Report on Monitoring, Status And Management of the Brown bear in the Alps

Large Carnivores, Wild Ungulates and Society Working Group (WISO) of the Alpine Convention

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Executive Summary

The population **trend of bears across the Alps is positive**, but with a great discrepancy between central Alps (strongly increasing population, so far; 98 ind. CI 86-120 in 2023) and eastern Alps (stable presence; 48 ind. CI 41-57 in 2015). No genetic connection between the two subpopulations has been documented so far.

The main monitoring tool for bears in the Alps is **genetic**. Bear samples from the two main alpine subpopulations are processed by a network of labs. While in Slovenia the genetic monitoring is implemented on a 7-8 year basis, in Trentino the intensive monitoring is carried out every second year. All this data is collected in the long term as the **basic input for CMR population estimations** for both subpopulations, and to quantify the minimum number of individuals in other alpine areas.

Systematic **camera-trapping** is also carried out in Trentino as a complementary tool to the other investigation methods. **Radio and GPS tracking** are used to monitor problem bears, and are crucial to implement prevention actions and to facilitate bear removal.

Bears in human dominated landscapes cause conflicts with people, potentially threatening both property and human safety. This is particularly true for the **Alps, one of the mountain ranges with the highest human density** across all the brown bear world distribution.

Prevention and **communication** are crucial in bear management. The **bear spray** may be considered as well a useful tool to avoid attacks. Nowadays it can be legally purchased and used in Slovenia while it is forbidden in the other alpine countries. **Aversive conditioning** against confident bears has been constantly implemented in the central Alps, but its real effectiveness will require further investigations.

Regarding the **central Alps** population **27 problem bears** have been recorded in the period **2007-2024**; for several reasons, only a few of them have been removed. Differently, **in northern Slovenia problem bears are regularly removed**.

Bear removal is suggested when the other primary tools prove to be ineffective or in case of attacks on humans. **In the central Alps 7 bears performed 9 attacks** on humans in eleven

years (2014-2024). All these bears have been removed. Two females (out of the five that attacked people) were not immediately removed after their first attack, and both of them attacked again two years later, when with the next litter.

To date, in the central Alps a weak reaction of managers to the attacks has been observed, often hampered by animal rights Associations and Courts. One of the main consequences of such **missing or delayed management** is the worsening of people's attitude, which in turn may cause an increase in poaching risk. It has to be understood that removals, as for the specific situations stated in the Action Plan, are in the best interest of the whole bear population and that **conservation cannot overcome public safety**.

The **management of problem bears** in the future years will be the most **crucial** issue for bear conservation in the Alps.

1. MONITORING AND STATUS

1.1 Monitoring

1.2 Status

1.3 Zoom on Central Alps

1.1 Monitoring

The monitoring of the brown bear population of the Central Alps is performed by a network of several Institutions and volunteers. Here below are listed the main ones:

- Provincia Autonoma di Trento
- Regione Autonoma Friuli Venezia Giulia
- Regione Veneto
- Provincia Autonoma di Bolzano
- Regione Lombardia
- Regione Piemonte
- Swiss confederation (KORA, Cantons, Laboratoire de Biologie de la Conservation, Lausanne)
- Slovenia - Slovenia Forest Service, Ljubiana University, Divja labs
- Austria - Land Tirol - (Amt der Tiroler Landesregierung) and Carinthia
- Bavaria (Bayerisches Landesamt für Umwelt - LfU)
- Parks, Hunting associations, Alpine clubs, Volunteers, several others.

The main monitoring tool for bears in the Alps is **genetic**, since 2002. Bear samples are processed by Fondazione Edmund Mach (FEM) and Istituto nazionale per la Protezione e la Ricerca Ambientale (ISPRA) Labs in Italy, the Divja Lab in Slovenia, the Vienna Lab in Austria and Germany, the Losanna Lab in Switzerland. As a strong point, labs are connected and communicating with each other, with the advantage that methods and results can be shared.

From 2002 to 2023, approximately **12.000** and **7.000 bear samples** from the two main alpine subpopulations (from Trentino, central Italian Alps and Slovenia, eastern Alps, respectively) have been processed. The genetic monitoring is performed with different timing and schedules, according to the different subpopulations, areas, conservation status and management options.

In Trentino genetic monitoring takes place using two methods, described as systematic/intensive monitoring, based on the use of traps with scent bait, designed to capture hairs using barbed wire, and opportunistic monitoring, based on the collection of organic samples found in the area during routine activities, when ascertaining damage and by checking rub trees. Since 2019 the **intensive monitoring is carried out every two years** and consists of 114 hair-traps (2023) distributed in 4x4 km cells across the western side of the province and in the surrounding areas. Forest rangers play a key role in such monitoring field activities.

In Slovenia the genetic monitoring is implemented on a 7-8 years basis, mainly thanks to the hunters and foresters support. In the other alpine areas (Switzerland, Austria, Bavaria, Lombardia, Veneto and Friuli VG regions, Autonomous Province of Bolzano) where the bear density is much lower and no females have been detected so far, opportunistic genetic monitoring is made on a yearly basis.

All these genetic monitoring activities are performed in the long term as a basic tool for **CMR population estimations** (Trentino and Slovenia) or to quantify the minimum number of individuals (if not only presence/absence of the species) in the other areas (Switzerland, Austria, Bavaria and rest of the Italian Alps).

Furthermore, since 2015 the wild mammal community of Trentino, including the brown bear, has been studied using **systematic camera trapping**, as a cooperation between MUSE the Science Museum of Trento, the University of Florence, the APT's Wildlife Department and the Adamello-Brenta Nature Park, and with the support of a few volunteers. This monitoring, complementary to other investigation methods, is carried out every summer through a grid of 60 camera-trapping sites distributed across the brown bear core area, covering approx. 220 km2 in the southern part of the Brenta range and the neighbouring Paganella-Gazza massif, with each camera trap being operational for around 35 days between June and August. The project's goals include: determining changes in the medium-to-large mammal community, investigating activity patterns, documenting the arrival of new species, integrate information on the presence of bear females with cubs, understanding how species react to the extensive and widespread presence of people, and comprehending trends in relation to the use of the area by species over time.

Systematic camera-trap monitoring is much less important than the genetic monitoring in terms of population estimates, but it may play an important role in both the definitions of the population trends, the monitoring of peripheral areas with very low animal densities or the investigation of ecological patterns.

Radio and GPS tracking are used to monitor problem bears, especially in the Central Alps, or for research, mainly in Slovenia. Monitoring problem bears with GPS collars is crucial to implement all the prevention actions and also to facilitate bear removals. In the central Alps, when an attack occurs, this bear has to be removed: in such cases, monitoring with GPS collars is functional to that goal.

1.2 Status

At the end of 2023 the status of the two alpine bear populations, as for the size estimates, is:

- **98 (CI 86-120) individuals** (COY excluded) **in the central Alps** (i.e. Trentino and surrounding areas). The data comes from the <u>2023</u> intensive genetic monitoring;

- **48 (CI 41-57) individuals** (COY excluded) **in the eastern Alps** (i.e. Slovenia). This estimate dates back to <u>2015</u>. At the time this report was drafted, no more recent data was available.

- **very few more bears (0-5?)** may be roaming **in-between these areas** (i.e. north-eastern italian corner and southern Austria), and for this reason most of them may be not included in neither of the estimates above

The **eastern Alps** sub-population is the northern part of the big Dinaric-Pindos population (est. > 3.000 bears); very few females are present. The **trend** looks **stable** in the period 2016-2022, while 2023 data will soon be available.

The **central Alps** population has its core area in western Trentino, where all females and reproductions occurred since the reintroductions took place. The **trend** looks **positive** in the period 2002-2023.

No genetic connection between the two subpopulations has been documented so far.

Figure 1 compares the maps of the brown bear whole distribution in the Alps 2016 and 2022, showing the positive trend in the central Alps population vs. the stable situation in the eastern Alps.

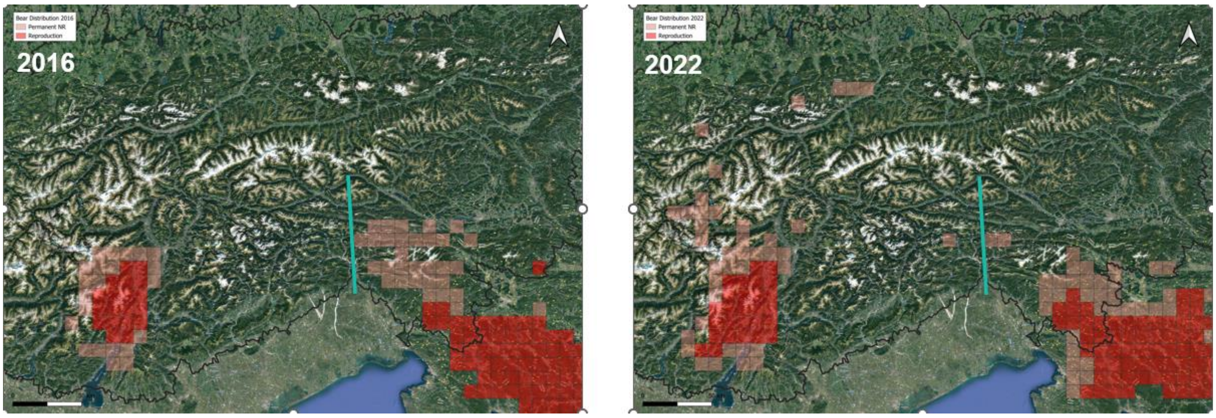
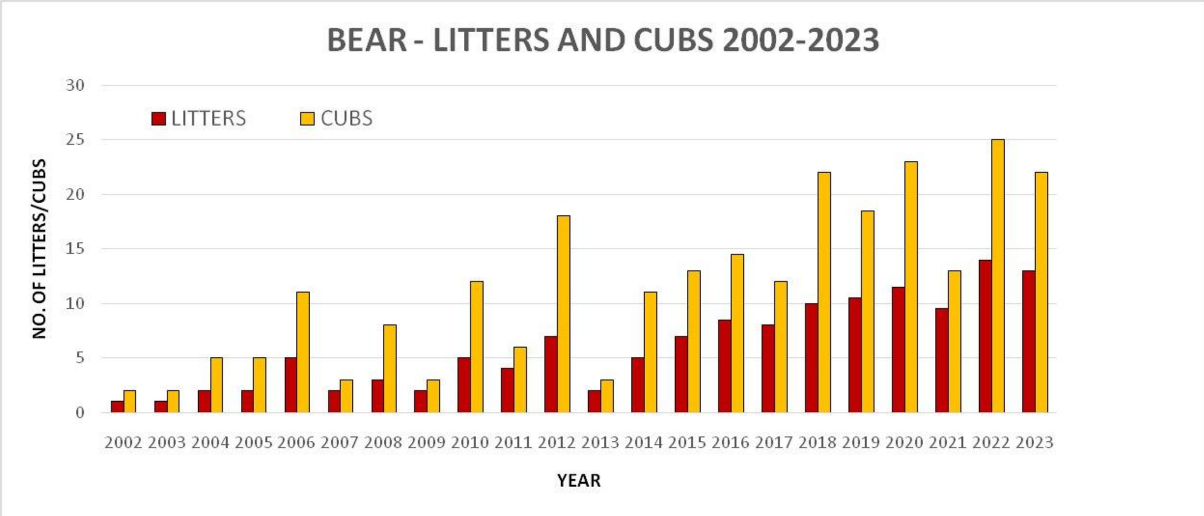


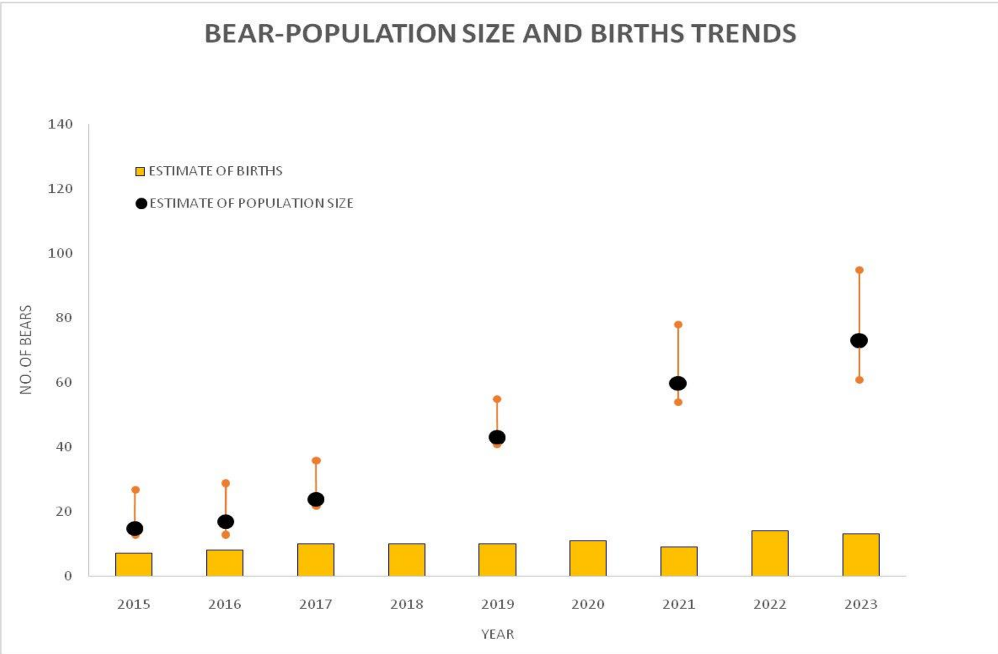
Figure 1: Brown bear distribution in the Alps - 2016 vs. 2022 (Life Dinalp Bear project)

1.3 Zoom on central Alps

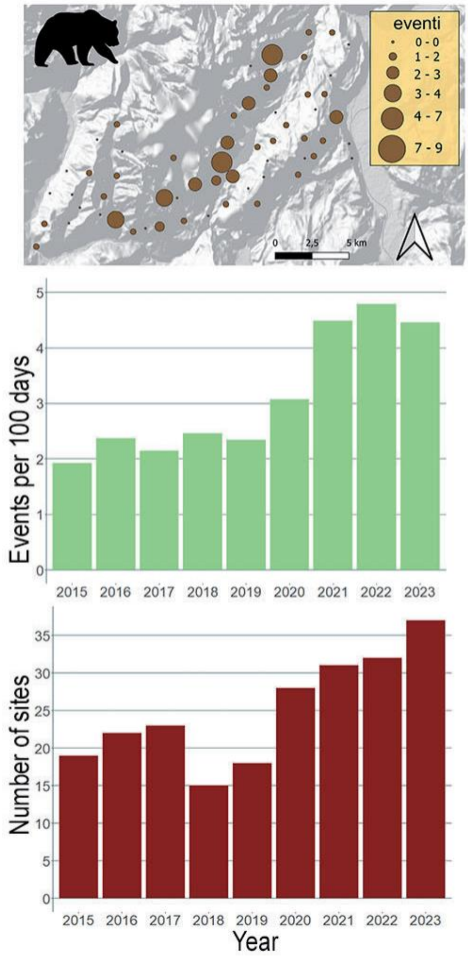
Since the first translocations of individuals in 1999, the trend of the small and isolated population in the central Alps has been positive, as shown by the **increasing number of litters recorded in the period 2002-2023** and **increasing population estimates** for the period 2015-2023 (see graph 1 and 2 below).



Graph 1: Number of litters and cubs estimated to be present each year, from 2002 to 2023 in the Trentino population. From 2016 onwards the data represent an average of the minimum and maximum number observed (from Large Carnivores Report 2023, Wildlife Service, Autonomous Province of Trento)



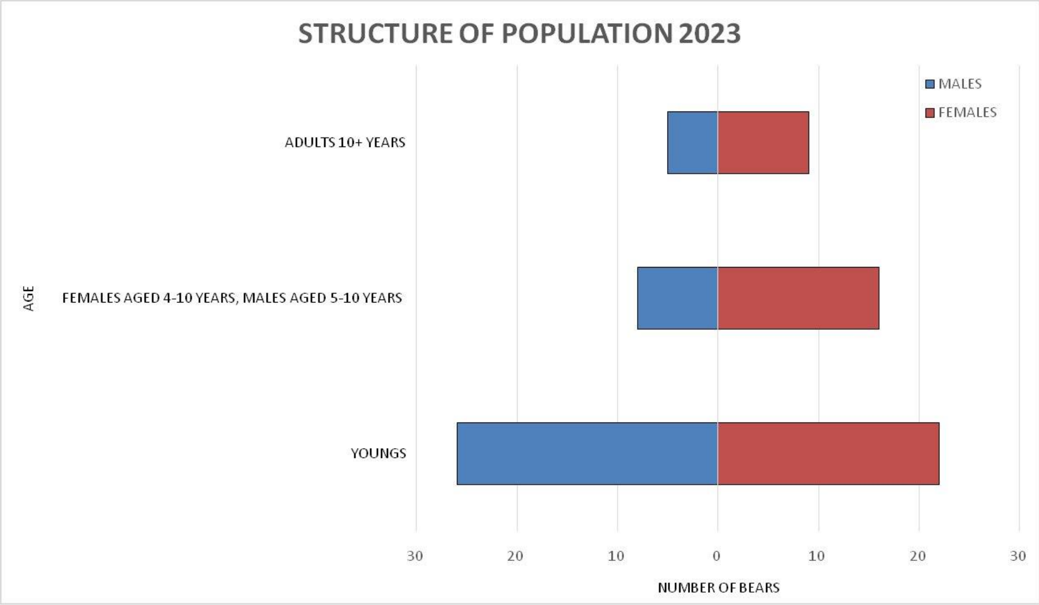
Graph 2: Trend for the population size of young and adult bears (excluding cubs) estimated using genetic marking-recapture (MR) models, (bars with dots representing the confidence intervals in orange) and trend for estimates of births (histogram with orange bars), (from Large Carnivores Report 2023, Wildlife Service, Autonomous Province of Trento).



Panel 1: The panel shows the map of events involving the passage of bears in the study area in western Trentino based on the 2023 summer camera-trapping sampling programme. The green bar chart shows the number of events (in this case normalised for every 100 days of sampling) recorded for the brown bear in each year of the project, begun in 2015. Likewise, the red barchart shows the number of sites where the brown bear was recorded in the same period (from Large Carnivores Report 2023, Wildlife Service, Autonomous Province of Trento).

The positive trend of the population is also documented by the **systematic camera-trapping** results for the period 2015-2023, both in terms of number of sites where bears were detected and number of detected passages (panel 1).

The **structure** of the population in 2023 is shown in Graph 3, which indicates the presence of more males than females in the youngs class (females aged 1-3, males 1-4; 27 vs 22) and more females than males in the adult class (including all females aged 4+ and all males aged 5+; 25 vs 14).



Graph 3: Structure of the population in 2023 on the basis of age groups. It also includes some animals of uncertain age, which have therefore been distributed among the same age groups with the same proportions relating to bears of known age (from Large Carnivores Report 2023, Wildlife Service, Autonomous Province of Trento).

As for the distribution of bears across the region, **the area occupied by females in 2023 is still almost completely within the province of Trento** (see Fig. 2) and remains relatively small (2.227 km^2). Oppositely, males are spread over a much wider area of more than 40.000 km^2 encompassing most of the central Alps (this taking into account the long dispersal movements of young males).

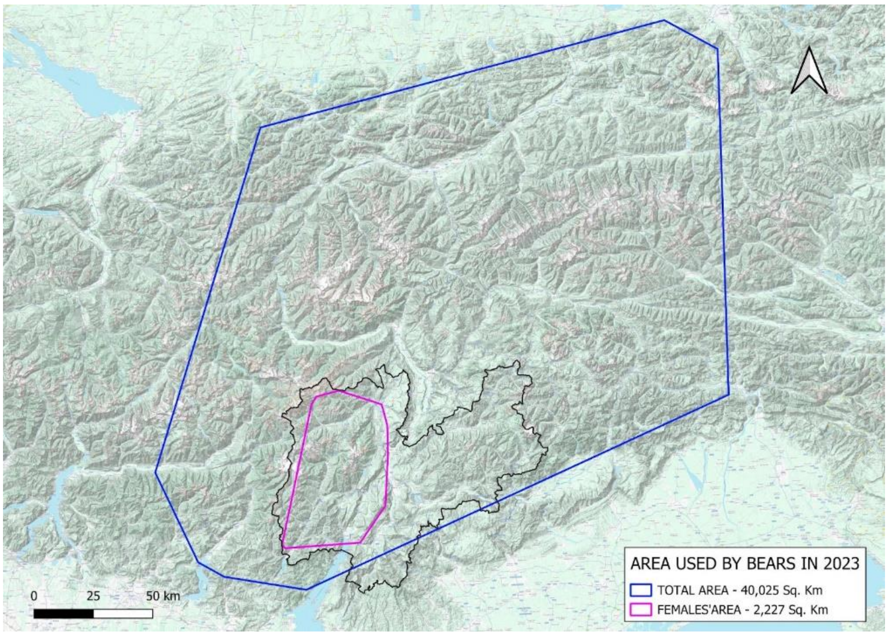
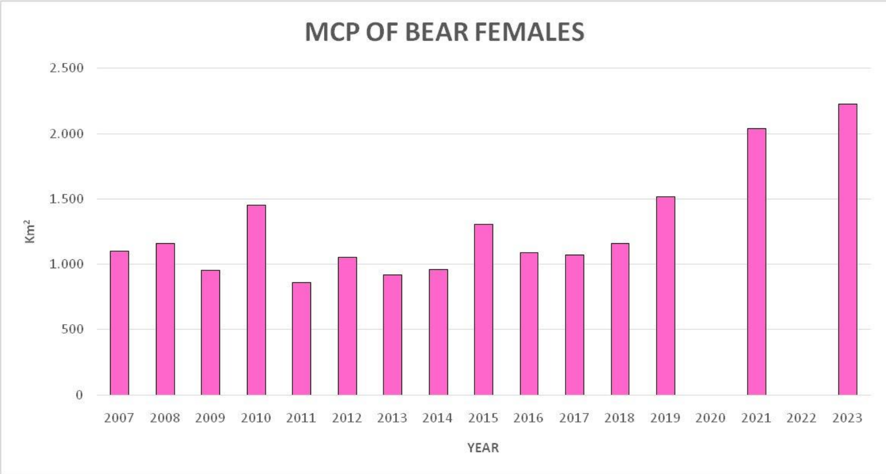


Figure 2: Area used in 2023 by brown bears from the central Alps population. Considering also the longest journeys made by young males, on the basis of the data obtained, in 2023 the bear population was distributed over a theoretical area of 40,025 km² (from Large Carnivores Report 2023, Wildlife Service, Autonomous Province of Trento).

It has to be noted that, despite being relatively small, the **area occupied by females** is **increasing** at a slow but constant rate as shown by Graph 4.



Graph 4: Expansion of the area occupied by female bears of the Trentino population (from Large Carnivores Report 2023, Wildlife Service, Autonomous Province of Trento).

Figure 3 summarises the **dispersion** movements of young bears, as documented from 2005 to 2023. Such roaming activities involved a total amount of 54 bears, all males. 15 of these (28%) died or disappeared, 24 (44%) returned, 2 (4%) emigrated, 1 (2%) is in captivity and 12 (22%) were still roaming in 2023.

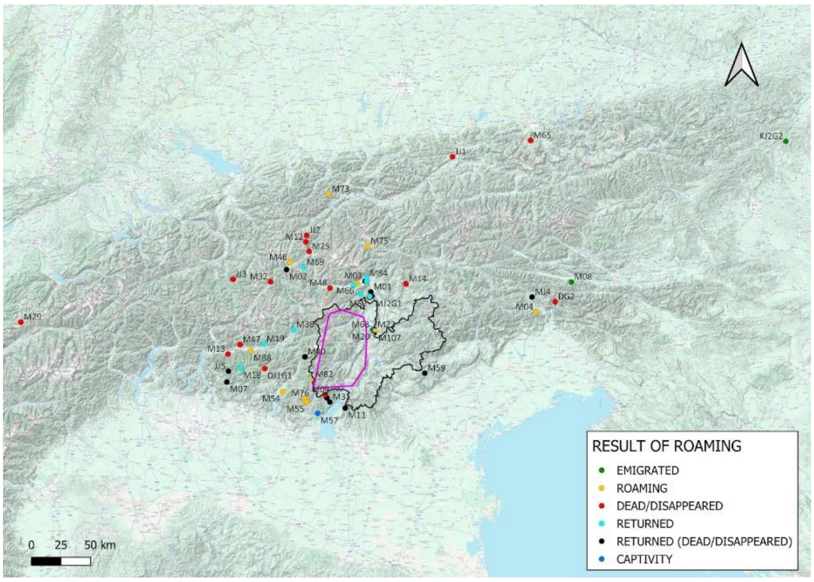


Figure 3: Documented cases of roaming (i.e. bears leaving western Trentino) in 2023 for the central Alps population (from Large Carnivores Report 2023, Wildlife Service, Autonomous Province of Trento).

2. CONFLICTS MANAGEMENT

2.1 Introduction

2.2 Primary tools for problem bear management

2.3 Removal: the extreme tool for problem bear management

2.1 Introduction

Bears in human dominated landscapes cause conflicts with people, potentially threatening both property and human safety. This is particularly true for the **Alps, one of the mountain ranges with the highest human density** across all the brown bear world distribution.

As for problem bears (usually less than 10% of the population according to the bibliography), they can be classified in two categories: a) **very damaging**, b) **dangerous** (i.e. a threat to human safety). This last quota is usually estimated to represent no more than 2% of the whole population.

According to the main Bear action Plans in Europe (Skrbinšek and Krofel 2014; Černe 2015) **damaging bears** are considered those that cause repeated damages to assets that are not easy to defend (i.e. cattle). **Dangerous bears** instead are so considered when they show repeated dangerous behaviours (i.e. trying to enter houses or following people) or when directly attacking people, both with a defensive or a non-defensive pattern, and regardless of whether they previously showed problematic behaviours.

Regarding the central Alps population and according to the PACOBACE definition, **27 "problem bears" have been recorded in the period 2007-2024**: 22 have been classified as dangerous according to the classifications mentioned above and 5 as very damaging. Among these, 6 have been legally shot (3 outside Trentino), 5 are kept in captivity, 2 have been found dead, 4 died as a result of accidents during management operations, 4 have been poached, 3 disappeared, 1 moved to another area, 2 are still free.

Differently, in the **eastern part of the Alps** (in northern Slovenia) **problem bears are regularly removed**.

2.2 Primary tools for problem bear management

Prevention is considered to be the first step to be implemented in problem bear management by the bear action Plans of the Alps, that means removal of attractants, bear-proofing of garbage bins, prevention of damages through electric fences, guarding dogs, placement of shelters for shepherds on high pastures.

Also the **bear spray** may be considered a useful tool to avoid attacks/physical contact between bears and people. Nowadays it can be legally purchased and used in Slovenia while it is forbidden in the other alpine countries.

Communication is crucial in all aspects of bear management. This is a key tool in order to make people aware of the right behaviour to adopt in the countries, to promote best practices and disseminate knowledge about the measures to be adopted for damages prevention.

Aversive conditioning against confident bears has been constantly implemented in the central Alps since 2003, with the use of both rubber bullets and bear dogs. Despite that, results are often mixed and of difficult interpretation and will require further investigation. This is usually also true at the international level.

2.3 Removal: the extreme tool for problem bear management

Bear **removal**, according to the Action Plans of the Alpine countries, is suggested when the other primary tools prove to be ineffective (i.e. no changes in bear behaviour) or in case of attacks on humans.

Regarding this last issue, **in the central Alps 7 bears performed 9 attacks on humans in eleven years (2014-2024)**. 6 of them have been classified as "defensive" attacks from the competent Authority and from the National Wildlife Institute (females defending COYS or yearlings), while 3 as "non defensive" attacks. 5 females and 2 males have been involved in the attacks, resulting in 9 people injured and 1 fatality. All these bears have been removed: 3 have been shot, 1 is in captivity, 1 died during capture and 2 have been found dead/poached.

It has to be noticed that **two females out of five were not immediately removed after their first attack, and that both of them attacked again two years later**, when with the next litter. In both cases the first removals had been obstructed by the Courts decisions, after the legal actions promoted by Animal rights Associations.

CONCLUSIONS AND RECOMMENDATIONS

The population **trend** of bears across the **Alps** is **positive**, but with a great discrepancy between central Alps (strongly increasing population, so far) and eastern Alps (stable presence of bears that are the northernmost part of the Dinaric-Pindos population).

To date, in the central Alps a weak reaction of managers to the attacks has been observed, often hampered by animal rights Associations and Courts. One of the main consequences of such missing or delayed management is the **worsening of people's attitude**, **especially in the rural and mountain areas** where people live close to bears and have to face the related issues. This of course may cause an **increase in poaching risk**.

For this reason it has to be noted that **removals**, as for the specific situations stated in the Action Plan, **are in the best interest of the whole bear population** and that **conservation cannot overcome public safety**.

Will the bear population (and related conflicts) grow more in the coming years? This is what is expected, if stochastic factors will not alter the consolidated trend. According to the ISPRA-MUSE study of 2021, up to 5 problem bears per year are expected in the coming years for the Trentino population, confirming how **management of problem bears in the future years will still be the most crucial issue for bear conservation in the Alps** (ISPRA-MUSE, 2021). Another ISPRA-MUSE study reports that up to 8 problem bears per year may be removed in the central Alps in the period 2023-2025, without compromising the sustainability of the population (ISPRA 2023).

A stronger **population control** (with yearly quotas such as in Slovenia) has been also recently discussed in the central Alps as a **possible future tool**, but the present Italian social/political framework seems to deny this possibility at the moment.

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