


AUTONOMOUS PROVINCE
OF TRENTO

FORESTRY AND WILDLIFE
DEPARTMENT

CERTIFICATO
UNI EN ISO 14001
OHSAS 18001

BEAR REPORT 2010

INIZIATIVA DELLA PROVINCIA AUTONOMA DI TRENTO
CONOSCI L'ORSO BRUNO
Servizio Foreste e Fauna

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Layout and graphics:
APT Wildlife Office - Publistampa S.N.C.

The information contained in this report may be quoted, citing:
Groff C., Dalpiaz D., Frapporti C., Rizzoli R., Zanghellini P. (editors), 2011 - "2010 Bear Report, Forestry and Wildlife Department of the Autonomous Province of Trento".

Cover page photo
C. Frapporti

Photos:
In the absence of captions: C. Frapporti (bears), C. Groff (landscapes)

Printed by:
Print centre of the Autonomous Province of Trento
Trento, February 2011

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Presentation

Management of the brown bear in Trentino is carried out on the basis of policy and programmes approved by the provincial government. It has assigned the Forestry and Wildlife Department with the task of acting as the organisation of reference in relation to carrying out the relevant programmes of action.

The Department's main partner at operational level is Adamello Brenta Nature Park, (ABNP) which promoted the Life Ursus project during the latter part of the 1990s. The park, which is an autonomous body funded by the Province, collaborates in various activities, particularly in the field of research, monitoring and communication. The institutional and technical-scientific partners involved in carrying out projects are the Ministry for the Environment and the Safeguarding of Land and Seas (MESLS) and the Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA).

Through the Autonomous Province of Trento's **Bear Report**, a technical document drawn up by the Wildlife Office, it is intended to pursue two important objectives. Firstly, to provide accurate, up-to-date and detailed information on the status of the bear population living in western Trentino and neighbouring regions and countries. Secondly, it aims to record a range of information illustrating the management techniques implemented in a precise and analytical manner, making it possible for those in the field to make use of this data by consulting a document which is as complete and exhaustive as possible.

The first objective falls fully within the context of the information campaign "Getting to know the brown bear", started up by the provincial administration in 2003, with the conviction that the Bear Report represents one of the key aspects in this context. The second objective is more specifically related to operational and management aspects. However, both respond to the need to provide the technical staff and authorities concerned with better knowledge, allowing them to make the right choices, guaranteeing the success of the project and hence the conservation of the bear.

This issue of the report refers to **2010** which, as is commonly known, was declared **"International Year of Biodiversity"**. Thus the report also sets itself the further and perhaps ambitious objective of making a specific contribution in this area, considering the very special biological value of the species and the geographical context – the Alps – in which the Trentino bear population lives.

In the period considered there was a further increase in the number of bears present, accompanied by an extension of the area occupied by the females, undoubtedly a positive sign. It was possible to gain this knowledge thanks to a major commitment to monitoring activities and constant experimentation of new techniques.

In terms of management, it is necessary to record a decidedly less positive aspect, namely a considerable increase in damage and in social tension linked to such incidents, despite the fact that the critical situations emerging were not directly proportional to the damage caused, according to the definitions adopted in the special protocol.

It is therefore increasingly important to succeed in responding promptly and in an appropriate manner to the needs of the different categories concerned. This will be made possible by updating strategies over time and **above all** by the institutions of reference granting our administration, which we believe has demonstrated its competence and technical capacity in the field, greater **management autonomy**.

This will allow a more wide-ranging and long-term approach, paying due attention to maintaining the delicate balance with the activities and presence of man in the mountains. It will also avoid sparking off responses resulting in social sensitivity towards the project drifting away and to the manifestation of forms of rejection and "unofficial" action.

To conclude, our heartfelt thanks must also go to all those, in particular Trento Natural History Museum (MTSN), who in various ways have collaborated in order to realise the individual initiatives in the programmes of action, but above all to the forestry and technical staff of the Forestry and Wildlife Department, the forest wardens, park wardens, gamekeepers and volunteers who have worked in the province in order to realise the projects and to gather the data without which this report could not have been written.

DOTT. MAURIZIO ZANIN
Manager of APT's Forestry and Wildlife Department

Introduction

The brown bear has never completely disappeared from Trentino, which is thus the only area in the Alps that can proudly affirm the continuous presence of bears.

However, protection of bears, which began in 1939, has not eliminated the risk of their becoming extinct. Direct persecution by man and, to a lesser extent, environmental changes taking place in the last two centuries, reduced the original population, bringing it to the threshold of extinction. At the end of the 1990s there were probably no more than three or four bears remaining, confined to the north-eastern Brenta area. However, just when all seemed lost, there was turn in fortunes, originating in the action taken by ABNP, which started up the *Life Ursus*, project together with APT and ISPRA (formerly INFS), co-funded by the European Union. Between 1999 and 2002 this led to the release of 10 bears (3 males and 7 females), giving rise to the population to which this report refers. The release of the bears was preceded by a detailed feasibility study supervised by ISPRA, which ascertained the environmental suitability of a sufficiently large area to play host to a viable bear population (40-60 bears), which is the ultimate aim of the project. This area extends well beyond the confines of the province of Trento, also involving neighbouring regions and countries.

Following the conclusion of the phase involving the release of the animals, the phase dedicated to the conservation and standard management of the bear population, perhaps even more demanding, began in 2002. For this purpose the provincial government laid down the operational guidelines on which these management activities should be based in resolutions no. 1428 and no. 1988 of 26 June 2002 and 9 August 2002. In particular, six programmes of action were identified (monitoring, damage management, management of emergencies, staff training, communication and national and international links), which represent the underlying structure followed in this report.

1. Monitoring

Monitoring of the bear has been carried out continuously by the Autonomous Province of Trento for more than 30 years. Over time, traditional survey techniques in the field have been supplemented by radiotelemetry (a method first used in Eurasia, in the second half of the 1970s), automatic video controls by remote stations, photo-traps and finally, in the last few years, by genetic monitoring.

This last technique is based on the collection of organic samples (hairs and scats) and takes place using two methods commonly defined as **systematic monitoring**, based on the use of traps with scent bait, designed to "capture" hairs using barbed wire, and on **opportunistic monitoring**, which is based on the collection of organic samples found in the area during routine service activities. In the last few years, genetic monitoring has represented the most crucial technique for collecting information regarding the bear population present in the province.

Since 2006, systematic monitoring in the area constantly frequented by bears has taken place in alternate years. Hence it took place in 2008 and again in 2010. Bearing this in mind, the results of genetic monitoring this year can be more accurately compared with the results for 2008 rather than with those for 2009.

Genetic monitoring was coordinated for the ninth consecutive year by APT's Forestry and Wildlife Department, with the collaboration of ISPRA, ABNP and a number of volunteers.

It is nevertheless implicit that the monitoring techniques cited do not guarantee that all the bears present will be detected.

Genetic Database

A total of **681 organic samples** were collected in the province of Trento in **2010**, of which 514 in an opportunistic manner and 167 using systematic monitoring, bringing the total number of samples collected and subjected to genetic testing since 2002 to 3,719. The fact that full scale genetic monitoring has now been carried out for **8 consecutive years** makes the "Trentino case" particularly interesting, as the medium-long term timescale for these activities (generally difficult to keep up and hence rare), makes certain types of analysis possible which would be unthinkable with more fragmentary monitoring.

The 681 samples were collected by the staff of the Forestry Service of the Autonomous Province of Trento (FS) (421 – 61.8%), by ABNP (216 – 31.7%) and by volunteers (44 – 6.5%). A further 62 samples were collected outside the province (in the province of Bolzano, the Lombardia and Veneto regions and Switzerland), contributing towards determining the total number of bears identified.

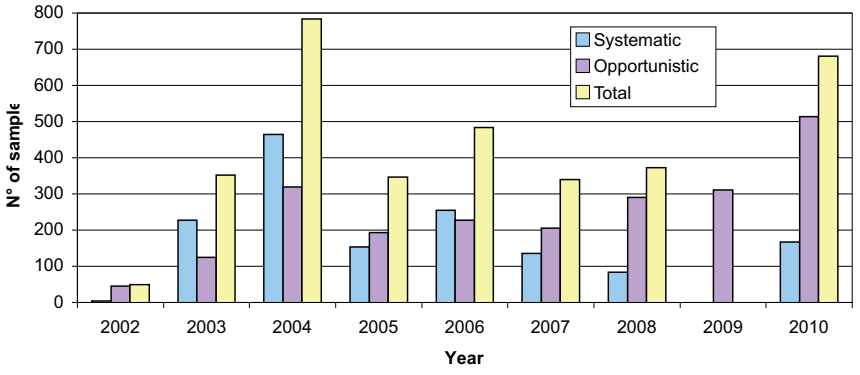
In 2010 genetic testing was carried out by

technicians from the conservation genetics laboratory at ISPRA. The samples collected (hairs and faeces) were sent to the laboratory for genetic tests, carried out using standard protocols, while the data was validated using population genetics software. The organic samples collected can be analysed in the standard manner or in more urgent cases, using a faster procedure (results within a couple of weeks from receipt of the sample). The methods involved, in accordance with the provisions of the PACOBACE plan, provide for amplification of ten different genomic regions (DNA microsatellites) and molecular sexing of all hair and faeces samples collected by staff and sent to the institute's laboratory. The high risk of error associated with analysis of samples collected using non-invasive techniques demands the use of laboratory procedures designed to minimise the risk of genotyping errors. With this scope the multiple amplification approach was adopted (Taberlet et al., 1996). This involves repeating a series of tests until a genotype considered to be reliable is obtained. Reliability was established using statistical evaluation, carried out using the Reliotype programme (Miller et al., 2002). This calculates the probability of the particular genotype observed effectively belonging to the population, based on the allele frequency observed in the population of reference and on the number of repeat tests providing concordant results. If the reliability of the genotype arrives at or exceeds 95% it is accepted and the sample identified is added to the database. Following processing of the initial results of genetic tests, the combination of genotypes identified is subjected to careful quality control carried out subsequently, through comparison of genetic data, sampling and data coming from other activities in the field (telemetry, observations etc.) designed to identify samples potentially subject to error. Further tests were used for these samples in order to clarify any uncertainty.

The trend in relation to the number of samples collected in Trentino over the last nine years can be seen below (Graph 1).

Graph 1

N° of organic samples collected by method



	2002	2003	2004	2005	2006	2007	2008	2009	2010	TOT.
Opport.	45	125	319	193	228	205	290	311	514	2230
System.	4	227	464	154	255	135*	83	-	167	1489
TOTAL	49	352	783	347	483	340	373	311	681	3719
N° of traps	4	39	41	42	47	17*	57	-	57	

* only within ABNP

In 2010, for the first time, the Forestry and Wildlife Department, with the support of a student researching a thesis and the collaboration of ABNP, also coordinated monitoring of rub trees, namely plants on which bears leave signs of their presence by leaving their odour and hair on the bark. The monitoring of rub trees is considered to be part of opportunistic monitoring, despite the fact that the controls are systematic to a certain degree.

BOX 1 - Monitoring of rub trees

Monitoring of rub trees was promoted and coordinated by the Wildlife Office of APT, making reference to techniques adopted in North America, techniques which it had the opportunity to observe directly during training exchanges with colleagues working in the field of bear management in the United States and Canada. The activity was set up and carried out in agreement with leading experts working in this field for many years. It represents an innovation at both national and European level, in terms of the way it was carried out. The monitoring was made possible thanks to increased knowledge regarding rub tree sites and the collaboration of park wardens from Adamello Brenta Nature Park, the staff of the Forestry and Wildlife Department and above all thanks to the work of a student researching a degree thesis on Forestry Science at the University of Padova, who carried out field work and processed the data gathered.
Monitoring was started with a group of 47 known trees, arriving at 73 rub trees by the end of the season. These were distributed in a relatively uniform manner in the area constantly frequented by bears (an area of around 300 km²). The first step was to record the characteristics of the sites, carry out georeferencing and equip them by attaching sections of barbed wire to the trees. This made it possible to collect samples of hair from the animals rubbing against the tree. Samples of hair (132 in total) were collected from the barbs of the barbed wire every three weeks from April to November. Using genetic testing it was possible to identify the animals marking the trees. Genetic monitoring took place alongside an initial experimental phase of photographic monitoring at a limited number of sites (those most popular with bears). A number of photo traps were placed at the sites making it possible to obtain the first images and films (see Photo 1). The photographic documentation was useful for integrating the knowledge coming from genetic monitoring, among other things also allowing interesting observations regarding the use of the marking points by other species of animals.

Photo 1 - Brown bear photographed in the process of marking a tree
(F. Rovero, Trento Natural History Museum)

As expected, there were more males involved (6 bears identified), above all sexually mature males. However, a number of females (3 bears identified) also made use of the trees. The males were mostly active in the spring, whereas the females mostly marked the area in autumn.*
It is also intended to continue monitoring in the future, in collaboration with Adamello Brenta Nature Park, attempting to extend the network of points monitored and ensuring that such activities take place in a systematic manner. This type of monitoring indeed seems to offer a good cost-benefit ratio in terms of genetic identification of bears present in the area and is at all events interesting in terms of management.

Photo 2 - Brown bear photographed while marking (M. Tiso, University of Padova)

* Detailed results more directly linked to aspects of scientific research involved in the monitoring carried out are available in the degree thesis written on the subject. This is available by contacting the Wildlife Office of the Forestry and Wildlife Department.

Status of the population at the end of 2010

Processing of the data collected provided the following information regarding the identification of the bears sampled, the movements of individual animals and estimation of the population. It also made it possible to determine the genealogy of the cubs born and sampled in 2010.

It is recalled that starting from 2008, newborn animals and/or bears migrating to the area have been identified with progressive numbering preceded by the letter "F" for females and "M" for males. At all events, information regarding the identity of the parents is known and available in a specific database.

Definitions

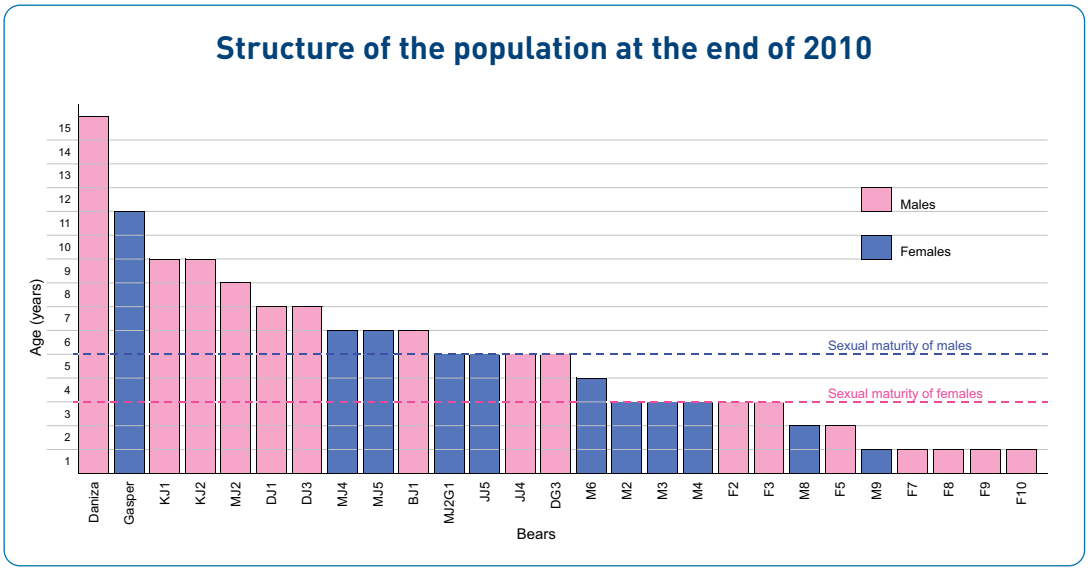
- **"detected bears"**: bears whose presence has been ascertained during the last year, either genetically or on the basis of unequivocal observations;
- **"undetected bears"**: bears for which no evidence has been found in the last year alone;
- **"missing bears"**: bears certainly or most likely no longer present within the population, as they have been found dead, killed, taken into captivity or for which no genetic evidence has been found in the last two years;
- **"cubs"**: bears aged between 0 and 1;
- **"young bears"**: males between the age of 1 and 5 and females between the age of 1 and 3;
- **"adults"**: males over the age of 5 and females over the age of 3;
- **"immigration"**: the arrival of bears from another population to join the bear population present in the province;

- **"emigration"**: the abandoning of the bear population present in the province by one or more bears in order to join another bear population.

Overall **28 animals were detected genetically during 2010**. All of them were detected using **opportunistic** genetic monitoring, whereas only 13 of these bears were identified using **systematic** monitoring, so none of them using exclusively this method (in 2008 8 out of 24 bears were detected using systematic monitoring, of which one exclusively with this method). In the light of this data it will be evaluated whether to continue with genetic monitoring using the systematic method in years to come, bearing in mind the cost-benefit ratio offered by the method to date.

One female cub born in 2010 died and thus cannot therefore be included among the bears considered to be present at the end of the year. Hence there were a total of **27** bears; **11 males** and graph 2) (M-F sex ratio 1:1.45 - n=27).

Graph 2

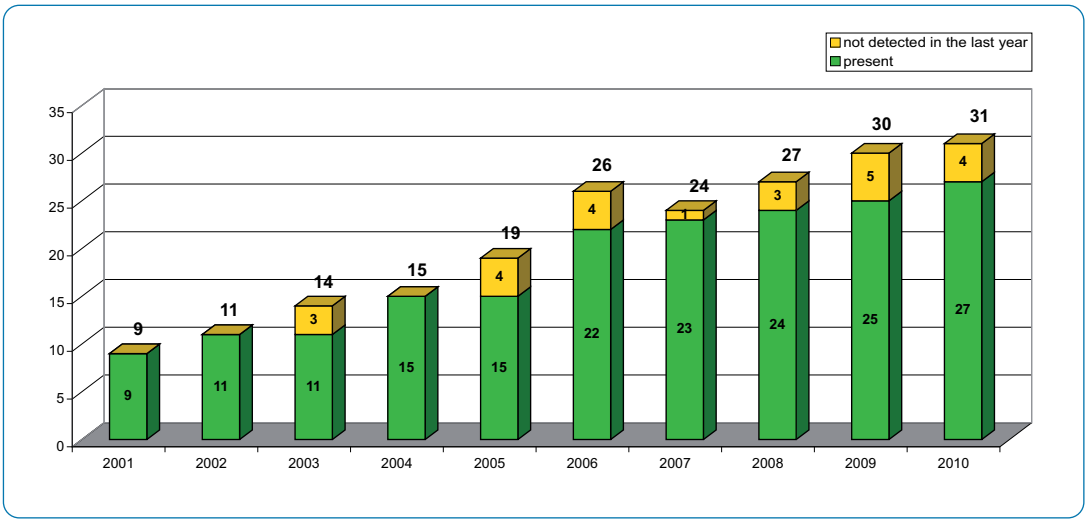


Once again this year it is likely that the genetic monitoring carried out did not detect all the bears making up the population. Considering the presence of other individuals not detected in the last year alone (4) as likely, and excluding those missing for two or more years (13), the **estimated population in 2010** is from **27 to 31 bears**. It should be underlined that the minimum number (27) represents the number of bears certainly present, whereas the maximum (31) is exclusively an evaluation of probability based on specific criteria which to date have been shown to be valid but which have intrinsic limitations.

It is therefore essentially a "minimum population estimate", which is different from a genuine "population estimate", for which it is necessary to make use of statistical models for capture, marking and recapture (CMR), which are currently being processed in collaboration with ISPRA.

The population **trend** therefore shows once again a slight increase in the last year (see Graph 3). Indeed, the minimum number of bears certainly present has increased by two. The **average annual growth** in the bear population in the period 2002-2010 is **15.2**%.

Graph 3



Reproduction

In 2010 **there were three litters** genetically ascertained (photo 3), with a total of **six cubs**. **KJ1** gave birth to three cubs (three females), **Daniza** gave birth to two cubs (a male and a female) and **BJ1** also had a litter (at least one female, which was born and died during the year, as stated previously).

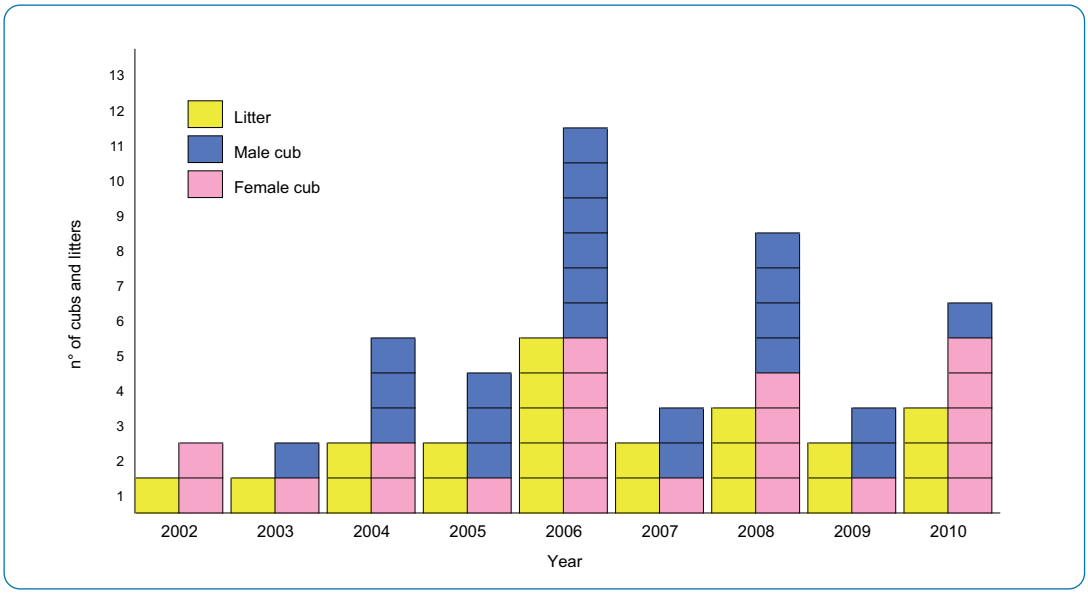
Photo 3 - Bear with three cubs photographed by photo trap in the municipality of Terlago (M. Vettorazzi APT Forestry and Wildlife Dept. Archives)

It is thought that the female KJ1 actually gave birth to **4 cubs**, as suggested by two sightings made by several people and video footage, albeit of poor quality. The sightings took place on 25 and 26 April on the steep slopes of the Paganella above the Lamar lakes. However subsequently all the reports coming from the area make reference to a bear accompanied by three cubs, suggesting that the fourth cub died. At all events, the lack of absolute certainty regarding the presence of the fourth cub and the identity of the mother mean that for all the data processed in this report it is necessary to consider KJ1 to be the mother of only the three cubs identified genetically.

There have therefore been at least **21 litters** ascertained genetically in Trentino in the last **nine years**, and at least **44 cubs** have been born (22 males and 22 females – see Graph 4). The **average number of cubs per litter** is 2.09 and the M-F sex ratio is 1:1 (2002-2010, n=44).

Only **2** of the 21 litters ascertained to date (9.5%) are the result of mating between **blood relatives** (father and daughter)

Graph 4



Reproductive animals

There were **three** sexually mature **males** present in 2010. A further two males reached the age of five in January 2011, thus bringing the total number of sexually mature males believed to be currently present to five.

There were **nine** sexually mature **females** present in 2010. A further two females reached the age of three in January 2011, thus bringing the total number of sexually mature females believed to be currently present to eleven.

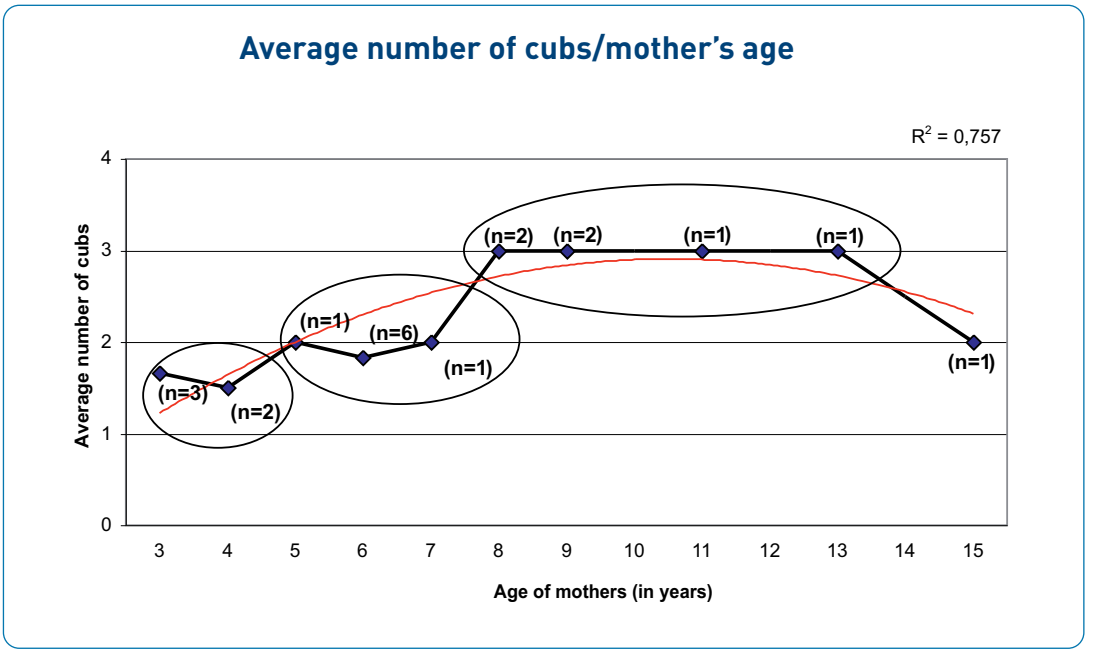
The **average age of primiparous females** in the period 2006-2010 (n=6) is **3.67**.

The **average gap between consecutive litters for the same female**, recorded in the period 2002-2010 (n=10 gaps, referring to 7 females), is **2.2 years**.

The number of litters ascertained also makes it possible to highlight how on average the **number of cubs per litter** to date has essentially been proportional to the age of the mother, with less than 2 cubs for females aged 3-4, around 2 for females aged

5-7 and 3 for females aged 8 or over (see Graph 5). For the first time this year a litter of less than three cubs was recorded for a mother over the age of 8 (Daniza, aged 15, once again observed this year with two cubs, as confirmed by genetic tests). This single item of data could already highlight a decrease in the prolificacy of older females, in line with what has been observed for other bear populations and with the biology of the species. The link between the average number of cubs per litter and the age of the mother is represented with a certain degree of approximation by the red polynomial regression line in the graph, with a coefficient of determination of 0.76.

Graph 5



Bears absent in the past but detected again in 2010

During 2010, **two** bears which were absent in 2009 were genetically detected: the male **MJ5** and the female **BJ1**, both aged five. Confirmation of the presence of BJ1 and her ability to reproduce (given that the cub found dead was hers) is certainly positive for the genetic variability of the population, considering that she is the only surviving descendent of Brenta, a founding member of the community, who died in 2006.

Bears not detected in 2010

Four bears present in 2009 **were undetected for the first year** in 2010 (the two males **DG2** and **KJ2G2**, born in 2006, the female **KJ1G1**, again born in 2006 and the male **M7**, born in 2009). They have not yet been classified as "missing" bears (see Definitions on page 11), as there is a concrete possibility that they are still present.

Missing bears

In 2010 it was possible to ascertain one case of **"emigration"** (see BOX 2), involving the male bear M5, who arrived spontaneously in eastern Trentino in 2009 and was fitted with a radio collar in October of the same year in Primiero, as is known.

BOX 2 - The long journey of M5

In March this year, having terminated his hibernation in the Val Noana (TN) (photo 4), M5 moved rapidly over the Belluno side of the Vette Feltrine mountains, subsequently roaming further, his movements being monitored using the GPS collar and taking him to the Asiago tableland (VI), the Vallagarina (TN) and the Adige valley. He moved south along the left side of the valley, until he reached the hills overlooking the city of Verona.

Photo 4 - M5 outside his den in the Val Noana (C. Groff, APT Forestry and Wildlife Dept. Archives)

From here he journeyed once again into the zone at the foothill of the Alps, straddling the provinces of Vicenza and Trento (Piccole Dolomiti area) and moved on to the Asiago tableland. From this point, on 14 May, the radio collar ceased to function. M5 undoubtedly remained in the area for a few more days, his presence being demonstrated by numerous cases involving damage, above all preying on donkeys.

The sudden halt in reports from the Vicenza area starting from the end of May coincided with reporting of a bear by colleagues from the State Forestry Service in Tarvisio (UD), photographed on 2 June 2010 by a photo trap not far from the Slovenian frontier. The animal had yellow ear tags (Photo 5), which made it possible to ascertain his identity by reading the numbers shown on the tags.

Photo 5 - M5 photographed by a photo trap in Tarvisio (UD)
(UTB Tarvisio, Lynx Project, Italy)

It was then possible to document the subsequent movements of the young male in Slovenia, this time thanks to our Slovenian colleagues, who reported repeated sightings of a large bear with a red radio collar and yellow ear tags by local hunters starting from September. His movements were again documented by various photos taken using photo traps (Photo 6), and the bear probably returned to the area where he was born and originated, namely southern Slovenia. Thus in 2010 M5 made a journey of around 320 km as the crow flies, crossing the eastern Alps from West to East, from the hills of Verona to southern Slovenia. It is likely that he was in search of females during the mating season and it is believed that he probably made the same journey undertaken in 2009, but in the other direction. This is probably the longest journey ever documented in the Alps for a brown bear (see Figure 1).

Photo 6 - M5 photographed by a photo trap near Postumia (SLO)

Figure 1
The movements of M5 documented in 2010

The calculation of "missing" bears in 2010 must also include the **death** of the female cub **F6**. The head of the cub was found (Photo 7) on 21 May 2010, not far from Malga Arza (Denno). It was not possible to determine the cause of death, although the fact that it took place during the mating season makes it plausible that the cub was killed by a male bear, with the scope of making the mother once again available for mating. Infanticide is not rare among bears and has been extensively described in literature regarding the ethology of the species, but had not previously been documented in Trentino.

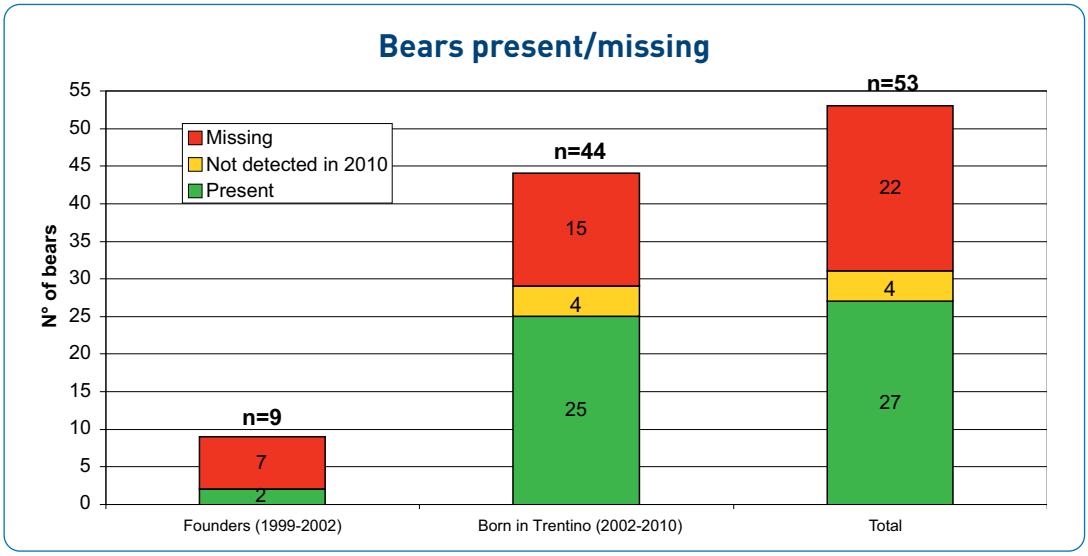
Finally, genetic monitoring confirmed the absence of ten bears already missing in 2009, in addition to a **further seven bears** found dead (4 cases), killed (2 cases) or taken into captivity (1 case). **Three further** bears were added to those missing, given that for the second consecutive year in 2009 no genetic traces of them were found.

Thus there were a total of **twenty-two missing bears** at the end of 2010. As regards this figure, see the considerations in the "Survival rates" section on page 20.

Photo 7 - The remains of the cub found at Malga Arza on 21 May 2010 (R. Calvetti, APT Forestry and Wildlife Dept. Archives)

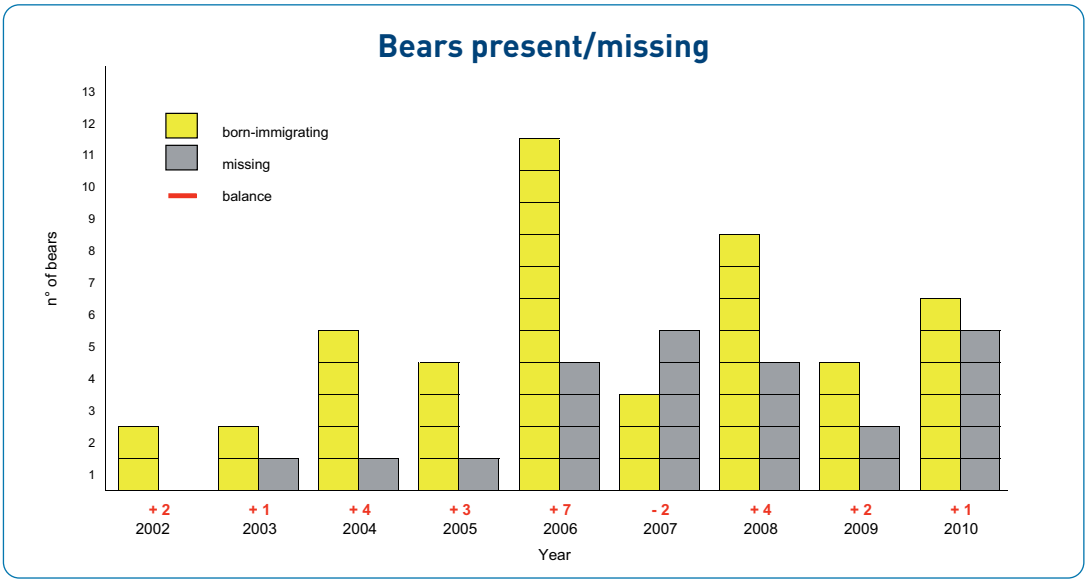
Graph 6 shows the relationship between missing bears, bears undetected in 2010 alone and bears present.

Graph 6



Graph 7 shows the **balance between births-immigrating/missing bears** year by year. In 2010 there was a positive balance (+1). This was the result of six births, 1 emigrating bear and three new bears classified as missing.

Graph 7

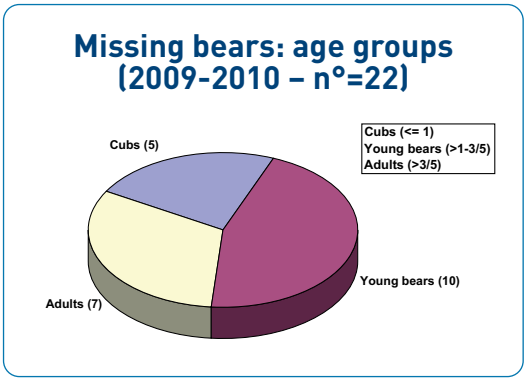


In the year of their disappearance the **missing** bears (n=22) were made up of seven adults, ten young bears and five cubs (see Graph 8).

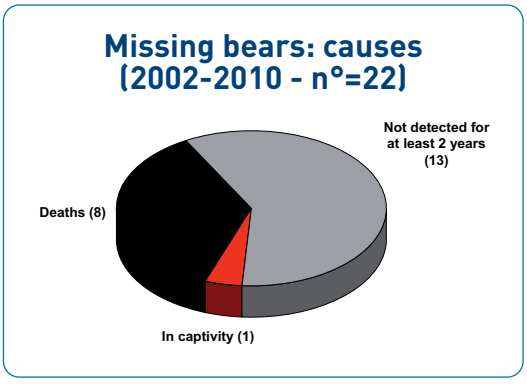
Of the **missing bears**, eight have died, one has been taken into captivity and thirteen have not been detected genetically at least in the last two years, (see Graph 9).

The **dead** bears (n=8) belonged to the following age groups: cubs (4), young bears (3) and adults (1), the share being shown in Graph 10.

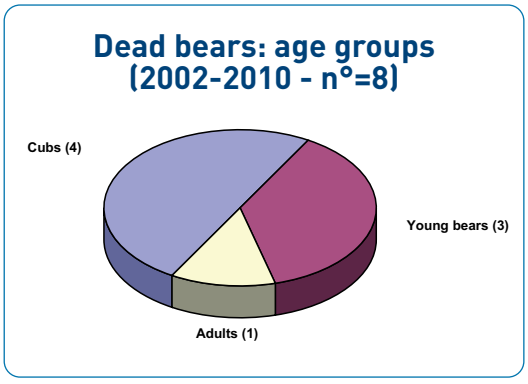
Graph 8



Graph 9



Graph 10



The **deaths** (Table 1) were the result of natural causes in three cases, unknown in one case and due to human action in the other four cases (Graph 11).

Survival rates

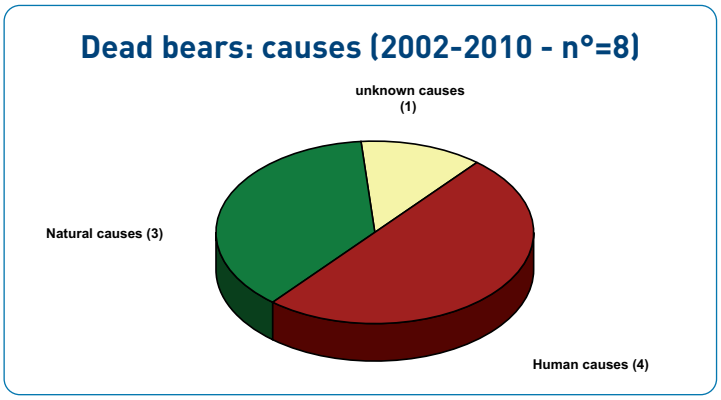
The new data available makes it possible to update the survival rate for the three different age groups (cubs, young bears and adults, as described in the Definitions on page 11) as compared to 2009, differentiated for the two sexes (Graph 12).

The data refers to a period of **9 years** (2002-2010) during which it was possible to record the survival or death of **47 bears** with 161 passages from one year to another (**161 bear-years**), In addition to cases of certain death (8), the "mortality" category, considered in the broader sense, also in-

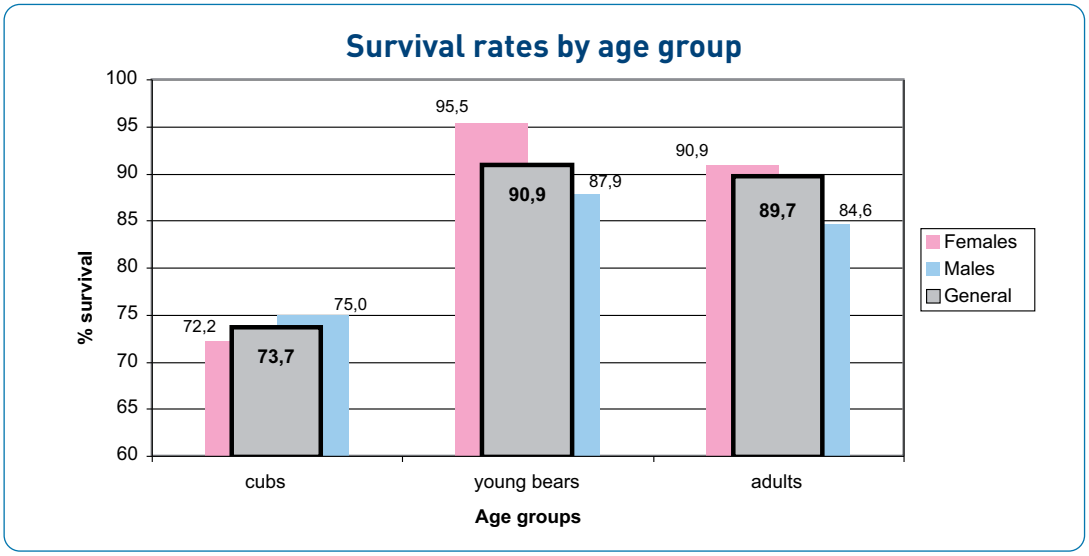
Table 1 - Mortality-causes (* in Germany - ** in Switzerland)

year	natural causes	road accident	shot down during management	accident during management	unknown	total deaths
2002						0
2003	1					1
2004						0
2005						0
2006	2		1*			2
2007						0
2008		1	1**	1		2
2009						0
2010					1	1
TOTAL	3	1	0	1	1	6

Graph 11



Graph 12



cludes bears it has not been possible to detect for at least two years previously (13 cases) and bears taken into captivity (1 case), confirming the criteria used for the definition of "missing" bears. Thus the figures also include the three bears shot/removed following management decisions (JJ1, JJ3 and Jurka).

Excluding the three bears shot or removed following management decisions and referring thus exclusively to "**natural**" **causes of death**, one can note an increase in the survival rate for young males (from 87.9% to 93.5%) and adult females (from 90.9% to 92.6%).

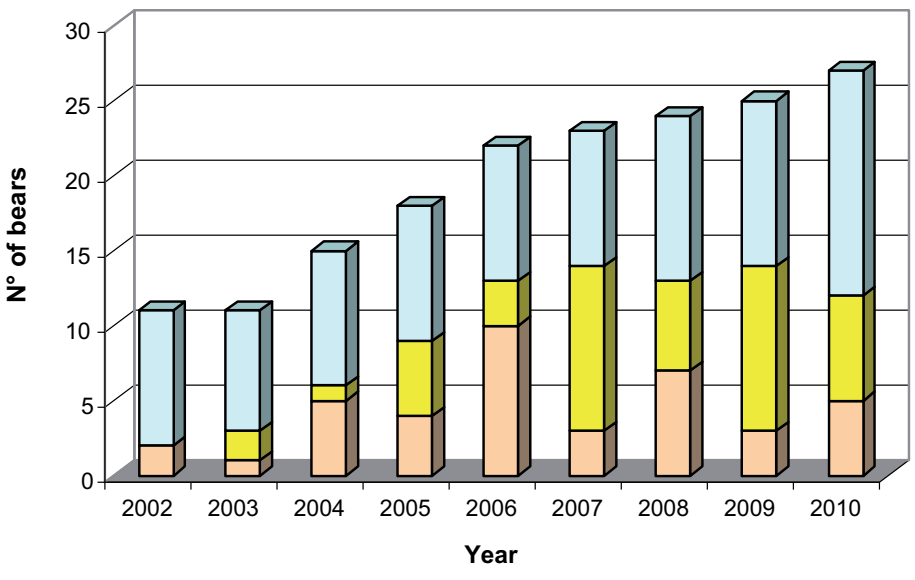
Cubs are therefore confirmed as the category with the lowest survival rate (fewer than 3 out of 4 cubs reach their first birthday). Furthermore, it should also be considered that it is very likely that the calculation excludes a number of cubs not arriving at their first birthday whose presence is not detected by genetic monitoring. The survival rate for young and adult bears (around 90%) instead shows that around one out of 10 individuals (young and adult bears) disappears from the population each year.

The survival rates recorded are not markedly different from those highlighted in the literature for other bear populations (in particular, as regards the survival of cubs, for populations in the Pyrenees and Austria, E. Knauer, unpublished data).

Structure of the population

At the end of 2010 the population ascertained was made up of **sixteen adults** (eleven females and five males), **six young bears** (one female and five males) and **five cubs** (four females and one male). Graph 13 shows the trend for the 2002-2010 period.

Graph 13

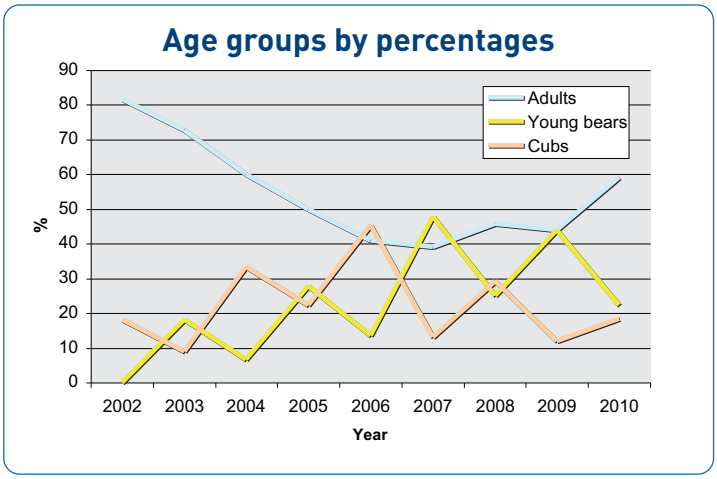


	2002	2003	2004	2005	2006	2007	2008	2009	2010
adults	9	8	9	9	9	9	11	11	16
Young bears	0	2	1	5	3	11	6	11	6
Cubs	2	1	5	4	10	3	7	3	5
Total	**11**	**11**	**15**	**18**	**22**	**23**	**24**	**25**	**27**

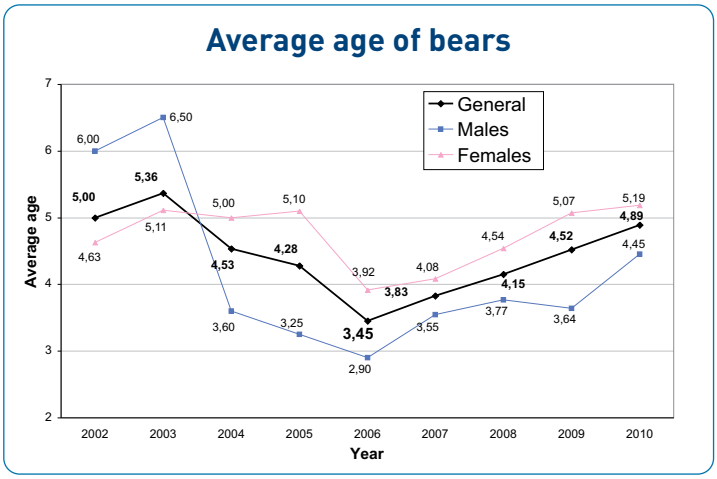
The **percentage of bears in the three age groups (adults, young bears and cubs)** in the period 2002-2010 is shown in Graph 14. For the third year in a row there was an increase in the percentage of adults in terms of the overall population, going from 39% in 2007 to 59% in 2010. This figure confirms the evolution underway, with movement towards a more mature population, whereas there continues to be fluctuation in terms of the number of cubs and young bears, the latter being closely linked to the former (and succeeding them chronologically).

It is also interesting to note th**e volution in the average age of the bear population** over the nine year period examined, also differentiated by sex (see Graph 15); in 2010, for the fourth consecutive year, there was an increase in average age (**now 4.89**).

Graph 14



Graph 15

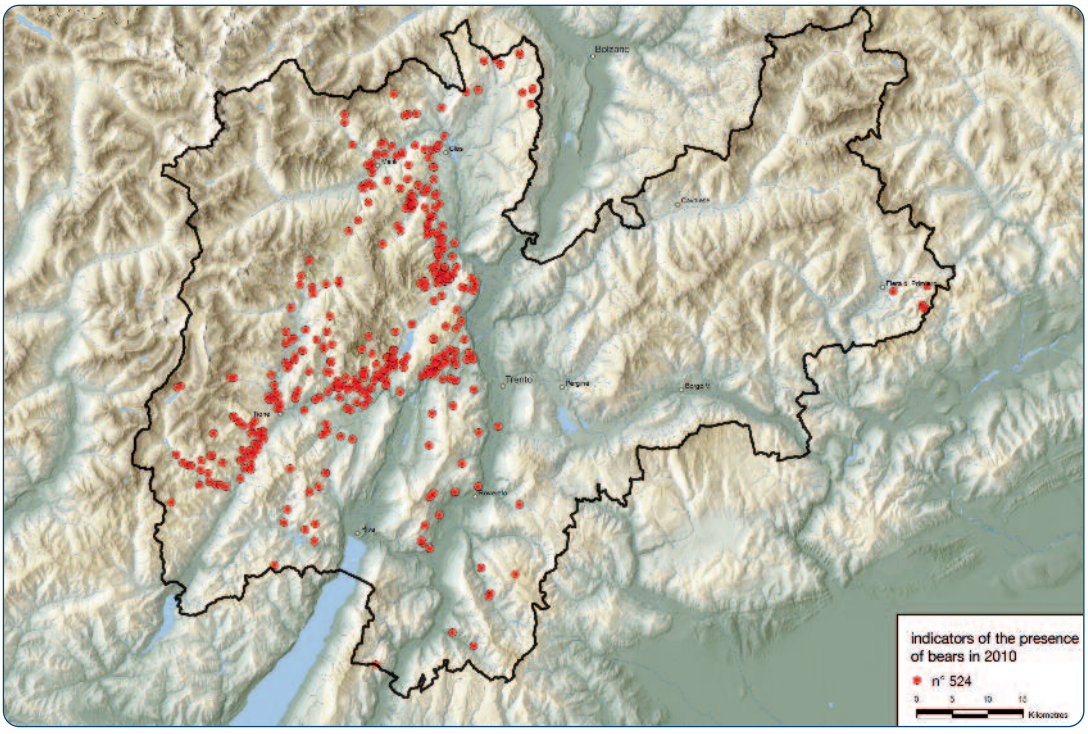


Use of the territory

All the **27** bears detected in 2010 were present within **Trentino**. The presence of six of these animals was also detected with certainty in the **province of Bolzano** (MJ4, MJ5, MJ2G1, M2, M3 and M8), two also in **Lombardia** (M6 and M2), two also in **Veneto** (MJ4 and M4) and one also in Engadina, **Switzerland** (M2). All the 8 bears also identified outside the province were males.

The **524 area localizations** related to the presence of bears collected within the province during 2010 (indicators of presence shown in the weekly reports, genetic monitoring data, other) are shown in Figure 2.

Figure 2
Reports of bears in the province of Trento in 2010



Along with the Giudicarie valleys, the Brenta and neighbouring Paganella-Gazza mountains still represent the core area for the small population, whereas the neighbouring areas on the left hand side of the River Noce, the central and upper Val di Sole, the Presanella, Ledro Alps and Bondone-Stivo and Altissimo mountains saw relatively sporadic frequentation.

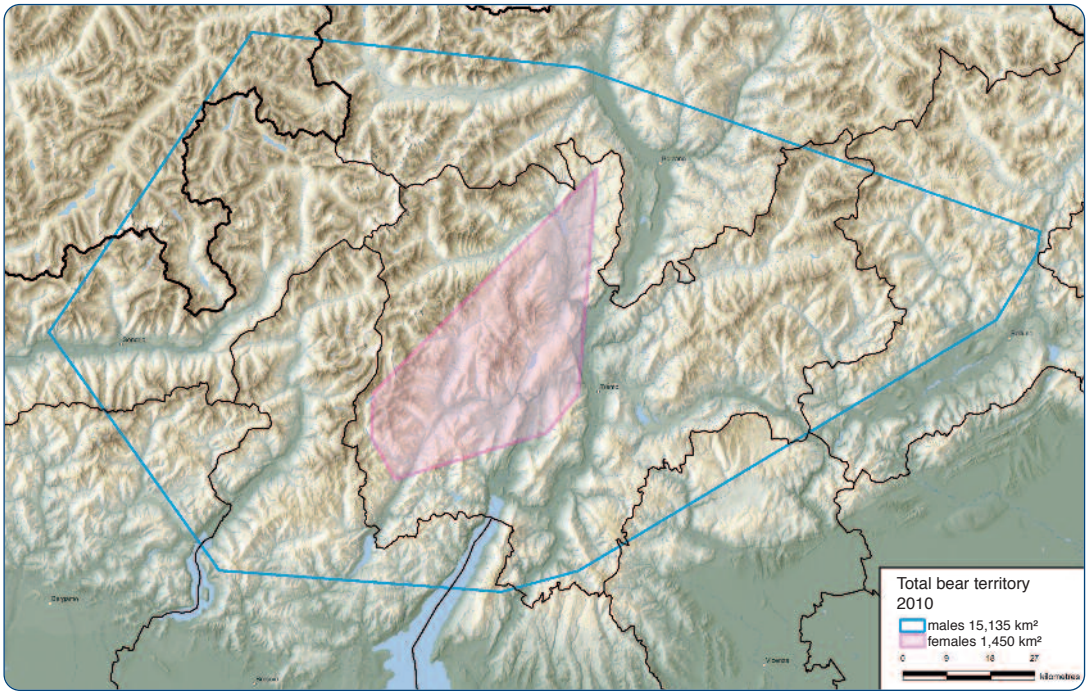
It should however be noted that the area frequented by female bears has expanded considerably as compared to 2009, both to the north (up to the upper Val di Non, close to the frontier with the province of Bolzano) and to the south-east (in particular Bleggio, up to the Ballino pass).

There were very few reports regarding eastern Trentino. These few certainly concern the male bear **M5** in the period after hibernation in Val Noana (Primiero), before departing for the long journey described in BOX 2 and the male bear **MJ4** who left the Brenta mountains in May, crossing the Adige valley and moving first to the same Primiero area frequented by M5, without leaving intermediate traces, and then to the province of Belluno, at least up to the autumn, mostly in the valleys near Piave, to the north of Longarone.

Area occupied by the population

Considering also the longest journeys made by young males during 2010, the **population** of brown bears present in the central Alps, which is mainly centred around western Trentino, in 2010 frequented a theoretical area stretching out over around **15,135 km²**. The area occupied by the **females** in a stable manner (Figure 3) is decidedly smaller (**1,450 km²**), still situated within the province, but considerably larger than in the previous year (955 km² in 2009). The areas occupied were estimated using the minimum convex polygon method, applied to 100% of the fixes available. This also leads to the inclusion of vast areas which are not suitable and/or not actually used, especially within the macro-area including the movements of young males.

Figure 3
Area occupied by the bears in the central Alps in 2010 (in blue), highlighting the area within this occupied by females in a stable manner (in pink)



Density of the population

The **density** for the area frequented by the bears in a more stable manner in 2010 was **1.7 bears/100 km²** (25 bears identified genetically within the area occupied by the females in a stable manner in 2010, namely 1,405 km²). This is in line with the data presented in the bibliography in relation to the alpine environment and the forecasts of the feasibility study which preceded the *Life Ursus* project.

Roaming

In the period 2005-2010 it was possible to document **roaming** (understood as movement outside western Trentino) involving **fourteen bears** (all young males). **Nine** of these were still **present** in 2010: most of them have already returned (although it is not possible to say whether definitively or not), **two** were shot down following management decisions in foreign countries, **one disappeared** in 2005 in the frontier area between Engadina (CH) and

the province of Bolzano and **two** have not been **detected** in the last year.

It should be underlined that the fate of a further six males aged one to three, who have disappeared, is not known. They may have moved into other areas. To date **no roaming of females** born in Trentino has been documented.

Other monitoring activities in 2010

As will be explained in more detail in the chapter regarding emergencies, on 22 October 2010 the female bear **DJ3** was recaptured and fitted once again with a radio collar (as the old collar had stopped working on 24 June 2010), her behaviour making more intense monitoring of her movements necessary. Furthermore, the movements of the male bear **M5** were also monitored using **radiotelemetry** up to 14 May 2010, when his collar stopped working at some point in the province of Vicenza. The **2010 home-ranges** of DJ3 and M5, calculated using the minimum convex polygon method (MCP), stretched respectively over 278 km² and 2,383 km² (respectively 442 and 942 GPS fixes available for the periods 1 January - 23 June and 1 January - 13 May) and are shown in figures 4 and 5.

The genetic monitoring conducted without interruption since 2002 has made it possible to follow most of the bears in a continuing manner, confirming their presence over time and, at least partially, the home-ranges used. These are recorded year by

Figure 4
Home-range of DJ3 in 2010 (MCP)

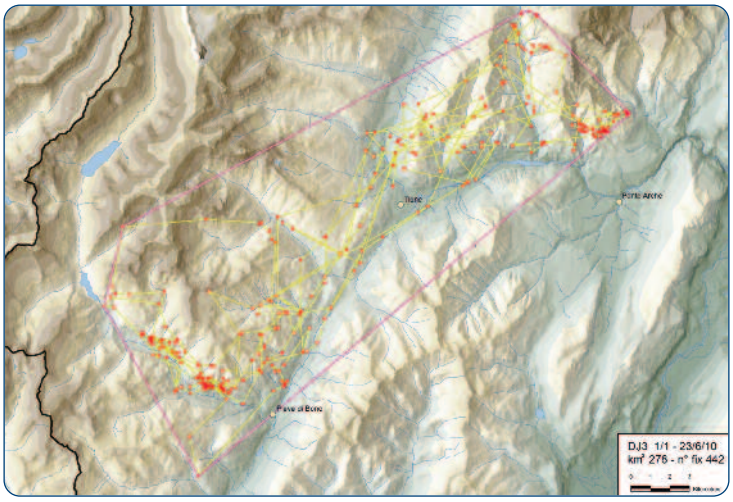
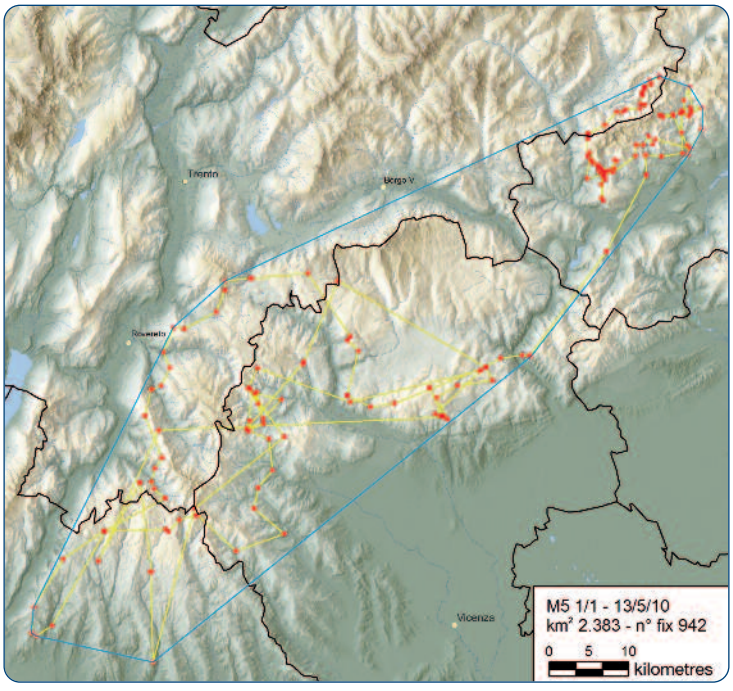


Figure 5
Home-range of M5 in 2010 (MCP)



year for each individual animal. As an example, below we give the home-ranges (MCP) of the male Gasper and the female Daniza from 2004 to 2010 (figures 6 and 7).

Figure 6
Home-range of Gasper in the 2004-2010 period

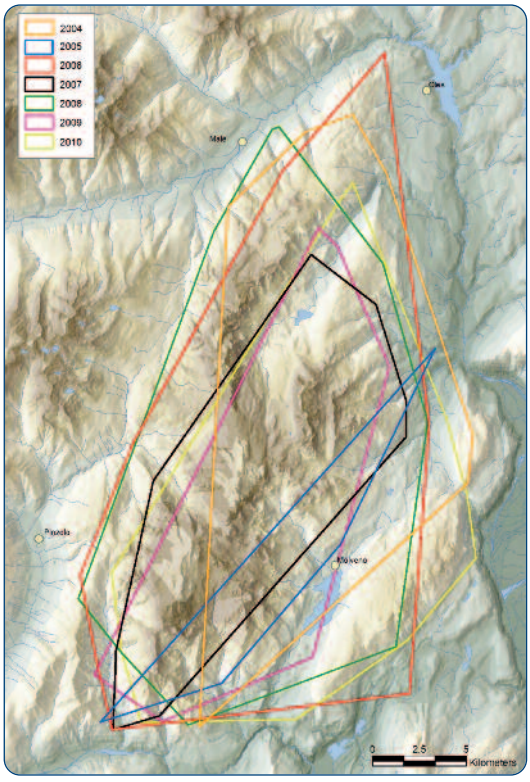
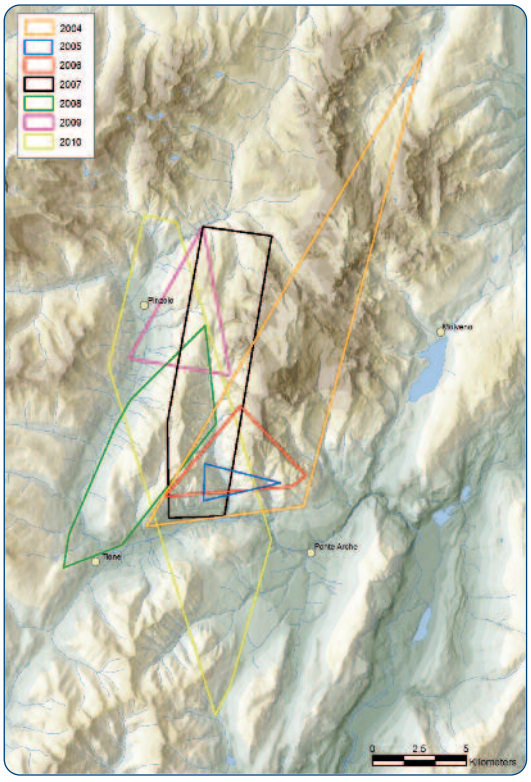


Figure 7
Home-range of Daniza in the 2004-2010 period



Monitoring of dens

In 2005 Adamello Brenta Nature Park started up a the research project called "den monitoring", with the aim of understanding the characteristics and discovering sites used by brown bears for hibernation in the province. Starting from 2008, analysis of microclimatic conditions inside dens was started up, along with comparison of the parameters measured in potential dens or caves suitable for hibernation but which had not yet been used for the purpose. DS1923 Hygrochron Temperature/Humidity Logger iButtons were used to gather data.

In 2010 44 of the 47 sensors installed in 2009 were recovered (photo 8): of these, 21 were recovered from inside dens actually used by bears and 23 from potential dens. In addition to recovering the sensors installed in 2009, a further 41 buttons were installed: 14 in dens already used by bears and 27 in potential dens.

The ultimate goal of this phase of the research is to monitor all known hibernation sites by 2011, together with a significant number of potential caves, in order to gain more information about climatic conditions in the months during which the bears hibernate. Furthermore, the search for and monitoring of new hibernation sites and potential caves con-

tinued. In 2010, 8 new potential caves were discovered and added to those discovered during exploration of the territory (1988-2009) over a period of 22 years, bringing the total number of potential caves to 87, alongside the 65 hibernation sites already known in western Trentino. The usual analytical description of the 8 new potential caves was carried out and temperature and humidity sensors were placed in 7 of them.

Photo 8 - Recovery in summer 2010 of a sensor installed during the 2009 monitoring session (F. Zibordi, Adamello Brenta Nature Park)

2. Damage compensation and prevention

By now APT has gained more than thirty years' experience as regards compensation and prevention of damage caused by brown bears. Indeed, since 1976 100% of the material value of assets damaged are being reimbursed and it is possible to acquire preventive works (mostly electric fencing), either with funding covering up to 90% of costs or through a system of gratuitous loans. The relative regulations, dealt with in article 33 of provincial law no. 24/91, have been revised several times and updated over the years, most recently with Provincial Government resolution no. 2296 of 3 November 2006, also on the basis of the directives imposed by the Provincial Government in the previously mentioned resolution no. 1988 of 9 August 2002. The regulations regarding works for the prevention of damage were instead last updated with resolution no. 232 of 5 May 2006 of the Manager of the Forestry and Wildlife Department.

Compensation for damage caused by bears

In 2010, 256 notifications of damage caused by wild predators and attributed to brown bears were forwarded to the Forest and Wildlife Department (248 in western Trentino and 8 in eastern Trentino), with an increase of 111% as compared to 2009. All the damage in eastern Trentino concerned a single bear (MJ4).

237 claims for compensation were received by the department, of which 230 have been processed (224 accepted and 6 rejected), 7 are currently being examined, whereas 19 notifications were not followed up by the claimant.

In 82% of cases of damage, specific inspections were carried out by forestry staff, who were responsible for drawing up a report.

Overall, **€ 118,075.87 compensation for damage caused by brown bears** was paid.

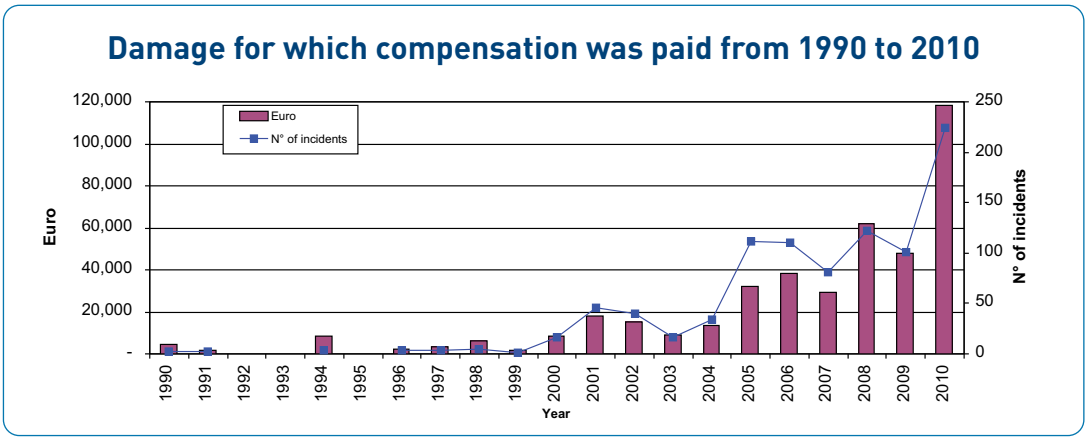
The considerable increase in the number of cases of damage as compared to the previous year is related to a combination of factors, including the following:

- the natural numerical increase in the bear population;
- the natural fluctuation in the availability of natural foodstuffs, which in years of shortage (as in the case of 2010) leads bears to use food sources deriving from human activities more frequently;
- the specific behaviour of certain bears, responsible for causing more damage;
- the presence in spring of young roaming bears frequenting certain areas (e.g. the Vallagarina), where certain resources, particularly bee-hives, were not completely protected, leading to numerous cases of damage;
- the particular situation arising last winter with some bears not going into hibernation, leading, for the first time in the last ten years, to a number of cases of damage to bee-hives in the Val di Non and the Val di Daone also during January and February.

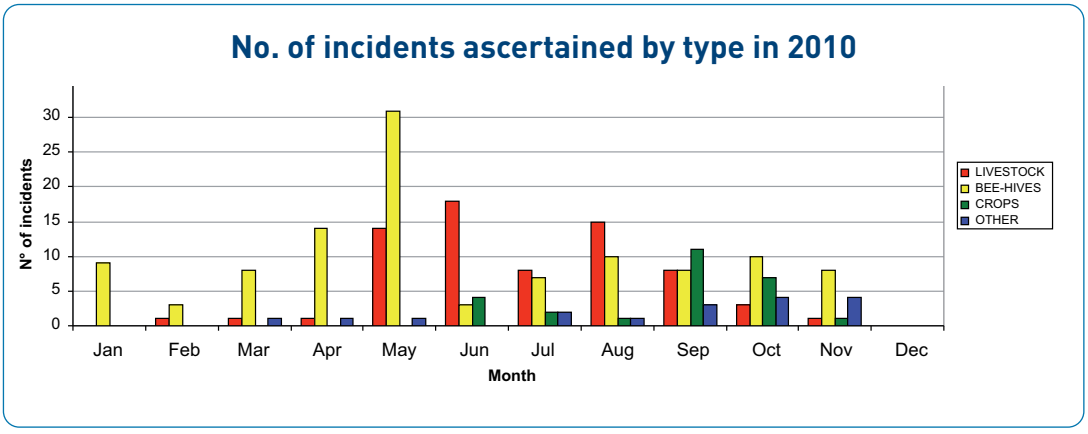
In 82 cases, namely around 35% of all cases of damage recorded, genetic monitoring made it possible to determine the **identity of the bears involved** with certainty. The animals causing most damage were three males: M6 (responsible for around a quarter of all the attributable damage), JJ5 and M2, followed by the two female bears Daniza and DJ3 and the male bear MJ5. The six bears mentioned above were responsible for around 60% of the damage for which the author was identified.

Graph 16 shows the trend for damage caused by brown bears and for which compensation has been paid over several years, whereas graphs 17 and 18 show the chronological distribution of this damage in 2010 and in the period 2002-2010.

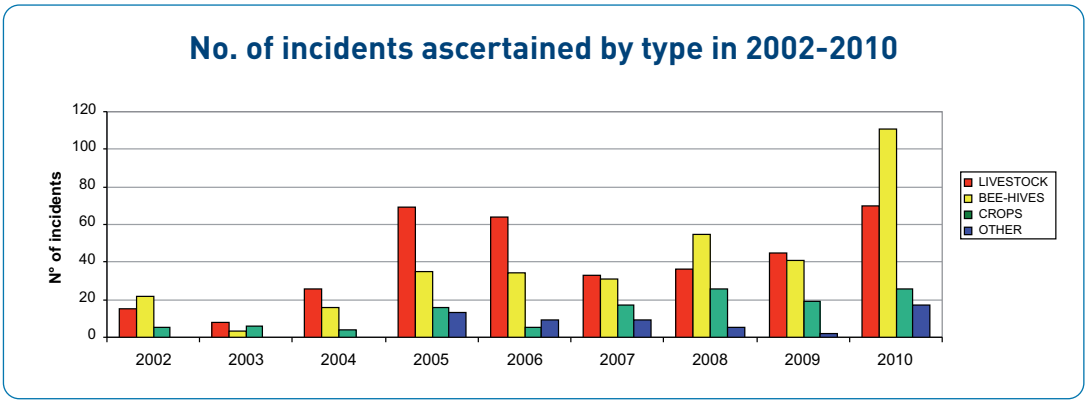
Graph 16



Graph 17

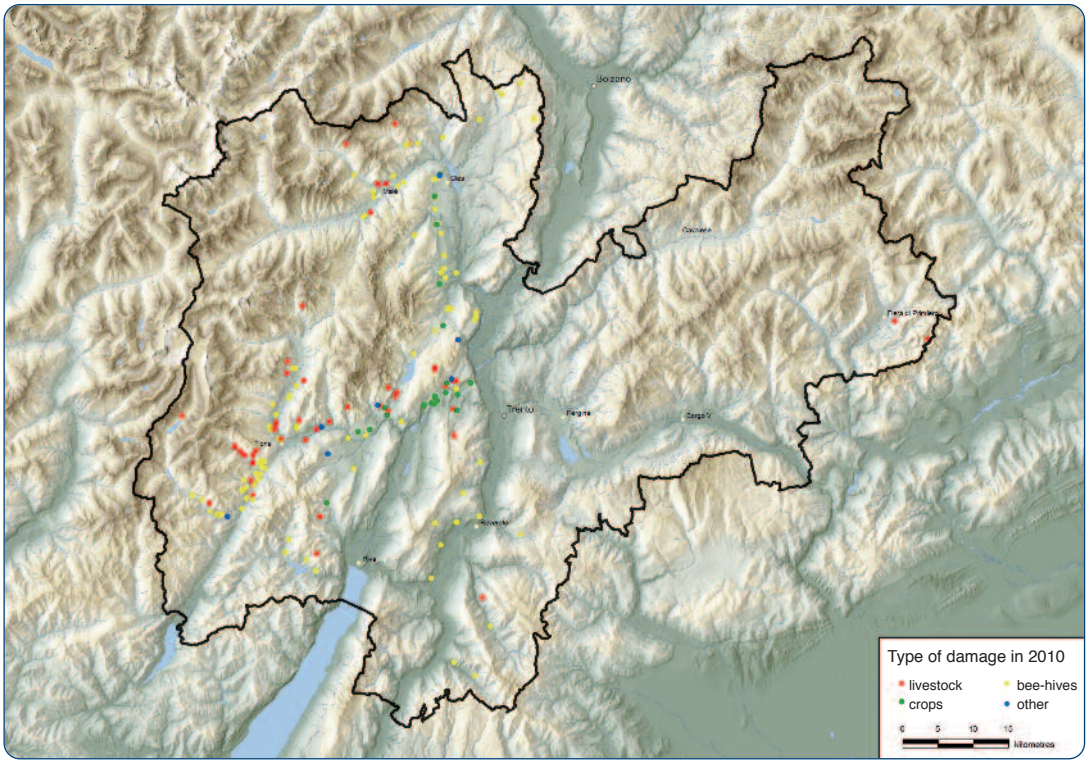


Graph 18



The geographical distribution of the damage recorded can be seen in Figure 8.

Figure 8
Geographical distribution of damage caused by bears recorded in 2010



Prevention of damage by bears

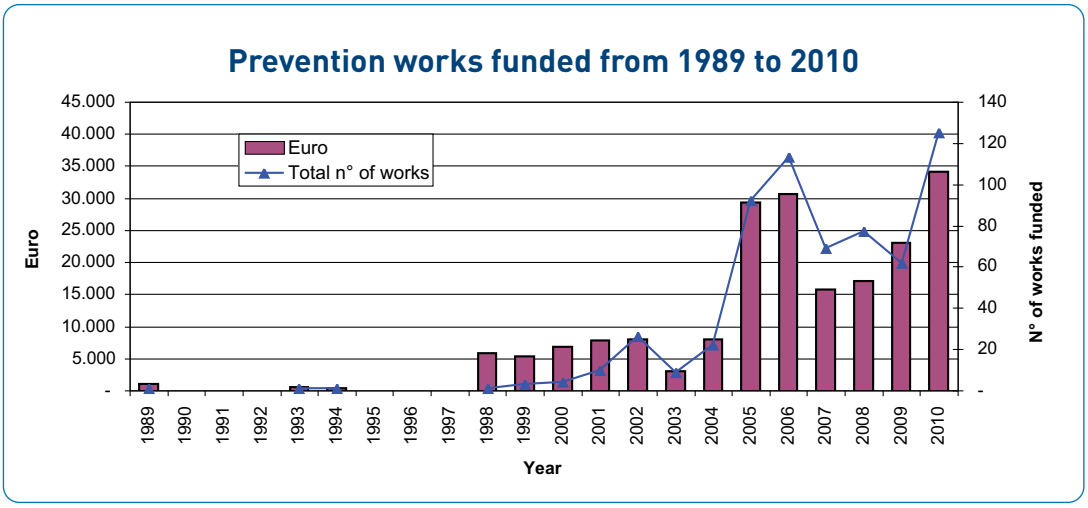
In 2010, **115** applications for funding were presented for **prevention works** protecting assets from damage by brown bears; 2 applications were withdrawn by the applicants, 2 were rejected as they were requested for areas in which the presence of bears is very sporadic, 107 have been

processed and 4 have not yet been concluded (the users have not yet collected the material). Overall **120 works (electric fences) were distributed**, of which 66 designed to protect bee-hives and 54 to protect livestock, with **overall expenditure** of **€ 30,500**; almost all of these involved the stipulation of **gratuitous loans**.

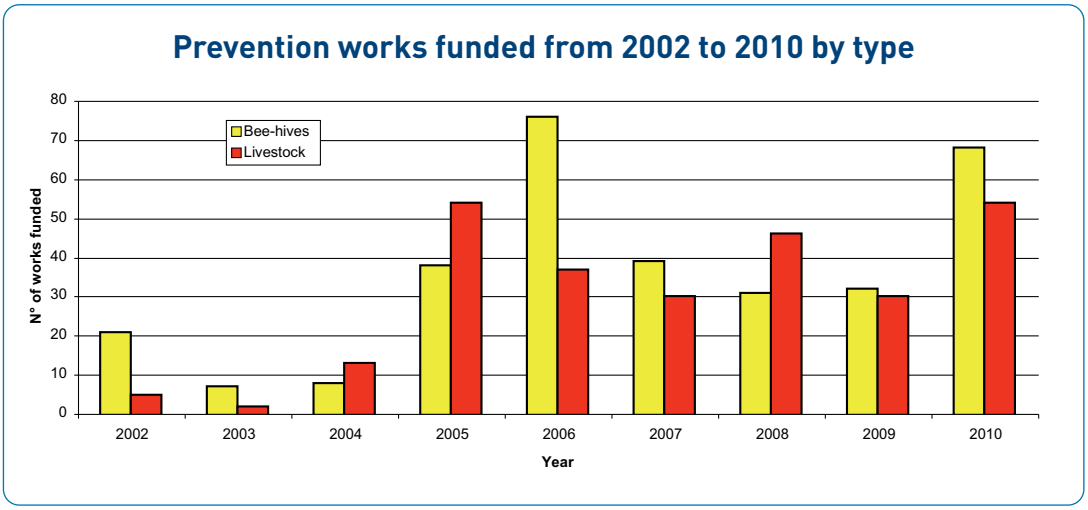
Five further fences (4 for livestock and one for bee-hives) were purchased directly by those concerned and funded with a **contribution** of between 60% and 90%, depending on the extent of the asset protected, with an overall cost of **€ 3,602.09**.

Below it is possible to see the trend in the distribution of prevention works over a number of years (Graph 19) and the different types of works in the period 2002-2010 (Graph 20), with reference to livestock and beekeeping.

Graph 19

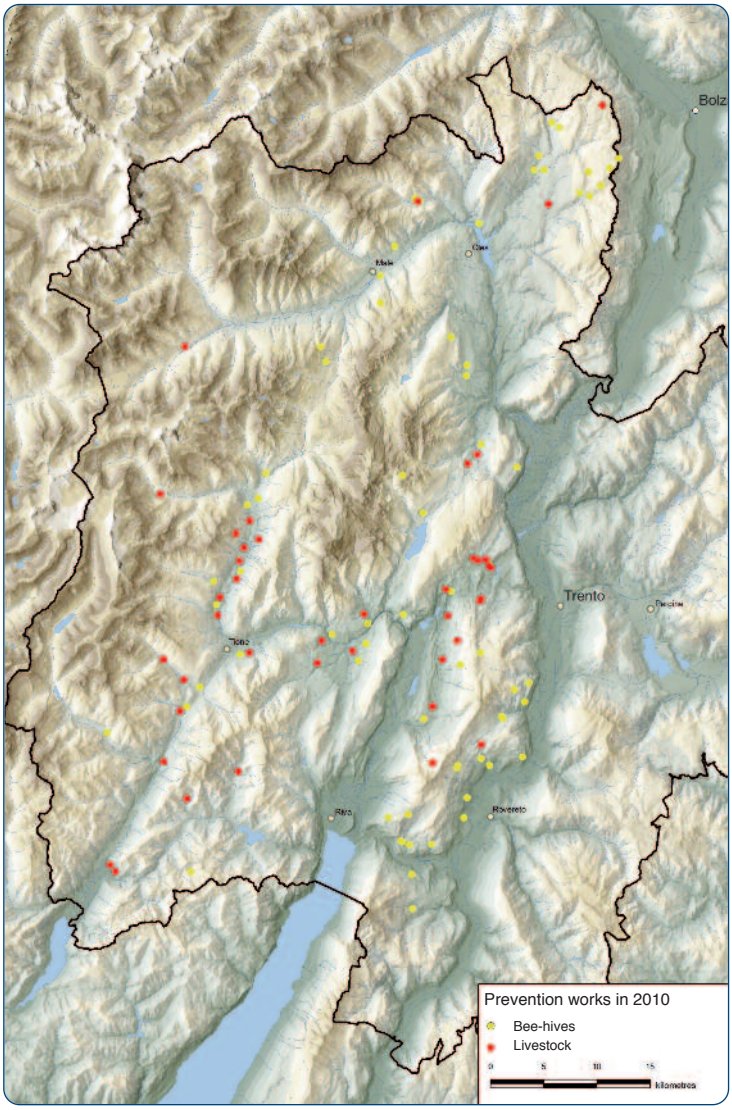


Graph 20



The geographical distribution of the works set up in western Trentino in 2010 can be seen in Figure 9.

Figure 9
Location of prevention works over 2010



Support for animal husbandry

As in previous years, in spring 2010, two **prefabricated structures** were transported by helicopter to the mountains in order to allow shepherds to remain close to two large flocks throughout the mountain grazing season (at Prada and Valandro, respectively in the municipalities of Dorsino and Stenico). These were taken back down to the valley at the end of the season. In the Valandro area the Department is in the final phase of reconstructing an old mountain dairy, which in the future will offer a satisfactory base for shepherds working in the area. Once again this year, despite moments of tension given the presence of several bears in the area, including a female bear with three cubs, the number of animals lost in these two large flocks (which included more than 2,000 animals in total) due to the action of bears was extremely limited.

In the context of activities designed to mitigate conflict between bears and animal husbandry activities, in 2010 eleven high power electric fences were distributed to shepherds (fences with 2.5 joule nominal power, fuelled by rechargeable 80 Amp battery and supported by a 25 watt solar panel). One example of intervention by the department took place in the Daone valley, where following the killing of 12 sheep from a herd of 1,000 animals by the female bear DJ3, the two shepherds present in the area were given high power electric fences which made it possible to avoid new raids by the bear.

3. Management of emergencies

The Law of 11 February 1992 no. 157 includes the brown bear among the species granted special protection (art. 2, paragraph 1).

The D.P.R. of 8 September 1997 no. 357 (subsequently amended and supplemented by D.P.R. 120/03), implementing the 92/43/EEC directive regarding the conservation of natural and semi-natural habitats and wild flora and fauna, includes this species in enclosure B (species of community interest, whose conservation requires the designation of special areas of conservation) and D (species of community interest which require strict protection), thus considering the brown bear as a priority species.

The current national legal framework therefore forbids the disturbing, capture and killing of large carnivores (D.P.R. 357/97, art. 8).

However, action may be taken to control problem bears in critical situations, in accordance with the provisions of national regulations (D.P.R. 357/97, art. 11, paragraph 1; L. 157/92, art. 19, paragraph 2; L. 394/91, art. 11, paragraph 4 and art. 22, paragraph 6), regional and provincial regulations.

Indeed, in order to avoid conflict with human activities and for reasons of public safety or for other compelling reasons of relevant public interest, the possibility of an exception to the ban on the capturing or killing of animals is provided for, subject to the authorisation of the Ministry for the Environment, Land and Seas, having consulted ISPRA, on condition that there are no other practicable solutions and that departure from the rules does not prejudice the satisfactory conservation of the populations of the protected species, (D.P.R. 357/97, art. 11 paragraph 1).

In the province of Trento the management of emergencies represents a field of action in which it has only been necessary to operate in the last few years, given the considerable expansion in the bear population and more specifically as a result of the presence of a few animals considered to be "problematic".

In 2003 the Ministry for the Environment, Land and Seas and the Autonomous Province of Trento prepared the "protocol for action regarding problem bears and intervention in critical situations".

This protocol provides the technical guidelines on the basis of which the Forestry and Wildlife Department, which represents the provincial organisation of reference, has identified, trained and equipped the staff in charge of intervening in these situations. Op-

erational management in Trentino is based on the use of staff from the provincial forestry service (PFS), to which the Forestry and Wildlife Department makes recourse, through the setting up of a special unit which is on call.

This has been operational since 2004 and is active each year from March to November. In 2010 it was made up of 9 coordinators, who have the support of an emergency team made up of two people, also on call in turn within a group of specially chosen and trained staff made up of 14 members. When necessary the team is joined by veterinary staff from the provincial health services (given special training since 2008) or from outside the administration.

Activities of the emergency team

In 2010 the activities of the emergency team took place from 1 March to 12 December, the season lasting slightly longer than in 2009 due to bears also remaining active at the beginning of December. However, no further cases of damage were recorded from the last ten days of November until the end of the year.

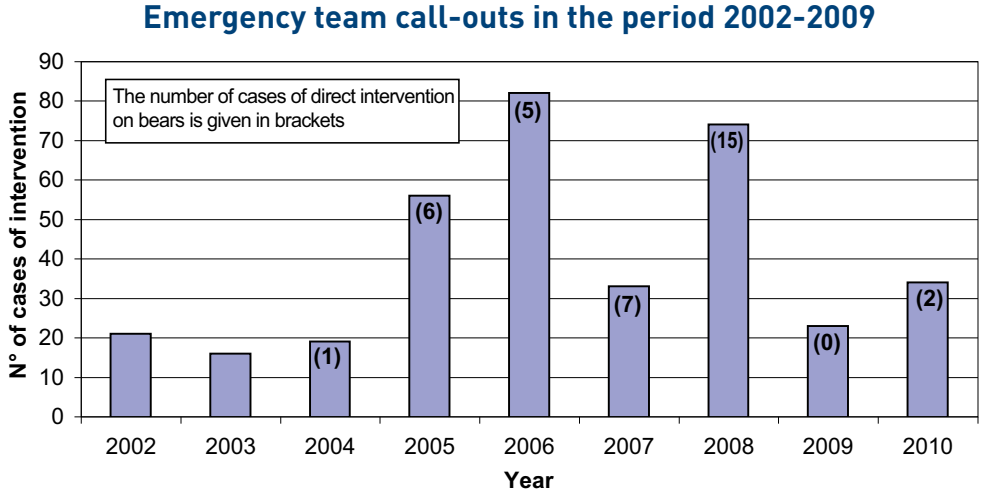
In 2010 the **emergency team** was called on **34 times** (Graph 21), in most cases following reports of damage or the sighting of bears close to inhabited areas. Their action was mostly limited to protecting and informing the population, while in only **two** cases were they called on to **intervene directly to dissuade the animal**. In one case in particular, dissuasive action was put into effect using an exploding dart and bear dogs.

There were however some problems reported in relation to the female bear DJ3, who was responsible for numerous cases of damage to bee-hives and livestock (sheep) close to towns or even within them, as in 2008, manifesting overconfident behaviour in relation to man.

Once again, it was possible to ascertain that most of the problems can be attributed to individual bears displaying problematical behaviour in terms of causing damage or displaying excessive confidence.

As regards the prevention of critical situations, it should be recalled that in 2010 a further **100 120 litre bear-proof waste bins** were ordered and distributed throughout the area.

Graph 21



The location of intervention by the emergency bear team in 2010 is shown in Figure 10.

Figure 10
Location of intervention by the emergency team

Capture

In the context of emergency management, there is a "capture team" made up of staff specially trained for these activities. They are supported by veterinary staff in relation to health aspects.

In 2010, bearing in mind the particularly damaging and overconfident behaviour of the female called DJ3 and considering the provisions of the plan for the capture of problem bears, it was considered opportune to capture her once again, in order to replace her radio-collar, as the previous one was no longer functioning.

For this purpose a "tube trap" was positioned in the area frequented by the bear. This method did not prove to be effective, perhaps also because when first captured the bear was kept in the trap in the phase of recovery. Indeed the bear, while frequenting the site, was very wary and never fully entered the trap.

A second attempt was made in July in the Daone valley (at Malga Bissina), where Aldrich snares were prepared, using as bait sheep carcasses previously preyed on by DJ3. In this case, although returning to feed on two consecutive nights, the bear managed to elude the snares.

On the evening of **22 October 2010** in the municipality of Praso (at Malga Pozze), the team succeeded in capturing DJ3 using an appropriately modified Aldrich snare (Photo 9).

The 7-year-old female weighed 130 kg and was in excellent health. She was fitted with a radio-collar operating using the VHF and GPS system.

All the attempts at capture were only initiated once it had been established with certainty, through the use of photo traps, that the site was frequented by the bear in question and not by other bears.

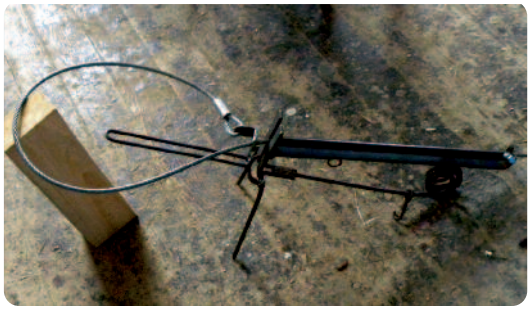


Photo 9 - Modified Aldrich snare
(P. Zanghellini, APT Forestry and Wildlife Dept. Archives)

BOX 3 – Veterinary aspects related to the capture of bears

The capture of DJ3 on 22 October 2010 took place using procedures developed and consolidated by recent experience, with operating methods, materials and sedation and manipulation procedures which are as standardised as possible. Recourse to codified operating methods is essential for guaranteeing the success of capture, avoiding operating in an improvised manner without objective assessment. While the scope is to allow the fitting of radio-collars or the transfer of the animal, the first priority is to guarantee the safety of the team personnel and the animal itself.

Veterinary support for the capture team was guaranteed by a veterinary surgeon from the Veterinary Public Health and Safety Unit of the provincial health services. (Photo. 10).

No significant changes to anaesthetising procedures have been made from the first experiences to the present day: bears captured in the last few years have been sedated with a mixture of a sedative-myorelaxant (an α2-adrenoceptor, xylazine) and two general anaesthetics (a dissociative agent, tiletamine, and a benzodiazepine, zolazepam) in well-defined proportions. These have been adjusted only slightly during the various captures which have taken place. The literature frequently reports the use of medetomidine (another α2- adrenoceptor) instead of xylazine, the latter being a dated but still widely used substance: in Italy a medetomidine-based drug suitable for the purpose is not currently commercially available, so recourse to xylazine, albeit in very low doses, is practically obligatory. The use of more than one active ingredient is justified by the fact that in this way it is possible to reduce the respective doses, resulting in a greater safety margin for the animal: during the captures taking place to date, no anaesthetic accidents have taken place.

Manipulation of the sedated animal, which in any case must not take place within fifteen minutes of administering the drugs, must be carried out using standardised procedures, in so far as this is possible, also bearing in mind the peculiarities of each case: the drugged animal is normally placed on flat terrain, in dorsal recumbent position with all four limbs extended and with a special mask over its eyes; one limb is attached to a tree with an Aldrich snare and a piece of wood is placed at the back of its mouth, for reasons of security and in order to assist with inspection of the teeth and the oral cavity.

Photo 10 - Veterinary procedures during the capture of DJ3
(P. Zanghellini, APT Forestry and Wildlife Dept. Archives)

The animal is constantly monitored by the veterinary surgeon, who pays particular attention to respiratory function, through visual checking of the frequency and depth of respiration with the use of a pulse oximeter, to check oxygenation of the blood. Other vital parameters to be monitored are cardiac frequency, through evaluation of impulses, auscultation (preferably), or using a pulse oximeter. Body temperature is another parameter, often undervalued, to be kept under control: as described in the literature there have been more cases of hyperthermia (over 40°C), even in the coldest seasons, than of hypothermia.

Having terminated all procedures involving the animal and removed the safety restraints (snare around the limb), the veterinary surgeon proceeds with administration of the specific antidote (atipamezole) for the α2-adrenoceptor; the recovery time (to standing on four feet) can vary from 30 minutes to several hours.

During the recovery phase the animal is not subjected to tactile and sound stimulation and on the basis of the experience gained, it is normally preferred to leave the animal to recover in a closed tube trap: this avoids the possibility of the bear, which is still partially sedated, causing itself any harm, or worse still representing a hazard for the safety of staff and any other people who may be present in the area.

In the event that recovery instead takes place in the natural environment, in the open, the animal is placed on flat terrain, in such a way that is it visible from afar, so it can be checked at regular intervals in total safety: this is the most delicate phase in terms of the safety of staff, as a recovering bear may act aggressively to an approaching human rather than moving away as it would normally do.

The following table summarises captures taking place in the period 2006-2010.

Table 2 - Captures taking place in the period 2006-2010

No.	Date of capture	Location	Bear	Method of capture	Scope of intervention	Period of radio monitoring	Method of release	Sex	Age	Weigh	Notes
1	23/08/2006	Malga Grum (Terzolas)	Jurka (1st)	Free ranging	Fitting of GPS radio-collar	23/8/06 28/6/07	On site without dissuasion	F	9	140	Female with 3 cubs
2	28/06/2007	Rifugio Genzianella (Terres)	Jurka (2nd)	Free ranging	Fitting of GPS radio-collar	-		F	10	130	No cubs
3	02/07/2007	Maso Dos (Pinzolo)	Daniza	Free ranging	Fitting of GPS radio-collar	2/7/07 5/5/08	On site without dissuasion	F	12	106	No cubs
4	13/06/2008	Molveno (Molveno)	KJ2G1	Free ranging	Fitting of GPS radio-collar	-		F	3	95	Died by drowning in Lake Molveno
5	13/07/2008	Loc. Mangio (Castel Condino)	DJ3	Free ranging	Fitting of GPS radio-collar	13/7/08 23/6/10	On site with dissuasion (dogs + rubber bullets)	F	5	95	No cubs
6	27/09/2008	Loc. Pineta (Molveno)	KJ1G1	Aldrich snare	Fitting of GPS radio-collar	27/9/08 5/4/09	On site with dissuasion (dogs + rubber bullets)	F	3	130	No cubs
7	15/10/2009	Val Canali (Tonadico)	M5	Aldrich snare	Fitting of GPS radio-collar	15/10/09 13/5/10	On site with dissuasion (dogs + rubber bullets)	M	3 - 5	175	
8	22/10/2010	Malga Pozze (Praso)	DJ3	Aldrich snare	Fitting of GPS radio-collar	22/10/10	On site without dissuasion	F	7	130	No cubs

Road accidents

During 2010 two **road accidents** were reported (at Faè, near Cles and in the vicinity of Vigolo Baselga), bringing the number of incidents reported to date to 13, as shown in Table 3.

Table 2 - Road accidents reported in the period 2002-2010

No.	Date	Location	Bear/s involved***	Sex and age	Fate of the bear
1	30 August 2001 at 00.50	Laives (BZ) (A22 motorway)	Vida	Female aged 4.5	Injured quite seriously but survived
2	4 November 2005 at 6.45	Preore (prov. road n° 34)	DJ3	Female aged 2	Survived and reproduced
3	28 June 2006 at 00.30	Fai (prov. road n° 64)	MJ2	Female aged 3.5	Survived and reproduced
4	28 October 2006 at 3.00	Caldes (main road n° 42)	Unknown	Unknown	Unknown**
5	29 October 2007 at 23.25	Ciago (prov. road n° 18)	Unknown	Unknown	Unknown**
6	18 July 2008 at 4.00	Villa Rendena (prov. road n° 34)	Daniza + 3 cubs	Female aged 13 with 3 cubs born that year	1 female cub died
7	18 July 2008 at 4.00	Nembia (prov. road n° 421)	KJ1G1	Female aged 2.5	Survived with no consequences
8	16 August 2008 at 23.45	Strembo (prov. road n°236)	Daniza + 2 cubs	Female aged 13 with 2 cubs born that year	1 cub injured, probably survived
9	15 October 2008 at 00.30	Bus de Vela (main road n° 45 bis)	Unknown	Unknown	Unknown**
10	9 April 2009 at 23.00	Passo Palade (BZ) (main road n° 238)	Unknown	Unknown	Unknown**
11	9 December 2009 at 19.30	Tione (prov. road n° 37)	Unknown	Unknown	Unknown**
12	25 May 2010 at 22.30	Strada del Faè (prov. road n° 43)	Unknown	Unknown	Unknown**
13	22 October 2010 at 6.30	Vigolo Baselga (prov. road n° 84)	Unknown	Unknown	Unknown**

* the identity of the bear was ascertained through genetic testing

** an immediate inspection took place with dogs, suggesting that the animal hit moved off autonomously

In both cases the impact was relatively minor, the drivers of the vehicles were not injured and inspections carried out subsequently with bear dogs suggested that the bears moved away from the site of the accident immediately

Bear dogs

During 2010 two new Russo-European Laika bear dogs purchased in Germany were assigned to their handlers, joining the two dogs already available (photo 11), and thus completing the unit as planned. The first two dogs are now fully mature and have been used on various occasions, in particular to check the areas where the two road accidents occurred, in at least two cases for dissuasion of bears causing damage and to check areas frequented by females with cubs in order to obtain organic samples for genetic monitoring.

The training of the two adult dogs and of their handlers continued according to a special programme, while the main training phase for the other two dogs will take place in 2011, given their young age, also with the collaboration of specialist trainers.

Photo 11 - The four bear dogs with their handlers (C. Groff, APT Forestry and Wildlife Dept. Archives)

In order to improve the use of the dogs the "**Criteria for the use of bear dogs**", representing the reference document for coordinators and handlers in all possible operating situations (wounded bears, road accidents, overconfident bears, dissuasion during post-capture release etc.) was implemented and partially reviewed.

4. Communication

Communication is considered by the provincial administration to be an aspect of fundamental importance in the management of bears and represents one of the six Programmes of action referred to in the previously mentioned resolution of the provincial government no. 1988 of 9 August 2002.

Considering this, starting from 2003 a specific information campaign was started up called "Getting to know the brown bear", which has seen numerous initiatives in the past and is still active. This report, which among other things also has an informative role, is one of the initiatives designed to allow the wider public to better understand this animal, with the conviction that only knowledge can lead to harmonious coexistence with the bear in the medium to long-term.

With regard to these communication activities, the Forestry and Wildlife Department has always been supported by Adamello Brenta Nature Park, which has been active in this field for many years in its own area, and by the Trento Natural Science Museum, which has offered educational activities related to bears for schools from the very beginning.

The main activities undertaken during 2010 are summarised below.

Evening sessions and meetings

Table 4 lists the eleven meetings/evenings organised within the context of the information campaign "Getting to know the brown bear" (some of which promoted by Adamello Brenta Nature Park when relevant to its area, with around 530 participants overall). Some of these meetings were specifically organised in response to local situations and requests for information, linked for example to situations arising when certain bears caused special concern

Table 4 - Public meetings held within the context of the "Getting to know the brown bear" campaign

Place	Date	No. of participants
Trento Natural Science Museum (with presentation of the 2009 Bear Report)	3 February	95
Mezzano (for bee-keepers)	30 March	20
Parco Natura Viva (VR)	11 April	40
Vezza d'oglio (BS) (per Legambiente)	8 June	55
Rovereto for bee-keepers)	21 June	40
Daone *	5 August	40
Brentonico	6 August	50
Vallarsa - Festival "Tra le rocce e il cielo"	19 August	50
Bosco Chiesanuova (VR) Lessinia Film Festival	27 August	50
Magras	7 October	50
Trento Natural Science Museum	3 November	40

* Evening organised in collaboration beetween APT and ABNP

because of the number of incidents involving damage. Further evenings were held within the context of the Adamello Brenta Nature Park 2010 summer programme. A detailed list is given in Table 5.

Table 5 - public meetings about bears held by ABNP

Place	Date	Title	No. of participants
Spormaggiore	17 March	The fauna park: activities carried out within the context of the Giulietto Chini grant	n.a.
Adamello Park - Breno (BS)	23 April	The return of the great carnivores	11
Adamello Park - Ponte di Legno (BS)	23 June	The return of the great carnivores	6
Tione	8 July	The bear: Lord of the woods	38
Pinzolo	22 July	The park animals: the great return	200
San Lorenzo in Banale	28 July	The park animals: the great return	30
Pinzolo	12 August	The bear: Lord of the woods	n.a.

Accompanying activities

In the context of the Adamello Brenta Nature Park 2010 summer programme, the following initiatives were offered: "A stroll with the bears", "Invitation to the reign of the bear" and "Guided tour of the bear house and Spormaggiore wildlife centre" (in collaboration with Spormaggiore wildlife park) - see Table 6.

Table 6 - Summary of accompanying activities offered by ABNP

Initiative	Total participants
A stroll with the bears	218
Invitation to the reign of the bear	141
Guided tour of Spormaggiore wildlife centre - bear house	107
Invitation to Spormaggiore	179

Informative material produced and distributed

The third "Bear Report" (**2009 Bear report**) was issued, representing both a valid means of communicating and raising public awareness and a useful working tool for the department.

In 2010 around 3,000 copies of the **brochure** "In the land of the bear" (6,000 copies printed) were distributed. Furthermore 1,000 new **posters** entitled "The bear: part of our history" were printed, of which 800 were distributed.

During 2010 Adamello Brenta Nature Park continued to issue the bulletin/newsletter "**I Fogli dell'Orso**" (which can be requested free of charge at the address orso@pnab.it), with two issues coming out during the year. Celebrating its 25th edition, "I Fogli dell'Orso" has published a total of 259 articles over a period of eight years, involving 117 authors, including internal departmental staff and external contributors. There are currently 1,164 registered members.

In spring the Park also finished drawing up the 4th volume dedicated to bears in the "Documenti del Parco", the 18th in the series devised in 1993 in order to disseminate the results obtained within the context of research promoted by Adamello Brenta Nature Park.

The book, entitled "**L'impegno del Parco per l'orso: il Progetto Life Ursus**" recalls the history of the bear in Trentino, with particular reference to the project for the reintroduction of the bear promoted by the Park at the end of the 1990s. 2,000 copies were printed.

Communication project for schools: "Getting to know the brown bear", in collaboration with Trento Natural History Museum

For the seventh consecutive year the MTSN continued to offer a programme of tried and tested educational activities on the subject of brown bears in Trentino. The activities are kept up-to-date thanks to coordination with the Wildlife Office of APT, which also guarantees consultancy on the content. The 2010-2011 edition of the guide to the educational activities of the museum also contained all the educational initiatives realised in collaboration with the Forestry and Wildlife Department, as has taken place since the 2003-2004 edition.

Once again in 2010 five types of activity were offered:

- "Hands-on museum" a 90' guided visit to the mammals room, with particular emphasis on the bear and other large alpine carnivores, with the opportunity to see and touch particular types of materials (skulls, casts of footprints, hairs etc.);
- "Laboratory", 2.5 hours of interactive activities, partly providing information on the bear and other large carnivores (using powerpoint and various materials) and partly practical (simulation of radio-tracking, realisation of plaster casts of footprints, recognition of different mammal hairs through the use of educational worksheets);
- "Travelling Museum", an activity divided into three sessions, two in the classroom and one (the middle session) involving a trip to an area frequented by bears to look for any signs of their presence;
- "From the Museum to nature", a guided trip lasting a morning to an area frequented by bears to look for any signs of their presence;
- "Meeting the expert", a seminar taking a more detailed look at the subject, in the form of a 2.5 hour session reserved for secondary school pupils.

In the context of the existing agreement between the Forestry and Wildlife Department and the Trento Natural History Museum, the museum organised the following educational activities in the period 1 January 2010 - 31 December 2010:

- interactive laboratories on the subject "The bear and other large carnivores in the Alps, with 164 pupils participating;
- "travelling museum", with sessions in the classroom and excursions in the province for 84 participants.

In the context of activities for schools, through its Communication Department the Adamello Brenta Nature Park carried out the usual activities relating to the brown bear. The statistics for the 2009/2010 school year are given in Table 7.

Table 7 - Educational initiatives on the bear carried out by ABNP for schools

Title	Number of schools	Number of classes	Number of pupils
Bear Project, the return of the bear to the Alps and peaceful coexistence with man (educational project: 2 classroom sessions and 1 trip to the Bear Visitors Centre in Spormaggiore)	19	28	425
A day with the bears (1 session: Bear Centre at Spormaggiore)	15	34	627
Large carnivores project (educational project: 2 classroom sessions and 1 trip)	6	6	89

In addition to these activities, the Park also carried out a project at the *Istituto Tecnico Commerciale e per Geometri* (high school technical institute) in Cles entitled "The brown bear in the Central Alps", with 650 participants. Furthermore, educational worksheets on the brown bear were prepared to support the environmental education projects undertaken with classes in primary and middle schools.

Web sites

The site **www.orso.provincia.tn.it**, also available in English, was further updated and all sections completed; monthly updating was also guaranteed. It is currently organised into 210 pages and received **30,160** visits by 16,747 visitors in 2010. The site also contains this report and the documents mentioned it.
2010 saw continuing implementation and updating of content in the section of the Adamello Brenta Nature Park web site (**www.pnab.it**) dedicated to the bear (20 pages overall).

Questions and motions

The necessary information was provided in order to respond to the following questions raised regarding bears:

- Question for written reply no. 1233/XIV of 25/01/2010
  Insurance for damage caused by bears

- Question for immediate oral reply no. 1250/XIV of 28/01/2010
  Presence of the bear in Primiero and awarding of compensation for the damage caused

- Question for written reply no. 1417/XIV of 5/03/2010
  Life Ursus Project and compensation for damage caused by bears

- Question for written reply no. 1991 of 23/08/2010
  Life Ursus Project and sustainability study ordered by the provincial administration

- Question for written reply no. 2118/XIV of 4/10/2010
  On the presence of bears in Trentino and damage caused by them to livestock
- Question for written reply no. 2126/XIV of 06/10/2010
  Presence of bears in the area and episodes of aggression towards man

- Question for immediate oral reply no. 2143/XIV of 14/10/2010
  Damage caused by bears to animal husbandry and bee-keeping sectors

Press releases

7 press releases regarding the bear were issued by the Forestry and Wildlife Department with the support of the Press Office:

- No. 231 of 1 Feb. 2010
  PRESENTATION OF THE "2009 BEAR REPORT"
  With the participation of Claudio Groff from the provincial administration's Forestry and Wildlife Department

- No. 253 of 3 Feb. 2010
  BEARS: A SUMMARY OF THE SITUATION THIS EVENING AT 20.30 AT THE NATURAL SCIENCE MUSEUM
  The Forestry and Wildlife Department will present an update on the status of the bear population and related activities.
  The "2009 Bear Report" will be presented and distributed on this occasion.

- No. 1033 of 14 Apr. 2010
  THE SITUATION OF BEARS IN THE ALPS AT A WORKSHOP ON 21 AND 22 APRIL
  Appointment at the forestry and nursery centre at Casteler
  The meeting is promoted by Arge-Alp and organised by the provincial administration's Forestry and Wildlife Department

- No. 2738 of 20 Aug. 2010
  CONSERVATION OF THE BROWN BEAR: ACTION TAKEN
  Following the indications of President Lorenzo Dellai, the government has approved the project
  The province ratifies the financial contribution decided by the European Union
- No. 2795 of 25 Aug.2010
  JURKA THE BEAR GOES TO GERMANY
  Transfer of the animal made possible by the agreement between the Forestry and Wildlife Department and the German "Bear Foundation"

- No. 2825 of 27 Ago. 2010
  JURKA IN CAPTTIVITY, CLARIFICATION OF CERTAIN ASPECTS
  Note from the Autonomous Province of Trento's Forestry and Wildlife Department

- No. 3248 of 2 Oct. 2010
  BEAR AT MAGRAS: PROTOCOL PROCEDURES SET IN MOTION
  Capture is also possible in the event of behaviour which may cause social alarm

The following press releases were issued by Adamello Brenta Nature Park:

- 19 March 2010
  SPORMAGGIORE-CAVEDAGO-PARK COLLABORATIVE AGREEMENT SIGNED

- July 2010
  18TH VOLUME IN THE SERIES "DOCUMENTI DEL PARCO"

- October 2010

A NEW LIFE PROJECT FOR THE BEAR

Other communication initiatives

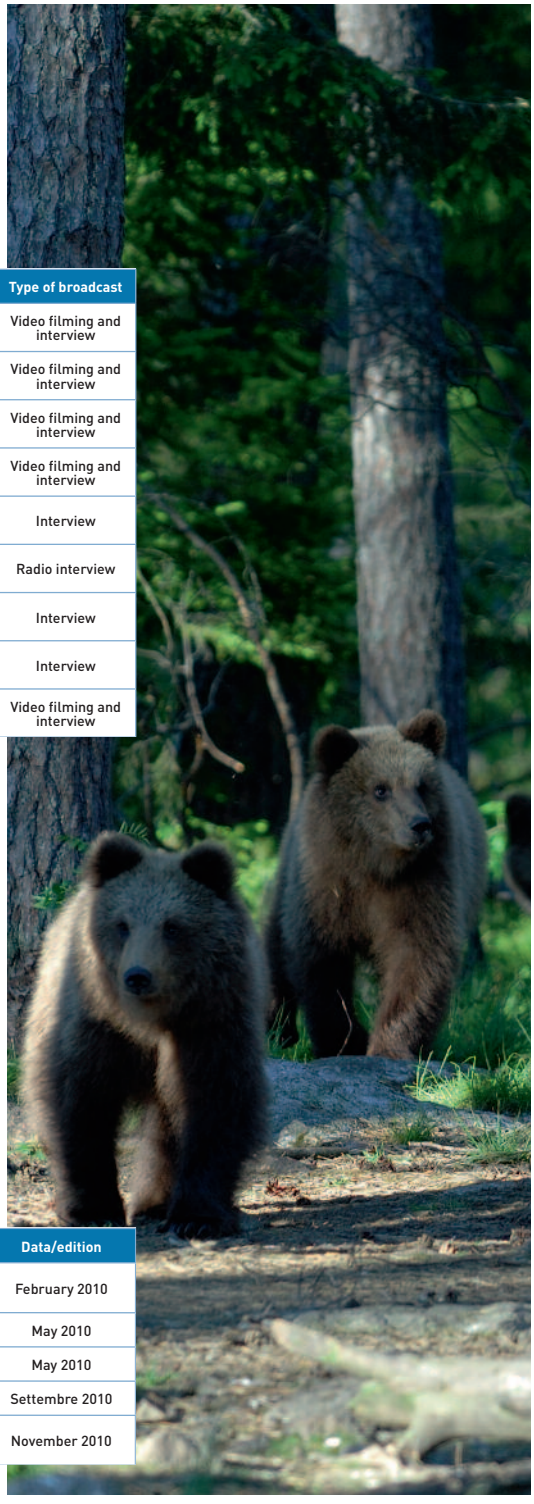
Radio-TV broadcasts

APT's Forestry and Wildlife Department and ABNP took part in the following radio interviews and television broadcasts (Table 8):

Table 8 - List of broadcasts on the bear with the participation of APT or ABNP during 2010

Radio/TV station -programme	Subject	Data	Type of broadcast
RTTR *	Coexisting with the bear	8 February	Video filming and interview
TCA - "Prevention and health" feature	Coexisting with the bear	19 February	Video filming and interview
RAI 3 Regionale (Trento station):	The bear	broadcast on 2 February	Video filming and interview
Canale 5: TG5 **	The bear	19 June	Video filming and interview
Televisione suisse romande: TG**	The bear	29-30 June (broadcast 5 July)	Interview
Radio RAI International **	Bears and wildlife in the park	July 2010 (broadcast in autumn)	Radio interview
Juventus Channel **	The bear	14 July	Interview
RAI 3 – Geo&Geo ***	The bear	5-6 August	Interview
BBC *	The bear	16-17 November	Video filming and interview

* with the participation of APT; ** with the participation of ABNP; *** with the participation of APT and ABNP



Newspaper and magazine articles

APT's Forestry and Wildlife Department and ABNP supervised the production of articles (scientific or informative articles) and granted interviews (supplying content and iconographic material) in the following publications (see Table 9):

Table 9 - List of articles published in 2010

Title/subject	Newspaper/magazine	Data/edition
Status of the brown bear population in Trentino, central Italian Alps, at the end of 2009 *	IBA Newsletter	February 2010
Ursus live: un grido di libertà **	Adamello Brenta	May 2010
Lo stato dell'orso trentino **	www.ambientetrentino.it	May 2010
Management of the bear population in the Alps	Reisemagazin - Germania	Settembre 2010
Gli orsi in Trentino: ambiente naturale e "habitat politico" **	www.ambientetrentino.it	November 2010

* produced by APT; ** produced by ABNP

5. Training

Correct management of the bear population 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, dealing with damage and, to a lesser extent, monitoring. Training represents one of the six Programmes of action referred to in the previously mentioned resolution of the provincial government no. 1988 of 9 August 2002.

APT's staff are given specific training which is constantly updated. The training initiatives realised during 2010 are illustrated below.

Main training initiatives regarding bears

APT's Forestry and Wildlife Department organised the following training courses:

- **Casteler, 26 January 2009**. Meeting to provide **updates** on 2009 figures and **plan** work in 2010 for **provincial staff** involved in the management of bears;
- **Casteler, 25 February 2010**. Training session for **new staff** from the province involved in the management of bears;
- **Piana del Cansiglio (BL)**, **1 April 2010**. Training session for staff from **provincial administrations in Veneto** and other interested organisations;
- **Candriai, 19 April 2010**. Training session for aspiring **Area Tour Guides** on bears and other large carnivores;
- **Trento Natural Science Museum, 7 May 2010**. Training course on large carnivores for **teachers** from secondary schools;
- **Casteler, 28-29 June 2010**. Training session for staff from the **State Forestry Service** in the Friuli Venezia, Giulia, Veneto and Abruzzo regions;
- **Casteler, 26 October 2010.** Meeting to exchange experience on the management of the wolf and the bear with **Slovenian colleagues**;
- **Casteler, 18 November 2010.** Training session for the four **bear dog handlers**.

ABNP organised the following training courses:

- work experience for two students from the Istituto Agrario di S. Michele all'Adige;
- seasonal workers at the Park (information points and valley offices): training session on the wildlife in the Park and projects underway, with particular attention for matters linked to the bear.

6. National and international links

Links with neighbouring regions and countries take on a strategic importance in the management of such a highly mobile species as the brown bear. Bearing this in mind, even before the start of the Life Ursus project, official contact was made with neighbouring regions, it being clear that the area of western Trentino was not sufficiently large to house a viable population of bears. Over time these relationships have been strengthened and consolidated, with regard both to the territorial expansion of the small population, which has effectively concerned neighbouring regions and countries, and effective policy coordination implemented by the Provincial Government with the previously mentioned resolution no. 1988 of 9 August 2002. Following this, links transcending provincial boundaries were institutionalised and with the input of the Ministry for the Environment, Land and Seas and the coordination of APT **the Action Plan for the Conservation of the Brown Bear in the Central-Eastern Alps (PACOBACE)**" was approved by all the partners and printed in 2010. In addition to the Autonomous Province of Trento, this also involved the Autonomous Province of Bolzano and the Lombardia, Veneto and Friuli Venezia Giulia Regions.

Activities designed to guarantee **transnational coordination** also continued, in the light of the numerous cases of young bears moving into neighbouring areas reported over the last few years.

In the context of inter-regional and international collaboration, the following meetings and workshops with colleagues from other regions or nations took place:

- **Bologna, 1 February 2010.** Joint meeting with other regions from the Italian Alps regarding the genetic monitoring of the bear over the next few years, held at ISPRA offices;
- **Zernez (CH), 10 March 2010.** Meeting on management of the alpine bear population;
- **Casteler (TN), 20 and 21 April 2010.** Second meeting on management of the alpine bear population, in the context of ARGEALP.

Adamello Brenta Nature Park, representing **ALPARC - Alpine Network of Protected Areas**, took part in the work of the "Large Carnivores and Wild Ungulates" platform, set up within the context of the Convention of the Alps to encourage international collaboration, the exchange of experience and knowledge and standardisation of management methods and plans in relation to species of ungulates and carnivores present in the alpine area. Thanks also to workshops organised in 2010 (Innsbruck 2-3/2/2010; Triesenberg 1-2/6/2010; Triesenberg 13-15/10/2010), the platform is completing analysis of the current situation (distribution, extent and problems linked to the presence of wild ungulates and large carnivores, requests of stakeholders etc.), which will represent the basis on which to construct a pan-alpine conservation strategy.

LIFE+ "ARCTOS" Project

On 31 May 2010 the European Commission approved the co-funding proposal for a new LIFE+ project on the brown bear.

The project, called "ARCTOS – Conservation of the Brown Bear: Coordinated Action for the Alps and Apennines" (LIFE09 NAT/IT/000160), is promoted by Abruzzo, Lazio and Molise National Park and provides for the participation of WWF Italia, the State Forestry Service, the University of Rome La Sapienza, the Abruzzo, Lazio, Lombardia regions, the Autonomous Region of Friuli Venezia Giulia, the **Autonomous Province of Trento** and **Adamello Brenta Nature Park**, all partners which have previous experience of European projects (LIFE NATURA) aimed at the conservation of the species.

The initiative developed out of the need to combat the main threats to the conservation of the brown bear in Italy, identified as the progressive loss of the natural habitat, conflict with the activities of man (particularly animal

husbandry) and the lack of sufficient ecological-ethological knowledge about the species to enable adoption of the most suitable management practices.

The main objective of LIFE+ ARCTOS is to implement management procedures and protocols designed to ensure conservation of the brown bear populations present in Italy in the long term, through careful identification, sharing and preparation of experience, methods and effective tools for safeguarding the species,

The project is expected to last for 48 months, starting on 1 September 2010 and ending on 31 August 2014, with total expenditure of € 3,984,820, 67.63% of which (€ 2,694,934) funded by the European Commission.

APT will be involved in the implementation of action designed to prevent damage (installation of electric fences), discourage bears from approaching inhabited areas (production and distribution of bear-proof waste bins) and actions related to communication. In order to do so it has available a budget of € 172,368, with EU funding representing € 109,013 of this.

ABNP will be involved in the implementation of preparatory action (analysis of animal husbandry practices and development of management policy; evaluation of health risks linked to domestic livestock), concrete conservation initiatives (experimentation and installation of bear-proof waste bins) and communication activities (promotion and dissemination of information on bears and project actions, through the involvement of residents, administrators, schools etc.). The overall cost of such actions is expected to be € 114,967, of which around a third (€ 34,452) will paid for directly by the Park. Many of the actions listed will be carried out in close collaboration with the Autonomous Province of Trento, also involved in the field of measures to prevent damage by bears.

In the context of the project, an initial coordination meeting was held with all the partners at Pescasseroli (AQ) on 21 and 22 October 2010 and a second meeting was organised in Trento on 9 and 10 December 2010.

7. Research and conferences

Research - tests

Prevention works

Damage has also been recorded with a certain frequency for assets protected by prevention works funded by the Autonomous Province of Trento (electric fences). The bears succeed in getting past these barriers by digging under or climbing over the fences when these are installed using previously existing supports (e.g. wire mesh). In order to try and avoid these problems the quality of the materials adopted in prevention works has been improved, also by supplying **more powerful fence electrifiers** equipped with rechargeable batteries, or by substituting electric tape with galvanised steel wire, when the electric fences are supported by robust structures. Fences have also been constructed with technical characteristics adapted to particular types of use.

Furthermore a number of technical modifications were tried out when realising works designed specifically to protect bee-hives, in order to prevent bears from getting past the fences by digging under them. In one case **electric welded mesh** (photo 12) was positioned and anchored to the ground along the perimeter of the fencing, whereas in a second case, a further electric tape was placed **outside** the fence (photo 13) at a distance of around 60/70 cm, around the whole perimeter of the fencing.

Both solutions would seem to significantly improve the efficacy of prevention works, as no more damage was caused by bears.

Photo 12 - Electric welded mesh to prevent digging, tried out experimentally at the base of electric fences (E. Bonapace, APT Forestry and Wildlife Dept. Archives)

Photo 13 - Electric tape installed outside the fences (D. Rossi, APT Forestry and Wildlife Dept. Archives)

Tube traps

In order to facilitate the capture of problem bears the development of capture systems continued. In particular, tube traps were improved by equipping them with a mobile device for positioning the bait which encourages the bear to move further inside the trap, along with realisation of both a remote control electronic shutter release system triggered by an operator and an automatic electronic shutter release triggered by the bear.

Waste management within the Park: an experimental proposal

In 2009 ABNP began gathering information on waste management within the park. The data was obtained both directly both by park wardens and indirectly by contacting those responsible for waste disposal in the different districts concerned (Giudicarie, Val di Non, Val di Sole and the Adige valley).

In this way information was obtained about the bins present within the Park (type, use, waste etc.), collection methods and any changes planned in the immediate future.

In close collaboration with the Wildlife Office of APT's Forestry and Wildlife Department, problematic situations were also identified (waste dumps effectively frequented by bears in the past, bins located in particular situations etc.) in the areas under the jurisdiction of the forestry districts of Trento, Tione, Rovereto-Riva, Cles and Malé, namely the areas of Trentino most concerned by the presence of bears.

The objective was to acquire greater knowledge of the current waste management system, in order to consider the planning of trials to be carried out in close collaboration with provincial departments regarding methods to be adopted to reduce conflict and problems linked to the presence of bears.

Finally, in order to start up trials of methods to adopt to reduce conflict and problems linked to the presence of bears, automatic instruments were set up for video filming/photography (video and photo traps).

Conferences and scientific papers

APT's Forestry and Wildlife Department and ABNP participated in the following conferences and meetings, using their own funds (see Table 10):

Table 10 - List of scientific papers presented by the Park at conferences, seminars and workshops

Conference title (organiser)	Place	Date	Type of paper and title
International Bear Association Conference *	Tiblisi (GEORGIA)	16-22 May	Poster "Status of the brown bear population in Trentino, Central Italian Alps, at the end of 2009"
Bioweek 2010 (Trento Natural Science Museum) **	Trento	20-21 May	Communication: The Adamello Brenta Nature Park's brown bear conservation project: from reintroduction to scientific research
Green Week - Biodiversity - Our lifeline (European Commission) **	Brussels (Belgium)	1-3 June	Communication: URSUS Project – Protection of the Brenta brown bear population
			Poster: Brown bear conservation through LIFE funding

* participation by APT; ** participation by ABNP

APT's Forestry and Wildlife Department and ABNP also drew up or contributed to the drawing up of the following scientific papers (see Table 11).

Table 11 - Scientific articles

Magazine	Issue	Title of article	Author/s
Molecular Ecology	19/2010, pages 3938-3951	The power of genetic monitoring for studying demography, ecology and genetics of a reintroduced brown bear population	De Barba M. et al.
Journal of Applied Ecology	47/2010, pages 172-181	Comparing opportunistic and systematic sampling methods for non-invasive genetic monitoring of a small translocated brown bear population	De Barba M. et al.

APPENDIX 1
The lynx

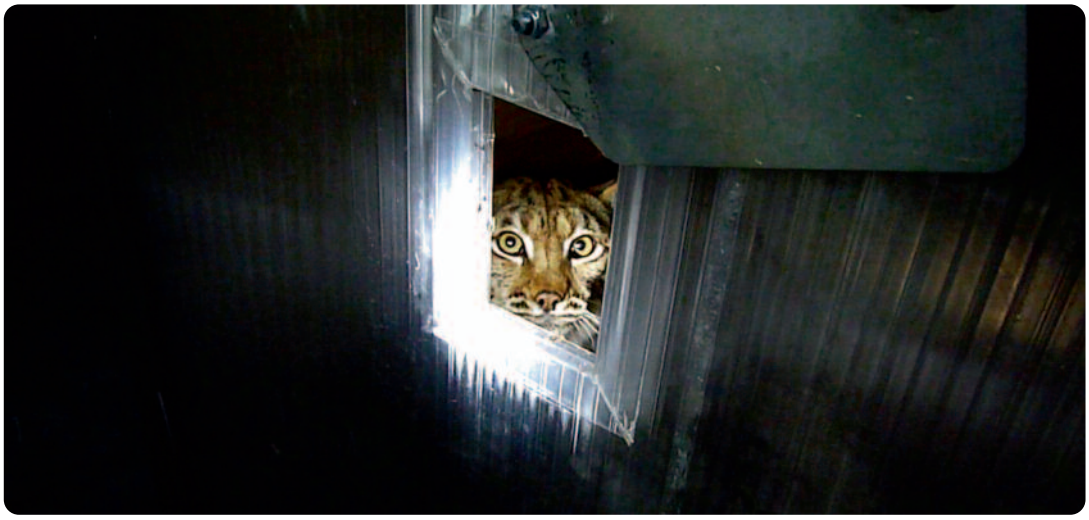


Photo 1 - The lynx in the crate at the time of capture on 10 February 2010 (C. Groff, APT Forestry and Wildlife Dept. Archives)

For the moment the young male Eurasian lynx known as **B132** seems to have established a fairly stable territory in the Brenta mountains. Indeed, since his arrival in the province in spring 2008 he has moved around within an essentially unchanged home-range, in an area comprising the Val di Tovel, the eastern and southern Brenta mountains and Monte Gazza.

In 2010, the animal, which belongs to a species which is, if possible, even shyer and more elusive than the brown bear, remained the only lynx whose presence was ascertained within Trentino, although there were some traces suggesting the presence of at least a second animal.

As is known, monitoring of the feline was facilitated from the time it entered Trentino as the animal had fortunately been fitted with a radio collar by colleagues from the Swiss National Park. Indeed B132, born in Spring 2006 in the distant canton of St. Gallen (Switzerland), was captured and fitted with a radio collar in **Engadina**. Once freed, he moved rapidly over a considerable distance (more than 200 km, the longest journey documented for the species in the Alps), arriving first in the Val di Sole, having crossed Lombardia, and then in the Brenta mountain range, where he finally established himself on the eastern slopes.

Thanks to the radio collar, equipped with GPS-GSM technology and hence capable of transmitting satellite fixes at pre-established intervals through the cellular phone network, as well as functioning using the traditional VHF radio mode for searching in the field, the lynx's movements were recorded constantly in 2008 and 2009 by the staff from the Trentino forestry service, with the collaboration of staff from Adamello Brenta Nature Park, the Associazione Cacciatori Trentini and Swiss technicians who regularly shared satellite fixes (see 2008 and 2009 Bear Reports). The batteries of the transmitters ran out during 2009, as expected, and it was thus considered opportune to recapture B132, in order to continue monitoring an animal with a unique history, among other things the only lynx it is currently possible to trace in a continuing manner in the province.

Recapture

Capture took place using a "**box trap**", developed and produced by the Forestry and Wildlife Department. From August 2009, two of these cages (three for a brief period) were set up in known areas of passage for the lynx. The box was constructed in wood rather than in metal mesh to avoid the animal damaging his claws or teeth in an attempt to escape. The structure had a single guillotine-type drop down door, functioning with a release mechanism triggered by the animal and a telephone transmitter (in addition to a radio), advising staff in real time in the event of the mechanism being triggered. Scent lures were placed in the cage to attract the animal and changed frequently. This type of capture, used successfully by Swiss colleagues on several occasions, was thus modified and developed by the department, which effectively carried out new trials in the field (see BOX 1). It is not a common procedure, at least in Italy, as this is only the second lynx to have been captured in the country (the first was captured in 2007 and again in 2008 in Friuli Venezia Giulia).

BOX 1 – Box traps for capturing lynx: the Trentino experience

Two traps in natural wood (1,195 x 1,150 x 2,500 mm), and subsequently a third in wire mesh, were constructed in order to capture the lynx. The wood traps were inspired by models prepared by Swiss colleagues with some substantial structural modifications: indeed they were constructed with a single entrance as compared to the two in the original traps, substituting the second with a thin fixed panel of transparent polycarbonate; the single guillotine-type sliding door was made lighter by inserting a PVC honeycomb panel inside the metal frame and reinforced padding at the base (photo 2).
The door was kept open using a vertical door frame and steel wire, linked to a shutter release mechanism, a mechanical device (commercial) with an opposing lever system released by a trigger (photo 3). The trigger was tied to a fine nylon thread which crossed the trap at a height of around forty centimetres.
The traps were set up at the capture sites starting from August 2009 and kept under control using a dual alarm system: one based on radio frequencies and the second equipped with a GSM modulator capable of sending a voice call and text alarm to eight telephone numbers. The

Photo 2 - A box trap in the field
(C. Groff, APT Forestry and Wildlife Dept. Archives)

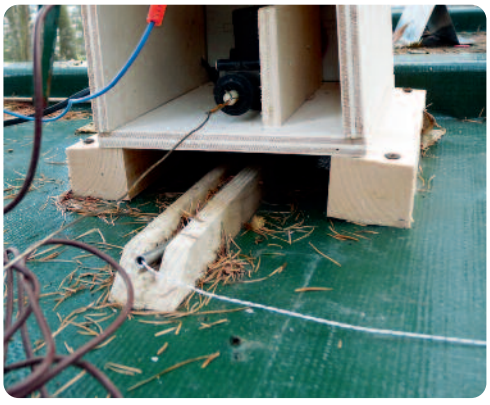


Photo 3 - The door release mechanism for the trap
(A. Stoffella, APT Forestry and Wildlife Dept. Archives)

modulator was enclosed in an IP68 container to protect it from humidity and adverse weather conditions, powered by a 12 Volt 7.5 Ampere battery
Around the middle of November the lynx entered one of the traps for the first time, managing however to avoid the nylon cord which should have triggered the door release device (see 2009 Bear Report). It was therefore decided to substitute the nylon cord with a self-constructed electromagnetic mechanism using salvaged materials. A solenoid recovered from a scrapped car door was attached to the trigger, inserting a thin platform into the trap which could be easily covered with earth, leaves and moss. The platform was made up of two layers of plywood a few millimetres thick and a simple plastering trowel which separated and bent between the two layers of plywood, as in a pedal switch. Finally the solenoid was connected to the two layers of plywood using electric wire: a very slight pressure of just a few grams was sufficient to bend the trowel and close the circuit, triggering the solenoid. This system was shown to be very effective. Indeed shortly after it was adopted the lynx was successfully captured.
During this first experience of capturing a lynx in Trentino, which lasted several months, a number of problems were found: transporting traps to sites which are not always easy to access, freezing and thawing which tended to block the mechanical parts, constant checking and substitution of batteries etc., all aspects which were however resolved one by one. The final result was the successful capture of the lynx, while limiting stress for the animal to a minimum and without causing him any physical damage.

At 22.22 on **10 February 2010** the alarm signal for the trap situated above Lake Molveno alerted the departmental team, which arrived on site in less than half an hour and was immediately able to ascertain that the feline had been captured by the trap. The animal, which appeared calm, was anaesthetised with the assistance of a veterinary surgeon, subjected to the usual health checks and biometric measurements (it weighed 24.5 kg) and its radio collar was substituted (using the same model adopted previously) (photo 4).

Photo 4 - The capture squad with lynx B132 (C. Groff, APT Forestry and Wildlife Dept. Archives)

The lynx was awakened following the standard veterinary procedure, recovering in the expected timescale (around an hour), thanks to administration of a specific antagonist. He was then able to regain his freedom, disappearing into the night with a few rapid bounds in the midst of heavy snowfall.

Photo 5 - Photogram of B132 in the wild, taken with photo trap (C. Groff, APT Forestry and Wildlife Dept. Archives)

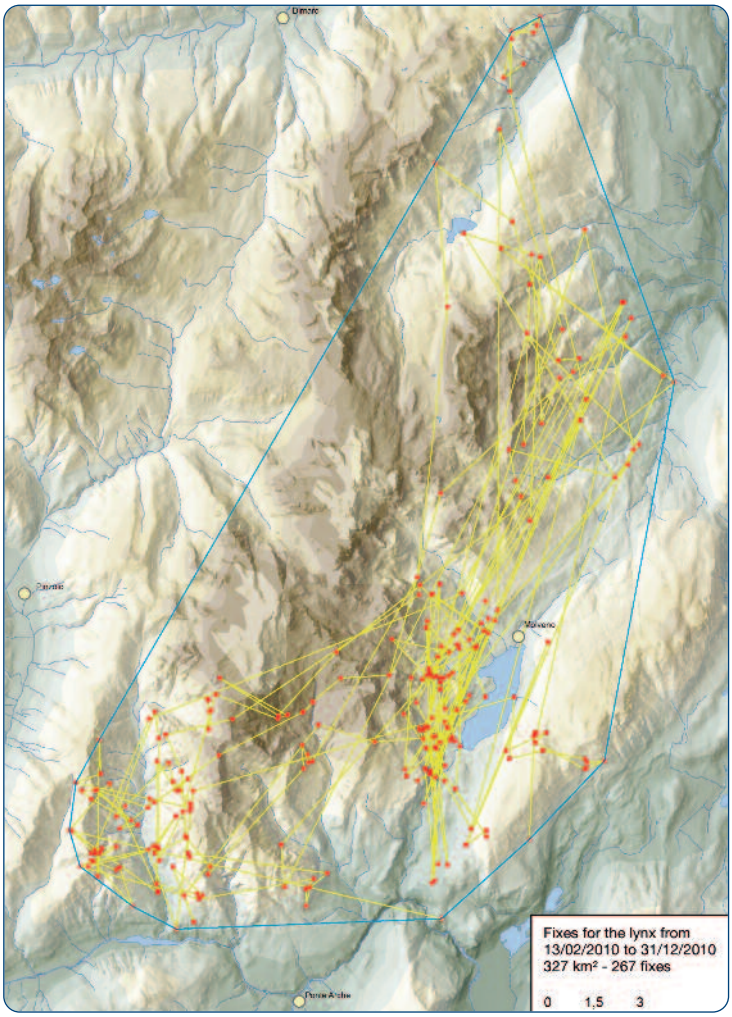
Monitoring subsequently highlighted greater use of the southern part of the territory used in 2008 and 2009, at the expense of the more northerly area. In particular the lynx was frequently present on the southern slopes of the Brenta mountains and Monte Gazza, also visiting the extreme south-west (namely the right-hand side of the Val Algone and part of the Val Manèz) and the south-easterly part of his territory (the slopes of the Gazza, overlooking Valle dei Laghi).

Once again in 2010 there were very few reports of the feline not linked to GPS/VHF monitoring; on three occasions it was possible to film the animal using photo traps (photo 5).

The ***home-range*** of the lynx from 13/02/2010 to 31/12/2010, calculated using the minimum convex polygon method, was **327 km²** (Figure 1).

Figure 1

Home-range of lynx B132 in the Brenta mountains from 13/02/2010 to 31/12/2010, calculated using the minimum convex polygon method (MCP)



In 2010 monitoring of the lynx's **predatory** habits (photo 6) was also continued. During the year, the remains of 12 animals which can certainly be recorded as the lynx's prey were found (ten roe deer, one wild deer and one moufflon).

Photo 6 - One of lynx B132's prey (R. Rizzoli, APT Forestry and Wildlife Dept. Archives)

For the Expo Riva Caccia Pesca e Ambiente fair in 2010 (on 27 and 28 March) the Forestry and Wildlife Department set up a **stand dedicated to the lynx**, to illustrate the biology, ethology and history of the lynx present in Trentino (photo 7).

Photo 7 - Stand dedicated to the lynx (D. Dalpiaz, Trento Natural Science Museum)

APPENDIX 2
The wolf

On **13 April 2010** the staff of Adamello Brenta Nature Park found **tracks of a large canine** (photo 1) in the snow on the north-eastern slopes of the Brenta, along the ridge dividing the lower **Val di Tovel** from the **Val di Non** (Figure 1).

Figure 1
The trail of the wolf found in the Val di Non on 13 April 2010

Photo 1 - The tracks of the wolf in the snow
(Matteo Zeni, Adamello Brenta Nature Park)

Following the trail, it was possible to collect some samples of urine at points where the animal had "marked" the area. The results of genetic testing carried out by the Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA) confirmed the suspicions raised by the tracks in the snow among staff. The prints indeed belonged to a male **wolf (*Canis lupus*)**, belonging to the Italian population. The animal, probably young, must therefore have roamed from the western Alps, where a viable population coming from the Apennines established itself in the 1990s.vi

Having identified the wolf genetically, the Wildlife Office subsequently contacted the bodies responsible for dealing with wolves in

the central-western alpine area (in particular in the Piemonte region, Switzerland and France), in order to investigate the possible origin and history of the young male. It was thus possible to confirm that the wolf had already been identified in 2009 no less than three times in Switzerland and classified as **"M24"** (24th male wolf identified in Switzerland since 1995, the year of the first confirmed presence of the species in the Swiss Confederation). The wolf was detected genetically for the first time in Münstigertal (eastern part of the canton of Valais) on 7 September 2009, then on 25 November 2009 and 27 December 2009 at Obersaxen (canton of Grisons).

Further tests and checks, still underway, have highlighted the fact that the genotype is not among those known in Piemonte, whereas it could be among those identified in France. At all events, the wolf departed from his native western Alps, covering several hundred kilometres in order to arrive in Trentino.

It should also be recalled that "M24", after having been identified in the Brenta area, moved north, where he was once again identified genetically in the **Val d'Ultimo (BZ)** at Malga Gamper (at the site of damage taking place on **27 May 2010**) and then photographed by local hunters on **9 August 2010**, again in the Val d'Ultimo (photo 2).

Finally, tracks in the snow probably made by the same wolf were found on 17 November 2010 at Malga Gamper, while on 19 November 2010 a fawn is thought to have fallen prey to a

Photo 2 - The wolf photographed last summer in the Val d'Ultimo; image taken from the newspaper "L'Adige"

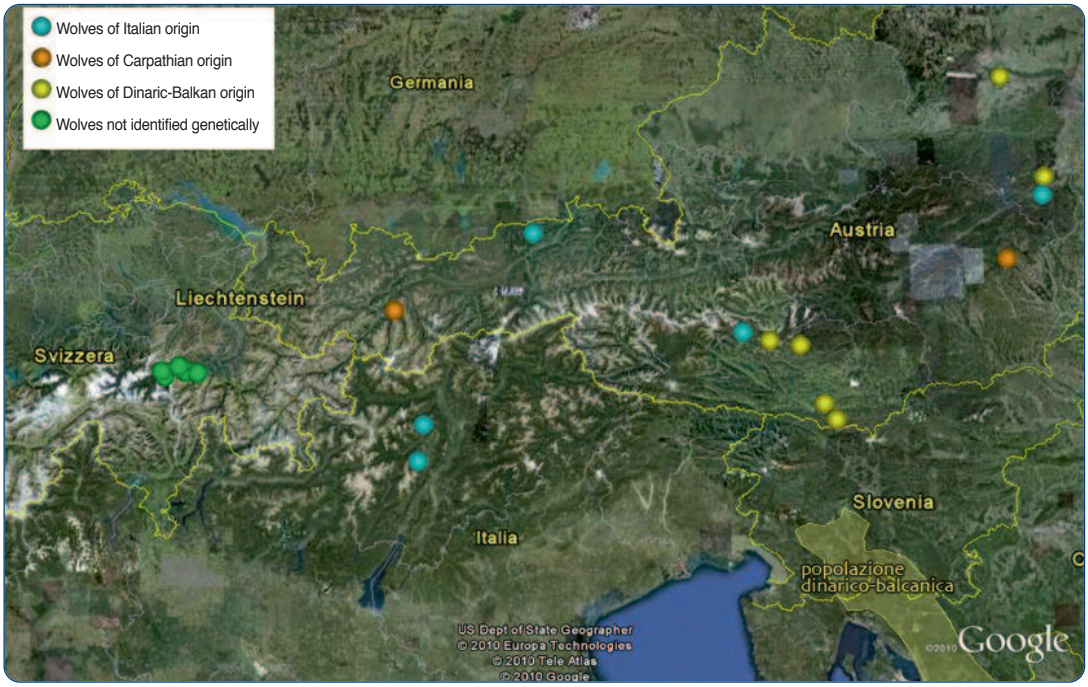
wolf in the upper part of the valley in the municipality of Santa Valpurga, (source: Hunting and Fishing Office of the Autonomous Province of Bolzano).

Considering the newly confirmed presence of the wolf, APT's Forestry and Wildlife Department organised a **training session** for its own bear staff during the visit of Slovenian colleagues to Trentino, given their specific involvement in the management of wolves in Slovenia. The meeting was held in **Casteler** on **26 October 2010**. The presence of a live wolf in the province was thus ascertained for the first time in 2010, more than 150 years after the disappearance of the species and a couple of years after the remains of a wolf were found in the Val di Fiemme. The genetic tests showed that this wolf instead originated from the Dinaric-Balkan population. In the last few years, the natural expansion of the wolf in the western Alps has led to the presence of individual wolves being reported both in Trentino and South Tyrol, as well as in neighbouring areas of Lombardia, Austria and Bavaria.

Once again in 2010 it was possible to genetically document the presence of individuals from all three of the "source populations" (Italian population from the western Alps, Dinaric-Balkan population in Slovenia/Croatia and Carpathian-Baltic population in Slovakia/Poland) in the **central-eastern Alps**. Six clearly distinct animals were recorded specifically in Austria, but the real number is probably seven or eight. Of the six wolves identified, two come from the Carpathian/Baltic population (one male and one unidentified), two from the Dinaric-Balkan population (both females) and two from the Italian population (neither identified) (Figure 2).

It is likely that the male M24 reported in Trentino and South Tyrol is a further and different wolf as compared to the two wolves of Italian origin cited above, considering the contemporary nature and continuity of the relative reports and the large distances involved.

Figure 2
Wolves identified in the central-eastern alpine area in 2010 - G. Rauer, modified and supplemented



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