

GDK: 149.74 *Canis lupus* : 151.2 : (497.12)

Prispelo/Received: September/September 1998

Sprejeto/Accepted: Oktober/October 1998

Izvirni znanstveni članek

Original scientific paper

## THE RETURN OF THE WOLF (*Canis lupus*) INTO ITS HISTORIC RANGE IN SLOVENIA-IS THERE ANY PLACE LEFT AND HOW TO REACH IT ?

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### Abstract

In the course of a post- World War II anti-wolf campaign in Slovenia, the range of the species has been reduced. The wolf was nearly exterminated in the northern and north-western Dinarics and in the Prealps. The range of the wolf in Slovenia over that period, was reduced by about 2000 sq.km. 40 km of fenced highway Vrhnika-Postojna-Razdrto was put into operation in 1972. Historic corridor habitats, leading from the south-east towards the north have thus been affected and since that period, few reliable reports on the occurrence of wolves on northern side of the highway have been gathered. All-year protection of the wolf over an area of 1000 sq.km in south-central Slovenia in the border area with Croatia, adopted in 1976 was followed by a slow increase in the population. But, despite promising population trends and projected plans on the conservation management of large carnivores in Slovenia, the return of the wolves into their historic range will probably be affected or even rendered impossible by the development of State supported sheep farming, accelerated construction of the highway network, and also by other kinds of wolf-unfriendly human activities.

*Key words: wolf, historic range, expansion, highway, sheep farming, Slovenia*

## POVRATEK VOLKA V OBMOČJE HISTORIČNE RAZŠIRJENOSTI V SLOVENIJI - ALI JE TAM ŠE KAJ PROSTORA IN KAKO GA DOSEČI?

### Izvleček

Območje razširjenosti volka v Sloveniji se je med kampanjo za uničevanje volkov po II.svetovni vojni močno skrčilo. Volk je praktično izginil iz severnih in severozahodnih delov dinarskega ter iz predalpskega območja. V tem obdobju se je površina območja razširjenosti volka v Sloveniji zmanjšala za okoli 2000 km<sup>2</sup>. Leta 1972 je bil zgrajen in ograjen 40 km dolg odsek avtoceste Vrhnika-Postojna-Razdrto, s čimer so bile prizadete historične koridorske povezave med habitati volka na jugovzhodu in tistimi na severozahodu. Po tem obdobju je bilo le malo preverjenih informacij o pojavljanju posameznih volkov na severni strani avtoceste. Po uveljavitvi celoletne zaščite volka na okoli 1000 km<sup>2</sup> območja v osrednjem delu južne Slovenije ob meji s Hrvaško leta 1976, je pričela populacija ponovno rahlo naraščati. Kljub obetavnim populacijskim trendom in veljavni strategiji ohranitve velikih zveri v Sloveniji pa bo povratek volka v območja nekdanje razširjenosti otežen ali celo onemogočen z nadaljnjim razvojem od države podprte ovčereje, pospešeno gradnjo avtocestnega omrežja ter drugimi oblikami volku-neprijaznih človekovih dejavnosti.

*Ključne besede: volk, areal razširjenosti, širjenje, avtocesta, ovčereja, Slovenija*

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# 1 BRIEF HISTORY OF THE WOLF - HUMAN INTERACTIONS ON TODAY'S TERRITORY OF SLOVENIA

## KRATKA ZGODOVINA ODNOSOV MED VOLKOM IN ČLOVEKOM NA DANAŠNJEM OZEMLJU SLOVENIJE

For the third time in the 20th century, the wolf (*Canis lupus* L.) is trying to resettle its historic habitats over the greater part of Europe and North America. Social life, intelligence, high rates of reproduction, opportunistic carnivore feeding, skillfulness in using human-owned food sources, and low non-hunting mortality are the triggers, conditioning positive trends of wolf populations in the periods of low human pressure upon the species (SCHRÖDER, PROMBERGER 1993, MECH 1995, ZEDROSSER 1995, BOITANI 1997, BREITENMOSER 1998, ADAMIČ, KOREN 1998, etc.). This phenomenon is a real challenge for traditionally rigid attitudes of Europeans towards the wolf, which play a pronounced negative role in their minds and literature, even in children tales. Although living in the periods of worldwide efforts on preserving rare animal species, rain forests and general biotic diversity, we are not yet aware that this very time we are really capable of sharing our tiny European landscapes with the wolf, as a member of the biotic communities there. It is much easier for the European mind to cope with the survival of Indian tigers, than to imagine the wolf living in neighbouring forests.

Southern Slovenia represents the very northwestern edge of the Balcano-Dinaric range of the wolf which extends from Greece and Albania, over a great part of sparsely settled mountain areas of the former Yugoslav republics. The species range is spatially covered with that of the brown bear (*Ursus arctos* L.). The actual range of the wolf in Slovenia is limited to the Dinaric High Karst forests of Notranjsko and Kočevje and is much smaller than was the historic one (ADAMIČ 1986, 1993). Following older published data on wildlife on today's territory of Slovenia (FREYER 1842, SCHOLLMAYER 1889, HILTL 1893, SKJOLTE 1909, etc.), the greatest part of extensive forest areas was inhabited by the wolf till the mid-19<sup>th</sup> century. Under the provisions of Austrian hunting legislation adopted in 18<sup>th</sup> century, large predators, the wolf, the brown bear and lynx (*Lynx lynx* L.) have been persecuted all-year, since that period on. In the second half of the 19<sup>th</sup> century, an anti-predator campaign became so efficient that the lynx disappeared from the whole area, and the wolf and brown bear were nearly exterminated (ŠIVIC 1926). It is important to stress that in the period up to the end of 19<sup>th</sup> century, the greatest part of the forests in the area was still unlogged and unopened with forest roads (HUFNAGL 1898, MOHORIČ 1958), but it is also true that the

forest surface was much smaller than is the actual one. State given bounties might have been an important economic trigger of the anti-predator campaign.

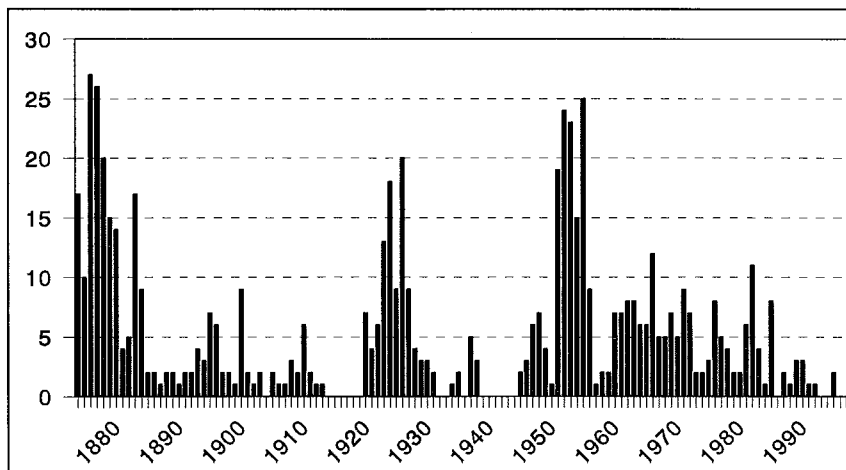


Figure 1: Adjusted data on the harvest of the wolf on the today's territory of Slovenia in the period 1874 - 1996 (different sources).

Grafikon 1: Prilagojeni podatki o odstrelu volkov na današnjem ozemlju Slovenije v obdobju 1874 - 1996 (po različnih virih)

The population of wolves rose again at the end of World War I. As old proverb known among people in the Dinarics saying, "wolf and war are brothers" proved to be realistic. The anti-wolf campaign in the post-1920 period was led by the Wolf Extermination Committee, established in 1923 in Kočevje, with most of the members being professional hunters. In the period between 1923 and 1930, 127 wolves were destroyed on the territory of the county of Kočevje (BIŽAL 1939). Similarly, the wolf was chased in other parts of the then territory of Slovenia. Following efficient extermination campaigns in late thirties, the wolf became very rare even in its core range in the central Dinarics.

The range and density of wolves in Slovenia increased again at the end of World War II. In post-War period the wolf extended its range towards north and northeast. On Pohorje, a vast forested mountain area in north-eastern Slovenia where, according to HILTL (1893) the wolf disappeared in the first half of the 19<sup>th</sup> century, the wolves appeared again in 1952, after an absence of about 100 years. Despite continuous persecution, led by professional hunters of the then State Game Reserve Pohorje, the wolf persisted in the area till 1956. In 1953 even a litter of 2 pups was detected (AČKO 1955). Altogether 3 wolves, 2 adults and 1 pup

were shot on Pohorje in the campaign till 1956. Since after 1956, no signs of wolf occurrence on Pohorje was noticed (FAJMUT 1956). Up to 1960 the wolf was still present on the whole area of the northwestern Dinarics including Nanos, Hrušica, Trnovski gozd and Idrija mountains.

According to the Law on Hunting in Slovenia, adopted in 1949, all kinds of extermination including trapping and use of poisonous baits were legal. The Wolf Extermination Committee, reelected in 1950 in southcentral Slovenia was active in State Wildlife Reserves of Kočevje. Similar anti-wolf tactics to that of the post-World War I campaign were used. The detection and destroying of litters, as well as killing the parent-wolves at waterholes was the most efficient tactic in their reduction (ŠVIGELJ 1954). In 1962 the use of poisonous baits was forbidden due to accidental death cases among humans, mainly children. As efficient anti-wolf campaign was led in neighbouring Gorski Kotar in the same period (FRKOVIC 1973,1975).

Following the successful release of the lynx in 1973 into the area of Kočevje (ŠTRUMBELJ 1974), the wolf, top ungulate predator was systematically persecuted in the area of Kočevje, particularly in State Wildlife Reserves, regardless of "the acceleration of natural selection pressure upon ungulate populations and reduction of forest damages through lynx predation" being stated among the goals of the reintroduction (ČOP 1990). The ban of wolf bounties in 1973 had a negligible effect upon the intensity of wolf extermination. In 1976 the legal hunting season for wolf (1.10.-28.2.) was adopted by Law on management and hunting of wildlife in Slovenia. Litter destroying was thus forbidden for the first time in a long history of persecution of the wolf.

Yearlong protection of the wolf in whole of Slovenia was proposed in 1990 by the Slovene Hunters Association. But due to an outbreak of rabies in Slovenia, the Ministry of Slovenia for the Agriculture and Forestry decided not to adopt it. The Act on the Protection of Rare and Endangered Species in Slovenia was issued in October 1993 by the Ministry of Slovenia for Culture, by which yearlong protection of the wolf on the whole territory of Slovenia was adopted. By the same act, the State became responsible for compensation for the damages to human property, caused by large predators, including the wolf. After several hundreds years of permanent extermination, the chances of cohabitation among the wolf and humans also became realistic in Slovenia.

## **2 RECOVERY OF THE POPULATION OF WOLF IN SLOVENIA - RESULTS OF MONITORING IN THE SNEŽNIK WILDLIFE RESERVE, SOUTH-CENTRAL SLOVENIA**

### **PONOVNO NARAŠČANJE VELIKOSTI VOLČJE POPULACIJE V SLOVENIJI - UGOTOVITVE MONITORINGA V GOJITVENEM LOVIŠČU JELEN-SNEŽNIK, V OSREDNJEM DELU JUŽNE SLOVENIJE**

Being aware that hunting pressure upon wolves, although not supported by the State Agencies, would be suppressed since the decision of the Slovene Hunters Association from 1990, we initiated in 1991 the all year monitoring of the population dynamics of the wolf (as well as of brown bear and lynx) in the Snežnik Wildlife Reserve. The target area of 276 sq.km is situated in south-central Slovenia. About 90% of the area is covered by forests, with prevailing mixed beech (*Fagus sylvatica*) - fir (*Abies alba*) stands. On its southern and southeastern edges Snežnik Wildlife Reserve borders on the vast forests of Gorski Kotar in Croatia. There is no permanent settlements in the area. According to BERCE (1986) there were more than 400 km of forest roads, accessible by 2-wheel drive vehicles in the area in 1985, which corresponds to road density of about 1460 m / 1 sq.km of the area. MECH et al (1988) reported that wolves in Minnesota, USA prefer areas with road density less than 360 m / 1 sq.km of the area, but avoid those with densities exceeding 830 m/ sq.km. The same authors concluded that the areas with denser road networks are easier reached by the hunters, who represent the main threat to the wolves. If the habitat suitability of Snežnik Wildlife Reserve for wolves would be ranked by the same criteria, with about 1460 m of 2-wheel drive roads/ 1 sq.km, the area is unsuitable for the wolves. But it is important to stress that the wolves have been all year protected in the area since 1976. Also forest roads in remote parts of the reserve are left unploughed in winters.

All year mapping of reliable signs of wolf presence (sightings, wildlife prey rests, scats, howling, tracks) inside 1 x 1 km grid cells (n = 306) was launched in 1991. The share of wolf positive days (WPD in which the presence of the wolf was detected), compared to total monitoring days per year is shown in table 1.

Table 1: Percent (%) shares of wolf-positive days - days with fresh signs of the presence of wolf (WPD) in the Snežnik Wildlife reserve, compared to total monitoring days / year in the period 1991-1997

Preglednica 1: Letna razmerja med skupnim številom opazovalnih dni in številom dni z ugotovljenimi znaki prisotnosti volkov v Gojitvenem lovišču Jelen-Snežnik v obdobju 1991-1997

Year <i>Leto</i>	No. of monitoring days per year <i>Število opazovalnih dni na leto</i>	No. of wolf positive days (WPD) per year <i>Število pozitivnih volčjih dni (PVD) na leto</i>	Share (%) of WPD per year <i>Delež (%) PVD na leto</i>
1991	1057	22	2,08
1992	845	17	2,01
1993	919	27	2,94
1994	846	52	6,14
1995	657	55	8,37
1996	849	101	11,89
1997	608	96	15,79
TOTAL <i>Skupaj</i>	6081	370	6,08

The share of WPD in yearly amounts of monitoring days increased in the period 1991 - 1997 ( $r=0,9276$ ,  $n=7$ ,  $p < 0,001$ ).

Data on the size of sighted groups of wolves in the Snežnik Wildlife Reserve (average size  $\pm$  SD etc.) are shown in table 2.

Table 2: Data on registered (sighted) groups of wolves (mean size  $\pm$ SD, median group size, etc.) in Wildlife Reserve Sneznik in the period 1992 - 1997

Preglednica 2: Podatki o registriranih, direktno opaženih skupinah volkov (povprečno število  $\pm$  SD, mediana velikosti skupin, itn.)

Year <i>Leto</i>	No. of sighted groups <i>Število opaženih skupin</i>	Mean group size <i>Povprečna velikost skupine</i>	SD	CV(%)	Min.	Max.	Median group size <i>Mediana velikosti skupin</i>
			<i>SD</i>	<i>CV (%)</i>	<i>Min</i>	<i>Max.</i>	
1992	16	2,19	1,60	73,1	1	8	2,0
1993	19	3,53	2,25	63,7	1	8	3,0
1994	46	2,93	1,99	67,9	1	8	2,0
1995	47	3,32	1,85	55,7	1	7	3,0
1996	53	3,62	1,99	55,0	1	7	3,0
1997	70	3,00	1,59	53,0	1	6	2,0

Successfully raised litters inside the Snežnik Wildlife Reserve, but also in surrounding forested areas have also been registered nearly every year.

### **3 WHAT ARE THE CHANCES FOR THE RETURN OF THE WOLF INTO ITS HISTORICAL RANGE IN THE ALPS AND WHAT WOULD BE THE ROLE OF ALPINO-DINARIC CORRIDOR**

#### **KAKŠNE SO MOŽNOSTI ZA POVRATEK VOLKA V OBMOČJE HISTORIČNE RAZŠIRJENOSTI V ALPAH IN KAKŠEN POMEN PRI TEM BO IMEL ALPSKO-DINARSKI KORIDOR**

According to the study on the historic distribution of the wolf on recent territory of Austria (ZEDROSSER 1995,1996), the migration corridor Slovenia-Italy-Carinthia was the main connection between the Dinaric range of the wolf and the Alps. Alpino-Dinaric large predator corridor (ADAMIČ, KOREN 1998), which extends from Gorski Kotar, along the Snežnik-Javornik mountain ridge into Nanos and Trnovski gozd and towards the northwest into Prealps and Alps, was therefore the main target of our study on current wolf expansion.

Simultaneously to increased occurrence of the wolf in the Snežnik Wildlife Reserve, where the species was fully protected since 1976 on, the cases of the penetrations of single animals and small groups into the species' historic range in the northwestern Dinarics, became more frequent. Our speculations that wolves established new trails, enabling them to cross the fenced Ljubljana-Razdrto highway section, built in 1972 were confirmed in winter 1993. On March 24th, 1993 a pack of 6 wolves (3 adults + 3 subadults) was sighted and tracked in snow on their two days excursion into the Nanos mountains. On their way back into Snežnik on March 25th, according to the tracks in snow, the group crossed the highway again, following the same trail, leading beneath the Ravbarkomanda highway viaduct, with the length of 595 m.. Altogether, the two day excursion of wolves from Snežnik to Podkraj on Nanos and back, was about 120 km long.



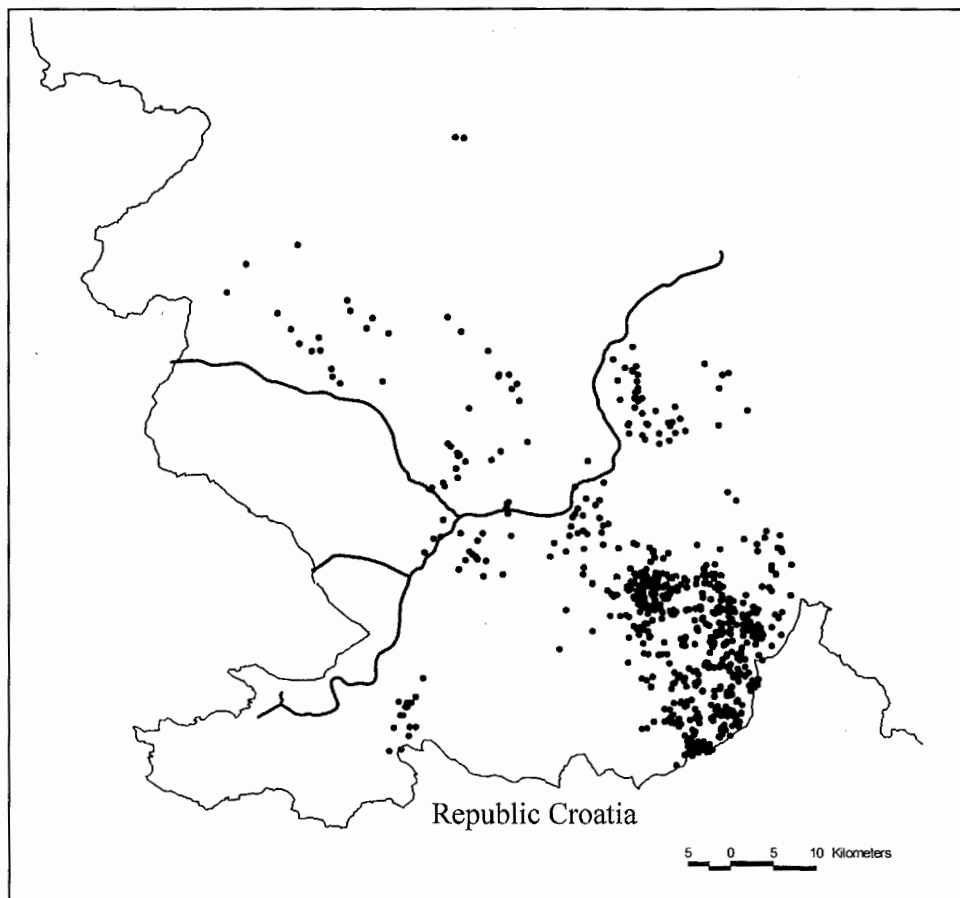


Figure 2: *The situation of the Alpino-Dinaric corridor of the wolf in Slovenia. The locations of registered wolf signs in the period 1991-1997 is shown by black dots. The network of the highways in the area is shown by black lines*

Slika 2: *Položaj Alpsko-Dinarskega koridorja volka v Sloveniji. Lokacije inventariziranih znakov prisotnosti volkov v obdobju 1991-1997 so prikazane s črnimi pikami. Omrežje avtocest v območju je prikazano s temnimi linijami.*

Reliable snow tracks of single wolves have been observed in fir-beech forests of Trnovski gozd even previously, in winters 1991 and 1992. On June 4th, 1995 two wolves were shot on the northwestern edge of current wolf range, on two different locations within a distance of about 40 km. The male wolf of 37 kg was shot at Stomaž on western slope of Nanos. According to the official statement of the hunter, the single animal chasing roe deer (*Capreolus capreolus*) in the dusk was thought to be a stray dog. Similar was the explained reason for the shooting of a female of 26 kg, being in the group of two animals, also chasing

roe deer at Novaki, on notheastern slope of Mt.Porezen. Both hunters have excused their illegal act by long years absence of wolves in the area.

Altogether 535 signs of wolf occurrence in Alpino - Dinaric corridor, including the Snežnik Wildlife Reserve were registered in the period 1991-1996 (table 3)

Table 3: *Types of registered signs of wolf inside the Snežnik Wildlife Reserve and other parts of Alpino-Dinaric corridor*

Preglednica 3: *Primerjava strukture registriranih znakov prisotnosti volkov v Gojitvenem lovišču Jelen-Snežnik in drugih delih Alpsko-Dinarskega koridorja v obdobju 1991-1997*

Type of the signs of wolf occurrence <i>Vrsta znakov</i>	Snežnik Wildlife Reserve (n=415) <i>Gojitveno lovišče Jelen Snežnik (n=415)</i>	Other monitored parts of Alpino-Dinaric corridor (n = 120) <i>Drugi deli Alpsko-Dinarskega koridorja (n=120)</i>	Whole Alpino - Dinaric corridor (n = 535) <i>Celoten Alpsko-Dinarski koridor (n=535)</i>
Tracks <i>Sledi</i>	22,9	40,0	26,7
Sightings* <i>Dir.opazovanja</i>	41,0	30,8	38,7
Predation upon livestock <i>Napadi na živino</i>	0,2	6,7	1,7
Prey rests (wildlife) <i>Ostanki plena (divjad)</i>	35,9	20,8	32,5
Wolf shot <i>Odstreljeni volkovi</i>	0	1,7	0,4
Total <i>Skupaj</i>	100,0	100,0	100,0

\* Females with pups have been sighted in 13 cases. Average litter size =  $2,38 \pm 0,65$ , median 2,0.

The signs of wolf occurrence gathered in the Snežnik Wildlife Reserve, with more sightings, prey rests, and less predation upon livestock, when compared to other parts of the Alpino-Dinaric corridor, prove that the preserved suitability of the Sneznik area will be of crucial importance for further expansion of the wolf into the Alps. According to the Figure 3, all year occurrence of the wolf signs was registered in both parts of Alpino-Dinaric corridor.

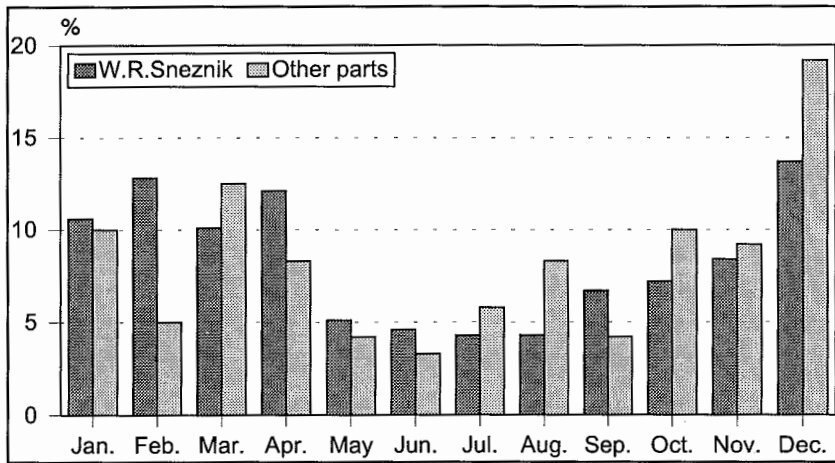


Figure 3: Comparison of % monthly occurrence of wolf signs in the Snežnik Wildlife Reserve and in other parts of the Alpino-Dinaric Corridor in the period 1991-1997

Grafikon 3: Primerjava mesečnih deležev (%) znakov volčje prisotnosti v Gojitvenem lovišču ZGS Jelen-Snežnik in drugih delih Alpsko-Dinarskega koridorja v obdobju 1991-1997

In October 1997, the crossing of the highway by the wolves beneath the Bandera viaduct (281 m) on the western edge of the historic range of the species was confirmed for the first time. Since, the wolves were often tracked on sand beds, put in the underpasses and the viaducts on the Razdrto-Kozina highway section, opened for the traffic in 1995. In May 1998, 74 sheep, kept in poorly protected enclosure on northern side of the highway were killed by a pack of 3 wolves in 4 successive nights. In every single night the wolves approached the enclosure over a 6 m wide highway bridge, connecting the target enclosure to a vast forested area on southern side of the highway. Observations there prove that the highway is not an ultimate obstacle for the wolves, which using their intelligence are able to distinguish what is real danger for them and what is not.

The wolves have already penetrated into the foothills of the Jelovica plateau in Prealps (June 1995 - male wolf shot by local hunter, November 1997 - 2 wolves sighted). If current wolf-friendly legislation in Slovenia is not changed, we expect them to reach the Alps in a few years. According to the trends of european wolf populations, discussed by HELL and DURICKA (1991), LANDRY (1996), BOITANI (1997) and BREITENMOSER (1998), the expected return of the wolf into Slovenian Alps is fully realistic and is just the question of time.

## 4 CONCLUSIONS

Although put on the Red List of threatened species in Slovenia, but also yearlong protected since 1993, the future welfare of wolf in Slovenia is yet uncertain. Recently the wolves in Slovenia are, more or less constantly present only in southcentral parts of the State, primarily in remote forested areas along the border with Croatia. The greatest part of those animals are actually temporal migrants that circulate in the forests on both sides of the State border. Steady trails are used during the circulations, which is especially obvious in snow rich winters (BRANCELJ 1981, ŠTRUMBELJ 1995, ŠTIMAC 1996). In the periods with deeper snow the red deer winteryards were regular targets of wolf invasions. Because of evident transboundary connections between wolf subpopulation in southcentral Slovenia and those in Gorski Kotar and Lika in Croatia, future welfare of the species thus depends, not only on legal status of wolf in Slovenia, but also on that in Croatia. Establishment of interstate cooperation among Slovenia and Croatia for joint conservation of natural resources in border areas and the creation of Dinaric Large Predator Mega-reserve, with extensive conservation management strategy for all large predator species would be the best solution. The challenge and significance of cross boundary management plans of expanding wolf populations have been stressed by several authors, as most reasonable and efficient conservation solution for the welfare of the species (MECH 1995, NOSS et al 1996, )

Despite yearlong protection of the wolf in Slovenia was proposed by the Hunters Association of Slovenia in 1990, the late did not hesitate in autumn 1997 to put in the application for "preventive extraction of three wolves". Its initiative was not triggered by elevated cases of wolf predation upon livestock, but due to the predation upon red deer in hunting reserves of the Hunters Association. It is hard to speak about the degree of poaching of wolves, but there were some evidences about it which might be seriously taken into account.

The development plans of State supported sheep-farming in southcentral and northwestern Slovenia pose a serious threat to future welfare of the wolf, as well as that of the lynx and the brown bear. Thus induced human-predator conflicts and rising aversion of the farmers against the protection of large carnivores in Slovenia, will doubtless make the conservation management action plans uncertain.

Despite our own observations on the abilities of wolves to cross man-made obstacles, we suspect that ongoing construction of the highways in Slovenia will doubtless affect the chances for further expansion of the wolf and resettling of its historic range, if proper

mitigation measures would not be adopted. Historic corridors and locally established trails between Gorski Kotar and southeastern Slovenia will also be affected by the planned highway connections in Croatia (ŠTRUMBELJ 1995).

There are some important securing facts, concerning future welfare of the wolf in Slovenia that were not yet fully achieved e.g.:

- preservation of key habitats in the core area, especially those surrounding the natural parks and reserves, but also those in new population islands will hardly to be reached on large enough level. Planning the levels of sustainable use of natural resources especially those of timber extraction inside crucial wolf habitats is still to be taken as an utopic goal in Slovenia. But being typical forest dwellers, the welfare of large predators in Slovenia strongly depends upon future forest management, as well as by other activities which might affect suitability of declared predator conservation areas,
- implication of compulsory mitigation measures into the process of the construction of highway network in Slovenia towards improved permeability of newly induced obstacles. If further expansion of the wolf into yet suitable, unoccupied habitat islands in outer area is to be expected, the functioning of (e)migration corridors, linking newly occupied habitats to source population areas should be ensured even by the additional construction of the ecoducts on traffic loaded highway sections,
- extension of current research on human-wolf relations and human attitudes towards large predators in Slovenia. The late might be an important part of the study on human dimensions of the conservation of large predators in Europe. According to the results of current studies on human attitudes upon large predators in Slovenia (KORENJAK 1995), the wolf gained the lovest rank of sympathy among investigated groups. Therefore we find the positive conditioning of public opinion towards the wolf among the most important future tasks of the long-term conservation of the species in Slovenia,
- reinforcement of the State adopted regulations upon the obligatory use of anti-predator protection devices on sheep pastures in the areas of regular and/or periodic presence of wolf and other large predators,
- achieving legal, yearlong protection of the wolf on whole territory of Slovenia with implicated pennalties even for incidently shooting of wolves. Any extraction of single problem animals will have to be adopted by State nominated expert group, and will have to be carried out by professional emergency team, but not by local amateur sport hunters,
- keeping elevated densities of ungulate populations particularly those of red deer (*Cervus elaphus*), representing the key prey source of the wolf in the core area (ADAMIČ; BERCE 1995).

If proposed will be implemented in the legislation and in real life, the chances of long term persistence of the wolf and other two large predators in Slovenia will look more realistic than recent ones. It is to stress that anything which is going to happen to the population of the wolf in Slovenia, will be of crucial impact for projected return of the species into Eastern Alps. Therefore, the conservation of viable populations of large predators in Slovenia is also of European extensions.

## **POVZETEK**

Slovenija predstavlja severozahodni rob kontinuiranega Dinarsko-Balkanskega območja razširjenosti volka, ki se razteza od Grčije in Albanije, čez redko naseljena gorata območja nekdanjih jugoslovanskih republik in, ki se prostorsko praktično prekriva z območjem razširjenosti rjavega medveda. V biogeografskem smislu pa slovensko ozemlje predstavlja funkcionalno povezavo med Alpami in Dinaridi. Na pomembnost Slovenije v procesu mednarodne akcije za povratak velikih zveri v Alpe, poleg današnje razširjenosti opozarja tudi ugoden populacijski status teh vrst pri nas. Današnje območje razširjenosti volka v Sloveniji je dejansko omejeno na visokokraške jelovo-bukove gozdove Kočevske in Notranjske in je (še) precej manjše kot v obdobju do srede 19. stoletja. Sodeč po starejših pisnih virih o razširjenosti divjih živali na današnjem ozemlju Slovenije so volkovi naseljevali vsa večja gozdna območja. O tem, ne nazadnje, pričajo tudi mnoga ledinska in domača družinska imena v različnih delih Slovenije.

Iz ohranjenih podatkov o odstrelu volkov na okoli 280 km<sup>2</sup> velikem veleposestvu rodbine Auersperg na Kočevskem v obdobju od sredine 18.stoletja pa do konca I.svetovne vojne je razvidno, da je uničevanje volkov potekalo podobno kot v drugih evropskih deželah. Zakonodaja iz srede 18.stoletja je v avstrijskih deželah sprožila kampanjo organiziranega uničevanja volka, rjavega medveda in risa pa tudi jelenjadi in divjega prašiča. Pregarjanje je bilo tako učinkovito, da je v drugi polovici 19. stoletja ris že povsem izginil, rjavi medved in volk pa sta bila tik pred tem. Podobno so zveriregarjali tudi na današnjem ozemlju Hrvaške. Šele reinterpretacija takratnega bistveno manjšega prostorskega deleža gozdov v pokrajini ter takratne velikosti kontinuiranih gozdnatih območij nam dopušča razumeti, kako so kljub slabemu orožju, primitivnim komunikacijam in slabi odprtosti gozdov v 18. in 19.stoletju uspeli praktično iztrebiti velike zveri. Življenjski zgodbi volka na Kočevskem in v Snežniških gozdovih v 19.stoletju opozarjata, da človekova naklonjenost in/ali averzija determinirata "politični aspekt" (ne)primernosti habitatov. Te dragocene zgodovinske lekcije se moramo zavedati vsi, ki kakorkoli sodelujemo pri oblikovanju ohranitvene strategije

velikih zveri in drugih problematičnih živalskih vrst, ki s človekom tekmujejo v izkoriščanju istih (enakih) naravnih virov, mu lahko povzročajo škodo in so mu izjemoma lahko celo nevarne.

Izjemna vitalnost, inteligenca ter visok reprodukcijski potencial so tiste značilnosti, ki so volku omogočile, da je preživel večstoletna preganjanja in, da v 20.stoletju že tretjič poskuša zasesti območje svoje historične razširjenosti v Sloveniji pa tudi drugod v Evropi. Prvič se je številčnost volkov na slovenskem ozemlju povečala po koncu I.svetovne vojne. Lovci takrat niso držali križem rok. Leta 1923 so v Kočevju ustanovili Odbor za pokončevanje volkov. Njegovo glavnino so sestavljali poklicni lovski čuvaji, uslužbenci Auerspergovega veleposestva ter čuvaji zakupniških lovišč. V obdobju med letom 1923 in 1930 so samo v Kočevskem srezu uničili 127 volkov. Podobno so volka pred II.svetovno vojno preganjali tudi v drugih delih današnje Slovenije. Učinkovita je bila protivolčja kampanja tudi v drugih delih predaprilske Jugoslavije tako, da je volk v poznih 30.letih postal redek celo v osrednjih Dinaridih.

Drugič je volk uspešno izkoristil predah v preganjanju, ki ga je prinesla II.svetovna vojna. Le-ta je zajela celoten Balkanski polotok in onemogočila oziroma prekinila kontinuirani človekov pritisk na to živalsko vrsto. V Sloveniji se je volk v tem obdobju razširil proti severu in severovzhodu. Na Pohorju, kjer so volka iztrebili že v prvi polovici 19.stoletja, se je ta ponovno pojavil leta 1952. Zakon o lovu iz leta 1949 je dovoljeval vse mogoče načine iztrebljanja volka, nastavljanje zastrupljenih vab, pasti in odstrel. Ponovno je zaživel Odbor za pokončevanje volkov. Jedro Odbora so sestavljali izkušeni poklicni lovci takratne Uprave gojitvenih lovišč s Kočevske in Notranjske. Posebno spretno so izkoriščali nekatere vedenjske značilnosti volčjih družin v času vzreje mladičev, itn.. Konec 60.let so volkove še vedno sistematično uničevali po celi Sloveniji, enako na Hrvaškem. Zaradi drastičnega zmanjševanja številčnosti volkov v osrednjem območju razširjenosti, na Kočevskem, Notranjskem in v sosednjem Gorskem Kotaru so se zmanjševali tudi znotrajvrstni pritiski, ključna prožila za emigracije.

Ograjena avtocesta Vrhnika-Postojna, ki so jo dogradili in za promet odprli decembra 1972, leta 1974 pa podaljšali do Razdrtega, je močno prizadela širjenje volkov iz osrednjega območja proti severu. Vendar pa so se posamezne živali, kljub temu (še) pojavljale na severni strani avtoceste. Verjetno so posamezni volkovi že takrat odkrili ohranjene odprte poti skozi avtocestno oviro in so se za prehajanje iz osrednjega območja proti severu posluževali avtocestnih podvozov in maloštevilnih viaduktov. V 80.letih so tako sledili volkove na severni strani avtoceste v bližini manjšega viadukta nad

počivališčem na Lomu. Domnevamo, da pod tem okoli 100 m dolgim viaduktom vodi en krak koridorja po katerem prihajajo volkovi iz osrednjega območja ter nadaljujejo pot v Hrušico in naprej proti Trnovskemu gozdu, kjer so jih po letu 1990 že večkrat sledili in videli.

S tretjim poskusom širjenja vrste se v Zahodnih Dinaridih, v Sloveniji in na Hrvaškem ponovno soočamo v 90.letih.. Prožilo za to je celoletna prepoved lova volkov v Sloveniji, ki jo je leta 1990 predlagala Slovenska lovska organizacija, dokončno pa jo je leta 1993 uveljavila Uredba Vlade Republike Slovenije o zavarovanju ogroženih živalskih vrst v Sloveniji (Ur.list RS 57/93), ki je volka uvrstila v seznam celo leto zaščitenih vrst. Evropske civilizacijske norme zapisane v Bernski konvenciji so nas očitno dosegle pozno. Od 16. maja 1995 je volk tudi na Hrvaškem uvrščen na seznam zaščitenih vrst.

Po letu 1990 so se informacije o pojavljanju volkov na severni strani avtoceste Vrhnika-Razdrto pričele gostiti. 23.marca1993 je več ljudi opazovalo in v snegu sledilo skupino 6 volkov, ki so iz Javornikov pod viaduktom Ravbarkomanda nadaljevali pot v smeri Podkrajja in se naslednji dan (24.marca) po isti poti vrnili. V najnovejšem poskusu širjenja proti severu so volkovi leta 1995 prodrli v okolico Novakov pri Cerknem, nedaleč od južnega vznožja Jelovice. 3.junija 1995 je bil v okolici Novakov "pomotoma" ustreljen 37 kilogramski volk-samec. Leta 1996 je bil 1 volk opažen in sleden pri vasi Bate na Banjški planoti. Decembra 1997 so se volkovi pojavili v Čavnu. Pričakujemo, da se bodo volkovi ponovno pojavili na Jelovici in od tu po zahodnem koridorju prodrli naprej v Alpe.

Volkovi so odkrili tudi odprtino pod viaduktom Bandera v bližini Dolenje vasi pri Senožečah. Ta 281 m dolg in več 10 m visok viadukt predstavlja glavni prehod skozi odsek ograjene AC Razdrto-Čebulovica, o čemer pričajo registrirane sledi volkov in drugih velikih sesalcev na peščeni sledilni blazini pod viaduktom, na kateri redno odčitavamo sledi živali, ki so prehode uporabile

Osrednje območje današnje razširjenosti volka v Sloveniji predstavljata Kočevska in Notranjska v povezavi z Gorskim Kotarom na Hrvaškem. Kot pri večini vrst velikih sesalcev so vsa dogajanja v zvezi z robnim širjenjem populacije volkov in njihovim povratkom v historične dele habitatov povezana z dogajanjem v osrednjem območju razširjenosti, smo leta 1990 pričeli z integralnim monitoringom prisotnosti velikih zveri in njihovih plenskih vrst na območju Gojitvenega lovišča Zavoda za gozdove Slovenije Jelen-Snežnik, na površini okoli 280 km<sup>2</sup>. Izbrano območje na jugu in jugovzhodu meji



na Gorski Kotar. Iz tako zbranih podatkov (tabela 1) je razvidno, da pogostnost inventariziranih znakov prisotnosti volkov, od leta 1991 do vključno leta 1997, značilno narašča ( $r^2 = 0,92767$ ,  $n=7$ ,  $\alpha < 0,001$ ) in, da v Snežniškem območju očitno narašča tudi velikost populacije volkov. O pozitivnih številčnih in prostorskih trendih volkov, prostorskem ter njihovem naraščajočem vplivu na plenske vrste poročajo tudi s Kočevske.

Ker sodi naraščanje velikosti populacije med najpomembnejša prožila za (e)migracije in širjenje populacijskega območja, lahko v prihodnje pričakujemo tudi prodor volkov v oddaljena območja. V kolikor se, zaradi pritiskov ciljnih skupin prebivalcev v osrednjem območju razširjenosti volka v Sloveniji (ovčerejci, lovci) zaščita volka ne bo poslabšala, lahko v nekaj letih pričakujemo prodor volkov v Alpe. Da so tovrstne ocene realne, pričajo tendence vrste, ugotovljene v drugih alpskih deželah. V Italiji so volkovi iz osrednjega Apeninskega polotoka v 80.letih prodrli v okolico Torina, leta 1992 pa so se pojavili v Nacionalnem parku Mercantour v Primorskih Alpah v Franciji.

Snežniško območje, ki smo ga izbrali kot izhodiščni del naših raziskav o širjenju volka v historične habitate, se ponaša z več kot 90 % gozdnatostjo. Tudi večina novih območij, v katerih so volkove bodisi opazovali ali sledili je znotraj gozda. Mnenja evropskih raziskovalcev ekologije volka pa se glede pomenskih razsežnosti deleža gozda v volčjih habitatih precej razlikujejo. Rezultati raziskav v različnih delih geografske razširjenosti vrste dokazujejo, da volkovi naseljujejo različne tipe habitatov in torej niso izključna znotrajgozdna vrsta. Vsi pa ugotavljajo, da sta dostopnost prehranskih virov in človekova toleranca oziroma nepreganjanje, pomembni determinanti primernosti habitatov. Iz naših dosedanjih raziskav v Alpsko-Dinarskem koridorju pa je razvidno (tabela 3), da si volkovi celoten skup, za življenje potrebnih "orodij" najlažje poiščejo v obsežnih gozdnatih območjih. V 50.letih, ko so se volkovi pojavili v gozdovih na Jelovici in na Pohorju, je minilo kar nekaj let preden so jih lovci Uprave gojitvenih lovišč uspeli iztrebiti. Ob ponovnem povratku v Alpe se bo tudi volk verjetno najprej naselil v gorskem gozdu. Zgodovinski spomin, ki je generacije volkov opozarjal na človekovo nevarnost bo treba šele premagati. Zato pa bo potreben čas.

Kljub očitnim pozitivnim trendom populacije volkov po celoletni zaščiti v Sloveniji in na Hrvaškem pa ostaja povratek vrste v še primerne dele historičnih habitatov vprašljiv. Da bi omogočili postopno revitalizacijo in dolgoročno preživetje vitalne populacije bi bilo potrebno zagotoviti:

- ohranitev veljavnega varstvenega statusa volka oziroma zagotoviti celoletno zaščito vrste na celotnem ozemlju države. Vsak neupravičeni, tudi naključni odstrel je zato

- potrebno primerno sankcionirati. Za izločitev problematičnih osebkov ali manjših skupin volkov mora biti pooblaščenca ustrezno usposobljena profesionalna skupina,
- povračilo škode, povzročene od volka in drugih velikih plenilcev. Lastnike drobnice v izpostavljenih območjih je treba motivirati k uporabi učinkovitih varovalnih sredstev,
  - zavarovanje ključnih delov habitatov v osrednjem območju razširjenosti ter omogočiti volku dostop do potencialnih habitatov v širšem območju Slovenije. Potencialne habitate je potrebno najprej opredeliti in nato poiskati poti za njihovo zavarovanje,
  - prepustnost že zgrajenih in načrtovanih avtocestnih odsekov, ki sekajo ali se dotikajo pomembnejših krakov migracijskih koridorjev. Ograjene avtoceste brez zadostnega števila primerno oblikovanih in razmeščenih (lahko tudi večnamenskih) avtocestnih podvozov, mostov in viaduktov reducirajo ali celo blokirajo možnost širjenja vrste,
  - razmere za ohranitev povečane gostote preferiranih plenskih vrst (jelenjad!) v osrednjem območju razširjenosti, s čimer bo mogoče povečati dopustno gostoto volkov, pospešiti njihovo širjenje in zagotoviti še sprejemljiv obseg plenilskih napadov na domače živali.

Šele po zagotovitvi razmer za uspeh naštetih ukrepov v širšem območju današnje razširjenosti lahko pričakujemo tudi dejanski premik v dosedanjem sobivanju človeka in volka tudi v Sloveniji.

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