works installed were considered to be **adequate** and suitable for prevention, and **49% inadequate**. Comparison of the respective data for the two years thus shows an **improvement in the use and management** of the works provided to recipients as gratuitous loans. However, there is still ample room for improvement, and the administration intends to work on this in the coming years.

Photo 26 - Checking of a damage prevention work protecting beehives in Val di Sole (M. Benvenuti - Wildlife Department Archives)

Support for animal husbandry

One of the objectives of the provincial administration is to encourage shepherds and their flocks/herds to make use of the alpine pastures. The presence of the shepherd and adoption of the most appropriate systems for preventing damage, along with fair compensation and constant connection 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 animals at high risk of predation by wolves (cattle under the age of 15 months) (see BOX 5, 2018 Large Carnivores Report, pages 32-36).

The practical and operational results of this experimentation are assessed annually, and together with the instructions contained in the policy document ***"Management and Prevention of Damage by Wolves in the Province of Trento"* (dott. Duccio Berzi, 2018)**, the experience gained from initiatives by bodies owning alpine pastures and/or individual farmers, information collected in a standardised manner on the type of alpine pastures and their management (see the section *Assessment of the vulnerability of alpine pastures*), and spot checks on the correct use of damage prevention works, represent the basis on which to evaluate initiatives to be taken to improve action to prevent damage by large carnivores.

This information also represents the basis for updating the "***Handbook for the Prevention of Damage by Wolves and Bears***". The document, which describes prevention measures in detail (type of work, method of construction, type of materials, and method of distribution) and the relative technical characteristics, is a fundamental support tool for prevention coordinators. It is

periodically updated in relation to new needs noted when analysing the data gathered. In this period an **initial revision** is currently underway, with the objective of best describing the fields of intervention and the operational tools available to prevention coordinators.

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

In 2020, in the context of a fruitful collaboration underway between the Magnifica Comunità di Fiemme and the Forestry and Wildlife Department on the prevention of damage by wolves, **two electric fences were installed and tried out at Malga Agnelezza** (caprine livestock) and **Malga delle Buse** (bovine livestock); both the farms are located in Lagorai mountain range, in the Municipality of Castello-Molina di Fiemme.

In the first case, the shepherds encountered management problems and there were two predations inside the enclosure (one by wolves and one by a bear), after which some modifications were made, also directed at aspects relating to the management of livestock, such as the creation of special gates, as well as making the protective elements (7-wire electric fence) more efficient. Bearing in mind past problems, in 2021 the fence will be reinstalled with the addition of further technical modifications, and will be subjected to constant monitoring by forestry staff in the area, also with the use of camera traps.

While there were no predatory events, the trials at Malga delle Buse nevertheless highlighted difficulties in management of the enclosure. These were related to the presence of a single shepherd to supervise around 80 cattle at alpine pasture (of which 25 animals under the age of 15 months), stabled at night inside an enclosure with an electric fence made up of 120 cm wire netting, and the difficult morphological/logistical conditions of the pasture.

In the Municipality of Novella (Brez) at **Malga Monte Ori,** a further **two fences were funded by the EU Rural Development Programme (RDP)** to protect cattle at mountain pastures (around 100 animals). These will be used in 2021 and may also provide for a special experimental automatic gate.

In the Municipality of Moena (**Passo S. Pellegrino** and the **pastures of Malga Lusia**), **two additional fences** were funded by the **RDP** to protect young cattle under the age of 15 months. The first already came into operation in 2020 and no predation was recorded, while the second will be used next summer.

It is worth noting the creation of a small enclosure created at **Alba di Canazei** to protect ovine livestock, which has been shown to be particularly suitable for zones with heavy snowfall. The lower part of the enclosure is made up of metal fencing, while two electrified wires run above it (with an overall height of around 170 cm).

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

In 2020, the **prevention coordinators** followed the specific progress of **57 alpine pastures in total**. These were provided with damage prevention works during the grazing period for the animals (usually from June to September). Activities to support pasture activities also involved

the positioning of **18 accommodation modules** (14 of which belonging to APT) transported by helicopter, in order to encourage the constant presence and supervision of guardians for the livestock (Photo 27).

Photo 27 - Wood cabin for shepherds at Malga Posta, Carega mountains (T. Borghetti - APT Wildlife Department Archives)

The Forestry and Wildlife Department also installed a **permanent wooden shelter** (see Photo) to substitute a prefab transported by helicopter in previous years to the pastures at Malga Posta in the **Carega** mountains (Ala). In the box below, the subject of prefabs/permanent accommodation modules is discussed further.

BOX 3 - Shelters for shepherds at high altitude

By Stella Liberi (APT Forestry Department)

As is known, the Forestry Department has developed a structured system of active and passive measures targeted at preventing damage caused by bears and wolves, damage which has seen a significant increase in the last few years. The efficacy of these measures necessarily requires the **constant presence of shepherds** close to the flocks-herds. In order to encourage this presence, **accommodation modules (prefabs)** have therefore been made available to shepherds, supplied in the form of gratuitous loans and transported to the mountains by helicopter for the summer alone.
The prefabs present some **problems**: there are limitations to their use in particularly windy sites, they have a relatively significant aesthetic impact on the landscape, and they are not especially comfortable for the shepherds. It is also necessary to consider the costs and risks of transporting them to the mountains by helicopter.
For these reasons it is intended to proceed with their gradual replacement using **permanent wooden shelters,** of limited size (around 4m x 4m), made using the log house construction technique. These structures can also be built by teams from the forestry districts, after suitable training with special courses, leading to considerable savings.
In **2020** the Forestry Department **provided 14 units** and organised the transport of a further **four units owned by shepherds.** From an initial assessment, based on the distribution of the units provided in the province and analysis of the provincial hazard map, it emerged that in some cases (8) it would not be possible to build permanent shelters, as the units

were situated on private land, or located in medium hazard risk areas or areas to be further investigated. In one case it was also believed that the shepherd had made insufficient use of the unit and therefore the advisability of investing in a permanent structure should be evaluated.
Aspects relating to permits for the construction of permanent shelters were therefore further investigated. Whereas in **areas outside the parks the authorisation process** has already been established for every phase in the process, from planning to the termination of work, in **areas inside the parks** there are still **aspects to be determined**, in relation to the regulations for the implementation of park plans. It is noted that five of the shelters would need to be constructed in areas falling within the Adamello Brenta Nature Park and two shelters within the Paneveggio Pale di San Martino Nature Park.
At Sette Laghi in the Municipality of **Ronchi Valsugana,** and Orena in the Municipality of **Castello Tesino**, agreement has already been reached for the assembly of two log houses already available to the Forestry Department. Furthermore, the building of a further structure at Prato della Madonna in the Municipality of **Pieve Tesino** is also planned.

Photo A - Modular log house pre-assembled in Borgo Valsugana, with a view to installation at high altitude (Photo by Borgo FDO - APT Wildlife Department Archives)

(M. Zeni)

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 since several years, 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 Autonomous province of Trento (as well as in Friuli Venezia Giulia, Veneto, Lombardy and the Autonomous Province of Bolzano), on the basis of which the Forestry and Wildlife Department has identified, trained and equipped special staff.

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

2018 saw the enactment of **Provincial Law No. 9/18**, on the basis of which the **President of the Province is responsible for authorising exceptions to the ban on capturing or killing of bears or wolves, according to the aforementioned European regulations**, after having consulted ISPRA. This law was deemed valid by the Constitutional Court in 2019.

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

Furthermore, as regards the management of **problem bears** in the province of Trento, it is worth noting the document produced by **ISPRA (January 2021)** with the technical and scientific support of **MUSE** "**Conflict with human activities, public safety risks and management problems. An analysis of the current situation and predictions for the future**".

In the event that **public security and safety** is at risk, the capture or killing of an animal can be ordered by the **President of the Province with an extraordinary emergency order**, 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.**

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

On **26 August 2020** a meeting of the **Committee for Public Order and Safety,** chaired by the **Government Commissioner**, was dedicated to **management of problem bears and wolves**.

The case of the male bear M49

The case of the **problem bear M49** was last referred to on **pages 42** and **43** of the **2019 Large Carnivores Report.**

His markedly problematic and **dangerous behaviour** was already confirmed by **ISPRA** following **consultation** in 2019; specifically, the Institute, the highest national technical and scientific body on the matter of wildlife, described M49 as a bear capable of giving rise to "**significant risks for human safety**".

The bear in question has indeed been involved in a total of **49** successful cases (plus a further 18 attempts) of **breaking into mountain huts, second homes, refuges, mountain farms and dairies**, knocking down doors or windows in order to enter, moving from one room to another and turning the interior upside-down in search of food. It is not known whether M49 has been enticed into dwellings in the past by humans.

The bear's behaviour is an example of no. **17** "Bear attempts to enter dwellings, including those only used seasonally" in the list of **problematic behaviour** described by the **Pacobace** in **Table 3.1,** where this behaviour is listed in **increasing order of problematic conduct, from 1 to 18**.

Following the order to remove the bear for reasons of public safety, as is known M49 was **captured** on **14 July 2019** and transported to the Casteler wildlife area, from which however he succeeded in **escaping,** moving into eastern Trentino, where he spent the winter of 2019-20, probably in the Vanoi area.

In **spring 2020 activities directed at his recapture** recommenced, in application of the extraordinary emergency orders issued by the President of the Province. The bear was extremely mobile in eastern Trentino, making recapture operations difficult. In this period he continued to systematically **break into buildings and dwellings** (Photo 28).

The likelihood of capture increased when the bear returned to the **western part of the province** and began to make use of the area occupied between 2018 and 2019. A tube trap was therefore positioned in the **mountains above Tione**, on the right-hand bank of the River Sarca, and on **28 April 2020** the bear was **recaptured** and transferred to the **Casteller wildlife area.**

After a period of adaptation in the den and neighbouring internal enclosure, on **23 July 2020** M49 was **released into the wildlife area.** On the **night between 26 and 27 July** the bear once again succeeded in **get-**

Photo 28 - Door broken down by the bear M49 in order to enter a dwelling (Photo from APT Wildlife Department Archives)

ting out of the enclosure by forcing the electrowelded wire mesh (12 mm diameter rods) at a point where two "sheets" of meshing were joined together, succeeding in opening up a space sufficiently large to allow him to escape.

The bear again crossed **eastern Trentino**, showing himself to be highly mobile, until he once more reached the upper **Vanoi** area, where he settled, carrying out repeated predation on domestic livestock (cattle and equines), as he had also done in the other areas (e.g. Val di Mocheni and Val Calamento) he had crossed on his route towards the Vanoi valley.

The bear's permanence in the upper Vanoi area made it possible to position a number of tube traps, inside one of which M49 was **recaptured on 7 September 2020**, to be transported anew to the **Casteller wildlife area**, now the object of further work to reinforce the enclosure.

The case of the male bear M57

M57 is a **male bear** born in **2018**. Starting from the summer of 2019, following separation from his mother, he began to show excessively confident behaviour, **repeatedly entering inhabited areas,** representing no. **13 (out of 18)** in the list of **problematic behaviour** described in **Table 3.1 of the Pacobace** "13. Bear repeatedly reported in residential areas or in the immediate vicinity of dwellings used in a stable manner". This took place above all to look for rubbish bins, despite the fact that in one area, the Paganella tableland, numerous **bear-proof bins**, namely organic waste bins modified to make it difficult for bears to gain access to the contents, have been distributed since 2009 (for the first time in Italy). It is likely that this measure reduced the use of organic waste by the bear but was evidently not enough to dissuade him from a more or less constant search for situations favouring his chances of feeding on this food source. Not even **dissuasive activities** with dogs and rubber bullets were able to change this.

The situation got worse in autumn 2019 and spring 2020, when there were the first cases of M57 **following hikers,** in the Paganella tableland and on the right-hand bank of the lower Non valley, also for long stretches and at very close quarters, despite the fact that in many cases the people involved did everything possible to send the bear away. This conduct represents no. **16 (out of 18)** in the list of **problematic behaviour** described in the **Table 3.1 of the Pacobace** "16. Bear intentionally follows people".

Marked **over-confidence with man**, which on several occasions was translated into a voluntary search for contact with people, suggests that individual was strongly **conditioned by food**, to the point of having progressively lost all fear of man. There is however no certain evidence that the bear in question was fed by humans.

Repeated attempts to **capture the bear to fit him with a radio collar** were unfortunately unsuccessful, despite him having visited at least two sites equipped and active for this purpose; during these activities an adult female bear was captured (see the section on captures), promptly tagged and released.

The episode involving a **deliberate attack on man** that led to the subsequent capture of the animal unfortunately confirmed the rapid worsening of his problematic nature. The attack took place on the evening of **22 August 2020** at around **22:30,** on a paved and illuminated **pathway** going from the sports area in the town of **Andalo** along the banks of a small lake bearing the same name (Photo 29).

Photo 29 - The site of the attack by M57 in Andalo (C. Groff - APT Wildlife Department Archives)

The person attacked, a young man in the Carabinieri police force, was first interviewed by his colleagues and then by the staff of the Forestry and Wildlife Department. The statements recorded by the police forces show that after an **initial visual contact between the bear and the man at a distance of a few dozen metres from each other** (with both on the paved and illuminated pathway, the bear arriving from the small lake below), the bear headed **straight for the man, who remained immobile.** On reaching him, he first began to sniff him and then knocked him to the ground, repeatedly biting and scratching him, causing injuries to various parts of his body and dragging him for several metres towards the small lake below. The aggression was temporarily interrupted when the victim managed **to escape and move a few metres away.** Immediately followed and reached by the bear, the man was **again thrown to the ground** and bitten several times. Only the action of several people arriving a few minutes after the beginning of the incident made the bear stop the attack. The bear then **walked away but remained in the same area** (outskirts of Andalo) in the subsequent hours. The injuries suffered by the person involved required **hospitalisation**.

This aggression represents no. **18 (out of 18)** in the list of **problematic behaviour** described in the **Table 3.1 of the Pacobace** "18. Bear attacks (with physical contact) without provocation". This is the **highest level of danger** provided for in the case of the brown bear. It is the first time that this has occurred in Trentino and in Italy as a whole.

Taking prompt action, the staff of the Trentino Forestry Service found the bear a few hundred metres from the site of the incident, intent on feeding from some rubbish bins outside a hotel, just a few dozen metres from a campsite. During the night, on the orders of the President of the Province, the animal was therefore **captured using the free-ranging technique** (shooting of a free-ranging animal with an anaesthetising dart) and transported to the **Casteller wildlife area**.

Genetic testing carried out promptly by FEM, both on organic samples found on shreds of the victim's clothes and samples taken from the captured animal, confirmed what appeared to be clear, namely that the incident had involved the male bear **M57**.

The case of the female bear JJ4

In the late afternoon of **22 June 2020,** the female bear **JJ4** was involved in an **attack on two people** (father and son) at Torosi on Monte **Peller**, which led to **injuries** and subsequent hospitalisation. The testimony provided by the persons attacked was entirely in line with the reconstruction made using objective data on the terrain following an inspection by forestry staff early in the morning on the day after. It emerged that the incident resulted from a **close encounter**, **a surprise** for all those involved (people and bear), unfortunately giving rise to a defensive attack. Information acquired shortly afterwards made it possible to genetically ascertain the identity of the animal involved (the female bear JJ4, aged 14, whose organic traces were found on the clothing of the people attacked), and thanks to intensive monitoring

of the area, to verify that she was accompanied by **three cubs**. It is therefore highly likely that this behaviour can be attributed to no. **15 (out of 18)** in the list of **problematic behaviour** described in the Table 3.1 of the Pacoback "15. Attack (with physical contact) to defend cubs...".

In line with the response in previous cases of attacks on man by female bears accompanied by cubs (Daniza on one occasion and KJ2 twice), the President of the Province issued an **extraordinary emergency order** for reasons of public safety in order to 1. **Guarantee monitoring and supervision of the area** to reduce the risk of other possible incidents, 2. **Identify and make the bear involved recognisable** and 3. **Remove the bear and take into permanent captivity.** This was decided because of the **concrete and latent danger** of new attacks taking place (see the case of the aforementioned female bear KJ2) and bearing in mind that **intensive monitoring alone** could not, for evident technical reasons, **reduce this risk** to the safety of humans.

The technical body (the Large Carnivores Division of Trentino Wildlife Department and Forestry Service) rapidly implemented the first two points of the order, seeing to guaranteeing **supervision** of the area in order to inform people, and carrying out genetic identification along with **capture** of the bear responsible for the attack **and fitting her with a radio collar** (on **28 July 2020 - Photo 30**). The **removal** of the bear has instead been **postponed,** pending **legal proceedings** regarding the extraordinary emergency order.

Photo 30 - Capture of JJ4 to fit her with ear tags and radio collar (F. Angeli -APT Wildlife Department Archives)

Action was also taken to make the geographical position of the bear known, through an **online map** (https://grandicarnivori.provincia.tn.it/Segnalazioni-orse-con-piccoli), which was **updated regularly (daily)** for the benefit of all those visiting the mountains. It is the **first time** that an information service of this kind has been organised **in Italy**. It should be reiterated that is absolutely not sufficient to adequately contain the risk of further close encounters and possible incidents. However, fortunately no such incidents have taken place, at least not up to the end of 2020.

Other problematical issues

Overall, during 2020 **54** events were reported linked to the **use of food of human origin** by bears and **19** episodes linked to **over-confidence.** Most of these episodes involved the aforementioned bears **M49** and **M57**. These events are an alarm signal, as excessive habituation to human presence, and above all the dependence of bears on the use of garbage increases the possibility of frequent interaction, with potentially dangerous consequences.

The **use of anthropogenic food** by bears was mainly reported in relation to **organic waste bins**/general waste bins or domestic **composters**. In 29 cases these were situated in rubbish tips, in 11 cases in inhabited areas, isolated houses/farms and/or link roads, and in 14 cases close to commercial activities such as restaurants or mountain huts. Most of the episodes concerned the Paganella tableland area, where M57 was present. In this area, for some time organic waste bins have been replaced with **bear-proof bins** in places most sus-

ceptible to the presence of bears**.** As a result, there had been no problems for several years, except in sporadic cases; evidently in the case of a bear such as M57, with unusually persistent behaviour, the measures adopted were not sufficient.

In a fair number of cases (**25 out of 54**), thanks to video/photographic documentation of the events and/or genetic testing, it was possible to attribute this behaviour to one or more young bears, among which the female **F54** (young/subadult bear recorded genetically for the first time) and the two brothers **M57** and **M62**. In 2 cases the adult female **F20,** not new to overconfident behaviour or searching for/using waste, was recorded with certainty (Val Genova).

As regards **overconfident behaviour** (**19**), it is possible to affirm that in nine cases these again related to **young bears**, with particular reference to the **two brothers** mentioned above, whereas in the remaining 10 cases the identity of the bear is unknown. It can be noted that almost all the problematic situations of this kind took place in areas between the Val di Non and the Val di Sole, supporting the hipothesis that they were caused by no more than a couple of young bears.

Lastly, a specific episode taking place in **Calliano** should be noted, involving the young male bear identified as **M63**. On the evening of **5 May 2020,** the bear crossed the centre of the village, probably while traversing the Adige Valley from west to east, as it was possible to reconstruct from traces and sightings. For reasons not altogether clear (perhaps because it was frightened), at a certain point the young animal **climbed up two flights of external stairs to a dwelling,** to then descend rapidly, jump to the ground in acrobatic fashion and disappear into the night in the countryside around the town. After this report there were no other signs of presence attributable with certainty to this bear. In subsequent weeks, sightings of a bear in the Vallarsa and lower Valsugana suggested that it might be the same bear moving east, but the only genetic evidence collected in the area during spring (specifically in the province of Vicenza, not far from the border with the Trento province) related to another young male, M59. Hence the subsequent movements of the "Calliano" bear remain unknown. Future data from genetic monitoring will perhaps shed light on its movements.

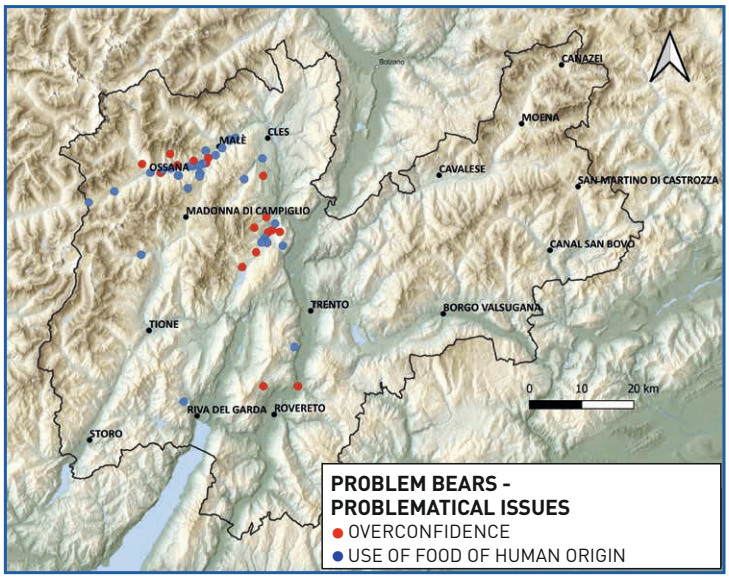
In general, through the relevant district forestry offices, the Forestry and Wildlife Department ensured the **presence of forestry staff locally** at the times bears are most active, namely the early hours of the morning and the evening/night, in the municipalities most concerned by the forays of bears. The scope of this activity was to verify the effective presence/absence of bears in the areas where there is the maximum likelihood of encounters with man and to **inform** people visiting these areas of the right behaviour to adopt in the event of a close encounter with the bear.

In two cases it was possible to intervene with action to directly **deter bears.** In one case the deterrent action was carried out with rubber bullets (in Val Genova on the female F20), whereas in a second case bear dogs were used to deter the bear, at a restaurant on the outskirts of Andalo.

Figure 11 below shows the points where critical situations linked to the overconfidence of bears took place.

Activities of the emergency team

Figure 11

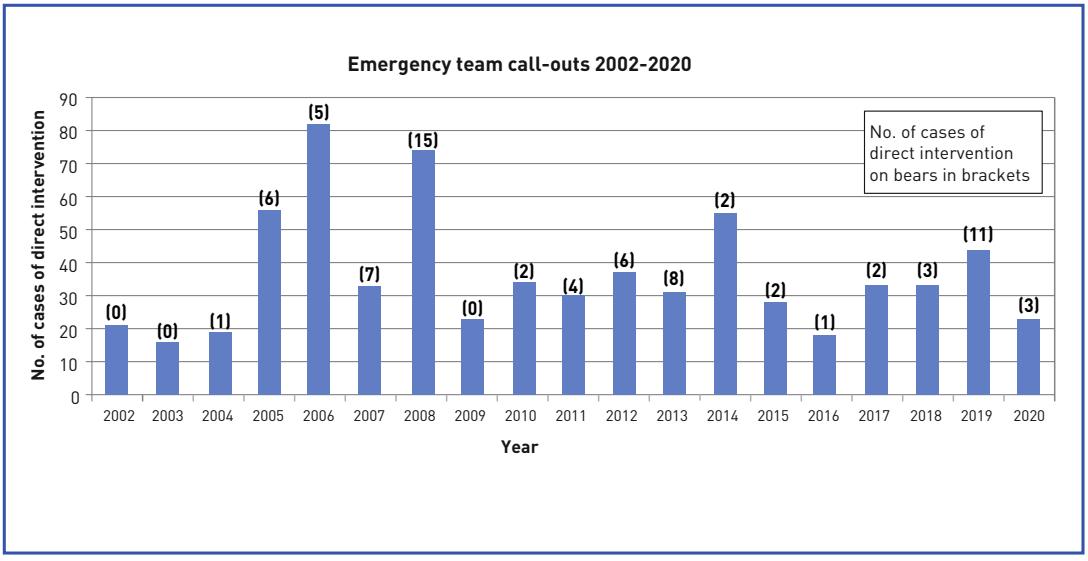


The activities of the emergency team took place from 2 March to 7 December 2020, with a total of **23 call-outs**, all regarding **bears**, of which one given code red status, 17 code yellow and five code white (Graph 5).

The team members carried out direct action to deter the animal in three cases, two of which with rubber bullets and bear dogs and 1 with noise and bear dogs. It should be highlighted that in another case the emergency team was called out to manage a situation linked to an attack on a man, leading to the capture of the bear (see section "The case of the male bear M57").

The emergency team workers were never called on to intervene to manage critical situations linked to the presence of **wolves**.

Graph 5



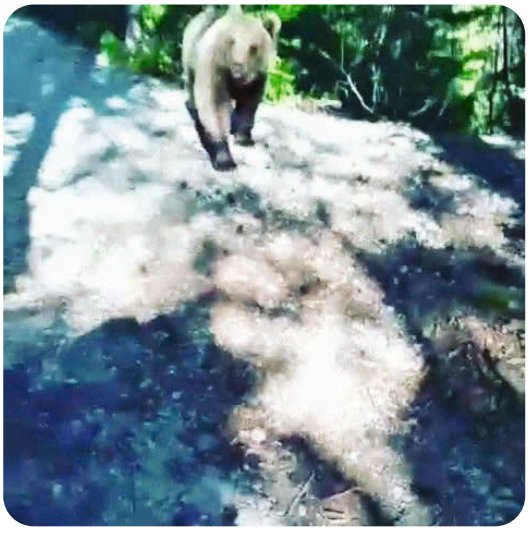
Close encounters between men and bears

During 2020, in addition to the two attacks involving M57 and JJ4 reported above, there were a **further 10 cases of close encounters between bears and men, three** of which **can be categorised as bluff charges**: involving a cyclist at Cadine on 12 July, a jogger at Caldes on 26 August and a forest warden at Dimaro-Folgarida on 29 August.

In **five further cases a bear** (most probably **M57,** given the areas in which the events took place, the physical characteristics of the animal and his very particular behaviour) **intentionally followed people at very close quarters** (Photos 31 and 32). The incidents involved: a resident, at Castel Belfort in Spormaggiore on 8 March; a forest warden at Plan dela Madonna in Sporminore on 5 May; a boy and the man accompanying him at Contra in Sporminore on 24 May; a hiker at Pramorbiol, between Cavedago and Spormaggiore, on 23 June; another hiker on the Margherita footpath at Contà on 16 August.

A **sixth** further **case,** partially similar, took place on 1 July in Ville d'Anaunia at Cialana, where a bear showed **excessive confidence** in relation to a mushroom picker, approaching twice after having encountered him, to then lie down and rest around twenty metres away. Organic findings recovered from the site by the bear dog unit, intervening promptly to assist the man, who in the meantime had climbed onto a tree stump, made it possible to identify the male bear M62, aged 2.5, M57's brother.

A further case of a close encounter was recorded on 11 June in Arco, where a bear showed **threatening behaviour** to a hiker, without however approaching the person involved.



Photos 31 and 32 - Photograms from mobile phone videos filmed by the people involved in tailing on 24 May in Sporminore and 23 June between Cavedago and Spormaggiore (Wildlife Department Archives)

Capture of bears

Six bears were captured during **2020 (Photo 33)**, of which **five** with **tube traps** and **one** capture of a **free-ranging** bear with an anaesthetic dart.

All the captures took place in the context of activities to capture/recapture the problem bears **M49, M57** and **JJ4.**

Photo 33 - Phase in the capture of a bear (R. Guadagnini - APT Wildlife Department Archives)

Below there is a brief description of the **captures** taking place in **2020**:

1. On **28/04/2020,** at **Malga Rosa (Porte Rendena),** the male known as **M49** was captured with a tube trap, to be transferred to the **enclosure at Casteler**;
2. On **30/06/2020,** at **Priori (Cavedago)**, in the context of activities to capture and fit the young male bear M57 with a radio collar, an **adult female (aged 12**) known as **F2** was captured in a tube trap. Given that the bear did not have the characteristics of the target animal (a young male), she was microchipped and fitted with ear tags before being immediately **released**;
3. On **27/07/2020,** at **Rio Tinto (Caldes)**, in the context of activities to capture and fit the female bear JJ4 with a radio collar, a **young bear (age 1.5)** was captured in a tube trap. Given that the bear did not have the characteristics of the target animal, the bear was immediately **freed** by opening the trap;
4. On **27/07/2020,** again at **Rio Tinto (Caldes),** the adult female (aged 14) known as **JJ4,** involved in an attack on two people (father and son) at Torosi on Monte Peller on 22/06/2020, was captured with a tube trap, fitted with a radio collar and tags and released at the site;
5. On **23/08/2020,** near **Andalo,** the young male known as **M57** was captured with an anaesthetic dart using the free-ranging technique. A few hours earlier, on the evening of 22/08/2020, the animal had attacked a person without any provocation, along a footpath near the sports centre of the town of Andalo;
6. On **07/09/2020,** at **Malga Socede (Castello Tesino),** the male known as **M49** was captured with a tube trap, to be once more transferred to the **Casteler enclosure,** from which he had again escaped on 27/07/2020.

The number of **captures** taking place **since 2006** has therefore risen to **45** (26 involving females, 17 males and two of undetermined sex) and concerned **30 different animals**. Of these captures, **29** were carried out with **tube traps**, **nine on free-ranging bears**, four with an **Aldrich snare** and three **manually** (for cubs born that year).

BOX 4 – Veterinary aspects of capture activities

By Roberto Guadagnini

From this year, **veterinary support** for the capture of bears and wolves has been provided by a **freelance veterinary surgeon** with expertise in the field of large carnivores, through a special agreement stipulated with the Provincial Health Services.

In this framework, **health aspects relating to capture activities in 2020** are briefly described below.
At the time of each anaesthetic, both for captures and specific medical operations at the Casteler enclosure, the bears are subjected to a **full medical examination, anaesthetic monitoring** and **sampling for laboratory tests.** Anaesthetic monitoring is managed both clinically, with assessment of breathing characteristics (frequency and profundity) and cardiac auscultation (beats and rhythm), and with the use of instruments such as a pulse oximeter, capnograph, sleeve for non-invasive blood pressure management, monitor for graphic representation of respiratory characteristics, electrocardiograph and endo-oesophageal thermometer. The constant and systematic monitoring of all vital signs makes it possible to best manage every phase of the anaesthesia and to respond as quickly as possible to any anomalies that may arise. All the instruments (equipped with batteries offering several hours' autonomy) are transported to the site where the bear is captured and in the space of a few minutes a genuine open-air operating theatre is set up. During the anaesthesia, oxygen is administered continuously intranasally and fluids intravenously, in quantities depending on the body condition and mass of each individual animal (before each operation the weight and body condition score are checked).
While the anaesthetic is effective, **organic samples** of various kinds are taken: tissue samples for genetic testing, making it possible to identify the bear with certainty; hairs and skin to assess the health of the integumentary system and/or check for the presence of parasites; ear and rectal swabs to check for the possible presence of pathogens. A faeces sample is also taken for coprological tests. It is also important to take blood samples, which allow the general metabolic condition of the animal to be checked, through haematochemical-serological screening. A urine sample completes the medical protocol for the management of the "bear" patient, both in the wild and in captivity.
The veterinary surgeon has the primary task of **guaranteeing maximum wellbeing** during all the operations before, during and after the anaesthesia. Vets must be very careful when manipulating bears (reducing the tactile, visual and aural sensitivity of the animal), as well as checking that they are not wounded during the capture procedure. All the manoeuvres and organic material sampling procedures take place without causing the animal any pain and without any limitations on recovery after the anaesthesia.
All the **anaesthetics are injected** into the muscle of the bear with a dart fired by tranquilliser gun. The anaesthetic achieves its maximum effect after an induction time (monitored by the vet) of twenty minutes. On conclusion of all the procedures carried out

during the anaesthesia, **drugs acting as antidotes to the anaesthetic** are administered. In the space of a few minutes the phase of reawakening begins. As well as raising the safety threshold during anaesthesia, oxygen and fluid administration also guarantee the animal recovers better after waking. During the reawakening phase, the bear is kept in the tube trap to avoid environmental risks (falls from cliffs, into water, etc). Only **after a period of monitoring under close medical supervision**, during which the animal recovers all its organic functions and its full physical and mental faculties, **is it once again released into the wild**.

In 2020, **all the anaesthetics had a favourable result** and no problems were reported following anaesthesia.

Photo A - Vets at work during a capture operation (M. Zeni - APT Wildlife Department Archives)

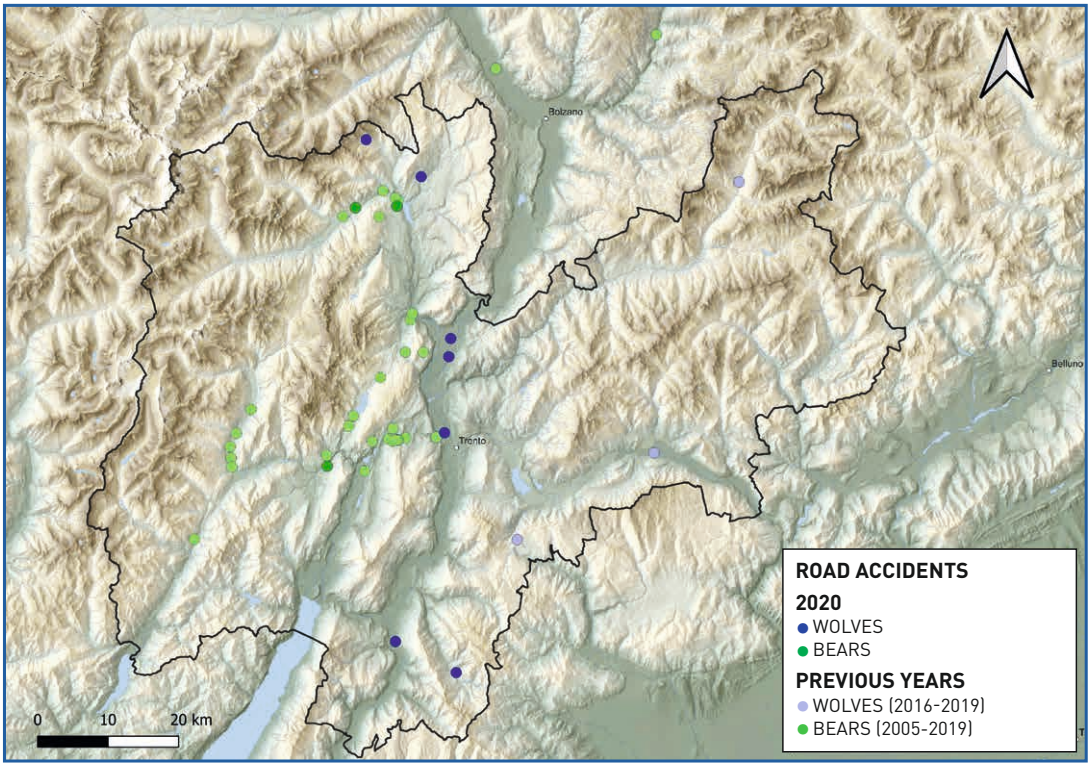
Road accidents involving bears and wolves

During 2020 there were **three cases of road accidents** involving **bears** in the province of Trento, bringing the total number of the accidents in the region **recorded to date** to **38** (of which two in the province of Bolzano) (Figure 11). In all three cases, the vehicles involved in the impact with the animals were travelling relatively slowly and the drivers were not injured. Checks carried out on site suggest that the bears hit by the vehicles also escaped without any serious consequences.

The first case took place on **22 September 2020**, on the SS 237 road at Ponte dei Servi near **Comano Terme**, a few metres from the provisional roundabout on the road towards Trento. The vehicle involved was travelling slowly and bumped gently into a **fairly small bear,** perhaps a young, which actually rested on the car door. The animal then headed off into the woods above the road, moving towards Comano, without suffering any consequences. There was no damage to the vehicle. No genetic samples of the animal involved were found.

The second case took place on **25 September 2020** along the SS 42 road shortly after the Cassana-San Giacomo junction, in the Municipality of **Caldes**. According to the driver, the impact was slight, because when she saw the bear appear on the road she managed to brake before hitting it. The vehicle had only slight damage. An inspection by the members of the bear dog unit made it possible to identify the route followed by the bear following the impact. This showed the animal succeeded in nimbly getting over three fences to protect apple orchards from deer, thus suggesting the consequences of the accident were not serious. Some hairs were recovered along

Figure 12



the route followed by the dog unit, subsequently making it possible to ascertain that the animal involved was **M44** (a male bear aged 3.5). Organic samples collected in the future in the area will be able to confirm the presence of the bear hit by the vehicle and identified.

The third case took place on **17 October 2020** along the SS 43 road at Dres, on the outskirts of **Cles**. According to the driver, the animal came rapidly down the slope above the road and bumped gently into the side of the car. An inspection by the members of the bear dog unit made it possible to trace at length the route followed by the bear following the impact and to obtain hair and excrement samples. On the basis of the evidence collected on site, the possibility of the animal having suffered major consequences as a result of the accident was excluded. Genetic testing ascertained that the animal involved was **M62** (a male aged 2.5). The bear was subsequently detected genetically at damage sites (on 20 November and 9 December), confirming the hypothesis at the inspection site, and he was observed directly on at least two occasions by forestry staff involved in activities to deter the bear; the animal appeared to be in perfect physical condition.

As regards **wolves**, in 2020 there were **eight road/rail accidents**, **seven of which** (as already mentioned on page 24) were **fatal** for the animals involved.

The first case took place on the night of **20 March 2020** on the S.S. 12 road, just south of the town of **San Michele all'Adige**, where a **female** aged 2-3 weighing **31.8 kg** was hit and killed by a motor vehicle.

The second case was reported on **25 April 2020** at "Cemiglio" near **Rumo**, where the remains of a 3-year-old **male wolf** weighing **32 kg** were found. Tests carried out on the animal's remains showed various injuries resulting from a violent impact (fractures and multiple injuries). It is surmised that the animal died where it was found as a result of these injuries, probably resulting from a road accident.

The third case was recorded on **5 November 2020**, when staff from the permanent firefighters service were called on to recover the remains of a canid hit and killed on the S.S.12 road on the **Trento ring road**, at **Campotrentino**. The animal involved turned out to be a 2-year-old **female** weighing **23.4 kg**.

The fourth case was recorded on **17 November 2020**, on the S.P. 219 road from Casae to Speccheri, in the **Vallarsa.** The animal involved was a 7-month-old **male** weighing **26 kg**.

On **24 November 2020** (fifth case) on the S.P. 50 road at Toldo, near **Trambileno**, a motor vehicle hit a wolf as it was crossing the road carrying the carcass of a wild animal in its mouth. A subsequent inspection by a gamekeeper from the ACT with the assistance of a tracking dog made it possible to find the carcass transported by the wolf (a roe deer), but not the wolf. There was no damage to the vehicle, so it is considered likely that the animal did not suffer any major physical trauma.

On the following day, **25 November 2020**, on the S.S. 12 road at **Serravalle all'Adige,** an ambulance hit and killed a 3-year-old **male wolf** weighing **37 kg** (sixth case)**.**

On **19 December 2020,** around a hundred metres south of **Mezzocorona** railway station, staff from the local police force and the forestry service recovered the remains of a canid that had died after being hit by a train and found on the railway track: it was a **female wolf** aged 2-3, weighing **26.1 kg** (seventh case).

Lastly, on **25 December 2020**, on the S.S. 42 road between Romallo and Cloz in the Municipality of **Novella,** a **male wolf** aged 2-3 and weighing **33.1 kg** was hit and killed by a motor vehicle (eighth and final case).

The eight accidents (seven of which fatal) involving wolves taking place in 2020 highlight both the current **phase of rapid recolonisation of the whole of the Trentino territory** by the species, but also in general, the danger of communications routes (particularly busier roads on the valley floor) for wildlife, including large carnivores. In this context, the Adige Valley, highly urbanised and crossed by major road and rail links, represents one of the most important ecological barriers in the whole of the Alps, as demonstrated by the four wolves hit and killed there in 2020.

Lastly, the accidents taking place in 2020 confirm the tendency of wolves to follow **ungulates** towards the **valley bottom in winter**, as well as the marked tendency of dispersing wolves to roam over large areas. These movements during dispersion also include numerous crossings or attempts at crossing urbanised areas and major communications routes.

The bear-dog unit

The **Bear Dog Unit** has now been **operational for 14 years** and intervenes on average **around 50 times a year** (Photo 34), guaranteeing a permanent service throughout the province, with **six dog units** (Photo 35).

During 2020, **two inspection and recovery operations following road accidents** were carried out, in the Municipality of Caldes in September and in the Municipality of Cles in October (see page 51 of this Report).

The inspections made it possible to exclude major injury, given the dynamic action of the bears when moving away from the place of the impact.

In 2020 the unit intervened **seven times to carry out deterrent action,** specifically:

- action taken on 3 March, following M49's foray into the centre of Daiano;
- action taken at Ronzo Chienis on 28 March, due to repeated damage at a poultry farm;
- action taken on 8 July in relation to M57, intent on preying on a goat close to the Tana dell'Ermellino restaurant in Cavedago;
- one call-out to support the emergency team on 31 July, to deter the overconfident bear M57, repeatedly reported in the town centres of Andalo and Cavedago;
- on 7 September, an attempt to intervene in Folgarida di Dimaro in relation to the overconfident bear M62, which was feeding from organic waste bins;
- on 10 and 11 December, two repeated actions in relation to M62, in the village of Flavon, after predation on calves inside units alongside a stable.

Furthermore, activities were carried out with dogs in order to reconstruct the dynamics of the following events:

- the **attack on two people by the female bear JJ4** taking place on 22 June in the Municipality of Cles;
- **overconfident bear interacting with man**, an incident taking place in Sporminore on 3 June 2020 (no genetic test results);
- **overconfident bear interacting with man**, an incident involving M62 taking place in Ville d'Anaunia on 1 July;
- checking a **report on the presence of a bear** in the Municipality of Mezzana on 22 September, with no result.

In addition to the direct action taken in relation to bears reported above, **anti-poaching checks** were carried out, along with outings for the purpose of **training** and a number of meetings between staff, the latter necessarily curtailed in 2020 due to restrictions linked to the Covid-19 pandemic.

In the field of communication, the precious opportunity to present the work of the **Bear Dog Units** in the **RTTR** programme **"Le Sentinelle del Trentino"**, broadcast in November 2020 should however be mentioned.

Photo 34 - Activities to deter a young over-confident bear - photogram from mobile phone video (M. Baggia - APT Wildlife Department Archives)

Photo 35 - Russo-European Laika bear dog (I. Albertini - APT Wildlife Department Archives)

Bear-proof bins

Following periodic checks on bear-proof bins distributed in the area, in 2019 the Forestry and Wildlife Department decided to fund modifications to a **further 45 waste bins** (see the 2019 Large Carnivores Report, page 47). In the first few months of 2020, the company responsible for waste management in the area (Azienda Speciale per l'Igiene Ambientale - ASIA) **positioned these on the Paganella tableland** (Spormaggiore, Cadevago, Fai della Paganella, Andalo and Molveno), to replace bins without bear-resistant mechanisms, or bear-proof bins that were present but not working properly. However, in 2020 it was precisely this geographical area that was subject to intensive activities by the young bear M57 in his search for organic waste. This highlighted certain weak points in a management system that had proved effective until then, even in areas with a substantial presence of bears. It was noted, for example, that the modified bins (the first of which positioned in the municipalities listed above and the upper Valle dei Laghi in 2009, for the first time in Italy) were often left open by users after depositing organic waste, effectively making garbage accessible to bears. Consequently, at the beginning of 2020, in agreement with ASIA, the Forestry and Wildlife Department's Large Carnivores Division designed a **sticker,** then **produced and attached on site by ASIA,** to be applied to all bear-proof bins to remind users of the importance of carefully closing the bins after each use (Photos 36 and 37).

Furthermore, local forestry service staff produced an updated map of the distribution of bear-proof bins, which made it possible to intervene during the season, in association with ASIA's technical staff, moving some of these bins to the places most vulnerable to M57's forays.

During 2020, the Azienda Speciale per l'Igiene Ambientale (**ASIA), in association with APT's Forestry and Wildlife Department,** began revising the management of organic waste in its area of jurisdiction, a process that is still being implemented. Indeed, **in 2020** throughout the

Photos 36, 37 - Bear-proof bin poorly closed and visited by M57, and new sticker produced by ASIA and the Wildlife Department in 2020 (M. Zeni - APT Wildlife Department Archives)

territory of the **Municipality of Vallelaghi**, which also includes small hamlets located close to the woods, **the 120 litre organic waste bins** used to date (many of which equipped with bear-resistant mechanisms, issued as described by the Forestry and Wildlife Department) were **replaced with large containers with electronic locking devices**, which are effectively **bear-proof.** The aforementioned replacement has also been extended to other areas of the Valle dei Laghi (Cavedine, Bondone). This is an important change, taking place in one of the areas in Trentino most affected by the presence of the species.

This **change** will also be implemented on the **Paganella tableland** in the near future; Spormaggiore will see the replacement of organic waste bins with the structures already installed in the Valle dei Laghi and surroundings in the first few months of 2021, whereas slightly different types of waste containers are being studied for Cavedago, Andalo, Fai and Molveno. At all events, these are intended by the waste disposal company and the municipalities concerned to be bear-proof.

The large numbers of visitors at tourist destinations such as Andalo and Molveno in summer make waste management particularly complex, but **local authorities** are very aware of the need to include **the presence of bears** among the factors determining future management methods, also thanks to the constant **information and promotion** activities carried out by **APT.**

A further positive example of increasing awareness as regards the issue comes from the **Municipality of Arco**, where in 2020, following repeated problems with bears visiting certain zones in the mountains affected by human activities (San Giovanni al Monte, Monte Velo) in 2019 (Photo 38), the **municipal administration replaced the previous method of organic waste collection with itinerant collection**, clearly considering and mentioning the presence of the bear in the specially prepared regulations.

In 2020, organic waste bins were also repeatedly visited by at least one young bear in the **Val di Sole**, specifically in Dimaro Folgarida and the surrounding area (Photo 39). To suitably manage the problem, the local **Comunità di Valle** responsible for waste collection, in agreement with the Forestry District Office (FDO) of Malé, **temporarily eliminated some of the bins at risk.** In the meantime, the Forestry and Wildlife Department, in cooperation with the Comunità di Valle and FDO, and with the support of local prevention coordinators, commissioned and funded the development of two prototype bear-proof mechanisms for the organic waste bins in use at the sites (slightly different from those managed by ASIA in the areas previously described), and subsequently had the **first 7 bear-proof bins** made, immediately positioned in the territory of the Comunità di Valle. Thanks to synergistic action by the bodies mentioned above, a **further bear-proof mechanism prototype (based on a model of Slovenian origin)** suitable for organic waste bins in the Val di Sole is currently being designed and produced. After appropriate prior **testing,** during 2021 other waste collection centres visited by bears in the Val di Sole in 2020 will then be **suitably updated**.

Photos 38, 39 - Yearling visiting waste bins at San Giovanni al Monte (Arco) and M62 at Costa Rotian (Dimaro Folgarida) (T. Bagatoli and M. Benvenuti - APT Wildlife Department Archives)

4. COMMUNICATION

The main **activities carried out during 2020** are summarised below.

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

Evening sessions and meetings

Table 4 lists the meetings/evenings organised by the Forestry and Wildlife Department. Most of these meetings were organised in response to local requests for information and dialogue.

Table 4

Type	Date	Place	No. of participants
Public meeting regarding wolves	22/01/2020	Barco di Levico	130
Public meeting regarding wolves	13/02/2020	Vigolo Vattaro	150
Meeting regarding bears directed at winemakers	19/02/2020	Trento (c/o cantine Lunelli)	80
Public meeting regarding bears	6/08/2020	Istituto Cimbro di Luserna	30

In the context of the theatrical and cultural initiative "**Who's afraid of the bear?**" the Forestry and Wildlife Department participated at a number of meetings with the public (**26 August and 28 August** in **Trento**, **31 August** at **Cantina di Toblino**, **4 September** in **Caldonazzo**).

(M. Zeni)

Press releases and council questions

With the support of the Press Office, **64 press releases** were issued, of which **50 press releases** regarding **bears**, **11** regarding **wolves** and **three** on **large carnivores** in general.

Furthermore, the necessary information was provided in order to respond to **26 questions raised at the Provincial Council** (standard or with an immediate response): **23** regarding **bears**, **one** concerning **wolves** and **two** regarding **both** large carnivores.

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

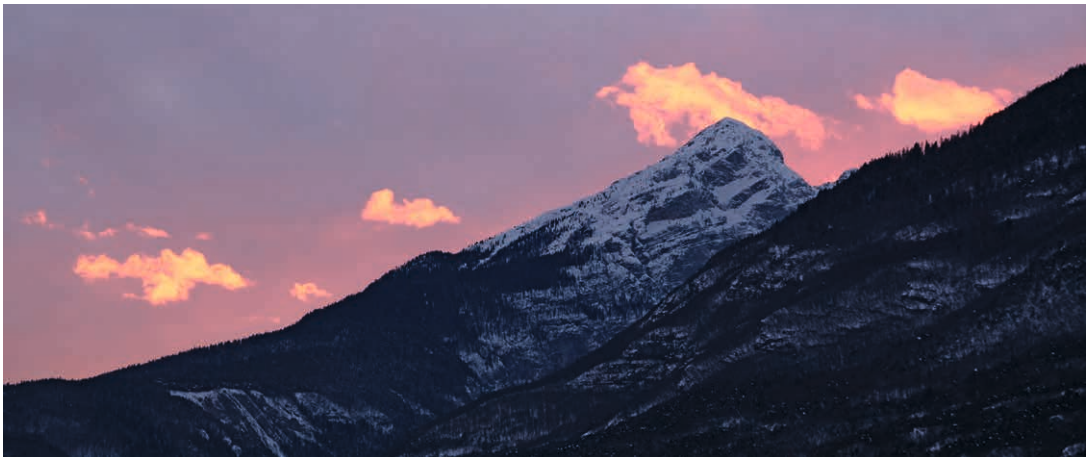
INFORMATION AND TRAINING ON LARGE CARNIVORES:

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

9-10 February 2020: "Valentine's Day among the wolves", Lessini mountains (organised by the Pressano SAT branch)

Other activities:

- 25 July 2020, **Malga Arza**: educational session on the brown bear for children at the "7x7 Estate in comune" event (Municipalities of Campodenno, Contà, Denno, Sporminore and Ton – following an invitation from the Denno SAT branch);
- 19 September 2020, **Val di Ledro**: "Large carnivores in Trentino" debate, in the context of the "Valle di Ledro Global Day 2020" (together with WWF Trentino);
- 26 August – 5 September 2020: "**Who's afraid of the bear?** – Artistic exploration of the relationship between man and the bear in Trentino"; SAT was the lead partner in the project and also participated at a number of cultural gatherings on the subject to complement the theatre performance "Night of the Bear".



(M. Zeni)

Other communication initiatives

- 20 January, interview on **RAI-TV** in **Trento** in relation to the presence of the **lynx** in Trentino;
- 19 February, interview on **Radio 1** regarding the presence of the **lynx** in Trentino;
- 26 April, meeting for the article on the **management of bears** in the magazine **L'Espresso**;
- 8 May, interview on "**YOU PET TV**" regarding **large carnivores**;
- 22 May, interview on **Radio Primiero** about the **wolf**;
- 26 May, interviews with **TCA**, **RTTR** and **The New York Times** regarding the close encounter between a **bear** and a boy in the municipality of Sporminore;
- 6 July, interview on **SKY Canale 235** regarding the management of **bears**;
- 20 July, interview regarding **bears** for the magazine **"Il Melo"** - Val di Non;
- 28 July, interview on the management of **bears** for the magazine **Süddeutsche Zeitung**;
- 28 July, interview for the TV programme **Agorà on RAI 3** regarding the management of problem **bears**;
- 19 August, interview with the **Repubblica** newspaper on the management of **bears**;
- 20 August, interview with the Zurich-based magazine **Neue Zuercher Zeitung** on the management of problem **bears**;
- 1 September, interview on **TV Telepace** regarding the management of **bears**;
- 7 September, interview on the Italian-speaking channel **RSI - Radio Televisione Svizzera** on the management of **bears**;
- 8 September, interview with **RAI News 24** regarding the management of **bears**;
- 14 September, interview on **bears** for the programme **Unomattina** on **RAI 1**;
- 19 October, television feature on **bear dogs** on **RTTR**;
- 19 October, television feature on **guard dogs** for **Canale5.**

Round table on information and participation in the management of large carnivores

The "**Round table on information and participation in the management of large carnivores**" did not meet in 2020 due to the **Covid-19** emergency.

(M. Zeni)

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 the management of emergencies and 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 training events taking place during 2020 were also affected by the **serious restrictions put in place due to the COVID-19 emergency.**

- **8 and 9 February 2020**, **CAI course on large carnivores** in **Nevegal** (**BL**). Update on the status and management of large carnivores in the province of Trento;
- **20 February 2020**, **Casteller**, 2019 update (Report data) and **training for staff involved in the monitoring and management of large carnivores** (APT, Nature Parks, Associazione Cacciatori Trentini);
- **9 March 2020**, **training and updating session on large carnivores** for **education workers** at **Muse,** c/o Muse;
- Training sessions targeted at bear dog handlers, held at the forestry nursery centre in **Castelleer on 20 May 2020,** regarding **first aid in the field** in the event of the wounding/poisoning of a dog;
- **12 September 2020**, **Mezzolombardo**, training in the context of a course at the **University of Insubria** on **communication relating to wildlife;**
- **27 October 2020**, video conference on the management of large carnivores in the province of Trento in **the framework of the course on Sustainable Management of Natural Resources at the University of Trento's Faculty of Economics.**

Photo 40 - Staff training activities (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.

In 2020, national and international networking activities **were also seriously affected by the COVID-19 pandemic.**

The Alpine Convention Large Carnivores Platform

2020 saw continuation of the activities of the **Alpine Convention Large Carnivores Platform (WISO)**, set up in 2009, the Autonomous Province of Trento also being represented within the Italian delegation. In the 2019-2020 two-year period, the Platform was chaired by Slovenia and specifically by its Forestry Department. In 2020, due to Covid-19, the Platform only met online, with a **video conference summit** on **13 and 14 October 2020**.

Figure 12

alpenkonvention • convention alpine
convenzione delle alpe • alpska konvencija
www.alpconv.org

Other opportunities for national and international networking

Photo 41 - Meeting of staff from the two autonomous provinces in the field in the upper Val di Non (APT Wildlife Department Archives)

- **17 February 2020**, meeting in the field with colleagues from the Autonomous Province of Bolzano on the occasion of **conclusion of radio-telemetry monitoring of the female wolf WBZ F1** and recovery of her radio collar. (Photo 41)
- In **spring 2020 a collaborative agreement** was stipulated with the **Abruzzo, Lazio and Molise National Park - PNALM (**the only other place in Italy with a viable population of brown bears) to **cooperate in the conservation and management of brown bear popula-**

tions in the central Alps and Apennines. The agreement provides for a commitment to reinforce existing collaboration and to share experience as regards the different **monitoring techniques**, **health monitoring**, anaesthesia techniques and **veterinary aspects** linked to captures, **damage prevention and compensation, management of emergencies,** including capture activities, **communication, staff training, promotion of good practice with the exchange of experience between businesses** in the two areas, and promotion of opportunities for **meeting and exchanging experience at national and international level**. The agreement provides for **meetings to be held at least annually,** in Abruzzo and Trentino alternately.

In 2020, as a result of the COVID emergency it was not possible to organise the first meeting, which it is hoped will be held in 2021.

- Visit to **Slovenia from 15 to 17 September 2020** for an exchange of experience regarding **management and research into large carnivores**, with the **Slovenian Forestry Department** and the **University of Ljubljana** (Photo 42).

Photo 42 - Visit to Slovenia (C. Groff - APT Wildlife Department Archives)

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

Once again in 2020, the provincial administration participated in the activities of **LCIE** with its staff (Figure 13).

Figure 13

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

Among other things, the **Bear Specialist Group of IUCN** has provided the provincial administration with authoritative **opinions** regarding the most opportune management measures to be adopted in the cases of the female bear **JJ4** and the male bear **M57**.

Conferences and meetings

Due to restrictions associated with the **Covid-19** pandemic, in 2020 **there were no opportunities to participate in national or international conferences** on the management of bears and large carnivores.

NOTE

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