



**LIFE** Population level management and  
**DINALP** conservation of brown bears in northern  
**BEAR** Dinaric Mountains and the Alps



# 2017 ANNUAL POPULATION STATUS REPORT FOR BROWN BEARS IN NORTHERN DINARIC MOUNTAINS AND CENTRAL- EASTERN ALPS

*Action C.5: Population surveillance*

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## Introduction

This is the third of annual Population Status Reports planned within LIFE DINALP BEAR. It provides an overview of both how population is being managed and its current status over the entire area in question. With these reports, we'd like to give the basic tool to wildlife managers dealing with bear management in each respective country/region, to include the situation in neighboring areas in their conservation and management planning.

Understanding the status of populations of conservation concern is essential for effective conservation and management, which is also true for brown bears in the area covered by LIFE DINALP BEAR. Such population-level understanding is the foremost condition that must be met if we are to transcend the national or regional-level conservation and management practices that are the current norm in wildlife management and conservation.

In this third report we've again had some problems in production. Since we're still ironing-out the common information infrastructure, we decided to stick with the expert approach. Each of the experts updated the text for his or her geographic area with the most recent available data on all recorded aspects of bear monitoring to produce an up to date picture of the status of the bears in our area. The same goes for the distribution maps – we used distribution maps prepared for the previous report and updated them with new information. In this manner we're keeping information and its presentation consistent.

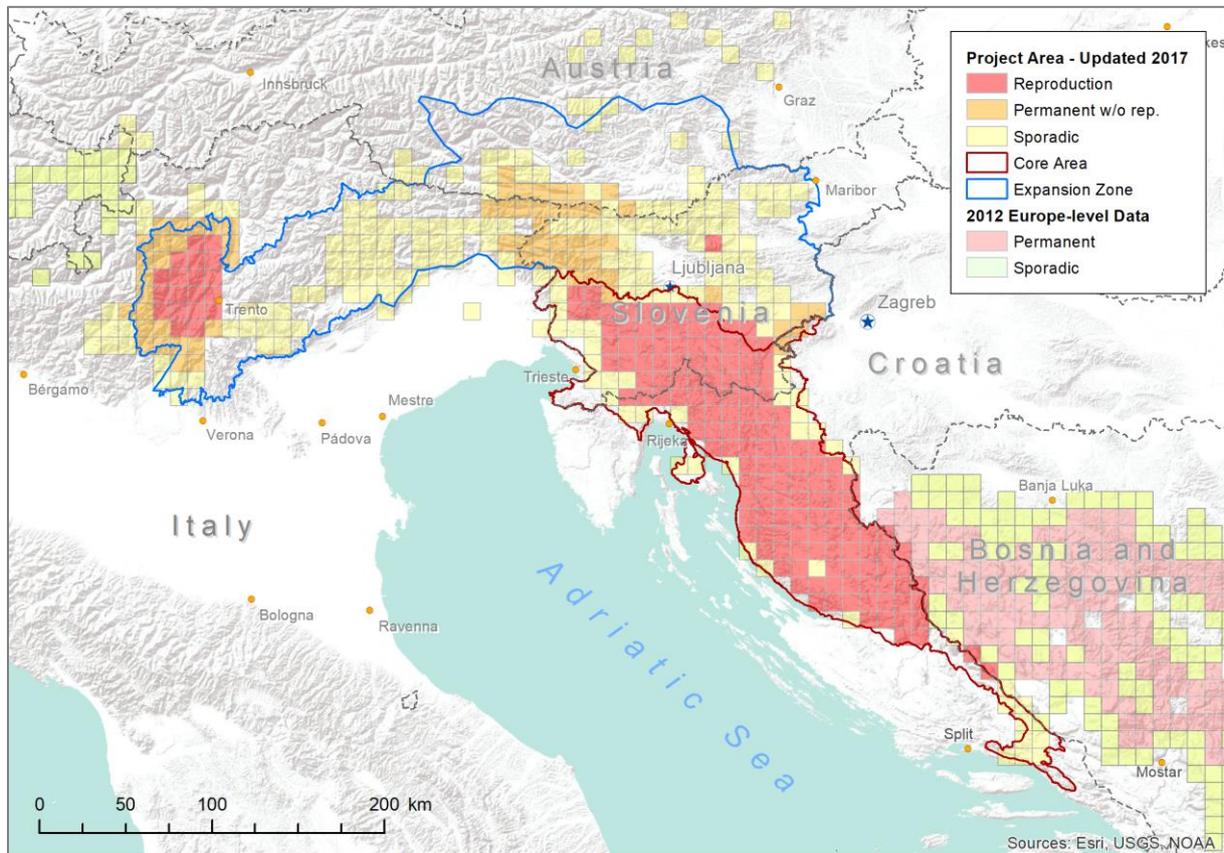
We believe that this document is a useful, updated compendium of available knowledge about our bears and that it will serve its purpose for management and conservation.

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## Bear population status – project area overview



**Figure 1: Bear distribution in LIFE DINALP BEAR project area – updated 2017 (status between 2012 and 2016).** **Permanent presence, reproduction** – areas where cubs were confirmed within the last three years; **permanent presence, no reproduction** – areas where bears have been present for at least three years over the last five years; **sporadic presence** – areas where bear presence has been documented for fewer than three seasons in the last five years period.

### Distribution

The project area of LIFE DINALP BEAR spans over four countries: Croatia, Slovenia, Austria and Italy. It is roughly divided into two areas: the Core Areas and the Expansion Zone.

The **Core Areas** are the main brown bear range in Croatia, Slovenia and western Trentino in the Central Alps. The first area stretches from Bosnian border in Croatia, along the Dinaric Mountain Range up to the foothills of the Alps. This is where most of the bears are. The area is rugged, covered by dense forests and has relatively low density of people, mostly limited to valleys. It has one of the

highest brown bear population densities ever recorded. It is the main source for natural expansion of bears into the Alps and has been the source for all reintroductions of this species in Western Europe. The second area, in Central Alps, host a small but so far viable population of around 50 bears originated by the reintroduction carried out in the frame of two LIFE projects (Ursus I and II) in 1997-2004. 48 litters and 101 cubs have been recorded in that area in 2002-2015, representing an important stepping stone for natural expansion of bears into the Central and Eastern Alps.

The **Expansion Zone** includes Eastern Alps in Slovenia, Austria and Italy. Bears are expanding into this zone from the Core Areas in Slovenia and in western Trentino. There is permanent bear presence in the southern part of this zone, in the pre-alpine areas in Slovenia and in the alpine and pre-alpine range in the Region of Friuli V.G., Veneto and eastern Trentino, but the last genetic survey in Slovenia in 2007 has shown that the bears in Slovenian Alps were few (21, 19-23 95% CI) and that the sex structure was heavily male-biased (70%M vs. 30%F).

## Population estimates & monitoring

While monitoring of brown bear conservation status has traditionally been country-specific, this situation is improving considerably through the monitoring activities within LIFE DINALP BEAR. There are estimated to be around 1500 bears in the entire project area in 2016, but the quality of these estimates still varies between countries (see country-specific chapters below). The vast majority of these bears are in the Core Areas (49-66 are in the Trentino area where bears were reintroduced). We estimate that approximately 30 animals are present in the expansion zone (not including Trentino).

**Table 1: Population estimates for bears in the project area for 2016.**

Item	Slovenia	Croatia	Italy, FVG	Italy, Veneto	Italy, Trentino	Austria
Number of bears (best estimate)	478 (437 - 512 95%CI, estimated in 2007)	1000	4	2, temporary presence	49 - 66	2, temporary presence
Sex structure	Males 40.5%, Females 59.5% (2007 estimate)	50% females, 50% males (on limited number of samples (67) in 2008); likely more females than males	4M	2M	M:19, F:18, I:1 (identified quota)	2M
Method of estimation	Mark-recapture estimate using noninvasive genetic samples, entire range sampled (2007)	Mark-recapture estimate using noninvasive genetic samples and extrapolated for whole bear range (2007)	Minimal number based on genetic data	Minimal number based on genetic data	Minimal number based on genetic monitoring (opportunistic on damage and other and systematic on rub trees), mark-recapture estimate, camera traps, observations.	Minimal number based on genetic data

## Detected bear mortality

No bear mortality was detected in 2016 in Austria. Four dead bears have been detected in Trentino: one hit by a train in Switzerland, two poisoned and one for unknown reasons (sex: 2 males and 1 females, 1 unknown; age: 1 cub, 2 subadults, 1 adult). Most of mortality in Slovenia and Croatia has been through legal cull/hunting (81,9 %), followed by traffic mortality (11 %). Mortality is male-biased (M: 61,7 % vs. F: 38,3 %). In this season this ratio in Slovenia (M: 63,6 % vs. F: 36,4 %) and Croatia (M: 61 % vs. F: 39 %) is more similar compared to other years. Such ratio skewness is expected since females with cubs are protected, making males more exposed to legal cull. In Croatia the sex ratio is less skewed than in 2015.

In 2016 in Slovenia detected mortality represents only 41 % of mortality detected in 2015, which was other ways similar to previous years. That is due to delay in late acceptance of decree on removal of specimens of brown bear and wolf from nature and thus only 34,4 % of the hunting quota had been fulfilled. In other countries detected mortality is similar to those reported for 2015.

Table 2: Mortality in the project area in 2016.

Item	Slovenia	Croatia	Italy, Trentino	Total
Number	46	136	4	186
Sex structure	M: 28, F: 16, U: 2	M: 83, F: 53	M: 2, F: 1, U: 1	M: 113, F: 70, U: 3
Legal cull/hunting	29	120	0	149
Illegal killing	1	1	0	2
Intervention cull	2	3	0	5
Sanitary cull	0	1	0	1
Traffic: car	6	3	0	9
Traffic: train	4	7	1	12
Found Dead	3	0	1	4
Intraspecific aggression	1	0	0	1
Natural causes (exhaustion)	0	1	0	1
Poison	0	0	2	2
Other	0	0	0	0

\*M – male, F – female, U - unknown

## Population goal and population level cooperation

There are currently no clear guidelines or common visions for development of a common bear management strategy, and collaboration at the management level is still relatively poor. The initiative is starting within LIFE DINALP BEAR to change this through the project. The first step are these reports.

## Conflicts and conflict management

Conflicts with humans appear over the entire project area. These are mainly livestock and property damages, but there have also been cases of humans being injured by bears. In all countries involved compensations are being paid for bear-caused damage, but the compensation systems vary. The differences between countries are huge, but in 2015 and 2016 they have been a little less dramatic than what we observed in the report for 2014. In 2016 there were 291,095 € paid for compensation of 666 damage cases. In 2016 there were 13 cases more than in 2015, but still a lot less than in 2014, when 414,850 € were paid for 850 damage cases. A large proportion of this reduction is on account of Slovenia, where the number of damages in 2015 was reduced by 32% (or by 99,047 €, 404 damage cases compared to 597 in 2014). This decrease is in all damage categories and not connected to a specific type of damage. As in previous years the largest proportion of damages are compensated in Slovenia (56,31 %), where the number of damage cases slightly decreased compared to 2015 (from 404 to 375 cases), but the amount of compensations has slightly increased (from 159,810 € to 162,202 €), which is probably due to a bit different proportions of damages by categories. Relatively large number of damages in Slovenia is not unexpected since there are many bears sharing space with a considerable population of humans. But as a contrast, damages in Croatia remain remarkably low, with altogether 8,729 € (3,15 %) paid for 21 (3.15 %) cases. While the money paid per damage case is close to that in Slovenia or the Friuli Venezia Giulia part of Italy, there are not many damage cases. In Croatia, damages done by bears are compensated by responsible hunting right owners directly to the owners of the damaged property. Investigation of damage cases is done by representatives of the hunting organizations and owners of the property, and they agree on the value of compensation. If they cannot agree the court process is initiated. Because the state does not cover damage compensations, reporting of damage cases to the responsible Croatian Ministry of Agriculture may be incomplete.

The number of damage cases has remained stable in Trentino (124 compared to 128 in 2015). In



Austria we didn't have complete damage data for 2014 (and no data on the amount of compensations paid that year), but these data became available for 2015. Number of damage cases and the amount of money paid for compensations have almost doubled from 2015 to 2016 (2015: 70 cases, 18,510 €; 2016: 133 cases, 36,560 €).

In Friuli Veneto Giulia the number of damages remains low (9 in 2016). As a contrast, the damages in Regione Veneto dropped considerably (to 8 from 36 in 2014, and 3,382 € compensations paid vs. 47,124 € in 2014). Bear M4 who was responsible for high damages in 2014 in Regione Veneto (47.124 €) was monitored during 2015/16 in Friuli. The bear damage data for 2016 is summarized in the table below.

In the past year there were two reports of human injuries in the project area. In Slovenia two hunters received light injuries by bears on two different occasions. Both of them were positive about the incidents. In Trivisio one bear attracted a lot of people's attention roaming the main street, but unlike expected there were few concerns about the danger the bear poses to humans. Similarly, there was a bear in Austria that was several times observed by people at close distance during daytime and even ventured into the city of Villach. This seems to be the same bear as the one observed in Trivisio.

Table 3: Damages done by bears in the project area in 2016.

Item	Slovenia	Croatia	Italy, FVG	Italy, Veneto	Italy, Trentino	Austria	Totals, Medians
No. of cases	375	21	9	4	124	133	666
No. of cases %	56,31%	3,15%	1,35%	0,60%	18,62%	19,97%	100,00%
Paid (€)	162.202 €	8.729 €	8.461 €	1.749 €	73.394 €	36.560 €	291.095 €
Paid (%)	55,72%	3,00%	2,91%	0,60%	25,21%	12,56%	100,00%
Paid per case	432,54 €	415,67 €	940,11 €	437,25 €	591,89 €	274,89 €	437,08 €
Paid per bear	334,30 €	0,42 €	1.058,00 €	1.691,00 €	1.366 €	9.255,50 €	1.212,00 €
Cases per bear	0,78	0,02	2,25	2,00	2,14	66,50	2,07
<b>Damages by subject</b>							
Sheep	94	0	3		28	122	247
Cattle	9	0	1			4	14
Other domestic animals	12	1 (8 gees and 1 rabbit)		12 rabbits	80		92
Beehives	85	3 (12 beehives)	4	2	113	10	214
Crops	24	1 (corn)	1		2		27
Orchards, vineyards	67	2 (6 plum trees)		grapes (200 kg)	31		98
Objects	13	14 feeders (6 big game, 3 salt, 3 red deer and 2 roe deer)			4	33 silage bales	17
Grass (pasture)	71						71
Horses	-	-	-	-	7	-	7



All areas have implemented some sort of a quick-response system (bear intervention group) that is used when a situation with a problem animal has to be dealt with. These activities are summarized in Table 4. For Austria and Veneto region in Italy, no such activities were reported for 2016.

**Table 4: Interventions in case of “bear problems” – by reasons and outcomes. The organization of bear response teams, collection of data and actions taken are different in different countries and regions, so the data may not be directly comparable.**

Item	Slovenia	Croatia*	Italy, FVG	Italy, Trentino	Total
Total Number of Interventions	211	15	2	18	246
<b>Causes</b>					
Bear damage	25	2	1	10	38
Bear in/near settlement	152	4		2	158
Traffic accident	26	10			36
Attack on human	5	0			5
Orphaned cub(s)	1	1			2
Other	2	0		1	3
<b>Outcomes</b>					
Talking with people	169	min. 18	2	Not recorded	189
Averse conditioning (chasing bear away)		1			1
Translocation of bear		0			
Removal of bear, number	2	3 (1 intervention shooting + 2 outside of bear zone)			3
Removal of attractant (garbage...)					
Other	9		bear near campsite	1	
<b>Bear on the highway</b>					
Search for a bear after collision with a car.	31*		2		33
Monitoring the area			2	5	7

\* In Croatia hunting right owners are investigating bear damage sites since they are responsible for damage compensation. IT members visit bear damage site only in the case of repeated damage and when her/his opinion is needed for intervention removal request by hunting right owner.

## Threats

There are several threats listed in different areas, and most are repeated from the previous report. Conflicts with humans are still listed as the foremost threat in most areas. Garbage conditioning / poor waste management and poor protection of property have been frequently listed. Additional threats are genetic isolation (in Trentino core area) and lack of females (reproduction) in Friuli-Venezia Giulia (FVG), Austria and Alpine area of Slovenia. While a case of a bear immigrating (probably from the Dinaric Mountains) in 2009 and emigrating back in 2010 has been reported, no natural geneflow from the larger population (which would require successful reproduction of the immigrant animal) has been recorded so far.

**Table 5: Threats to bear conservation and main causes of conflict with humans.**

Item	Slovenia	Croatia	Italy, FVG	Italy, Veneto	Italy, Trentino	Austria
Main Threats to Bear Conservation	Low tolerance of local residents.	Male biased trophy hunting	Lack of females	Presence of bear is still sporadic and totally male-biased; conflicts at local level caused by damages and misinformation by local media about the danger; potentially, poaching / poisoning	Low tolerance of local residents, genetic isolation.	No females; low tolerance to damages.
Main Causes of Conflict With Humans	Small-holder grazing, ranching and farming. Increase in numbers is too fast for many people and is resulting in many complains, opposition.	Garbage conditioning (individual bears)	Low conflict level	In general, problematic and "high damaging" bears: as in the previous 2 years, is not the case of 2016, due to very low presence and few damage cases	Fear and damages.	Unprotected beehives and sheep on Alpine pastures.

## Croatia

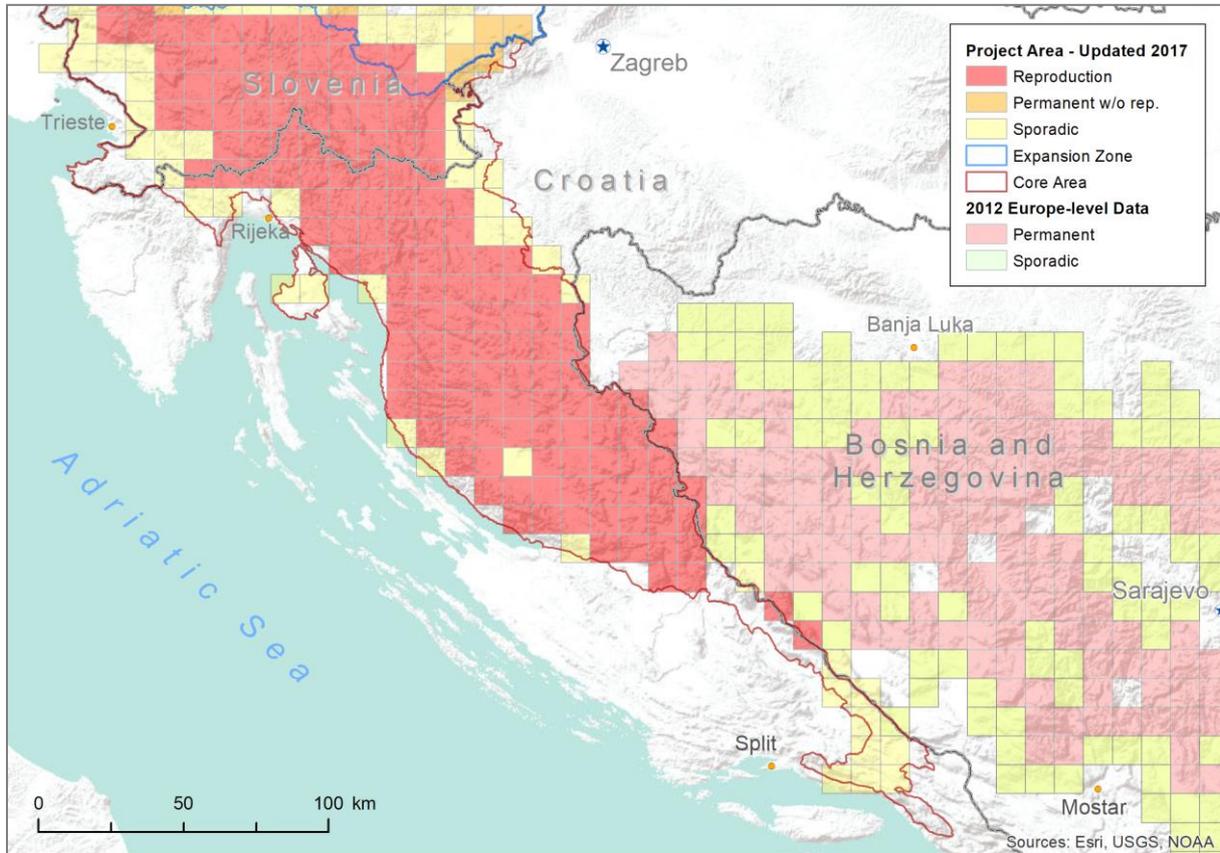


Figure 2: Brown bear distribution range in Croatia.

### General Information

#### Distribution

The total bear distribution area in Croatia has been defined in 2008 and no new information were obtained in 2016. The refining of bear range will be done in 2017. Officially bear range extends over 11,824 km<sup>2</sup>. The permanent bear presence habitat extends over 9,253 km<sup>2</sup>, while sporadic bear presence extends over 2,570 km<sup>2</sup>. Bears are distributed over the entire Gorski Kotar and Lika regions, the western and southern part of the Karlovac county, the Učka and Ćićarija mountains in Istria, the central and northern part of the island of Krk, the Žumberak mountains, the coastal part from Bakar to Maslenica and the area surrounded by the Kamešnica, Mosor and Biokovo massifs.

The best habitats in Gorski Kotar, Velika Kapela, Mala Kapela and Velebit, have an average density of 10 or more bears per 100 km<sup>2</sup>. High population density drives frequent migration of younger males to neighboring peripheral areas of the bear range (Učka, Ćićarija, Pokuplje, Priobalje, etc.). 94.2% of the permanent bear presence areas are hunting units, and 5.8% are located in national parks. In the national parks, bears are permanently protected.

Permanent bear presence habitats are areas in which bears satisfy all their food, water, space, non-disturbance, cover, breeding and denning needs and are present year-round. Females with cubs are regularly recorded in those areas. In those areas all prescribed protective measures are implemented in order to ensure the stability of the population. Local inhabitants accept bears as a part of their natural environment.

Sporadic bear presence habitats are areas with a sporadic presence of bears or areas in which the number of bears does not guarantee the continued existence of the species, or where bears do not den regularly. These are habitats to which bears are returning and which are usually connected to permanent bear presence areas in Croatia, Slovenia, or Bosnia and Herzegovina. Seems that there is a trend that some of “sporadic” areas will become “permanent.”

Bears occasionally cause damage in these areas. Within the sporadic bear presence habitats are areas where bear presence is desirable and areas in which bear presence is undesirable, which is reflected in the management regime.

### **Population estimates & monitoring**

The current estimate of the number of bears in the Croatian segment of the Dinara-Pindos population continue to be about 1000 individuals (Kocijan and Huber, 2008). This is still the best available estimate for 2016. The number has been obtained by genotyping 547 bear scat samples collected in 3 study areas: 9378 km<sup>2</sup> Gorski Kotar North, 1000 km<sup>2</sup> Gorski Kotar South, 998 km<sup>2</sup> Velebit (about 30% of bear range in Croatia), where a minimum of 210 different individuals were genetically determined. Those data were analysed through mark – recapture modelling and “Rarefaction” curve calculations, and then extrapolated across the entire bear range in Croatia. Resulting estimates had a relatively large margin of error but also indicated that at least 1000 bears were present.

In addition to the genetic approach, coordinated bear counts from high stands at feeding sites are done during pre-specified days in spring and autumn. These counts are envisioned in the Bear Action Plan

and are used to determine population trends, not population size. Monitoring also includes a full record and samples of each dead bear (from hunting, traffic mortality and other causes of death), and data from satellite telemetry research.

A large non-invasive genetic study of population size has been organized in 2015 within LIFE DINALP BEAR together with Slovenia. A total of 2205 scat samples were collected from September until December 2015 in Croatia. The study should provide a precise abundance estimate and a reference point for future brown bear monitoring. Final laboratory analyses, genotyping and capture-mark-recapture models are being done at the time of writing of this report and will be available in the next yearly report.

### **Legal status & relevant management agencies**

With accession to EU in 2013 brown bear in Croatia became a strictly protected species, but also remained a game species. The main management agency for bears in Croatia is the Hunting Directorate within the Ministry of Agriculture. Since the bear became a protected species, the management is shared with the Directorate for Nature Protection within the Ministry for Protection of Environment and Nature.

The operational management follows the Brown Bear Management Plan for the Republic of Croatia. The Brown Bear Management Committee prepares yearly Action plans and supervises their implementation. The Bear Intervention Group helps with the actions in the field including the management of bears showing problem behaviour.

In the last four years quota for bear hunting has been set to 120 bears plus up to 30 individuals expected to be lost due to other reasons, including the intervention removal of problem ones. The outcome for 2016 was 120 hunted and 16 lost by other means: 7 on railroads, 3 on roads, 1 euthanized, 1 natural death, 3 intervention removal and 1 poached. On a multi-year average only 84 % of the hunting quota has been fulfilled and other losses were also lower than anticipated (78 %).

### **Population goal and population level cooperation**

According to the management plan the total habitat capacity is around 1100 bears and the social capacity (acceptance) may be around 900. Currently both are assumed to have been reached and the goal of active management is to keep the population within the given limits.



Bears in Croatia are a part of the Dinaric-Pindos population and are directly shared with neighbouring Slovenia and Bosnia and Herzegovina. With Slovenia there is full cooperation on the level of scientists, while the political agreement and collaboration in management is still in need of improvement. Intensive activities are planned within LIFE DINALP BEAR to overcome these difficulties. With Bosnia and Herzegovina the main difficulties are lack of capacity and complicated political situation in that country. Promising partnership started with NGO “Centar za životnu sredinu” from Banja Luka.

## Conflicts and conflict management

Current conflict levels are surprisingly low. The acceptance of bears can be on average considered as very good. The extensive surveys in 2002 and 2008 showed that 86% and 72%, respectively, respondents living in the bear range would agree with increasing bear numbers in Croatia (Majić et al 2011). That is mainly related to the status of bears as a game species, where maintenance of large population secures income through hunting. Continued tradition of living with bears makes coexistence easier as local inhabitants know how to minimize livestock depredation and destruction of beehives. The damages that occur are compensated by hunting organizations (except in the national parks) that are in most cases comprised by local inhabitants as well. Hence the total compensations paid per year are very low, on average about 6000 €, or only about 6 €/bear/year. Comparably low bear damages can only be found in Sweden (3.6 €/bear/year), while the other extreme is Norway where one single bear causes twice as much damage as ~1000 bears in Croatia (12,666 €/year/bear).

The Brown Bear Management Committee and the Bear Emergency Team are the bodies that care for the implementation of the Brown Bear Management plan (Huber et al. 2008) and the implementation of the yearly Bear Action Plans. That work includes decisions on the size and distribution of hunting quotas and on emergency removals of problem bears after other measures have failed. The revision of Brown bear management plan for Croatia is planned for the year 2017.

## Threats

The current situation with bear population segment that lives in Croatia is very favourable and the potential threat may only be the events that would change something in the ever fragile balance between any large carnivore and humans. The immediate problem was the forced change of bear status from “game” to “strictly protected” by EC decision. Efforts were taken to mitigate the negative effect on the public acceptance and to prevent the explosion of damage compensation requests towards the state. The quota hunting continued smoothly through “derogations” and bear kept the “game” status as well. The bear-caused damages are continued to be compensated by hunters.

Another issue is to prevent habituation of bears to human food sources (accessible garbage and poor or no protected property, e.g. beehives, crops, livestock...) through timely actions such as appropriate garbage disposal and better property protection or negative conditioning and removal of habituated individuals.

There was extensive construction of major new infrastructure (highways) in the bear habitat over the previous decade, but these seem to have been satisfactory mitigated by numerous crossing structures including a number of large green bridges (Kusak et al 2009). In 2015, within the scope of LIFE DINALP BEAR, large scale protection measures were implemented to prevent brown bear appearance and mortality on highways: electric fences, one-way exit doors, jump-out ramps and 30 bear-proof garbage bins were installed along the Rijeka-Zagreb motorway. A future threat may be the planned construction of “wind power parks” in the core bear habitat, especially in the critical denning zones (Huber and Roth 1997).

## Situation and events in 2016

### Population size and trends

The estimate of the population size has not changed – in lack of better data it is still estimated at approximately 1000 bears. Intensive noninvasive genetic sampling was carried out from September until the end of December 2015 in a whole bear range in Croatia in order to obtain genetically based estimation of population size. 2205 samples were collected in Croatia alone (4677 together with Slovenia), which should provide a very reliable estimate. Final laboratory analyses, genotyping and capture-mark-recapture models are being done at the time of writing of this report and a more precise



population size estimate will be available in the next yearly report.

### **Management decisions**

Following the standard decision-making procedure, hunting quota has been set as 120 plus up to 30 for other causes of mortality.

### **Special events**

The year 2016 was relatively calm considering special events with bears. Fewer bears were approaching house and fewer than average died in traffic accidents.

Newly established Protocol for the highway intervention team is in use and gives directions for actions in a case of bear appearance inside the highway corridor. HBBET and Protocol were established in 2015 within LIFE DINALP BEAR project.

## References

- Bautista, C., Naves, J., Revilla, E., Fernández, N., Albrecht, J., Scharf, A. K., Rigg, R., Karamanlidis, A. A., Jerina, K., Huber, D., Palazón, S., Kont, R., Ciucci, P., Groff, C., Dutsov, A., Seijas, J., Quenette, P., Olszańska, A., Shkvyria, M., Adamec, M., Ozolins, J., Jonozovič, M., Selva, N. 2016. Patterns and correlates of claims for brown bear damages on a continental scale. *Journal of Applied Ecology*. 2016 doi: 10.1111/1365-2664.12708.
- Frković, A., Huber, D., Kusak, J. 2001. Brown bear litter sizes in Croatia. *Ursus* 12:103-106.
- Huber, D., Roth, H.U. 1997. Denning of brown bears in Croatia. *Int. Conf. Bear Res. and Manage.* 9 (2): 79-83.
- Huber, D., Kusak, J., Frkovic, A. 1998. Traffic kills of brown bears in Gorski kotar, Croatia. *Ursus* 10: 167-171.
- Huber, Đ., Kusak, J., Majić-Skrbinšek, A., Majnarić, D., and Sindičić, M. 2008. A multidimensional approach to managing the European brown bear in Croatia. *Ursus* 19:22-32.
- Kaczensky, P., Huber, D., Knauer, F., Roth, H., Wagner, A., Kusak, J. 2005. Activity patterns of brown bears (*Ursus arctos*) in Slovenia and Croatia. *Journal of Zoology* 269: 474-485.
- Kocijan, I. and Huber, Đ. 2008. Conservation genetics of brown bears in Croatia. Final report. Project Gaining and Maintaining public acceptance of Brown bear in Croatia (BBI-Matra/2006/020 through ALERTIS).
- Kusak, J., Huber, D. 1998. Brown bear habitat quality in Gorski kotar, Croatia. *Ursus* 10: 281-291.
- Kusak, J., Huber, D., Gomerčić, T., Schwaderer, G., Gužvica, G. 2009. The permeability of highway in Gorski kotar (Croatia) for large mammals. *European Journal of Wildlife Research* 55:7-21.
- Linnell, J. D. C., Trouwborst, A., Boitani, L., Kaczensky, P., Huber, D., Reljic, S., Kusak, J., Majic, A., Skrbinsek, T., Potocnik, H., Hayward, M. W., Milner-Gulland, E. J., Buuveibaatar, B., Kirk A. Olson, K. A., Badamjav, L., Bischof, R., Zuther, S., Breitenmoser, U. 2016. Border Security Fencing and Wildlife: The End of the Transboundary Paradigm in Eurasia? *PLOS Biology* DOI:10.1371/journal.pbio. 1002483 June 22, 2016.
- Linnell, J., D. Huber, A. Trowborst, L. Boitani. 2016. Refugee fences fragment wildlife. *Nature*



529:156, January 2016.

Majić, A., de Bondonia, A.M.T., Huber, Đ., Bunnefeld, N. 2011. Dynamics of public attitudes toward bears and the role of bear hunting in Croatia. *Biological Conservation* 144: 3018–3027.

Swenson, J.E., Adamič, M., Huber, D., Stokke, S. 2007. Brown bear body mass and growth in northern and southern Europe. *Oecologia* 153: 37-47.

Molinari, P., Krofel, M., Bragalanti, N., Majić, A., Černe, R., Angeli, F., Huber, D., Groff, C., Hipolito, D., Jerina, K., Jonozovič, M., Mohorović, M., Reljić, S., Seveque, R., Stergar, M., Molinari-Jobin, A. 2016. Comparison of the occurrence of human-bear conflicts between northern Dinaric Mountains and south-eastern Alps. *CDP News*. 9-17, 12. 2016

## Slovenia

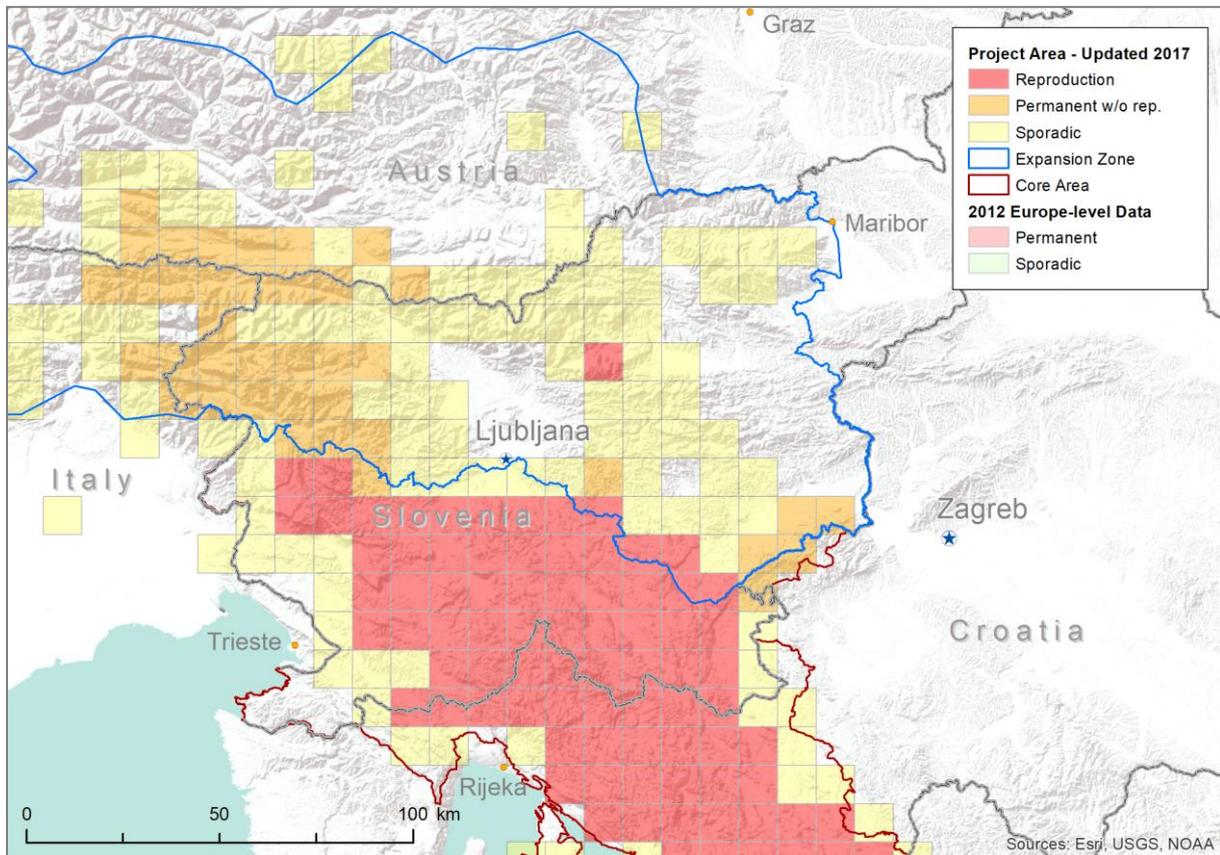


Figure: Bear distribution in Slovenia.

## General Information

### Distribution

Bears in Slovenia are the northern edge of the large Dinaric-Pindos population. The majority of bears in Slovenia are found in the south of the country, next to Croatian border, south of Ljubljana – Trieste motorway and Sava River. The population density of bears NW of this highway is considerably lower, but some bears are permanently present, and there are frequent occurrences of bears in the Julian Alps and the pre-alpine regions. North of Ljubljana and Sava river bears appear sporadically and are typically dispersing juvenile males.

## **Populations estimates & monitoring**

The population size was last estimated in a high-intensity noninvasive genetics CMR study in 2007 which covered the entire area of permanent bear presence in Slovenia. The population size in winter, after the yearly cull and before the new generation of bears was born in the spring (the lowest yearly number), was estimated at 440 (396-480 95% CI).

Bears are also routinely monitored through yearly systematic observations at feeding places (352 feeding places monitored simultaneously) and through population reconstruction using age data of culled bears. The population is considered stable.

For the core area in the Dinaric Mountains, a highly-intensive noninvasive genetic sampling was implemented between September and December 2015, together with Croatia. 2472 samples were collected in Slovenia (4677 together with Croatia), which should provide a very reliable estimate. Final laboratory analyses, genotyping and capture-mark-recapture models are being done at the time of writing of this report and final estimate will soon be available.

Parallel to this, less intensive but long-term genetic sampling has been started in the Alpine and Pre-Alpine areas of Slovenia, complementary to such sampling in border areas of Italy and Austria. The goal of this sampling is to keep a close watch on how the population expansion into the Alps is progressing. Samples are being analyzed and we expect to include the first results in the next Population Status Report.

## **Legal status & relevant management agencies**

Bear is listed as a strictly protected species in Slovenia. Its management and conservation are responsibility of Ministry of Environment and Spatial Planning. There is a yearly cull quota which is based on an expert opinion by Slovenia Forest Service, which is then discussed and modified by the Large Carnivore Management Advisory Board, which consists of representatives of various stakeholders. On basis of this the “exceptional cull” is allowed through a decision by the competent minister. For the last 10 years culling quota has varied between 60 and 90 animals (with exception of the season 08/09). The quota for the last few years has been similar to those set over the past decade.

## **Population goal and population level cooperation**

The management goal is to keep the population size stable and minimize conflicts with humans. The population is conserved mainly in the bear core area, except potentially in some “corridors” towards Austria and Italy, if decided so (not precisely defined what this means). However, bears are not supposed to be permanently present in these “corridors” according to official management strategy, although at present there is no regular hunting there (only so called management removals of problem individuals).

Considerable efforts have been made to improve transboundary cooperation in bear management. These goals are planned to be realized within LIFE DINALP BEAR project.

## **Conflicts and conflict management**

There are regular conflicts with agriculture and occasional bears wandering into villages or even cities which create considerable fear among local residents. There have been infrequently injuries of humans, however no fatalities have happened in the last couple of decades. Damages to property are being systematically compensated, but the compensation system has been criticized as it does not stimulate people to invest in protection (compensations usually exceed commercial value of the destroyed property). A “Bear Response Team” has also been organized which deals with problem bears and immediately reacts to concerns expressed by people in the bear area. However, any other actions preventing conflicts (e.g. bear-friendly garbage management, removal of “bear attractants” from the environment etc.) are sorely lacking.

## **Threats**

The main threats are habitat fragmentation/loss through urban sprawl and development of traffic infrastructure. A considerable threat is also traffic (automobile or train collisions) which causes significant bear mortality on a yearly basis. An indirect, but very serious threat are conflicts with humans and destruction of their property, as this lowers the support for bear conservation and increases demands for high cull quotas. During the last years populations of some large carnivores in Slovenia are increasing in numbers and are also expanding their distribution area. For a lot of people this is happening too fast and is resulting in more and more complains and oppositions.

## Situation and events in 2016

### Population size and trends

The population size estimate from 2007 is not reliable anymore since too much time has passed. Jerina & Krofel (2012) estimated on basis of population reconstruction using dentin-layer aging of killed bears that up to 2012 the population size should have remained approximately the same. A highly successful noninvasive genetic sampling has been implemented in the fourth quarter of 2015 within the LIFE DINALP BEAR project, and the results should provide a new reliable orientation point for management.

### Management decisions

A culling decision was made for the period 1 October 2016 until 30 September 2017. But due to late acceptance of decree on removal of specimens of brown bear and wolf from nature, removal was allowed with a three and a half months delay (20 January 2017). Due to this delay only 34,4 % of the hunting quota had been fulfilled.

Bear cull was precisely specified by weight categories spatially precisely distributed. The planned cull was 90 bears. For the core area, the planned cull was 76 bears – 53 below 100 kg, 14 between 100 and 150 kg, and 9 above 150 kg. In the “edge” area a cull of 14 bears was planned: 8 below 100 kg, 4 between 100 kg and 150 kg, 2 below 150 kg, and 2 over 150 kg. Additionally, a cull of two bears <150 kg was planned in Prealpine and one in Alpine areas. Other mortality (traffic, natural death etc.) is not part of the quota.

In 2016, 46 bears were recorded dead in Slovenia, 28 males and 16 females. 29 died in legal cull, one was illegal killed, 2 in intervention culling, 6 in car accidents, 4 in train accidents, three bears were found dead by undetermined reasons, and one died because of intraspecific aggression.

### Special events

On two different occasions hunters were injured by a brown bear during hunting. In the first case (on 26 July 2016) hunter surprised a bear when approaching a feeding site. In the second case (on 6 November 2016) hunter surprised a bear during a driven hunt. In both cases hunters received light injuries and were positive about the incident.

## Italy

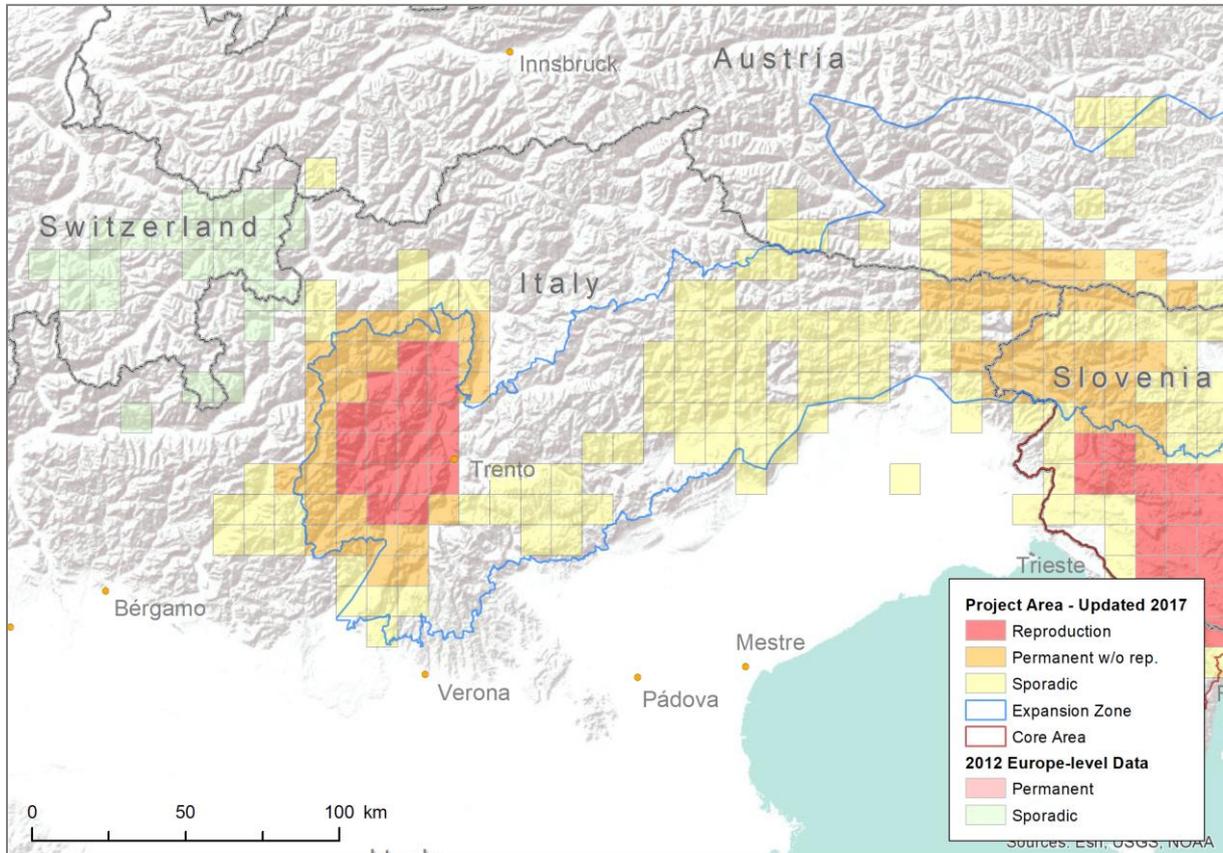


Figure 3: Brown bear distribution in Northern Italy.

## General information

### Distribution

Bears in Italy are found in 2 populations, the autochthonous Central Apennine and the re-introduced Alpine population in Trentino. The autochthonous population in the Apennines is outside of the project area, completely isolated and will not be treated in this report.

In Trentino the female area covers 1,090 km<sup>2</sup> (2016) in the western part of the province. The resident range is more or less stable since 2012, as well as the range of the dispersers (around 20.000 km<sup>2</sup>). Additionally, there is a third nucleus in the eastern Italian Alps which is part of the expanding Slovenian population and partially from expanding individuals from Trentino. This occurrence is

situated in north-eastern Friuli VG, where a few male bears are permanently present.

In Veneto only opportunistic monitoring is done by the provincial police and national forest service (CFS) staff, following damages or presence signs reports. Biological samples collected during the monitoring are sent to ISPRA (the national Institute for Environmental Research) for genetic analysis. Even in 2016, as before in 2015 after the “annus horribilis” of 2014 with the highest amount of bear damages ever recorded (caused by M4 bear), only a few sporadic bear presences were detected in the region. These were concentrated in spring and autumn and in areas neighboring to “source areas” with permanent presence of bear: in Monte Baldo area in Verona province, at the border with the Adamello area of Trento province, where the male bear M19 has been detected in spring (from late April to the beginning of June) and in Autumn (September-October); in central Cadore area (Belluno province), the male bear Gen23, from Slovenian population, was detected in June and September and probably spent the winter in the same area. For the third consecutive year, the presence of the bear in Veneto was therefore extremely small and sporadic.

### **Populations estimates & monitoring**

The minimum estimate for the Trentino bear population is 49 individuals (range 49-66 including coys), with a CMR estimate of 42 (38-55 without coys). The population trend is apparently stable or slightly increasing in the last three years. Monitoring is done by Forestry service personnel, park staff, Museum of Science staff and Hunting Association. In Friuli VG in 2016 eight to nine different bears (all males) have been detected through genetic sampling. The monitoring is done by the Regione Autonoma Friuli Venezia Giulia and Comando Unità Tutela Forestale Ambientale e Agroalimentare Carabinieri, Progetto Lince Italia and the University of Udine.

### **Legal status & relevant management agencies**

Bear management in Italy is decentralized at regional and local (i.e. provincial and regional) level. The bear is fully protected in Italy. A management plan was drafted in 2010 by a team of experts (neither the public, nor stakeholders have been involved) of the Ministry on Environment, National Wildlife Institute and the Regional governments; it is not really mandatory at the legal level, but in fact it is pretty much observed by g.o. managers.

The Trentino population falls under the jurisdiction of the Forestry and Wildlife Department of the Provincia Autonoma di Trento. Management involves the public and all stakeholders on the highest level possible. The management of bears in Trentino does not depend on single projects but is rather carried out since the 1970s as part of routine wildlife management.

### **Population goal and population level cooperation**

The goal for the Trentino population is a MVP of ~50 individuals and to connect the small and isolated Alpine population with the large Dinaric-Pindos population. So far, a couple of bears are known to have moved from Trentino to northern Slovenia but no significant movements in the opposite direction (which would be useful for the small isolated population of the central Alps) have been recorded so far. International cooperation occurs through the Alpine Convention and other international networks.

### **Conflicts and conflict management**

Conflicts exist over livestock depredation, destruction of beehives and crops harvesting; compensation is paid by the Forestry and Wildlife Department after inspection and confirmation by own, specifically trained personnel. 100% of the market value is paid within two months. In Trentino, additional funds are available by the Forestry and Wildlife Department for prevention measures such as electric fences, livestock guarding dogs and shelters for shepherds in the mountains. Two attacks on humans have been recorded in 2014 and 2015 (females with cubs) reducing even more the positive attitude of people toward bears.

### **Threats**

Trentino: Despite the positive trend, livestock depredation and the occurrence of problem bears (bears approaching human infrastructure & settlements in search of food in a place with high human density) still remain a challenge when it comes to local acceptance of bears. This makes it necessary and important to improve 1) quantity and quality of information, and 2) efficiency in removing problem bears. Both are regarded critical success factors.

Friuli VG: there is a low conflict level with only a few damages.

Veneto: both conflicts and threats, and the overall perception of bears, follow the irregularity of bear presence, changing radically from year to year between “total indifference” and “priority emergency”.

These conditions, which is reflected in the attention of media and local politics, makes it difficult to build a balanced and regular management approach to the bear in the region.

## **Situation and events in 2016**

### **Population size and trends**

The monitoring season 2016 (15th year of successive genetic monitoring) on brown bears in Trentino-Italy pointed out that the population has an essential stability in the last three years, with a minimum population presently estimated to be 49 (max 66) individuals with 11-18 cubs observed in 2016.

Trentino is still the only region in the Italian part of the project area where reproduction is reported.

In Friuli VG eight to nine different bears have been confirmed using genetic sampling, all of them males.

In Veneto in 2016, only few sporadic presences of bear were recorded in the region, concentrated in spring and autumn and in areas neighbouring to Trentino and Friuli VG (Monte Baldo in Verona province, Alpago – Cansiglio in Belluno and Treviso province). The presence of bears in Veneto is still a sporadic and irregular event.

### **Special events**

In the night of 9. to 10. November 2016 at 03:00 a brown bear was filmed by a “security camera” in Via Roma, the main street of Tarvisio (a village of almost 5000 inhabitants), while he’s crossing the street near the pedestrian lines. This event had a great echo in the public: the local intervention team received numerous phone calls of people who wanted to know more about bears and to receive the video footage. Unlike expected there were few concerns about the danger the bear poses to humans.



## References

AA.VV., 2010 - Piano d'Azione interregionale per la Conservazione dell'Orso Bruno nelle Alpi centro-orientali – PACOBACE. Quad. Cons. Natura, 33, Min. Ambiente - ISPRA. [\[Link\]](#)

Groff C., Angeli F., Asson D., Bragalanti N., Pedrotti L., Rizzoli R., Zanghellini P. (editors), 2016

"2015 Bear Report", Forestry and Wildlife Department of the Autonomous Province of Trento. [\[Link\]](#)

## Austria

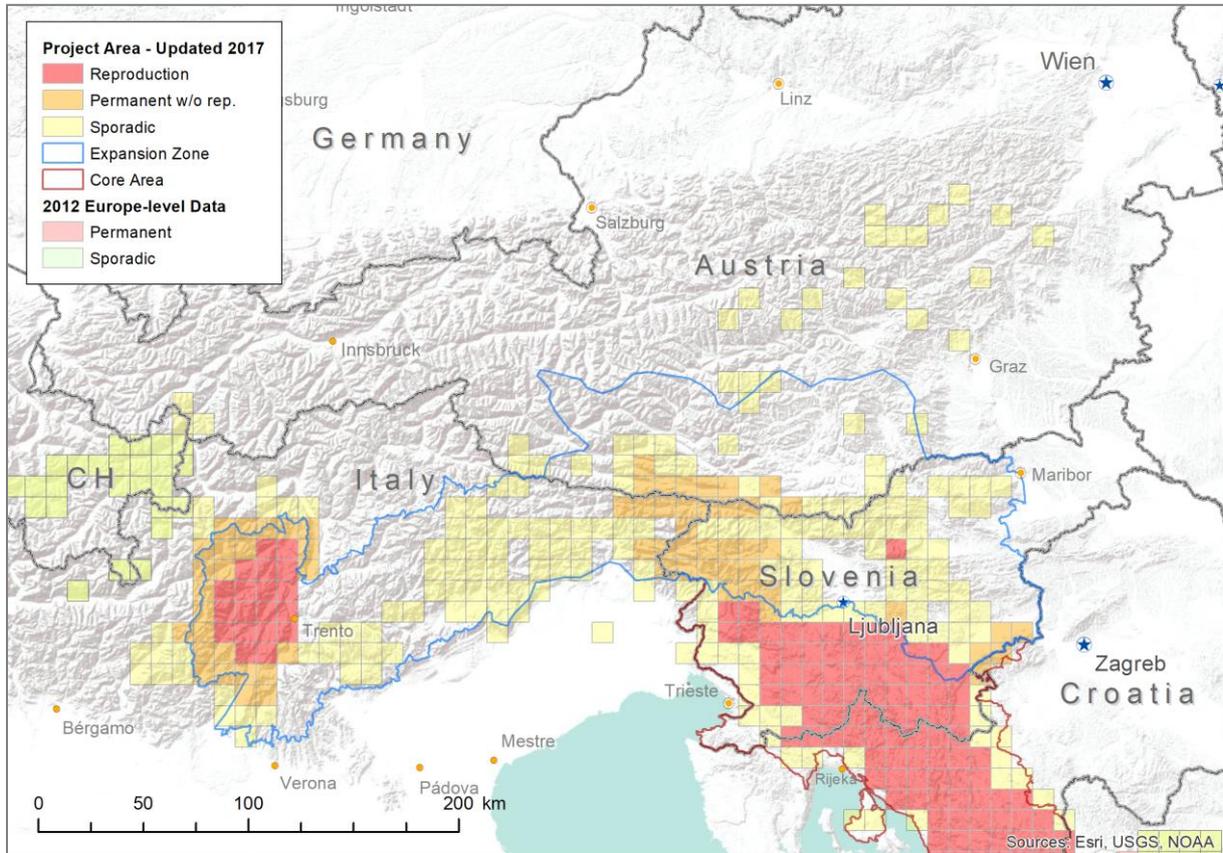


Figure 4: Bear distribution in Austria.

### General information

#### Distribution

Bears in Austria are part of the Alpine bear population but are presently only found in southern and western Austria along the border to Slovenia, Italy and Switzerland. No reproduction has been confirmed in this area and so far, all animals that were individually identified have been males, either originating from the Slovenian or the re-introduced Trentino bear population.

Between 1989 and 1993 three bears (2 females and 1 male) were re-introduced to the Northern Limestone Alps in central Austria where a single migrant male bear had settled in 1972. Between 1991 until 2006 a minimum of 31 cubs was produced. However, genetic monitoring which was started in

2000 finally revealed that the population never reached more than 12 individuals (1999) and that most cubs disappeared already as a yearling or two-year-old bear (Kruckenhauser et al. 2008). By 2011 the last descendent of the released bears had finally disappeared and the population is now formally considered extinct. The most likely explanation for the disappearance of this small population is illegal killing in combination with the small population size.

### **Population estimates & monitoring**

Population size of the bear occurrence in Austria is difficult to provide as long-distance dispersers from both the Slovenian and the Trentino bear population seem to move in and out of the border region. It is probably realistic to assume that ca. 5 different male bears may roam for some days, weeks or months the southern Alps of Austria within the course of a year (in 2013, 2014, 2015 and 2016 four, three, two, and six individuals, respectively, were detected by genetic monitoring). Presumably no bear is staying permanently in Austria, but some individuals have been registered in several consecutive years indicating that some bears stay permanently in the border region of Slovenia, Italy, and Austria.

Bear signs reported by third parties are inspected and documented by three wildlife professionals, the so called “bear advocates”. All bear signs (with the reservation that in Carinthia not all data collected by the provincial administration and hunting organization are provided) are entered into a central database and rated according to the re-fined German SCALP criteria (Kaczensky et al. 2009). Bear monitoring is heavily based on genetic monitoring since 2000 (Kruckenhauser et al. 2008).

### **Legal status & relevant management agencies**

In Austria the bear is mainly subject to the hunting law but enjoys a year-round closed season. Responsibility for protecting species in accordance with the Habitats Directive lies with the hunting and nature conservation authorities of the provinces. A Coordination board for bear, wolf and lynx management in Austria (KOST) - composed of representatives of the hunting and nature conservation authorities of the provinces, the bear advocates and representatives of selected stakeholders - meets twice a year to review and discuss management issues regarding large carnivores in Austria.

The first bear management plan for Austria was published in 1997 and revised in 2005 (Coordination board for Bear Management in Austria 2005). The target of the Austrian bear management is “to protect brown bears in Austria and to establish and maintain a viable population in a favourable

conservation status, with special emphasis on a peaceful coexistence of humans and bears and the creation of necessary conditions to connect existing populations to allow the bears to expand into suitable habitats” (Coordination board for Bear Management in Austria 2005).

### **Population goal and population level cooperation**

There are no explicit population goals for bears in Austria. Habitat modelling shows a high habitat suitability of the Eastern Alps (Austria, NE Italy, Germany & N Slovenia) and suggests a habitat capacity for a minimum of 518-686 mature bears (1228-1625 individuals; G thlin et al. 2011).

Monitoring within Austria is coordinated by the bear advocates. Genetic monitoring is closely coordinated with the neighbouring countries so that individual bears can be identified and backtracked to the respective source population (Karamanlidis et al. 2009). Furthermore, there is and always has been close cooperation on the technical level with colleagues from neighbouring countries e.g. cross-border tracking of radio collared animals. On the political level cooperation is happening within the framework of the Alpine Convention. However, there is no formal population level management or even a commonly expressed goal.

### **Conflicts and conflict management**

The main conflicts with bears are over 1) damages caused by bears to beehives and to free-ranging livestock on Alpine pastures (~130,000 sheep / goats and ~300,000 cattle graze with minimal supervision on Alpine meadows over the summer months) and 2) actual or perceived impacts on hunting (bears visiting ungulate feeding sites spooking game and raiding feed, bears killing red deer in winter enclosures or at feeding sites, hunters risking close encounters).

Damage compensation is paid for destroyed beehives and confirmed livestock kills. However, compensation payments are “voluntary” (no legal right for compensation) and in many provinces they are covered at least partly by the hunting associations through the hunting insurance. Compensation payments do not cover additional labor costs. Because of the expansion of the wolf population in the Alps, a pilot project for damage prevention in sheep grazing on Alpine pastures has been launched in 2012. The program includes the testing of fencing, herding, and livestock guarding dogs in 5 pilot areas (two projects have been realized up to now).

Game killed by bears or damages to hunting infrastructure (e.g. feeding sites) are not reimbursed.

Re-introduced bears seem to have been perceived by local people as “artificial” and “belonging to WWF”. The official policy by the Austrian hunter’s associations is that they oppose any re-introductions, but welcome bears that arrive naturally.

### Threats

The re-introduced bear population in central Austria became extinct, the situation in Carinthia is stagnant, but dispersing male bears from Trentino are increasingly reaching Western Austria. Illegal killings seem to be a problem, although a proof is extremely difficult to obtain (Kruckenhauser et al. 2008). The latest case was the radio collared male bear *Rožnik*, which dispersed from Slovenia into the Austrian province of Carinthia in May 2009. Three days after having crossed the border into Austria for the first time the collar stopped. Twelve days later the carcass was found by locals on the Slovenian side of the border and an autopsy confirmed the bear had been shot (Kaczensky et al. 2011). Another case was detected in Central Austria in 2007, 13 years after the bear has been shot.

### Situation and events in 2016

The general situation of bears in Carinthia and in the whole of Austria did not change in 2016. There is no trend visible in the number of bears present and the number of damages recorded. The number of bears individually genotyped was higher than in the years before (5 in Carinthia, 1 in Eastern Tyrol) and more samples have been collected than in 2015. Again, several observations and attacks on beehives or sheep were reported close to houses or settlements. In May a conspicuous bear was observed by people several times at close distance during daytime; it had a distinctive white patch at the shoulder and it was dubbed Rudolf (and Rodolfo in Italy, as it was recorded also in the Tarvisiano). This bear even ventured into the city of Villach following the railway tracks up to the western railway station. The last record of this bear is a genetic one from hairs collected on silage bales ripped open (in the sample another bear was detected, maybe a brother of Rudolf).

## References

Coordination board for Bear Management in Austria. 2005. Bears in Austria – a management plan. Revised version 2005. WWF Austria, Vienna, Austria.

Güthlin, D., F. Knauer, T. Kneib, H. Küchenhoff, P. Kaczensky, G. Rauer, M. Jonozovic, A. Mustoni, K. Jerina. 2011. Estimating habitat suitability and potential population size for brown bears in the Eastern Alps. *Biological Conservation* 144: 1733–1741

Kaczensky, P., K. Jerina, M. Jonozovic, M. Krofel, T. Skrbinšek, G. Rauer, I. Kos, B. Gutleb. 2011. The case of the bear Rožnik – are illegal killings an underestimated threat for brown bear recovery in the Eastern Alps? *Ursus*, 22(1):37-46.

Karamanlidis A.A., De Barba M., Georgiadis L., Groff C., Jelenčič M., Kocijan I., Kruckenhauser L., Rauer G., Sindičić M., Skrbinšek T., Huber D. 2009. Common guidelines for the genetic study of brown bears (*Ursus arctos*) in southeastern Europe.

Krukenhauser, L., G. Rauer, B. Däubel, and E. Haring. 2009. Genetic monitoring of a founder population of brown bears (*Ursus arctos*) in central Austria. *Conservation Genetics* 10:1223–1233.