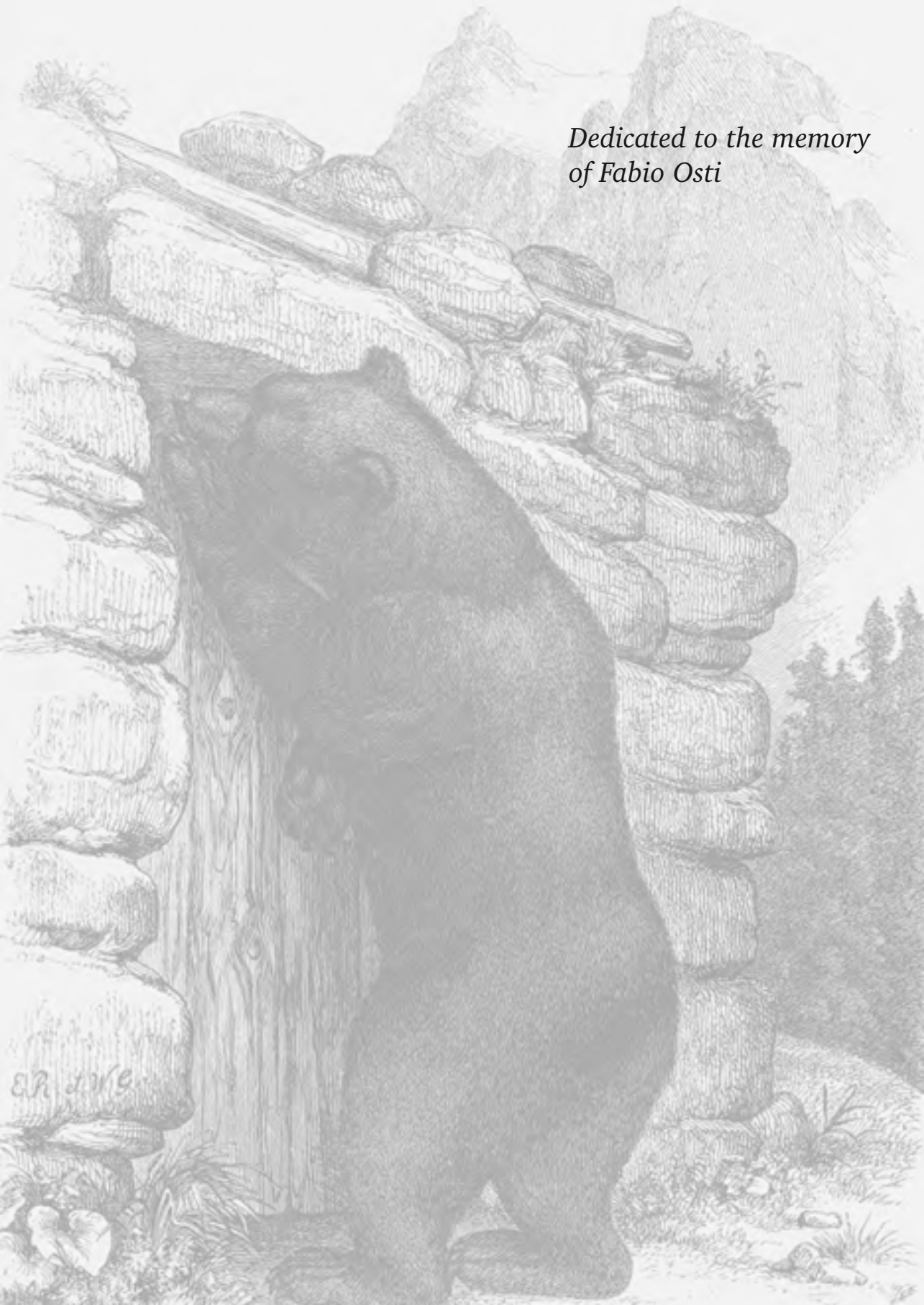
AUTONOMOUS PROVINCE OF TRENTO

2009 BEAR REPORT



Dedicated to the memory
of Fabio Osti

AUTONOMOUS PROVINCE
OF TRENTO

FORESTRY
AND WILDLIFE OFFICE

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CERTIFIED

BEAR REPORT 2009

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«Every time I returned to those mountains, it seemed impossible that far from the city, the noise and the dirt, these people talked about animals, deer, trees and even bears, the Spirit of childhood mountains, as if these were still part of everyday life and an ordinary dimension».

M. Balboni - "Il paese alto", 1996

CONTENTS

Presentation

Management of the brown bear in Trentino is carried out directly by the Autonomous Province of Trento (APT), on the basis of its statutory responsibilities and existing regulations regarding the protection of wildlife, (L.P. of 9 December 1991, no. 24). Since 2002, following the adoption of specific lines of intervention by the provincial government, the Forestry and Wildlife Department has been responsible for the realisation of the relevant programmes of action.

The Department's main partner at operational level is the Adamello Brenta Nature Park, (ABNP) which promoted the Life Ursus project during the latter part of the 1990s, thanks to which the continuing presence of the bear in our mountains was ensured. The park, which is an autonomous body funded by the Province, collaborates in various activities, particularly in the field of research, monitoring and communication.

Given the national and international importance of managing a species such as the bear, 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) also represent indispensible institutional and technical-scientific partners.

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, clear, up-to-date and detailed information on the status of the small bear population living in western Trentino and neighbouring regions and nations. Secondly, it aims to record in a precise and analytical manner a range of data illustrating the management techniques implemented, in order to make 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 2002, with the conviction that the Bear Report represents one of the key aspects of this campaign. 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 shows that management of the bear is gradually consolidating with the progressive acquiring of operational ability in terms of structures and staff, demonstrating both the correctness and topicality of the choices made, including the desire to make available the experience gained in the most transparent and complete manner.

At the same time there were interesting new developments in 2009 as regards both the **lynx** and the **wolf**, the latter in particular reappearing in Trentino for the first time in more than a century. Thus the province of Trento is the first area in the Italian alps to have objectively recorded the presence of all three large carnivores (the bear, the lynx and the wolf), after they disappeared or became extremely rare in the 19th and 20th centuries. Is this just a first step towards their definitive return to our mountains? At all events, the path to be followed will be neither short nor without difficulty, above all in social terms.

In conclusion, our heartfelt thanks must also go to all those, in particular Trento Natural Science Museum (TNSM), who in various ways have collaborated in order to realise the individual initiatives in the programmes of action, above all to the forestry and tech-

nical staff of the Forestry and Wildlife Department, the forest wardens, park wardens, gamekeepers and volunteers who have worked in the area 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, modifications to the environment 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 nations.

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 action programmes 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 (the first radio collars used in Eurasia, in the second half of the 1970s), automatic video control 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 as **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 will be carried out again in 2010. Thus the results of genetic monitoring in 2009 (carried out exclusively using the opportunistic system) are **only partially comparable** with the 2008 results. This comparison will only be fully valid when it is possible to make use of the data to be collected in 2010 using both the methods cited.

Genetic monitoring was coordinated for the seventh consecutive year by the Forestry and Wildlife Department of APT, with the collaboration of ISPRA, ABNP, the Associazione Cacciatori Trentini (ACT) 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.

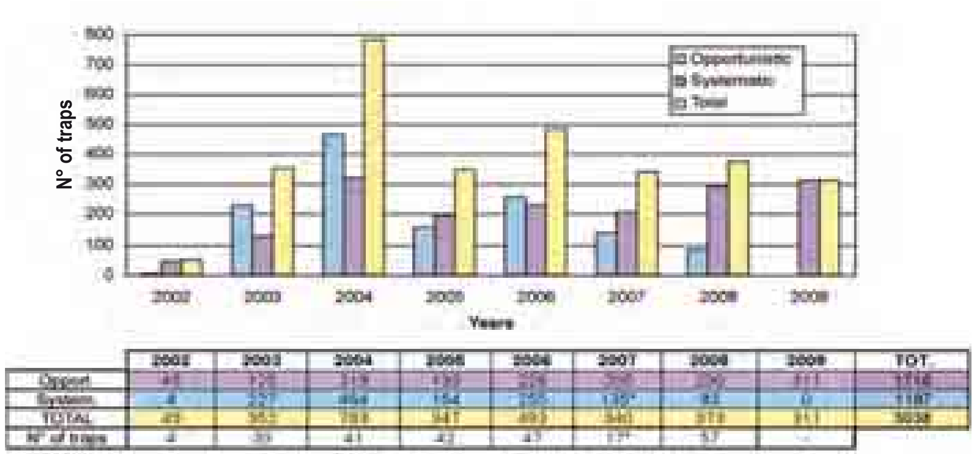
Genetic database

311 organic samples were collected in the province of Trento in 2009, all using the opportunistic method, bringing the total number of samples collected and subjected to genetic testing since 2002 to more than 3,000 (Graph 1).

The 311 samples were collected by the staff of the Forestry Service of the Autonomous Province of Trento (FS) (200 - 64%), by

Graph 1

N° of organic samples for each method



* only within ABNP

ABNP (68 - 22%) and by volunteers (43 - 14%). A further 63 samples were collected outside the province (in the province of Bolzano, in the Lombardia and Veneto regions and in Austria), contributing towards determining the total number of bears identified.

In 2009 genetic analysis was carried out by technicians assigned the task by APT, who made use of ISPRA's laboratories and the support of this institute and the University of Idaho (USA). The samples collected, mostly hairs and faeces, but also tissue from a captured bear, were sent to the laboratory for genetic analysis. The first phase of testing involved the extraction of DNA. In the case of hairs the DNA is obtained from the cells found at the root, whereas in the case of faeces it comes from cells sloughed off during digestion and contained there. The DNA isolated in this way was amplified using the polymerase chain reaction technique (PCR) to identify the individual using microsatellite markers. Gender was identified using markers linked to sexual chromosomes and bear samples were distinguished from those of other species of mammals using mitochondrial DNA. Analysis of kinship was then carried out to identify new cubs and the respective parents and to reconstruct the pedigree of the population. The tests were carried out on the basis of standard protocols and the data was validated using population genetics software. The organic samples collected can be analysed in the standard manner (results at the end of the season) or in more urgent cases, using faster procedure (results within one week from receipt of the sample).

Status of the population at the end of 2009

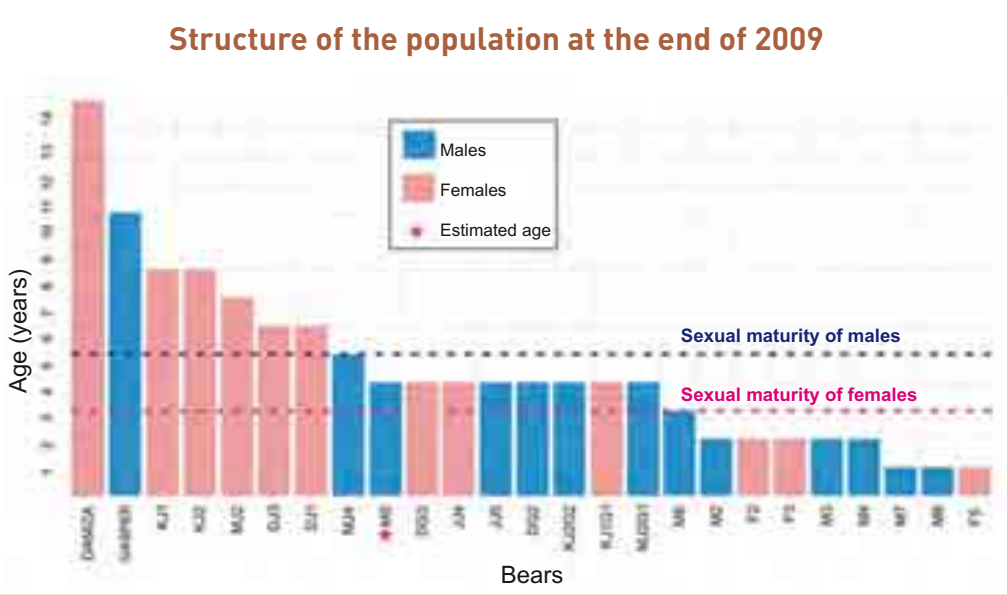
Processing of the data collected has provided the following information regarding the brown bear population present in Trentino and neighbouring regions in 2009. Starting from 2008, newborn animals and/or bears moving into the area have been identified with progressive numbering preceded by the letter “F” for females and “M” for males. Information regarding the identity of the parents is known and available in a specific database.

Definitions

- **“detected bears”**: bears whose presence has been ascertained genetically or by unequivocal observation during the last year;
- "**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.

Overall **25 animals were traced genetically during 2009** (Graph 2); 13 males and 12 females (M-F sex ratio 1.08:1 - n=25). For the first time since the conclusion of the reintroduction project (2002), a case of an immigrating bear was recorded in the easternmost part of the province (the young male **M5, which is** probably of Slovenian origin and was estimated to be between 3 and 5 years old). Considering that this year genetic monitoring was carried out using the opportunistic method alone, it is not certain that almost all the bears making up the population were genetically detected. As regards this, it should be highlighted that in the period from 2004 to 2008 a number varying from a minimum of one to a maximum of six bears were detected each year by the systematic monitoring system alone. Considering the possibility of the presence of other individuals not detected in the last year alone (5), and excluding those missing for two or more years (10), the **estimated population in 2009** ranges from **25 to 30 bears**. It should be underlined that the minimum number (25) represents the number of bears certainly present, whereas the maximum (30) is exclusively an evaluation on the basis of probability.

Graph 2



Reproduction

In 2009 there were **two recorded litters**, with a total of three **cubs**. DJ3 gave birth to two cubs (two males, M7 and M8) and MJ2 gave birth to one cub (a female, F5). For DJ3, a female aged 6, this was the second litter, both consisting of two cubs (2007 and 2009), as it was for MJ2, aged 7 (two cubs in 2006 and one in 2009); the latter represents the first recorded case of a gap of three years between litters (rather than two) for this population.

A **third unidentified female** accompanied by a cub is considered likely to be present in the southern Brenta area (Photo 1), following numerous sightings apparently excluding the possibility of this being MJ2. Finally, the presence of a fourth female with a cub is considered possible in the northern Brenta area. However, to date there is no genetic or objective evidence of both these last two cubs and it will only be possible to confirm their presence in the future.

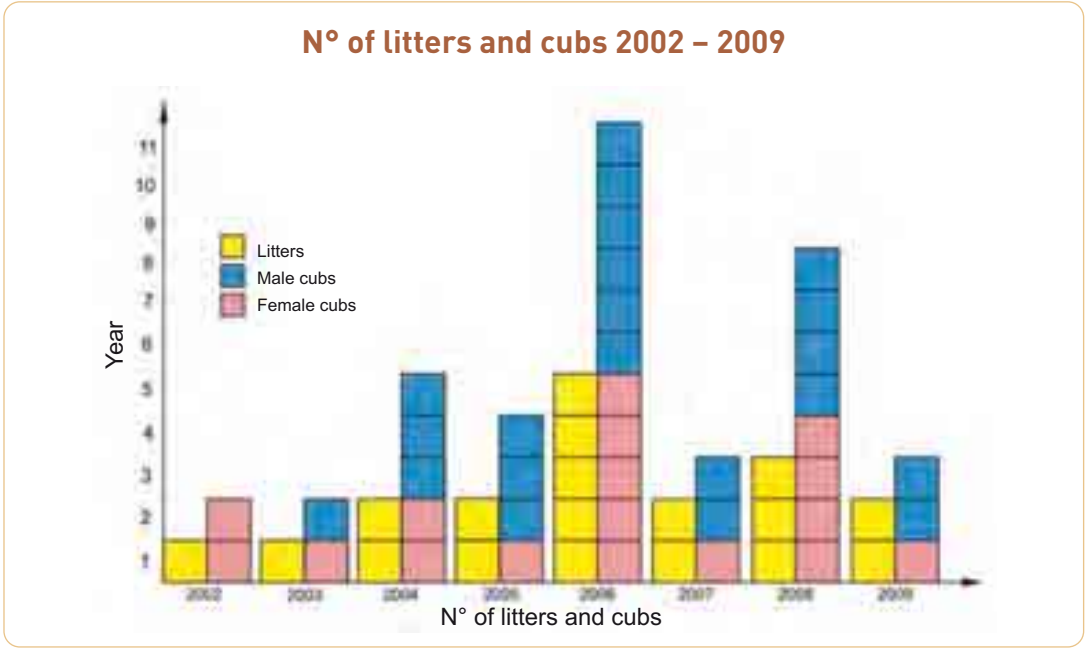
There have therefore been at least 18 litters recorded in Trentino in the last eight

Photo 1 (A. Caliari)

years, while no less than 38 cubs have been born (21 males, 17 females - Graph 3). The average number of cubs per litter is 2.11 and the M-F sex ratio is 1.24:1 (2002-2009, n=38).

Reproductive bears. There were two sexually mature **males** present in 2009: Gasper,

Graph 3



aged 10 and MJ4, aged 5, whereas the presence of Joze was not detected. It should however be noted that there are a further four males aged four (without considering M5 as to date he has frequented a different area, where there are no females), who could theoretically already reproduce, given the number of adult females present (nine) and the information in the bibliography regarding the sexual maturity of young males.

Gasper has reproduced in all the last four years; no less than ten times with six different females (with a total of 19 cubs, the same number fathered by Joze).

To date ten **females** are certain to have had cubs: the five founders (Jurka, Daniza, Maja, Brenta and Kirka) and five bears born in Trentino (KJ1, KJ2, MJ2, DJ1 and DJ3). Daniza, MJ2 and KJ2 are the only females to have mated with both males; Kirka, Jurka, Maja and Brenta have only mated with Joze; KJ1, DJ1 and DJ3 only with Gasper.

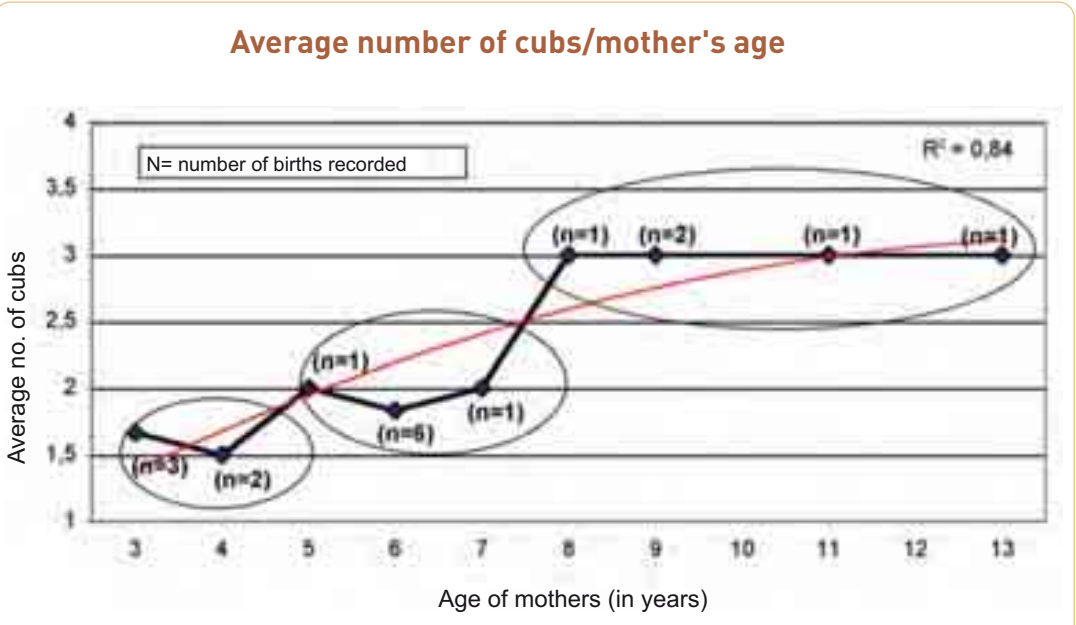
The **average age of primiparous females** in the period 2006-2009 (n=5) has been **3.4** to date; this is relatively young if compared with the data available in the literature and may represent a further sign of the environmental suitability of the area frequented by the bears.

The **average gap between consecutive litters for the same female**, recorded in the period 2002-2009 (n=8 gaps, referring to 7 females), was **2.12 years**.

The average **number of cubs per litter** to date has been essentially 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 4). The correlation 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 0.84.

As already seen, there are nine reproductive females currently present. Considering that two of them undoubtedly gave birth in 2009 and a further two may have done so, there are

Graph 4



five-seven females theoretically able to reproduce in 2010, as the two-four bears who had litters in 2009 would not normally be expected to give birth again before 2011.

Bears absent in 2008 but detected once again in 2009

During 2009, two bears which were absent in 2008 were genetically detected: the male **M6** born to DJ3 and Gasper, probably in January 2007, and the four-year-old female **DG3**. The case of M6 is particularly interesting, as in the year of his birth, this bear was only observed, together with his mother and sister (see the 2007 Bear Report, page 6) and not identified genetically, not even in the following year (2008). This is the first case in Trentino of a bear being identified genetically after two years during which no genetic traces had been found.

Bears not detected in 2009

Five bears present in 2008 **were undetected** for the first year (**Joze**, the brother and sister **M1** and **F4**, born in 2008, **BJ1**, a female born in 2005 and **MJ5**, a male born in 2005). They have not yet been classified as "missing" bears (see Definitions on page 9), as there are concrete possibilities that they are still present.

Missing bears

In 2009 no deaths or killings were recorded.

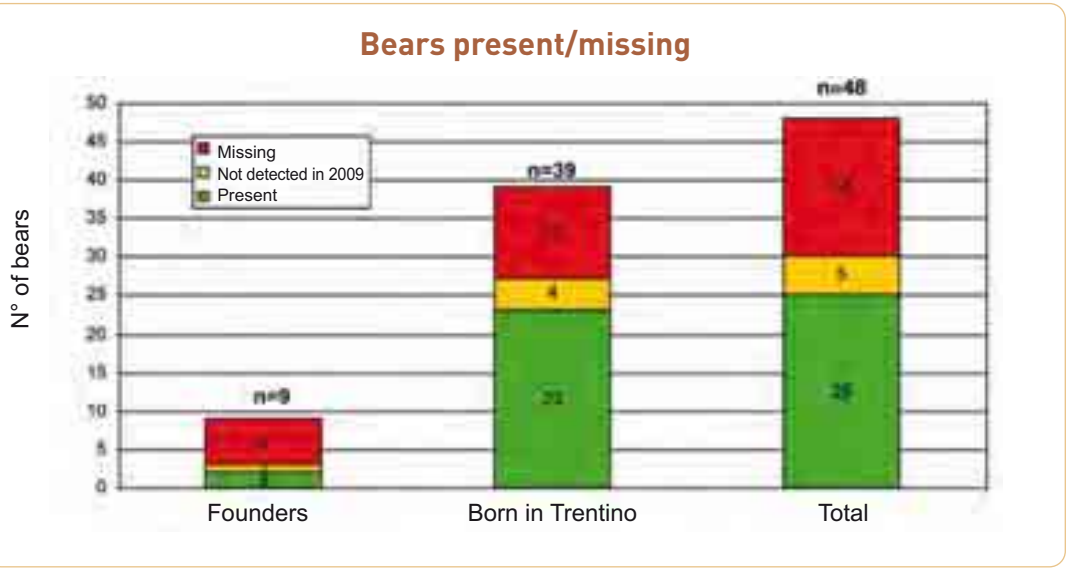
Genetic monitoring highlighted the absence of all the bears (**eight**) already missing in 2008, in addition to a **further eight bears** found dead (5 cases), killed (2 cases) or taken into captivity (1 case).

Two further bears (the male **DJ1G1** and the female **DJ3G1**, both born in 2007) were added to those missing, as for the second consecutive year in 2009 no genetic traces of them were found.

Thus there were a total of **eighteen missing bears** at the end of 2009.

Graph 5 shows the relationship between missing bears, bears undetected in 2009 alone and bears present. 37% of the theoretically possible population was missing.

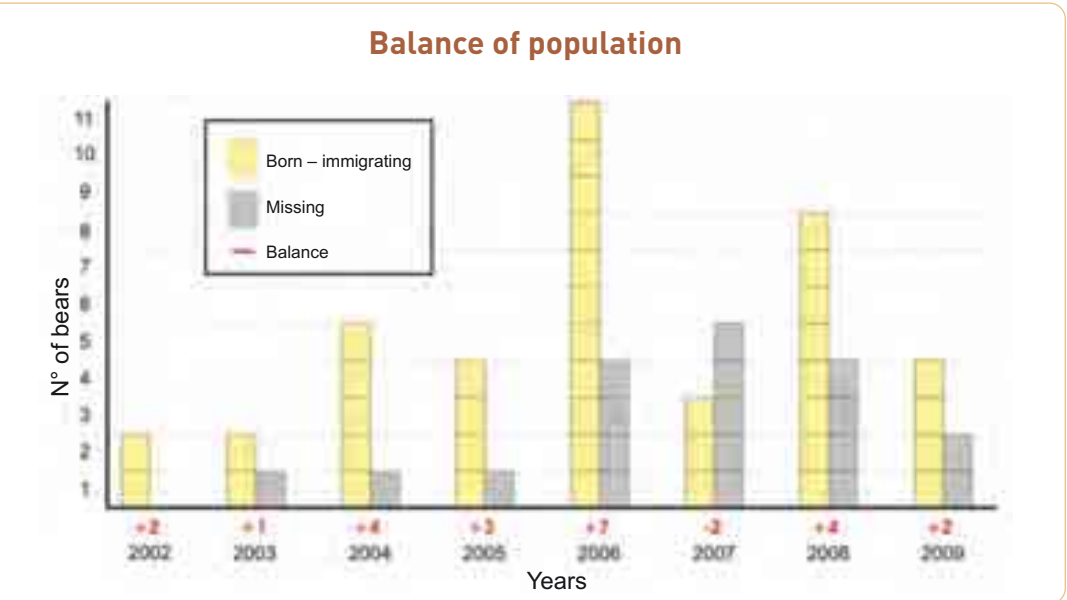
Graph 5



Graph 6 shows the **balance between births-immigrating/missing bears** year by year. In 2009 there was a positive balance (+2).

This was the result of three births, 1 immigrating bear, no recorded deaths and two new bears classified as missing.

Graph 6



Considering the year of their disappearance, the missing bears (n=18) were made up of six **adults**, five young bears and seven **cubs** (see Graph 7).

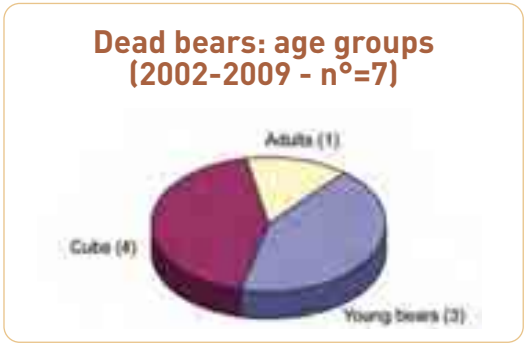
Graph 7

Of the missing bears, ten have **not been detected genetically for at least two years**, seven have **died** and **one** was **taken into captivity** (Graph 8).

Graph 8

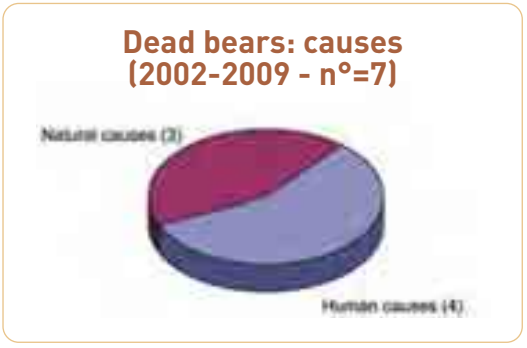
The **dead** bears belonged to the following age groups: cubs (3), young bears (3) and adults (1), the proportion being shown in Graph 9.

Graph 9



The **deaths** (Table 1) were the result of natural causes in three cases (MJ1, DG1 and Brenta) and due to human action in the other four cases (Graph 10).

Graph 10



JJ1 and JJ3 were shot down abroad as a result of management decisions (respectively in Bavaria and Switzerland), KJ2G1 died in an accident during a capture operation and F1 was killed in a road accident.

Survival rates

The data available makes it possible to calculate the

Table 1 – Mortality-causes

year	natural causes	road accident	shot down during management	accident during management	other	total deaths
2002						0
2003	1					1
2004						0
2005						0
2006	2		1			3
2007						0
2008		1	1	1		3
2009						0
TOTAL	3	1	2	1		7

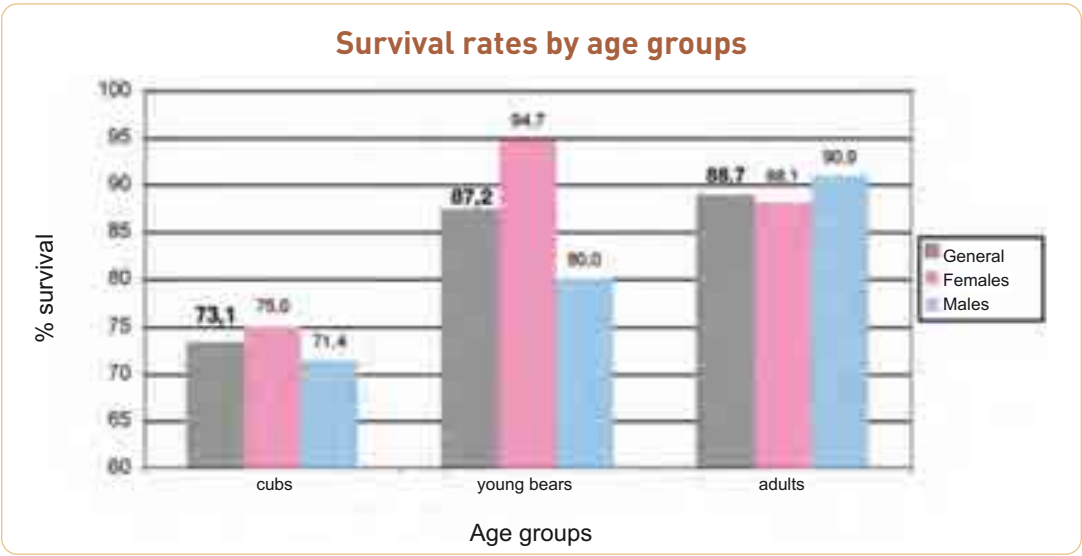
survival rate for the three different age groups (cubs, young bears and adults, as described in the Definitions), differentiated for the two sexes (Graph 11).

The data refers to a period of 8 years (2002-2009), during which it was possible to record the survival or death of 42 bears, with 136 passages from one year to another (136 bear-years). The "mortality" category, considered in the broader sense, also included bears it had not been possible to detect for at least the previous two years (10 cases) and bears taken into captivity (1 case), confirming the criteria used for the definition of "missing" bears", in addition to cases of certain death (7). Thus the figures also included the three bears destroyed/removed following management decisions (JJ1, JJ3 and Jurka).

Excluding the three bears destroyed or removed and referring thus exclusively to "natural", causes of death, one can note an increase in the survival rate for young males (from 80% to 90%) and of adult females (from 88.1% to 90.5%).

The graph nevertheless highlights a significant difference between the two sexes in relation to the survival rate of young bears, with females doing better. This is perhaps due to the effectively greater vulnerability of males, which usually move over a wider area, thus being exposed to greater risks, and to the fact they have a longer phase of youth before reaching reproductive age.

Graph 11



Structure of the population

At the end of 2009 the recorded population was made up of **eleven adults** (nine females and two males), eleven **young bears** (two females and nine males) **and three cubs** (one female and two males). Graph 12 shows the trend for the 2002-2009 period. The larger number of young males (78%) as compared to females (22%) can also be explained by the previously mentioned different duration of youth for the two sexes.

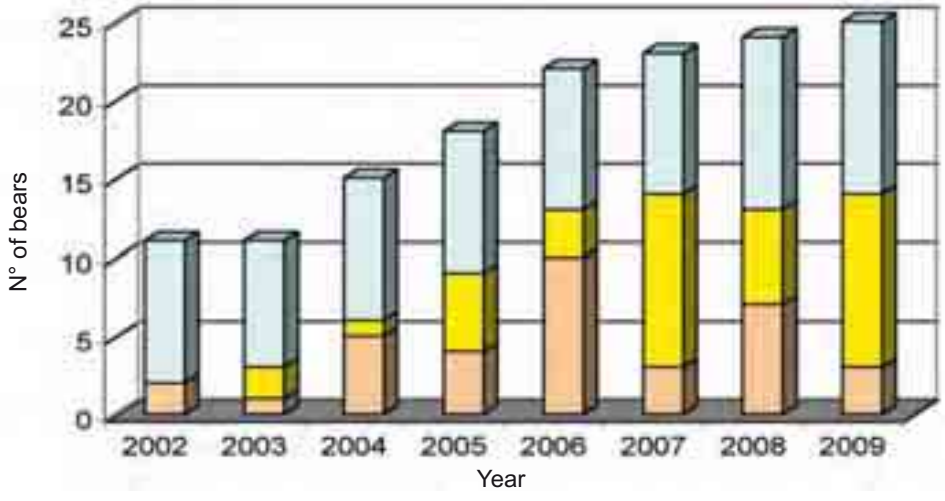
The **trend** for the small population thus appears to be essentially stable for the last year. The minimum certain number indeed increased by one, considering however the immigrating bear frequenting eastern Trentino.

As the numbers are still very small, the future of the population remains uncertain and even casual individual episodes (losses) could compromise development; at all events, it should be recalled, as highlighted at the beginning of the chapter, that the results of genetic monitoring in 2009 (exclusively opportunistic) are only partly comparable with the 2008 results.

The **percentage of bears in the three age groups (adults, young bears and cubs)** in the

Graph 12

Age groups

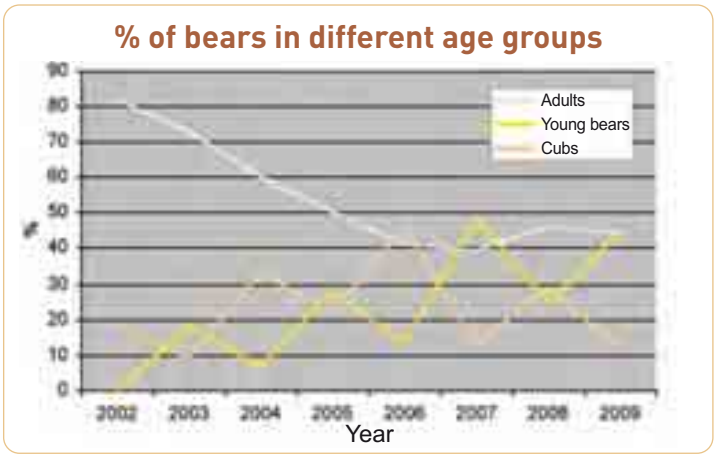


	2002	2003	2004	2005	2006	2007	2008	2009
Adults	9	8	9	9	9	9	11	11
Young bears	0	2	1	5	3	11	6	11
Cubs	2	1	5	4	10	3	7	3
Total	**11**	**11**	**15**	**18**	**22**	**23**	**24**	**25**

period 2002-2009 is shown in Graph 13. For the third year in a row there was substantial stability in terms of the number of adults, around 40% of the population, whereas there continued 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 the **evolution in the average age of the bear population**

Graph 13



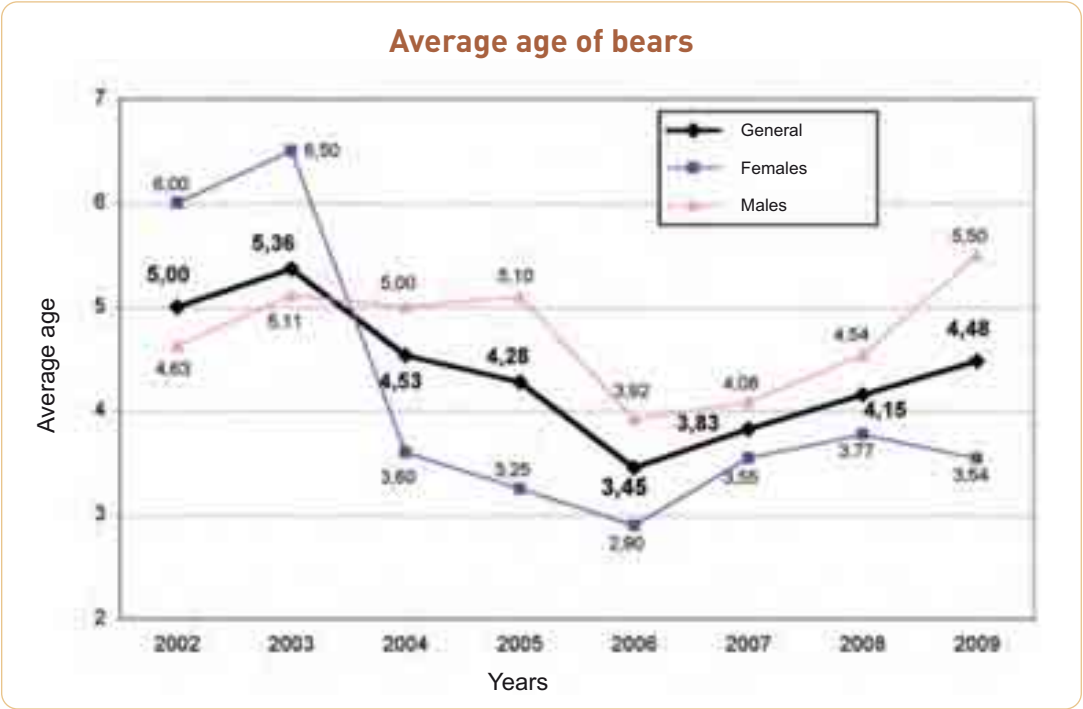
over the eight years examined (Graph 14); in 2009, for the third consecutive year, there was a slight increase in average age (now 4.48).

Considering that the survival rates found to date have increased proportionally with the age of the bears, the increase in the average age of the animals can, at this stage, be considered to be a positive sign for the future of the small population.

Use of the territory

22 out of the 25 bears traced in 2009 were

Graph 14

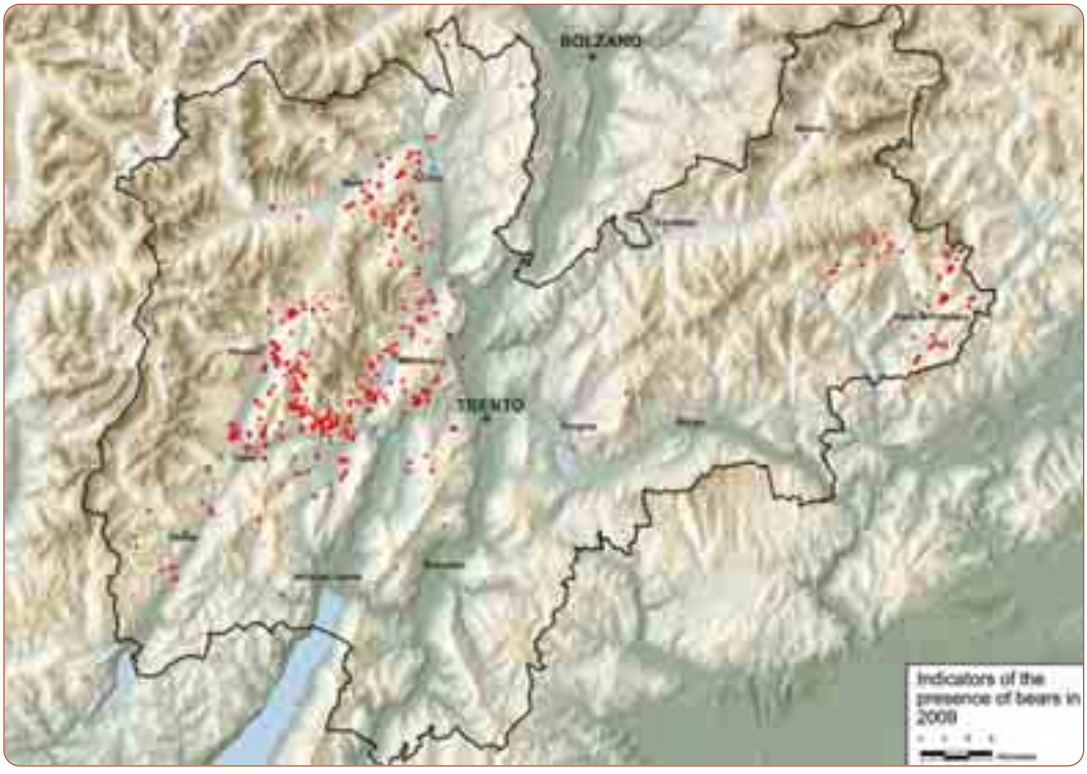


detected in the **Trentino** area. In 2009 the presence of **5** animals was detected with certainty **outside the borders of the province** (2 of these also in Trentino), all young males age three or four: **DG2** and **MJ2G1** in the province of Bolzano, **JJ5** in Lombardia (and from June once again in Trentino), **KJ2G2** in Veneto and Austria, **M5** in Veneto and Trentino.

The **493 overall signs of presence** collected within the province during 2009 (indicators of presence shown in the weekly reports, genetic monitoring data, other) are shown in Figure 1.

The Brenta mountains and the neighbouring Paganella-Gazza mountains still represent the core area for the small population, whereas the neighbouring areas on the left hand side of

Figure 1
Reports of the presence of bears in the province of Trento in 2009



the Val di Non, the left hand side and upper Val di Sole, the Presanella and Adamello mountains, the Ledro Alps and the Bondone-Stivo mountain chains, still saw relatively sporadic frequentation. It is worth mentioning the return of the four-year-old male **JJ5**, born to Jurka and Joze, who having spent around 25 months in Lombardia (from May 2007 to June 2009) was detected from June to October in the area around Val Rendena and San Lorenzo in Banale.

The reports relating to eastern Trentino refer almost entirely to the young male identified genetically as "**M5**", the second certain case of immigration to Trentino from the east, following the appearance of the bear known as "Friz", detected in eastern Trentino and the Belluno area in the 1999-2001 period. Considering the route taken by M5 to reach eastern Trentino, documented genetically at least in the final stages, it is believed that the bear was born in Slovenia (no births have ever been

detected in the Carinthia area in Austria or in Friuli Venezia Giulia) and that his subsequent roaming led him to our province, passing through the Belluno area.

Another bear which had also frequented western Trentino during 2008 (**KJ2G2**, coming from the population originating with the Life Ursus project) moved suddenly and decisively towards the north in the spring, leaving the Asiago tableland, crossing first the Valsugana and then the province of Belluno, until he entered eastern Tyrol (Austria). Here at the beginning of June (on the 4th to be precise), the last certain genetic data relating to him was collected, following an episode in which he was recorded as having preyed on sheep.

In the spring of 2009 in the province of Belluno, the home-ranges of a bear **originating in the Balkans** and a bear coming from the **population in the central Alps** were thus **overlapping**, albeit in a temporary manner and in relation to two roaming males (figure 2). This is the first time that this has been documented following the separation of the two populations, which took place during the 19th century.

As regards the eastern part of the province, it is worth recalling the finding of a bear's tracks in the Val dei Mocheni, on the slopes of Mount Gronlait on 2 May 2009 (photo 2). These belonged to an unidentified small-medium sized bear and are hence unlikely to belong to the two bears mentioned above. The sighting reported along the old provincial road between Levico and Pergine in the same period probably refers to the same animal.

Figure 2
Indicators of the presence of the bears M5 and KJ2G2 in the province of Belluno (source: Province of Belluno)

Photo 2
Bear tracks in the Val dei Mocheni (V. Cristofori)

Roaming

It has been possible to document the roaming of **nine bears** (young males) in the period 2005-2009. **Five** of these were still **alive** in 2009 (three outside the province and two returning after around two years spent outside the province), **two** were **killed** following management decisions, **one disappeared** in 2005 in the area bordering on the Engadin (Switzerland) and the province of Bolzano, whereas the last has **not been detected** in the last year (last certain reports of presence in 2008 in the upper Val di Non on the border with the province of Bolzano).

It should be highlighted that the fate of a further five males disappearing between the ages of one and three and which could have begun roaming is unknown.

Area occupied by the population

Considering also the longest journeys made by young males during 2009, the **population** of brown bears present in the central Alps, which is mainly centred around western Trentino, currently stretches **over a theoretical area** of around 18,000 Km². The **area occupied by the females in a stable manner** is decidedly smaller (**955 Km²**) and situated within the

province (see Figures 3 and 4). The areas occupied have been estimated using the minimum convex polygon method, applied to 100% of the fixes available. This also led 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.

The relative density of the area frequented by the bears in a more stable manner (c. 20-22 bears over an area of 955², namely **2.1 bears/100 Km²**) is in line with the data available in the bibliography in relation to the alpine environment and the forecasts of the feasibility study which preceded the Life Ursus project.

Other monitoring activities in 2009

As will be explained in more detail in the

Figure 3
Area occupied by the bears in the central Alps in 20098 (in blue), highlighting the area within this occupied by females in a stable manner (in pink)

Figure 4
Detail of the area occupied by females in 2009 (955 km2)

chapter relating to the management of emergencies, during 2009 the male bear M5 was captured and fitted with a radio collar, his behaviour making more intense monitoring of his movements necessary. **Radiotelemetric** monitoring was also used for the females DJ3 (for the whole year) and KJ1G1 (only up to 21 April, when the collar came off at Diòn, above Lake Molveno).

The 2009 **home-ranges** of DJ3 and M5, calculated using the Minimum Convex Polygon method (MCP), stretched respectively

Figure 5
Home-range of DJ3 in 2009 (MCP)

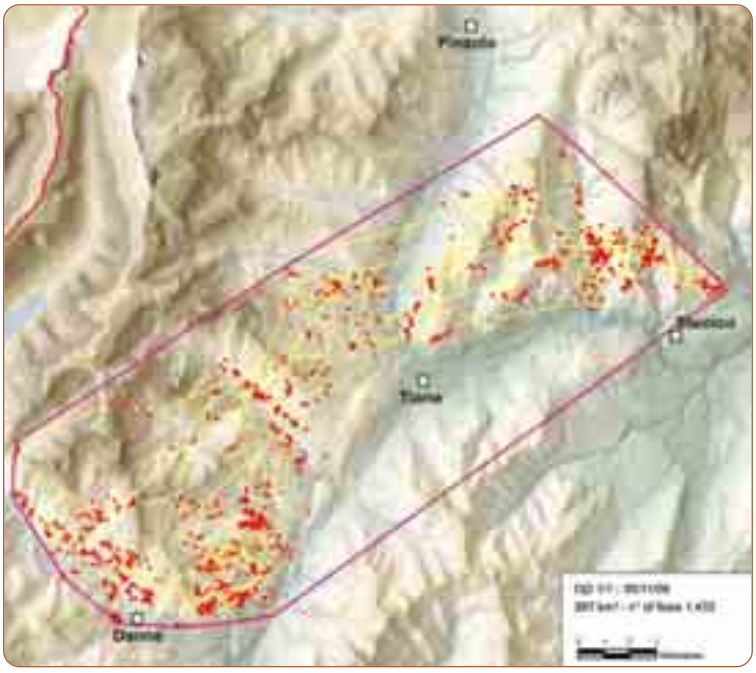
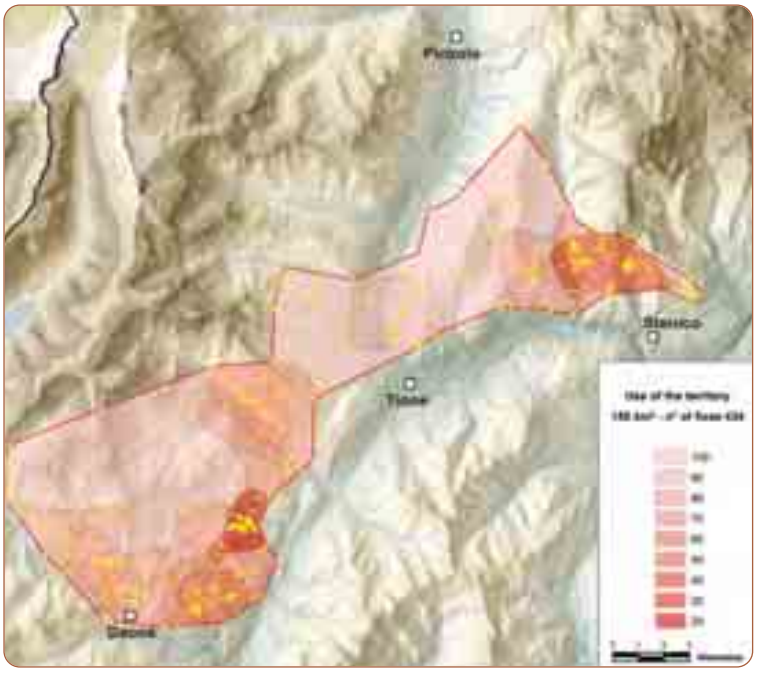


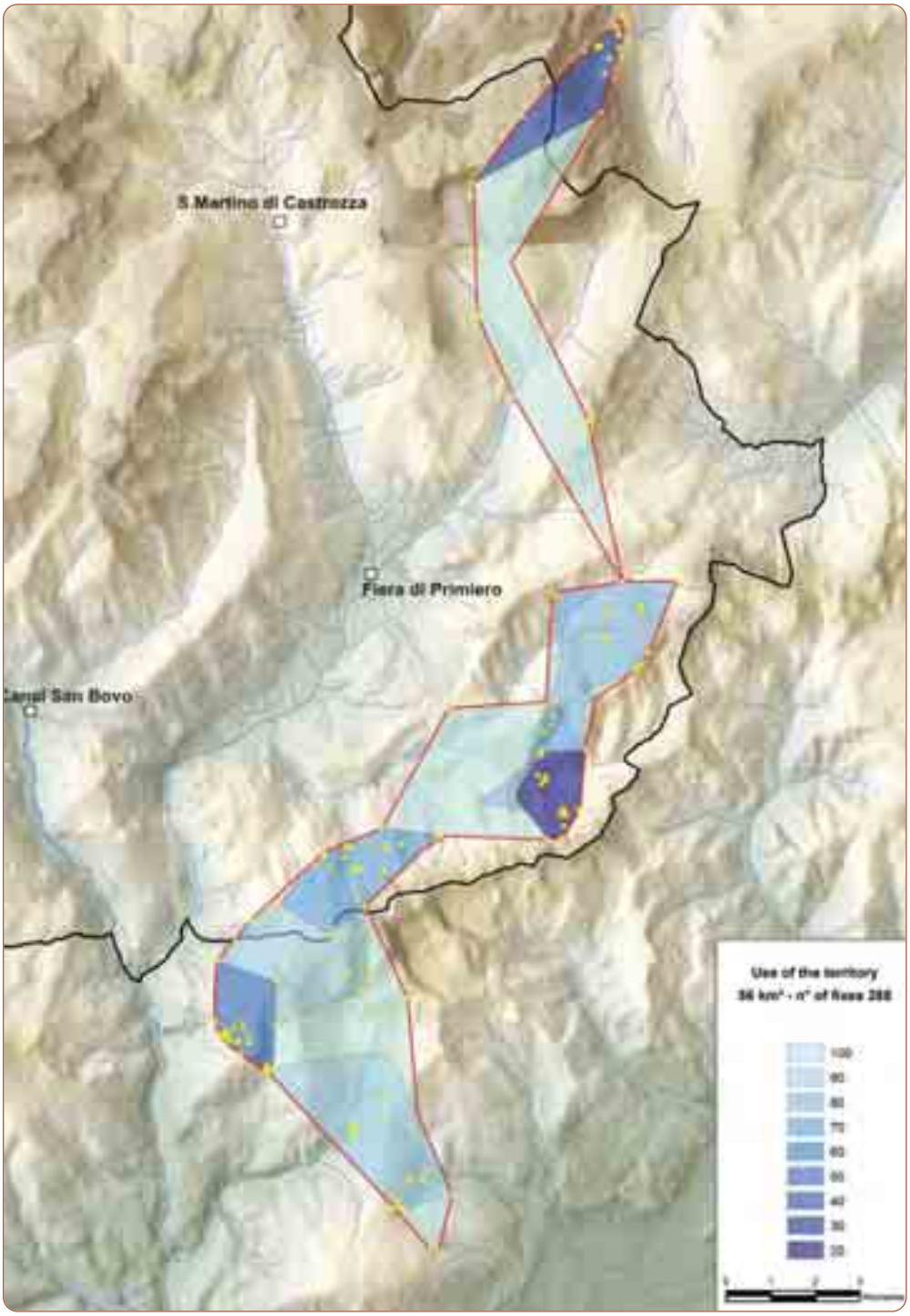
Figure 6
Home-range of DJ3 in 2009 (LoCoh)



over 267 km² and 150 km² (respectively 1,433 and 288 GPS fixes in the periods 1 January - 30 November and 15 October – 27 November) and are shown in figures 5 and 7. In figures 6 and 8 the same home-ranges were calculated using the LoCoh method, to highlight the use of aggregate and non uniform spaces recorded in both cases.

Figure 7
Home-range of M5 in 2009 (MPC)

Figure 8
Home-range of M5 nel 2009 (LoCoh)



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. As an example, below we give the home-ranges (MCP) of the male Gasper and the female Daniza from 2004 to 2009 (figures 9 and 10).

Figure 9
Home-range of Gasper in the 2004-2009 period

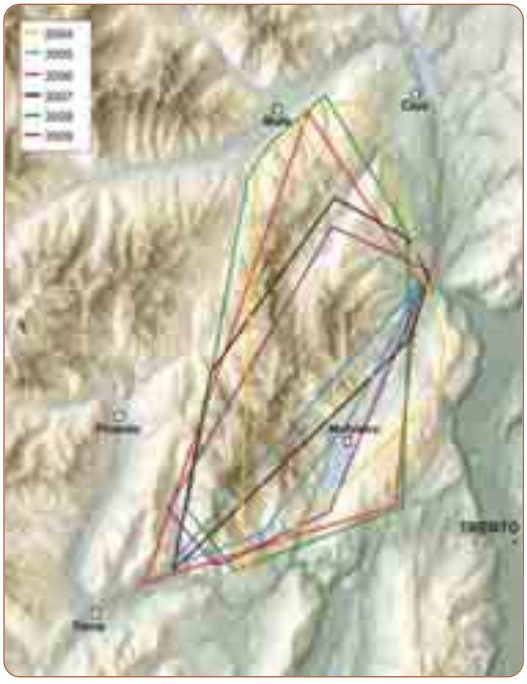


Figure 10
Home-range of Daniza in the 2004-2009 period

Monitoring of dens

The "Bear Project - monitoring of dens", promoted and realised by the Adamello Brenta Nature Park starting from 2005 with the scope of understanding the characteristics and locations of sites used by bears for hibernation, currently centres on analysis of the microclimatic conditions inside dens actually used or potentially exploitable. In the conviction that temperature and humidity orient the ecological winter choices of the species, starting from 2008 surveying of these parameters was started up using special microclimatic sensors. In the summer of 2009, the 59 sensors installed in 2008 were collected: 27 from dens actually used by bears (with the presence of bedding material) and 32 in potential caves. In addition to this, activities in the field led to

Photo 3
Bears' dens often have a very small entrance (A. Caliari)

the positioning of a further 47 sensors inside further caves: 23 dens and 24 potential caves. The ultimate scope of this phase of the investigation is to monitor all known hibernation sites by 2010, together with a significant number of potential caves, in order to gain more information about the climatic characteristics of the caves in the months during which the bears hibernate. At the same time the search for and monitoring of new hibernation sites and potential caves continued. During exploratory activities in 2009, new caves were discovered and described and were added to those discovered during exploration of the territory (1988-2009) over a period of 22 years, bringing the total number of known hibernation sites in Trentino to 65 (and potential caves to 77).

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 all damage has been 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 22 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 2009, 121 notifications of damage for which it was possible to establish that bears were responsible were forwarded to the department; 108 claims for compensation were received, of which 102 have been processed and 6 are currently being examined, whereas 13 notifications were not followed by the presentation of formal claims for compensation. 100 claims were accepted, 1 partially accepted and 1 refused (in both cases the prevention works provided by APT had not been mounted by the claimer). In 80% of cases in which damage by wild predators was notified, inspections were carried out to check on the damage reported, followed up by specific reports ascertaining the damage.

Overall, **€ 48,060.59 compensation for damage caused by brown bears** was paid.

In the western part of the province (the area historically frequented by the bears) there was a fall of 37% in cases of damage caused by bears, falling from 139 in 2008 to 88 in 2009 (this however is without considering the damage in eastern Trentino, which was a new factor linked to the presence of the male M5 in the area).

This fall in the number of cases of damage as compared to 2008 may be motivated by the substantial availability of wild ungulate carcases in spring 2009, following a winter with a large amount of snow, and by the fact that two

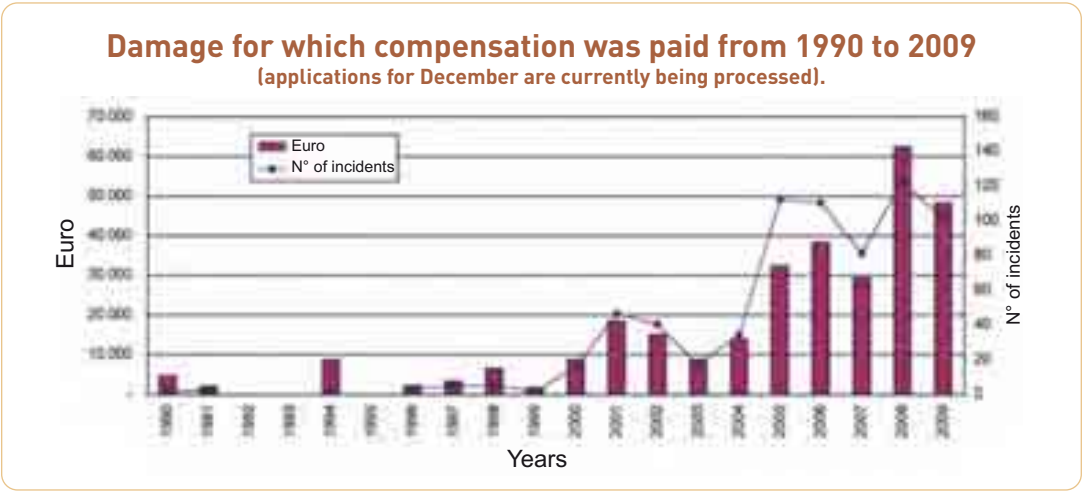
bears which caused a particularly large amount of damage during 2008 were subjected to dissuasion activities last year when captured in order to fit them with radio collars; finally the number of works for damage prevention in the area is now significant and may have contributed partly to lowering the number of cases of damage reported.

In 77 cases, namely 63% of all cases of damage recorded, genetic monitoring made it possible to determine the **identity of the bears involved** with certainty. The 77 cases of damage were attributed to 19 different bears and the animals causing most damage were M5, linked to 20 cases of damage (26%), KJ2 with 9 cases of damage (12%), MJ4 with 6 cases (8%), Daniza, JJ5 and M4 with 5 cases each (6%). Thus the six bears mentioned above were responsible for 64% of the damage for which the author was identified, reinforcing the idea that there are a few bears which tend to cause damage habitually and many bears that rarely cause damage.

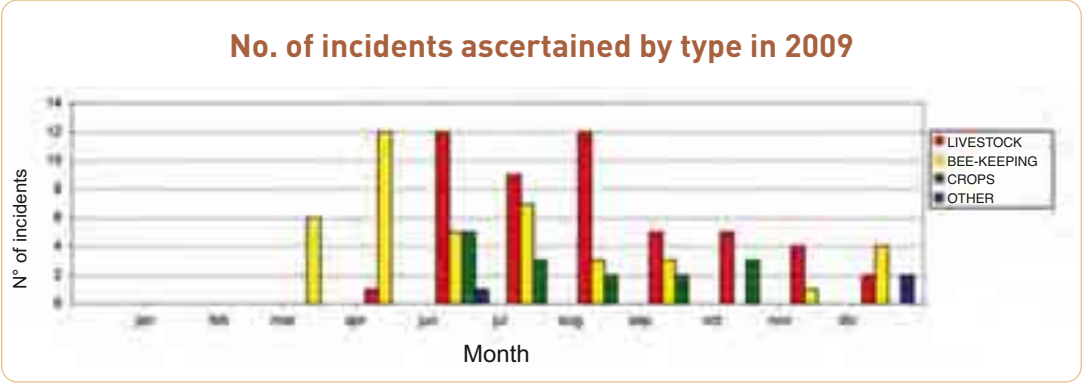
Graph 15 shows the trend in the damage caused by brown bears and for which compensation has been paid over the years, whereas graphs 16 and 17 show the chronological distribution of this damage in 2009 and in the period 2002-2009.

The geographical distribution of recorded damage caused by bears can be seen in Figure 11.

Graph 15



Graph 16



Graph 17

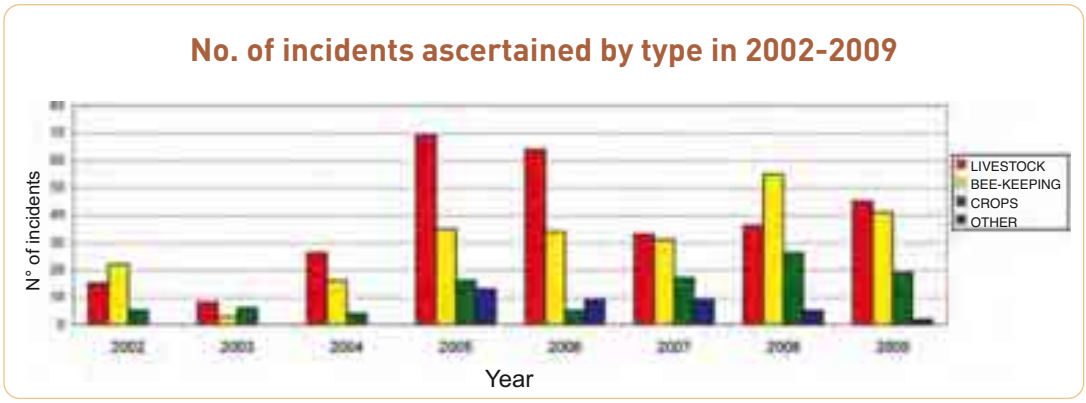
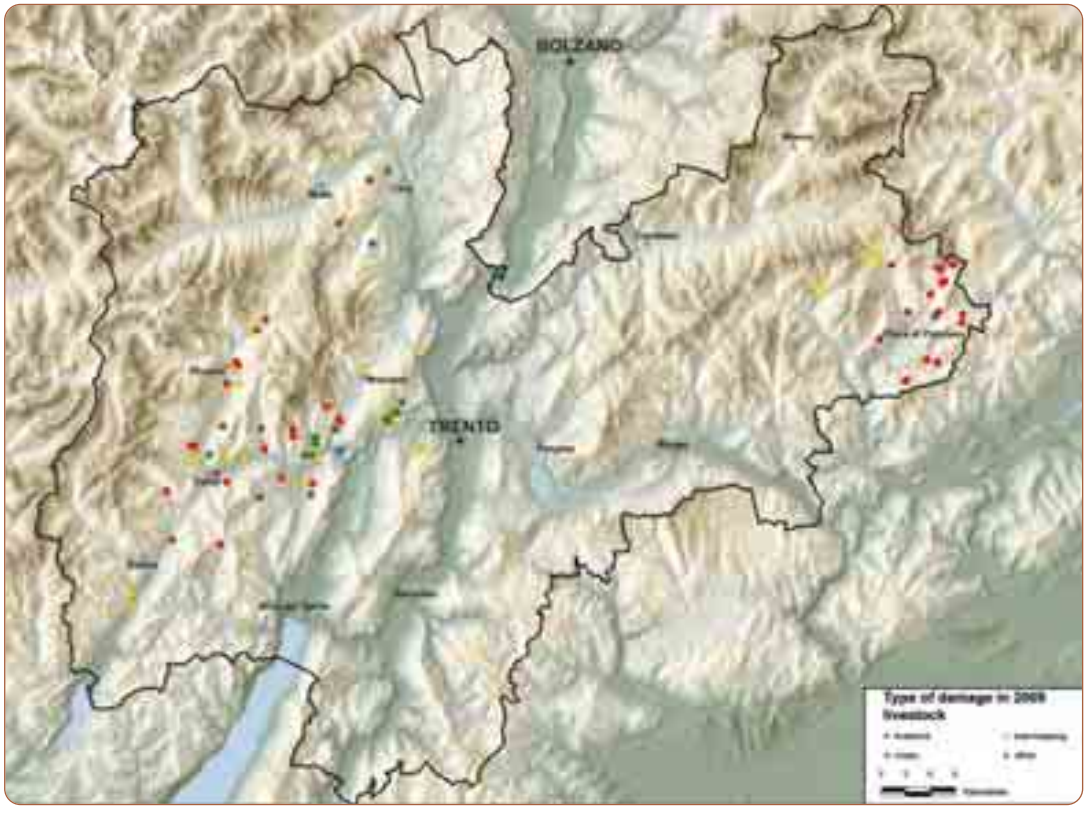


Figure 11
Geographical distribution of damage recorded in 2009 caused by bears



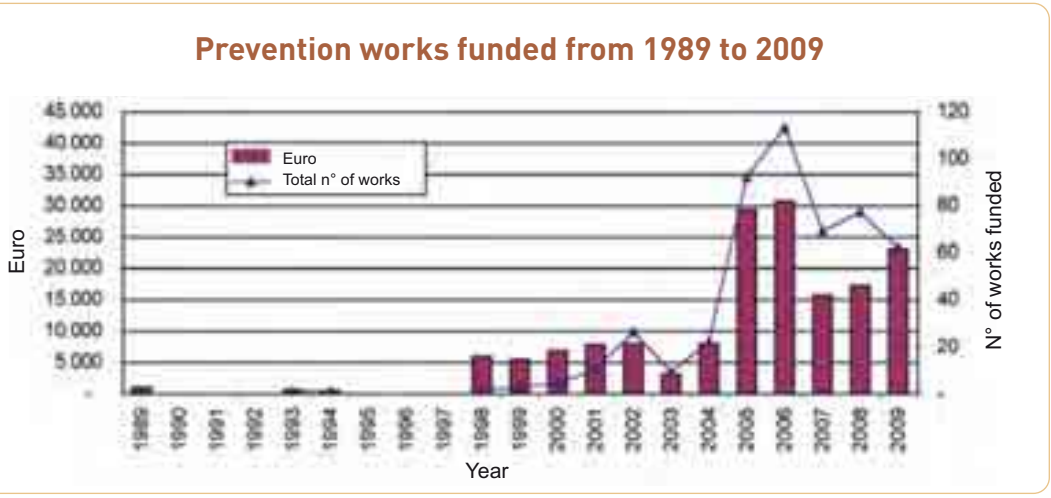
Prevention of damage by bears

In 2009, 56 applications for funding were presented for **prevention works** designed to protect assets from damage by brown bears; 1 application was withdrawn by the applicant, 2 were rejected and 53 have been processed. Overall 62 works were distributed (of which 32 designed to protect beekeeping

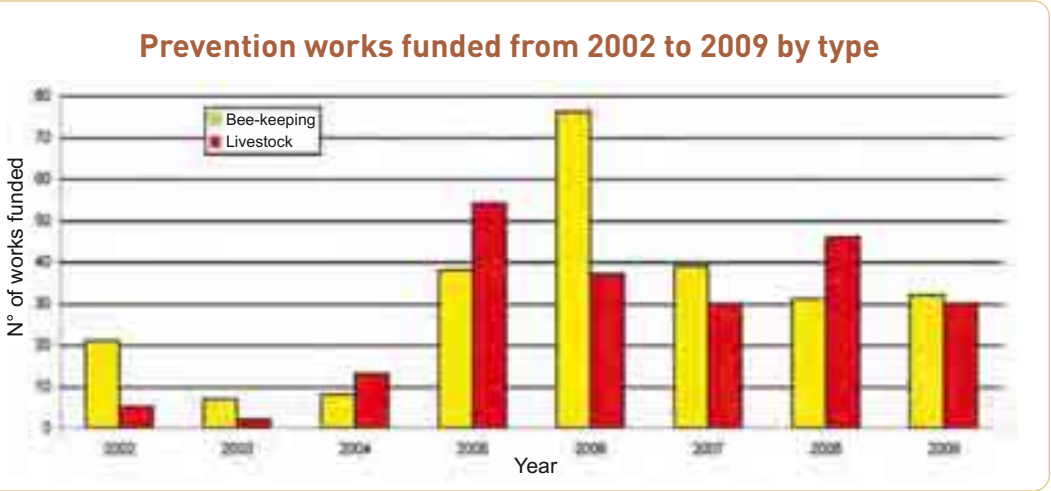
and 30 to protect livestock), with an **overall expenditure** of € 23,038; almost all of these involved the stipulation of gratuitous loans. One specific case of prevention work designed to protect a farm inside the wildlife area of Spormaggiore, due to the large size involved, led to expenditure of € 3,241. It should be highlighted that a further 13 works were distributed in the Primiero area, considering the presence of the bear M5. In this case the works were all **lent temporarily** by the provincial administration (rather than in the form of long-term gratuitous loan of use), considering that the presence of a young roaming bear may be only temporary and occasional.

Below it is possible to see the trend in the distribution of prevention works over a number of years (Graph 18) and the different types of work in the period 2002-2009 (Graph 19), with reference to livestock and beekeeping.

Graph 18

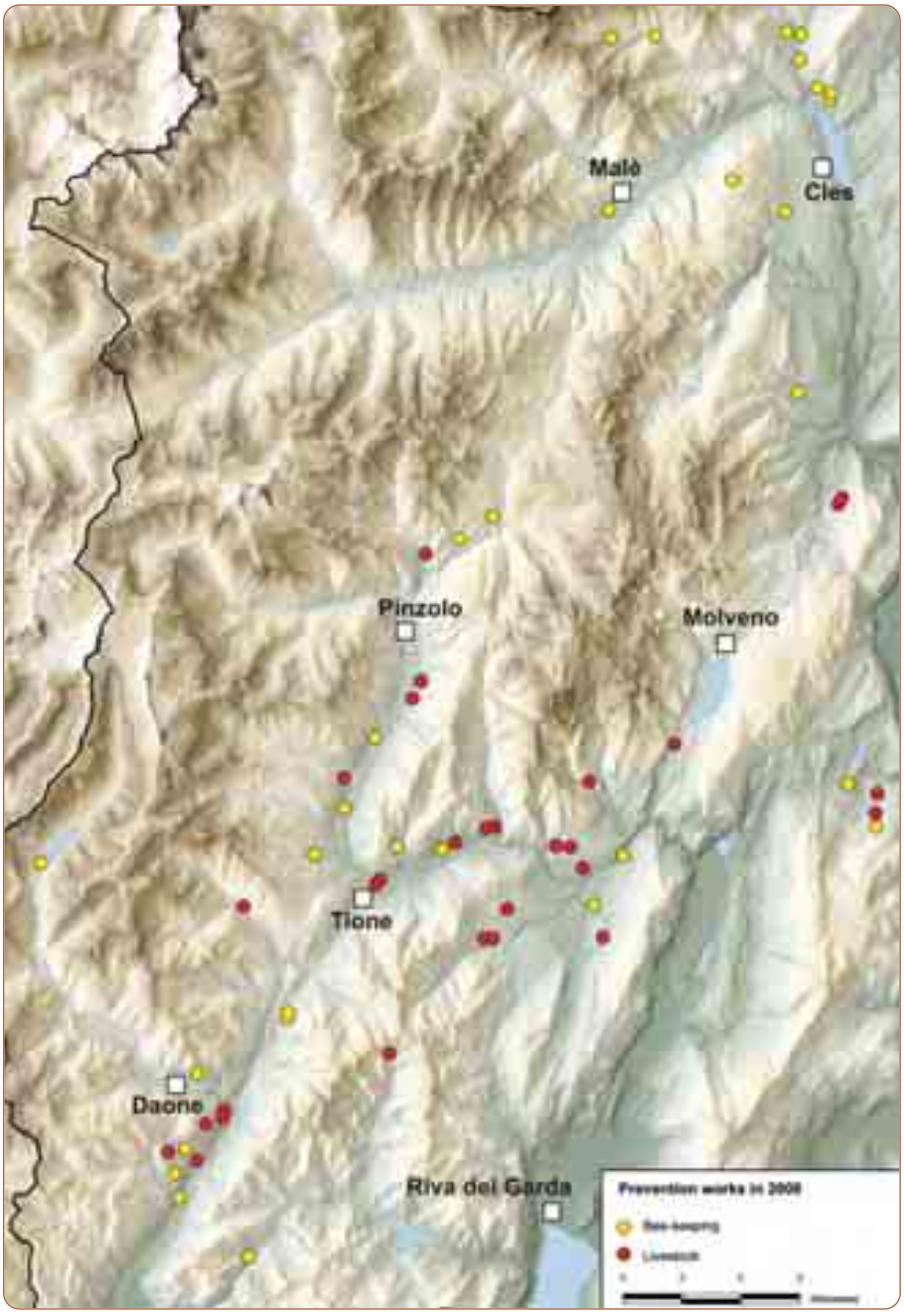


Graph 19



The geographical distribution of the works set up in 2008 can be seen in Figure 12.

Figure 12
Location of prevention works over 2009



Support for farming activities

On 3 June 2009 and 18 June 2009, 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); on 28 September and 15 October respectively, these were once again taken back down to the valley. Once again in 2009 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 (5 animals).

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 predators (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, regional and provincial 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).

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 individuals considered to be "problematic".

In July 2003 the Ministry for the Environment, Land and Seas authorised the Autonomous Province of Trento, according to D.P.R. 357/97 and subsequent amendments, to intervene as provided for in the special "protocol for action regarding problem bears and intervention in critical situations".

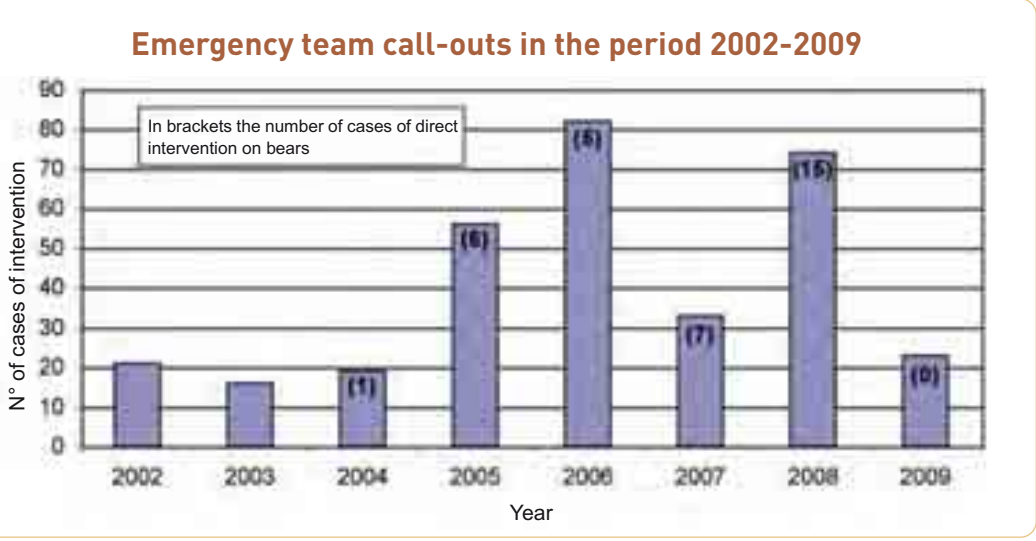
This protocol provides the technical guidelines on the basis of which the Forestry and Wildlife Department, which represents the provincial organisation of reference, has identified, trained and equipped the staff in charge of intervening in these situations. Operational management in Trentino is based 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 2009 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

During 2009 there were no cases of critical situations, understood as situations in which bears were involved in situations justifying the putting into effect of dissuasive measures or removal. Indeed, in all 24 cases when the emergency team was called on, following the reporting of damage or sightings close to inhabited areas, their action was limited to protecting and informing the population, without any direct intervention as regards the animals (Graph 20).

Graph 20



In general, it is believed that the drastic fall in emergencies as compared to 2008 was at least partly attributable to the reduction in the activities of three individuals (KJ1G1, DJ3 and Daniza) who had created the biggest problems during the 2008 season. This would seem to

significantly influence the overall picture, given the limited number of bears present (even lower if reference is made to the few problem bears). In particular the two bears fitted with radio collars last year precisely in order to allow better control, also in terms of dissuasion (DJ3 and KJ1G1) have behaved in a more reserved manner, approaching inhabited areas considerably less and causing less damage (as it was possible to ascertain through radiotelemetry). It is believed that a significant contribution to this change was the "traumatic release" following their capture (with the firing of rubber bullets and pursuit by bear dogs). In this context it is possible to draw initial positive conclusions as regards the action taken, although its efficacy also in the medium-long term will still need to be evaluated. The location of intervention by the emergency bear team in 2009 is shown in Figure 13.

Figure 13
Location of intervention by the emergency team

A separate case concerns the young male **M5**, probably of Slovenian origin, which frequented the area around Primiero from the month of June, causing a certain amount of alarm due to the damage caused, mainly to sheep/goat farms and bee-keeping. However, his behaviour never required the intervention of the emergency bear team. Indeed the predatory episodes, although frequent, took place in the mountains, almost always at night and were directed above all at unguarded flocks. This behaviour, although damaging and socially not without problems, should not be considered an indication of a particularly problematical bear, above all when this is facilitated by local socioeconomic conditions (the pasture for small flocks is mostly wild in the case of Primiero), as in the case in question. The social alarm caused by numerous incidents involving damage and thus the need to better monitor the animal's movements, along with the considerable scientific interest linked to the possibility of studying the behaviour of a roaming bear which did not belong to the population of western Trentino, led to the decision to nevertheless proceed with capture of the bear in order to fit him with a radio collar. In the following paragraph the main phases in the capture are briefly

Capture

To deal with the management of emergencies there is a "capture team" made up of staff specially trained for these activities, supported by veterinary staff.

In 2009 it was considered opportune to capture only one bear, the young male **M5**, displaying the problematical behaviour described in the previous paragraph, in order to fit him with a radio-collar.

On the evening of **14 October** in Primiero (**Val Canali**), inside the Paneveggio-Pale di San Martino Nature Park, the bear, a male weighing 175 kg and estimated to be between 3 and 5 years old, was captured using an Aldrich snare, positioned close to the carcass of a sheep previously preyed on by the same bear (Photo 4) and fitted with a radio-collar operating using the VHF and satellite system. Rapid genetic tests established that the bear did not belong to the population present in western Trentino.

The capture was also intended as an op-

Photo 4

portunity to carry out dissuasive action to discourage the bear. His liberation (Photo 5) thus took place, as tried out in the past with other bears, at the place of capture, which in this case was pasture used by the sheep preyed on, the bear being chased by Laika dogs used by the Forestry and Wildlife Department and firing a number of rubber bullets.

Photo 5

The capture procedure took a total of six days in order to prepare the sites and four days for the capture. The baiting and equipping of the two sites with snares and tube traps involved around eleven days' work overall, carried out by the forestry staff in the area.

The following table summarises the captures carried out in the period 2006-2009.

Table 2 – Captures carried out in the period 2006-2009

n°	Date of capture	Location	Bear	Method of capture	Aim of intervention	Method of release	Sex	Age	Weight	Notes
1	21/05/2006	[illegible]	Jurka (1*)	Free ranging	GPS radio collar	At site without dissuasion	F	9	110	Weight estimated, female with 2 cubs
2	29/05/2007	[illegible]	Jurka (2*)	Free ranging	Tracking mini-transmitter	-	F	10	112	No cubs
3	02/07/2007	[illegible]	Gemma	Free ranging	GPS radio collar	At site without dissuasion	F	12	104	No cubs
4	13/06/2008	[illegible]	KJ001	Free ranging	GPS radio collar	-	F	5	95	Drowned in Lake [illegible]
5	14/07/2008	[illegible]	[illegible]	Free ranging	GPS radio collar	At site with dissuasion (dogs) + rubber bullets	F	4	95	No cubs
6	27/05/2009	[illegible]	KJ101	Alpinist snare	GPS radio collar	At site with dissuasion (dogs) + rubber bullets	F	3	110	No cubs
7	19/10/2009	[illegible]	M5	Alpinist snare	GPS radio collar	At site with dissuasion (dogs) + rubber bullets	M	2 - 3	170	Bear immigrating from eastern Alps

Investimenti stradali

During 2009 one **road accident** involving a bear was reported within the province. On the evening of **9 December** a bear was hit by a car on the northern outskirts of **Tione**. The checks carried out on site made it possible to ascertain that the animal immediately moved away from the place of the accident. The collision actually involved two vehicles, although not in a serious manner, travelling in opposite directions. During the inspection of the site fresh excrement was found and this was subjected to genetic testing which may make it possible to identify the bear.

Another accident occurred in the province of Bolzano on **9 April**, near **Passo Palade**, not far from the border with the province of Trento; the bear does not appear to have suffered any major trauma and moved away from the place of impact immediately, as it was possible to ascertain by following its tracks in the snow (data from the Autonomous Province of Bolzano).

Table 3 summarises the cases of road accidents reported to date.

Table 3 – Road accidents reported in the period 2002-2009

N°	Date	Location	Bear's identity *	Sex and age	Fate of the bear
1	10 August 2002	[illegible] (A22 motorway)	[illegible]	Female	Injured quite seriously but survived
2	4 November 2005	Preore (prov. road n°[illegible])	DJ3	Female	Survived and reproduced
3	28 June 2006	Fai (prov. road n°[illegible])	MJ2	Female	Survived and reproduced
4	28 October 2006	Caldes (prov. road n°[illegible])	Unknown	Unknown	Unknown **
5	29 October 2007	Cogolo (prov. road n°[illegible])	Unknown	Unknown	Unknown **
6	18 July 2008	Villa Rendena (prov. road n°[illegible])	Daniza + 3 cubs born that year	Female aged 13 with 3 cubs born that year	1 female cub died
7	22 July 2008	Nembia (prov. road n°[illegible])	KJ1G1	Female aged 2.5	Survived with no consequences
8	14 August 2008	[illegible] (prov. road n°[illegible])	Daniza + 3 cubs	Female aged 13 with 2 cubs born that year	1 cub injured, probably survived
9	15 October 2008	Bus de Vela (prov. road n°[illegible])	Unknown	Unknown	Unknown **
10	9 April 2009	Passo Palade (BZ) (state road n° 238)	Unknown	Unknown	Unknown **
11	9 December 2009	[illegible] (prov. road n°[illegible])	Unknown	Unknown	Unknown **

* the identity of the bear was ascertained through genetic testing
** an immediate inspection took place with dogs or following tracks in the snow, suggesting that the animal hit moved off autonomously

Waste management

At the beginning of 2009, the first 100 bear-proof waste bins were distributed to the areas which had been shown to be most vulnerable to date (Paganella tableland, upper Valle dei Laghi – see Figure 14), in a **joint initiative with the Waste Management Policy Department** and with the collaboration with A.S.I.A.

Different types of bins were tried out, eventually choosing to modify the closing mechanism of existing organic waste bins (Photo 6) to make them inaccessible to bears, with a handle that requires turning in order to open the lid.

In the latter months of the year production of a further 100 bins was started up, partly for distribution in the province and partly to be held in reserve so that they can used when required in specific locations.

Figure 14
Area involved in the first tests of bear-proof bins

Photo 6
Bear-proof bin

Training of bear dogs

During 2009 the training of the two **Russo-European Laika bear dogs** and their handlers continued, based on a special training programme making reference to the data available and to the experience of trainers and colleagues operating in similar situations abroad, particularly in France (see the chapter on training on page 47). During the spring training course the "**Criteria for use of dissuasion**" using bear dogs were also drawn up, representing the reference document for coordinators and handlers in all possible operating situations (wounded bears, road accidents, overconfident bears, dissuasion during post-capture release). The most important occasions on which the dogs were used during 2009 were the release of M5 in Primiero (Photo 7) and the checks following the accident taking place near Tione.

Photo 7
The bear M5 chased by the bear dogs during his release following capture

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 action programmes referred to in the previously mentioned resolution of the provincial government no. 1988 of 9 August 2002.

Considering this, in 2003 a specific information campaign was started up called "Getting to know the brown bear", which has seen numerous initiatives and continues to do so. 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 communication activities, the Forestry and Wildlife Department has always been supported by the 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 2009 are summarised below.

Evening sessions and meetings

Table 4 lists the seven meetings/evenings organised within the context of the information campaign "Getting to know the brown bear" (some of which promoted by the Adamello Brenta Nature Park if relevant to its area, with around 500 participants overall). Several of the meetings were specifically organised in response to local situations and requests for information linked to certain bears causing concern.

A further 5 evenings were held within the context of the Adamello Brenta Nature Park 2009 summer programme. A detailed list is given in Table 5.

Table 4

Place	Date	N° of participants
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

* In collaborazione con il PNAB

Table 5

Place	Date	N° of participants
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

Informative material produced and distributed

The second "Bear Report" (2008 Bear report) was issued, an instrument representing both a valid means of communication and knowledge for the public and a useful working tool for the department.

A new updated version of the brochure "In the land of the bear" (6,000 copies) was produced and 1,000 copies were distributed. Furthermore 500 new posters entitled "The bear: part of our history" were printed. The brochure entitled "Experiencing the Adamello Brenta Nature Park: Safeguarding the Bear" was updated and 20,000 copies printed. The park also saw to the updating of the test accompanying the T-shirt "Welcome back, bear".

Communication project for schools: “Getting to know the brown bear”, in collaboration with Trento Natural Science Museum

For the sixth consecutive year the TNSM 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 2009-2010 edition of the guide to the educational activities of the museum also published 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 2009 the guide was subdivided into three volumes, dedicated to three different stages in schooling (nursery schools, primary and middle schools, secondary schools and “over 14s”). There were five types of activity 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”, 3 hours of interactive activities, partly providing information on the bear and other large carnivores (powerpoint, various materials) and partly practical (simulation of radio-tracking, realisation of plaster cast 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 Science Museum, the museum organised the following educational activities in the period 1 January 2009 - 31 December 2009:
- Interactive laboratories on the subject "The bear and other large carnivores in the Alps, with 198 pupils participating;
- "travelling museum", with sessions in the classroom and excursions in the province for 90 participants;
- excursions "On the trail of the brown bear”, with 57 participants.

A course for students aimed at illustrating bear management methods in the province of Trento was held on 8 May 2009 at the Istituto Agrario in S. Michele all’Adige.

In the context of activities for schools, the Adamello Brenta Nature Park realised the initiatives listed below (the data on participation will be available in the first few months of 2010):

- The Bear Project, encouraging 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);
- Large carnivores project (educational project: 2 classroom sessions and 1 trip);
- A day with the bears (1 day visit to the Bear Visitors Centre in Spormaggiore).

Furthermore, educational worksheets on the brown bear were prepared to support the environmental education projects undertaken with classes in primary 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 23,626 visitors in 2009. The site also contains this report and the documents mentioned it.

2009 saw continuing implementation and updating of the 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 following questions were presented regarding bears:

- no. 648 of 23 July 2009,
  Reintroduction of the bear to Trentino and related costs;
- no. 733 of 3 September 2009,
  The *Life Ursus* project and damage caused as a result of the bears present in Trentino;
- no. 818 of 23 September 2009,
  Presence of the bear and related damage in the Primiero area;
- no. 888 of 14 October 2009,
  Presence of the bear in Val Canali and related effects on the area.

Press releases

6 press releases regarding the bear were issued:

- No. 55 of 14 Jan. 2009,
  The results of genetic monitoring in 2008: THERE ARE 24 BEARS IN TRENTINO;
- No. 215 of 3 Feb. 2009,
  Presentation of the 2008 report tomorrow evening at the Natural Science Museum: THE BEAR IN TRENTINO, THE CURRENT SITUATION;
- No. 229 of 5 Feb. 2009,
  140 cases of damage reported, with compensation for 62 thousand euro. 77 prevention works funded: A YEAR WITH 24 BEARS: PRESENTATION OF THE 2008 REPORT;
- No. 297 of 12 Feb. 2009,
  THE 2008 BEAR REPORT IN THE NEW "PAT-INFORMA";
- No. 2323 of 16 July 2009,
  Tomorrow at 20.30 at the district centre in Sala Negrelli: INFORMATION EVENING ON THE BEAR AT FIERA DI PRIMIERO;
- No. 3374 of 15 Oct. 2009,
  The action of the provincial Forestry and Wildlife Department reaches a successful conclusion over two nights: PRIMIERO BEAR CAPTURED AND FITTED WITH RADIO-COLLAR.

Other communication initiatives

Informative articles were prepared by the Forestry and Wildlife Department of APT and published in the following magazines:

- "A la conquete des Alpes" su "Salamandre" (CH), no. 194 of October and November 2009;
- Article in "Lo scarpone", the magazine of Club Alpino Italiano – May-June 2009;
- "Key results of 2008 genetic monitoring of bears in Trentino, Italy" in "International Bear Association - news", vol. 18 no. 1 – February 2009.

The ABNP also produced the following articles on the subject of bears (published in periodicals, magazines web sites etc.):

- "The brown bear – 2009 animal of the year", at the site **www.pronatura.ch**, January 2009;
- Detective della natura", in "La rivista de Trekking", January 2009;
- L'orso", in the magazine "Focus", February 2009;
- "L'orso", at the site **www.dolomitidibrentain.it**, 10 March 2009;
- "Le fantome d'Engadine", at the site **www.lqui.ch**, 10 June 2009;
- "Au Trentin, le royaume de l'ours", in "Le Quotidien Jurassien", 12 June 2009;
- "Fauna delle Dolomiti" - Casa Editrice Panorama, June 2009;
- "L'orso bruno sulle Alpi. Status e prospettive future", in the online magazine of **www.agraria.org**, no. 84 - July 2009;
- "26 maggio 1999 - 10 anni fa Masun", in "Adamello Brenta Parco", Anno XIII, no. 2 - July 2009;
- "Bears on the Alps", in the Swiss newspaper "Tages-Anzeiger, 11 August 2009;
- "Il Parco Adamello Brenta ringrazia il ri-

torno dell'orso", in "Il Sole 24 Ore", 26 September 2009;
- "A la conquete des Alpes", in "Salamandre", October-November 2009;
- "The brown bear in Italy", at the site **www.medveke.sk**, 24 November 2009;
- "Le tane degli orsi: uno studio pluriennale del Parco", in "Adamello Brenta Parco", Anno XIII, no. 3 - December 2009.

Following direct requests from TV and radio channels, the ABNP also participated (or provided information for the realisation) of the radio and television programmes listed below:
- filming and interview regarding bears in Trentino for the Swiss TV station "Televisun Rumantscha", 21 April 2009;
- interview on the *Life Ursus* project for the programme "Girovagando in Trentino", 15 May 2009.

As part of the exhibition "The alpine hunter – from predator to manager", realised by the Luserna Documentation Centre and open to the public from 13 April 2009 al 6 January 2010, the Forestry and Wildlife Department collaborated by loaning two stuffed brown bears, on display with an information panel on the subject prepared by the Forestry and Wildlife Department. The two bears, a young female and a cub, were among bears which had died in Trentino and were prepared by experts, adopting an ethological approach.

- During 2009, production of the bulletin /newsletter "I Fogli dell'Orso" continued (this can be requested free of charge at the address **orso@pnab.it**), with the drawing up of 34 articles and statements. In addition to issue no. 19, sent at the beginning of the year, nos. 19 (an extraordinary edition coming out in May) and 20 (October) were also published. There are currently 1,145 registered members.
- In 2009, the Bear entre in Spormaggiore,

a museum entirely dedicated to the history and biology of the bear, was visited by a total of 10,425 people (period considered: 12.06-27.09.2009).

- In the context of the Adamello Brenta Nature Park 2009 summer programme, the "Bear trails" initiative was realised in two different valleys in the park (Val Brenta and Val di Tovel, with 6 meetings involving 117 participants and 13 meetings involving 212 participants respectively).
- ***Bear live***: a single act play on the brown bear in the Alps. Theatrical monologue from a text by Roberta Bonazza, directed by R. Bonazza and Alessio Cogoj. Actor A. Cogoj. Staged in Spormaggiore on 24 October 2009, during the Open Park event.
- The stand “A park for the bear” was used in 2009 on the following occasions: - Trophy Exhibition 2009, Pinzolo, 26-26 April 2009;
  - Visitors Centre, Orobie Valtellinesi Park, Alberedo per San Marco (SO), 1-31 August 2009;
  - XIX regional fair of mountain products from Lombardia, 16-18 October 2009.

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 2008 are illustrated below.

Main training initiatives for APT staff

- Refresher training session for the staff of the province, the Adamello Brenta Nature Park and the Associazione Cacciatori Trentini on the status of the population at the end of 2008 and organisation of activities in 2009, held in Casteler on 13 January 2009.
- Meeting to coordinate, update and train those working in the field of livestock farming (Mattarello, 24 April 2009), during which it was also possible to obtain technical information about electric fencing, provided by experts in the sector (Photo 8). The meeting was also opened up to supervisory staff from Veneto.

Photo 8

- Training session for staff from Primiero, Casteler, 8 July 2009. A theoretical/practical training day was held on the criteria to be exercised for the dissuasion of problem bears, linked to the presence of the bear known as "M5".
- Exchange of experience on the training of bear dogs (Casteler, 13-16 October 2009). The Trentino team is the only dog unit specialising in bears in the whole of the alpine area. There is another in the French Pyrenees, which has successfully used this type of dog for several years. Hence an important exchange of experience between French and Trentino colleagues has developed, through the scheduling of reciprocal visits.

Four dogs and their handlers visited the Forestry and Wildlife Department last October. After their arrival, there was an initial welcoming session, followed by four days of intense activities in the area; the Trentino and French handlers and their dogs followed numerous trails in the most beautiful and spectacular areas of the Brenta mountains, the heart of the area most frequented by bears. They looked for traces, developed friendships and exchanged experience on the character and training of dogs, methods for their use and the results obtained. The visit ended with a round table at the Casteler centre, with the exchanging of images, movie clips and data on the management of bears (and dogs) in their respective countries of origin.

- Meeting in Bergamo, 23 March 2009. In the context of collaborative initiatives provided for by the "Plan of Action for the Conservation of the Brown Bear in the Central-Eastern Alps (PACOBACE)", a training day directed at supervisory personnel from the Province of Bergamo, Sondrio and the Orobie Valtellinesi Park was held in Bergamo on 21 March 2009,
  entitled: "The organisation of emergency teams and methods of dissuasion for problem bears".
- Meeting with staff from Abruzzo dealing with the capture of bears, during the workshop "Techniques for the capture of chamois; comparing experiences" (Pescasseroli, 14-16 July 2009).

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 states and the 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 (lastly by Lombardia and Veneto). In addition to the Autonomous Province of Trento, this has 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 over the last few years.

In the context of international collaboration, the following meetings with colleagues from other regions or nations took place:

- **Bolzano, 6 April 2009**. Joint meeting with the Autonomous Province of Bolzano and the Tyrol to prepare an agreement for cooperation regarding bear management. This agreement then became part of a wider agreement between the Autonomous Province of Trento, the Autonomous Province of Bolzano and Land Tyrol in the context of the transfrontier collaboration initiative known as "**Euregio**".
- **Zernez (Switzerland), 4 - 5 June 2009**. Workshop on management of the brown bear in the Alps organised within the context of the **Arge Alp** "Large Carnivorous Mammals in the Alps Project", attended by representatives of the relevant departments for the management of large carnivores in the Arge Alp member regions. The next meeting, in 2010, is scheduled to take place in Trentino.
- **Stubaital (Austria), 5 June 2009**. Informative meeting on the bear, organised by Land Tyrol and directed at local representatives, at which the Forestry and Wildlife Department gave a presentation.

On 12 March 2009 the Adamello Brenta Nature Park was nominated to represent **ALPARC (Alpine Network of Protected Areas)** at the "Large Predators" Alpine Convention. This platform was set up during the 10th Conference of the Alps, which took place in Evian (France), and has the scope of encouraging international collaboration, the exchange of experience and knowledge and standardisation of management methods and plans.

7. Research and conferences

Research and experimentation

During winter 2008-09 two new types of bear traps (a tube trap and a M-15 foot snare trap) reflecting models used in Canada to capture bears were prepared by the Wildlife Office. In order to test their efficacy, in view of possible future use, these were set up in the area (Val Algone and Nembia - S. Lorenzo in Banale) from 17 May to 16 June and furnished with bait, mainly by the staff involved in the capture team. Checks on frequentation of the capture sites by bears were carried out using digital photo traps and by positioning barbed wire for the collection of samples of hair to be used for genetic testing. The tube trap was visited by three different bears in the Val Algone (Gasper, KJ1 and DG3) and by one at Nembia (JJ5); all the animals were photographed and identified genetically. The bears entered the trap completely and in some cases repeatedly (Photo 9).

Photo 9

The M-15 foot snare trap was positioned in the Val Algone and was frequented by two bears (Daniza and KJ1), who consumed the bait inside the tube, gaining access in an erect position and using their front paws, with the method provided for to ensure the correct functioning of the trap (Photo 10). Once again both bears were photographed and identified genetically. The experiments showed clearly that both traps were potentially suitable for the capture of bears, simplifying capture procedures and reducing the commitment in terms of personnel.

Photo 10

Survey into man-bear encounters

On the basis of the 256 encounters between bears and men analysed, the survey carried out since 2007 by the Wildlife Office of ABNP (see also the 2008 Bear Report) has shown:

- that the predominant reaction of the bear (in around 60% of encounters) was to move away from the person sighted;
- that no cases of attacks have been reported;
- that only one case has been reported of a bear reacting actively, albeit not in a menacing way and thus not corresponding with a "false attack" in the genuine sense of the term;
- in a third of encounters (36% of the overall samples) the bear did not move away: this behaviour would seem to be linked both to the presence of cubs (a resource to be supervised and protected by females) and to the bear's failure to perceive the presence of humans. At all events, the subsequent reaction of the bears to the encounter with man (after having remained at the site) is mainly (in 78% of cases) to move off;
- females with cubs tended to manifest less precipitous behaviour and greater vigilance as compared to bears without cubs.

- the bear's reactions to the encounter with man would not seem to be influenced by the distance from the observer, at least until a "security distance" is reached: at greater distances (over 100 metres), the bears did not consider the encounter as an immediate danger, reacting with relative tranquillity;
- the behaviour of the bear at the time of the encounter would not seem to be conditioned by the greater or lesser degree of silence adopted by the observer before the encounter;
- in the presence of dogs, the bears tended to act less precipitously, both due to a greater perception of the visitors (who were thus "avoided" in advance) and due to the inadequacy of the reaction to flee in a similar situation;
- in the dark the bears were more likely to react to encounters with man by fleeing as compared to encounters during the day or at dusk.

Conferences

The Department participated at the following conferences, using its own funds:

- "Second international workshop on genetic research into brown bear (Ursus arctos) populations in the Alps, Dinaric Alps, Pindus and Carpathian mountains" - **Zagreb (Croatia), 9-10 May 2009;**
- International conference "Integrating population genetics and the biology of conservation" - **Trondheim (Norway), 23- 26 May 2009**;
- Workshop "Biology and the Conservation of Large Carnivores" – Casentino Forests National Park – **S. Sofia (FO), 30 September-1 October 2009**.

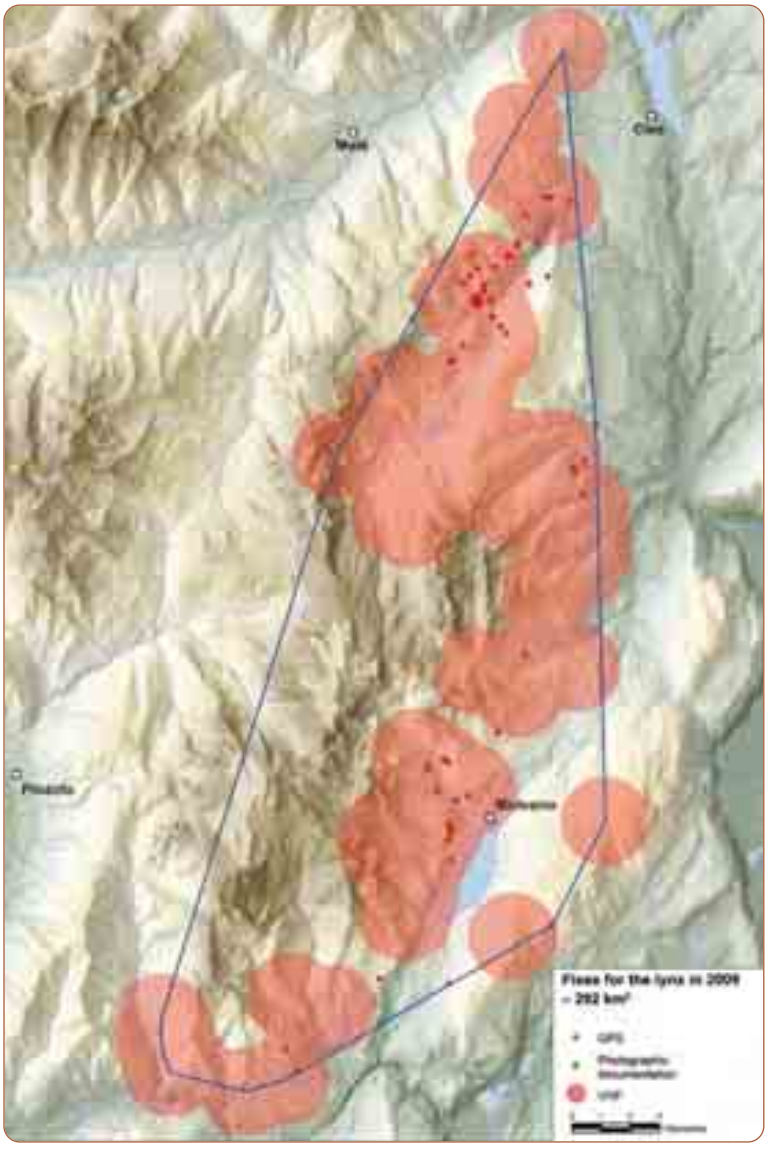
The ABNP participated at the following conferences, using its own funds:

- Conference on bears, wolves and lynxes in the Alps and Carpathian mountains - **Mittersill (Austria), 13 March 2009** - Presentations: "The Adamello Brenta Nature Park's Bear Project" and "The brown bear in the Alps: situation and future prospects";
- Alpine-Carpathian International Colloquium "Large carnivores: management, research and public relation strategies for protected areas" - **Nizke Tatry (Slovenia)** - Presentation: "Bears, wolves and lynxes in the Alps: current situation and future perspectives. The role of the ALPARC large carnivores working group".

Appendix 1 – The lynx in Trentino in 2009

The young male Eurasian lynx weighing 24 kg and known as B132, entering the territory of Trentino on 23 March 2008 (see the 2008 Bear Report), remained essentially within the home-range used in the previous year (Figure 1).

Figure 1
Home-range of lynx B132 in the Brenta mountains from 1/1/2009 to 9/10/2009, calculated using the Minimum Convex Polygon method (MCP)



In the early months of the year monitoring continued thanks to the satellite fixes supplied by colleagues in the Swiss National Park. On 10 April 2009 the battery of the GPS transmitter ran out and monitoring was therefore continued by the staff of the Forestry and Wildlife Department using traditional radiotelemetry (VHF) (Figure 2). This second form of transmission was also exhausted on 9 October 2009.

Figure 2
Monitoring techniques for lynx B132 in 2009

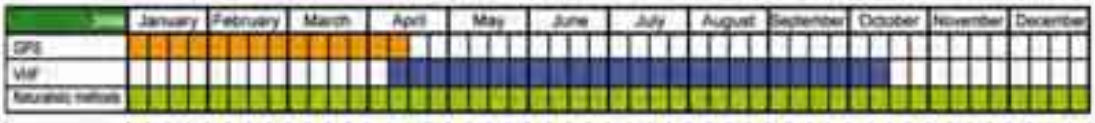


Photo 1

Photo 2

After this date it was nevertheless possible to confirm the presence of the animal, both thanks to tracks left in the snow (Photo 1) and through photos taken in the field (10 July 2009 at Casinati in Val delle Seghe, Molveno - Photo 2 and 14 November 2009 above Lake Molveno – Photo 3).

Currently, (December 2009) B132 is still in the woods in the eastern Brenta mountains, around 200 km away from its place of birth.

The fact that the radio-collar ceased to function last October makes it more difficult to follow the animal's movements: for this reason the Forestry and Wildlife Department intends to recapture the lynx to fit it with a new collar to make monitoring possible.

With this scope activities directed at recapturing the animal in question were started up in August by the Forestry and Wildlife Department, using two box traps realised by them, sim-

ilar to the one illustrated in Photo 3.

In December a third trap, similar to the others, was positioned in the field, in order to increase the chances of capture during the winter months, considered to be most suitable for the purpose.

The additional phase of intensive monitoring which would be made possible by capture would provide extremely interesting information about recolonisation of new areas by the species (a phenomenon which has been only partially investigated), also in relation to the possible presence of other animals.

As regards this, the idea that there may be a second lynx in the area frequented by B132 was borne out by further elements during 2009.

In particular, in the late afternoon of 25 July, there was a presumed sighting of a lynx by a hunter in Val delle Seghe (Molveno), precisely at a time when the male B132 was located by the staff of the Forestry and Wildlife Department in Val di Tovel, through radio tracking.

On 27 November a park warden of the Adamello Brenta Nature Park instead followed lynx tracks in the snow in Val di Tovel, for some considerable distance (Photo 4). These would seem to belong to two decidedly different animals (front paws with a diameter re-

Photo 3

Photo 4 (E. Dorigatti)

spectively of 7-8 and 10-11 cm – survey data in Figure 3), thus providing further support for the theory that a second lynx is present.

Finally, as highlighted in Figure 4, once again in 2009 the home-range of the lynx is included within the area occupied by the brown bear population in a stable manner.

Figure 3 (M. Zeni)

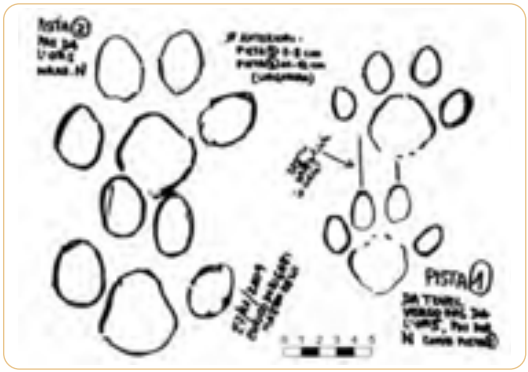


Figure 4
Comparison of the home-range of lynx B132 (in blue) and the core-area of the brown bear population in 2009

Appendix 2 – First signs of the presence of wolves in Trentino after more than 150 years

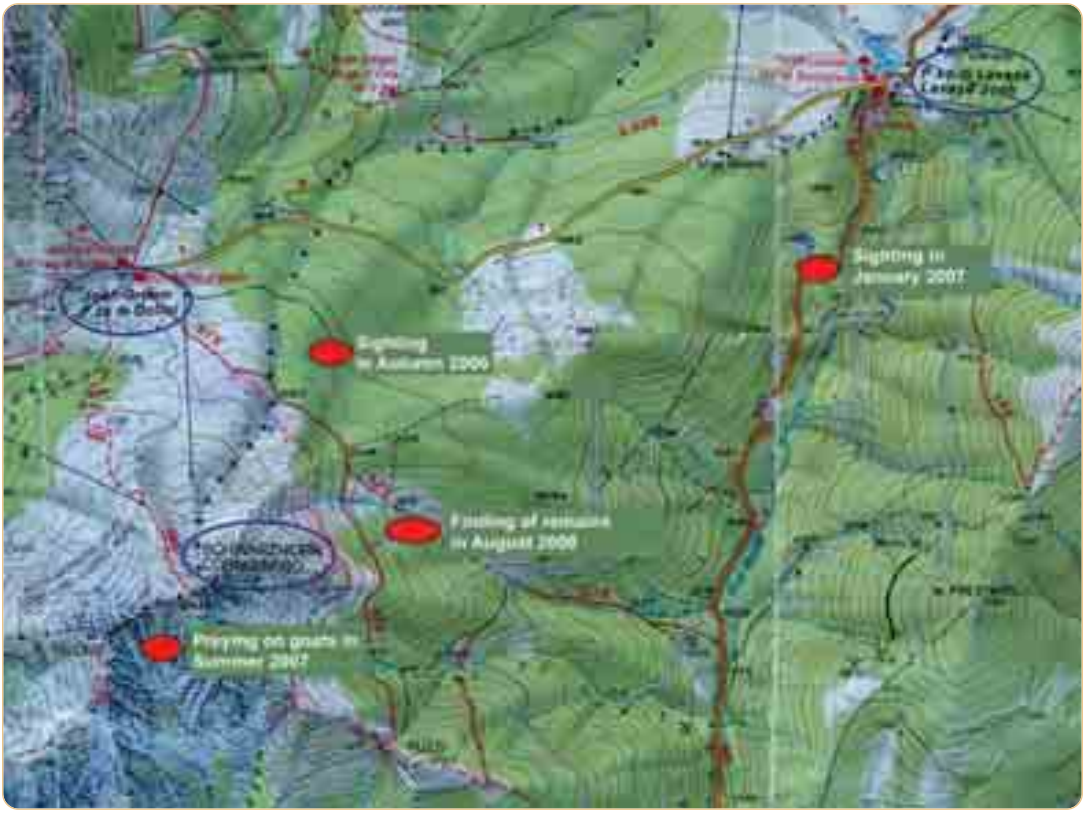
Photo 1
Wolf photographed in controlled conditions (wildlife area)

During the summer, hunters from Varena informed the Cavalese district forestry office of the Autonomous Province of Trento that they had found the remains of a canine not far from the Oclini pass in Val di Fiemme in Autumn 2008. This was subsequently shown to be a wolf *(Canis lupus)* (Photo 2) and is the first confirmation of the presence of the species in the province of Trento, more than 150 years after its disappearance.

Photo 2
The site where the remains of the wolf were found.

The finding would appear to confirm a number of reports made in the area in the last few years which had not previously been corroborated, such as possible sightings (Autumn 2006 and January 2007) and probable preying on goats (summer 2007) - Figure 1.

Figure 1



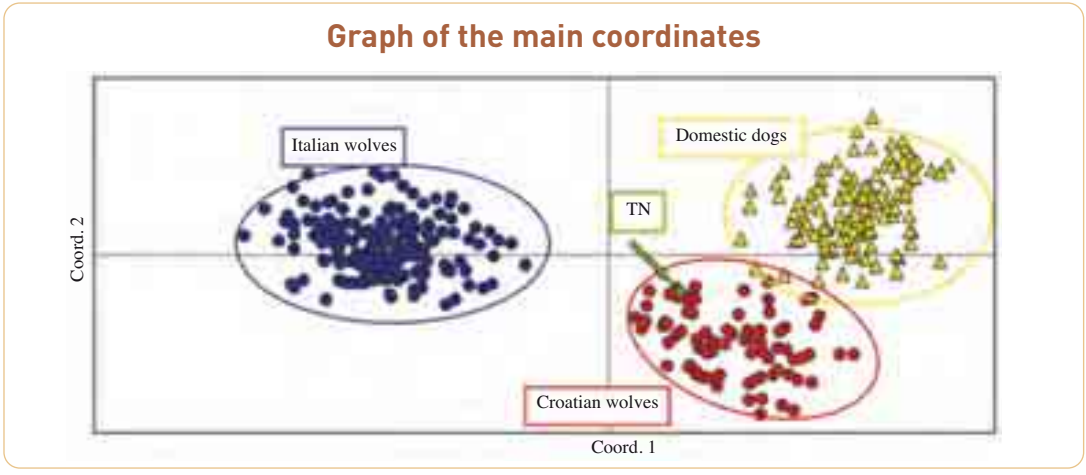
The death of the wolf, due to unknown causes, is thought to date back to Autumn 2007. Although coming to an unfortunate end, the animal reminds us that wolves are not far away (in a biogeographical sense) and their return to the Trentino mountains is only a question of time. The confirmation that the remains actually belonged to a wolf, as the bones recovered appeared to suggest (Photo 3), only came following genetic testing carried out by ISPRA.

Photo 3
The wolf skull found

The report from the genetics laboratory confirmed that the wolf was not of Italian origin (not Canis lupus italicus) and that the sequence of the mitochondrial DNA control region coincided with the W3 haplotype present in the Croatian population». It is therefore considered likely that the animal originated in the Balkans, although at the moment there is no certainty as regards this, nor is it certain that it will be possible to ascertain this in the future.

At all events, principal components analysis (PCA) realised by ISPRA (Graph 1) shows clear attribution of sample TN2C (relative to the animal in question) to a group of wolves coming from Croatia, therefore excluding the possibility that it was of Italian origin or that it could be attributed to a dog.

Graph 1
Principal components analysis carried out using GenAlex v6.1software
The two axes (coord. 1 and coord. 2) represent 64.56% of the genetic variability observed between individuals. The blue points represent wolves in the Italian population, the red points wolves from the Croatian population, the yellow triangles domestic dogs and the green square is the TN2C sample, whose genotype was genetically similar to the Croatian samples (source: ISPRA).



Thus the wolf, capable of travelling even hundreds of kilometres, is likely to have arrived in Trentino from a population present in Slovenia (around 50 wolves, linked to a Croatian population of 200-250). Although this cannot be excluded altogether, it is very unlikely that the animal originated in captivity.

2009: the year of contact between the Italian and Balkan wolf populations

As is known, recolonisation of the alpine area by the wolf began from the west, in the 1990s, starting from the northern Apennines, where it probably never disappeared altogether. Its natural expansion into the Alps (where the wolf has always been present as an autochthonous species belonging to the alpine ecosystem) led to establishment of a population in the area straddling the Piemonte region and France, currently numbering around 150 animals. Some wolves have also reached the Valle d'Aosta, Lombardia, Switzerland and, most recently, Austria and it can be surmised that this expansion towards the east will continue. The eastern part of the alpine area has seen the appearance of the first animals from populations found in Croatia and southern Slovenia, as well as in Poland (Carpathian mountains).

Recent data from Austria (genetic analysis of samples collected at places where animals had been preyed on or wolves sighted) highlighted contact between the two metapopulations of Italian and Balkan

wolves for the first time. In particular, surveys carried out in Austria (A. Kranz, pers. com.) show how during 2009 it was possible to ascertain the overlapping of the territories of "Italian" and "Balkan" wolves on at least two occasions.

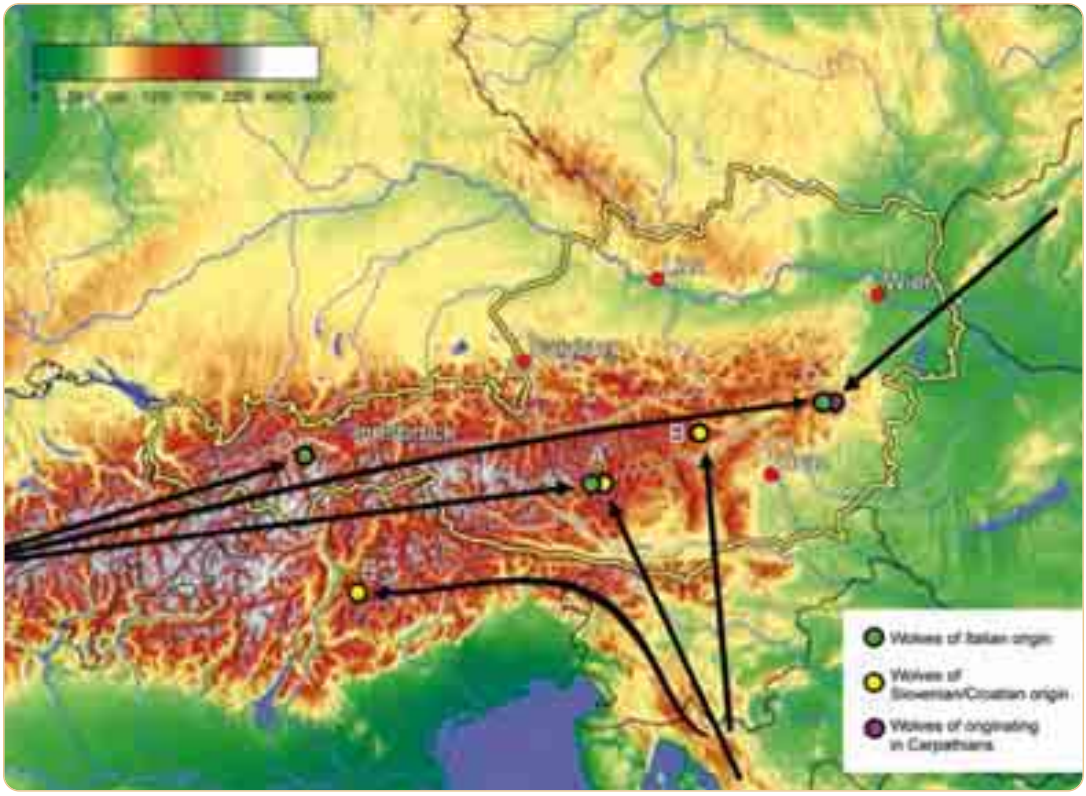
In the first case in August 2009, a wolf of Italian origin was reported in the area of Spittal, on the River Drava in Carinthia; another wolf, this time of Croatian/Slovenian origin, was reported in the same area, specifically at St. Veit (Carinthia), from February to September 2009 and perhaps even subsequently (Figure 2, point A). Checks of biological samples from the animal of Italian origin are still underway, according to information from our Austrian colleagues.

In the second case there was a overlapping of territories even further east, in the Weiz district of Styria, where in September 2009 a second wolf of Italian origin was identified; in April 2009 the presence of an animal of Carpathian origin was reported in the same area (point C). A fifth wolf, of Croatian/Slovenian origin and observed in April 2009 at Knittelfeld in Styria (point B), can be added to these four wolves.

What is more, at the end of October a wolf of Italian origin was identified in the Pitztal area, near Innsbruck (Tyrol – point D); it is not known whether this was one of the two previously mentioned animals, or a third wolf (M. Janowsky, pers. com.).

All this paints a relatively lively picture, which together with the Trentino data, albeit referring to the presence of a wolf in 2007 (point E), highlights a rapid acceleration in the process of recolonisation of the Alps by the wolf (it is not possible to predict whether this will also be long-lasting).

Figure 2
Reports of wolves recorded in Austria and Trentino in 2009 (A. Kranz, amended and supplemented)



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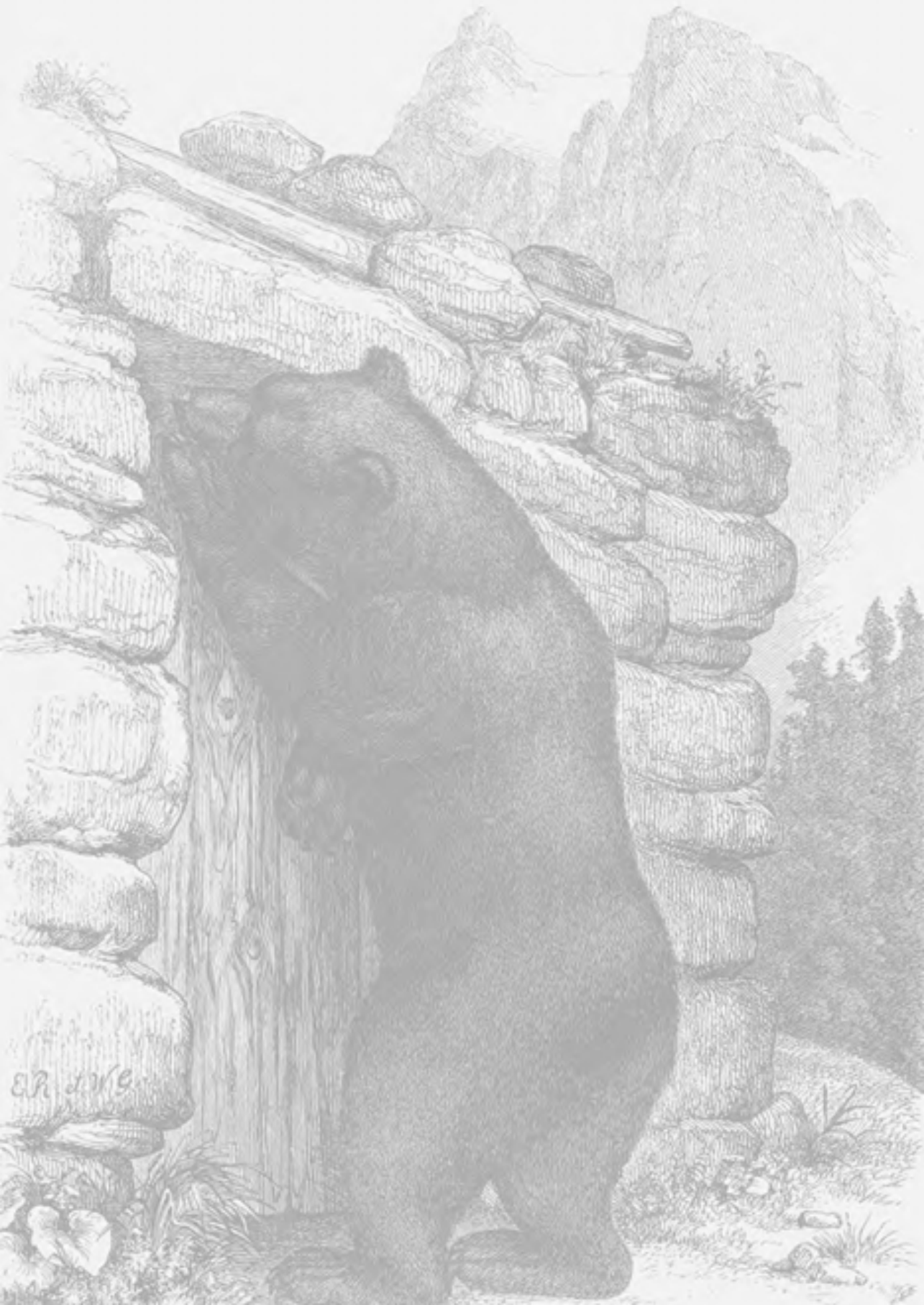

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