"Conservation and Management of Wolves in Croatia"

PROJECT bulletin

Life

ZAŠTITA I UPRAVLJANJE VUKOVIMA
U HRVATSKOJ

Content

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Introduction

There is no doubt that wolf is one of those animal species that attract most human attention and trigger most of our feelings, both negative and positive.

Livestock breeders complain about the extensive damage done to the livestock, hunters blame the wolf for the decrease of game populations, while many people regard it as a bloodthirsty, life-threatening animal. Such, mostly negative attitudes towards the wolf have existed ever since people started dealing with livestock breeding. Former communities of nomads and hunters saw in wolf a model of a perfect hunter, and many nations considered it their ancestor or their brother. At the same time, due to the domestication of this species, the man acquired one of the most faithful companions – a dog.

A pair of grey wolves (*Canis lupus*)

Wolf was worshiped by Indians, Egyptians and Romans (remember the myth on Romulus and Remus). However, in mediaeval Europe wolf was a symbol of all evil that people found in themselves and that image was deeply imprinted into man's consciousness. After all, everyone remembers the stories about the Little Red Riding Hood, Wolf and three piglets, Wolf and seven kids.

Unfortunately, such attitudes to wolf lead to the extermination of this species from the largest part of Europe and North America.

In spite of organised chases and poisoning, wolf still managed to survive in the territory of Croatia. Until the end of the 19th century, wolf has been widespread throughout Croatia, now being constantly present in the territories of Gorski kotar, Lika and Dalmatia.

However, the awareness of the need for nature conservation, and the conservation of wolf, is developing more and more each day. We are familiar with the fact that wolf has an important role in maintaining the natural balance and conservation of healthy populations of the wild animals they feed on. Wolf is an indicator of the preserved state of the nature of a country, and our obligation towards the coming generations is to preserve the species. After all, we are bound to do it according to international regulations, and specifically those related to the obligations of a country aiming to become a full member of the European Union.

Grey wolf

The purpose of this bulletin is to inform you about the problems of the wolf protection and the current activities that are being systematically implemented so as to preserve this species, which are integrated under the LIFE project called "Conservation and management of wolves in Croatia".

Situation before the project start-up

In the end of 1980s and the beginning of 1990s, the number of wolves in Croatia had considerably decreased, and experts suggested a strict legal protection of the species. Consequently, in 1995 wolf was protected by the Rule Book on the Protection of Certain Mammalian Species (Mammalia).

Implementation of the conservation activities was aggravated by numerous unresolved issues and problems with local interest groups, primarily with livestock-breeders and hunters, who are affected by the wolf protection.

Livestock-breeders complain about the extensive damage inflicted by wolf to the livestock. The largest damage on the livestock has been recorded in the territory of Dalmatia, where in the lack of natural prey wolf feeds mostly on the livestock. At the same time, in this area the culture of the livestock tending has been abandoned, unlike for instance the area of Lika. Another aggravating circumstance is the heavy war aftermath, because of which a large number of households were reduced to elderly people, incapable of livestock tending. Only in the post-war period the development of modern, large farms with organised livestock breeding began, bringing along an improved livestock tending culture.

In the territory of Gorski kotar, wolf mostly feeds on wild animals, which evokes the huntersž negativity, considering the wolf guilty for the decreased number of game. On the other hand, there are opinions that the decreased number of game is a result of inadequate game management, and often also of unsanctioned poaching.

Due to such opposites, the considerable increase of illegal kill of wolf hasn't been sanctioned so far, due to the lack of evidence. At the moment, only the case of the kill of wolf at Dragonožac near Zagreb is being processed.

A separate problem is inadequate informing of the public and insufficient education of the inhabitants. The media often feature scandal-tinged news on wolf, guided by the logic that such news are best sold.

Izložba o vuku održana u Hrvatskom prirodoslovnom muzeju 1994. godine

Obilježavanje vuka

Noticeable is also a considerable lack of communication among interest groups, as well as the fact that local inhabitants have not been included in deciding upon the wolf, although they are directly being affected by wolf conservation activities.

Upon proclaiming the wolf a protected species, activities began aimed at reducing the conflicts and improving in situ protection of this animal species.

In 1996, the Veterinary Faculty, University of Zagreb, started implementing the scientific project titled "The large carnivores of Croatia". This project also included the determination of the wolf area of occupancy, estimation of its population, analysis of diet, wolf influence on domestic animals, mortality, habitats, and telemetric monitoring of wolves in Dalmatia, as well as the survey on public attitudes to wolves and on activities related to public information. The results of this project have yielded important information on the state of wolf population in Croatia.

The former State Directorate for the Protection of Nature and the Environment (SDPNE), as the competent authority for wolf conservation, has hired experts to assess the damage to livestock, and compensated the damage done by wolf and other protected species established by their assessment. In the period 1995 to 1997 three seminars for assessment experts were held, and a manual for identification of traces of large carnivores left on the attacked livestock published.

In order to reduce the damage done to livestock by wolf, in 1997 SDPNE, with the financial support of INA Oil Refinery, started to donate tornjak dogs, an Croatian livestock guarding dog breed. Up to 2002, the total number of donated dogs amounted to 120, mostly in the hinterland territory of Dalmatinska zagora. The donation turned out to be mostly successful, with rare failures in cases where dogs were not trained or kept properly (not properly fed or trained as pets, etc.).

SDPNE has also established a Committee for Monitoring Large Carnivore Populations, as an advisory body for the issues of large carnivore protection. In 1999, the members of this Committee prepared "The temporary wolf management plan for Croatia", as guidelines to authorities in solving the problems of wolf protection. This plan has never been implemented due to the lack of resources, and the lack of will in these authorities and in the concerned interest groups.

Tornjak sa stokom

In 2000, under the leadership of Professor Alistair Bath and Aleksandra Majić, the project on survey of the human dimension in wolf management was implemented, including also the survey of public opinion on wolf. The project has shown a spatial division of the attitudes towards wolf, as well as the difference between the attitudes of particular interest groups. The most positive opinions have been registered in the territory of Gorski kotar, and the most negative in Dalmatia.

In 2001, the Ministry of Environmental Protection and Physical Planning (MEPPP) financed the project of the Faculty of Veterinary Science for the implementation of this temporary plan. In the framework of the project two workshops were held under the guidance of A. Bath and A. Majić, where the representatives of different interest groups tried to find the common approach to wolf conservation in Croatia. The idea of these workshops was to join all the interest groups within this process, and prepare them for reaching a consensus solution. However, due to large differences in attitudes and mutual distrust, the consensus was not achieved.

These activities resulted in the need for a systematic approach to wolf protection and to the introduction of a mechanism for long-term wolf conservation and as harmonious life as possible

Prvo anketiranje lokalnog stanovništva o stavovima prema vukovima

with people. Since the resources needed for such activities exceeded the available budgetary amounts, the Committee for Monitoring Large Carnivore Populations proposed at the session meeting held on September 20, 2001, that they are complemented from the European Commission's LIFE – Third Countries fund. In line with this, under the leadership of Ana Štrbenac, former adviser in the Nature Protection Department, a project proposal titled "Conservation and Management of Wolves in Croatia" was prepared, which later received the funding from the LIFE programme for the year 2002.

About the project

Implementation and financing of the project

The project has been initiated by the Ministry of Environmental Protection and Physical Planning as implementing agency, in partnership with the Veterinary Faculty, University of Zagreb. The beginning of the second year of the project has been marked by the change of government and consecutive restructuring of the Government. Consequently, all the issues concerning nature protection have been transferred from the MEPPP to the Ministry of Culture. Taking into account the fact that the activities in the project, in conformity with the new Law on Nature Protection, have been transferred into competence of the State Institute for Nature Protection, the official transfer of project implementation authority to the Institute is being in process.

The total price of the project is EUR 664,810, out of which EUR 418,200 (66%) have been ensured from the LIFE – Third Countries programme, while the co-financing share of the project partners amounts to EUR 246,610 (34%).

Project objective and duration

The main objective of the project is to establish a mechanism for long-term conservation of wolves and make their co-habitation with people as harmonious as possible. The project has been effective for three years now, having started from the end December 2002.

Activities in the project

The project is being implemented through five basic activities:

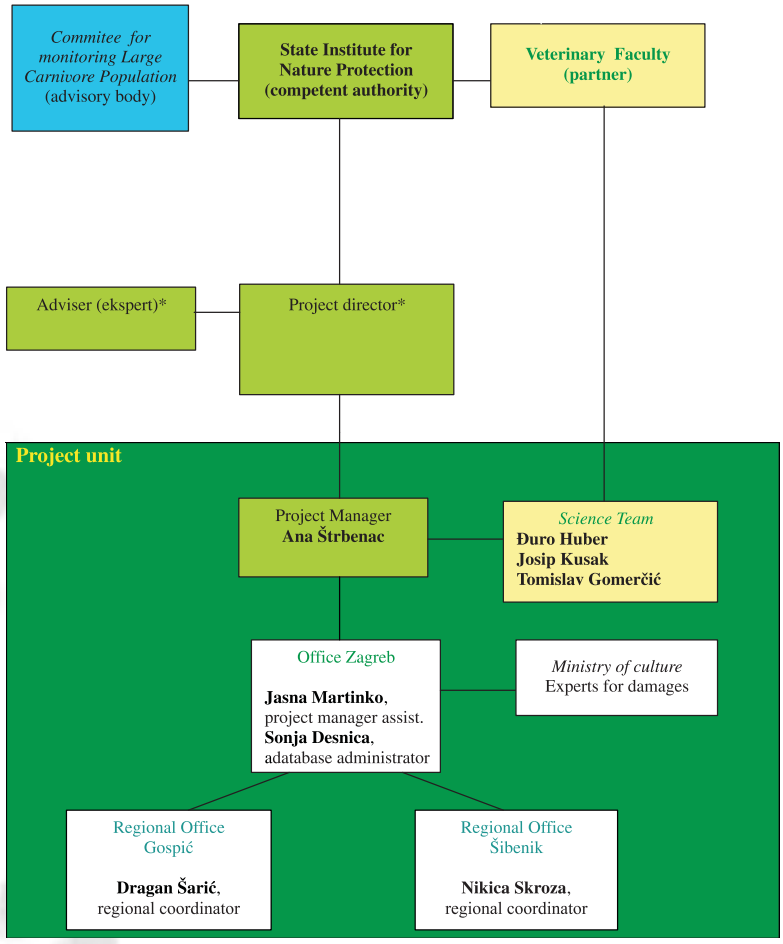
1. Institutional strengthening
2. Monitoring of wolf population and management activities
3. Damage reduction
4. Education and information
5. Strengthening participation of stakeholder groups in decision-making

Who is who in project implementation?

Project implementation unit

The project implementation unit coordinates and conducts the activities in the project. The central role lies on the office in Zagreb, while regional offices are in charge of the implementation of activities at the local level. Experts from the Veterinary Faculty making up the scientific task force, are in charge of the implementation of wolf population monitoring and wolf management activities, as well as for delivering lectures on wolf in elementary and secondary schools in Gorski kotar, Lika and Dalmatia, and lectures for damage assessment experts.

Organisational scheme of project



* In the first project year, when the MoEPP was the beneficiary of the project, Mr. Ivan Martinić, former assistant minister for nature protection and Mrs. Jasminka Radović, former head of the Department for Biological and Landscape Diversity, were in position of project director and project adviser. Upon change in the project beneficiary, these postions are taken by Mr. Davorin Marković, director of the SINP and Mrs. Radović, as the head expert of the SINP, who continues to act as project adviser.

The Committee for Monitoring Large Carnivore Populations has an advisory role in the project implementation, and also operates as a kind of coordinating body since the members of the Committee are directly involved in project implementation.

Members of the Committee:

- **Želimir Štahan**, Ministry of Culture, Nature Protection Division
- **Ana Štrbenac**, State Institut for Nature Protection
- **Branko Iviček**, Ministry of Agriculture, Forestry and Water Management, Forestry and Hunting Division
- **Branka Bukovi**ć**-Šoši**ć**, M.Sc.**, Ministry of Agriculture, Forestry and Water Management, Veterinary Science Division
- **Prof. Đuro Huber, D.Sc.**, Veterinary Faculty, University of Zagreb, Biology Institute
- **Josip Kusak, D.Sc.**, Veterinary Faculty, University of Zagreb, Biology Institute
- **Darko Kovačić, M.Sc.**, Public Institution "Lonjsko polje" Nature Park
- **Alojzije Frković**, a retired employee of Croatian Forest Management Enterprise (Hrvatske šume) and a member of the Croatian Hunterśz Association

In 2003 the assessment of damages from the protected animal species was performed by following experts: Željko Dasović, Josip Tomljanović, Dragan Milković, Davor Zec, Alojzije Frković, Ana Grgas, Dalibor Lovretić, Ivica Šupe, Stipe Kokić, Boris Šabić, Damir Bosiljevac, Zoran Bračulj, Anita Petković and Dražen Matičić.

In 2004 certain changes among experts occurred, since certain experts couldn't perform their tasks anymore. This bulletin gives the list of experts from the year 2004, noting that the selection of one more expert for the territory of the Lika-Senj County is in process.

List of experts with contacts

REDNI BROJ	IME I PREZIME	MJESTO STANOVANJA	TELEFON	ŽUPANIJA	FAKS
1.	Željko Dasović	Brinje	053700688 *mobitel:* 098414355	Ličko-senjska županija	
2.	Dragan Milković	Gospić	053679026 *mobitel:* 0989397156	Ličko-senjska županija	
3.	Igor Hak	Gračac	023775070 *mobitel:* 098446665	Ličko-senjska županija	
4.	Alojzije Frković	Rijeka	051546236 *mobitel:* 0916060641	Primorsko-goranska županija	051546130
5.	Ana Grgas	Benkovac	023681997	Zadarska županija	023681110
6.	Marko Ljubičić	Knin	022661402 *mobitel:* 0915338938	Šibensko-kninska županija	
7.	Ivica Šupe	Šibenik	022334333 022214126 022214549 *mobitel:* 0915052267	Šibensko-kninska županija	022331441

REDNI BROJ	IME I PREZIME	MJESTO STANOVANJA	TELEFON	ŽUPANIJA	FAKS
8.	Stipe Kokić	Sinj	021824901 *mobitel:* 098423159	Splitsko-dalmatinska županija	
9.	Boris Šabić	Makarska	021612008 *mobitel:* 0915384585	Splitsko-dalmatinska županija	021612008
10.	Damir Bosiljevac	Omiš	021863239 *mobitel:* 0915133263	Splitsko-dalmatinska županija	021862553 021862140
11.	Zoran Bračulj	Split	021539814 *mobitel:* 0916060663	Splitsko-dalmatinska županija	021539814
12.	Anita Petković	Dubrovnik	020331139 *mobitel:* 0989271007	Dubrovačko-neretvanska županija	
13.	Dražen Matičić	Karlovac	047613439 047613400 *mobitel:* 098763981	Karlovačka županija	047613438

External associates

Several external associates are also involved in the project implementation:

Prof. Alistair Bath, Memorial University in Newfoundland (Canada), is in charge of managing the workshops for the development of the Wolf Management Plan and assisting the regional coordinators in holding meetings with local livestock-breeders.

Aleksandra Majić together with Professor Bath manages workshops for the development of the Wolf Management Plan, and conducts the survey of public attitudes on wolf.

Šandor Horvath operates the programme of the donation of *tornjak* dogs and is in charge of filming a documentary on wolf.

Goran Gužvica, "Oikon", carries out telemetry research on wolf in the territory of Lika, in cooperation with experts of the Veterinary Faculty.

Prof. Luigi Boitani is an expert advisor in the drafting of the Wolf Management Plan.

Results of the first project year according to the key activities

The project was presented to the broad public for the first time on a press conference on December 17, 2002, at the former Ministry of Environmental Protection and Physical Planning. In the beginning of March 2003, a meeting titled "Protection and management of wolves in Croatia" was held in the "Risnjak" National Park, where the project was presented to the representatives of all interest groups concerned with the problems of wolf conservation in Croatia. On that occasion the details related to operationalisation of the project have been agreed upon as well. The meeting hosted around 50 participants, including former MEPPP, Ministry of Agriculture and Forestry, Ministry of Environment of the Republic of Slovenia, Administrative Department for Economic Affairs of the County of Primorje-Gorski kotar, Faculty of Veterinary Medicine of the University of Zagreb, experts from Great Britain and Bulgaria, representatives of hunters and livestock-breeders associations, public institutions for managing protected areas, Croatian Forest Management Enterprise, certified assessment experts and new candidates.

Institutional strengthening

Project recruitment

The LIFE project implementation unit was established at the former Ministry of Environmental Protection and Physical Planning at the beginning of 2003. Željka Rajković has been chosen to work at the office as an assistant project manager, and Sonja Desnica as a database administrator. In October 2003 Željka Rajković was replaced by Jasna Martinko.

Dragan Šarić from Gospić and Nikica Skroza from Šibenik were recruited as regional coordinators. It should be noted that only the inhabitants of regions for which regional offices have been established had a right to apply for the job of a regional coordinator, giving preference to the unemployed.

Start of work of the regional offices

In April 2003, two regional offices managed by regional coordinators were established within the area of wolf distribution, namely the regional office for Gorski kotar and Lika in Gospić, and the one in Šibenik for the territory of Dalmatia. Establishment of these offices is the result of the

attempt to include the local community more actively in solving the problems of wolf protection. In relation to that, the regional coordinators constantly maintain contact with local inhabitants through meetings and actively participate in education and informing the public in that region. These offices also play an important part in implementation of the donation programme, contributing to maximised efficiency of the use of donated dogs and fences for the protection of livestock from wolf attack, through regular site-visits to donation users.

New experts and the seminar for experts

In March 2003, a seminar for judges was held in the framework of one meeting, where participants were informed about the legal framework of damage compensation, identification of the predator traces on a victim, and experiences of other experts, as well as about the existing guidelines for damage determination and the assessment record format. Adequate changes in the form have been made, in order to improve the damage assessment process. The practical part of seminar included the section of animals killed by wolf. The candidates for new experts participated in seminar together with the current experts. Consequently, since 2003 three more experts have been hired: Zoran Bračulj for the territory of the Split-Dalmatia County, Dragan Milković for the territory of the Lika-Senj County, and Dražen Matičić for the territory of the Karlovac County.

Seminar za obuku vještaka

Monitoring of wolf population and management activities

Telemetric monitoring of wolves in Gorski kotar

After the successful wolf capture season in summer/autumn of 2002, the winter saw three marked wolves. Unfortunately, this didn't last long and at the moment only one more wolf is alive and monitored. At the beginning of winter, two wolves marked with radio-collars were lost within 2 weeks. The first one was W6 – Blaža, found on 3 December 2002, within boundaries of the Risnjak National Park, near the village of Krašićevica. The first examination in the field showed that the female was shot, which was confirmed by additional examination and autopsy at the Veterinary Faculty. Blaža has been monitored for 41 days, during which time seven of her locations have been recorded.

The female W4 – Ines was found ten days later, on December 13, 2002, near the Platak skiing centre, in the region of Malo Snježno. On the basis of its remains and due to the fact that they were found out of the well-known movement radius of the "Snježnik" pack, it has been concluded that Ines was killed and subsequently eaten by other wolves, with the remains serving as food for the vultures afterwards. During the 177 days of monitoring, Ines the she-wolf had been located 50

Slikanje i mjerenje vuka

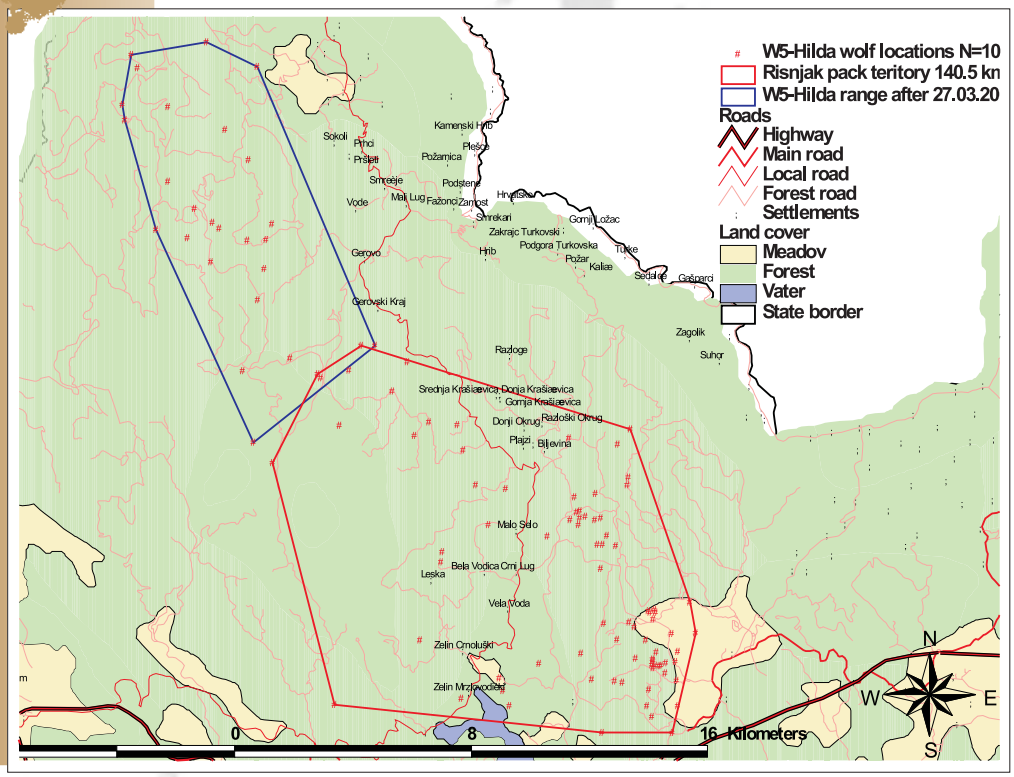
times. The monitoring period was too short to get a picture of the complete size of the territory covered by the pack called "Snježnik". All the locations of Ines, except the last one, have covered the surface of 59.3 km2. After the death of W4, at least two more wolves were left in the same territory.

W5 – the third female called Hilda – survived the winter of 2002/2003, and until March 27, 2003 stayed within the already known movement radius of the "Risnjak" pack. According to the frequency of traces in snow, it was concluded that the pack consists of four wolves, including Hilda. The size of the pack territory was 140.5 km2 at that time. On 18 April 2003, Hilda was found north from the pack territory, on the territory of the neighbouring pack called "Snježnik"! Since than until January 2004, she stayed on this territory and not once was she found within her previous radius. The movement and activity of Hilda during spring and summer show that she didn't have a burrow or a gathering place. In January 2004, with the first snow, it was possible to follow the traces. Then it turned out that Hilda wasn't alone, but accompanied by a big male, and that they kept north from the territory of the "Risnjak" pack, but didn't move westward. Ines used the similar movement pattern during her life. The reason for this was probably the existence of a third pack living in the western part of the territory of the two known packs. Its existence has been confirmed through the traces in snow (at least four wolves). This was the pack that had probably killed Ines after getting into their territory. Hilda abandoned the pack and found a new area of occupancy and a mate on the territory of the former "Snježnik" pack.

Table 1. The key data on the monitored wolves in Gorski kotar, 21 June 2002 to 11 January 2004

Oznaka	Ime	Početak	Kraj	N lokacija	N dana	Sudbina
W4	Ines	21.6.2002	15.12.2002	50	177	mrtav
W5	Hilda	02.7.2002	11.1.2004	111	558	živ
W6	Blaža	23.10.2002	3.12.2002	7	41	mrtav
Ukupno				168		

Map 1. Movement territories of th pack of marked wolves in Gorski kotar.



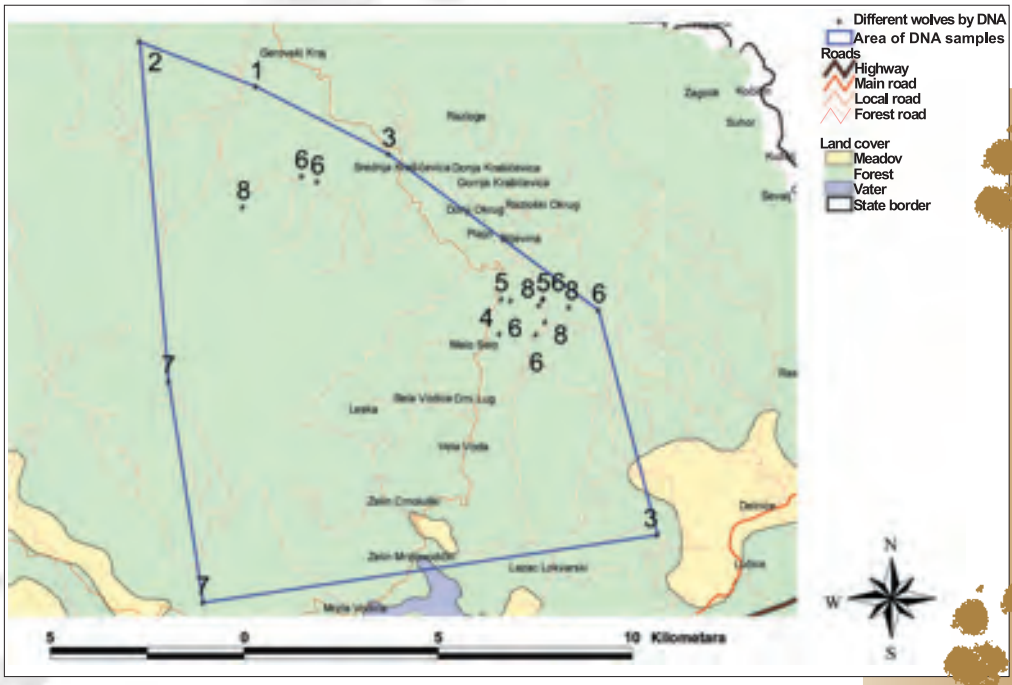
W6-Blaža found shot within boundaries of the Risnjak National Park on December 3, 2003.

Genetics in the research of wolves in Gorski kotar

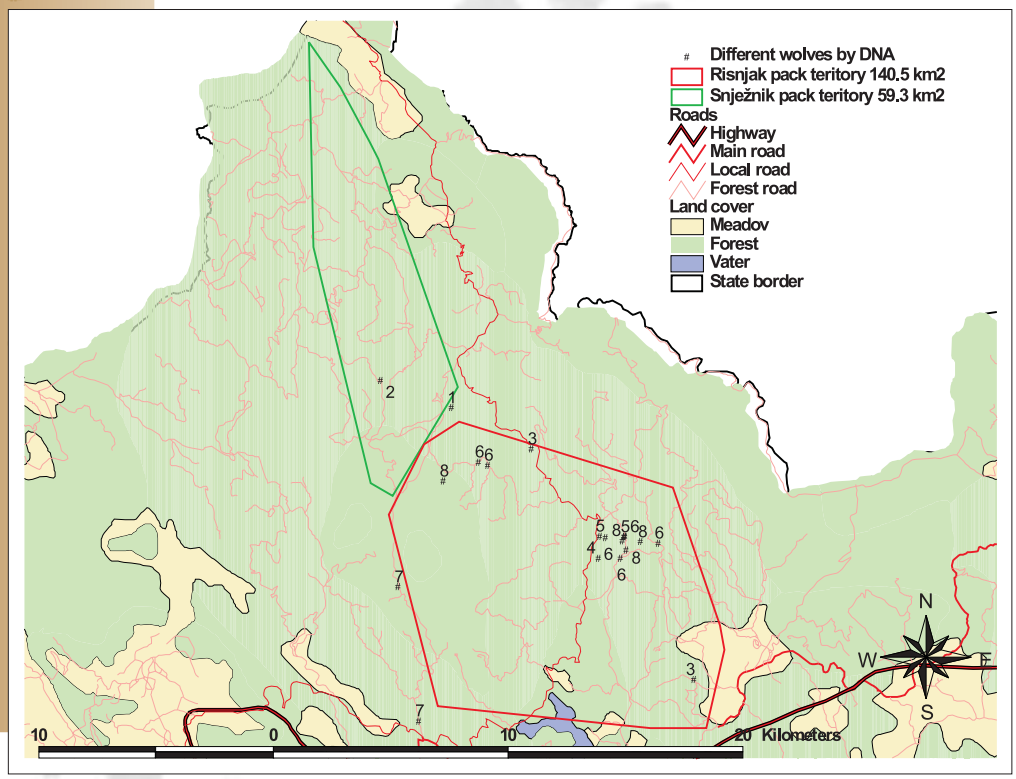
Besides telemetric wolf monitoring that is envisaged by the project, experts from the Veterinary Faculty, University of Zagreb initiated the genetic analysis of wolf scat samples, which is one of the most reliable state-of-the-art methods of determination of wolf populations.

Collection of the samples of fresh wolf scats for genetic research purposes started in 2002. The first results fit in and complement the telemetric data. Genetic analyses have confirmed that a considerable number of wolves hasn't managed to survive the winter of 2002/2003, or has abandoned the pack territory, especially the "Snježnik" pack. During the summer of 2002, samples of scats have been collected on the surface of 123 km2, and the corresponding analysis has determined the existence of eight different wolves in this territory. Layering of this map with the maps of the territories of the monitored packs has lead to a conclusion that six wolves belonged to the "Risnjak" pack (individuals 3, 4, 5, 6, 7 and 8), and the remaining two to the "Snježnik" pack (individuals 1 and 2), as well as that the lowest number of wolves in these packs was in summer 2002. It is possible that some other individuals haven't been found yet, because the number of faeces samples was relatively small. At the end of winter only three more wolves from the "Risnjak" pack were still alive (according to the traces in snow). This means that, besides Blaža, at least one more wolf from the pack had disappeared (killed or left the pack) during the winter.

Map 2 Sampling spots for the genetic analysis and spatial distribution of certain individuals. Each genetically determined individual is marked with a number (1 to 8).



Map3 Relation between the positions of genetically determined wolf individuals and the territories of telemetrically monitored wolves.



Telemetric monitoring of wolves in Lika

In August 2003, the research of wolves was initiated in the territory of Lika, oriented towards the region of Kuterevo, Krasna and Kosinja, and the northern slopes of Velebit. On November 25, a young female (W7, Jelica), seven months old, was captured in the territory of Jelovac above Krasno. It received a collar which enables satellite tracking of the animal. The female was in good health and weighed good 18 kilos. Upon releasing the collared female, the subsequent intensive

Prvi obilježeni vuk u Lici - vučica Jelica

monitoring confirmed that she had joined the pack on the fourth day after release. It was confirmed that the pack to which the collared female belonged had been moving in the range of 156 km2 during that period. After that, the female was monitored by the method of classical telemetry, and six more positions located within the formerly confirmed territory of this pack's movement were recorded.

Wolf mortality

In the period from November 1, 2002 to April 17, 2004, we have registered the deaths of 15 wolves. As much as four of them (WCRO42, WCRO44, WCRO45, WCRO46) from the same pack – the one living in Dalmatia, in the territory of the once telemetrically monitored pack called "Opor". The reproductive female (WCRO42) was the first one killed, followed by at least three more cubs during the summer. When examining the body of the female, it was found out that in 2003 she had seven pups altogether.

Table 2. List of the known death causes in the period from November 11, 2002 to April 17, 2004

Datum	Mjesto	Područje	Oznaka	Spol	Dob	Masa	Uzrok uginuća
30.11.2002	Krašićevica – Plajzi	Gorski kotar	WCRO38	F	0.8	24	W6-Blaža, ustrijeljena
8.12.2002	Platak, Malo Snježno	Gorski kotar	WCRO39	F	1.8		W4-Ines, drugi vukovi
14.12.2002	Dragonožac	Dolina rijeke Save	WCRO40	M	1.8	31	Ustrijeljena
21.2.2003	Kukuzovac, Mojanka	Dalmacija	WCRO41	M	3.5	31	Auto
12.6.2003	Prgomet, Nožine	Dalmacija	WCRO42	F	5.0	29	Auto
27.7.2003	Vrhovine - Rudopolje	Lika	WCRO43				Vlak
27.7.2003	Zrmanja	Lika					Auto (tijelo bačeno na smetlište i zatrpano)
13.8.2003	Primorski Dolac	Dalmacija	WCRO44		0.5		Auto
13.8.2003	Primorski Dolac	Dalmacija	WCRO45		0.5		Auto
13.8.2003	Primorski Dolac	Dalmacija	WCRO46		0.5		Auto
25.11.2003	Gospić	Lika	WCRO47	F	2.5	29	Auto
14.12.2003	Trolokve	Dalmacija	WCRO48	M	4	31	Lišmanioza
7.12.2003	Kijevo	Dalmacija	WCRO49	M	3	31	Auto
31.3.2004	Mrzli Dol	Lika	WCRO50	?	?	?	Bjesnoća
17.4.2004	Maljkovo	Dalmacija	WCRO51	M	2	32	Auto

The most frequent cause of wolf mortality was traffic, at which young wolves have been killed the most. Obviously this does not reflect the real picture because the illegal kill of wolves has never been reported.

Collection of data on wolf prey, impact and habitats

In the scope of this activity, data on the wolf prey, i.e. game and livestock, data on damage done to livestock and to other habitat features which define the presence of wolf (roads, inhabitants, etc.) were collected.

Data on the game in the wolf area of distribution have been collected on several occasions for the purpose of implementation of the management plans for large predators. The arrangements for further systematic data collection, in accordance with the obligations pursuant to the Law on Hunting which is in the competence of the Ministry of Agriculture, Forestry and Water Management, are being settled.

The Croatian Livestock Selection Centre generously assisted in the collection of data on the populations of registered livestock in Croatia for 2002 and 2003.

A new database for recording the damage done to livestock by wolf has been developed on the basis of the amended records. Since the damage for the period 1996 to 1999 has been recorded before the project start, the data from the 2000 and 2001 records were entered during the first year of implementation, and the input of data for 2002 is in process.

A more detailed analysis of all collected data will be published after GIS processing. For the present publication, illustrative is the example of processing of certain data referring to livestock populations and the damage recorded in 2000 and 2001.

Analyses of livestock populations and damage done by wolf

Analysis was made for 1,696 settled requests for the period from January 1, 2000 to December 31, 2001, out of which 780 referred to damages done in the year 2000, and the rest to damages in 2001. Data on the damage reported in 2002 and 2003 have not been analysed in detail because they are still being entered into database. Therefore this bulletin only lists the data on the number of performed inspections. It is clearly seen that the greatest number of damage reports come from Šibenik-Knin and Split-Dalmatia County.

Since the inspections are carried out whenever there is a suspicion that damage has been done by a protected animal species (wolf or lynx), the number of inspections does not necessarily equal the number of damages done by wolf.

Očevid štete

It has been estimated in 1555 (91.5%) cases of all the reported damage that wolf was the performer of damage, lynx in 4 (0.2%) cases, bear as well in 4 (0.2%), jackal in 11 (0.7%) and dog in 14 (1%) cases. In 108 (6.4%) cases, estimate was insecure or was not uttered. In accordance with this, it can be concluded that in total 724 damages caused by wolf occurred in 2000, and 831 in 2001, or increase of 12,9%.

Table 3 Number of the reported damages done on livestock per counties in period from 2000 to 2003.

Županija/Godina	*2000.*	*2001.*	*2002.*	*2003.*
1. Dubrovačko-neretvanska	38	43	41	68
2. Splitsko-dalmatinska	294	355	382	330
3. Šibensko-kninska	344	371	*278	661
4. Zadarska	73	113	74	108
5. Ličko-senjska	27	30	51	66
6. Primorsko-goranska	4	2	5	10
7. Karlovačka	0	2	3	7
UKUPNO	780	916	834	1250

** Data do not include inspections performed by an expert Dalib or Lovretić, who covers several municipalities in the territory of the Šibenik-Knin County, and by Mate Šaban from the Lika-Senj County.*

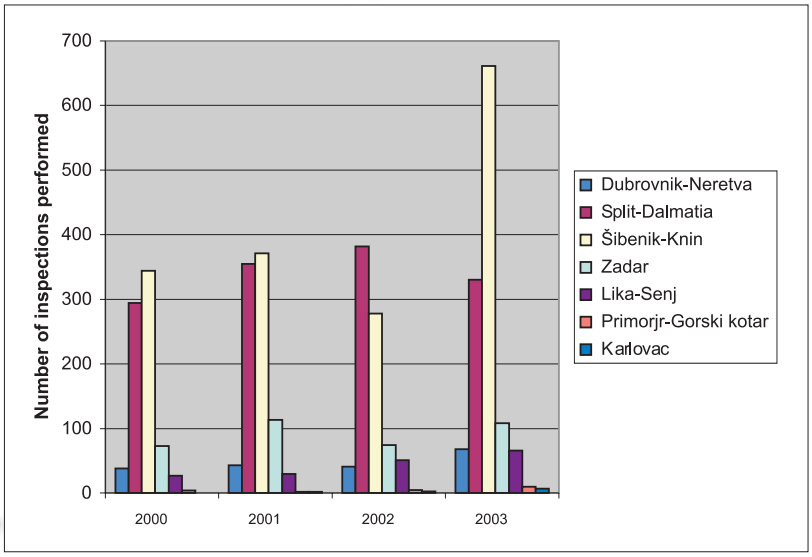


Table 4 Distribution of the reported damage done to livestock according to the estimated kind of predator and counties, in 2000 and 2001

Predator	Vuk		Ris		Medvjed		Čagalj		Pas		Nepoznat		Ukupno	
Županija/godina	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
Dub-neretvanska	36	43	0	0	0	0	0	0	0	0	1	0	*37*	*43*
Spl-dalmatinska	274	323	0	0	0	0	0	0	4	6	15	26	*293*	*355*
Šib-kninska	311	335	0	0	0	1	2	9	2	1	28	25	*343*	*371*
Zadarska	73	101	0	0	0	0	0	0	0	0	1	12	*74*	*113*
Ličko-senjska	26	26	1	3	1	1	0	0	1	0	0	0	*29*	*30*
Prim-goranska	4	1	0	0	0	1	0	0	0	0	0	0	*4*	*2*
Karlovačka	0	2	0	0	0	0	0	0	0	0	0	0	*0*	*2*
Ukupno	724	831	1	3	1	3	2	9	7	7	45	63	780	916

Wolves attack the whole range of domestic animals, primarily sheep and goat, but also cattle, horses, donkeys and dogs.

Table 5 Populations of each particular kind of livestock attacked by wolf all over the counties in 2000 and 2001

Vrsta	Govedo		Konj		Koza		Magarac		Ovca		Pas		Ukupno	
Županija/godina	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
Dub-neretvanska	21	26	0	1	10	15	1	4	23	12	2	0	*57*	*58*
Spl-dalmatinska	34	38	11	0	203	240	20	23	343	332	29	24	*640*	*657*
Šib-kninska	18	34	1	3	97	96	15	11	527	506	3	6	*661*	*656*
Zadarska	0	1	0	0	98	146	0	2	173	205	1	0	*272*	*354*
Ličko-senjska	0	0	0	0	0	6	0	0	61	39	0	0	*61*	*45*
Prim-goranska	0	0	3	0	0	1	1	0	11	0	0	0	*15*	*1*
Karlovačka	0	0	0	0	0	0	0	0	0	11	0	0	*0*	*11*
Ukupno	73	99	15	4	408	504	37	40	1138	1105	35	30	1706	1782

It is evident in the mentioned data that the greatest number of damages is done by wolf to sheep and goat. Comparing these data with the data of the Croatian Livestock Selection Centre we get the share of livestock killed by wolf in a total number of livestock. Unfortunately, the data on the total number of livestock is not totally correct and does not reflect the real situation. This only refers to the livestock that are registered by the CLSC, and the most reliable data can be obtained through the requests for incentives for every single head. According to rough estimates, this number reflects nearly 80% of the real situation in the field And in some areas even less. All damages are also not reported. The percentage stated in tables 6 and 7 is not therefore completely correct and the real share of livestock killed by wolf is probably a little lower. The data of CLSC have been used for the analysis because there are no other data at the moment.

Table 6: Share of sheep and goat killed by wolf in a total number of sheep and goat per counties in 2000.

2000. godina				
Vrsta	Ovca		Koza	
Brojnost stoke → Županija	*Ukupno reg. od HSSC	Udio stoke nastradale od vuka (%)	**Ukupno reg. od HSSC	Udio stoke nastradale od vuka (%)
Dub-neretvanska	3.676	0,6%	4.846	0,2%
Spl-dalmatinska	47.433	0,7%	14.492	1,4%
Šib-kninska	36.590	1,45%	4.827	2%
Zadarska	70.512	0,25%	14.918	0,65%
Ličko-senjska	25.157	0,25%	1.304	0%
Prim-goranska	30.615	0,04%	618	0%
Karlovačka	10.783	0%	2.760	0%
Ukupno	224.766	0,5%	43.765	0,93%

**Total numbers of sheep head (incl. lambs) in 2000, registered by CLSC*
***Total numbers of goat head (incl. kids) in 2000, registered by CLSC*

Table 7: Share of sheep and goat killed by wolf per counties in 2001

2001. godina				
Vrsta	Ovca		Koza	
Brojnost stoke → Županija	*Ukupno reg. od HSSC	Udio stoke nastradale od vuka (%)	**Ukupno reg. od HSSC	Udio stoke nastradale od vuka (%)
Dub-neretvanska	2.127	0,6%	2.767	0,5%
Spl-dalmatinska	52.808	0,6%	10.980	2,2%
Šib-kninska	63.744	0,8%	5.722	1,7%
Zadarska	59.822	0,35%	9.848	1,5%
Ličko-senjska	60.019	0,06%	4.083	0,15%
Prim-goranska	21.582	0%	548	0,2%
Karlovačka	10.435	0,1%	1.872	0%
Ukupno	270.537	0,4%	35.820	1,5%

**Total numbers of sheep for which requests for incentives have been submitted in 2001.*
***Total numbers of goat for which requests for incentives have been submitted in 2001.*

Ovce koje nisu čuvane - najčešći plijen vuka

Damage reduction

Donation of *tornjak* dogs

Tornjak is the Croatian breed of a mountain dog, the first written traces of which lead us back to the manuscripts of the Croatian Catholic Church, and Petar Horvat, the bishop of Đakovo (13th century). They have been raised for livestock-breeding in these areas for centuries, as they are better adapted to the natural conditions of our country than any other shepherd dog, and specially inclined to the life near the herd. Today, they are modern thoroughbred offsprings of a very old kind of livestock guarding dogs. Due to their innate psychophysical features, tornjaks are equal competitors of large carnivores. By the constant inspection and marking of areas within which they daily move, they create a protected territory to which predators enter only in special conditions. If it does happen that they enter, the dogs alarm the people, and are nearly always capable of chasing away the intruders.

The tornjaks donation programme, as one of the activities in the scope of the LIFE project, started in July 2003, by printing leaflets with basic information on this breed and requirements and criteria for donation. Young tornjaks could have been donated only to the livestock breeders from regions in which there was a possibility of wolves attacking livestock and which are affected by wolves, the herds of which regularly graze in nature, and are not let into pastures without supervision, whose herds number at least 50 head, and who didn't and wouldn't have any poisonous substances on pasture-land in a form that would be dangerous for dogs.

The leaflet has been distributed through regional offices to the livestock breeders from the territories of Gorski Kotar, Lika and Dalmatia.

Near a hundred of livestock breeders have applied, but only those who satisfied the prescribed criteria and committed to adequate dog management were selected, so as to obtain the best possible results in cattle protection from wolf attacks. Mr Šandor Horvath held lectures to the selected cattle breeders with the instructions on raising, keeping and feeding of dogs. For Lika and Gorski Kotar the lecture was held in Gospić, and for Dalmatia in Benkovac. On these occasions the livestock breeders got the written instructions as well in the form of brochure.

Predavanje stočarima o odgoju i držanju pasa tornjaka

In order to ensure purchase of the envisaged 60 puppies, the information on project and purchase of puppies has been sent to the addresses of all registered livestock breeders in Croatia, and the data on bitches and predicted terms of litter have been requested as well.

Tornjaks are supposed to start trained between the age of 7 weeks and three months, and as close as possible to the environment in which they are going to be used, so as to perform their actions successfully. Therefore, the puppies in this age are bought from registered breeders and donated to selected livestock breeders. For the training of tornjaks it is necessary that they live freely near the livestock since early age, especially when it moves around in nature. A dog raised on a chain, in a cage or as a pet, is not useful in herd protection. Tornjaks can successfully perform their role after they have turned one year, reaching full maturity at the age of two and a half. The work-span of a tornjak exceeds 10 years.

Štenci tornjaka

All the purchased puppies are regularly registered in the Croatian Kennel Club, with genealogies.

The first two takeovers of puppies were done on 13 December 2003 and 20 January 2004 in the Regional Office for Gorski Kotar and Lika in Gospić, when they were donated to the livestock breeders from Karlobag and Lukovo Šugarje. Upon receiving the dogs, each livestock breeder was obliged to sign a contract whereby assuming the right of using tornjak dogs, but also certain obligations in order to ensure adequate keeping and using the dogs for the protection of cattle against wolf attacks.

The first puppies for Dalmatia have been delivered to livestock breeders from Ervenik and Kijevo. The takeover was done in Knin, on 5 February 2004, on the territory of the Regional Office for Dalmatia. Together with puppies, the livestock breeders were handed over their genealogies, written instructions on obligatory health treatment of dogs, as well as the instructions on their training, keeping and feeding so that they could perform their function properly.

Primopredaja štenaca

The first donees from Gorski kotar were from Mrkopalj and Lukovdol, receiving two puppies on 30 March 2004. Consequently, in the framework of the project ten puppies altogether have been distributed before the beginning of April.

Regional coordinators inspect the condition of the donated dogs, through monthly visits to the donees. On each visit, coordinators fill out the "Dog Protocol", made for every single dog, containing the data related to efficiency of dogs. This is the method of monitoring the keeping and condition of the dogs. We will be able to estimate the real value of tornjaks in the sense of herd preservation and protection only after they will have turned one year. A good cooperation in health treatment and inspection of dogs has been achieved with local veterinary stations.

Donation of electric fences

Same as the donation of tornjaks, the electric fences donation program started in July 2003 by printing an information leaflet. After the leaflet had been distributed to livestock breeders through regional offices, 62 applications, mostly from the Lika livestock breeders, came in. The selected donees were present at pilot presentations of the installation of electric fences, held in Oteš, a village near Gospić, and in Benkovac in October 2003. On this occasion, all the details on the preparation and installation of fences, the way of handling the fence and on managing the livestock inside the fence were explained.

Dodjela električne ograde u Lici

Postavljanje električne ograde u Lepurima Donjim kraj Benkovca

The first electric fence was installed in Oteš, in November 2003, on the farm of Nikola Baričević, and further donations followed on the territory of Lika (Smiljan, Bunić, Široka Kula, Kukuljanovo and Poljica – 16 in total).

The hand-over of electric fences for the territory of Dalmatia was done in Benkovac, in the premises of PZ "Raševljka", because the four livestock breeders from the greater Benkovac area got the donations.

By signing the contract for the use of electric fences, the donees obliged themselves to their adequate maintenance and use. In order to increase efficiency of fences, livestock breeders also obliged to regular filling out of the protocol for the use of fences and submission thereof to the regional coordinators. The protocol contains the data on fence switching dynamics, electric voltage, number of head enclosed by the fence, and on possible appearance of wolf near the fence.

Education and information

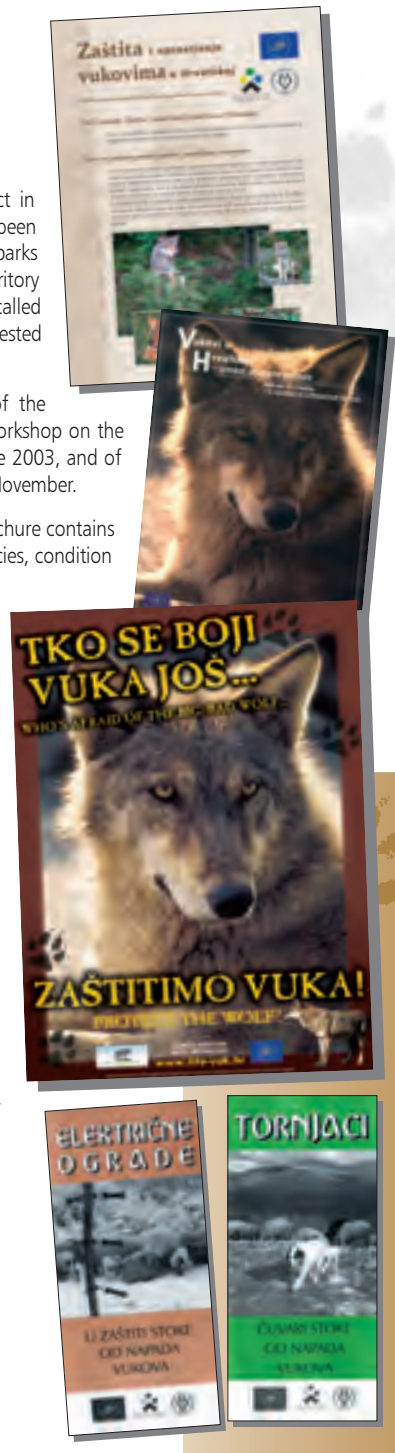
Publications

At the beginning of project implementation, the information leaflets on project in Croatian and English have been published. The Croatian version of the leaflet has been distributed to local inhabitants, public institutions for the management of national parks and nature parks, representatives of counties, towns and municipalities in the territory of the project, representatives of NGOs, participants of the workshops called "Development of the Wolf Management Plan for Croatia", and to all other interested stakeholders.

The English version of the leaflet has been distributed to a representative of the Delegation of European Commission to Croatia and to the participants of the Workshop on the protection of large beasts in the Carpathian, held in Romania (Brašov) in mid June 2003, and of the International meeting on wolves, held in Segovia (Spain) in the beginning of November.

The brochure on wolf, primarily intended for schools, has been published. The brochure contains basic information on the wolf biology, relationship between the man and this species, condition of wolf population in Croatia, and the importance of wolf conservation. Also, a contest has been organised for those who have read the brochure – it required replying to 11 questions made up on the bases of brochure contents, where ten correct answers will be awarded with the publications published in scope of the project, the T-shirt with the image of wolf, and the other nature protection publications. The brochure has been distributed to pupils of elementary and high schools from Gorski kotar, Lika and Dalmatia.

Other publications included the wolf poster and previously mentioned information leaflets on the donations of tornjak dogs and electric fences.



Web-page

The detailed information on project activities, as well as on the problems of wolf protection in Croatia in general, can be found on the official web-pages of the project since July 2003: www.life-vuk.hr.

The average number of visits to the pages is 18.000, from Croatia, Europe, and world (Bosnia and Herzegovina, Switzerland, Austria, SAD, Canada, Belgium, Serbia and Montenegro, the Netherlands, United Kingdom, Lithmania, Finland, Italy, Australia, New Zealand etc.).

Izgled web stranice

Lectures in schools

Within the project, lectures on wolves are being held for primary and high school students in the territories of Gorski kotar, Lika and Dalmatia, within the wolf's area occupancy. The purpose of these lectures is education of the children and youth about the role and importance of wolves in nature. Lectures are organised in the form of 45-minute presentations. Due to really high interest, several lectures were held outside this area as well.

Up to now, altogether 20 lectures on wolves have been held in primary and high schools, two for students of Veterinary Faculty, University in Zagreb, and students of Associate-degree college in Karlovac. The majority of lectures were held by Josip Kusak, D.Sc., from the Veterinary Faculty, University in Zagreb.

Great support in organisation of lectures and distribution of educational materials in Zadar county provides members of Wolf Protect Association of Croatia.

Lectures were held in this primary and high schools:

Primary schools

1. "Kuterevo" Primary School – Kuterevo, 09 December 2003
2. "Ante Starčević" Primary School – Pazarište and Klanac, 10 December 2003
3. "Tin Ujević" Primary School – Šibenik, 17 December 2003
4. "Unešić" Primary School – Unešić, 17 December 2003
5. "Juraj Šižgorić" Primary School – Šibenik, 03 March 2004
6. "Bilaj" Primary School – Bilaj, 04 March 2004
7. "Ferdinandovac" Primary School – Ferdinandovac, 22 March 2004
8. "Gornji Kosinj" Primary School – Gornji Kosinj, 23 March 2004
9. "Knin" Primary School – Knin, 24 March 2004
10. "Kistanje" Primary School – Kistanje, 24 March 2004
11. "Perušić" Primary School – Perušić, 20 April 2004
12. "Dr. F. Tuđman" Primary School – Lički Osik, 20 April 2004
13. " I. G. Kovačić" Primary School – Lukovdol
14. "Mrkopalj" Primary School – Mrkopalj

Secondary schools

1. Secondary Trade School – Gospić, 25 November 2003
2. "Dr. Ivan Kranjčev" High School – Đurđevac, 18 February 2004
3. "Antun Vrančić" High School – Šibenik, 03 March 2004
4. "Juraj Baraković" High School – Zadar, 21 April 2004
5. Secondary School of Chemistry – Zadar, 21 April 2004

Predavanje u osnovnoj školi u Šibeniku

Contacts with the media

Besides regular verbal contacts with journalists, three press-conferences have been held in the framework of the project (two in Zagreb and one in Zadar), at which the project activities and the status of their implementation have been presented.

About hundred articles have been published in press, coupled by ten reports on television and several radio shows.

Konferencija za novinare u Zagrebu

Izvadci iz tiskovina

Strengthening stakeholder participation in decision-making

Surveying the public attitudes on wolves

In order to document scientifically the points of view of the Croatian inhabitants on wolves and wolf management in Croatia, as well as their knowledge and beliefs on them, a survey has been carried out. The poll was anonymous, and the random sample of target population involved adults (older than 14) from the territories where wolves constantly dwell today – Gorski kotar, Lika and Dalmatia (Figure 1). Since the mentioned regions considerably differ in certain features which can be expected to have a large influence on the viewpoints of public on wolves (for example, the frequency of wolf attacks on domestic animals, the development of sheep-breeding, and the like), an independent and representative sample, proportional to the number of inhabitants for each settlement, has been prepared. The aim was to get 95% reliable results (with possible error of +/- 5%), so the size of this sample amounted to 400 polls in each region. Therefore, the total sample for all three regions involved 1.200 examinees.

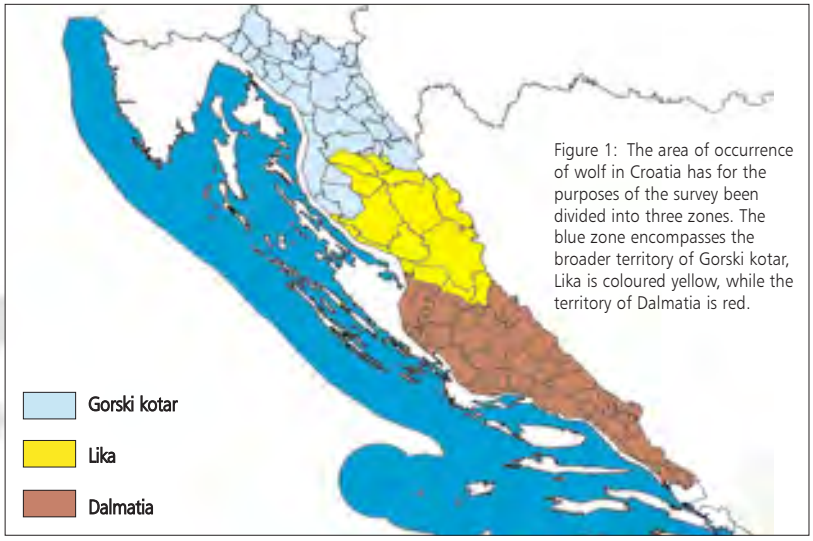


Figure 1: The area of occurrence of wolf in Croatia has for the purposes of the survey been divided into three zones. The blue zone encompasses the broader territory of Gorski kotar, Lika is coloured yellow, while the territory of Dalmatia is red.

The questionnaire contained 82 questions that included the following topics:

- The viewpoints on wolves in general
- Attitudes on various topics related to wolf management (damage done by wolf on domestic animals, wolf population in Croatia, its protection, etc.)
- The fear of wolves
- Knowledge of biology and of the wolf condition in Croatia
- The experience of examinees with wolves
- Demographic data on the examinee (sex, age, education)

All 1200 interviews have been carried out by personal contact and conversation at the examinees' quarters. Some of the interviewers were volunteers. On average, one interviewer made around 12 interviews a day, so that the survey took 99 days in total. The survey has been carried out in more than 360 settlements in the regions of Gorski kotar, Lika and Dalmatia, with maximum three interviewers present simultaneously. More than 80% representatives of public chosen at random have agreed to be examined.

As one of the most important interest stakeholder groups, the viewpoints of which need to be carefully analysed and taken into consideration when making decisions on wolf management in Croatia, the livestock breeders have been in special focus of the research. Regional coordinators in Šibenik, for the territory of Dalmatia and in Gospić, for the territory of Lika and Gorski kotar, have contacted sheep-breeders and goat-breeders in person, and even offered assistance in filling out the questionnaire.

Besides interviewing among the inhabitants from the wolf-dwelling territories of Croatia, the opinions of inhabitants of urban territories (more precisely from Zagreb) were surveyed as well. The questionnaires with a return address and pre-paid postage have been mailed to thousands of addresses in Zagreb, selected at random from the phonebook.The used questionnaires have been prepared in conformity with the questionnaire that was prepared in 1999 in a similar research, and in order to enable a reliable comparison of the data from two different periods. That way the monitoring of public opinion on wolves in Croatia has started.The results have showed that the inhabitants of urban territories have the most positives attitudes. Namely, more than 63% respondents from the City of Zagreb thought of themselves as being in favour or completely in favour of wolves.

The analysis of the results of the questionnaires filled in by the representatives of public in the territories where the wolves dwell has shown that the viewpoints on wolves in Croatia are still relatively positive. Although the majority of examinees consider that their opinions on wolves haven't changed in the last few years, a shift towards more positive and neutral viewpoints compared to the 1999 data is noticeable. For instance, for the question "Which one of the following answers describes the best your viewpoint on wolf? (Figure 2), the percentage of the examinees who have chosen the answers "I am totally against" or "I am against", has decreased in Dalmatia from 62% to around 50%, in Lika from 47% to 37%, and in Gorski kotar from 37% to 21%.

The attitudes to wolves are still the most positive in Gorski kotar, and the most negative ones in Dalmatia. This fact can be explained by very high rate of discontent of the inhabitants of Dalmatia because of damage done by wolves, and the belief that wolves unnaturally inhabited this territory in the period after the Homeland war.

The knowledge of biology and of status of wolves in Croatia remained at the same level marked in Dalmatia for 1999, while the knowledge of wolves in Lika and Gorski kotar is statistically considerably worse than four years ago. The best experts in wolves are the inhabitants of Dalmatinska zagora region, while the inhabitants of Gorski kotar know

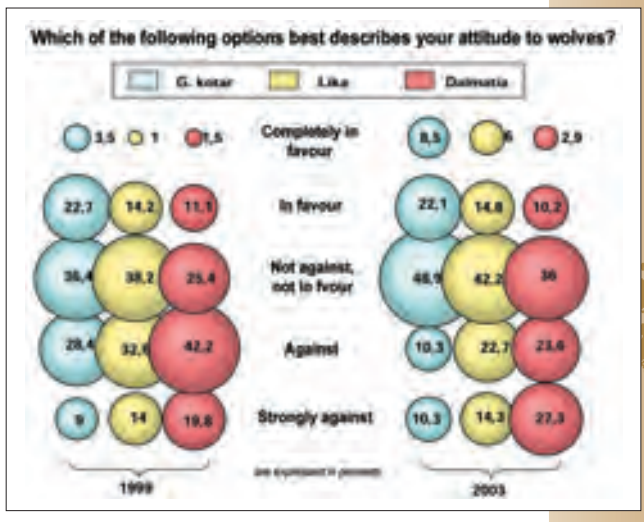


Figure 2 Answers to the same question put in polling carried out in 1999 and 2003. Values are expressed in percents

the least about wolves. It is interesting that, contrary to expectations, the examinees that have the best knowledge on the biology of wolves and their status in Croatia have shown the most negative attitude toward these animals.

Meetings with livestock raisers and hunters

In order to ensure the higher rate of participation of the representatives of local interest groups in making decisions on the wolf protection in Croatia, the meetings with livestock breeders and hunters from Gorski kotar, Lika, and Dalmatia have been organized. The participants of the meetings have expressed their opinions on the problems of wolf protection and proposed the possible solutions. All these solutions have been taken into consideration during development of the "Wolf Management Plan for Croatia".

Sastanak sa stočarima u Mrkoplju

Gorski kotar

In the territory of Gorski kotar, four meetings with local livestock breeders and hunters have been held, together with a series of informal conversations during visits to local inhabitants, which involved the part of Primorje region as well.

The meetings were held in Mrkopalj and Jelenje – Dražice, where 56 representatives of livestock breeders from Poljice, Begovo Razdolje, Brestova Draga, Sunger, Potkilovac, Baštijan, Kukuljanovo and Bakar, together with the representatives of hunting associations "Vepar" (Boar) and "Jelen" (Deer) from Čavle – Jelenje section, have participated.

Livestock breeders mainly complained about too small and insufficient compensation for the damage done by wolf and poor herd protection against wolves. They proposed higher reimbursement of damages and expressed their interest for donation of electric fences and livestock guarding dogs. In addition, they also emphasized their approval of the wolf protection, along with the preventive protection of livestock.

Hunters are convinced that wolf population is increased, that does not correspond to the number of game in hunting-grounds. In their opinion, "damages"* done to game should be recorded and reimbursed. They proposed m ore intensive communication between the competent institutions. Regarding wolf status, they approve of the wolf protection, but only if complemented by the defined kill quotas for wolves.

... i u Donjem Lapcu

Lika

In the territory of Lika, seven meetings were held – five with livestock breeders and two with hunters, at which 125 stakeholders participated. Also, a large number of visits and informal conversations with local livestock breeders have been done.

The meetings were held in Gospić, Vrelo Zrmanje, Karlobag and Donji Lapac, and the representatives of livestock breeders from Klanac, Perušić, Vranovina, Aleksinac, Zrmanja, Kum, Kusac, Ribarica, Cesarica, Lukovo Šugarje, Lovinac, Ribnik, Sv.Rok, Štikada, Orlovac, Kestenovac and Doljanje, the representatives of the county hunting association and ten hunting clubs (Orao (Eagle) from Kosinje, Kuna (Marten) from Lički Osik, Lana from Perušić, Jastreb (Hawk) from Kosa, Klis from Perušić,

* Only damages on livestock are reimbursed, because livestock is a private property. On the other hand, game is state property, so "damages" on game are not reimbursed.

Tetrijeb from Pazarište, Lika from Gospić, Gradina from Udbina and IKAM d.o.o. from Gospić) participated in the meetings.

Like in Gorski kotar, livestock breeders in Lika ask for higher reimbursement of damages and consider donation of electric fences and tornjak dogs necessary. They point out the lack of natural prey for wolf (doe, deer, wild boar) as a problem.

The opinion of hunters corresponds to those in Gorski kotar. They particularly emphasiz that wolf must be protected because he is part of our cultural heritage.

Dalmatia

In the territory of Dalmatia ten meetings were held, in which approximately hundred sheep-breeders and partly goat- and horse-breeders participated. The meetings were held in Mravnice, Unešić, Podgrađe, Knin, Benkovac, Oklaj, Kijevo, Primorski Dolac and on Biokovo.

Sastanak sa stočarima u Kijevu

Also, there have been a great number of informal talks, and some of them participated in the working stakeholder meetings (Thematic session on wolf management in Croatia and influence on game management organised by the Croatian Liberal Party of the Split-Dalmatian county in Trogir, on 24 May 2003; The second livestock breeders assembly in Benkovac, 10 June 2003).

Livestock breeders in Dalmatia believe that the existing compensation system should be improved. They complain that the procedure of proving the damage is too complex and sometimes the valid proofs for damage are not available. In these cases the damage is not reimbursed. One of the most important things is regular payment of reimbursements. Like livestock breeders in Gorski kotar and Lika, they also propose higher reimbursement, at least EUR 150-200 for one sheep would be desirable. When the meeting moderator asked if they would pay the same price when buying the sheep, the livestock breeders did not give a positive respond. Some livestock breeders suggested the model of subsiding.

They also point out that the inhabitants are old and dying away, so it is physically difficult to organise constant herd guarding. There are different opinions about the donation programme. Some livestock breeders are interested for donation and some believe that electric fences are only partly usable due to field configuration. Furthermore, in their opinion costs of keeping tornjak dogs are too high.

It is important to mention that these viewpoints will be taken into consideration for the implementation of the management plan.

Workshop on the implementation of the Wolf Management Plan

Altogether five workshops on the implementation of Wolf Management Plan have been held in Croatia, in which representatives of all stakeholder groups (hunters, livestock breeders, representatives of the state government, local government, NGOs, representatives from Slovenia, etc., took part. All the participants of the workshops agreed that the main goal is to conserve the wolf population in Croatia, but they should agree on the way of achieving this goal. Data on the condition of wolf population, features of wolf habitation (including roads and crossings for large beasts), number of game and cattle, genetics research, former experience related to prevention of damage done to domestic animals (donation of tornjak dog), analysis of damage done to domestic animals, international and national regulations and documents related to wolf protection, research of the human dimension and on the protection regime in Slovenia, have been collected and

Radionica za izradu Plana upravljanja vukom u Velebnom

... i u Skradinu

presented. The most discussions referred to the wolf protection regime, and the issue whether it is necessary to stick to strict protection or rather enable interventions into the wolf population. The last workshop was held in Skradin, in mid December 2003. Representatives of the Croatian Hunting Union refused to participate in this workshop, explaining that their viewpoints have not been taken into consideration. To that purpose they delivered their written statement with suggestions. Independent from this, and according to the workshop plan, the rest of participants have elaborated the option of protection in detail, with the possibility of the intervention into wolf population. All the representatives agreed with this option, provided that the intervention should be limited and strictly supervised in conformity with international and national regulations (without jeopardizing the population). It has been decided that this option should be applied for a definite period of time, hoping that this would result in the decrease of illegal kill. If this proves wrong, the option of strict protection will be again taken into consideration. It was agreed that a small task force should finalise the plan proposal and submit it to the rest of the workshop participants.

The Wolf Management Plan is a result of joint efforts of the following organisations / groups:

- State Institute for Nature Protection
- Croatian Forest
- Croatian Hunters Association
- Croatian Livestock Selection Centre
- Ministry of Agriculture, Forestry and Water Management, Department of Forestry, Department for Hunting, Department for Veterinary Science
- Ministry of Environment Protection, Physical Planning and Construction
- Ministry of Culture, Department for Nature Protection
- National park Krka
- National park "Paklenica"
- National park "Plitvička jezera"
- National park "Risnjak"
- National park "Sjeverni Velebit"
- Oikon d.o.o
- Nature Park Velebit
- Faculty of Science, University in Zagreb
- Faculty of Forestry, University in Zagreb
- Livestock Breeders Association
- Croatian Association For Wolf Protection
- University of Slovenia, in Ljubljana
- Department for Economic Development, Primorsko-goranska County
- Veterinary faculty, University in Zagreb
- Slovenian Department of Forestry
- Green Action
- County Hunter Association

Plans for the second project year

Development of the Wolf Management Plan is ongoing, and it is expected to enter the legal procedure soon.

Publishing of the brochure on wolf, intended for pre-schoolers, and the wolf poster have been planned, and a documentary on wolf is in preparation.

Since children and their teachers have shown interest for a more active involvement in wolf protection during the lectures, an adequate program will be designed this year. Likewise, an initiative will be offered to the competent ministry in order to include the lectures on wolf in the regular school curricula.

Te program of donations of electric fences and tornjak dogs is being successfully continued as well, and that is why the supervision of donation users will be one of the main activities of regional offices this year.

The State Institut for Nature Protection joined the donation as well, and during December 2003 and January 2004 bought and donated five female puppies, which were distributed to livestock breeders from the territory of Mrkopalj, Lukovdol, Karlobag and Gospić.

In other words, in the scope of implementation of this LIFE project, livestock breeders have shown interest for independent breeding of tornjaks, and establishing smaller regional associations along particular regions. This way, the tornjak dogs breeding centres would be established in the territory where they are needed the most, and the traditional way of cattle tending would come to life.

Capturing and monitoring of wolves in Gorski kotar and Lika are in process, and we hope that this year more wolves will be marked. The rest of data that make up the base for determining the way of population management are being collected. Besides the data on cattle, these are the data on game, roads, inhabitants, types of habitats and land covers. All these data, including the ones on donated tornjak dogs and fences, will be processed through modelling in GIS. Except these data, also the adequate data from other nature protection projects that are being implemented by competent authorities will be taken into consideration. In this way, for instance, the State Institut for Nature Protection implements a LIFE project for the establishment of national ecological network and the NATURA 2000 network, the Ministry of Environmental Protection, Physical Planning and Construction implements a LIFE project for mapping the land cover, while the Karst Ecosystems Conservation (KEC) project is being implemented within the Ministry of Culture.

It should be noted that GIS modelling is an important tool for the planning of wolf population management in Croatia, in particular for comparing the spatial distribution of all factors which directly and indirectly affect the wolf population in Croatia, answers to the questions which factors (environmental, social and economic) affect the present and future distribution and expansion of the wolf population the most, and where certain problems can be expected.

In the first half of the year a training seminar for experts is planned.

In the framework of the project more emphasis will be put on cooperation between various stakeholders, particularly in collection of data and educational activities.

All informations are available in our publication, on officional website www.life-vuk.hr and may be obtained by contacting our office in Zagreb or any of the two regional offices in the areas inhabited by the wolf.

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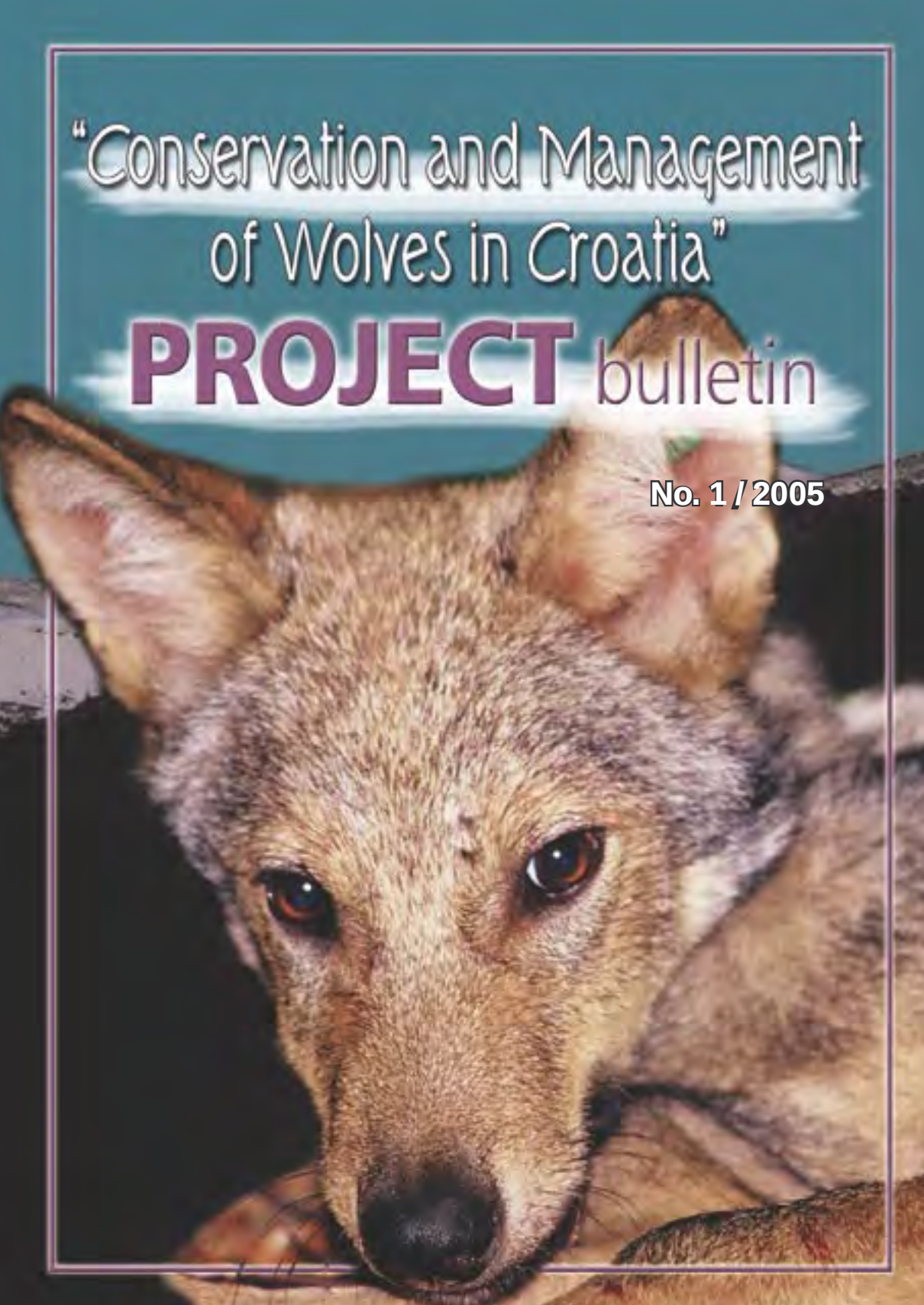
"Conservation and Management of Wolves in Croatia"

PROJECT bulletin

No. 1 / 2005



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A Word of Introduction

Is the wolf in Croatia presently better than two years ago when we started working intensively on its conservation and management in Croatia in the context of the LIFE project? Conservation of wolves is a long lasting and a comprehensive task, especially because of the fact that it is primarily based on co-operation with people and, as we know, it is always the most difficult thing. After all, the future of wolves in Croatia depends in the end solely on man and on an active co-operation and collaboration of all the so-called interest groups, especially those living with the wolf. A number of things may be said to have improved, particularly in terms of communication between various interest groups. The process of preparing the Wolf Management Plan for Croatia showed that this co-operation is possible. We simply learned to communicate by listening to one another and by respecting other opinions too, so as to reach the adequate solution. In the Plan we determined jointly all activities and procedures required for the conservation of wolves, at the same time minimizing the problem issues. The implementation of the Plan will show to what extent we were successful.

We are witnessing both the improvement of co-operation and positive changes at the level of public awareness. This can be best seen on the example of a she-wolf named Eva. Not so long ago the central TV news brought among the breaking news a story of sheep killed by wolves, accompanied by photographs of old women stained with blood. Contrary to this we can presently see on the news the local population rescuing this traditionally "detested" animal species. It is true, damage to the livestock keeps happening, it is recorded and regularly compensated for. In addition to compensation for damages a number of guarding dogs – tornjak and electric fences were donated to the livestock breeders in support of the protection of livestock against wolves' attacks over the last two years. There is an ever-growing recognition of the fact that livestock properly kept is less often or not at all exposed to damage. In any case, no matter whether it comes to the game or livestock, the wolf always attacks those most accessible. Apart from changes in the field of livestock breeding we are faced with harmonization of the hunting management and the presence of large carnivores. The areas inhabited by large carnivores will be a constituent part of the NATURA 2000 ecological network as the principal nature conservation programme of the European Union. It has been made obligatory to all the countries to maintain a favourable status of species, i.e. of large carnivores in these respective sites.

Fig.1. The operation of rescuing Eva in the Sebišine hamlet in Imotski

Major infrastructure developments, such as the construction of roads, have cut habitats of large carnivores in Croatia in two parts. Fortunately for them, it is precisely owing to the results of scientific studies of large carnivores of Croatia that had started even prior to the LIFE Project that numerous green bridges were constructed to help the animals cross to the otherwise cut off habitat parts. Finishing works on bridges and installation of monitoring sensors, including the fastening of motorway fences, are expected to make a safe crossing of animals possible.

Besides, the establishment of regional offices within the framework of the project proved to be of remarkable benefit to communication with local population, whose viewpoints have been integrated into the Wolf Management Plan presented in this Bulletin. The implementation of all points of the Plan should ensure the wolves a safe future.

This Bulletin should help you make your own evaluation of the extent to which our activities so far have contributed to this goal and of the answer to the question put at the beginning.

Achievements of the Second Project Year in View of Basic Activities

Institutional Strengthening

Activities performed by regional offices

The project implementation at the regional level has been entrusted to regional co-ordinators in charge of the Regional Office for Gorski kotar and Lika situated in Gospiæ and the Regional Office for Dalmatia with the seat in Šibenik. In their operation regional offices succeeded in establishing a permanent communication with livestock breeders, hunters, local authorities and other persons interested in the wolf conservation issues. Most of the activities were focused on the guarding dogs and electric fences donation programme and on organization of school lectures, other events and presentations in connection with the project implementation. Within the framework of the programme the co-ordinators regularly visit livestock breeders who have received the donations and advise them on the ways of using the guarding dogs and electric fences donated in accordance with the donation purpose.

New damage assessment experts and seminars for damage assessment experts

In the second project year two seminars for damage assessment experts were held – one in Baške Oštarije on 17 June 2004 and the other in Zagreb from 15-16 February 2005.

During both seminars lectures were given on legal frameworks for damage compensations and on recognizing the predator's signs on the victim, with the emphasis on special differences between individual predators. On that occasion the damage assessment experts had the opportunity to exchange their on-site experiences. Discussions were also held on the instructions for damage assessment and on the protocol form sheet, which underwent minor changes. The practical part of seminars included the dissection of animals killed by wolves.

The seminar held at the Faculty of Veterinary Medicine, University in Zagreb focused on practical work. The damage assessment experts attended a lecture on basic field dissection

techniques that included also a dissection itself carried out on several animals. Special attention was paid to sampling needed for additional examinations and DNA analyses. In this connection a need has arisen to draw up a protocol on the collection of protected animals killed.

In 2005 certain changes took place in the composition of damage assessment experts. Dra•en Matièiæ responsible for the County Karlovaèka was no longer able to carry out expert evaluations and therefore his substitution by Ivan Pavlièiæ from Rakovica was proposed. It was also proposed to sign contracts with Darko Abramoviæ in charge of the County Sisaèko-moslovaèka and Miroslav Andriæ of the County Zadarska. The Ministry of Culture is presently in the process of signing contracts with those experts. The present issue of the Bulletin brings a complete list of damage assessment experts for the year 2005.

Appointed damage assessment experts in 2005

No.	Full name	Place of residence	Phone No.	County	Fax No.	E-mail
1.	•eljko Dasoviæ	Brinje	053700688 mob: 098414355	Lièko-senjska		
2.	Dragan Milkoviæ	Gospiæ	053679026 mob: 098439187	Lièko-senjska		
3.	Igor Hak	Graèac	023775070 mob: 098446665	Lièko-senjska		
4.	Berislav Šimuniæ	Senj	053881418 mob: 0981882833	Lièko-senjska	053881404	
5.	Alojzije Frkoviæ	Rijeka	051546236 mob: 0916060641	Primorsko-goranska	051546130	
6.	Ana Grgas	Benkovac	023681997	Zadarska	023681110	anagrgas@hzpss.hr
7.	Miroslav Andriæ*	Benkovac	023682015	Zadarska		
8.	Marko Ljubièiæ	Knin	022661402 mob: 0915338938	Šibensko-kninska		
9.	Ivica Šupe	Šibenik	022334333 022214126 022214549 mob: 0915052267	Šibensko-kninska	022331441	
10.	Stipe Kokiæ	Sinj	021824901 mob: 098423159	Splitsko-dalmatinska		
11.	Boris Šabiæ	Makarska	021612008 mob: 0915384585	Splitsko-dalmatinska	021612008	boris.sabic@st.t-com.hr
12.	Damir Bosiljevac	Omi š	021863239 mob: 0915133263	Splitsko-dalmatinska	021862553 021862140	
13.	Zoran Braèulj	Split	021539814 mob: 0916060663	Splitsko-dalmatinska	021539814	zoran_braculj @yahoo.com
14.	Anita Petkoviæ	Dubrovnik	020331139 mob: 0989271007	Dubrovaèko-neretvanska		
15.	Ivan Pavlièiæ*	Dre•nik grad	047784009 mob: 098446813	Karlovaèka		
16.	Darko Abramoviæ*	Sisak	044559151	Sisaèko-moslovaèka		

*in the process of contracting

Fig. 2. Dissection of a killed sheep carried out at the seminar for damage assessment experts held in Baška Oštarije

Fig. 3. Dissection and lecture at the seminar for damage assessment experts held at the Faculty of Veterinary Medicine, University of Zagreb

Wolf Population Monitoring and Management Activities

Telemetric Monitoring of Wolves and Genetic Analysis

Gorski kotar

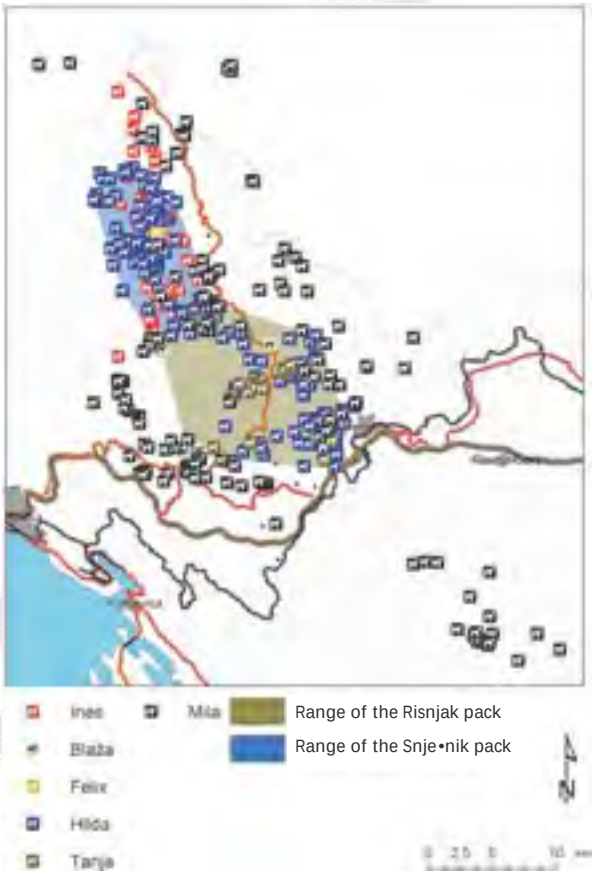
The second half of 2004 proved highly successful in capturing and collaring of the wolves. In a relatively short period of time three wolves were captured and collared: a wolf cub named Felix, captured on 15 August 2004 in the range of the Snje•nik pack; a young female named Mila, captured on 11 September 2004 near Tršæe and a reproductive female named Tanja, captured on 17 September 2004 in the range of the Risnjak pack. Unfortunately, Felix did not justify its name and died of infection on the third day after capturing. The signal emitted by Mila was lost in December 2004 and was recorded for the last time in the area of Kupièki vrh. It is suspected that Mila has been shot and the collar destroyed.

The first monitoring results for Mila pointed to the conclusion that she belonged to the Platak pack. Later it proved, however, that she did not belong to any of the packs, but was rather in search of a living space and a partner. Mila was moving over a territory of as much as 940 km, which is eight times the size of known ranges of wolves' packs in Croatia. In one day, for example, she used to cover even 30 km. Her presence was also recorded in the adjacent Slovenia. On her way she was entering or passing the ranges of alien packs, exposing herself to the danger of being detected and killed by other wolves.

The female named Tanja belongs to the Risnjak pack. It is assumed that females named Bla•a and Hilda collared earlier are her direct descendants and Felix her grandson, but this has yet to be confirmed by genetic analyses.

The monitoring of Hilda, collared as early as 2002, continues. As known, she left her pack (Risnjak), found a new living space and a male and had young. With 976 days Hilda is the longest monitored wolf so far.

The studies showed the wolves of Gorski kotar to be highly active during the day, because sufficiently protected by forest vegetation. Unlike them, the wolves of Dalmatinska zagora are most active at night.



Map 1. Range of movements of all wolves collared in Gorski kotar

Fig. 4. The female named Mila, the first wolf of Gorski kotar to be GPS-GSM collared

Fig. 5. Felix, a wolf cub of the female named Hilda

By monitoring the footprints in the snow and analysing the DNA of wolf's excrement samples the packs of wolves in this part of Gorski kotar showed to number between two and six individuals, which means that in three packs the number of individuals would vary from 10 to 15 at most. The number of wolves varies constantly. Young wolves are born in spring, some of them get killed soon and some manage to reach the age of leaving the parents' pack, but it is precisely in the period of separating from their pack that the majority gets killed. Only few of them reach the sexual maturity and even fewer get the chance for reproduction.

The analyses of other samples collected are expected to give an answer to the question of kinship of wolves collared in Gorski kotar so far.

Fig. 6. The female named Tanja, collared soon after Mila

Lika

Since late in March 2004 a component of a collar for classic telemetric monitoring ceased operating, it was no longer possible to monitor the female named Jelica. As informed by hunters of this area, the female wolf was observed in the middle of November 2004. The collaring of a new individual is in process as of May 2004.

Fig. 7. Monitoring the movements of Eva in Imotski

Dalmatia

Late in February Adam Bakoviæ from the Sebi š ine hamlet not far from the Runoviæi village in Imotski found a she-wolf entangled in a trap set for wild boars although strictly prohibited by law. A steel noose was tightened around her waist and while the animal was trying to free itself, the steel rope kept cutting deeper and deeper into its body causing severe injuries. With the help of some neighbours Adam Bakoviæ managed to free the she-wolf from the rope and carried her to his home, where he placed her into the stable. The news soon reached Zagreb, precisely at the time when the meeting of the Committee for Monitoring Large Carnivores Populations was taking place. Immediately upon the receipt of the information Josip Kusak left for Sebi š ine. Because of the advanced infection the female was brought to the Veterinary Station of Imotski where the wound was surgically treated by Luka Majiæ, Ivan Gudelj Ivanica, Perica Tucak and Mario Mar š iæ. The she-wolf was given all necessary medicines and received a GPS collar. After the listeners of the local radio station had voted, taking into consideration the finder's name, the female was named Eva. In view of the severity of the injury the female was not given much chance, however, she managed to survive and join the pack living in that area. In her movements she even entered the neighbouring Bosnia and Herzegovina.

The operation of rescuing Eva represents a positive example of how local population can contribute considerably to conservation of wildlife species and nature in general.

Mortality of wolves

In the period from 24 July 2004 to 1 May 2005 the death of nine animals was recorded. An interesting case happened in Donji Lapac, where a rabid animal attacked a man, was killed and destroyed, but only its head reached Zagreb for the analysis. By the appearance of the skull the experts believe that the animal was a wolf, but this has yet to be confirmed by the results of a genetic analysis, although in this case it is much more important that the animal actually was rabid. Namely, each rabid animal, regardless of the species, can attack humans.

It is also interesting that since the beginning of 2005 more information have been received about illegally killed wolves, which was previously not often the case. In this a valuable contribution is made by the hunters.

Table 1. A list of known deaths of wolves in the period from 24 July 2004 to 1 May 2005

Date	Site	Area	Marking	Sex	Age	Weight	Cause of death
28.08.2004	Gicijev vrh	Gorski kotar	WCRO54	M	0,40	14,50	Chlamidia sp.
01.09.2004	Bukov vrh	Gorski kotar	WCRO55				Found dead after 2 years (small axe)
21.09.2004	Donji Lapac, Gajnice	Lika	WCRO56?	F			Rabies
22.12.2004	Sinj Glavice Donje	Dalmatia	WCRO58	F	7	28	Unknown (poison?)
02.01.2005	Novo Selo Bosiljevsko	Kordun	WCRO59	F	6	37	Shot
17.02.2005	Vrbnik Polje – Kaldrma	Dalmatia	WCRO60	F	0,8	24	Unknown (poison?)
17.02.2005	Èitluk – Puljane	Dalmatia	WCRO61	F	11	29	Shot
18.05.2005	Konjsko, close to Dugopolje	Dalmatia	WCRO62	F	2	26	Road-kill
29.04.2005	Grab, close to Trilj	Dalmatia	WCRO63	M?			Road-kill (found burnt)

Fig. 8. A wolf killed on a road ….

Fig. 9. … and by poaching

Analysis of the game number

For the needs of the project data have been collected relating to the number of game by species, the planned and performed annual kill in hunting seasons of 2002/2003, 2003/2004 and 2004/2005 and the number of livestock head killed by wolves yearly. The analysis includes the following species: roe deer, red deer, mouflon, chamois, wild boar and brown bear.

Three form sheets for each of the three hunting years were sent to 218 addresses of hunters' clubs and individuals holding one or more hunting grounds on lease in the wolf's range of distribution. So far answers have been received from 128 hunters' clubs that filled in and returned 451 form sheets from a total of 154 state and common hunting grounds. Out of five national parks situated in the wolf's range of distribution three have sent their answers (Tables 2 and 3). The majority of form sheets completed were received from the counties Lièko-senjska, Karlovaèka and Primorsko-goranska. All the data were stored in a database and analysed.

It should be noted that the data collected do not reflect the actual number of game. Although these data represent the hunting management basis, this estimate is not scientifically founded and should be taken with due reservations. In other words, these data are of a subjective nature and at the same time the only data on the game available in Croatia. Nevertheless, they reflect general trends in the number of game or rather give a specific picture of potential stocks of wolf's prey.

Table 2. Number of state and common hunting grounds and national parks in counties of the wolf range that submitted completed form sheets for the number of game

County / No. of hunting grounds	State hunting grounds	Common hunting grounds	National parks	Total
Dubrovaèko-neretvanska	3	3	0	6
Splitsko-dalmatinska	5	1	0	6
Šibensko-kninska	6	9	0	15
Zadarska	8	5	1	14
Lièko-senjska	33	11	1	45
Primorsko-goranska	10	12	1	23
Karlovaèka	12	36	0	48
TOTAL:	**77**	**77**	**3**	**157**

Table 3. Number of completed form sheets for the number of game in state and common hunting grounds and national parks in the counties of the wolf range

County / No. of hunting grounds	State hunting grounds	Common hunting grounds	National parks	Total
Dubrovaèko-neretvanska	9	9	0	18
Splitsko-dalmatinska	15	3	0	18
Šibensko-kninska	18	21	0	39
Zadarska	23	15	3	41
Lièko-senjska	92	36	3	131
Primorsko-goranska	30	36	3	69
Karlovaèka	36	108	0	144
TOTAL:	**223**	**228**	**9**	**460**

Table 4. Land area of hunting grounds included in the game data processing

County	Mainland area of the county (km²)	Land area of hunting grounds included in data processing (km²)	Share in total mainland area of the county (%)
Dubrovaèko--neretvanska	1783	313.72	17.60
Splitsko--dalmatinska	3620	530.19	14.65
Šibensko-kninska	2850	928.02	32.56
Zadarska	3642	1402.25	38.50
Lièko-senjska	5258	3641.38	69.25
Primorsko-goranska	2544	1547.65	60.84
Karlovaèka	3622	2399.11	66.24

The data received indicate a continuous upward trend in the number of game from year to year in all counties except in the County Primorsko-goranska.

Table 5. Trend in the number of game by individual counties

County	2002/2003	2003/2004	2004/2005
Dubrovaèko-neretvanska	112	133	137
Splitsko-dalmatinska	697	771	840
Šibensko-kninska	285	289	323
Zadarska	605	742	755
Lièko-senjska	4099	4735	5044
Primorsko-goranska	4744	4634	4648
Karlovaèka	4355	4583	4823
TOTAL:	**14897**	**15887**	**16570**

Fig. 10. Total number of head of game by counties and hunting years

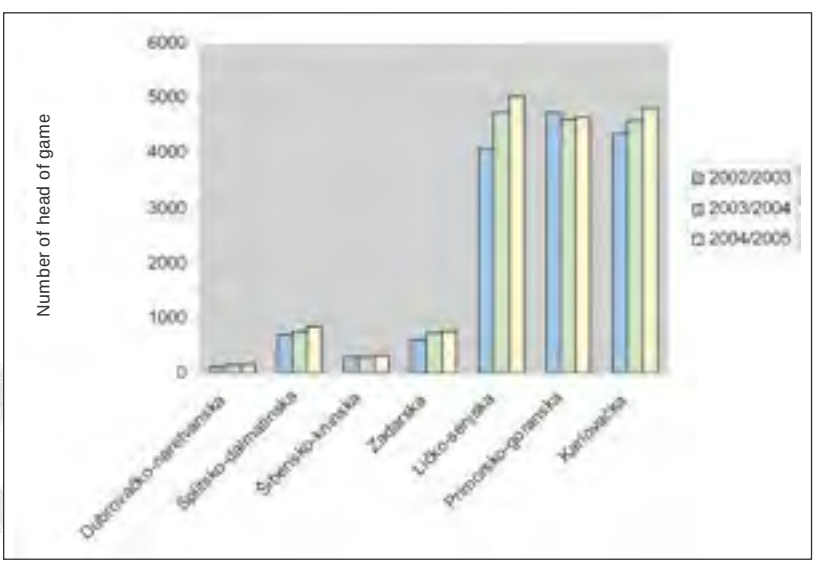


Table 6. Number of head of game by counties in the hunting year 2002/2003

County	Roe deer	Red deer	Mouflon	Chamois	Wild boar	Brown bear	TOTAL
Dubrovaèko-neretvanska	0	0	0	18	94	0	112
Splitsko-dalmatinska	10	0	85	455	147	0	697
Šibensko-kninska	14	0	0	37	234	0	285
Zadarska	101	9	0	64	407	24	605
Lièko-senjska	1483	308	414	165	1470	259	4099
Primorsko-goranska	2224	1163	108	141	857	251	4744
Karlovaèka	2962	127	0	0	1195	71	4355
TOTAL:	**6794**	**1607**	**607**	**880**	**4404**	**605**	**14897**

Table 7. Number of head of game by counties in the hunting year 2003/2004

County	Roe deer	Red deer	Mouflon	Chamois	Wild boar	Brown bear	TOTAL
Dubrovaèko-neretvanska	0	0	0	30	103	0	133
Splitsko-dalmatinska	19	0	49	516	187	0	771
Šibensko-kninska	16	0	0	39	234	0	289
Zadarska	117	12	0	100	487	26	742
Lièko-senjska	1737	354	452	205	1709	278	4735
Primorsko-goranska	2244	1115	98	141	787	249	4634
Karlovaèka	3128	142	0	0	1234	79	4583
TOTAL:	**7261**	**1623**	**599**	**1031**	**4741**	**632**	**15887**

Table 8. Number of head of game by counties in the hunting year 2004/2005

County	Roe deer	Red deer	Mouflon	Chamois	Wild boar	Brown bear	TOTAL
Dubrovaèko-neretvanska	0	0	0	35	102	0	137
Splitsko-dalmatinska	26	0	53	531	230	0	840
Šibensko-kninska	19	0	30	40	234	0	323
Zadarska	127	18	0	118	464	28	755
Lièko-senjska	1934	321	440	229	1813	307	5044
Primorsko-goranska	2216	1125	95	158	793	261	4648
Karlovaèka	3401	121	0	0	1222	79	4823
TOTAL:	**7723**	**1585**	**618**	**1111**	**4858**	**675**	**16570**

Despite a constant rise in the number of game from year to year, its distribution by species remained the same in all counties. So roe deer is evidently the most numerous game in the area of the counties Karlovaèka, Primorsko-goranska and Lièko-senjska. The data indicated show also that in this part of Croatia between 80 and 90 per cent of the total game stock live in the territory occupied by wolves. In Dalmatia the most numerous species are the wild boar and the chamois.

When we compare data on the kill performed and on the number of game killed yearly by the wolf or the lynx, we come to the conclusion that the majority of the game fall victim to a regular kill (14-15 per cent) and only a substantially lower percentage gets killed by the wolf and the lynx or dies of other causes (road-kill, disease, etc.). This trend is noticeable in all of the counties and in all three hunting years with the exception of the County Splitsko-dalmatinska. However, it should be noted that the data available for the County Splitsko-dalmatinska do not reflect the actual state, because hunting grounds located in this county, which were covered by our analysis and returned the form sheets filled in, account for 14 per cent of the total mainland area of the county only. This is indeed too small a share to justify the assessment for the entire county.

Table 9. Share of killed game in the total number of the head of game* by causes of kill and by counties in the hunting year 2002/2003

County/Game	Kill recorded	Killed by wolves	Killed by lynx	Other causes
Dubrovaèko-neretvanska	44.64	7.14	0.00	0.89
Splitsko-dalmatinska	2.30	11.91	0.00	2.87
Šibensko-kninska	9.47	1.40	0.00	4.56
Zadarska	16.69	0.99	0.00	2.48
Lièko-senjska	12.71	3.22	0.90	1.85
Primorsko-goranska	16.38	2.74	1.08	3.83
Karlovaèka	13.64	2.14	0.23	3.83
TOTAL:	**14.00**	**3.06**	**0.66**	**3.20**

* roe deer, red deer, mouflon, chamois, wild boar

Table 10. Share of killed game in the total number of the head of game* by causes of kill and by counties in the hunting year 2003/2004

County/Game	Kill recorded	Killed by wolves	Killed by lynx	Other causes
Dubrovaèko-neretvanska	35.34	8.27	0.00	3.01
Splitsko-dalmatinska	1.17	14.92	0.00	3.63
Šibensko-kninska	10.03	1.38	0.00	13.15
Zadarska	11.73	3.91	0.13	7.14
Lièko-senjska	13.20	3.46	1.37	3.55
Primorsko-goranska	15.02	3.52	1.14	4.47
Karlovaèka	17.65	2.01	0.28	4.25
TOTAL:	**14.49**	**3.64**	**0.83**	**4.36**

* roe deer, red deer, mouflon, chamois, wild boar

Table 11. Share of killed game in the total number of the head of game* by causes of kill and by counties in the hunting year 2004/2005

County/Game	Kill recorded	Killed by wolves	Killed by lynx	Other causes
Dubrovaèko--neretvanska	35.77	6.57	0.00	2.19
Splitsko-dalmatinska	2.38	18.93	0.00	1.79
Šibensko-kninska	13.93	2.48	0.00	4.33
Zadarska	14.57	3.31	0.13	1.46
Lièko-senjska	13.40	4.06	1.01	2.44
Primorsko-goranska	15.45	3.10	1.18	4.43
Karlovaèka	18.95	2.30	0.41	4.04
TOTAL:	**15.28**	**3.99**	**0.77**	**3.42**

* roe deer, red deer, mouflon, chamois, wild boar

Fig. 11. Game is a natural wolf's prey

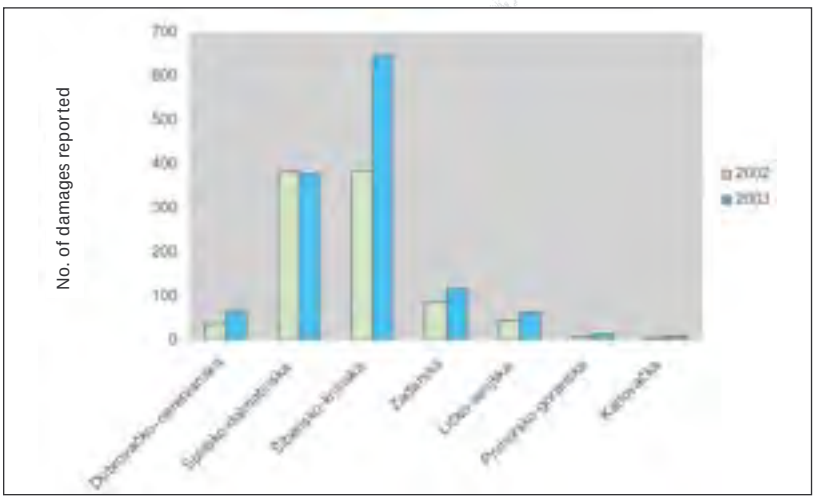
Analysis of the livestock number and damage caused by wolves

In the period from 2002 to 2003 a total of 2,242 compensation claims were received relating to damage caused by a protected predator. In total, the highest number of claims originated from the counties Šibensko-kninska and Splitsko-dalmatinska and the least from the County Karlovaèka. The data indicate that more than three quarters of the damages reported occurred in the area of Dalmatia. It is also evident that the number of compensation claims in 2003 increased by 36 per cent as compared to 2002. Namely, from year to year an ever-growing number of people (livestock owners) is informed of and becomes familiar with the fact that they can exercise their right on a compensation if they suffered damage caused by a protected predator. In the requests received many livestock breeders stressed that they had never before reported damage caused by wolves or lynxes, because they did not know their rights. In the process of informing and educating the population the LIFE Project played an important role.

Table 12. Number of damages reported in 2002 and 2003

County	2002	2003
Dubrovaèko-neretvanska	37	66
Splitsko-dalmatinska	384	379
Šibensko-kninska	383	648
Zadarska	86	118
Lièko-senjska	44	63
Primorsko-goranska	9	13
Karlovaèka	5	7
TOTAL:	**948**	**1294**

Fig. 12. Number of damages reported in 2002 and 2003



Since investigations are conducted always when a protected animal (a wolf or a lynx) is suspected of having caused the damage, the number of investigations completed does not mean at the same time the number of damages caused by wolves. It should be noted that compensations are also paid when it is likely that the damage was caused by a wolf. The damage analysis results presented in this Bulletin relate only to cases when these damages may be attributed to wolves with certainty.

In 2002 the wolves were found to have undoubtedly caused damage in 74 per cent of cases. In some of the cases the damage is judged to have been caused by a dog, a bear or a golden jackal. In 5.4 per cent of the cases the judgement was uncertain or not made at all. In 2003 the number of recorded damages caused by wolves increased in relation to the total number of damages recorded – it is estimated that in 81 per cent of all cases the damage was without any doubt caused by wolves.

Compared to 2002 the share of the dog as a predator in the total number of damages dropped considerably. However, it should be stressed that the data on damages caused by dogs do not reflect the actual status. The dog as a predator is, namely, known to appear in a much larger number of damages yearly. This problem is particularly marked in Dalmatinska zagora where the number of stray dogs is high, but there is no adequate sanitary service for their elimination. A considerable number of persons who have suffered damage do not even claim for damages, because the dog is not a protected animal and therefore no right on compensation can be exercised on these grounds.

Table 13. Distribution of reported damages on livestock caused certainly by the predator mentioned

Predator	Wolf		Lynx		Brown bear		Golden jackal		Dog		Unknown		TOTAL	
County/ Year	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003
Dubrovaèko--neretvanska	37	65	0	0	0	0	0	0	0	0	0	1	37	66
Splitsko--dalmatinska	340	330	0	0	0	0	0	0	3	1	17	15	360	346
Šibensko--kninska	270	513	0	0	0	0	1	5	1	0	27	26	299	544
Zadarska	12	73	0	0	1	0	0	0	0	0	5	1	18	74
Lièko-senjska	37	56	0	3	1	0	0	0	0	0	2	1	40	60
Primorsko-goranska	6	11	0	1	2	0	0	0	0	0	0	0	8	12
Karlovaèka	2	4	0	0	0	0	0	0	1	0	0	0	3	4
TOTAL	**704**	**1052**	**0**	**4**	**4**	**0**	**1**	**5**	**5**	**1**	**51**	**44**	**765**	**1106**

The analysis of data on domestic animals killed showed that wolves most often attack the small stock, i.e. sheep and goats, and less often the bovine cattle, i.e. beef cattle, donkeys and horses. In the period from 2002 to 2003 sheep and goats account for as much as 95 per cent of all domestic animals attacked. The wolf also feeds on domestic dogs.

In term of the territory, the greatest part of the livestock was killed in the area of Dalmatian counties (92.3 per cent), which is not astonishing, because the analysis of the wolves feeding habits carried out in 2002 showed the domestic animals to account for 73.4 per cent of the wolves diet in the area of Dalmatia.

Table 14. The number of each individual livestock species attacked by wolves by counties in 2002 and 2003

Species	Beef cattle		Horse		Goat		Donkey		Sheep		Dog		TOTAL	
County/ Year	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003
Dubrovaèko- -neretvanska	16	30	1	3	35	31	5	5	12	72	0	0	69	141
Splitsko--dalmatinska	13	15	4	0	293	338	12	6	544	391	47	52	913	802
Šibensko--kninska	9	6	1	0	68	127	4	17	588	1009	17	13	687	1172
Zadarska	5	10	1	2	112	145	1	1	110	186	0	2	229	346
Lièko-senjska	0	0	0	1	0	6	0	0	122	165	0	0	122	172
Primorsko--goranska	0	0	0	0	4	32	0	0	9	2	1	1	14	35
Karlovaèka	0	0	0	0	0	1	0	0	7	9	0	1	7	11
TOTAL	**43**	**61**	**7**	**6**	**512**	**680**	**22**	**29**	**1392**	**1834**	**65**	**69**	**2041**	**2679**

In the present Bulletin the share of livestock killed by wolves in the total number of livestock of a specific county is presented. As compared to the previous issue, the number used this time relates to the total number of livestock in the range of the wolf, i.e. only the livestock registered in the mainland part of the county was taken into consideration, excluding the

livestock living on islands. The data on the total number of the livestock were furnished by the Croatian Livestock Centre (HSC). The total number of sheep and goats in 2003 exceeding considerably that of 2002 is a result of changed livestock recording criteria. The 2002 data represent only the number of livestock registered by the Croatian Livestock Centre. The increase in the number of livestock in 2003 is closely connected with the introduction of records of the government grants for all head of cattle, either included in the selection system or not.

Table 15. Share of sheep and goats killed by wolves in the total number of sheep and goats by each county in 2002

Species	Sheep		Goats	
No. of cattle --> / County	Total no. registered by HSC	Share of livestock killed by wolf (%)	Total no. registered by HSC	Share of livestock killed by wolf (%)
Dubrovaèko-neretvanska	891	1.35	901	3.88
Splitsko-dalmatinska	20497	2.65	7157	4.09
Šibensko-kninska	45824	1.28	4470	1.52
Zadarska	47809	0.23	10819	1.04
Lièko-senjska	25510	0.48	1562	0.00
Primorsko-goranska	3784	0.24	407	0.98
Karlovaèka	7567	0.09	865	0.00
TOTAL	**151882**	**0.92**	**26181**	**1.96**

Table 16. Share of sheep and goats killed by wolves in the total number of sheep and goats by each county in 2003

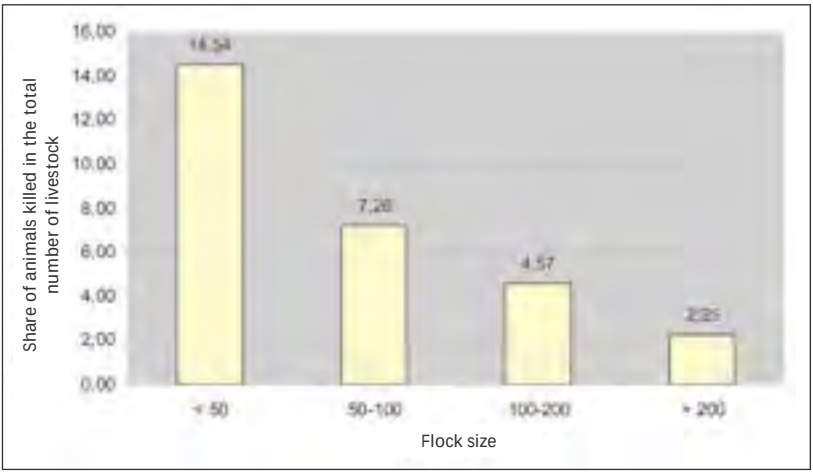
Species	Sheep		Goats	
No. of cattle --> / County	Total no. registered by HSC	Share of livestock killed by wolf (%)	Total no. registered by HSC	Share of livestock killed by wolf (%)
Dubrovaèko-neretvanska	3054	2.36	1020	3.04
Splitsko-dalmatinska	22353	1.75	8221	4.11
Šibensko-kninska	66552	1.52	5768	2.20
Zadarska	72135	0.26	13493	1.07
Lièko-senjska	45442	0.36	2398	0.25
Primorsko-goranska	7641	0.03	419	7.64
Karlovaèka	14065	0.06	864	0.12
TOTAL	**231242**	**0.79**	**32183**	**2.11**

Investigation reports contain also data on the size of the flock of sheep or goats attacked. During the analysis all cases for which such data were available were taken into consideration regardless of the year of damage. For that reason Table 17 contains data on the size of flocks from 1995, when the payment of compensations for damages started, to 2003.

Table 17. Number of animals killed in relation to the flock size

Flock size	No. of attacks	Total livestock present	No. of animals killed	Average no. of animals killed per attack	Share of animals killed in total no. of livestock
< 50	254	6913	1005	3.96	14.54
50-100	65	4420	321	4.94	7.26
100-200	15	2101	96	6.40	4.57
>200	6	1820	41	6.83	2.25

Fig. 13. Share of animals killed in the total number of livestock in relation to the flock size



The data indicate that smaller flocks suffer larger damage than those bigger. Although the average number of animals killed per each attack is lower (which is logical given the smaller number of animals of the flock), the share of animals killed in the total number of livestock exceeds by far that of smaller flocks.

Fig. 14. Unguarded livestock falls easy prey to wolves

Action Plan

for Implementation of Wolf and Lynx Management Plans

1. Research and Monitoring

1.1. Establishment of the National Wolf and Lynx Monitoring System

Wolf and Lynx Populations Monitoring

Activities	What?	Who is in charge?	When? Deadline?	Funds?
Collection of wolf and lynx carcasses and other samples (hairs, excrements)	1. Prepare a protocol for collection of wolf and lynx carcasses containing instructions and contact addresses and send it to all participants 2. Supply the protocol and sampling test-tubes for genetic analysis to all participants	Josip Kusak, Jasna Jeremiæ-Martinko Đuro Huber	10 April 2005.	Government budget (as part of regular operations)
Telemetric monitoring		Josip Kusak (wolf); Tomislav Gomerèiæ (lynx)	Permanently	Government budget (regular operations + MSES* + Ministry of Culture) + county budgets
Following the tracks in snow	Once a year, in winter, organize marking of wolf and lynx traces in snow – Protocol on the data collection methodology	Josip Kusak and county hunters' clubs including supervisors of national and nature parks and forest administrations. Data processing – State Institute for Nature Protection (the data are public).	September 2005 To start in winter 2005/ 2006 – accurate date to be agreed later.	As part of regular operations + funds raised from hunting rents.

* Ministry of Science, Education and Sports

Activities	What?	Who is in charge?	When? Deadline?	Funds?
Monitoring of prey populations	1. Organize collection of existing data (hunting statistics – new Hunting Law) and repeat this each year	Coordination: MAFWM* - Robert Laginja, Branko Ivièek	Unknown, in process (waiting for adoption of the new Hunting Law).	Government budget
	2. Design and organize scientific assessment of game number that includes a combination of various methods (traces in snow + genetics + counting) – pilot area	Participants: Croatian Hunters' Club, county offices of economy, hunting concessionaires, Branko Ivièek, •uro Huber, Dario Majnariæ et al.	Agreement on co-operation and methods – by end of June (to select test hunting grounds).	Government budget (MAFWM), county budgets, international funds – bilateral co-operation with Slovenia
Application of GIS	Digitalize boundaries of hunting grounds in Croatia	Coordination: MAFWM - Branko Ivièek, Zrinko Jakš iæ	In process for state hunting grounds. Common hunting grounds -?	Government budget (MAFWM)

All the data collected are integrated and processed by the State Institute for Nature Protection (SINP) as the central expert institution responsible for monitoring the state of nature (in compliance with the Nature Protection Law).

* Ministry of Agriculture, Forestry and Water Management

2. Habitat Preservation

Activities	What?	Who is in charge?	When? Deadline?	Funds?
Preservation of habitat integrity and quality	Implement NATURA 2000	SINP	Phase I – 2003-2007	Presently international funds (LIFE Project, CRO-NEN, PHARE as of 2006), government budget, county budgets
	Require additionally the Ministry of Culture to approve the development of a rulebook on measures for protection of green bridges.	Committee for Monitoring Large Carnivores Populations at the Ministry of Culture	April 2005	Government budget – Ministry of Culture
	Print information booklets about green bridges in Croatian and English.	•uro Huber, Josip Kusak, Ana Štrbenac, Jasna Jeremiæ--Martinko.	Autumn 2005 (depending on funds)	Government budget – Ministry of Culture, State Institute for Nature Protection, Croatian Hunters' Club?, Croatian Motorways?, Green Action?, Wolf Conservation Association

3. Hunting

3.1. Harmonization of hunting management with wolf and lynx conservation

Activities	What?	Who is in charge?	When? Deadline?	Funds?
Establishment of monitoring system for game status in Croatia	Same as with prey population monitoring + establishment of central GIS database in MAFWM.	MAFWM: Robert Laginja, Branko Ivièek	In process	Government budget (i.e. MAFWM budget -? funds from hunting rents)
Incorporation of wolf and lynx presence in increment coefficient and game stock.	1. Draw the attention of hunting lease holders to the obligation to follow the provisions of Art. 14, par.2 and Art. 4 of the Nature Protection Law when revising hunting management documents. Data are available at SINP. 2. Harmonize the Rulebook on Development of Hunting Management Documents.	Performed – •. Štahan MAFWM – Branko Ivièek	At the first revision of hunting management documents.	Government budget (regular operations)
Game population increase.	See activity above + introduction of adequate autochthonous game species	MAFWM, Croatian Hunters' Club, other hunting concessionaires	At the first revision of the Wolf Management Plan	Future international projects in co-operation with hunting lease holders.
Scientific establishment of objective assessment of wolf and lynx impact on game populations.	Launch a pilot project of scientific impact assessment in a certain area and apply that model in future to all other hunting grounds	Draft lynx project containing such an assessment for wolf and lynx has already been proposed for financing from the INTERREG programme.	Draft project sent to competition by 1 March 2005	INTERREG III programme (if accepted); Other international funds as part of nature conservation projects; In future to be funded from the government budget (MAFWM).

3.2. Prevention of illegal kills of game, wolf and lynx

Activities	What?	Who is in charge?	When? Deadline?	Funds?
Give broader powers to gamekeepers and supervisors of protected areas and strengthen their co-operation with local police.	1. Hunting Law – amendment? 2. Prepare instructions on persons to be notified in case of illegal kill of wolf, lynx or another protected species. 3. Prepare a list of nature protection inspectors, hunting inspectors and representatives of local police with contact addresses for better information exchange.	MAFWM, Committee (•. Štahan, A. Frkoviæ) Ministry of Culture – Nature Protection Department – some of inspectors Some of nature protection Inspectors + MAFWM + Ministry of Interior	Immediately	Government budget – regular operations
Increase efficiency of authorized inspection services on site.	See above.			
Educate authorized services.	Organize a seminar on protected animal issues for police, inspection and other authorized persons.	Ministry of Culture – Darka Spudiæ, Andrea Štefan	April 2005, as part of regular meeting for CITES	Government budget – regular operations
Increase responsibility of hunting concessionaires for non-reporting on illegal wolf and lynx kill.	Legal basis is available; enforcement of penal liability should be encouraged and supported (mass media pressure).	Authorized inspection	Permanently	-
Tighten sanctions against poaching (extra sanctions of taking away weapons permanently).	Legal basis is available; enforcement of penal liability should be encouraged and supported (mass media pressure).	Ministry of Interior	Permanently	-

Protocol for collecting of protected animals killed (wolf, lynx)

Damage assessment expert

If rabies is suspected

COMPETENT VETERINARY ORGANIZATION

NATURE PROTECTION INSPECTION

Zagreb Office: Katica Bezuh,	098/406-974
Rijeka Office: Ivanka Jelenić,	098/406-313
Zadar Office: Damir Mitrović,	098/406-979
Šibenik Office: Davor Cukrov,	098/406-982
Split Office: Marijana Franičević,	098/407-052
Varaždin Office: Hrvoje Stunković,	098/406-984
Đakovo Office: Željko Vuković,	098/406-314

FACULTY OF VETERINARY MEDICINE DEPARTMENT OF BIOLOGY

JOSIP KUSAK
091/2212-133

STATE INSTITUTE FOR NATURE PROTECTION

JASNA JEREMIĆ- MARTINKO
091/6106-448

COMPETENT POLICE STATION

TRANSPORTATION

Pack into a PVC bag

Place into a refrigerator or a freezer, if possible

Protocol for the Collecting of Protected Species Killed (Wolf, Lynx)

Introductory remarks

The provisions of the Nature Protection Law and the plans adopted for wolf and lynx management in Croatia lay it down that in case of a notification/information about protected species killed procedure must be applied as described in the schematic presentation attached. First of all a damage assessment expert (according to the attached list) is to be called and he should then notify the competent police station, nature protection inspection and the Faculty of Veterinary Medicine of the University of Zagreb or the State Institute for Nature Protection (contact persons as per schematic presentation). If it is suspected that the animal has suffered from rabies, the local veterinarian (competent veterinary organization) is to be invited too. Should, for example, the police be notified of the animal killed before the damage assessment expert, he must be immediately contacted.

Report on the event

The police are obliged to draw up a report of the event for the purpose of possibly initiating a criminal or infringement procedure, forwarding the animal to toxicological treatment, etc. The report drawn up by the damage assessment expert must contain the following information:

1. Time of the finding (date and hour);
2. The first person to find the carcass;
3. Finding site – the best GPS co-ordinates or co-ordinates read from the topographic map; if impossible, the site is to be described in as much detail as possible;
4. Time of death (date and hour), if known; if not, then estimated time;
5. Cause of death, if known (road-kill, shooting, etc.) or what is suspected;
6. Brief description of the event and other details not specifically required under previous items, but considered important by the damage assessment expert;
7. Photo of the animal on the finding site and of the finding site itself, particularly if showing any special features (the damage assessment expert's estimate).

Transportation

Transportation of dead animals will be organized on a case-by-case basis, depending on the situation on site. If possible, the animal should better be immediately transported to the Faculty of Veterinary Medicine in Zagreb. If transportation cannot be organized the same day, it is recommended to get in touch with the competent veterinary organization. In that case the best thing to do – depending on the season – is to pack the carcass into a thick PVC bag and place it into a refrigerator or freezer until the arrival of Josip Kusak or another person from the Faculty of Veterinary Medicine in Zagreb (or until organizing another means of transport to Zagreb). If the animal is suspected to have suffered from rabies, it is OBLIGATORY to notify the competent veterinary organization that will act in accordance with statutory provisions. The carcass of the animal suspected to have been rabid is to be forwarded to the Croatian Veterinary Institute in Zagreb or to veterinary institutes of Kri• evci,Vinkovci, Rijeka or Split. In other cases the dead animal will firstly be examined at the Faculty of Veterinary Medicine of the University of Zagreb.

4. Livestock Breeding

4.1. Direct livestock management and increase efficiency of livestock keeping

Activities	What?	Who is in charge?	When? Deadline?	Funds?
Encourage larger, but not too large flocks.	Recommendation	Croatian Agricultural Extension Institute	Permanently	-
Continue assisting livestock breeders in protecting livestock against wolf and lynx attacks.	Continue donation programme introduced as part of the LIFE Project	SINP and future local branches	2006	Government budget, county budgets (counties Zadarska and Primorsko-goranska already involved)
Establish autonomous breeding and selecting system of shepherd dogs in the range of wolf and other predators.	Hold meeting with president of the Croatian Kennel Club Found local associations of breeders	SINP in co-operation with the Croatian Kennel Club	2006	Government budget and the Croatian Kennel Club

4.2. Finish livestock registration in Croatia

Activities	What?	Who is in charge?	When? Deadline?	Funds?
Livestock tagging	Mark all domestic animals with corresponding tags	Croatian Livestock Centre; MAFWM – Veterinary Department	Not determined yet. Permanently.	Government budget
Establishment of (central) livestock register	Prepare corresponding database	Croatian Livestock Centre; MAFWM – Veterinary Department	Not determined yet	Government budget

4.3. Improve the existing damage compensation system

Activities	What?	Who is in charge?	When? Deadline?	Funds?
Ensure more regular and prompter payment of compensations	On site work of damage assessment experts. Work of responsible persons in administration	Ministry of Culture	Permanently	Regular operations
Improve the performance of damage assessment experts	Continue holding seminars	Ministry of Culture; SINP; Faculty of Veterinary Medicine	2006	Government budget (Ministry of Culture)
Revise current instructions in the procedure of assessing damage caused by protected predators including respective compensation rates	Prepare a proposal of a corresponding rulebook	Committee for Monitoring Large Carnivores Populations	Autumn 2005	Government budget (Ministry of Culture)

4.4. Encourage better co-ordination of livestock breeders

Activities	What?	Who is in charge?	When? Deadline?	Funds?
Organize associations / co-operatives by individual counties	For example – establish association for the area of the Zadarska County	Ozren Erceg, Ana Grgas	Permanently	-

4.5. Solve the problems of stray dogs

Activities	What?	Who is in charge?	When? Deadline?	Funds?
Improve the operation and encourage establishment of sanitary services in the area of threatened counties	Substantiated request	Counties, municipalities, towns	Permanently	County, municipality and town budgets

4.6. Prevention of illegal disposal of slaughterhouse waste

Activities	What?	Who is in charge?	When? Deadline?	Funds?
Record and remedy illegal waste disposal sites	Substantiated request	Counties, municipalities, towns	End of 2005	County, municipality and town budgets
Intensify inspection control and punish all offenders	Substantiated request	MAFWM – Veterinary Department; MEPPPC*	Permanently	Government budget

* Ministry of Environmental Protection, Physical Planning and Construction

5. Interventions in Wolf and Lynx Populations

5.1. Implementing the intervention

Activities	What?	Who is in charge?	When? Deadline?	Funds?
Determine quotas	Annual quota has already been proposed. Shooting quota will be proposed later (after the first 6 months). Prepare decisions for these proposals.	Committee for Monitoring Large Carnivores Populations Ministry of Culture – •elimir Štahan	Annual quota – January 2005; shooting quota – September 2005 February 2005 for annual quota and September 2005 for shooting quota	Government budget – regular operations
Carry out interventions operationally	Prepare detailed instructions with contact addresses	Committee	September 2005	Government budget – regular operations
Undertake emergency interventions	Draw up a contingency plan	Committee	June 2005	-
Disposal of wolf and lynx carcasses	See under collection of dead wolves and lynxes			
Intervention control	Invite representatives of interest groups to some meetings of the Committee, but only in mutual agreement.	Committee	Permanently	Government budget

6. Education and Information

6.1. Conducting educational and information campaign

Activities	What?	Who is in charge?	When? Deadline?	Funds?
Raise funds for information and educational campaigns	Solicit funding through international projects Consider the possibility of marketing activities to raise funds	Ana Štrbenac, •uro Huber, Jasna Jeremiæ-Martinko, Josip Kusak	Continuously Winter 2006	Government budget – regular operations
Design a broader information and educational campaign	Present wolf and lynx management plans Develop campaign plan and programme	Ana Štrbenac, •uro Huber, Jasna Jeremiæ-Martinko, Josip Kusak, Aleksandra Majiæ-Skrbin š ek	March – June 2005	Government budget – regular operations
Lecture on wolves and lynx	Continue activities started within the LIFE Project	Josip Kusak + students to be entrusted with the task	Permanently	Government budget, international funds
Propose incorporation of lectures on wolves and other large carnivores into regular syllabus	Arrange a meeting with representatives of the competent ministry (science and education) and agree upon future co-operation	Ministry of Culture and SINP	April 2005	Government budget – regular operations
Inform the public regularly	Hold press conferences, publish announcements and similar	Ministry of Culture and SINP	Permanently	Regular operations

7. Public Participation in Decision-making

Activities	What?	Who is in charge?	When? Deadline?	Funds?
Direct involvement of active representatives of interest groups in decision-making processes	Adopt annual action plans Revise the Plan	Everybody	March 2005 Autumn 2007	Regular operations of individual institutions / associations
Quantitative monitoring of attitudes and levels of knowledge	Continue monitoring	Aleksandra Majiæ-Skrbin š ek	September 2005	LIFE Project

8. Tourism

Activities	What?	Who is in charge?	When? Deadline?	Funds?
Establish educational and information centre for large carnivores in their respective ranges	Prepare draft project to encourage this form of tourism focusing on the wolf, the bear and the lynx in the area of Gorski kotar and apply for funds from the government, county and other budgets.	SINP – Ana Štrbenac, Jasna Jeremiæ-Martinko, •uro Huber, Josip Kusak. Tourist agencies, local community and ministry responsible for tourism are to be involved.	Autumn 2005	Regular operations
Design and organize tourist visits	To be solved as part of the above mentioned project draft.	Ditto	Ditto	Ditto
Design souvenir manufacture	To be solved as part of the above mentioned project draft.	Ditto	Ditto	Ditto

9. Co-operation with neighbouring countries

Activities	What?	Who is in charge?	When? Deadline?	Funds?
Establishment of a permanent international working group (Cro – Slo – B&H)	Contact with Slovenian side is established. Investigate the possibility of involving B&H representatives. Meeting in Slovenia – transboundary management of large carnivore populations (15-16 April, Osilnica, LCIE)	Committee for Large Carnivores Monitoring; Ministry of Culture; competent ministries of Slovenia and B&H	Spring 2005	INTERREG?

Guarding dogs - tornjak and electric fences donations

The guarding dogs and electric fences donation programme continued within the framework of the project by donating 50 dogs and 9 electric fences in the period from April 2004 to April 2005. Due to a vivid interest of livestock breeders the number of dogs and fences donated exceeds the number planned and therefore some of the counties provided help. In order to raise the funds needed presentations of project results achieved so far were held in the counties Primorsko-goranska, Lièko-senjska, Zadarska, Šibensko-kninska and Splitsko-dalmatinska. However, while the counties Primorsko-goranska and Zadarska joined the donation programme, the counties suffering the highest damage have not responded to the initiative to help livestock breeders living in the range of large predators. Owing to the support of the counties mentioned ten more dogs were donated – 5 in the Country Primorsko-goranska and 5 in the County Zadarska.

So from the beginning of the project implementation a total of 83 dogs and 33 electric fences have been donated owing to the funds secured by the LIFE project, the State Institute for Nature Protection and the counties Primorsko-goranska and Zadarska.

The purpose of the programme is, however, not the providing of dogs or electric fences by the state or the county to each livestock breeder, but to make livestock breeders understand the importance of guarding the livestock and recognize the possibility to reduce the risk of damage in this way. After all, the analysis of claims for compensations showed that damages were lower in places where the livestock was guarded.

Fig. 15. Sheep surrounded with the electric fence in Rièice, Lika

Gorski kotar and Lika

In the area of Gorski kotar and Lika 26 male tornjak puppies were donated to livestock breeders from Brinje, Donji Lapac, Gospiæ, Karlobag, Klanac, Korenica, Lièki Osik, Lukovdol, Lukovo Šugarje, Mrkopalj, Novi Vinodolski, Ogulin, Perušiæ, Podlapaèa, Senj and Smiljan over the last year. Five more tornjak puppies were donated to livestock breeders of Gomirje, Moravice, Sunger, Tršæe and Vrbovsko in April 2005 owing to the funds secured by the county. By this the total number of dogs donated in Lika and Gorski kotar since the beginning of the project implementation has increased to 37.

The dogs were delivered in the premises of the Regional Office in Gospiæ and to the livestock breeders themselves on the spot during January, May, June and August 2005.

All the dogs are regularly controlled by visiting the livestock breeders donated every two months and checking the dogs' state and efficiency, feeding methods, care given by the breeders and whether the dogs are kept with livestock.

The dogs donated proved highly efficient, especially those older, because no new damages happened to the livestock not only of the breeders donated, but also of those living in the immediate neighbourhood. The dogs functioned successfully by warning the breeders of the presence of wolves and other animals. The breeders are very satisfied with the dogs donated and consequently the number of requests for new donations has considerably increased.

Co-operation with local veterinary stations taking care of the health status of the dogs donated is also satisfactory.

Unfortunately, there were losses as well. A total of five dogs died, of which three died of a disease and two were killed by accident. The dogs' owners informed the regional co-ordinator accordingly and for each case the corresponding medical documentation or a police report are available.

During 2004 16 fences were donated in the area of Gorski kotar and Lika and a number of new requests for donations were also received. Electric fences are delivered on spot directly to the livestock breeders donated, because the local coordinator determines previously the site and makes arrangements for setting up the posts needed to mount the electric fence.

Early in 2005 13 more fences were donated in the area of Gorski kotar and Lika, of which five were funded by the project and eight from the budget of the County Primorsko-goranska.

The fences were donated to livestock breeders from Gospiæ, Lièki Osik, Mu š aluk and Brinje in Lika and Gomirje, Novi Vinodolski, Moravice, Fu•ine, Lukovdol and Mrkopalj in Gorski kotar.

A total of 29 electric fences have been donated in Gorski kotar and Lika since the beginning of the project implementation.

Electric fences donated proved very efficient. Livestock breeders, who keep their livestock surrounded by electric fences in an adequate way, suffered no more damage from predators. An interesting event was reported in Gorski kotar when a bear »got burned» on the electric fence.

The fences are regularly controlled and it has been made obligatory to livestock breeders to monitor their efficiency and record all parameters into a special monitoring form sheet.

In the context of their visit to Croatia in October 2004 the European Commission representatives responsible for implementation of the LIFE Programme visited some of the livestock breeders donated in Lika.

Fig. 16. Visiting electric fences with the EU representatives

Dalmatia

In the area of Dalmatia a total of 29 tornjak puppies were donated to livestock breeders in Boraja, Ervenik, Glavice, Gljev, Hrvace, Kijevo, Knin, Kru š evo, Leæevica, Maovice, Mirloviæ Zagora, Nevest, Podumci, Primorski Dolac, Rada š inovci, Sinj, Une š iæ and Vinjani Donji in the course of 2004. During January and March 2005 17 more tornjak puppies were donated in the same area, thus increasing the total number of dogs donated in Dalmatia to 46.

Fig. 17. Donating of tornjak puppies in Sinj

They were delivered on sites or rather in places to which local livestock breeders gravitate.

All the dogs are controlled by regularly visiting the livestock breeders donated and have also proved very efficient. The breeders suffered no further damages to the livestock and were warned by the dogs of the presence of predators. The breeders are therefore very satisfied with the dogs and the number of requests for new donations has also considerably increased.

The success of the donation is also due to a good co-operation with local veterinary stations that take care of the health condition of the dogs. Unfortunately, four dogs were killed in this area too, of which two on the road, one died of a disease and one of a poison – all of them documented by veterinary and police reports. The file relating to the dog poisoned was forwarded to the General Attorney's Office.

As already mentioned in the previous Bulletin issue, four electric fences were donated to livestock breeders in Lepuri Donji and Benovac in Dalmatia. The persons donated suffered no damage and some of them reported that fences were no longer necessary. For that reason two fences were removed from Lepuri Donji to new users in Kijevo and Biteliæ.

Despite the fact that livestock breeders are less interested in electric fences than in the dogs, in the area of Dalmatia these fences proved efficient to the satisfaction of breeders donated.

The fences are also regularly inspected and the breeders are bound to monitor their efficiency by filling in a special monitoring form sheet.

Fig. 18. For the guarding dogs – tornjak, it is most important to be kept with the livestock from the very beginning

Education and Information

Publications

In the first issue of the bulletin dealing with the project »Conservation and Management of Wolves in Croatia» all activities carried out from the project start to April 2004 were described in detail.

After the official adoption the Wolf Management Plan for Croatia was published both in Croatian and English language.

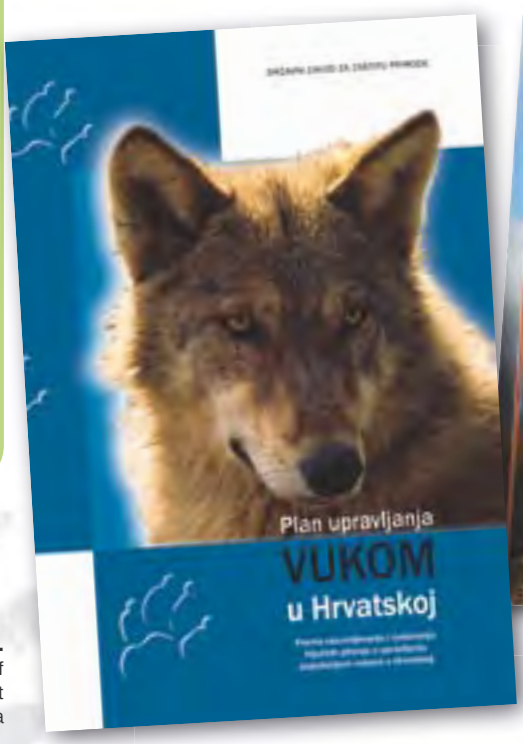


Fig. 19. Wolf Management Plan for Croatia

Fig. 20. The first issue of the project bulletin

Web site

The official web sites of the project are regularly updated. Two new links have been added - Research and monitoring and Crossings for animals, which now make it possible to find on the web sites detailed data on wolf studies in the area of Croatia and the results of telemetric monitoring, as well as all information on the so-called “green bridges” and other crossings for animals in the country. Pc-chip, one of the leading computer magazines of Croatia, voted this to be the March 2005 web site.

The number of web site visitors has been increasing from month to month and has already passed 20,000. The visitors are mostly from adjacent, but come also from other countries of Europe and the world such as the USA, Canada, Germany, Great Britain, Sweden, Japan, Mexico, Norway and New Zealand.

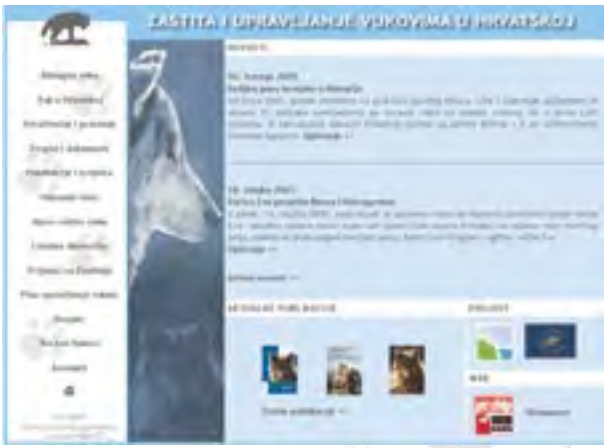


Fig. 21. Official project web site www.life-vuk.hr

School lectures

Within the context of the project there are ongoing lectures about wolves held to pupils of primary and secondary schools so as to make them familiar with the importance and role of wolves in nature.

In the school year 2004/05 lectures were held in ten primary and secondary schools in the area of Gorski kotar, Lika and Dalmatia and one each in Zagreb and Vara•din.

Besides, lectures were also given to students of part-time study of hunting and nature conservation at Two-year College of Karlovac and students of Faculty of Veterinary Medicine, University of Zagreb.

Lectures were held in the following primary and secondary schools:

Primary schools:

"Vrbovsko", Vrbovsko
"Severin na Kupi", Severin na Kupi
"Karlobag", Karlobag
"Jure Turiæ", Gospiæ
"Murterski škoji", Murter
"Faust Vranèiæ", Šibenik
"Bukovac", Zagreb
"Kuterevo", Kuterevo
"Krasno", Krasno

Fig. 22. A lecture on wolves given to pupils of the Murter primary school

Secondary schools:

Secondary Vocational School, Moravice
"Bla• Juraj Trogiranin" Secodary Vocational School, Trogir
First High School of Vara•din, Vara•din

Public information

The general public is regularly informed of the activities carried out within the project both on the web sites and by press conferences, presentations or announcements. So on 22 May 2004 a presentation of the project achievements and the related publications was held in the Zagreb zoo within the context of the International Biodiversity Day and the Nature Protection Day in Croatia. On that occasion an info-point was set up beside the wolves' enclosure, where the zoo visitors were able to obtain all information about the wolf and the sweets distributed freely by a "Wolf", a "Sheep" and a "Little Red Riding Hood".

The project achievements were also presented in counties of the wolf range – Lièko-senjska, Splitsko-dalmatinska, Primorsko-goranska, Zadarska and Šibensko-kninska, accompanied by three press conferences.

The donating of tornjak dogs within the framework of the donation programme was covered by mass media. This especially applies to dog donation in Sinj in October 2004 and in Benkovac and Mrkopalj in the first half of 2005.

Mass media have especially covered the case of a she-wolf named Eva, reporting twice on her in the central Sunday TV news.

Apart from that, several articles were published in newspapers and reports came in the air on local radio-stations and on the TV in "Meridijan 16", county panoramas and "Life Live".

Fig. 23. Disproving the myth of a wicked wolf …

Fig. 24. … a wolf, Little Red Riding Hood and a lamb in the Zagreb Zoo distributing candies and informing the visitors about wolves

Intensification of Participation of Interest Groups in Decision-making

Wolf Management Plan for Croatia

Plan adoption

Following the workshops on the preparation of the Wolf Management Plan for Croatia attended by representatives of all interest groups and experts from the neighbouring Slovenia, a narrower group of authors prepared a draft plan that was presented at a special workshop help in the middle of June in Baške Oštarije. The draft plan was revised by Prof. Luigi Boitani, the author of the Action Plan for the Conservation of Wolves in Europe, and Prof. Alistair Bath, the moderator of workshops for the preparation of the Plan. The plan was afterwards forwarded to the competent ministry. By the decision of the Minister of Culture this Plan and the Lynx Management Plan for Croatia were officially adopted on 7 December 2004.

Plan presentation

On 14 February 2005 the plans for the wolf, lynx and bear management in Croatia were presented at the Faculty of Veterinary Medicine, University of Zagreb. All of these plans have been officially approved by the competent ministries. On behalf of the host the presentation was opened by Dr. Ljiljana Pinter, the dean of the Faculty of Veterinary Medicine. In the introduction the meeting was addressed by Josip Bartolèiæ, the former State Secretary of the Ministry of Agriculture, Forestry and Water Management, Dr. Marina Mlakar, the former Assistant to the Minister of Culture and Davorin Markoviæ, the Manager of the State Institute for Nature Protection. Special guests at the presentation were Prof. Luigi Boitani, who emphasized the importance of the preparation of those plans on the European scale, and Prof. Alistair Bath. In his opinion the Wolf Management Plan has focused the attention to the social dimension of management apart from that ecological, and to the co-existence of wolves and humans, or rather to the benefit that the population can derive from wolves - for example, for the development of eco-tourism. The contents of the Wolf Management Plan for Croatia itself were presented by Ana Štrbenac, Aleksandra Majiæ-Skrbinšek, Jasna Jeremiæ-Martinko, Sonja Desnica, •uro Huber and Josip Kusak.

Fig. 25. Official presentation of the management plans

What does the Management Plan bring?

The Wolf Management Plan for Croatia is a document specifying actions to be taken so as to ensure a long-term conservation of this species in a harmonious co-existence with man.

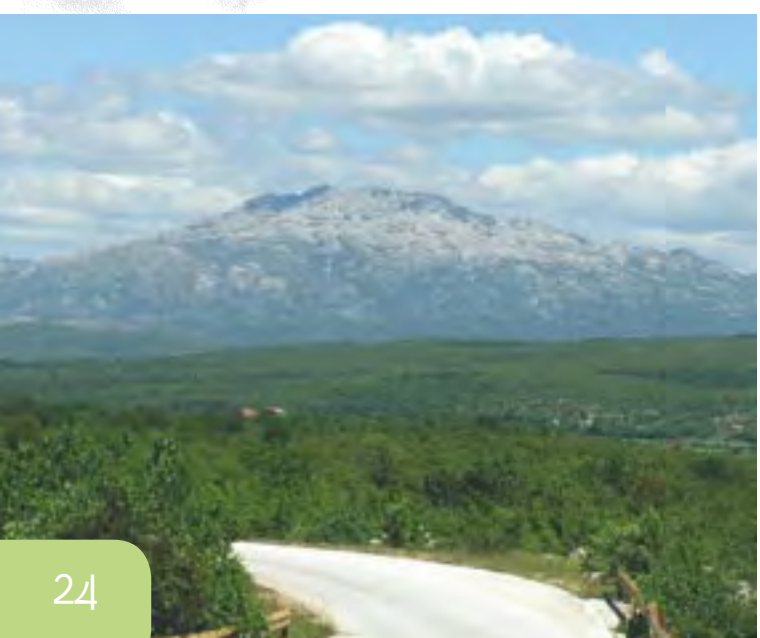
The Plan consists of two major sections: Management Plan Preparation Background and the Operative Wolf Management Plan. The first section describes in detail the wolf population status in Croatia and all the factors affecting this population. These data represent a basis for the preparation of the Operative Management Plan that includes a proposal of adequate actions divided into 12 thematic units.

Research and monitoring

The establishment of a national wolf population monitoring system is one of the essential activities within the context of research and monitoring, which includes the collection of data on wolves (telemetric monitoring and mortality analysis) and monitoring of the wolves' prey population.

Fig. 26. Research and monitoring of wolves includes a search for the signs of presence

Fig. 27. A wolf habitat on the southern slopes of the Velebit



Habitat preservation

In the Plan measures for maintaining the integrity and quality of wolf's habitats are proposed. These measures include the avoidance of constructions that cause habitat fragmentation; the construction of green bridges; maintaining of the existing spatial proportions of forests, meadows and agricultural land, the habitat quality monitoring; physical planning that takes into account the presence of wolves; the selective forest management and the prevention of introduction of allochthonous species in habitats.

Fig. 28.
A tunnel is also an animal crossing

Hunting

In order to achieve a proper balance between the conservation of this species and the economic interests the Plan proposes a number of measures aiming at harmonization of the present hunting management with wolf and other protected predators. These measures include taking into account the presence of wolves when deciding on the concessions, establishment of a game monitoring system, increase in the game population and a scientifically founded and objective assessment of the wolf's impact on the game populations. A special emphasis is placed on prevention of illegal kills of game and wolves and on introduction of stricter sanctions and wider responsibilities in such cases.

Fig. 29. Hunting management is to be brought in line with the feeding needs of the wolf

Livestock breeding

In the section dealing with livestock breeding measures are proposed that would direct the livestock management and increase the efficiency of livestock guarding, complete the process of livestock recording in Croatia and improve the existing damage compensation system. In this special emphasis is placed on the need to continue the dog and fences donation programme as a help to livestock breeders in the protection of livestock against wolves' attacks. It is also requested to pay compensations more regularly and at a faster rate, to improve the work of damage assessment experts and to review the existing instructions and the compensation rates in the process of assessing damage caused by protected predators. Measures are proposed to improve the co-ordination among livestock breeders, to solve the problem of wild and abandoned dogs and to prevent illegal disposal of slaughterhouse waste.

Fig. 30. The guarding of the livestock reduces damage caused by predators

Interventions in the wolf population

A special thematic unit deals with possible interventions in the wolf populations under the condition that such measures do not disturb the stability of the wolf population and are conducted on a strictly selective basis. Such a mode of protection should be carried out during a trial period of two years, primarily with the aim to reduce the illegal kill.

Interventions in the wolf population are only allowed in case of major damages caused to livestock, an unacceptable impact on the game, threats to humans and infectious diseases. Quotas are proposed by the Committee for Monitoring Large Carnivores Populations on a yearly basis and determined once a year on the regional basis (Gorski kotar, Lika and Dalmatia). These quotas include regional quotas, emergency measures, road kills and other death causes. When deciding on quotas the social carrying capacity is also considered. After the first six months the status analysis must be carried out and can result in a corresponding increase or decrease of the planned intervention scope. The method of intervention is kill, but it is not allowed during the reproduction time. It may be performed by a local hunting concessionary in co-operation with local co-ordinators and must be accompanied by a detailed report on each activity. In case of rabies, attacks on humans and other deviant behaviour emergency measures are also allowed beyond annual interventions planned, but this requires the preparation of an action plan. Wolves' carcasses serve primarily for scientific purposes. For the purpose of controlling the process of determining and conducting

interventions a committee will be set up, consisting of representatives of all interest groups and meeting on a yearly basis.

Education and information

In the context of education and information it is necessary to continue the educational and information campaign so as to improve the knowledge of this species and understand objectively the wolf conservation issues. These campaigns include lectures on wolves, publications, exhibitions and regular public information by press conferences and public announcements. The level of the knowledge of wolves will also be monitored through surveys of public opinion of wolves.

Fig. 31. Wolf conservation starts with the education of the youngest

Public participation in decision-making

Public participation in decision-making by immediate involvement or monitoring of the public attitudes is an indispensable pre-requisite for making adequate decisions on wolf protection and management in Croatia. The immediate involvement was also applied in preparation of this Plan, which was formulated at joint workshops.

Fig. 32. Joint workshops help in establishment of co-operation and participation of interest groups in decision-making processes

Tourism

In the Plan tourist industry promotion measures are proposed as a way to derive economic benefit from wolf conservation. In this regard it was proposed to establish a thematic educational and information centre for large carnivores and to design adequate tourist programmes and souvenirs.

Co-operation with neighbouring countries

The Plan has also placed a special emphasis on the need for an international co-operation, primarily with the neighbouring Slovenia and Bosnia and Herzegovina, and proposed possible modes of co-operation desired. Bosnia and Herzegovina has yet to sign the Bern Convention, which will be a basis for an active protection of this species. In this field Croatia may give a valuable contribution based on the country's experience. Croatia has already co-operated with Slovenia in preparation of the Plan. In this connection regular annual meetings of experts, information exchange and joint implementation of activities foreseen by this Plan are proposed.

Fig. 33. Presentation of the Wolf Management Plan at the International Seminar on Transboundary Co-operation in the Protection of Large Carnivores, Osilnica, Slovenia

Plan implementation

Implementation of the Plan falls primarily within the competence of the Ministry of Culture responsible for nature conservation. Besides, a successful implementation of the Plan requires the participation of ministries responsible for game and livestock management, i.e. the Ministry of Agriculture, Forestry and Water Management and the Ministry of Environmental Protection, Physical Planning and Construction in charge of physical planning. Other bodies such as authorized inspection services, the State Institute for Nature Protection as the central expert institution for nature protection, the Committee for Monitoring Large Carnivores Populations as an advisory body of the competent ministry and all other interest groups involved in the Plan preparation will also be included.

Plan revision

This Plan as a dynamic document should undergo a revision each two years and subsequently as required.

Plan funding

The finance necessary for implementation of the Plan will be secured from the government and county budgets and from international funds and the Environmental Protection Fund, if possible.

Action Plan for Implementation of the Wolf and Lynx Management Plans

After the adoption of the plans and their official presentation a meeting of the Committee for Monitoring Large Carnivores Populations and representatives of interest groups that participated in workshops was held, in which the Action Plan for implementation of the wolf and lynx management plans was discussed. The guidelines given by the management plans were used to develop a plan of concrete steps to be taken so as to ensure the practical implementation of the plans. A successful implementation requires co-operation and active involvement of all persons who participated in preparation of the plans. Apart from concrete steps persons, deadlines and funds were also determined. These activities are planned to be carried out in the years 2005 and 2006, i.e. until the plan revision foreseen. The Action Plan is a separate supplement to this Bulletin.

Implementation of Management Plans

Pursuant to the Action Plan agreed there started the implementation of individual activities.

Within the project framework important steps have already been made in the establishment of a national system for wolf population monitoring, enabling a systematic collection of data on wolf population, livestock, game as the wolves' prey and other features of the wolf's habitats. All the data are spatially processed by the GIS. The collection of these data requires the involvement of all persons capable of providing relevant information within the scope of their respective activities. In the project context a Protocol for Collecting of Protected Animals Killed (Wolf, Lynx) has been prepared and verified by the Committee for Monitoring Large Carnivores Populations, in the presence of Stjepan Jurenec of the Criminal Police Department of the Ministry of Interior. The Protocol describes in detail the notification

Fig. 34. Gorski kotar – the top quality large carnivores habitat in Croatia

procedure in case of finding a wolf or a lynx killed. It should be noted that such a notification is to be first submitted to the damage assessment expert, who must inform correspondingly other authorities in the chain, i.e. the competent police station, nature protection inspection, the Faculty of Veterinary Medicine or the State Institute for Nature Protection. If, for example, the police receive the information before the damage assessment expert, it must notify him correspondingly. A schematic presentation of the Protocol and the related explanations are a supplement to the present Bulletin. In this Bulletin issue a list of damage assessment experts for the year 2005 is also published.

Within the framework of the LIFE Project the State Institute for Nature Protection, as already mentioned, organized collection of data on the game living in the wolf range. The provisions of a new Hunting Law, which is in the process of adoption, lay down the obligation of an organized collection of data to be taken over by the Croatian Hunters' Club. The digitalisation of the boundaries of state hunting grounds co-ordinated by the competent ministry is underway with the aim to ensure a better spatial processing of data (GIS).

Fig. 35. Wolf – a natural asset of Croatia

The State Institute for Nature Protection requested the incorporation of such provisions in the new Hunting Law that would ensure that in preparation of the hunting management documents the presence of large carnivores is taken into account, which would in the end have an effect on the amount of the hunting lease. Moreover, a rulebook laying down the contents and the methods of preparing the hunting management documents will be adopted on the basis of a previous opinion of the ministry responsible for nature protection.

The Committee for Monitoring Large Carnivores Populations also discussed possible interventions in the wolf population if the population stability is not disturbed. The proposed annual quota or rather a number of individuals that may be eliminated from the population is 15 wolves or 10 per cent of the population number. This quota includes road-kills, poisoning and other causes. It is therefore necessary to inform competent institutions of such an event, following the procedure determined by the above-mentioned rulebook. In September a decision will be taken of the number and areas where regular interventions in the population will be allowed, based on the population monitoring and mortality results during the year. Apart from the Committee the representatives of all interest groups will also be invited to the meeting.

And finally, activities aiming at tourism and large carnivore promotion have started. Negotiations are underway with the Mrkopalj Municipality in Gorski kotar relating to the establishment of a future information and educational centre for large carnivores. The establishment of such a centre would encourage development of the region in terms of promoting ecologically sustainable tourism based on natural assets such as large carnivores. The finance needed for the arrangement of the centre will be secured within the framework of the PHARE project entitled "Implementation of NATURA 2000 in Croatia" that, if approved, is expected to start in 2006.

Plans for the Third Project Year

In the area of Gorski kotar, Lika and Dalmatia the so-called Open House Days will be organized and used to present plans for the wolf, lynx and bear management in Croatia. For this purpose educational posters will be displayed in a certain place containing information on all three carnivores (wolf, lynx, bear) and on the way how each individual may get involved in implementation of those plans. All interested persons will receive educational material and copies of the plans.

The second public opinion poll will be conducted with respect to wolves, wolf management, knowledge and beliefs of wolves. This will represent the completion of the most systematic survey of public opinion of wolves on a global scale, which will be used as a basis for planning the management of this animal species.

The development of a GIS model for wolf management in Croatia will be completed.

A picture book about wolf will also be prepared for preschool-age children.

The filming of a documentary on the wolf is just about to be finished.

A systematic monitoring of the wolf population and factors that affect it will continue and be used as a background for the National Wolf Population Monitoring System.

Owing to project results achieved so far activities relating to the promotion of ecotourism based on the presence of large carnivores will go on.

Fig. 36. Setting free the rescued and collared she-wolf named Eva

Fig. 37: Man and the wolf have both their place in nature

All detailed information may be found on official web sites
www.life-vuk.hr and by contacting our office in Zagreb or two regional offices
in areas inhabited by the wolf:

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PROJECT bulletin

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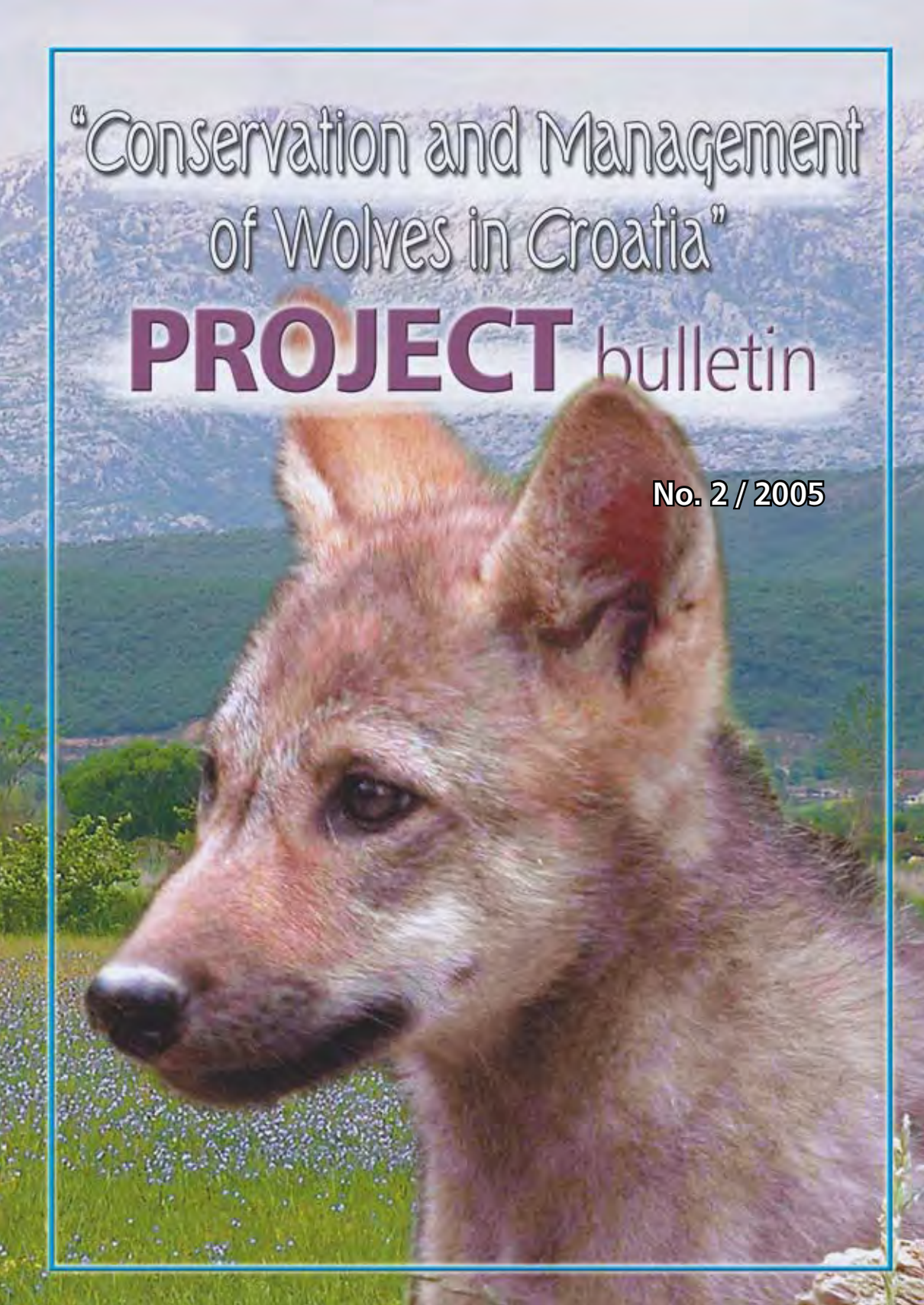

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Zagreb, November 2005

Introduction

We are at the end of the third and the last year of the LIFE project. This is the moment to look back and view the achievements; what the situation was when we got actively involved in conservation and management of wolves and what it is today. In short, this is the opportunity to identify where we were and where we are now; have we succeeded in our efforts to preserve a valuable segment of our country's natural wealth? Has anything changed in the meantime?

The information about a wounded wolf named Mane received from the local population and the attempt to save this animal by organizing a joint action, the assessing of the number of large carnivores and the game by monitoring the footprints in the snow found on hunting grounds throughout Gorski kotar and Lika, stabilization and reduction of damages in certain areas, more positive public attitude towards the wolf – these are only some of indicators showing that things really have changed, hopefully, for the wolf's better and for the better of nature conservation in general.

The project has really helped establish a system for the conservation and management of wolves that involves human resources in administrative, expert and scientific institutions, damage assessment experts, representatives of all interest groups and – most important – the local population. In this regard the establishment of regional offices in areas of the wolf's distribution proved highly valuable. Moreover, at present everybody is fully aware of the fact that co-operation of all who are connected with this issue in any way whatsoever and whose knowledge may contribute to its resolution is of vital importance for the conservation of wolves in Croatia. The conservation of wolves and nature is not the exclusive right of an individual nor is it something that is not our business as long as our narrow interests are satisfied. This should be a common interest of all, no matter whether a hunter, a livestock breeder, a scientist or a "green" NGOs, and to achieve this, we must co-operate and give our contribution.

While reading the present bulletin issue you will learn more about our activities in the last year of the LIFE project. But let us immediately announce: although the LIFE project is scheduled to end officially on the 1st December, our efforts in wolf conservation will continue, but wait until the following issue to learn more …

Fig. 1. The wolf named Mane was shot through the right hind leg

Achievements of the Third Project Year in View of Basic Activities

Institutional Strengthening

The institutional system for conservation and management of wolves in Croatia continues operating through activities performed by the project unit office in Zagreb as a segment of the Nature Inventorying and Monitoring Department of the State Institute for Nature Protection and by the respective regional offices for Gorski kotar, Lika and Dalmatia; through activities of the Department for Biology of the Faculty of Veterinary Medicine of the University of Zagreb, the Ministry of Culture, damage assessment experts of the Ministry of Culture, responsible for the assessment of damage caused by protected animals and the Committee for Monitoring Large Carnivore Populations of the Ministry of Culture, and through co-operation with representatives of all interest groups.

Activities Performed by Regional Offices

In the course of the third project year the Regional Office for Gorski kotar and Lika located in Gospić and the Regional Office for Dalmatia with the seat in Šibenik continued their activities by maintaining a permanent communication with the local community and representatives of all interest groups. Among the activities of the offices, the co-operation with livestock breeders in the livestock guarding dogs (*tornjak* breed) and electric fences donation programme should be pointed out. Their participation in provision of information on wolves killed and wounded, in popularization of the large carnivore management plans and their making the project results available to the local population were highly valuable. The offices also organized lectures about the wolf for primary and secondary school pupils and distributed the educational written and pictorial materials on that topic.

Fig. 2. Office in Zagreb and two regional offices situated in the wolf's distribution area

Damage Assessment Experts

The major task of appointed damage assessment experts is to assess damage caused to livestock by a protected animal, because damage compensation is paid on the basis of their assessments. Owing to their permanent on-site presence and contacts with livestock breeders, the experts also took part in other activities performed in the context of the project and thus grew to be an important link in the institutionalized wolf conservation system in Croatia. They provided information on cases when wolves were killed or wounded and prepared official reports. They also exercised control over interventions in wolf populations and some of them became members of the emergency team for large carnivores. Owing to their knowledge of the on-site needs and to their contacts they contributed to implementation of the donation programme.

Monitoring of wolf Population and Management activities

Telemetric Monitoring of Wolves and Genetic Analysis

Gorski kotar

During 2005 the monitoring of wolves collared continued and measures were taken to collar further individuals belong both to already known packs and to packs not monitored so far. The collection of faeces samples for the purpose of DNA analyses continued too. During the summer a considerable activity of people in the area investigated was recorded. In 40 various locations covering a total of 276 sq km people were felling down the trees, pulling out the logs, throwing away the waste in some places or digging out the gravel. All this affected the activities of wolves too. In the area of 282 sq km the signs of wolves (range markings, faeces and prey residues) were found in 61 different locations, mostly outside the area of intensive human activities. So for example, the Snježnik pack moved the litter or rather chose another gathering place three times in two summer months.

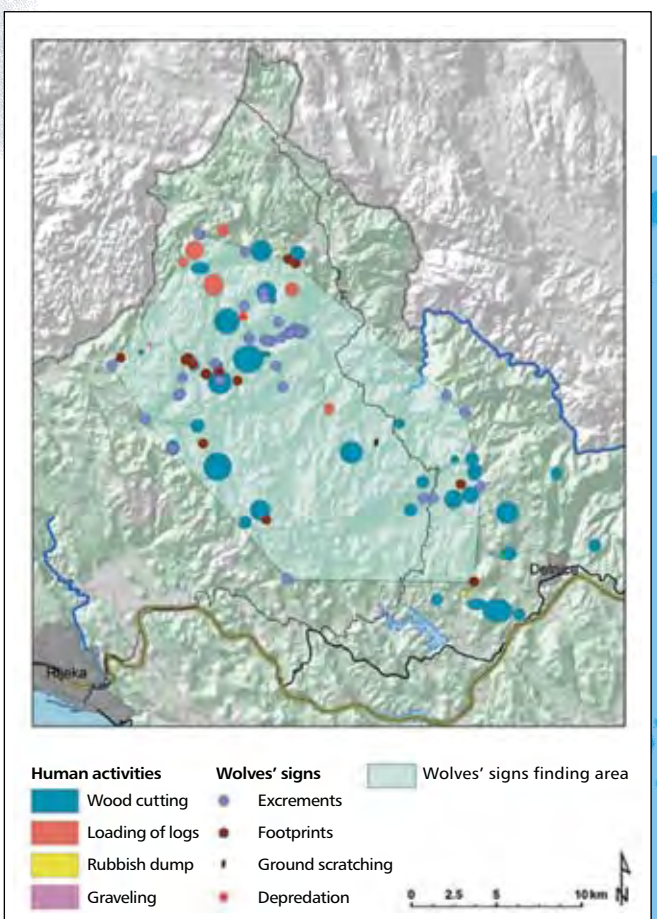


Fig. 3. Investigated part of Gorski kotar with indicated places where the signs of wolves and human activities were found

Collaring of New Wolves

In the summer of 2005 two new wolves were collared, both from the Snježnik pack. On 26 August 2005 a female wolf aged 2.5 years and weighing 27 kg was captured near the Veliki Tisovac Mountain, named W12-Sara and equipped with a GPS-GSM collar. Two days after collaring Sara joined the Snježnik pack.

Soon afterwards, on 14 September 2005, a second female wolf was captured – a this-year pup of the female wolf named Hilda, weighing 15.5 kg – and named W13-Kyra. W13-Kyra was equipped with the GPS-VHF collar previously carried for five months by Eva in Dalmatia who was killed in Bosnia and Herzegovina early in August 2005. The place of collaring, Goreći vrh above Smrekova Draga, was the third location to which the Snježnik pack moved its litter that summer. At the moment of capturing Hilda was about 10 km northwards, close to the border of Slovenia, and the newly collared pup joined the pack three days after.

Fig. 4. A female wolf named W12-Sara

Fig. 5. A female wolf named W13-Kyra

Monitoring of Risnjak and Snježnik Packs

The Risnjak pack: Since summer 2004 the pack has been monitored through the female wolf named Tanja, a reproductive female of the pack. By monitoring the footprints in the snow during the winter 2004/2005 the size of the Risnjak pack was estimated at four, probably even five wolves. By monitoring the pack during spring and summer it was not possible to confirm with certainty that the pack produced a litter in 2005. Tanja roamed the area in the same way as during the winter, each day in another place, sometimes even 15 km far from the previous one. The non-existence of a permanent place of return (den/gathering place) and the absence of other signs (intensive range marking, howling of young wolves) confirmed that the Risnjak pack had no young in 2005.

Tanja travelled also some new areas, for example round the spring of the river Kupa and the Kupica canyon near Delnice. It is particularly interesting, however, that she was also on the

Sopač hill to the south of the motorway. This means that the pack managed to find a crossing to another side of the motorway and thus extended its range to 193 sq km.

Snježnik pack: By the summer of 2005 the pack was monitored through a female wolf named Hilda and afterwards through two newly collared wolves too – W12-Sara and W13-Kyra. During the winter 2004/2005 the footprints in the snow confirmed that the pack consisted of four wolves. The monitoring of Hilda during the spring and summer showed that this year too the pack had young, which was ultimately confirmed when a wolf pup (W13-Kyra) belonging to this pack was captured. Three wolves of one and the same pack monitored simultaneously is the largest number achieved so far in Croatia.

The simultaneous monitoring of several wolves of the same pack gives a new dimension to the picture of the relationships within the pack. Hilda, as one of the parents, spends the time either in searching for food or with the wolf pups. Until the end of the summer W13-Kyra, this year's young, used to spend most of the time in one place waiting for Hilda to return. However, it has already been recorded that such a wolf pup aged only six months may cover as much as 10 km (in a straight line) during one night. On the other hand, W12-Sara spent very little time with the rest of the pack late in summer. She preferred coming alone or together with one or two young wolves to the edges of the pack's range and the forest, close to settlements, where more roe deer and introduced mouflons, a relatively easy prey for the wolves, may be found. Early in October W12-Sara joined the pack and since then all three wolves monitored have been recorded to roam the range of the pack.

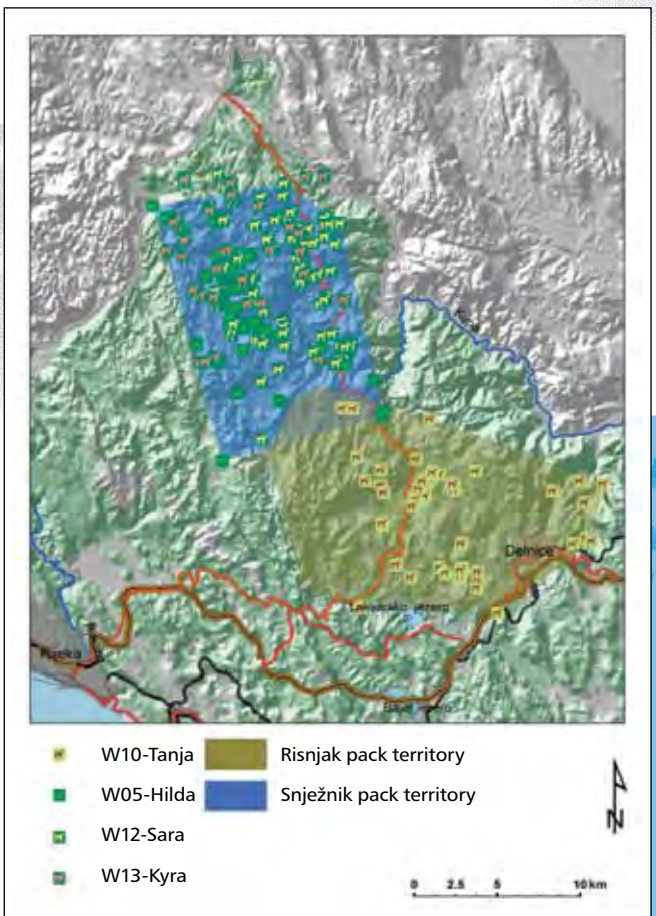


Fig. 6. Locations of wolves monitored in Gorski kotar and their ranges in 2005

Lika

In 2005 the field research in the areas of Senjsko bilo, Krasno, Mesinovac, Vratnik and Apatišan started early in June. In view of the fact that no traces of the wolf's presence in that area were found and that the information was received from the local population about six wolves allegedly shot early in spring, the field activities expanded to the area between Korenica and Donji Lapac too. In this area the presence of 4 to 5 wolves was confirmed and

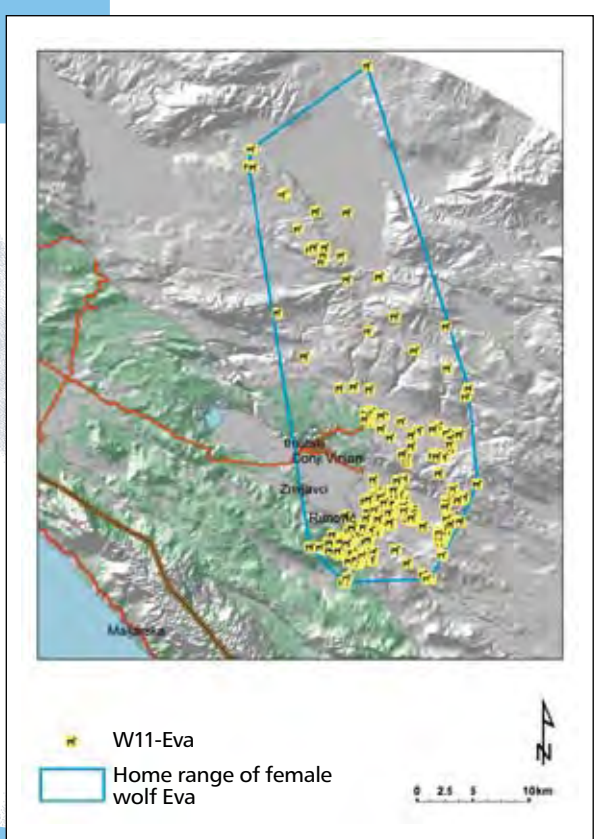
the residues of a wild boar fallen prey to a wolf were found. In addition to numerous events (capturing of three brown bears, five badgers and a number of foxes) a wolf was captured on 21 September, but managed to get out of the trap after 15 m. According to the traces, that was a mature, relatively large individual.

As the presence of three wolves was detected in the Velebit area mentioned since the middle of September, the field activities continues covering both the areas of the Velebit Mountain and the Lička Plješivica.

Dalmatia

Although the project did not envisage the satellite telemetry of wolves in Dalmatia, by a combination of circumstances a female wolf was equipped with a GPS collar in the Imotski area on 23 February 2005.

Fig. 7. After a surgery and GPS collaring the female wolf named Eva was released to the wild in the same place where found



During 157 days of monitoring Eva was located 541 times in total, of which 255 times (47.1 per cent) in Croatia and 286 times (52.9 per cent) in Bosnia and Herzegovina, whereby in Croatia she stayed in a smaller area round Runovići and Imotski and in Bosnia and Herzegovina she travelled as far as 80 km in the inland, up to Tomislavgrad, and then returned again to the border area where she spent most of the time. Thus Eva covered an area of 640 sq km, which is three times the area covered by an average wolf pack in Croatia, including Dalmatia too. Some of the time Eva presumably roamed alone, preparing to leave the pack.

Fig. 8. Eva's locations

On 3 August 2005, at 3.30 in the morning, she was shot near Vinjan in Bosnia and Herzegovina. Croatia shares with Bosnia and Herzegovina both a very long border and the wolf population, which is legally protected on one side of the border and exposed to danger on the other, because wolves may freely be killed there. This certainly has a highly negative impact on the efficiency of wolf conservation in Croatia. It is therefore to be wished that the status of wolves in the neighbouring Bosnia and Herzegovina will change in terms of legal protection.

Mortality of Wolves

Of the 15 wolves that died in 2005 till November 4, 13 cases were confirmed by wolf carcasses found. Eight wolves were hit by a vehicle, four were shot, one was presumably killed by sheepdogs and the cause of death for two wolves is unknown.

Table 1. A list of known wolf mortalities in 2005

Date	Site	Cause	Marking	Sex	Age (yrs)	Weight (kg)
02.01.2005	Novo Selo Bosiljevsko	shot	WCRO59	F	6	37
17.02.2005	Čitluk – Puljane	shot	WCRO61	F	11	29
17.02.2005	Vrbnik Polje – Kaldrma	unknown	WCRO60	F	0	24
18.04.2005	Koprivno	road-kill	WCRO62	F	2	26
05.05.2005	Grab near Sinj	road-kill		M	2	
01.06.2005	Oraovac Donji Lapac	found dead				
14.06.2005	Lovreč	road-kill	WCRO63	F		
20.07.2005	Voštane Gornje	sheepdogs	WCRO64	F	2	
03.08.2005	Vinjani near Imotski, B&H	shot	WCRO65	F	2.5	
21.08.2005	Ondić	road-kill	WCRO66	F	2.5	30
31.08.2005	Mazin	shot	WCRO67	M	6	37
01.09.2005	Mojanka	road-kill	WCRO68			
19.09.2005	Mojanka	road-kill	WCRO69	F	2	
21.09.2005	Grab	road-kill	WCRO70			
04.11.2005	Kričke	road-kill	WCRO71	F		

It is interesting to note another case of reporting on a wounded wolf in Lika. Namely, in the afternoon of 1 September the inhabitants of a village called Mazin near Donji Lapac informed the representatives of competent authorities about a wounded wolf found on the meadow close to the houses. The first information pointed to a wolf hit by a vehicle. Igor Hak, appointed expert for the assessment of damage caused to livestock by wolves, visited the spot and found the animal wounded and unable to get up on its hind legs. After a brief consultation with the staff of the State Institute for Nature Protection and the Department for Biology of the Faculty of Veterinary Medicine of the University of Zagreb it was decided to try to save the wounded wolf and return it to the wild. Late in the evening Dr. Josip Kusak brought the wolf to Zagreb. It was a grown up male, 3-4 years old, weighing 37 kg. The villagers named it Mane. In co-operation with Dr. Dražen Matičić, acting head of the Clinic for Surgery, Orthopedics and Ophthalmology of the Faculty of Veterinary Medicine, the wounded wolf was admitted, accommodated and received medical treatment. In the morning of 2 September the surgical team started with the treatment. The X-ray taken showed the bone fracture

in the right hind leg caused by a shot and it was decided to perform a surgery. Unfortunately, during the treatment the wounds were found to be too serious to cure and the wolf was euthanized. Since it was a gunshot wound resulting from an illegal act, the case was communicated to the competent nature conservation inspection of the Ministry of Culture.

Fig. 9. Surgery on Mane at the Faculty of Veterinary Medicine of the University of Zagreb

Gis Modelling

The purpose of preparing a wolf habitat model was to identify the location and the likelihood of the wolf occurrence in the near future at the level of the entire country. The data used for that purpose were the data on the wolf occurrence and wolf habitats collected within the context of the LIFE project, i.e. data important for the wolves when "deciding" whether to occupy a certain area. They included the number of artiodactyl species, the share of wooded areas, the share of agricultural land and pastures, the height above sea level and the density of roads. For habitat modelling the Mahalanobis distance method was chosen, by which, using input data sets, the likelihood of the wolf occurrence in the mainland part of Croatia was calculated on a 250x250 m surface grid. The result of the modelling was that, apart from areas currently inhabited by wolves, they are also likely to appear in the region of Banija, Žumberak, Ćićarija and even on the Papuk Mountain. That would mean rather 40-60 wolves more in Croatia.

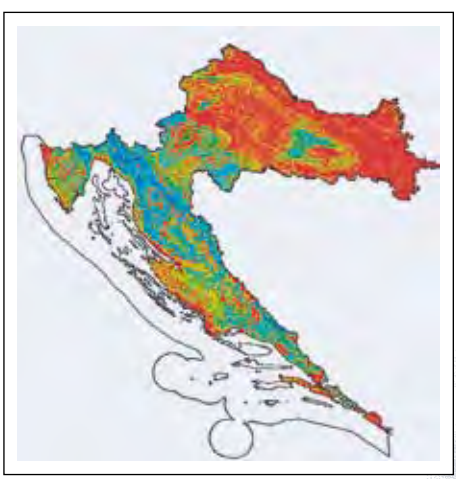


Fig. 10. Likelihood of wolf occurrence in Croatia considering the habitat conditions at the beginning of the 21st century

Analysis of the livestock number and damage caused by wolves

The analysis of investigation records received by the Ministry of Culture in the period from 1 January to 31 December 2004 showed a total of 1,420 cases of damage caused to livestock, which is a 9 per cent increase against the number of damages reported in 2003. Despite the rise in the number of reports, it still lies considerably below that of 2003 as compared to 2002, when it amounted to 36 per cent. As to the 2005 data, they are incomplete because the year has not ended yet. It is known, however, that since 1 January 2005 a total of 1,445 damages were reported. Viewing this fact and the former trend of damages it is assumed that in 2005 the number of damages will not differ substantially from that recorded last year, and that after ten years of monitoring this number has finally become settled.

From the aspect of counties the largest number of claims for damages was received from the counties Splitsko-dalmatinska and Šibensko-kninska and the smallest from the counties Karlovačka and Primorsko-goranska, which corresponds with the data of previous years. In comparison with 2003 the number of damages reported by counties in 2004 remained mostly unchanged or is even slightly lower, with the exception of the County Splitsko-dalmatinska where it is by 156 or 40 per cent higher.

Table 2. Number of reported damages caused to livestock in 2003 and 2004

County/Year	2003	2004
Dubrovačko-neretvanska	66	82
Karlovačka	7	8
Ličko-senjska	63	51
Primorsko-goranska	13	4
Splitsko-dalmatinska	379	535
Šibensko-kninska	648	621
Zadarska	118	119
TOTAL	**1294**	**1420**

Fig. 11. Investigation conducted by Damir Bosiljevac, appointed damage assessment expert

Since investigations are conducted always when a protected animal (a wolf or a lynx) is suspected of having caused the damage, the number of damages reported and investigations conducted does not imply at the same time the number of damages caused by wolves. Of the total of claims for damages analysed, the damage was caused by the wolf in 90.7 per cent, by the lynx in 0.3 per cent and by a dog in 1 per cent of the cases. In 8 per cent of the cases the identification was uncertain or not made at all. Of all the damages caused by wolves the damage assessment experts were certain about their estimate in 85 per cent of the cases and in 15 per cent of the cases the damage could only probably be attributed to the wolf. In comparison with 2003 the absence of the golden jackal as a damage-causer and a slightly higher number of damages caused by dogs may be observed. At the same time the number of cases in which the damage-causer is unknown increased almost threefold.

Table 3. Distribution of reported damages on livestock by estimated type of predator in 2004

County / Predator	Wolf	Lynx	Brown bear	Golden jackal	Dog	Unknown	TOTAL
Dubrovačko-neretvanska	82	0	0	0	0	0	82
Karlovačka	7	1	0	0	0	0	8
Ličko-senjska	45	3	0	0	0	3	51
Primorsko-goranska	4	0	0	0	0	0	4
Splitsko-dalmatinska	511	0	0	0	2	22	535
Šibensko-kninska	522	0	0	0	13	86	621
Zadarska	116	0	0	0	0	3	119
TOTAL	**1287**	**4**	**0**	**0**	**15**	**114**	**1420**

The wolf is known to attack a broad spectrum of domestic animals – from the horse, the donkey and the beef cattle, through sheep and goats, to pigs and dogs. In most of the cases the wolf's prey is small livestock, sheep and goats, which accounted for 90.6 per cent of all domestic animals attacked in 2004.

Table 4. The number of each individual livestock type attacked by wolves in 2002 and 2003 by counties

Species	Beef cattle		Horse		Goat		Donkey		Sheep		Dog		Pig		TOTAL	
County / Year	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
Dubrovačko-neretvanska	30	34	3	3	31	52	5	3	72	61	0	4	0	4	141	161
Splitsko-dalmatinska	0	0	0	0	1	0	0	0	9	18	1	0	0	2	11	20
Šibensko-kninska	0	0	1	0	6	48	0	0	165	91	0	2	0	0	172	141
Zadarska	0	0	0	0	32	0	0	0	2	15	1	0	0	0	35	15
Ličko-senjska	15	38	0	1	338	271	6	14	391	533	52	77	0	0	802	934
Primorsko-goranska	6	15	0	0	127	129	17	2	1009	845	13	26	0	0	1172	1017
Karlovačka	10	18	2	0	145	154	1	1	186	173	2	4	0	0	346	350
TOTAL	**61**	**105**	**6**	**4**	**680**	**654**	**29**	**20**	**1834**	**1736**	**69**	**113**	**0**	**6**	**2679**	**2638**

Despite a 9 per cent rise in the number of claims for damages in 2004 against 2003, the total number of animals affected dropped by 41 i.e. 1.5 per cent. Specifically, the number of sheep and goats affected dropped and that of the beef cattle and dogs rose. This might be a result of the raised livestock owners' awareness of the need to safeguard sheep and goats as the commonest wolf's prey, and of the neglect of the fact that the wolf is capable of killing an animal far larger than itself, such as beef cattle. Similarly, a dog chained up or "let free to run its fill" becomes an easier prey than flocks protected by livestock guarding dogs or electric fences (to which the LIFE project donation programme contributed considerably). Despite the drop in the number of animals fallen victims to wolves in 2004 against 2003, the overall value of compensations granted increased due to a higher market value of beef cattle and dogs in relation to sheep and goats. Thus 1,868,205.81 kunas were paid in 2003 and 1,918,708.23 kunas in 2004.

In terms of space, most of the livestock fell victims to wolves in the area of the counties Splitsko-dalmatinska and Šibensko-kninska, coinciding with the number of claims for damages received from these two counties. Like in 2003, this area accounts for 74 per cent of all the depredations in 2004. The only difference is that the number of animals, primarily sheep, affected in the county Šibensko-kninska dropped and in the county Splitsko-dalmatinska rose. The increase in the number of claims for damages and depredations in the county Splitsko-dalmatinska may probably be attributed to the fact that this large area is much better covered by damage assessment experts and that the population is much better informed. In 2003, namely, one more expert was appointed for the area of the county Splitsko-dalmatinska, but it took some time before the population learned that and started calling him more frequently to take part in investigations. It is also very likely that the motorway construction caused the relocation of some wolf packs and the change in the depredation area. Since it is precisely the municipalities located in the border area of the counties Šibensko-kninska and Splitsko-dalmatinska where a large number of depredations occur, this is very likely the reason for the change in the number of sheep attacked in these two counties.

This bulletin presents also the share of livestock affected, primarily sheep and goats as the commonest victims of wolf depredations, in the total number of sheep and goats of individual counties. The data on the total number of livestock in 2004, provided by the Croatian Livestock Centre (HSC), include all the livestock for which government incentives were requested, no matter whether it was included in the selection system or not. Similarly, those data relate only to the livestock present in the area of the wolf's distribution,

Table 5. Share of sheep and goats killed by wolves in the total number of sheep and goats by each county in 2004

Livestock type	**Sheep**		**Goats**	
No. of livestock → County	Total no. registered by HSC	Share (%)	Total no. registered by HSC	Share (%)
Dubrovačko-neretvanska	3789	1.61	1507	3.45
Karlovačka	14410	0.12	905	0,00
Ličko-senjska	57913	0.16	2322	2.07
Primorsko-goranska	44324	0.03	743	0.00
Splitsko-dalmatinska	50691	1.05	8816	3.07
Šibensko-kninska	73904	1.14	6118	2.11
Zadarska	97159	0.18	13679	1.13
TOTAL	**342190**	**0.51**	**34090**	**1.92**

i.e. in the mainland part of the counties studied, but the analysis does not cover livestock kept on the islands. The comparison of the results for the year 2003 and those for the year 2004 shows a slight decline in the share of livestock affected by the wolf in the total livestock number. The share of sheep dropped from 0.79 to 0.51 per cent and the share of goats from 2.11 to 1.92 per cent.

Fig. 12. The drop in the number of sheep and goats killed as compared to 2003 is a result of a raised livestock owners' awareness of the need to safeguard their livestock

Report on the Wolf Population Status in Croatia in 2005

The 2005 Report on the Wolf Population Status in Croatia was prepared for the purpose of implementing the Wolf Management Plan. The report outlines the main features of the wolf's distribution area in Croatia (population, livestock breeding, presence of game), presents data on damage caused to livestock and wolf's impact on the game, gives estimates of the wolf population size according to local experts' statements, presents the wolf mortality data for 2005 and gives a brief description of the wolf population status in the neighbouring countries that share this population with Croatia (Bosnia and Herzegovina and Slovenia).

The wolf's distribution area has been found mostly poorly inhabited, but containing a large number of livestock. The highest density of sheep and goats was recorded in the area of Dalmatian counties, while in the counties Primorsko-goranska, Karlovačka and Ličko-senjska this number is considerably smaller. On the other hand, those counties are characterized by a larger density of game, which is few in the area of Dalmatia. The analyses of the reports on investigations of damage caused to livestock testify to this figure, because over 90 per cent of all damages caused to livestock occur in the very area of Dalmatia where domestic animals represent most of the wolf's food. Over the last few years by far the largest number of damages was recorded in the municipalities of Unešić and Kistanje in the county Šibensko-kninska.

The wolf population size was estimated on the basis of statements given by appointed damage assessment experts of the Ministry of Culture, scientists dealing with wolf research, supervisors in protected areas and local masters of the hunt. The result was the number ranging from a minimum of 155 to a maximum of 225 individuals, which means 190 individuals on average divided into about fourty packs. According to the prevalent opinion of local experts the population size is stable, except in the area of the county Šibensko-kninska, where due to an increase in the number of damages caused to livestock the expert believe that the popula-

tion size has increased, and the county Dubrovačko-neretvanska, where the appointed expert has reported on a significant drop.

The analysis of the wolf mortality showed illegal kills and road-kill to be the major threat to wolves. According to present data, a total of 12 wolves were reported killed in the period from 1 January to 5 September, which means three individuals below the proposed yearly quota. However, viewing the past trend more cases of wolf mortality are expected by the end of the year.

The estimated size of wolf population in Bosnia and Herzegovina is 480-490 individuals. According to the hunting legislation of B&H entities, the wolf falls within the category of unprotected species and the yearly kill amounts to approximately 140 individuals. In rural areas damages to the livestock are common, but due to the wolf status as an unprotected animal livestock breeders receive no compensation. Slovenia has estimated its wolf population at 60-100 individuals. Here the wolf is protected and livestock breeders who suffer damage have right to compensation. Although the animal is protected, interventions in the population are allowed within the context of a regular and emergency kill. However, in 2005 no intervention in the population was allowed due to the lacking data on the wolf population dynamics and size.

Fig. 13. The 2005 report on the wolf population

Damage Reduction

Livestock Guarding Dogs - *Tornjak* and Electric Fences Donations

The guarding dogs - *tornjak* and electric fences donation programme established by the project continues, because the interest of livestock breeders surpassed all expectations. Thus further 18 dogs and 13 electric fences have been donated since April 2005. As known, the project envisaged the donation of 60 guarding dogs - *tornjak* and 20 electric fences. The total number of 98 dogs and 46 electric fences donated indicate clearly the extent to which the number of donations planned has been exceeded. This is both the result of donations from the LIFE project fund and the funds provided by the State Institute for Nature Protection and the counties Primorsko-goranska and Zadarska. Namely, the presentations of the project results and effects achieved in individual counties pointed to the need to help livestock breeders, which in some counties initiated and brought about a better co-operation in the process of resolving common problems.

The long-term interest does not lie in recognizing the problems and donating the money only, but much more in educating the livestock breeders that inhabit the large carnivores' range. The level of awareness of the necessity to guard constantly the livestock grazing freely has already been raised, especially in areas exposed to a higher risk of damage. A substantially greater number of households have organized and now accompany the livestock to the pas-

tures and use sheepdogs more frequently. Some livestock breeders who used to suffer individually high damages have in the meantime reduced the damage numerically or it has completely failed to occur. Such livestock breeders serve as an example to others and therefore in the long run they are expected to take more initiative in acquiring on their own sheepdogs and electric fences needed for the protection against attacks of large carnivores.

Fig. 14. Due to a vivid interest the number of *tornjak* dogs and electric fences planned by the donation programme was by far exceeded

Gorski kotar and Lika

***Tornjak* Dogs**

In the area of Gorski kotar and Lika a total of 39 *tornjak* dogs were donated. Within the framework of the project 28 male puppies were donated and 5 were bought by the funds secured by the County Primorsko-goranska. The State Institute for Nature Protection bought further 6 female puppies, with the aim to use them for reproduction after they reach the sexual maturity. In this way a targeted breeding and a higher usability of good quality autochthonous sheepdogs is encouraged and supervised in a long run. The livestock breeders who received the female puppies were obliged to donate the first litter to the State Institute for the purpose of future donations and to follow the instructions of experts involved in breeding activities. The dogs were donated to livestock breeders in Brinje, Donji Lapac, Gomirje, Gospić, Karlobag, Klanac, Korenica, Lički Osik, Lukovdol, Lukovo Šugarje, Moravice, Mrkopalj, Novi Vinodolski, Ogulin, Perušić, Podlapača, Senj, Smiljan, Sunger, Tršće and Vrbovsko. The donation took place in the Gospić Regional Office and immediately on site. Each donation was accompanied by a lecture on how the dogs should be trained, used and fed. The breeders received written instructions and for each dog a table was made containing dates of a compulsory vaccination against infectious diseases, parasites and rabies.

Due to a good co-operation with local veterinary stations that take care of the health status of the dogs donated, in several cases the life of the donated dog was saved.

Nevertheless a total of six dogs died in the area of Gorski kotar and Lika. Despite a professional intervention three died of a disease (cardiac arrest and parvovirus) and three were

killed by accident (two of them suffocated and one was hit by a vehicle). The dogs' owners informed the regional co-ordinator accordingly and for each dog killed a police and a veterinary report was prepared.

As part of his duties, the regional co-ordinator visits regularly the livestock breeders and checks the dogs donated every two months. On that occasion he checks how and under what conditions the dogs are kept and what the dog's state and efficiency are, or rather whether the breeder follows the instructions and fulfils the obligations under the contract on the right to use the dog donated. Each dog is photographed. All the data collected during the visit are entered into a form prepared for each individual dog and in this way the regional co-ordinator keeps a database on dogs donated.

The dogs donated at the beginning of the project are now more than 1 year old and proved highly successful in the field. According to the livestock breeders' statements, they have made it considerably easier to them to take the livestock to pastures and to control it. With some of them the damages failed to occur, but they did occur in the neighbourhood at the farms with no sheepdogs. As regards the keeping and caring for the dogs, the breeders are very satisfied too. The *tornjak* dogs, have, namely, proved to be hardly demanding dogs, highly social in contact with humans and adequately dangerous when guarding.

Fig. 15. From the earliest age a *tornjak* dog lives with the flock in a cattle-shed …

Fig. 16. … and on pastures

Electric Fences

In the area of Lika and Gorski kotar a total of 41 electric fences have been donated since the beginning of the project, of which 13 were purchased by the funds secured by the County Primorsko-goranska.

Electric fences were donated to livestock breeders in Brinje, Fužine, Gomirje, Gospić, Lički Osik, Lukovdol, Moravice, Mrkopalj, Mušaluk, Novi Vinodolski, Senj, Smiljan, Štikada and Udbina.

Electric fences donated proved also very efficient. The livestock breeders themselves buy extra electric wires and extend the existing security, and the number of requests for fences increased. The reason lies in the fact that livestock breeders, who keep their livestock adequately surrounded by electric fences suffer no more damage from predators.

The regional co-ordinator regularly visits the breeders who received donations and inspects the electric fences mounted. The livestock breeders are obliged to enter regularly the switching in and off of the fences and other parameters into the form sheets provided. During winter months when electric fences are not used, they must store them properly.

Fig. 17. An electric fence protects the livestock equally efficiently on the meadow…

Fig. 18. …. and in the forest

Tornjak dogs

In the area of Dalmatia a total of 59 guarding dogs - *tornjak* were donated, of which 54 male puppies were donated within the framework of the project and five were bought from the funds secured by the County Zadarska. The dogs were donated to livestock breeders in Čvrljevo, Boraja, Ervenik, Glavice, Gljev, Hrvace, Kijevo, Knin, Krnjeuve, Kruševo, Lećevica, Maovice, Mirlović Zagora, Nevest, Nunići, Planjane Donje, Podumci, Primorski Dolac, Radašinovci, Radučić, Ričice, Rupe, Sinj, Unešić, Vinjani Donji and Vinjani Gornji.

The donation programme was implemented in the same way as in Gorski kotar and Lika, including education and regular control so as to train the dogs for their role of livestock guardians. Nevertheless, there were considerable losses in this area. Of 10 dogs one died of a disease (parvovirus) despite the professional treatment, two died in accidents (hit by vehicles), two disappeared (for unknown reasons, one was presumably stolen) and as many as six were poisoned. In areas where the dogs were poisoned the competent inspection service was correspondingly notified and police reports forwarded to the State Attorney's Office.

Despite the initial distrust of livestock breeders in Dalmatia, they now advocate the use of sheepdogs. They are highly satisfied with their achievements, because they provide a valuable help in guarding the livestock. Major problems for dogs in Dalmatia are high temperatures and unavailability of fresh water. However, the livestock breeders themselves avoid for the same reason to take their livestock to pastures during the day when the temperatures reach their peaks. It should be noted that no further damages were recorded at livestock breeders that received donations. Due to the positive results the number of requests for donations has grown and the cases of individual breeders buying *tornjak* dogs themselves are not rare.

Fig. 19. The *tornjak* dogs donation in Unešić on 30.09.2005

Fig. 20. The *tornjak* dog named Bistri in Čista Mala was presumably poisoned

Electric fences

Within the framework of the project four electric fences were donated to livestock breeders in Bitelić, Benkovac and Kijevo in Dalmatia. The livestock breeders who received the donations are satisfied with the protection provided by the fence and are regularly visited by the regional co-ordinator. Unfavourable field conditions for mounting the fences in Dalmatia are the only reason why no further requests have been recorded.

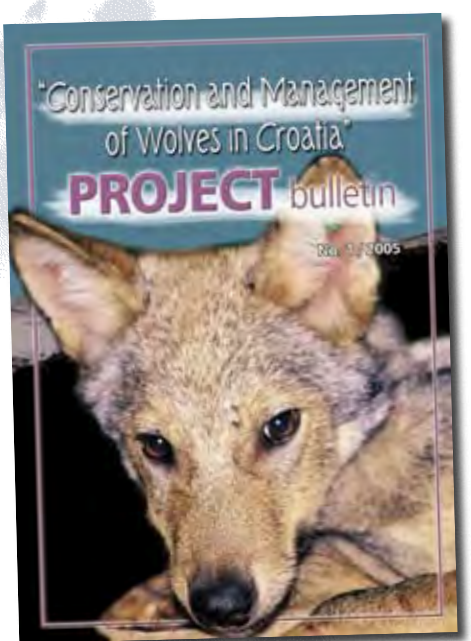
Education and Information

Publications

The second issue of the project bulletin containing the results of activities carried out in the second project year was published in May 2005. This issue included the Action Plan for implementation of the wolf and lynx management plans, the Protocol for collecting of protected animals killed (wolf, lynx) and the plans for the third project year.

A new wolf poster was printed too. This time, wolves presented on the poster are "known" individuals caught in the area of Croatia and monitored by satellite telemetry. Among others, the poster shows Eva, the "TV celebrity", Mila, the lone female wolf who travelled large distances in search for a partner, and Hilda who has been monitored for more than three years now and is the longest monitored female wolf in Croatia.

In addition to the poster on wolf seven educational and exhibition posters were printed, containing information on the wolf biology, its way of life, range of distribution, communication, the wolf management plan, the wolf conservation reasons and actual proposals how each person can contribute to wolf and lynx conservation in Croatia. The posters were used for the event called *The Open House Days* and on the occasion of other project results presentations.



As already mentioned, the *2005 Report on the Wolf Population Status in Croatia* was prepared and published on the official web-site.

In November 2005 a picture book about the wolf entitled "The Story about a Little Wolf Grga" intended for pre-schoolers was published. Grga tells the story of his life in the first person, from the day when he opened his eyes in the den for the first time to the moment of grounding his own pack together with his life companion. While growing up, Grga learns about wolf packs and the importance of wolves for the forest community, but speaks also about roads and people with rifles as main threats to the wolf's life. This is the attempt to teach the youngest children correctly about the life of wolves by means of a number of colourful, humoristic illustrations and a simple and warm, but still highly realistic piece of literature, not in a fairy-tale manner, in order to disprove the myths of an evil wolf from the Story of the Little Red Riding Hood who devours people.

Fig. 21. The second issue of the project bulletin

Fig. 22. A poster presenting telemetrically monitored wolves in Croatia

Fig. 23. Educational posters on the wolf

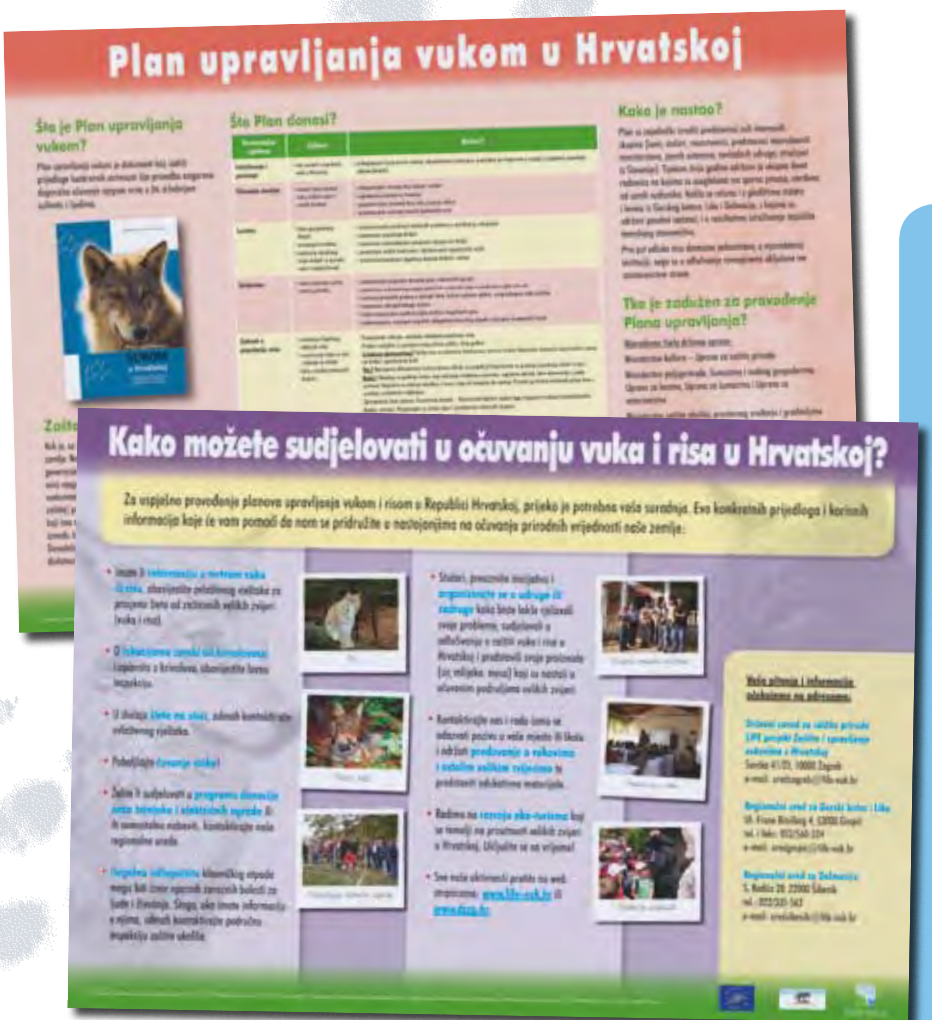


Fig. 23. Educational posters on the wolf (continued)

Fig. 24. The picture book about a little wolf Grga

Web site

The official web site of the project follows all the activities carried out within the framework of the project. This web site is regularly updated with new data so as to provide the Internet visitors with the up-to-date and good quality information.

The success of the official web site of the project is best demonstrated by monthly statistics of the number of site visits that has been increasing from month to month and has already passed 25,000. The visitors are mostly from adjacent, but come regularly from other countries of Europe and the world such as Germany, Switzerland, Romania, and the distant countries such as the USA, Canada and many others.

Fig. 25. Official web site of the project www.life-vuk.hr

School Lectures

From the publication of the second bulletin issue, lectures on wolves were held in seven more primary and six secondary schools located in the wolf's area of distribution, and one lecture to scouts in Zagreb. The lecture in Zagreb was given in co-operation with the Wolf Protection Association from Zadar, which also provides valuable support in organization of lectures in the Zadar area. Thus a total of 54 lectures have been held since the beginning of the project.

In autumn 2005 Magda Sindičić, the undergraduate ABD of the Faculty of Veterinary Medicine, joined Dr. Josip Kusak as a lecturer, since actively involved in large carnivores research and conservation for a very long time.

Fig. 26. A lecture on wolves given to pupils of the "Šime Budinić" primary school in Zadar

The lectures were held in the following schools:

Primary schools:

"Šime Budinić", Zadar
"Zrinski i Frankopani", Otočac
"Plitvička jezera", Mukinje
"S.S. Kranjčević", Senj
"Luka Perković", Brinje
"Skradin", Skradin
"Primošten", Primošten

Secondary schools:

"Vladimir Nazor" High School, Zadar
"Juraj Baraković" High School, Zadar
Secondary School for Natural Sciences and Printing, Zadar
"Plitvička jezera" Catering and Tourist School, Korenica
"Pavle Ritter Vitezović", Senj
"Otočac", Otočac

Documentaries

Two short documentaries on the wolf conservation issues in Croatia were filmed. The former gives an overview of the status of wolves in Croatia – the population status, the appearance of habitats, methods and scientific research results, damages caused to livestock by the wolf and conflicts between interest groups. The latter discusses the wolf conservation or rather the structure, financing and activities of the LIFE project.

Fig. 27. Shooting a documentary film on the wolf

Public information

The Open House Days

The event named *The Open House Days* held in the area of Lika and Gorski kotar was organized by the LIFE project and co-organized by the LIFE COEX project implemented by the Faculty of Veterinary Medicine with the aim to create a positive public attitude towards the brown bear in Croatia on a long-term basis. This was an educational and informative exhibition with the view to make the population of the area inhabited by large carnivores familiar with their biology, population sta-

Fig. 28. The Open House Day in Mrkopalj on 05.07.2005

Fig. 29. Informative stand during *The Autumn in Lika*

Fig. 30. The stand and the educational and informative exhibition on large carnivores at the Hunting Fair in Rijeka

tus and protection programmes. In addition to educational posters on the wolf, the lynx and the brown bear, diverse educational material was also made available to the visitors on that occasion – brochures, bulletins, leaflets, copies of management plans and practical information on large carnivore issues and the ways of getting involved in their conservation. *The Open House Days* were held as a separate event in Gospić, Krasno, Mrkopalj and Delnice, and subsequently in the context of larger events that took place in the area of Lika and Gospić. The first of them, a traditional event named *Autumn in Lika* took place on 8 and 9 October 2005 in Gospić. It was a good occasion to give two lectures on the wolf and the brown bear. In addition to posters, the event included the exhibition of the fells and sculls of large carnivores and the visitors were offered leaflets, publications and posters and given answers to all the questions on large carnivores by the project associates – Jasna Jeremić, Sonja Desnica, Dragan Šarić and Magda Sindičić. In cooperation with Rijeka Fair and Hunters Association of the County Primorsko – goranska, the educational and informative exhibition on large carnivores was organized in the scope of the 22nd North Adriatic Fair and the 7th Hunting and Fishing Fair that took place in Rijeka from 19-23 October. The visitors, mostly hunters, got an insight into large carnivore management plans, because their participation is a must for their implementation. Within the context of the fair a round table on hunting and the accession to the EU was held too and used to present the management plans for the wolf, the lynx and the brown bear in Croatia.

Participation in National and International Events

The project results, especially the Wolf Management Plan for Croatia, were presented at international events in which the project staff members and associates took part. One of them is the 2nd Slovene-Croatian Congress on Exotic and Wild Animals that took place in Ljubljana (Slovenia) from 26 to 28 September 2005. The lectures and presentations were divided into several areas: rodents and rabbits, birds, reptiles, amphibians and fishes, CITES, free-living animals and nature conservation and other exotic animal species. Jasna Jeremić of the State Institute for Nature Protection gave a presentation of project results within the framework of the topic on free-living animals and nature conservation, with a special emphasis on the Wolf Management Plan for Croatia. All the participants received brochures, bulletins and the

Management Plan, as a material printed in the context of the project, and an additional, well laid out information was provided by the educational poster exhibited. The project aroused great interest of Slovene experts, who are just about to start such a project too.

From 1 to 4 October the International Wolf Conference was held in Colorado Springs (Colorado, USA) in organization of the International Wolf Centre from Minnesota. The conference was attended by numerous scientists and experts dealing with wolves, who gave presentations in the field of wolf research, wolf management, education, human dimension, wolf impact on livestock and game, etc. As many as three presentations were dedicated to issues of wolf conservation in Croatia. Ana Štrbenac of the State Institute for Nature Protection made the participants familiar with the key issues of wolf conservation in Croatia, activities within the LIFE project and the Wolf Management Plan for Croatia. The details of the activities performed in workshops, which resulted in that Plan, were set out by Alistair Bath of the Memorial University of Newfoundland, who acted as the workshop moderator. Dr.

Fig. 31. Presentation of project results at the *International Wolf Conference* in Colorado …

Josip Kusak of the Faculty of Veterinary Medicine of the University of Zagreb presented the scientific aspect of wolf conservation in Croatia, including the results of research of the wolf population in Croatia carried out within the framework of the LIFE project over the last three years. The presentations were well-attended and welcomed with approval and Croatia was on several occasions highlighted as a positive example of wolf conservation in co-operation with all interest groups.

On the international symposium entitled "Game and Ecology", held on the Brijuni Islands from 10 – 13 October, Prof. Đuro Huber of the Faculty of Veterinary Medicine in Zagreb presented the large carnivores management plans.

Wolf Association from Portugal organized the 2nd International Congress on Iberyan Wolf in Castelo Branco from 10 to 13 November. Sonja Desnica of the State Institute for Nature

Protection gave a presentation on the project results and the Wolf Management Plan. The presentation was very well accepted with lots of questions from other paricipants.

Fig. 32.
… and at the 2nd Slovene-Croatian Congress on Exotic and Wild Animals

Mass Media Presentation

Mass media continued covering the wolf conservation issues. In this regard several articles were published in the press and wolf issues were a topic of popular informative and scientific television broadcasts such as "Good morning, Croatia" and "The Moment of Comprehension". Special attention was given to the case of the wounded wolf from Mazin.

The wolf is also the topic of the web site *www.fauna.hr* edited by the Terra association. The purpose of the web site is to use numerous texts, photographs, videos, interactive animation and instructive games to make the public familiar with interesting and poorly known facts about wolves, to explain the ever-increasing human impact on wolves and present protection programmes based on activities conducted within the framework of the LIFE project "Conservation and Management of Wolves in Croatia".

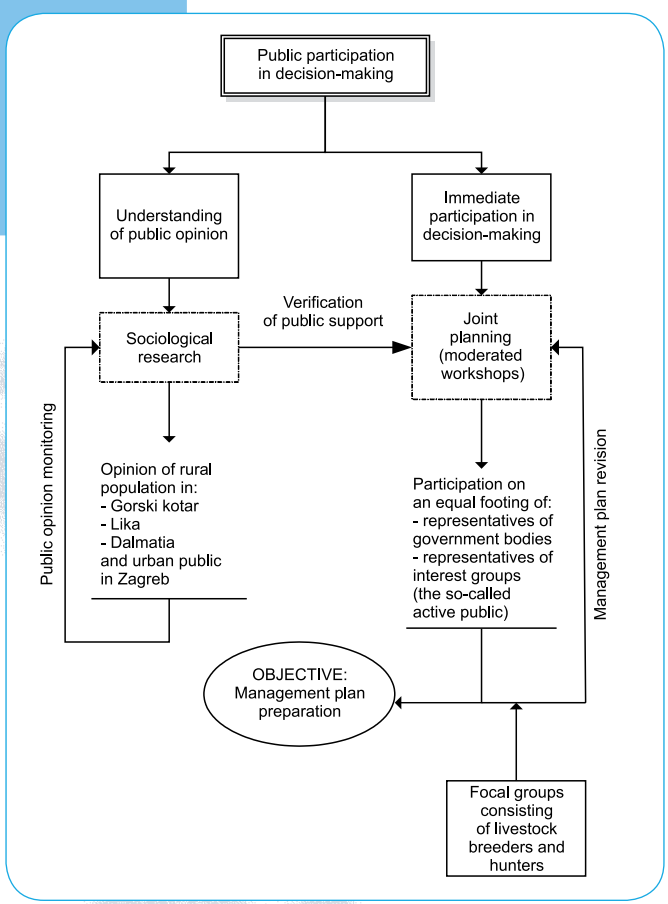
The web site mentioned received the award of the *World Summit on Information Society* as the best scientific Internet project.

Fig. 33. The wolf is the topic of the November web site *www.fauna.hr*

Strengthening Participation of Interest Groups in Decision-making

One of the key components of the project was targeted at strengthening of public participation in decision-making. Since various "publics" differ both by their socio-economic features and viewpoints with respect to wolf population management in Croatia, a combination of various methods to include general public in the decision-making process was applied. Figure 34 gives a schematic presentation of an integrated approach to this problem area, whose final objective was the preparation of the wolf management plan that will be approved by all interest groups.

Immediately involved in the management plan preparation process were representatives of various interest groups that traditionally do not communicate or have a communication burdened by mutual distrust. Consequently, the process involved biologists-researchers, hunters, foresters, representatives of competent ministries and non-governmental organizations (a full list of institutions and associations may be found in previous bulletins and in the Management Plan itself). All of them prepared the Wolf Management Plan for Croatia by co-operating at moderated workshops. Such a form of co-operation of public representatives in national committees on an equal footing is usually called "joint planning".



Besides, a better understanding of the general public attitude required the application of sociological methods of research. During the research the quantitative data on the general public opinion of wolves and the wolf management were scientifically collected in Gorski kotar, Lika and Dalmatia, including a sample of the urban public – a public opinion poll was, namely, conducted in Zagreb too. In this way the necessary "verification" of the public support to decisions taken by the representatives of interest groups was carried out. Some of the results mentioned will be presented in the following section "A Survey of Public Attitudes on Wolves".

The third way of public involvement in the decision-making process was used at the local level, in case of groups that demonstrated substantial local differences. Those were sheep breeders to a higher and hunters to a lesser degree. As a method the so-called "focal groups" were selected, or rather smaller meetings of a qualitative nature used to document the opinions of those groups.

Fig. 34. A schematic presentation of public involvement in the preparation of the Wolf Management Plan

A Survey of Public Attitudes on Wolves

The first public attitudes survey relating to wolves was conducted in 1999. During the project its results were used as a basis to make preparations for the survey conducted in 2003 and the so-called follow-up survey conducted this year (2005). The questionnaire used for both surveys consisted of over 80 questions covering various areas, such as general attitudes towards wolves, viewpoints on different topics of relevance to wolf management, fear of wolves, knowledge of the wolf biology and status in Croatia, the familiarity with the LIFE project "Conservation and Management of Wolves in Croatia", the respondents' experiences of wolves and demographic data on the respondents. Some of the answers to poll questions will be presented below.

The 2003 survey was conducted by means of a personal contact and conversation with the randomly selected pollees in their places of residence and that of 2005 by post. Various methodologies resulted in various quality of the polling data collected. Namely, potential respondents less interested in the subject matter of the survey tend to respond to the survey conducted by post to a lesser degree, while they would answer to questions in a personal contact with the survey taker. Considering this, the data collected are to be interpreted very carefully. For example, the examination of answers to one and the same question – "Which of the following answers illustrates best your attitude towards the wolf?" (five answers were offered ranging from "Strongly against" to "Completely in favour") – showed clearly the difference between the 2003 and 2005 responses. The implication is that there are far less neutral answers and, consequently, more positive or negative answers. However, if these data are presented in form of mean values, we can see no major changes in the very trend of answering to this question.

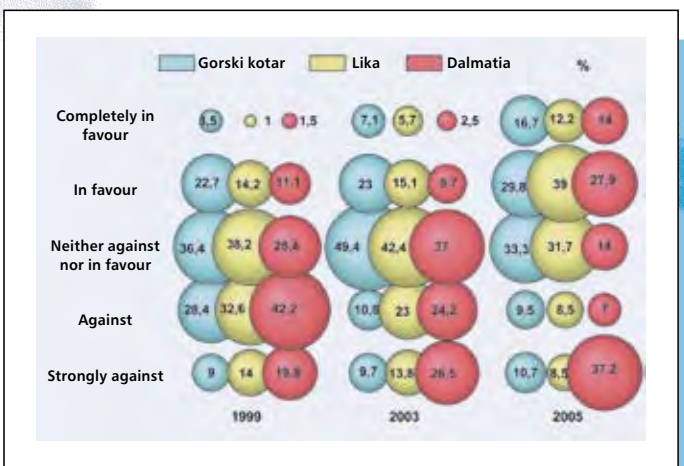


Fig. 35. Answers to the question "Which of the following answers illustrates best your attitude towards the wolf?" expressed in percentages

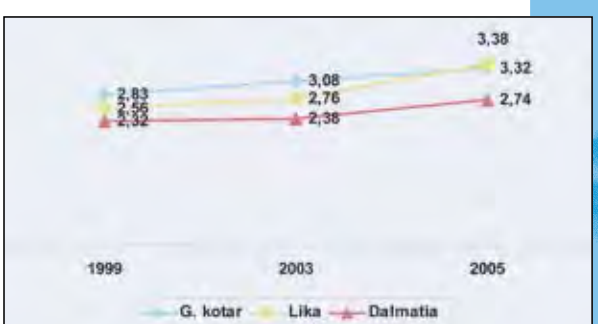


Fig. 36. Mean values of answers to the question "Which of the following answers illustrates best your attitude towards the wolf?" (Strongly against = 1, Against = 2, Neither against nor in favour = 3, In favour = 4, Completely in favour = 5).

It may be generally concluded that public attitudes towards the wolf are mostly positive, with the exception of Dalmatia, the region that suffered most of the damages caused to livestock by wolves. A considerable rise in positive answers given in Lika against the results of 2003 is also very interesting and might be attributed to field activities of the project. Namely, as much as 4.8 per cent of the persons questioned in Lika visited personally the Regional Office for Lika and Gorski kotar in Gospić (they stated correctly the name of the settlement in which the office is located) and 32.1 per cent knows that this office exists. Nobody of persons questioned in Gorski kotar visited the office (21.1 per cent knows of its existence), which was not unexpected, because damages caused by wolves in this region are sporadic. At the same time 2.4 per cent of persons questioned in Dalmatia visited the office in Šibenik and 26.2 per cent heard about its existence.

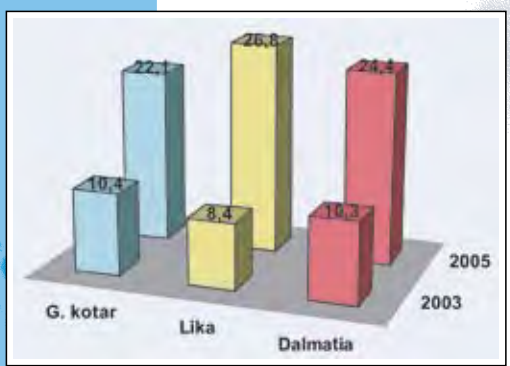


Fig. 37. Share of respondents (%) who have already heard of the LIFE project "Conservation and Management of Wolves in Croatia"

On the average, as many as a quarter of respondents in 2005 have already heard of the LIFE project before and the highest rise as compared to the 2003 survey was recorded in Lika, the region with a very active regional office.

Besides answering to questions many respondents added comments and suggestions regarding the poll itself or relating to the poll topic on their own initiative. Here are some of the various comments indicating clearly different viewpoints of wolves.

Dugopolje (Dalmatia)

Somebody has finally remembered to ask a "little man" what he thinks about the wolf and wolf management. Let the wolves be, as they are a part of nature and nature is a part of us and we need it, but let it be in such a manner that neither humans nor human activities are threatened by wolves. Therefore wolf management should be better organized and the wolf kill allowed.

Mogorić (Lika)

It would be more efficient and humane if the money spent in conservation of wolves would be invested in the protection of population already living here and to those who should come back, but have no place to come back to. You are pleading for carnivores and the people lack fundamental living conditions, because drinking water supply has been suspended. We have no schools, churches, transportation, the asphalt road is destroyed, the water supply closed, the electricity supply irregular. There are no shops and no doctor, but there are numerous other calamities and beyond all that you make our fear of wolves even greater.

Knin (Dalmatia)

I am very glad that such a survey is conducted and I feel honoured by having been invited to participate. I am a lover of animals, especially wolves and do not wish their extinction. I do not want them to become our past. They are a part of nature, a part of our past, presence and future. And I want it to stay that way.

Oklaj (Dalmatia)

My cap is off to you for doing this for wolves and also to all other people taking any steps whatsoever to help any other kind of animal, no matter whether already endangered or likely to become endangered (since living near us, it is their destiny sooner or later). As to wolves, I come from an area where wolves are always mentioned in a negative context and where it is a common practice to kill the wolf when it appears. Here many people live upon sheep and goats and mostly breed livestock. I can understand them to a certain extent, but what I cannot understand is that the state brings the imported wolves raised in cages and lets them roam about the region and expects them to live as if born here. This is not right either for these wolves (who will be killed here) or for the indigenous wolves or for the sheep (not for sheep breeders) that will fall victim to them. This is all too sad and too complex for me to clarify anything in a few lines. In any case, may cap is off to you and I send you my regards.

Implementation of the Wolf Management Plan

All the activities carried out in the context of the LIFE project are a segment of the Wolf Management Plan for Croatia and the agreed Action Plan. On the model of the preparation of the Plan itself, which has arisen out of co-operation of all interest groups, it is now being implemented. So, we are in the process of making preparations to organize an action of monitoring the footprints in the snow, which is one of the methods to determine the number of wolves, lynx and game. The action is to be undertaken in co-operation between the Ministry of Culture, the Ministry of Agriculture, Forestry and Water Management, the State Institute for Nature Protection, the Faculty of Veterinary Medicine of the University of Zagreb, the Croatian Hunters Association and Croatian Forests.

For the purpose of habitat conservation the preparation of the *Rulebook on Measures for the Protection of Animal Crossings* has started and the *Rulebook on Methodology and Procedures Applied by Appointed Experts in Damage Assessment* is being prepared with the aim to improve the current damage compensation system.

Despite many years of efforts to protect the wolf, which was the reason for having constructed green bridges over new motorways, we are still witnessing thoughtless actions that endanger wolf habitats. So for example, after the construction of the motorway and the Osmakovac green bridge in the Vučevica valley an infrastructure development was carried out overnight, likely to have a serious negative effect on the wolf population in that area and thus endanger the potential area of the national ecological network. Namely, by having constructed a motorway branch, i.e. the Vučevica junction, that cuts transversally the northern part of the valley, a valuable segment of the wolf habitat has been destroyed. The State Institute for Nature Protection, the Faculty of Veterinary Medicine and non-governmental organizations (*Green Action* and the Wolf Protection Association) undertook a series of actions to draw the public attention to this and requested the competent government bodies to give a statement. Although the construction of this junction was not planned at the time when the Environmental Impact Study was prepared, the competent government authority stated

that no special permit was required for such a development, because it belonged to the motorway corridor. The Committee for Monitoring the Large Carnivore Populations is making every effort to make the authorities impose the obligation of monitoring the impacts of the construction on the wolf population in that area despite the fact that the development has been carried out.

Fig. 38. Green bridges as animal crossings help to preserve the integrity of habitats

On 13 September the Committee held the eighth this year's meeting attended by Božo Biškupić, Minister of Culture; Jadran Antolović, State Secretary; Zoran Šikić, Assistant Minister responsible for nature protection; Branko Štulić, Assistant Minister responsible for finances and representatives of all interest groups. The main topics of the meeting were the overview of the lynx and wolf population status in Croatia and possible interventions in the populations of those large carnivores. The State Institute for Nature Protection presented the *2005 Report on the Wolf Population Status*. Early this year, according to the results obtained by many years of monitoring the wolf population and the current status and pursuant to provisions of the *Wolf Management Plan for Croatia*, the Committee concluded that in 2005 this population was capable of standing the mortality of 15 individuals (road-kills, shooting and other wolf mortality causes that are regular for different reasons). By 5 September 2005 the death of 11 wolves was recorded and a contained intervention covering 4 wolves was proposed in the areas with most of damages on livestock and highest impact on wildlife prey. It was the opinion of the Committee that such an action would not degrade the wolf population status, but might mitigate animosities that pose threat to preservation of the species. Moreover, the public attitudes survey conducted in the wolf's area of distribution show that a great majority of persons questioned support the controlled wolf kill.

Fig. 39. The construction of a motorway branch cutting transversally the northern part of the Vučevica valley and degrading the wolf habitat

On that grounds the Committee came out with the proposal to permit the intervention, but limited exclusively to individual hunts on the hunting grounds in Damatia, Lika and Gorski kotar in the period from 1 October to 31 December 2005. However, it was not permitted to kill collared individuals. In case of an intervention it has been made obligatory to inform immediately a damage assessment expert of the Ministry of Culture and to bring the wolf killed to the Faculty of Veterinary Medicine for a scientific examination. In this way it is expected to ensure control and selectivity of interventions. As provided for by the Plan, this protection regime will be implemented during a trial period of 2 years. The future of this regime will depend on the population stability and on the actual mitigation of animosities mentioned, including the illegal wolf kill. The population status will continue to be strictly monitored, all decisions on interventions revised and all measures taken, in order to make Croatia a country that can boast of being inhabited by all three large carnivores: the wolf, the lynx and the brown bear.

The establishment of an emergency team that will consist of the existing emergency team for the brown bear and of members responsible for the emergency response in connection with the wolf and the lynx (deviations of behaviour, rabies, etc.) is underway.

The State Institute for Nature Protection has rented the house for the future educational and information centre for large carnivores from the Mrkopalj Municipality. The conceptual design for interior decoration of the house is in the process of preparation and the funds are being collected for building works required. The finance needed for equipping the centre will be secured by the recently approved PHARE project for implementation of NATURA 2000 in Croatia.

Fig. 40. The extended meeting of the Committee for Monitoring the Large Carnivore Populations held on 13.09.2005

Project Future

The LIFE project ends officially on 1 December 2005, at least in the segment that received the financial support of the European Community. However, considering the project achievements and the planned activities, the project is going to continue. The objective of the financial assistance provided by the European Community was the establishment of a mechanism for a long-term conservation of wolves in Croatia in an as harmonious as possible co-existence with humans. After three years of intensive work we may conclude that the mechanism is established and everything that follows will be a continuation of its operation and improvement of the results achieved. It is particularly important to maintain co-operation of interest groups that started when preparing the Wolf Management Plan. At present, in implementation of the Wolf Management Plan, this co-operation has proved to go on through concrete concerted actions. The accession to the European Union and the establishment of the ecological network as part of the NATURA 2000 programme will provide conditions for intensification of activities in terms of preserving the habitats of wolves and other large carnivores. In the future, namely, the intensive construction of roads and urbanization will undoubtedly be one of the major factors of threat to these animals that need large spaces to live.

Fig. 41. The wolf is a value for future generations

Additional information is available at the official website www.life-vuk.hr,
at our office in Zagreb, or any of the two regional offices in the areas inhabited by wolf:

State Institute for Nature Protection
LIFE Project "Conservation and Management of Wolves in Croatia"
Savska cesta 41/23, p.p. 50
10144 Zagreb, Croatia
Phone/Fax No. +385 1 4866 187
e-mail: uredzagreb@life-vuk.hr

State Institute for Nature Protection
LIFE Project "Conservation and Management of Wolves in Croatia"
Regional Office for Gorski kotar and Lika
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53000 Gospić, Croatia
Phone/Fax No. +385 53 560 524
e-mail: uredgospic@life-vuk.hr

State Institute for Nature Protection
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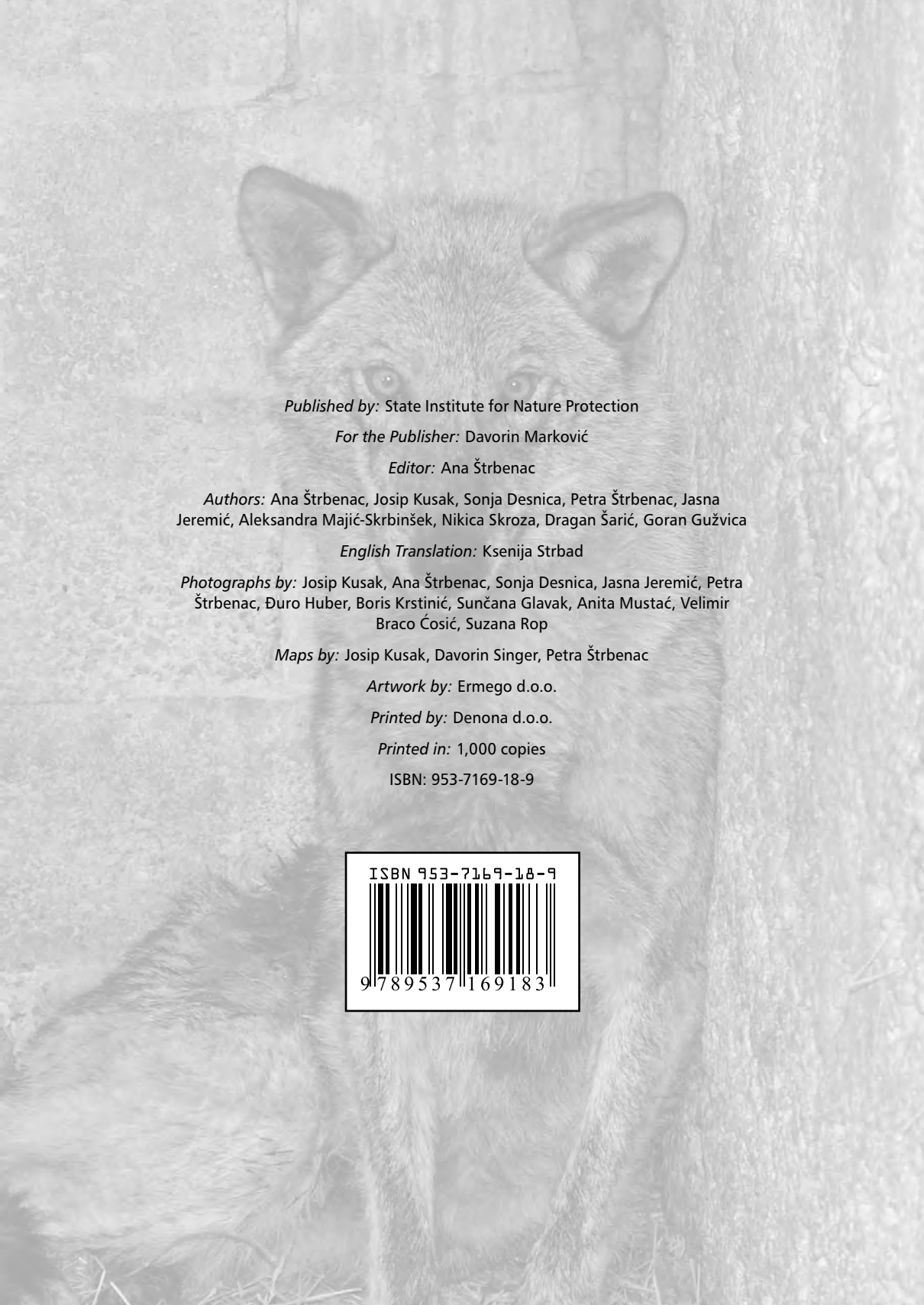
22 000 Šibenik, Croatia
Phone/Fax No. +385 22 335 563
e-mail: uredsibenik@life-vuk.hr



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Life
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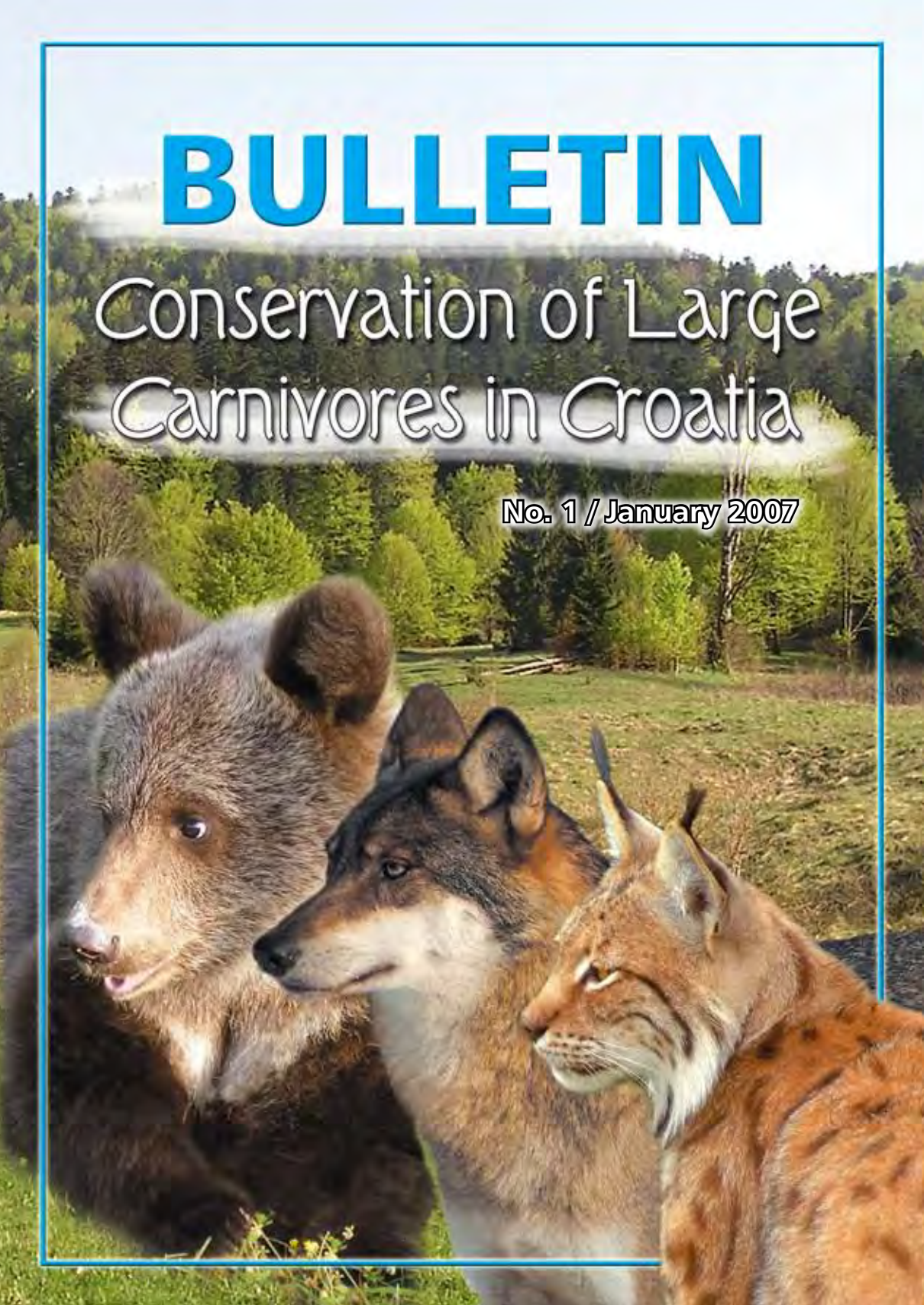
U HRVATSKOJ

BULLETIN

Conservation of Large Carnivores in Croatia

No. 1 / January 2007



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Zagreb, January 2007

A Word of Introduction

Large carnivores – the bear, the wolf and the lynx – are an important component of Croatia's biodiversity and a natural wealth that must be preserved. However, the issue of their conservation is highly complex, because – more than with any other species - it primarily requires working with people. And this is always the hardest. In Croatia all segments of large carnivore conservation are indeed intensively tackled. It is therefore no surprise that after three issues of the bulletin presenting results of the LIFE III project "Conservation and Management of Wolves in Croatia" we decided to launch an annual bulletin focusing on all the three large carnivores – the bear, the wolf and the lynx. Our idea was to inform all those interested about the achievements, problems, challenges and future plans by a bulletin to appear at the end of each year.

Fig. 1 Gorski kotar, an ideal habitat for large carnivores
(PHOTO BY A. ŠTRBENAC)

Well, what is then the actual status of large carnivores in Croatia? From the biological aspect bear and wolf populations may be said to be stable, but that of the lynx is declining. The problem will surely be solved by the cross-border lynx protection project implemented by Croatia and Slovenia. Here it should be stressed again that we share large carnivore populations with the neighbouring countries, which makes the cross-border co-operation in management and administration vitally important for ensuring the survival of these animals on a long-term basis. The cooperation with Slovenia is expected to be enhanced after the bilateral meeting on this topic scheduled for the beginning of 2007. It remains for us to foster cooperation with another neighbour – Bosnia and Herzegovina – which is one of our most important tasks in the future.

There have been major breakthroughs this year, such as the action of snow tracking carried out in collaboration with expert and scientific institutions, hunting ground concessionaries and supervisors of protected areas. This is a positive example demonstrating that large carnivore conservation may only be ensured by concerted efforts. The co-existence of humans and large carnivores requires minimization of all existing problems to the utmost. The LIFE COEX project "Improving Coexistence of Large Carnivores and Agriculture in South Europe", implemented in Croatia by the Ministry of Agriculture, Forestry and Water Management and the Faculty of Veterinary Medicine of the University of Zagreb, started activities aiming to reduce damage caused by bears and to prevent bears from habituating to humans. The placing of the so-called "bear-proof" waste containers in the bear distribution area represents the first step of these efforts. The importance of promoting the tourist industry based on large carnivores has already been emphasized on several occasions. Bear Labels and the Large Carnivore Centre whose establishment was initiated by the State Institute for Nature Protection represent significant activities that should demonstrate the potentials of large carnivores as a moving force of development. Nevertheless, the large carnivore conservation is hardly ever ideal. Fragmentation of their habitats poses currently a major threat to their survival. In 2006 we witnessed both the start of new road construction projects and the announcement of numerous further developments, primarily in the area of central Dalmatia. The area has come under a strong pressure and we are facing great challenges to resolve the situation for the benefit both of carnivores and humans.

And how could each citizen contribute to large carnivore conservation? To start with by being informed and this is precisely the purpose of this bulletin.

Editor

Government Bodies

In Croatia two government bodies are responsible for large carnivore conservation, management and administration. **The Ministry of Culture – Directorate for Protection of Nature** is in charge of the wolf and the lynx and **the Ministry of Agriculture, Forestry and Water Management – Directorate for Hunting** of the bear. Namely, pursuant to the Nature Protection Act of July 2005 or rather the Ordinance on Designation of Strictly Protected and Protected Wild Taxa of 2006 the wolf and the lynx are strictly protected species. The populations of these species are managed on the basis of the wolf and lynx management plans adopted by the decision of the Minister of Culture on 7 December 2004. According to the same Ordinance, the bear is a protected species, i.e. a species that may be managed and as such classified among game under the Hunting Act passed in November 2005. The bear is managed according to the Brown Bear Management Plan adopted by the decision of the Minister of Agriculture, Forestry and Water Management on 10 May 2004.

Within the scope of its activities the **Ministry of Culture** adopts wolf and lynx management plans and is responsible for their implementation. Furthermore, it enters into contracts with appointed experts for assessment of damage caused by wolves or lynx, pays damage compensations, sets up emergency response team, decides on interventions in populations, passes subordinate acts, exercises inspection control through nature protection inspectors and conducts other administrative matters. The **Committee for Monitoring Large Carnivore Populations** acts at the Ministry as a specialized advisory body through which the Ministry makes decisions on conservation and management of wolf and lynx populations. The Committee comprises representatives of all relevant institutions:

- Želimir Štahan, Ministry of Culture, Directorate for Protection of Nature
- Andrea Štefan, Ministry of Culture, Directorate for Protection of Nature
- Marko Trošić, Ministry of Culture, Directorate for Protection of Nature
- Branka Bukvić-Šošić, M.Sc., Ministry of Agriculture, Forestry and Water Management, Directorate for Veterinary Medicine
- Davor Zec, Ministry of Agriculture, Forestry and Water Management, Directorate for Hunting
- Zrinko Jakšić, Ministry of Agriculture, Forestry and Water Management, Directorate for Hunting
- Ana Štrbenac, State Institute for Nature Protection
- Prof. Dr. Đuro Huber, Faculty of Veterinary Medicine of the University of Zagreb, Department of Biology
- Assist. Prof. Dr. Josip Kusak, Faculty of Veterinary Medicine of the University of Zagreb, Department of Biology
- Dario Majnarić, M.Sc., Croatian Forests Ltd., Forest Administration, Delnice Branch
- Alojzije Frković, a retired employee of Croatian Forests Ltd.

As already mentioned, every damage caused by a wolf and a lynx is assessed by **appointed damage assessment experts** on behalf of the Ministry. At present there are 17 in number covering the total wolf and lynx distribution areas, which makes it possible for each person who suffered damage to exercise its right on compensation if the damage can actually be attributed to those animal species. These experts act upon instructions on the procedure of assessing damage caused by a strictly protected animal (predator) issued by the Minister. The related *Ordinance on Assessment of Damage Caused by Strictly Protected Wild Animal Taxa, Methodology and Practices Applied by Appointed Experts in a Damage Assessment Procedure* is at the final stage of preparation.

Each year appointed damage assessment experts take a training course intended for their professional improvement and exchange of field experiences. These training courses are organized by the State Institute for Nature Protection in collaboration with the Faculty of Veterinary Medicine of the University of Zagreb.

The **wolf and the lynx emergency response team** is in the process of setting up, with the task to respond to emergency situations such as rabies and other deviant behaviour of these carnivores.

The **Ministry of Agriculture, Forestry and Water Management** is in charge of adopting the Brown Bear Management Plan and relevant action plans and their implementation; it is in charge of setting up an emergency response team for the bear, entering into contracts with hunting concessionaries in state-owned hunting grounds, passing subordinate acts, exercising inspection control through hunting inspectors and appointed forestry inspectors and conducting other administrative matters. The Ministry is furthermore responsible for monitoring the bear populations in collaboration with the Faculty of Veterinary Medicine of the University of Zagreb, for implementation of the electric fences donation programme aiming at the reduction of bear-caused damage, for the promotion of the use of bear-proof waste containers, etc.

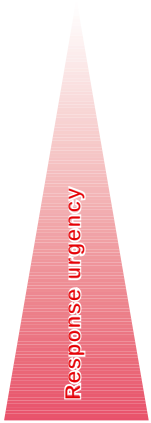
At this Ministry a **Committee for Implementation of the Brown Bear Management Plan** has been set up as a special advisory body. The Committee consists of representatives of all relevant institutions and organizations of which four were appointed by the Ministry of Agriculture, Forestry and Water Management and four by the Ministry of Culture:

- Branko Iviček, Ministry of Agriculture, Forestry and Water Management, Directorate for Hunting
- Zrinko Jakšić, Ministry of Agriculture, Forestry and Water Management, Directorate for Hunting
- Davor Zec, Ministry of Agriculture, Forestry and Water Management, Directorate for Hunting
- Želimir Štahan, Ministry of Culture, Directorate for Protection of Nature
- Prof. Dr. Đuro Huber, Faculty of Veterinary Medicine of the University of Zagreb, Department of Biology
- Associate Prof. Dr. Marijan Grubešić, Faculty of Forestry of the University of Zagreb, Institute for Forest Protection and Hunting
- Dražen Sertić, Croatian Forests Ltd., Forest Administration, Karlovac Branch
- Alojzije Frković, a retired employee of Croatian Forests Ltd.

The **Brown Bear Emergency Response Team** was set up by the decision of the Minister of Agriculture, Forestry and Water Management taken late in January 2005. The team consists of 9 members and acts according to the provisions of the Brown Bear Management Plan for The Republic of Croatia, the decision on setting up an emergency response team and the rules of procedure.

The emergency response team is tasked with the activities of preventing i.e. avoiding or minimizing the problems (bear orphans, bears getting used to feeding on garbage, damage), bear monitoring and interventions (elimination of problematic bears, etc.).

Table 1 Categorization of response urgency in relation to risk of danger of the bear

	**Encounter with a bear**
	Runs away when meeting a human
	Rises on rear legs when meeting a human
	Causes damage far from settlements
	Seen near solitary buildings
	A surprised bear fakes attack
	Meeting a man again at a smaller distance, does not run away
	When provoked, it fakes attack
	Female attacks to protect the young
	Looks for food close to inhabited houses
	Attacks to defend its prey/food
	Enters repeatedly inhabited places
	Tries to get into stables and inhabited houses
	Walks after humans
	Attacks unprovoked Injured bear

Expert Institutions

According to the Nature Protection Act the **State Institute for Nature Protection,** operating since September 2003, is an institution centrally responsible for specialized nature protection activities in Croatia. As regards large carnivores the Institute is in charge of monitoring wolf and lynx populations in collaboration with the Faculty of Veterinary Medicine of the University of Zagreb. Apart from supporting telemetric studies of the wolf and the lynx, the Institute organizes snow tracking and processes results, collects data on livestock number in the wolf and lynx distribution area, records and analyses damage caused by wolves and lynx and prepares annual reports on the wolf population status. Further, the Institute organizes and implements donation programmes for livestock guarding dogs and electric fences, organizes professional improvement of damage assessment experts, public education and information and coordinates formulation and revision of wolf and lynx management plans.

Scientific Institutions

As already mentioned, the main scientific institution dealing with large carnivores in Croatia is the **Faculty of Veterinary Medicine of the University of Zagreb – Department of Biology.** The scientists of the Department carry out telemetric and genetic study of large carnivores, participate in preparations for and implementation of actions of monitoring large carnivores by snow tracks, run training courses intended for damage assessment experts, analyse mortality data and are in general actively involved in all aspects of the large carnivore conservation, management and administration.

The bear related issues are to a certain extent tackled by the Faculty of Forestry and the Faculty of Science of the University of Zagreb.

Other Institutions and Organizations

In order to preserve large carnivores successfully it is absolutely imperative that all stakeholder groups cooperate. The institutional framework comprises some other institutions and organizations whose scope of activities is linked with large carnivores and should therefore also be mentioned, such as public institutions of national and nature parks in the wolf distribution area (NP[1]Risnjak, NP Northern Velebit, NP Plitvice Lakes, NP Krka, NP Paklenica, PP[2] Velebit), Croatian Forests Ltd. – Delnice Forest Administration and the Croatian Livestock Centre (HSC). Non-governmental organizations involved in these activities are the AWAP – Association for Wild Animals Protection, Croatian Hunters Association, the Wolf Protection Association of Croatia and the Green Action.

Professional Improvement of Appointed Damage Assessment Experts and the Emergency Response Team

A Training Course for Appointed Damage Assessment Experts

This year again, or precisely on 15 December 2006, the State Institute for Nature Protection in collaboration with the Faculty of Veterinary Medicine of the University of Zagreb organized the ninth in the row *training course for appointed damage assessment experts*.

As usual, the morning was dedicated to discussions about the legislative framework of compensations and to damage assessment experts' proposals and comments on the future damage assessment ordinance. The discussion was followed by a presentation given by Assist. Prof.

Fig. 2 Practical part of the training course for appointed damage assessment experts
(PHOTO BY Đ. HUBER)

[1] National Park
[2] Nature Park

Dr. Josip Kusak and an exchange of field experiences relating to recognition of predator's signs on a victim, highlighting particularly differences between individual predators. The training course was also attended by employees of the Šibenik Falconry Centre, doctors of veterinary medicine and four biology researches from Slovenia. In the afternoon a lecture on dissection techniques under the field conditions was held in the dissection room and the dissection itself was carried out by appointed damage assessment experts with the assistance of Ana Beck DVM.

In order to collect as many field data as possible, the Institute arranged collaboration with the Šibenik Falconry Centre. Upon completion of investigation the staff of the Centre would take over sheep and goat carcasses and carry out further forensic analyses in their laboratory. The Centre is presently seeking to organize a visit of American forensic scientists who would communicate their valuable knowledge and experiences to our appointed damage assessment and other experts.

Emergency Response Team Training

In the context of implementing the LIFE COEX project, the Ministry of Agriculture, Forestry and Water Management and the Faculty of Veterinary Medicine of the University of Zagreb have jointly organized two training courses for emergency response team members so far. Both training courses were held in Bjelski, Gorski kotar, from 25-26 April and from 1-2 December 2005 respectively. All emergency response team members attended both training courses that consisted of a theoretical and a practical part. During the theoretical part guidelines for future activities were adopted, similar teams operating in other countries presented and the response to specific problematic situations observed in Croatia discussed. In the practical part of the course all team members were taught how to use bear traps, to perform immobilization by means of a rifle and a blow-pipe and to intimidate problematic animals by rubber bullets and other non-fatal means.

Fig. 3 Emergency response team training in shooting with rubber bullets (PHOTO BY Đ. HUBER)

Implementation of Wolf, Lynx and Brown Bear Management Plans for Croatia

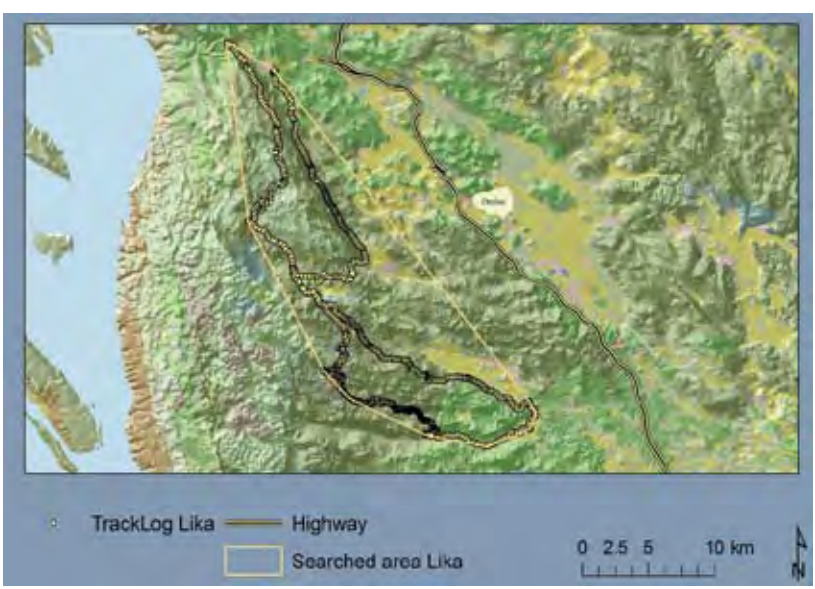
Large carnivore management and administration plans are documents that offer guidelines for the large carnivore conservation in an as harmonious as possible coexistence with man. These plans underlie the formulation of annual (for the brown bear) or biennial (for the wolf and the lynx) action plans outlining in detail specific activities and employees in charge of their implementation. The following is an overview of the 2006 achievements by several basic thematic units.

Large Carnivore Study and Monitoring

Collaring and telemetric monitoring of wolf and lynx

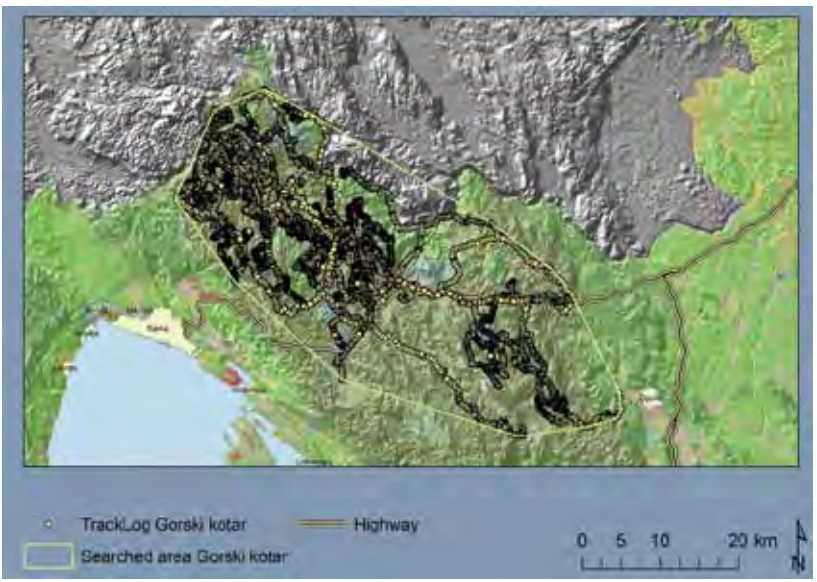
In 2006 the wolf study started in Lika. For the purpose of collaring the wolves Assist. Prof. Dr. Josip Kusak, head of the study, checked 284 km^2 of the Velebit in search of signs of wolves' presence and movement (tracks, excrements, scratching) during May and June. Arrangements were made for cooperation with the staff of NP Northern Velebit and PP Velebit, including local hunters and foresters.

However, as a result of an accident at work J. Kusak suffered first and second-degree burns, which made any further activities in Lika in 2006 impossible. The rest of the time was instead spent on capturing and collaring wolves in Gorski kotar, where it was found that of the four previously collared wolves only one remained.

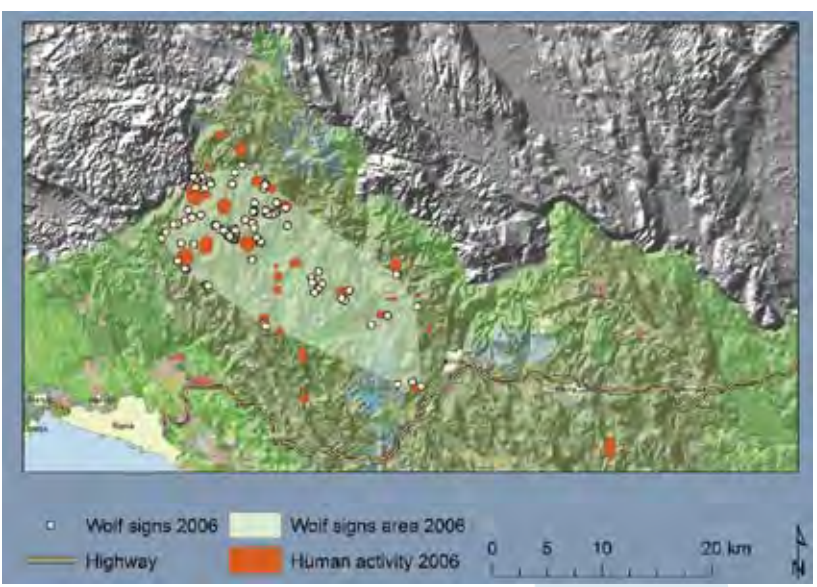


Map 1 Tracklog along forest roads on the Velebit while searching for signs of wolves' presence

The tour of Gorski kotar started late in August. Every week about 1,000 forest roads were searched and an area exceeding 1,350 km² combed. In slightly more than a month of tracking 100 signs of the wolf's and two traces of the lynx's presence were found and 30 areas of human activities identified (cutting of forest trees and pulling out the logs, gravel digging and waste disposal).



Map 2 Tracklog along forest roads of Gorski kotar while searching for signs of wolves' presence



Map 3 Area of Gorski kotar where wolf signs were found and human activities recorded in 2006

Preparatory activities for wolf collaring soon produced results. During the summer and autumn of 2006 as many as three wolves were captured in the area of Gorski kotar. On 11 September a she-wolf was caught near Lisine bearing already a collar that stopped functioning! According to the manufacturer's specification it should have emitted SMS messages and a radio-signal (VHF) and fall off on 26 August. It was **Sara**, whose signal disappeared on 15 June and who was therefore believed to have been killed. Sara weighed 1 kg more (27 kg) than last year when caught for the first time. She was fitted with a new collar, this time for satellite monitoring (GPS-UHF-VHF), and when set free, she returned to the *Snježnik* pack and has been roaming around mostly with a she-wolf named Hilda. It should be noted that Hilda has been monitored for more than four years now, which makes her the longest monitored wolf in Croatia. The frequency of howling confirms the existence of a new litter of the *Snježnik* pack, but the number of cubs is still unknown.

Fig. 4 The collared she-wolf Sara held by Vedran Slijepčević (a student from Croatia) and assisted by Nadia Cappai (a student from Italy) and Senem Tug (a student from Turkey) (PHOTO BY J. KUSAK)

Noah, a this year's cub weighing 18 kg, was captured in the Ričica valley, not far from the Suho hunting lodge (Smrekova draga – Gumance hunting ground) on 28 August. He was also fitted with a collar for satellite monitoring, expected to last a year, and was released in the place where captured. The pack to which the cub belongs was named *Suho*. On that day other members of the pack were seen in the same valley, one of them immediately after releasing Noah, and the next evening already they were howling all together in the Ričica valley. Next day they left for some other place. The collaring of the cub from the *Suho* pack (earlier monitored only by tracks and excrements and called the *Platak* pack or the "frontier pack") is a major move in the wolf study in Gorski kotar. The monitoring of this pack would help complete the picture of the movements, spatial distribution and number of wolves in the northern region of Gorski kotar. The repeated trials of howling demonstrate that Noah is not the only cub of this pack.

Fig. 5 Noah in the arms of Josip Kusak while waking up from the narcosis (PHOTO BY J. KOLAKOVIĆ)

Grga, a young male of the *Suho* pack, was captured and fitted with a collar for satellite monitoring of signals emitted by SMS (GPS-GSM-VHF) in the Kiršina draga valley on 20 October. He was Noah's brother from the same litter and weighed as much as 27 kg. This cub also joined other members of the pack soon and has since spent most of the time with Noah.

Fig. 6 Grga (PHOTO BY J. KUSAK)

Both cubs of the *Suho* pack were captured and treated in collaboration and with the assistance of Damir and Renato Prokopović, masters of the hunt in the area of the Smrekova draga – Gumance hunting ground.

No traps were placed for the *Risnjak* pack, because very few wolves were identified in that area earlier and the likelihood of a successful capturing was estimated as negligible.

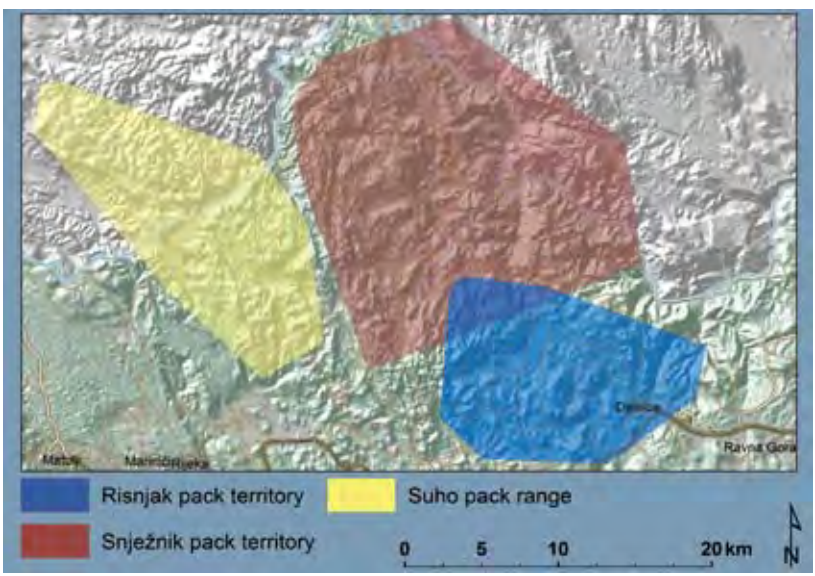
In addition to telemetric monitoring of new and newly collared wolves, three more wolves from two neighbouring packs, collared earlier, were monitored too – a reproductive she-wolf

Tanja of the *Risnjak pack,* she-wolves *Hilda, Sara and Kyra* of the *Snježnik* pack and Noah and Grga of the *Suho* pack mentioned earlier.

Data from Kyra's collar were for the last time recorded by radio communication (UHF) on 12 December 2005. During the aircraft search early in February 2006 the signal showed the alarm ("mortality") rhythm and was received from the direction of the Dizine hill near Zamost and Osilnica on the Slovene side. Subsequent searches of this collar were unsuccessful. The collar may have stopped functioning before the time indicated in the manufacturer's specification or the she-wolf may have been killed and the collar destroyed.

Late in August only Hilda's signal was received and Tanja disappeared.

Wolves monitoring during 2006 shows the *Snježnik* pack to have additionally extended its territory to an area currently covering 353 km^2 and the *Risnjak* pack to have reduced its territory to 160.3 km^2. This corresponds to the fact that the number of wolves in this pack dropped over the last year (only two wolves during winter 2005/2006).



Map 4 Territories of the *Risnjak, Snježnik* and *Suho* packs during 2006

During 44 days of monitoring the *Suho* pack covered an area of 51 km^2. It has already entered Slovenia as far as Ilirska Bistrica. This is another clear indication that management and administration of large carnivore populations necessarily call for cooperation of countries that share those populations.

Four **lynxes** have been collared in Croatia so far. The collaring started with the female named Bela, 8 months old and captured and collared in the middle of December 2001 near the border of the Risnjak National Park. Unfortunately Bela disappeared without trace in January 2002.

The second collared lynx named Ivan was captured under interesting circumstances. On 25 October 2005 Dario Majnarić phoned Josip Kusak to inform him that two small lynxes had strayed into a yard and a garden and did not know where to go. One young lynx landed in a garden surrounded with a wire fence and the other climbed on a plum tree in the corner of the garden.

Fig. 7 Young lynxes Ivan and Ana
(PHOTO BY J. KUSAK)

They were found to be a male weighing 4.5 kg and a female of only 4 kg. At that time of the year young lynxes should be almost double of the size. Their marked thinness and the fact that they strayed to the village alone suggested that they had lost the mother. The male was named Ivan and fitted with a small collar for classic telemetric monitoring (VHF) and the female was named Ana and was not collared. It was decided to return the lynxes to the wood as far as possible from the settlement, in an area called Veliko duboko, under the very massif of Bjelolasica. The place chosen for the release is at the same the feeding site where Tomislav Šporer, a local master of the hunt, feeds the bears. The day after the release T. Šporer brought some fresh meat and kept doing it at regular intervals of time. The periodic monitoring showed that the young lynx lingered around the feeding site during autumn 2005 and the first part of winter 2005/2006.

Fig. 8 Young lynx Ivan while being collared
(PHOTO BY J. KUSAK)

The snow cover last year made it impossible to track the lynx from the ground. Therefore an aerial search was organized in February and Ivan was found far from the feeding site and close to the inhabited area. Soon afterwards he was observed further to the north on the other side of the highway. He must have crossed the highway by one of the viaducts near Ravna Gora, which indicated that the highway in Gorski kotar represents no barrier for large carnivores: 25 per cent of its length are tunnels, viaducts and green bridges. The last signal from Ivan's collar was emitted early in April 2006.

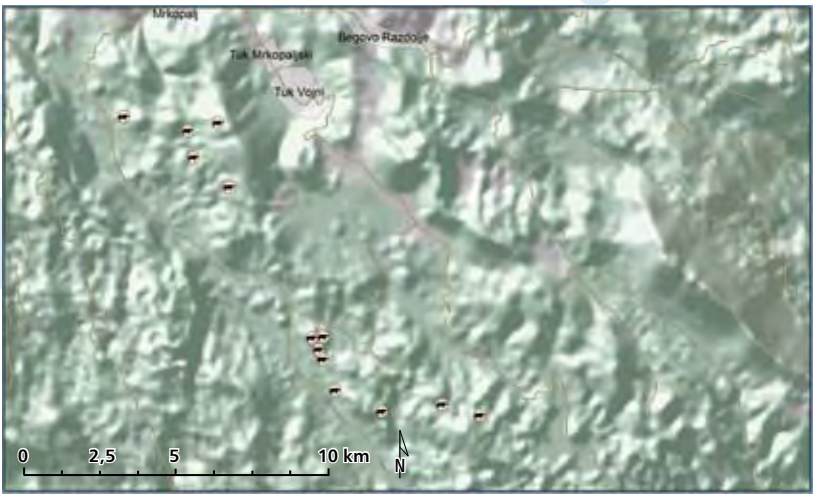
Map 5 Locations and living space of Ivan in the period from 25.10.2005 to 24.12.2006

Early in July a local hunter managed to capture the collared Ivan from a hunting stand by his mobile phone camera in the area where he was last located three months ago.

According to the latest information, a field crew headed by Vedran Slijepčević came across the shed collar in the area of Kupjački vrh on 24 December 2006. So it turned out that this lynx, although having obviously lost his mother prematurely, succeeded in surviving until sexual maturity owing to his having been removed from the settlement and released in the vicinity of the bear feeding site, where the local hunter provided him with meat for some time. It should also be noted that he did not get used to looking for food from human sources. It is interesting that the area covered by the lynx was reported to total 92.3 km^2.

On the last day of November another lynx was collared near Mrkopalj. Firstly, on 28 November the hunter Arsen Jakovac reported through the appointed damage assessment expert Alojzije Frković to have found a killed doe. Then Tomislav Gomerčić of the Faculty of Veterinary Medicine laid five traps around the killed doe, because the night before the lynx was observed to return to the prey. The lynx was captured and fitted with a collar for satellite monitoring (GPS – UHF). He was named **Ivek** and estimated to be aged 1.5 years and to weigh 18 kg. During two-week monitoring the lynx covered an area of 10.4 km^2.

Fig. 9 Ivek waking up from the narcosis
(PHOTO BY G. GUŽVICA)



Map 6 First data on Ivek's movement

The fourth lynx was captured in a hamlet Klarići near Drivenik on 4 January 2007. The day before a lynx pup killed 10 hens and was seen to sit on a hen-house. With the assistance of hunters the hen-house owners tried to catch it several times and finally managed to close it in the hen-house. The appointed damage assessment expert Alojzije Frković investigated the damage suffered and informed Tomislav Gomerčić about the lynx captured. The lynx was named Koko by the family that suffered damage and was fitted with a collar for classic telemetric monitoring. It was exhausted, undernourished and dehydrated and weighed only 5 kg. It was agreed with the master of the hunt Boris Miklić to relocate and release the lynx near a deserted house named Mošune (Novi Vinodolski forestry office). It was left in a deserted garage together with the hens killed. Unfortunately, it soon died due to its poor physical condition.

Fig. 10 Koko in the hen-house (PHOTO BY L. I. ŠVAGANOVIĆ)

Collaring, Telemetric Monitoring and Genetic Study of Bears

Since 25 September 2003 bears in Croatia have also been studied by radio transmitters (GPS-GSM collars). Seven bears have been monitored so far: three males – Mladen, Marko and Srećko and four females – Ela, Gama, Iva and Una. One male was killed by poaching only two days after collaring. Other six bears were monitored from 42 to 409 days. Only the female Una is being monitored currently. She was captured and collared near the spring of the river Una owing to a report of the inhabitants of the Gornja Suvaja village on 23 September 2005. Three bears monitored also during winter were reported to have spent in the den 81.3 days on average. The areas covered by two males monitored averaged 366.6 km^2 and those by four females 49 km^2.

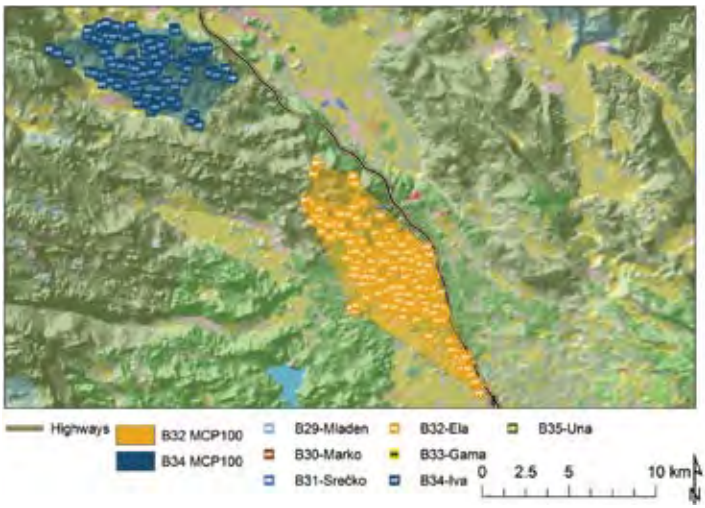
The entire study area was analyzed in the GIS. Each bear location was assigned a data about the share of habitat types in the relevant field. On bear locations agricultural land accounted for 2.7 per cent, pastures for 6.2 per cent and forests for 91.1 per cent on average. Given the 70 per cent share of forests in the ground cover of the entire area, the results showed that bears actively chose forest habitats. The heights above sea-level on bear locations were within the range of 758 m. The density of roads on bear locations was 0.90 km of roads per square kilometre, which is considerably lower than the average road density in the total area (1.9 km/km^2). The most evident feature was the avoidance of humans. The density of population on bear locations was only 0.1 per square kilometre as compared to 20 people per square kilometre in the total bear area of Croatia.

These results indicate clearly that satellite technology gives new insights into the biology of the bear. Among other indicators it testifies to the bear's selectivity regarding the habitats available, both with respect to the vegetation cover and especially to anthropogenic formations and humans in general.

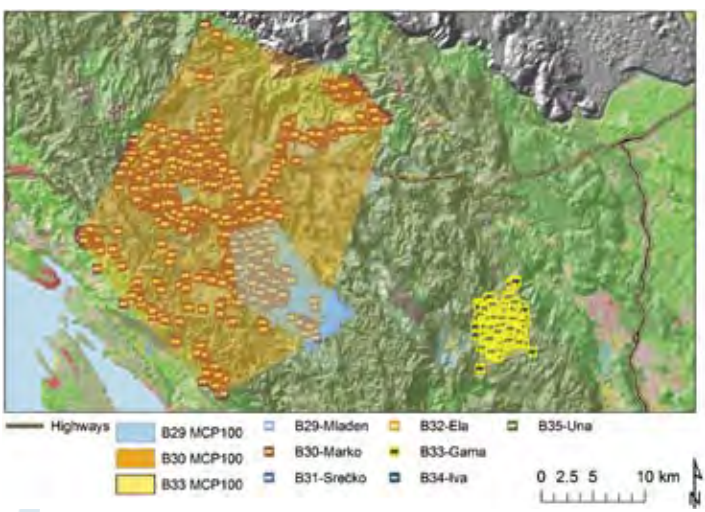
The male named Marko was found to have crossed the Karlovac-Rijeka highway 34 times! Of a total of 2759 lines connecting two successive locations of this bear 34 cross the highway. The majority of crossings were made across the Sopač and Sleme tunnels, the Dedin green bridge was crossed twice and the Tuhobić tunnel once. Two crossings (towards the north and back) at Benkovac fužinski may have been made over a fence.

The female Una moved partly about Croatia and partly about the adjacent Bosnia and Herzegovina.

Fig. 11 Anaesthetized Una held by Enkhsaikhan Namtar (a student from Mongolia) and Dr. Lisette Waits (a molecular biologist – geneticist from Idaho, SAD) (PHOTO BY J. KUSAK)



Map 7 Areas covered by Srećko, Ela and Iva



Map 8 Areas covered by Mladen, Marko and Gama

Apart from the radio telemetry study bears are also subjected to genetic study. Since 2005 tissue samples of bears shot or killed in any other way have been systematically collected in order to establish a genetic material bank of Croatia's bear population. Analyses are carried out by Ivna Kocijan, M.Sc. of the Animal Physiology Department of the Division of Biology at the Faculty of Science of the University of Zagreb. So far DNA has been extracted from 63 tissue samples. About 500 bear excrement samples have been collected in the northern Gorski kotar, on the Velebit and the Bjelolasica. In 350 samples the bear DNA was present in a negligible amount and extracted. The DNA analysis makes it possible to recognize individually all animals from which the samples originate, which is vitally important for an objective population size assessment. In parallel with the genetic analyses the samples collected are being mapped. The maps are used to calculate the size of each area studied, which is again necessary for statistic procedures of assessing the bear population size.

Mortality Analysis

The drawing up and distribution of the *Protocol for the Collection of Strictly Protected Species Killed (Wolf, Lynx)* have enabled a more systematic collection of data on wolves killed. So in the period from 15 November 2005 to 31 December 2006 18 **wolves** were found dead. Nine individuals surely or probably were killed in traffic, three were shot (one illegally and two in the context of regular and legal shooting) and the cause of death for six individuals was dubious or impossible to determine.

Carcasses of 14 individuals were found and brought to the Faculty of Veterinary Medicine of the University of Zagreb, 12 were examined and pathoanatomically studied. Other killed individuals were not found due to delayed reporting or illegality of the act, but their killing is evidenced by photo-documentation, traces in the place of accident or testimonies given by reliable eye-witnesses. The wolf mortality is believed to be higher than recorded, because we have been reliably informed of trapping in the area of the County of Zadar and laying poisonous baits in some parts of the counties of Split-Dalmatia and Šibenik-Knin.

Table 2 Wolves killed late in 2005 and during 2006

Found on	Place	Cause	Identification Mark	Sex	Age
16.11.2005	Zalesina	road-kill	WCRO72	M	1.8
24.12.2005	Strmenodolac	unknown (bites all over the body)	WCRO73	M	2.5
5.1.2006	Glina municipality	illegal shooting	GG200501051200	M	
17.1.2006	Turjaci	road-kill	WCRO74	F	1.8
2.2.2006	Rosulja-Bilja	road-kill (?)	DŠ020220061300		
6.2.2006	Medviđa	unknown			
27.2.2006	Krivodol-Berinovac	road-kill	WCRO75	F	2
3.3.2006	Badanj, Drniš	road-kill (?)			
25.4.2006	Metković 01	captivity (poisoned?)	WCRO76	M	2
15.5.2006	Metković 02	captivity (poisoned?)	Metković 2	F	2
15.5.2006	Metković 03	captivity (poisoned?)	Metković 3	M	2
12.5.2006	Paklenica	unknown	WCRO77		
27.5.2006	Pađene	road-kill	WCRO78		
6.10.2006	Pervan Selo	road-kill	WCRO79	M	3.5
24.10.2006	Cvrljivica	road-kill	WCRO80	F	
4.11.2006	Gluha draga	legal shooting	WCRO81	M	1
13.11.2006	Crna Gora hunting ground	legal shooting	WCRO82	F	0.8
27.12.2006	Korenica	road-kill	WCRO83	M	2.5

It should be noted that since the designation of the wolf as a protected species, the wolves have been shot legally for the first time.

Fig. 12 Wolf killed in traffic
(PHOTO BY T. ŠPORER)

Map 9 Wolf kill locations

The data on lynx mortality and the lynx population in Croatia in general are scarce. From the beginning of 2004 until today only three lynx individuals have been registered dead. On 19 May 2004 a 13-year old lynx was shot inside a wooden fence near Starigrad (Senj) on suspicion of rabies. The subsequent treatment showed that the animal was very old and exhausted rather than infected with rabies. The second lynx was shot on the road above Bribir on 20 September 2005. The driver alleges to have hit the animal by the car and killed it by firing a shot in its heart out of pity. The dissection carried out at the Faculty of Veterinary Medicine showed something different: the lynx was not previously hit and the cause of death was shooting. The case was referred to the court and the decision is pending. The last individual killed is the above mentioned young lynx named Koko whose carcass was found on 14 January 2007 in Mošun. Apart from these official data, there are some indications of two more individuals illegally shot – one in the Udbina area in 2005 and the other in the vicinity of Smiljan in August 2006.

In 2006 the total mortality of the **bear** recorded was 84; 49 were killed by legal shooting and 35 in different ways (road-kill, poaching, emergency kill, etc.).

Table 3 Bears shot in 2006

Shot in	Approved	Carried out	Sex*	
County of Karlovac	9	6	6 m	–
County of Primorje-Gorski kotar	27	21	14 m	7 f
County of Lika-Senj	30	17	16 m	1 f
County of Zadar	3	2	2 m	–
Total	70	46	38 m	8 f
Extra shooting (Croatian Forests)	5	3	–	3 f
Total	75	49	38 m	11 f

Table 4 Bears killed in other ways in 2006

Other causes	Approved	Carried out	Sex*		
railroad-kill	–	9	2 m	5 f	2 n
road-kill	–	14	5 m	7 f	2 n
exhaustion	–	1	1 m	–	–
poaching	–	1	–	–	1 n
emergency kill	12	7	4 m	3 f	
accidental kill (wild boar hunt)	–	1	–	–	1 n
islands (Krk)	–	2	–	2 f	–
total	12	35	12 m	17 f	6 n

* m – male, f – female, n - unknown

Apart from these official data, unofficial sources report on the mortality of four more individuals. Three are said to have fallen victim to poaching, of which two in the Karlovac area and one in the area of the County of Lika-Senj, and one to traffic.

Fig. 13 Bears are frequently victims of traffic (PHOTO BY J. KUSAK)

Damage Analysis

Analysis of Livestock Number and Damage Caused by the Wolf and the Lynx

The Ministry of Culture –Directorate for Protection of Nature received 1,428 claims for compensation of damage caused to livestock by strictly protected predators, i.e. 1,428 investigation records relating to damage caused in 2005. In 32 instances the investigation was repeated, which means that the appointed damage assessment experts visited the same place of damage two or more times due to reappearance of the livestock disappeared, the death of those injured or the emergence of new evidence. Consequently, the exact number of damage events reported in 2005 would be 1,396. The comparison of this data with the number of damage events reported in 2004 shows a 1.7 per cent drop in the number of reports. Viewing the fact that in 2004 the number of reports rose only by 9 percent against the previous year, it follows that the annual number of damage reports is a more or less stable and the deviations from year to year negligible.

Taking the counties, the largest number of compensation claims was received from the counties of Šibenik-Knin and Split-Dalmatia (a total of 84 per cent of all damages reported) and the least from the counties of Karlovac and Primorje-Gorski kotar. As compared to 2004 the number of damage events reported has proportionally dropped in all counties except in the County of Šibenik-Knin where it increased by 10 per cent. With this increase the County of Šibenik-Knin has by far the largest number of damage reports, or rather a half of all reports received in 2005 (of which 36 per cent come from the Unešić municipality alone).

Table 5 Number of reported damage events caused to livestock in 2004 and 2005

County of / Year	2004	2005
Dubrovnik-Neretva	82	64
Karlovac	8	3
Lika-Senj	51	38
Primorje-Gorski kotar	4	5
Split-Dalmatia	535	488
Šibenik-Knin	621	685
Zadar	119	113
TOTAL	**1420**	**1396**

Since a appointed damage assessment expert is obliged to come to the place of damage and conduct the investigation whenever a party damaged believes that the damage was caused by a protected animal, and in a certain number of cases it turns out that it was caused by an unprotected or unknown predator, the number of reported events of damage caused to livestock does not correspond to the number of damage events caused by wolves or lynx. On the basis of the total number of compensation claims in 2005 the wolf was found to have caused damage in 89 per cent, the lynx in 0.07 per cent, the bear or the golden jackal in 0.14 per cent and the dog in 2 per cent of cases. In 8.7 per cent the damage causer remained unidentified, because the condition of the carcass made the identification of the predator's signs impossible; the signs discovered did not point to any of the predators known or the carcass was not found at all. In relation to 2004, the number of cases in which a dog was a damage causer has almost doubled in 2005 and the damage caused by bears and jackals increased too. Of all the damage attributed to the wolf, in 83 per cent of cases the experts were absolute certain

about their judgement, while in 17 per cent of cases they concluded that the damage may have been caused by the wolf.

Table 6 Distribution of reported damage on livestock by estimated type of predator in 2005

County of / Predator	Wolf	Lynx	Brown bear	Golden jackal	Dog	Unknown	TOTAL
Dubrovnik-Neretva	64	0	0	0	0	0	64
Karlovac	2	0	0	0	0	1	3
Lika-Senj	30	1	2	0	0	5	38
Primorje-Gorski kotar	5	0	0	0	0	0	5
Split-Dalmatia	464	0	0	0	0	22	488
Šibenik-Knin	571	0	0	2	25	87	685
Zadar	106	0	0	0	1	6	113
TOTAL	1242	1	2	2	26	121	1396

In 2005, as well as in previous years, the wolf used to attack mostly small stock (sheep and goats) that accounted for 89.6 per cent of all domestic animals attacked. Bovine cattle were the victim in 5.3 and domestic dogs in 5.1 per cent of cases. As against the previous year, the total number of animals attacked by the wolf went down by 126 or rather by 4.8 per cent. So the number of sheep, goats, beef cattle and donkey attacked dropped to a certain extent, but the number of dogs attacked increased (by 14 per cent) as well as that of horses. By far the largest number of dogs fallen victim to predators was recorded in the area of the County of Split-Dalmatia and that of horses in the area of the County of Dubrovnik-Neretva. In majority of cases both were unattended and outside adequate protection facilities at the time when the damage occurred.

The next issue of the Bulletin will present the 2006 data which are still being processed.

Table 7 Distribution of wolf-caused damage by the type of livestock attacked in 2005

County of / Livestock	Beef cattle	Horse	Goat	Donkey	Sheep	Dog	TOTAL
Dubrovnik-Neretva	13	10	29	3	62	5	122
Karlovac	0	0	0	0	5	1	6
Lika-Senj	0	1	18	0	93	0	112
Primorje-Gorski kotar	0	0	0	0	17	1	18
Split-Dalmatia	53	3	300	7	496	106	965
Šibenik-Knin	27	1	115	5	816	16	980
Zadar	9	0	133	0	167	0	308
TOTAL	102	15	595	15	1656	129	2512

At first glance the number of sheep and goat as the most frequent victims of wolf depredation may seem high. Therefore the State Institute for Nature Protection requested the Croatian Livestock Centre HSC to furnish data on the total number of sheep and goats in Croatia in order to calculate the share of animals killed in the total number and assess the actual influence of wolves. From the data provided by the Croatian Livestock Centre those were selected that refer to the number of sheep and goats in the wolf distribution area, i.e. in the mainland areas of the counties where the wolf is permanently or occasionally present. The analysis results indicated that a total of 0.68 per cent sheep and 1.82 per cent goats were killed by the wolf in 2005. As compared to the results of the previous year, these percentages are more or less unchanged – in 2004 the share of sheep and goats killed by wolves was 0.51 and 1.92 respectively.

Table 8 Share of sheep and goats killed by wolves in the total number of sheep and goats in the mainland area of individual counties in 2005

Livestock type	Sheep		Goats	
County of / Livestock no.	Total no. registered by HSC	Share (%)	Total no. registered by HSC	Share (%)
Dubrovnik-Neretva	3147	1.97	1030	2. 82
Karlovac	12836	0.04	502	0.00
Lika-Senj	45863	0.20	2589	0.70
Primorje-Gorski kotar	5349	0.32	379	0.00
Split-Dalmatia	32258	1.54	7728	3.88
Šibenik-Knin	68436	1.19	5851	1.97
Zadar	76477	0.22	14659	0.91
TOTAL	**244366**	0.68	32738	1.82

Fig. 14 Among domestic animals sheep are the most frequent victims of the wolf (PHOTO BY A. FRKOVIĆ)

Damage Caused by the Bear

A systematic collection of data on damage caused by the brown bear started in 2004 through implementation of the LIFE COEX project. Pursuant to the Action Plan all hunting ground concessionaries are bound to submit to the competent Ministry a special form with filled in data on the total damage caused by the bear in their hunting ground in the previous year. The first data were collected in 2004 when 22 cases of damage were reported. The system proved to operate successfully in 2005 when a total of 88 cases with the damage estimated at 178,678 kunas were reported. During 2005 the bears caused most damage to arable land and orchards and the victims among domestic animals were three roosters, 126 hens, 12 sheep, a goat, a cow, six rabbits and 11 turkey-hens.

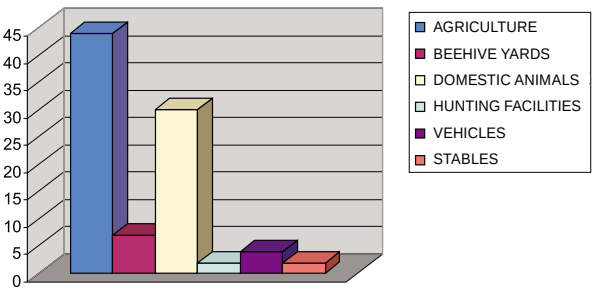


Fig. 15 Bear-caused damage in 2005

Fig. 16 In search of food a bear visited beehives (PHOTO BY J. TOMAIĆ)

Large Carnivores Impact on Natural Prey

In 2005 the State Institute for Nature Protection collected data from hunting ground concessionaries relating to the number and type of game in the wolf and the lynx distribution area, the annual kill planned and carried out and the number of animals fallen victim to the wolf and the lynx. However, as the hunting ground concessionaries were not explicitly obliged to submit the data required to the Institute, the data collected on that occasion covered only a half of the wolf and the lynx distribution area. Besides, these were the data of a subjective nature lacking any scientific foundation and as such could not reflect the actual number of the game, but only gave an indication of the trend.

Fig. 17 In Gorski kotar wolves and lynx feed primarily on natural prey (PHOTO BY T. GOMERČIĆ)

The recent Hunting Act obliges the hunting ground concessionaries to provide the Ministry of Agriculture, Forestry and Water Management with data relating to hunting management principles, game breeding programmes and game kills and trophies for the purpose of keeping central hunting records. We are informed by the Directorate for Hunting of the said Ministry that data entry into central hunting records is nearly finished. It is therefore expected that by spring 2007 data on the number and types of game in the wolf and the lynx distribution area will be available and used for further analyses.

The hunting ground concessionaries are also bound to integrate nature protection conditions laid down by the Ministry of Culture on the basis of expert documents of the State Institute for Nature Protection into hunting management principles, and to observe and implement the same in hunting grounds management. Some of the obligations imposed on hunting ground concessionaries are to monitor the status of the wolf and the lynx in the hunting ground as strictly protected animal taxa which are not game; to record all signs of their presence found (traces in snow, game killed); to apply instructions and provisions of large carnivore management plans relating to hunting grounds management, etc.

Snow tracking of large carnivore populations

The action of tracking large carnivore populations by traces in the snow is one of the methods used to study the population status and forms a constituent part of the national system for monitoring the wolf and lynx populations. The determination of the actual population status is a prerequisite for ensuring that future regulations and decisions, including possible interventions into populations of these strictly protected large carnivores are made on the basis of as reliable as possible data obtained by combining various research methods. The action was organized and coordinated by the State Institute for Nature Protection in collaboration with the Faculty of Veterinary Medicine. Given the fact that representatives of all interest groups participated in preparation of the management plans mentioned and agreed that mutual cooperation in collection of all relevant data was absolutely imperative, the preparatory discussions on organization of snow tracking actions were attended by adequately knowledgeable representatives of all those groups carrying out their activities in the areas inhabited by large carnivores: representatives of numerous hunters' associations and hunting ground concessionaries, representatives of Croatian Forests Ltd. and protected areas supervisors (NP Risnjak, NP Plitvice Lakes, NP Northern Velebit, NP Paklenica and PP Velebit).

Fig. 18 Discussing the organization of a snow tracking action in Lika (PHOTO BY S. DESNICA)

Fig. 19 Discussing the organization of a snow tracking action in Gorski kotar
(PHOTO BY S. DESNICA)

Fig. 20 Large carnivore snow traces (PHOTO BY Đ. HUBER)

At two meetings held during October 2006 – on 18 October in Gospić and on 25 October in Crni Lug (NP Risnjak) – the participants were made familiar with the methodology of work and the operational implementation of the action was agreed. It was agreed that at the first snow of the winter all habitats (hunting grounds and protected areas) inhabited by large carnivores would be co-ordinately visited and data on every trace recorded: animal species, movement direction and the smallest number of animals in a group. Data would be plotted on maps and the maps forwarded to the State Institute for Nature Protection for further processing and analysis. The data processed would be interpreted at a joint workshop and the size of population of each species in the study area estimated.

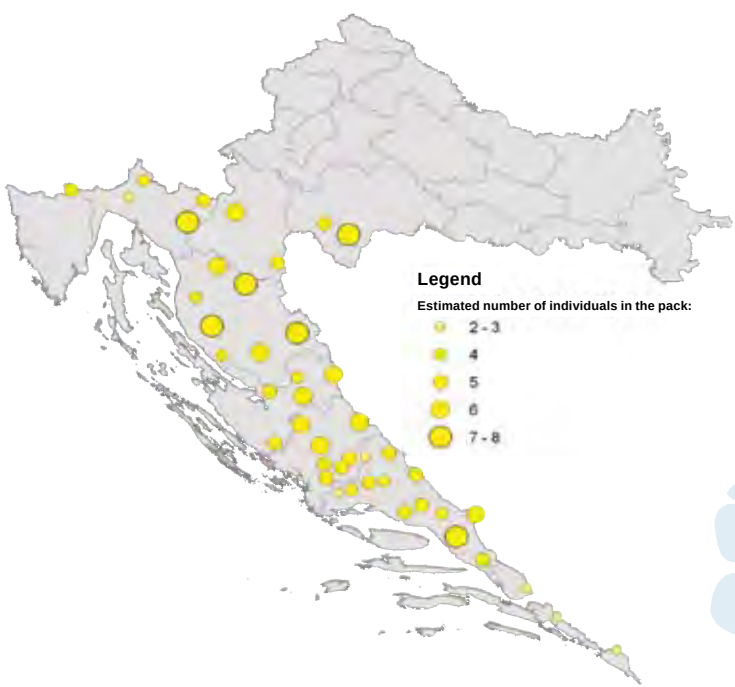
The first snow suitable for this kind of study fell in higher mountain regions in the middle of December and on 20, 21 and 22 December the trackers toured the areas of Gorski kotar and the Velebit. They were the representatives of the hunters' associations of "Tetrijeb" Gerovo, "Tetrijeb" Čabar and "Lagosta", the Croatian Forests Ltd. and Bigrom Ltd. and public institutions of NP Risnjak, NP Northern Velebit and PP Velebit. They toured the Bjelolasica, Kapela and Risnjak massif areas, the region of Smrekova draga and areas of the Čabar municipality round Prezid, Tršće and Gerovo in Gorski kotar, including the northern and the central region of the Velebit mountain belonging to the national park, the nature park and the hunting grounds "Ramino korito", "Lukovo Šugarje", "Visočica", "Northern Velebit" and "Central Velebit": Due to unfavourable weather conditions that made an integrated study impossible, some tracers still keep making field trips and recording the data wishing to get a complete picture of the wolf packs' movements. The snow is expected to fall in the central highland area of Lika and the southern Velebit, which would enable other tracers to swing into action. A certain number of forms completed and tracklog maps reached the Gospić office of the State Institute for Nature Protection, but data processing will only start when all the documents arrive.

2006 Report on the Wolf Population Status in Croatia

In 2006 the State Institute for Nature Protection prepared again the annual report on the wolf population status in Croatia in collaboration with the Faculty of Veterinary Medicine in Zagreb and local experts. The preparation of such a report is provided for by the Wolf Management Plan and it serves as a basis for the Committee for Monitoring Large Carnivore Populations to estimate the possibility of an intervention in the population. In such a case it proposes regional kill quotas for the current and a total annual quota for the following year. The total annual kill quota is set as a percentage of the estimated population size and, besides regional quotas, includes emergency interventions, road kills, illegal shooting and other mortalities. The report also presents analyses of data on wolf-caused damage to livestock and wolf mortality data in the period from 13 September 2005 to 13 September 2006, i.e. a period between two reports, and outlines briefly the legislation and wolf population status in neighbouring countries that share this population with Croatia (Bosnia and Herzegovina and Slovenia).

The analyses of livestock damage reports indicated that more than 90 per cent of all damages occured in Dalmatia, mostly in the area of the counties of Šibenik-Knin and Split-Dalmatia. The largest number of damages over the last several years was registered in the municipalities of Unešić and Kistanje in the County of Šibenik-Knin and Prgomet in the County of Split-Dalmatia.

The estimate of the wolf population size in Croatia based on statements of local experts – appointed damage assessment experts, scientific associates and protected areas supervisors – resulted in a range from at least 180 to 240 individuals at the most, i.e. an average of 210 divided into 40-50 packs. Considering the fact that a certain number of those packs roam on either sides of the border, or rather spend one part of the year in and another part outside Croatia – in Bosnia and Herzegovina and Slovenia sharing a long border with Croatia, the correction of this number gives an average of 190 individuals which corresponds to the 2005 estimate.



Map 10 Wolf packs number and size

According to the wolf mortality analysis, the primary threat to wolves is posed by construction of communications that fragment habitats and intersect their routes of movement, by illegal killing and shortage of natural prey. Judging by the experts' statements, the actual number of wolves killed could be considerably larger.

The wolf population size in Bosnia and Herzegovina is estimated at 500 individuals. In the Serbian Republic the wolf is an unprotected species and in the Federation of Bosnia and Herzegovina it is protected by close season pursuant to the recent Hunting Act of February 2006. The annual kill reported for the year 2006 was 292 individuals, but the actual number is believed to be higher. The population is stable and slightly increasing in some areas (municipalities of Kupres, Bihać, Glamoč, Grahovo, Šipovo and Bugojno). The wolf population in Slovenia is estimated at 60-100 individuals. Some indicators point to the rise in the population size, but it is quite probable that what we have here is simply the spatial expansion (wolf-caused damage appeared in the littoral region and the area of Krim, which are not traditionally wolf's areas). The wolf, the lynx and the brown bear fall within the competence of the Ministry of Environment and Spatial Planning that makes annual decisions on interventions in populations of all three species. In 2006 the kill quota for the wolf was ten individuals and no intervention in the lynx population was permitted.

Interventions in Populations of Strictly Protected Species

Interventions in the Wolf Population

As provided for by the Management Plan, interventions in the wolf population may only be approved under the condition that the population stability is not endangered and that the intervention is carried out selectively. An intervention may be approved for a trial two-year period, primarily in order to reduce the animosity and consequently the illegal shooting too. In the first year when the intervention covering four individuals was approved (two in Dalmatia and one each in Gorski kotar and Lika), not a single intervention was actually carried out. However, there are indications that an individual was killed at Kameno brdo in the "Trtar" hunting ground of the County of Šibenik-Knin in November 2005 and two individuals in the area of the "Bjelolasica" hunting ground (Gomirje region) in December of the same year. It is likely that the kill was not reported due to a partial deviation from the rights assigned by the Ruling. Regardless of the kill not carried out, five more individuals got killed in other ways until the beginning of 2006, mostly in traffic, which made the quota reached, and the individual exceeding the planned quota was taken into consideration when setting the regular annual quota for the year 2006. The regular annual quota for the year 2006 was set in January 2006, as 10 per cent of estimated wolf population size, because on the basis of the results of long-time monitoring of the wolf population and the current status the Committee concluded that the population could stand such a mortality (traffic, kill and other causes which are regular for various reasons) without any disruption of its stability. As in 2005 the wolf population was estimated to average 190 individuals, it was decided that in 2006 the mortality of 19 individuals would be tolerated, or rather 18, taking into account the individual whose mortality had exceeded the 2005 quota. The meeting of the Committee held on 13 September 2006 was attended by the representatives of various interest groups such as appointed damage assessment experts, representatives of the County of Primorje-Gorski kotar, public institutions of the Northern Velebit and Risnjak national parks, the Velebit Nature Park, the Croatian Livestock Centre, the AWAP – Association for Wild Animals Protection, the Croatian Hunters Association, the Croatian Wolf

Fig. 21 Wolf population in Croatia is still stable
(PHOTO BY A. ŠTRBENAC)

Protection Association, the University of Ljubljana and the Hunters Association of Herceg Bosna. On that occasion the above mentioned report on the wolf population status in 2006 was presented and the information about 11 more wolf deaths recorded since the beginning of 2006 provided. At the proposal of the Committee for Monitoring Large Carnivore Populations the Ministry of Culture approved therefore the intervention in 2006. By the decision of the Ministry of Culture dated 14 September it was allowed to kill seven wolves not radio-collared in individual wolf huntings – two in the Gorski kotar area, two in the area of Lika and three in areas of Dalmatia (two in the County of Šibenik-Knin and one on the Biokovo mountain) – in the period from 1 October to 31 December 2006. In Gorski kotar permits to intervene in the wolf population were given to the Hunters Association of the County of Primorje-Gorski kotar, Croatian Forests Ltd. – Delnice Forest Administration, FINVEST CORP Inc. from Čabar and the "Divokoza" Hunters Association from Brod na Kupi; in Lika they were given to Croatian Forests Ltd. – Gospić Forest Administration, Ikam Ltd. from Gospić and the "Bigrom" Hunters Club from Gospić, and in Dalmatia to the "Prepelica" Hunters Club from Unešić, the "Kamenjarka" Hunters Club from Drniš and Croatian Forests Ltd. – Split Forest Administration.

It was explained that in the area of the County of Šibenik-Knin the wolf caused most damage to livestock and in the areas of Lika, Gorski kotar and the Biokovo mountain to the game, which gives rise to hunters' animosity towards the wolf resulting in the illegal kill. Besides, at the meeting of the Committee held in Gerovo, that included a round table for the general public, the local population pointed to problems with the wolves and demanded that an intervention in the wolf population be approved. For that reason the above mentioned strictly controlled intervention in the wolf population was approved with the aim to reduce damage to livestock and the public animosity towards the wolf, which implies the illegal killing too. The kill was only permitted by individual hunting in the area of strictly defined hunting grounds in Dalmatia, Lika and Gorski kotar in the period from 1 October to 31 December 2006.

According to official data the kill quota was only reached in the Gorski kotar areas where both individuals foreseen were killed. The first legal kill was performed in the woods of Gluha draga in the area of the state-owned "Bjelolasica" hunting ground in the evening of 4 November 2006. The wolf was killed by Slavko Medved, a master of the hunt of the Vrbovsko forestry office, by hunting from a raised hide with a lure. It was a young male born in 2006 and weighing about 17 kg. In compliance with the decision of the Ministry of Culture the master of the hunt informed correspondingly Alojzije Frković, a appointed expert for assessment of damage caused to livestock in the area of the County of Primorje-Gorski kotar immediately following the kill. The second wolf was killed in the area of the "Crna gora" hunting ground in the night between 12 and 13 November. By hunting from a raised hide with a lure Marjan Mihelić, a hunter from the "Tetrijeb" Hunters Club from Čabar, killed a young female belonging to telemetrically monitored *Snježnik* pack. The she-wolf was also born in 2006 and weighed 23 kg. With this kill the approved wolf kill in Gorski kotar for the year 2005 was completed, which

was duly notified to all hunters clubs in the area of the County by the secretary of the Hunters Association of the County of Primorje-Gorski kotar the very following day. The scientists of the Faculty of Veterinary Medicine of the University of Zagreb took both carcasses and brought them to the Faculty for the purpose of analysis.

Given a greater and more heterogeneous region, land-mine coverage of certain areas and poorly organized hunters, the kill plan for Lika and Dalmatia was not fulfilled.

Conservation of Habitats

Habitats fragmentation and degradation are currently one of the major threats to large carnivores. Fortunately, the scientists of the Faculty of Veterinary Medicine have interfered in time, and now the existing highways have green bridges and other structures built to enable animals to cross the roads. However, the construction activities go on, and so does the struggle to ensure the preservation of the integrity of large carnivore habitats. It should be stressed once more that Croatia is obliged to preserve large carnivores according to national and international regulations, and especially the European Union legislation.

During 2006 the construction of highways in Croatia continued. The most important among those currently under construction is the continuation of the highway between junctions of Dugopolje and Šestanovac constructed in two sections. There are also plans to construct an express road from the Bisko junction to Kamensko on the border with Bosnia and Herzegovina, a tunnel through the Kozjak hill with a connection to the Vučevica valley and a larger tunnel through the Biokovo mountain.

In this area the sections of Dugopolje-Bisko and Bisko-Šestanovac cross the hinterland at a distance of 5 to 13 km from the Adriatic coast. The planned express road would branch off at the Bisko junction and run north-easterly up to Kamensko on the border with Bosnia and Herzegovina, where it would join the road also under construction on the other side of the border.

Map 11 Relation of the highway and the express road to the area of bears' periodical presence in Dalmatia with indication of the corridor through which they reach the Mosor and Biokovo mountains

A huge structure such as a highway that spreads across natural habitats of animals and surpasses all anthropogenic activities in the history in many areas has necessarily negative impacts on numerous natural processes, including the wildlife populations. The communications mentioned do not only affect the areas that they immediately cross, but have a far wider impact, especially as regards large carnivores that need uninterrupted habitat areas to survive. A single wolf pack of four individuals needs a habitat of 150 km^2 in Dalmatia. Two highway sections are 36.8 km long, but they cut off over 300 km^2 of habitats in the mountains of Mosor, Mali Mosor, Omiška Dinara and Rogoznica from the mainland. These areas are permanent wolf habitats where bears occasionally appear too. The possible impact of the planned express road from Čaporice to Kamensko is currently unknown, because we are not acquainted with the plans and possible structures needed to ensure its capacity, but from the location of the routes it is evident that it runs through the middle of the areas thickly overgrown with pubescent oak and oriental hornbeam forests at the stage of degradation. The site has an area of 700 km^2 and is used by bears from the Dinara and the Kamešnica mountains to reach the mountains of Mosor and Biokovo.

Although the highway plans included the construction of additional crossings and passages to make them passable for large carnivores, sudden changes made later by the constructors forced us to "trench warfare" for each metre of the crossing. The final outcome is still uncertain, but currently accepted plans promise a satisfactory connectedness of habitats in the Mosor mountain and in the hinterland.

All structures from the Dugopolje junction to the Perići viaduct on the Dugopolje-Bisko section are of lesser ecological importance, because they are located in relatively populated area with no forest cover and intersected by communications. However, there are two structures in this area that might be used to a certain extent for the crossing of large carnivores – the Zaranč tunnel and the Biakuše viaduct.

Fig. 22 The Biakuše viaduct seen from the north side and towards the Mosor mountain (PHOTO BY J. KUSAK)

The second part of the section has three structures – the Perići and the Bulati viaducts and the most important tunnel of Bisko. All the crossings are 2,135 m wide in total, which is 18.1 per cent of the section. However, all structures are not equally suitable for crossing, because those sized 4x4m are of no use and the larger ones (10x6m) are used for local roads. Of larger structures there are seven with a total width of 2,049 m (17.4 per cent of the section length).

The Bisko-Šestanovac highway section is 25,000 m long, with its entire length running parallel with the Mosor and Omiška Dinara massif and finally nearing the Biokovo mountain. The route runs through the wooded foots of these mountains, separating them from the hinterland, and parallel with the Cetina canyon that it bridges before Šestanovac.

Map 12 Spatial location of the Bisko-Šestanovac highway section

Before the highway construction the massifs of Mosor, Omiška Dinara and Biokovo were components of a unique habitat extending up to the border with Bosnia and Herzegovina and even deeper into the interior. The highway should not cut this area into two isolated parts.

As many as three special crossings for large mammals have been constructed on this section – the green bridges of Rošca (150 m), Konjšćica (150 m) and Vrankovića ograda (150 m).

Fig 23 The Vrankovića ograda green bridge under construction (PHOTO BY J. KUSAK)

The overall passability of the section is judged to be very good. It has eight crossing structures with passages over 80 m wide and a total width of 2,134 m (8.54 per cent of the total length of the section), which is most of all a contribution of two tunnels and three green bridges. **The lack of adequate passages on the last 7,800 m of the section is a great disadvantage.** The ground is here level, but overgrown with a thick forest ("a three-century-old forest") of insufficiently known ecological importance.

Despite certain requests to reduce or fill up the crossings planned, the scientific and professional circles will insist on the compliance with the minimum conditions to ensure the highway passability. The latest *Ordinance on Wildlife Crossings* adopted by the Ministry of Culture early in January 2007 is expected to contribute to resolution of existing problems relating to construction of communications. This Ordinance lays down the protection measures, persons liable to ensure protection and the methods of maintaining wildlife crossings across public roads, other communications or structures crossing the known migratory paths of the wildlife.

Damage Reduction

Damage caused to humans by large carnivores in their struggle for survival is a major stumbling-block to their protection. Despite payments made by the competent Ministry of Culture to livestock breeders that suffer damage from strictly protected carnivores (the wolf and the lynx) and in spite of the fact that hunting ground lessees cover the damage caused by the bear, a veiled dissatisfaction, fear and animosity remain present most of the time. With the aim to reconcile the "irreconcilable" and additionally protect all the involved, the livestock breeders are offered a programme of livestock guarding dogs - *tornjak* and electric fences donations besides the cash compensation.

Fig. 24 A livestock guarding dog – *tornjak*, a faithful guardian of a flock (PHOTO BY A. ŠTRBENAC)

Livestock Guarding Dogs - *Tornjak* and Electric Fences Donations

The programme of donating livestock guarding dogs and electric fences to livestock breeders that suffer damage from the wolf was widely implemented through the LIFE III project of conservation and management of wolves in Croatia. The project proposal envisaged the donation of 60 livestock guarding dogs and 20 electric fences, but the number was by far exceeded. Moreover, the donations were financially supported by the counties of Zadar and Primorje-Gorski kotar and the State Institute for Nature Protection.

Fig. 25 Donation of livestock guarding dogs - *tornjak* in Gospić
(PHOTO BY D. ŠARIĆ)

Upon completion of the project the State Institute for Nature Protection continued with the donations in the framework of regular operations. Taking into account previous donations, a total of 106 *tornjak* dogs and 49 electric fences were donated to livestock breeders in the area of Lika, Gorski kotar and Dalmatia by the end of 2006.

Late in February 2006 the FCI, the world's umbrella canine organization, officially recognized the *tornjak* dog as a special breed of Croatian and Bosnian-Herzegovinian origin. In the next decade the dog breeders will be faced with hard work on rearing and developing this dog breed. As a result and if all conditions are met, the *tornjak* dog will be given a permanent status of an internationally recognized breed.

Donations of *tornjak* dogs are multi-purpose acts. On one hand, they provide additional help to livestock breeders in the protection of their flocks and on the other they point to the necessity of a permanent livestock control in regions inhabited by predators. By protecting a flock, this old autochthonous breed re-assumes its working function and returns to areas where it has been bred and used for centuries. At the same time we support its spread and development.

An electric fence is an additional tool for the protection of livestock against predators. A corresponding model is selected depending on the type of livestock and the type of predator. The selection of adequate components and their correct placement and maintenance are of vital importance for successful functioning of electric fences. If properly used, it will be a reliable protection of the flock against predators.

Livestock Guarding Dogs

Of the total number of livestock guarding dogs – *tornjak* 43 puppies were donated in the area of Gorski kotar and Lika. During 2006 a female donated to Mate Radošević from Klanac had a litter and according to the donation agreement the owner gave up one female puppy. The Institute donated the puppy to a livestock breeder from Severin na Kupi. The Institute

also funded the donation of three more male puppies to livestock breeders in Udbina, Donje Pazarište and Jezerane. The delivery took place in the Gospić regional office.

As part of his duties the regional co-ordinator visited the livestock breeders who had received donations and checked how the dog donated was kept and used. The selected livestock breeders proved to be conscientious owners and users of the dogs. They followed the instructions for keeping and use of the dogs and respected the health care rules. Unfortunately, two donated dogs died this year – one in traffic and the other disappeared chasing a predator away from the flock. So the total number of dogs killed from the start of donation reached eight.

Livestock breeders in the area of Gorski kotar and Lika keep on expressing a lot of interest in donations of dogs, particularly given the absence of any damage to livestock breeders who received donations and an easier control and putting the livestock out on pasture. Further, the livestock guarding dog proved to be highly socialized in contact with humans and adequately vicious when guarding. It should be noted that livestock breeders started purchasing the dogs on their own initiative.

A total of 63 puppies have been donated in the area of Dalmatia so far.

In 2006 not a single dog was donated in this area, but the regional coordinator kept visiting the livestock breeders who had received donations and checking the way how they kept and used the dog donated. The initial doubts of livestock breeders about the effects of dogs were dispelled by the fact that after donation no damage was reported by any of them who had received the donation. As a result, the interest intensified especially in the County of Šibenik-Knin where damage caused to livestock is the greatest. Just like in Lika, some livestock breeders started purchasing dogs on their own initiative.

As three more donated dogs died last year, the total number of dogs killed rose to 13. Such a high loss is primarily due to poisoning (six dogs), traffic, snake's bite and disease, and two were lost (one disappeared and the other is suspected to have been stolen). In spite of the fact that poisoning was duly reported to police stations and the inspections, the damage causers were not found.

Electric Fences

Since the project start a total of 46 electric fences have been donated in the area of Gorski kotar and Lika, of which 18 were funded by the County of Primorje-Gorski kotar. Thanks to the same county five electric fences were donated to livestock breeders from Begovo Razdolje, Gomirje, Lukovdol, Vrbovsko and Prezid in March 2006. As part of his duties the regional co-

Fig. 26 Electric fences contribute to livestock protection
(PHOTO BY A. ŠTREBENAC)

ordinator kept visiting the livestock breeders who received donations and controlled the way of keeping and using electric fences. As a result of efficiency of fences and above all of the absence of any damage, the livestock breeders started buying the wire and extending electric fences by themselves.

Within the framework of the project four electric fences were donated to livestock breeders in Bitelić, Benkovac and Kijevo in the area of Dalmatia. The livestock breeders who received the donations are satisfied with the protection provided to the livestock and are regularly visited by the regional coordinator. Unfavourable field conditions for mounting electric fences in Dalmatia are the main reason for the absence of new requests and therefore there were no donations in this area in 2006.

Electric Fences Donations for the Prevention of Bear-caused Damage

The donation of electric fences for the prevention of damage caused by bears started in the context of implementation of the LIFE COEX project. So far a total of three electric fences have been donated and mounted in the area of Gorski kotar, of which two are used by bee-keepers who suffered a bear's attack and one by a livestock breeder raising sheep in the bear's habitat. Eight more fences are ready for donation.

Container Donations for the Prevention of the Bears' Access to Garbage

One of the bear conservation problems is that it gets used to feeding on garbage and thus to humans. For that reason the action of preventing the bears' access to garbage is being implemented in the context of the above mentioned LIFE COEX project. The project objective is to make the population, local authorities and public utility companies aware of the importance of this problem for the protection of bears and for improving coexistence between the bear and humans. Apart from educational actions the project also includes remediation of critical landfills and donation of specially designed bear-proof containers and garbage bins that prevent the bears from feeding on garbage. During 2005 two bear cubs were noticed feeding on the Sovića Laz landfill near Delnice, so they got used to humans. As that landfill has been frequently visited by bears and other wild animals, an electric fence was donated to prevent

Fig. 27 Placing of bear-proof containers in Sovića Laz
(PHOTO BY S. DESNICA)

the animals' access to garbage. A specially designed container was placed in the vicinity of the landfill. Bear-proof garbage bins were also placed in the Risnjak National Park, the Golubinjak Forest Park, the Velebit Nature Park and the Plitivice Lakes National Park.

Education and Information

The large carnivore conservation activities traditionally include a number of steps taken with the aim to inform and educate the general public in large carnivores as a natural value that deserves a special attention. For that purpose a series of publications were printed; lectures, presentations and the Open House Days held and web pages dedicated to large carnivores regularly updated.

Publications

Upon completion of the LIFE III wolf project the third bulletin was issued setting out the results obtained and objectives achieved.

In July 2006 the Ministry of Culture and the State Institute for Nature Protection published the Red Book of Mammals of Croatia presenting systematically the current data on the mammal fauna and estimated threat to each individual species based on the IUCN criteria. Out of a total of one hundred and one mammal species recorded in Croatia 41 are listed in the Red Book, among which three large carnivores too – the wolf, the lynx and the brown bear. The aim of the Red Book is to draw the attention of government and scientific institutions, non-governmental organizations and the general public to species considered threatened and to specific measures that need to be taken for them to cease being threatened.

Late in 2006 two more posters of the series named "Who's Afraid of the Big Bad Wolf" were printed.

A number of publications dealing with the brown bear were issued in the context of the LIFE COEX project, such as leaflets on the bear and garbage and on ecotourism and brochures on the brown bear, sheepdogs and electric fences, including posters of the bear and depredation prevention.

Fig. 28 New publications on large carnivores

Presentations, Lectures and The Open House Days

The LIFE III project of wolf conservation and management was complete early in December 2005, in the segment relating to the financial support provided by the European Commission. The final presentation of project achievements, held in Zagreb on 24 November 2005, was attended by numerous associates from Croatia, Slovenia and Bosnia and Herzegovina, including all other stakeholders in the conservation of wolves and nature in general. In addition to a detailed presentation of project achievements by basic activities given by the project staff, Sanja Pilić, the author of the picture book entitled "The Story about a Little Wolf Grga", set out the way how the picture-book was created, and Šandor Horvath, the author of the documentaries on wolves in Croatia, presented his two 15-minutes films - "The Expelled Host" and "The Wolves and Tomorrow". The final part of the presentation was filled with tumultuous emotions, the applause and joy. Ms. Ana Štrbenac, the head of the project, highlighted particularly that the project had succeeded in establishing the wolf conservation system in Croatia that involved competent authorities and all interest groups. Thanks to project activities the attitude of people towards the wolf has changed, which is best demonstrated by people reporting on the wolves found wounded and wishing to save them. Mr. Oscar Benedict, the first secretary of the EC delegation to Zagreb, expressed his great satisfaction with achievements and efforts put into the project and his hope that this project activities would continue with the support of the Republic of Croatia.

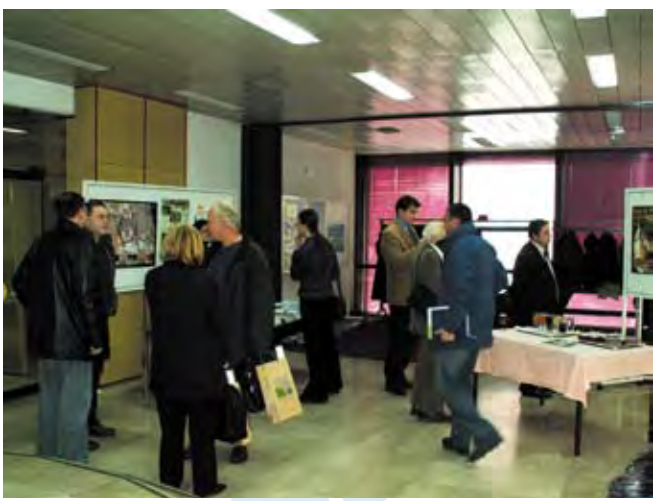


Fig. 29 Gathering of participants in the final presentation of the LIFE III wolf project
(PHOTO BY P. ŠTRBENAC)

During 2006 a series of lectures on wolves were given to a wide audience, pupils of primary schools, non-governmental organizations, hunters and the public in general.

The first lecture on the wolf entitled "Who's Afraid of the Big Bad Wolf?" was given **on-line through web** in the Profil Megastore bookshop in Zagreb on 20 February 2006. It was organized by an association named Terra with a view to present a new thematic issue – the wolves – to the general public on its web pages www.fauna.hr. Ms. Ana Štrbenac outlined the problems arising between the wolf and humans and the problem-solving strategies that aim at a long-term conservation of wolves. Assist. Prof. Dr. Josip Kusak gave information on the wolf's biology and wolf population status in Croatia and explained the way in which wolves were studied. Despite a rainy weather the lecture was well attended and when it ended the audience actively joined the programme by asking many questions. About 10 visitors from all over Croatia followed the lecture on-line on web pages and had the opportunity to communicate with the lecturers.

Fig. 30 On-line lecture on the wolf
(PHOTO BY P. ŠTRBENAC)

From 19 to 24 April 2006 the non-governmental organization called "Sunce" organized a series of events in Split to mark **the Earth Day**. The State Institute for Nature Protection and the Faculty of Veterinary Medicine joined the celebration by an informative and educational exhibition of large carnivores in Croatia entitled *The Open House Days* and a lecture on the same subject intended for school-children, members of the "Sunce" and the general public. Besides, by showing two documentaries on wolves in Croatia the State Institute for Nature Protection participated in a part of the programme dedicated to documentaries dealing with nature protection. Some of the highlights of the events were the lecture on the biology and study of the wolf given by Assist. Prof. Dr. Josip Kusak in the primary school of Kaštel Gomilica, which was well attended and well accepted by school-children in spite of school holidays, and the central celebration on the town quay on the Earth Day itself (22 April) where the information stand of the Institute attracted attention of the passers-by by wolf, lynx and brown bear posters and was constantly surrounded by the curious.

Fig. 31 Information stand of the Institute attracted vivid attention of the citizens
(PHOTO BY A. ŠTRBENAC)

Assist. Prof. Dr. Josip Kusak also gave a lecture to the students of the Karlovac two-year college taking a course in hunting and nature protection, the students of the Faculty of Veterinary Medicine, hunters and visitors of the Suho hunting lodge, pupils of the Čabar primary school, visitors of NP Risnjak and participants in the workshops organized by the Green Action.

Fig. 32 Josip Kusak giving a lecture at the Čabar primary school … (PHOTO BY J. KUSAK)

Fig. 33 …. and to hunters in the Suho hunting lodge (PHOTO BY J. KUSAK)

This year again the State Institute for Nature Protection participated in the exhibition of traditional products entitled *Autumn in Lika*. The exhibition took place in Gospić on 7 and 8 October 2006 and was organized by the Entrepreneurship Development Centre of the County of Lika-Senj with the aim to promote various foods, consumer goods and decorative products as well as the cultural and natural heritage of the county. Given an outstanding biodiversity and a highly preserved ecological condition of the County of Lika-Senj, including the fact that it is inhabited by all three large carnivore species, we felt it highly important to make the visitors familiar with actions taken to preserve them and the ways to get involved in their protection. Along with other educational and information material the visitors therefore received a list of nature protection and environmental inspectors, hunting inspectors and appointed experts for assessment of damage to livestock caused by protected predators containing the contact information.

"LOOK OUT! A BOOK!", a festival of children's and juvenile books organized by the Authors' House, started with an unusual picking in the Ribnjak park in Zagreb on 29 September 2006. A great number of colourful picture-books swinging from the branches were "picked" by 240 girls and boys from all parts of Zagreb. As all the picture-books dealt with animals, one of them happened to be "The Story about a Little Wolf Grga" published in the context of the LIFE III project. On that occasion Sanja Pilić the author of the story, read the whole picture-book to the children and they gladly started imitating the wolf's howling. Due to the children's great interest in picture-books, the picking ended in a moment.

Fig. 35 Children picking picture-books in the Ribnjak park in Zagreb (PHOTO BY S. LOVRENČIĆ)

Fig. 34 *Autumn in Lika* … (PHOTO BY J. JEREMIĆ)

Participation in National and International Events

The large carnivore protection and coexistence with humans were among main topics of the **First European Congress of Conservation Biology "Diversity for Europe"** held from 22 to 26 August 2006 in a small town of Eger in Hungary. In the context of this topic the European and the world's leading experts presented their experiences and outlined various strategies and approaches to the conservation of large carnivores. Croatian experts were present too. Prof. Dr. Đuro Huber presented the results of the study that had focused on frequency of using green bridges, and Aleksandra Majić-Skrbinšek compared two different ways of involving the public in the decision-making procedure on the example of developing the Wolf Management Plan and the Brown Bear Management Plan for Croatia. The large carnivore conservation in Croatia was also presented by a poster communication "Carnivore-Livestock Conflicts and Their Management – a Comparison Across Five Mediterranean Countries" created by the LIFE COEX project staff.

Fig. 36 A lecture on wolves in Hungary (PHOTO BY S. DESNICA)

In 2006 *the Croatian Biological Society 1885* organized in Rovinj the ninth in the row **Croatian Biological Congress** with international participation and with the State Institute for Nature Protection as one of the patrons. Following the tradition of previous congresses, this event was used to give an overview of research work and achievements in the field of biology, emphasizing particularly nature protection. In that context Ana Štrbenac gave a lecture "Wolf Conservation with the Acceptance of All Interest Groups: Development of the Wolf Management Plan for Croatia". In the congress premises numerous posters on the study of large carnivores, prepared by the staff of the Faculty of Veterinary Medicine in Zagreb, were exhibited.

Fig. 37 Large carnivores at the Croatian Biological Congress in Rovinj (PHOTO BY P. RODIĆ)

The non-governmental organization Green Action organized the **International Sava River Basin NGO Conference** held in Krapinske Toplice from 9-11 November. As the conference was organized within the framework of the regional project "Strengthening NGO Participation in EU WFD Implementation in Sava River Basin", the representatives of non-governmental organizations pointed to the necessity of their participation in activities of the sectoral and government ministries and local governments and self-governments, with the aim to ensure a closer co-existence in this area. Although deviating from the conference main topic at first glance, Sonja Desnica gave a presentation entitled "The Process of Developing the Wolf Management Plan for Croatia" with all reason, because it is an excellent example of public involvement in the decision-making that should be followed.

The **17th International Conference on Bear Research and Management** (IBA Conference) was held in Karuizawa, Japan from 2 to 6 October 2006. The main objective of the Conference was to provide opportunities for the exchange of knowledge of bear biology, management, protection and conservation between Western and Asian countries and thus ensure a more effective management of their populations at the global level. At the Conference Croatia was represented by Prof. Dr. Đuro Huber who was one

of the moderators of the Habitat Models Section and gave a presentation himself. The Section session was attended by 348 participants representing 37 countries. Prof. Dr. Đuro Huber set forth the first experiences in using the modern satellite technology (GPS/GSM) for telemetric monitoring of brown bears in the wooded mountain habitats of Croatia. The conclusion of the presentation based on a sample of seven telemetrically monitored individuals in the period from September 2003 to March 2006 was that in Croatia bears prefer forest habitats and avoid the presence of humans as far as possible.

Fig. 38 A lecture on bear at the Congress in Japan
(PHOTO BY D. ZLATANOVA)

Web pages

The official web pages of the LIFE III project www.life-vuk.hr are permanently updated with the latest information about implementation of the Wolf Management Plan in Croatia and recent reports and publications that can also be downloaded. Every month the page is visited by 30-40,000 visitors from all over the world on average. The web page of the international project of cross-border cooperation between Slovenia and Croatia in the management, protection and study of the Dinaric lynx population – DinaRIs – is under construction. The page www.dinaris.org is still incomplete, but it provides a lot of useful information, especially those in connection with the progress of the lynx population study and monitoring. The basic data on the biology, distribution, threats and programmes for the lynx and bear protection are available on web pages of the State Institute for Nature Protection www.dzzp.hr. All information on implementation of LIFE COEX project may be found on the web page www.life-coex.net.

In July 2006 the European Commission declared on its web pages the LIFE III project of wolf conservation and management the LIFE project of the month. It is stated that the project accomplished the objectives set and was implemented in line with the European Union standards and policies.

Fig. 39 The official web page of the State Institute for Nature Protection…

… and the LIFE COEX project

Cooperation with Interest Groups

Committees' Meetings

In 2006 the Committee for Monitoring Large Carnivore Populations held six regular meetings. Three of them were held in the premises of the Ministry of Culture in Zagreb and the rest were hosted in Gerovo by the Hunters Association of the County of Primorje-Gorski kotar, in Senjska Draga by the "Kamenjarka" Hunters Club from Senj and in Generalski Stol by the "Generalski Stol" Hunters Club. The intention was to establish the immediate communication with the local population in order to make the people familiar with the Committee's scope of activities and methods of work. It was also the opportunity for the Committee to hear about the problems of the local community and discuss possible ways of their resolution. Therefore the meetings consisted of two parts: a regular meeting of the Committee in the morning for which no participation of the local population was envisaged, but anyone interested was allowed to attend, and a round-table in the afternoon on a specific topic, specially prepared and planned for a dialogue with the local community. The round-table held in Gerovo was organized for the discussion about the status of a part of the wolf population in the area of Čabar, because Branko Kovač, the chairman of the "Tetrijeb" Hunters Club from Gerovo, and Marijan Filipović, the mayor of Čabar, had sent letters to the Ministry of Culture requiring a prompt action due to the rise in the number of wolves in the relevant area. At the round-table Assist. Prof. Dr. Josip Kusak informed the participants about the wolf biology and the progress and results of telemetric studies. Ana Štrbenac briefly explained how and for which period of time kill quotas are set according to the Wolf Management Plan. After the participants had described problems encountered in the hunting grounds and settlements, they received assurances that their views would be taken into consideration in September 2006, when deciding on interventions in the wolf population.

Fig. 40 The meeting of Commitee held in Gerovo
(PHOTO BY J. KUSAK)

The topic of the round-table held in Senjska Draga was the implementation of the Brown Bear Management Action Plan with a special reference to the area of the County Lika-Senj. Prof. Dr. Đuro Huber presented the **Brown Bear Management Plan for Croatia**. Magda Sindičić gave an overview of brown bear mortalities in 2005 and 2006 and Davor Zec, head of the Department for Hunting Ground Management of the Directorate for Hunting of the Ministry of Agriculture, Forestry and Water Management, presented the 2006 kill data. The major problem, besides bear-caused damage to bee-hives and shooting of radio-collared individuals, as stressed at the meeting, is the inability to reach the annual approved kill quota, which is likely to result in its reduction in the following years. When discussing the reasons, the question arose whether all hunting ground concessionaries knew their rights and obligations and reported all the killings carried out. The employees of the Department for Hunting invited hunting ground concessionaries to report the kill carried out the year before, if they had failed to do it already, explaining that they would not be punished for the delay. As to the damage mentioned, Magda Sindičić made the participants familiar with

Fig. 41 Round-table on the wolf held in Gerovo
(PHOTO BY J. KUSAK)

Fig. 42 Meeting of the Committee in Senjska Draga (PHOTO BY J. KUSAK)

the programme for donation of electric fences for the protection of bee-hives against bears implemented under the LIFE COEX project.

In Generalski Stol the round-table focused on wolves in the County of Karlovac with a special reference to the Generalski Stol area. Namely, in 2006 damage occurred to pet dogs in this municipality never experienced before, because wolves used to appear here from time to time only. The damage was met with the local population's resentment and numerous media reports. It was obvious that a constructive dialogue was needed between competent institutions and the local community to inform the people of their rights and obligations and to explain basic facts about the wolf biology to help dispel possible misconceptions and eliminate prejudices. Therefore a lecture was given on the wolf biology and study and the wolf population status in Croatia, the Wolf Management Plan for Croatia was presented, the reporting procedure for damage caused to livestock explained and the adequate way of guarding the livestock described. In cooperation with the municipality and the veterinary station it was agreed that lectures would be held for schoolchildren and all interested inhabitants in February 2007.

Fig. 43 Round-table on the wolf held in Generalski Stol (PHOTO BY J. JEREMIĆ)

The stakeholder groups participated also in the above mentioned enlarged meeting of the Committee for Monitoring Large Carnivore Populations dedicated to the discussion about the intervention in the wolf and the lynx population.

In 2006 three regular meetings of the Committee for Implementation of the Brown Bear Management Plan took place at which the annual brown bear action plan was discussed.

Other meetings

Apart from the round-tables held in the context of meetings of the Committee for Monitoring Large Carnivore Populations and attended by the representatives of the local community, mostly hunters, and apart from the meetings focused on the strategy of large carnivore snow tracking actions, a series of informal meetings of hunters and Dragan Šarić, the regional coordinator for Gorski kotar and Lika, took place too. At those meetings the hunters

had the opportunity to present data on impacts of protected predators (the wolf and the lynx) on the game and their requests to allow interventions in their populations. They also discussed the kill quota for Lika and areas in which they would have liked the shooting to be allowed, and the regional coordinator informed them of their rights and obligations in case the kill was allowed.

DinaRis

Cooperation with Neighbouring Countries

In addition to a regular communication between the ministries, scientists and hunters, foundations for an effective cooperation between Croatia and Slovenia were laid in 2006. This primarily applies to a cross-border lynx protection project entitled "Transboundary Cooperation in Management, Conservation and Research of the Dinaric Lynx Population". The project received funding from the INTERREG IIIA programme and will be implemented by the Faculty of Veterinary Medicine of the University of Zagreb, the State Institute for Nature Protection, NP Risnjak and Croatian Forests Ltd. – Delnice Forest Administration on the part of Croatia and by the Society for Conservation, Research and Sustainable Development of the Dinaric Alps – Dinaricum, the Faculty of Biotechnical Engineering of the University of Ljubljana, the Forest Institute of the Republic of Slovenia, the Nature Conservation Institute of the Republic of Slovenia, the Symbiosis Institute and the Slovene Hunters Association on the part of Slovenia. Numerous activities in the context of the project are designed to collect all relevant biological and sociological knowledge, to develop methods of joint monitoring of lynx populations and to establish cooperation at the highest scientific and management level. This is expected to result in preparation of a joint strategy for the Dinaric lynx population management as the first document of the kind made by Croatia and Slovenia, which is one of the major project objectives. During 17 months of the planned duration of the project the activities will focus on *public information and education* to enhance the ability of people to participate in the decision-making process and in this way improve the coexistence between the lynx and the local population; on *joint lynx population management* because actions taken in one country have an immediate effect on the population status in the other; on *survey of public opinion and degree of knowledge of the lynx* whose results would facilitate taking proper decisions on the lynx population management in Slovenia and Croatia and help in designing an adequate educational campaign; on the *development of a joint information infrastructure for monitoring the signs of lynx's presence* which implies the development of a special software package for entering data on lynx tracks observed into the database and for data browsing by means of a cartographic GIS interface; on the *research on habitat quality and population dynamics* by developing a habitat model and population dynamics model along with the population viability analysis, by analysing the lynx diet and collecting data on the lynx prey populations; and on the *genetic research* by developing a tissue-genetic bank of the Dinaric lynx population and analysing non-invasive genetic samples.

Consultations as to the start of an active bilateral cooperation in large carnivore management and administration between Slovenia and Croatia started late in December 2006. In this connection the first meeting of the representatives of the ministries, institutes and faculties will be held in Zagreb on 1 and 2 February. The purpose of the meeting is to learn about current large carnivore management and administration activities and make arrangements about harmonization of these activities, especially in the study and determination of interventions in large carnivore populations.

Tourism and Large Carnivores

Over the past years tourism based on the presence of large carnivores has been promoted with increasing intensity. As already known, there are plans to establish an educational and information centre for all three carnivores in their distribution areas. The centre will be located in Gorski kotar, an area of outstanding biodiversity, falling completely into the preliminary national ecological network of Croatia, and the most valuable large carnivore habitat in Croatia. At the beginning the municipality of Mrkopalj offered to rent the existing building that needed refurbishment, but the idea was dropped. The Institute then contacted the County of Primorje-Gorski kotar and officially presented the project proposal. It was proposed that a special building should be built for the needs of the Centre. The Centre would be a typical house of Gorski kotar built on the principle of energy efficiency and in an environmentally friendly manner. It would contain permanent exhibits of the three large carnivores (the wolf, the lynx and the brown bear) inhabiting the Gorski kotar area, a presentation room, a souvenir-shop and offices for the Centre and the Institute staff. The Centre would serve for public presentations, education, visits and studies. In collaboration with the County authorities and the Tourist Organization tours would be designed, educational paths arranged and the local population got involved into presentation and sale of autochthonous foodstuffs and production of souvenirs with a large carnivore symbol.

Fig. 44 Bear-friendly product label

Simultaneously with establishment of the Centre, the promotion of bear-friendly products started in the context of the LIFE COEX project. Bears are a significant natural asset of the country, but their diet and way of life bring them often into conflict with agricultural production. The use of effective damage prevention measures makes it possible to develop production that results in economic profit, but is not harmful to bears. The products manufactured could use the symbol of the bear as a trademark to be recognizable on the market. A lot of eco-products are being offered on the market. The customers are increas-

Fig. 45 The first product bearing the symbol of the bear in Gorski kotar (PHOTO BY Đ. HUBER)

ingly demanding and the decision to buy is conditioned by numerous factors. It is first of all the quality that guarantees that a product will find its way to the customer, just as a unique identifiability and marketing. The LIFE COEX project offers marking the product visually as "bear-friendly" and assistance in their placing on the market. All the interested entities that meet the conditions determined would be given the "bear label" free of charge. Such a product must originate from the area inhabited by the bear and fulfil all statutory preconditions for the placing on the market. The production process may not be harmful to the environment and may not endanger the habitat, restrict the movement or cause the mortality of the bear. For all other information the interested persons may contact the Faculty of Veterinary Medicine.

Other Activities

Wild Animals Held Captive

Wild animals belong to the wilderness and nature rather than our homes. Not a single form of domestication may satisfy mental and physiological needs of a wild animal. It is a common misconception that we help in saving a threatened species by removing the wolf cubs or the young of other wildlife species and taking care of them under "domestic" conditions. Nature has its cycles and regularities, with natural selection being one of them. Our intervention only produces new problems. Namely, wild animals have specific dietary habits and needs that are irreproducible in an urban or rural household. The changed and inadequate way of their holding leads to stress, loss of fear of humans and a series of similar "symptoms" by which they are forever lost for nature. Such acts should be prevented and the people educated so as to avoid such cases in the future. All species are to be kept and protected in their original forms

Fig. 46 Wolves are not pets (PHOTO BY M. CUKROV)

and habitats. It is therefore unacceptable to allow such "taking care" of wild animals and their young, regardless of the further course of their survival.

Once removed from nature, a wild animal is lost for nature and as such no natural treasure any more. It turns into a pitiful sight of captive nature. Do we want such a "nature"?

During 2005 the Directorate for Protection of Nature of the Ministry of Culture was notified of 15 wolves, 3 tigers and 3 brown bears illegally kept in at that time unregistered dog shelter in Marinići near Rijeka managed by the ZOO ECO Animal Friends Society. The Nature Protection Inspection carried out an inspection and the Ministry ruled that animals should be taken away. Four wolves were transported to the Emergency Reception Centre in Ruščica, another four wolves to the Osijek Zoo and the remaining animals were accompanied by all necessary export documents and moved to Italy – Fondazione Bioparco in Rome.

The captivity of three wolves in Metković is a pitiful, but prime example. A citizen of Metković held three wolves, removed from nature as cubs, in the yard of his house fenced with wire. In spite of all the care, regular feeding and veterinary examinations the owner was not able to meet all the conditions and needs of the wild animals. The Nature Protection Inspection carried out an inspection in November 2005, but as there was neither an adequate accommodation available nor a solution, the Ministry made the ruling to allow a temporary keeping of three individuals until a final solution. In March 2006 one of the wolves died, presumably on distemper, because there were some sick dogs in the immediate vicinity. Late in May 2006 the remaining two wolves died too, but this time the poisoning symptoms were found.

Early in July 2006 a citizen of Siverić, while walking through the Promina, found a starved wolf cub above the mountain lodge and took it home. He placed it in a space fenced with wire and took care of it. He informed the Nature Protection Inspection of his finding and the steps taken. Assist. Prof. Dr. Josip Kusak visited the cub and found it to be 4-6 months old, to weigh about 15 kg and have milk teeth. At that stage of development the cub needed adequate home. Early in October the wolf cub was brought to the AWAP where it was provided with adequate care and an isolated accommodation ensuring the minimum possible contact with humans.

The last indicative case occurred in a bear shelter in Kuterevo in 2006. Inadequate behaviour during filming and the disturbance of the bear in its cage provoked it to attack a man. As a result, the bear was killed.

These are not only cases of the kind. Are these examples to be followed or warnings that they should not be repeated?

On the last day of May 2006 an expert meeting on the occasion of the completion of the project "Providing Adequate Centre Operating Conditions", implemented during 2004/05 by the Directorate for Nature Protection of the Ministry of Culture in cooperation with the AWAP and the Embassy of the Kingdom of the Netherlands in Croatia, was held in the *Rescue Centre for Seized and Injured Protected Animals.* This is a positive example how a non-governmental organization can assist with its expertise in adequate providing for protected animals and their possible return to the wild.

Information and education are the first steps to be taken in raising the public awareness of the difficulties of keeping protected animals in captivity. In this regard the Embassy of the Kingdom of the Netherlands provided support to implementation of the project "Difficulties in Keeping Wild Animals in Captivity and their Removal from Nature" in 2007, which will involve several workshops dealing with this topic, the preparation of educational brochures, leaflets and posters, conducting an educational campaign and holding press conferences.

Plans for 2007

Apart from the already mentioned bilateral meeting on cross-border management of large carnivores, the lynx protection project and difficulties of keeping protected animals in captivity, the existing wolf and lynx management plans will be revised in 2007. It is planned to hold a joint meeting of all stakeholder groups in order to discuss the effectiveness of the current model, should it be further implemented or other solutions proposed. In 2007 the Large Carnivore Centre is to be finally established and all activities launched and implemented each year as a part of the large carnivore management in Croatia will continue.

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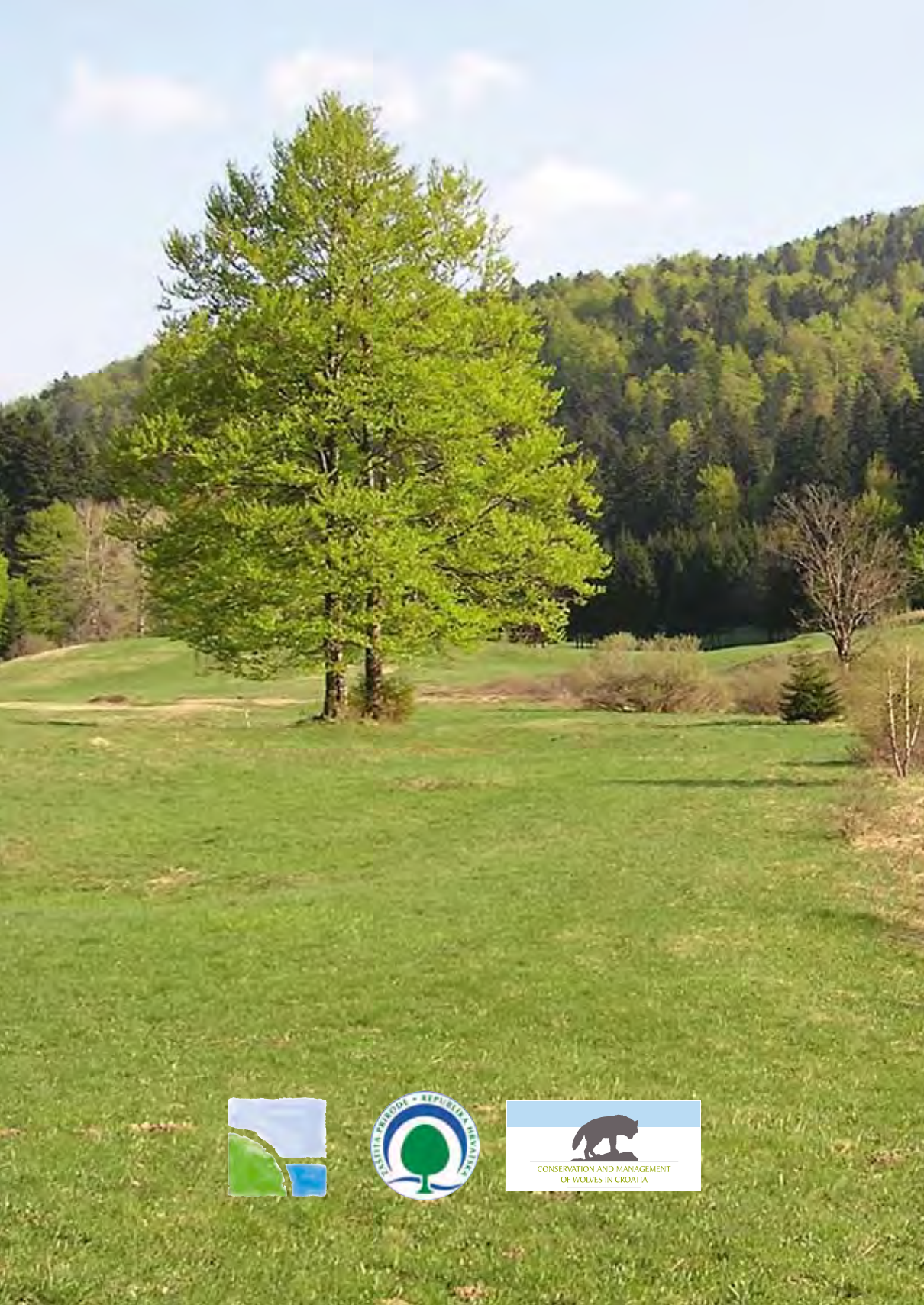
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