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REPUBLIKA SLOVENIJA
MINISTRSTVO ZA ZNANOST IN TEHNOLOGIJO

ZAKLJUČNO POROČILO O REZULTATIH RAZISKOVALNEGA PROJEKTA

I. Predstavitev osnovnih podatkov raziskovalnega projekta

1. Vrsta projekta: a. temeljni raziskovalni projekt

2. Šifra projekta: J-4297

3. Številka pogodbe: 3411-97-24-7297

4. Naslov projekta: Razsežnosti problemov ohranitve velikih zveri v kulturni krajini - primer rjavega medveda *(Ursus arctos L.)* v Sloveniji.

5. Naziv raziskovalne organizacije: Univerza v Ljubljani, Biotehniška fakulteta, Oddelek za gozdarstvo in obnovljive gozdne vire

6. Sofinancer: -

7. Odgovorni nosilec projekta: Dr.Mina Adamič,dipl.inž.gozd., izredni profesor

Datum: 30.7.1998

Podpis odgovornega nosilca projekta:

Biotehniška fakulteta UNIVERZA V LJUBLJANI 6

Podpis in žig izvajalca:

GDK 15 (497.12)(047.3)
Kljub.: velika zver, rjavi medved, Ursus arctos (L.), areal razširjenosti, ekologija živali, Slovenija

UNIVERZA V LJUBLJANI
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Gozdarski inštitut Slovenije

II. Vsebinska struktura zaključnega poročila o rezultatih raziskovalnega projekta:

1.Cilji projekta:

1.1.Ali so bili cilji projekta doseženi ?
a. da, v celoti

Opomba: Delo je v celoti potekalo v smislu postavljenih ciljev projekta. Zaradi samofinanciranja opravljenega dela raziskovalnih partnerjev (Institut für Wildbiologie und Jagdwirtschaft - Universität für Bodenkultur (BOKU) Wien, Avstrija, Wildbiologische Gesellschaft München e,V., Ettal, Nemčija, Lovska zveza Slovenije, WWF ITALY) funkcionalno presegalo okvire zagotovljenega financiranja s strani MZT.

1.2. Ali so se cilji projekta med raziskavo spremenili
a. ne

2. Poročilo o realizaciji predloženega raziskovalnega programa

2.1.1. Cilji projekta:

Rjavi medved (Ursus arctos L.) je predstavnik velikih zveri, ki so redka in dragocena sestavina biološke raznovrstnosti ter element naravne dediščne. Zaradi svojega trofičnega položaja pa funkcionalno sodijo v skupino problematičnih `ivalskih vrst, ki v kulturni krajini s človekom tekmujejo v izkoriščanju istih naravnih virov, mu povzročajo škodo in so mu lahko tudi neposredno nevarne. Raziskovalni projekt je usmerjen v proučevanje ključnih aspektov vrstne ekološke niše z uporabo radiotelemetrijske metode ter v iskanje možnosti za vgrajevanje ugotovitev v nacionalni program ohranitvene strategije. Ugotovitve bodo imele tudi širši pomen za ohranitev in revitalizacijo izoliranih populacij rjavega medveda in drugih vrst velikih zveri v Evropi. Osnovni cilj projekta je iskanje vzdržnih oblik sobivanja med človekom in rjavim medvedom v kulturni krajini, ob sočasnem zagotavljanju samoobnovljivosti ter dolgoživosti populacije ter zagotoviti varstvo ključnih delov habitatov in povezovalnih koridorjev med njimi.

2.1.2. Predstavitev hipoteze

Slovenija predstavlja severozahodni rob strnjenega Dinarskega populacijskega območja rjavega medveda. Populacija te vrste v Sloveniji je vitalna in ekološko funkcionalna oziroma visoko reproduktivna. Izločitve zaradi naravne mortalitete in kontroliranega lova so manjše kot output reprodukcije v obliki letnega prirastka populacije. Le-to pa je eden od ključnih vzrokov za daljinske emigracije presežnih osebkov ter kontinuiranega robnega širjenja vrste. Oportunistična prehranska strategija, sposobnosti cirkuliranja znotraj obsežnih individualnih arealov ter zmožnost kriptičnega bivanja v človekovi bližini, dopuščajo kapilarno penetracijo rjavega medveda tudi v intenzivno kultivirane dele človekovih habitatov. Pri tem brez težav premaguje naravne in inducirane ovire v prostoru.

Recentne oblike rabe prostora v kulturni krajini niso kompatibilne s strategijoohranitve vitalnih populacij problematičnih vrst prostoživečih živali, še posebej tistih z velikimi individualnimi areali aktivnosti. Le-te lahko ob vdorih v območja z intenzivno rabo v kratkem času povzročijo veliko materialno škodo ter strah in odpor med lokalnimi prebivalci. Z izgradnjo omrežja avtocest v Sloveniji se bo povečalo število konfliktnih točk med človekom in rjavim medvedom, s čimer bo na nekaterih odsekih avtocest dodatno ogrožena prometna varnost, povečala pa se bo tudi mortaliteta zaradi prometa.

Rjavi medved in drugi veliki plenilci so dragoceni elementi biološke raznovrstnosti in so v Sloveniji zakonsko zavarovani z Uredbo o varstvu redkih in ogroženih vrst. Slovenska populacija je genotipsko najprimernejša za ponovno poselitev širšega alpskega prostora, zato ima pomen ohranitve njenega vitalnega statusa nadnacionalne, evropske razsežnosti. Le s podrobnejšim poznavanjem populacijskih trendov in upoštevanjem življenjske strategije rjavega medveda bo mogoče napovedovati in preprečevati neželjene konflikte s človekom ter tako zagotoviti realne možnosti za ohranitev vrste v Sloveniji.

2.2 Ugotovitve projekta.

2.2.1. Radiotelemetrijska spremljava gibanja rjavih medvedov (mednarodni projekt Braunbär - Ljubljanski vrh)

Originalna poročila o poteku radiotelemetrijskega dela (P.Kaczensky in sod.) so priložena temu poročilu, zato o podrobnostih na tem mestu ne poročamo. Opozoriti pa je treba na nekatere ključne aspekte rezultatov, ki so pomembno vplivali na druge dele naše študije o rjavem medvedu:

S spremljavo individualnih daljinskih migracij radiotelemetriranih rjavih medvedov smo potrdili, da obstajajo nedvoumne povezave med osrednjim varovalnim območjem rjavega medveda v Sloveniji in Gorskim Kotarom ter Čičarijo na Hrvaškem. Posamezne locirane živali so v času spremljave z mesta odlova penetrirale tudi več kot 100 km daleč. Mlajši, v Hrušici odlovljen samec je čez Čičarijo potoval do kontinentalne strani Učke, na povratku nazaj pa smo signal izgubili. S tem so bile ponovne potrjene ugotovitve hrvaških raziskovalcev (skupine prof.dr.Đure Hubra z Veterinarskog fakulteta Sveučilišta u Zagrebu) iz začetka 80. let, ki so na Kočevskem večkrat locirali telemetrirane rjave medvede, odlovljene v NP Risnjak v Gorskem Kotaru. Ugotovitve obeh, hrvaškega in slovenskega radiotelemetrijskega projekta opozarjata, da Zahodno-Dinarsko populacijsko območje rjavega medveda obsega habitate na obeh straneh državne meje s Hrvaško in, da je zato treba skupaj s Hrvaško, v celotnem populacijskem območju oblikovati enotno strategijo ohranitve rjavega medveda in njegovih habitatov.

Ugotovljene individualne daljinske migracije opozarjajo, da je ca. 350.000 ha veliko osrednje varovalno območje rjavega medveda v Sloveniji (Uradni list SRS 25/66) premajhno, da bi zagotavljalo možnosti ohranitve vitalne, samoobnovljive populacije rjavega medveda ob minimalnih možnostih za nastanek problemovmed rjavim medvedom in človekom ter njegovo lastnino. Ugotovljena je bila nedvomna funkcionalna povezava med osrednjim varovalnim območjem ter Severozahodnim Visokokraškim območjem Nanosa, Hrušice, Idrijskega hribovja ter Trnovskega gozda.

Ponovno smo ugotovili, da (telemetrirani) rjavi medvedi prehajajo čez odseke avtoceste Vrhnika - Razdrto. S klasično radiotelemetrijsko spremljavo ni mogoče natančno ugotoviti načinov prehajanja in ožjih območij prehodov čez ograjo. Zato smo nadaljevali z monitoringom uporabe avtocestnih podvozov in viaduktov s pomočjo sledenja na peščenih slednih blazinah (sand beds). Sledna blazina je debela ca. 15 cm in široka 2 m, pripravljena iz primerno drobnega peska, nasutega po celotni širini podvoza ali po celotni dolžini odprtine pod viaduktom. Ugotovitve iz leta 1996 in 1997 kažejo, da medvedi razmeroma pogosto uporabljajo avtocestne objekte za varnejše prečkanje avtocestne ovire.

2.2.2. Rjavi medved in avtoceste v Sloveniji

Za popolnejšo oceno rizičnosti pri prečkanju avtoceste smo zbrali vse dosegljive arhivirane podatke o načinih in mestu prehajanja rjavih medvedov čez avtocesto, dodali pa smo jim rezultate radiotelemetrijske spremljave gibanja rjavih medvedov in spremljave prehajanja medvedov skozi avtocestne objekte s peščenimi slednimi blazinami. Zbrane ugotovitve so prikazane v tabeli 1.

Tabela 1. Registrirani načini in pogostnost prečkanja rjavih medvedov čez vozišče na odsekih avtoceste Vrhnika-Razdrto-Čebulovica v obdobju april 1992 - december 1997.

Ugotovljeni način prečkanja AC	Uspešno prečkanje	Neuspešno - trk z vozilom (poškodbe, smrt živali)	Skupaj	Uspešnost prečkanja (v % od skupaj)
Čez ograjo AC	19	11	30	63,3
Po mostu*	6	1	7	85,7
Skozi podvoz (podhod)	18	0	18	100,0
Pod viaduktom	12	0	12	100,0
Skupaj	55	12	67	82,1

***Opomba**: medveda, ki je večkrat prečkal AC po železniškem mostu nad odcepom za Unec je na mostu povozil vlak

Iz tabele 1 je razvidno, da:

-medvedi za prečkanje uporabljajo vse avtocestne objekte, tudi mostove in podvoze, ki praviloma niso bili dimenzionirani tudi za prehajanje divjih živali,

-v slabi polovici vseh registriranih prečkanj so medvedi splezali čez ograjo. Pomemben delež teh "izletov" se je končal s trkom medveda z vozilom oziroma s težjimi poškodbami ali smrtjo živali ter poškodbami vozil. Slednje opozarja, da klasična avtocestna ograja, brez dodatne električne zaščite ne preprečuje vdora medvedov na vozišče oziroma neposredno pred vozila. Domnevamo, da bo dodatno zavarovana avtocestna ograja onemogočila dostop na vozišče tudi srnjadi ter manjšim vrstam, ki so sicer pogosto žrtve prometa na AC (lisica, kuni, divja mačka, jazbec). Domnevamo tudi, da je prostih prečkanj avtocestne ograje več kot je razvidno iz tabele. Praviloma se le-ta dogodijo ponoči ob zmanjšani

prometni obremenitvi avtoceste in slabši daljinski vidljivosti. Verjetnost, da bi vozniki opazili vse primere vdorov čez ograjo na vozišče in o njih obvestili uslužbence na cestninskih postajah je zato ponoči zmanjšana. Prehajanje medveda in drugih velikih sesalcev skozi podvoze, pod viadukti (in v letih 1993 in 1994 tudi po mostovih) pa registriramo z odčitavanjem sledi na peščenih blazinah, nameščenih pod objekti. Vsako leto je bilo registriranih nekaj primerov uporabe avtocestnih objektov, izrazito pa se je uporaba podvozov in viaduktov za prehajanje medvedov čez avtocesto povečala v letu 1997. V tem letu ugotovljena prehajanja posebej prikazujemc v tabeli 2.

Tabela 2. Podatki o sledenju rjavega medveda na peščenih blazinah v podvozih in pod viaduktom Goli vrh v letu 1997.

Objekt (lokalno ime)	Vrsta objekta	Datum (interval odčitanja sledi)	Širina cdtisa 1.šape (cm)	Smer prečkanja	Opomba
Drnulca	podvoz	22.-27.06.1997	13.5	iz območja	medved 1
Drnulca	podvoz	16.-21.07.1997	13.5	iz območja	medved 1
Drnulca	podvoz	24.-25.07.1997	13.5	iz območja	medved 1
Drnulca	podvoz	03.-07.08.1997	13.5	v območje	medved 1
Drnulca	podvoz	03.-07.08.1997	13.5	iz območja	medved 1
Drnulca	podvoz	26.-27.08.1997	13.5	v območje	medved 1
Goli vrh	viadukt	23.-30.09.1997	13,0	iz območja	medved 2
Unec2	podvoz	30.10 - 04.11.97	13.5	v območje	medved 3
Unec2	podvoz	07.-11.11.1997	13.5	iz območja	medved 3
Unec2	podvoz	18.-19.11.1997	12.0	v območje	medved 4
Drnulca	podvoz	09.-10.12.1997	14.0	v območje	medved 5

Opomba: "Območje" = južna stran AC

Iz podatkov o izmerjeni širini odtisa sprednje (prve) šape rjavih medvedov na peščenih blazinah, razvidnih v tabeli in ob upoštevanju razdalje med posameznim objektom sodimo, da je avtocestne objekte v času monitoringa uporabilo 5 različnih medvedov. To opozarja, da v konkretnem primeru ne gre za specializacijo posameznega osebka, pač pa za ponavljajoč vzorec vedenja večjega števila živali. Domnevamo, da se je medved 1, ki je v času monitoringa v letu 1997 6x uporabil podvoz gozdne ceste Drnulca, v območje na južni strani avtoceste v 2 primerih vrnil po enem od bližnjih avtocestnih mostov. Le v dveh primerih smo namreč na peščeni blazini v podvozu registrirali obojestranski prehod istega medveda (z enako širokim odtisom 1. šape), povratka nismo registrirali v nobenem od sosednjih podvozov, prejeli pa nismo nobenega obvestila, da je bila žival opažena pri plezanju čez ograjo ali na cestišču. Kot razlog za večkratno uporabo podvoza je mogoče upoštevati obiskovanje krmišča za divje prašiče v bližnjem Raskovcu (LD Vrhnika) na severni strani AC.

V kolikor bi z namestitvijo dodatne električne zapore (»električni pastir«) onemogočili prosto prehajanje čez avtocestno ograjo bi se uporaba obstoječih objektov nedvomno

povečala, vsekakor pa bi se zmanjšala možnost za trke medvedov z vozili. Gradnja posebnih širokih, sonaravno oblikovanih objektov za prehajanje velikih sesalcev - ekoduktov, v kombinaciji s postavitvijo dodatne električne varovalne ograje, bi lahko problem nekontroliranega prehajanja zmanjšala ali povsem blokirala.

2.2.3. Rezultati GIS analize v okviru I. faze projekta varnejšega prehajanja rjavega medveda čez avtocestni odsek Vrhnika - Razdrto

Z uporabo Geografskega informacijskega sistema (GIS) smo (1) ocenili širše območje okoli izbranih odsekov avtocest z vidika primernosti habitatov za rjavega medveda in (2) evidentirali potencialne (e)migracijske koridorje, po katerih osebki iz osrednjega območja razširjenosti migrirajo proti severozahodu in pri tem prečkajo odseke avtoceste Vrhnika-Razdrto-Čebulovica. V ožjem smislu je cilj analize opredeliti primerne lokacije za gradnjo ekodukta za varen prehod čez AC. Območje analize je veliko 2500 km2 in leži v JZ delu Slovenije vzdolž avtoceste Vrhnika - Razdrto. Pri delu smo bili omejeni z realno razpoložljivostjo in lokacijsko ter vsebinsko natančnostjo podatkov. Kot najprimernejšo smo izbrali analizo na ravni 100 metrske prostorske ločljivosti in sicer iz naslednjih razlogov:

- podatki popisa gozdov kot ene od bistvenih vhodnih informacijskih ravni obstajajo le v obliki centroidov gozdnih oddelkov, oddelčne meje pa so neznane. Razporeditev oddelkov smo zato morali aproksimirati z metodoThiessenovih poligonov,
- natančnost obrisov naselij in gozdnega roba ni slabša od 100 m,
- pri ločljivosti manjši od 100 m bi iz analize izgubili pomembne linijske objekte in velik del (manjših) naselij. Glede na grobo ločljivost modela so ugotovitve uporabne predvsem na regionalni ravni, lokalno raven pa bomo zajeli na koncu dela s terenskimi ogledi. Samo analizo smo razdelili na dva dela v katera smo ločeno zajeli:
- ugotavljanje osrednjega, optimalnega habitata rjavega medveda na proučevanem območju, in

- ugotavljanje prepustnosti interspergiranih suboptimalnih habitatov med posameznimi krpami optimalnega habitata za rjavega medveda, s čimer smo opredelili potencialne koridorje.

Zgradbo habitata rjavega medveda v proučevanem območju. smo analizirali s prilagojeno metodo ocene primernosti habitatov, ki jo je za številne vrste definiral U.S. Fish and Wildlife Service. Bistvo metode je, da operiramo s prostorsko opredeljenimi podatki in da za vsako točko v prostoru izračunamo indeks primernosti habitata oz. HSI (Habitat Suitability Index), s čimer dobimo sliko razprostranjenosti habitata. HSI povdarja kvantitativne povezave med okoljskimi spremenljivkami in primernostjo habitata. Osredotoča se na prostorske podatke o tipu vegetacije, starosti gozda, sklepu krošenj, strukturi, reliefu, tleh, motnjah, velikosti in konfiguraciji zaplat gozda, gozdnem robu ipd., vključuje pa tudi poznane informacije o obnašanju vrste. V našem primeru s tako mnogovrstnimi podatki nismo razpolagali, zato smo se omejili na potek gozdnega roba, razporeditev naselij in podatke o gozdnih oddelkih (površina, lesna zaloga, razvojna faza,

glavna drevesna vrsta, razmerje med iglavci in listavci). Na podlagi teh podatkov in nekaterih ekspertnih informacij smo definirali model habitata. Predpostavke modela so:

- primeren habitat rjavega medveda je le znotrajgozdni prostor,
- zaplate gozda, ki so si bližje od 300 m funkcionirajo kot skupen gozdni kompleks če med njimi ni bariere n.pr. naselja s svojim vplivnim območjem; prometnice so le relativne bariere, ki jih medved lahko prečka,
- zaradi robnih vplivov se notranje gozdno okolje začne šele 300 m od gozdnega roba navznoter,
- primeren habitat tvorijo le kompleksi gozda ali povezane zaplate, ki so večje od 10.000 ha ,
- bivalni (varovalni) vidik habitata je bolj pomemben, kot prehranski,
- starejše razvojne faze so primernejše za bivanje rjavega medveda, kot mlajše,
- gozdovi z višjo lesno zalogo nudijo ugodnejše prebivalne (varovalne) razmere,
- za prehrano najugodnejši drevesni vrsti sta bukev in hrast (žir, želod),
- za prehrano sta listnati ali mešani gozd listavcev in iglavcev ugodnejša od čistega gozda iglavcev.

V skladu s predpostavkami modela smo iz osnovne maske gozda dobili razpored gozdnih kompleksov in zaplat, ki ustrezajo prostorskemu vidiku habitata. Pri združevanju bližnjih zaplat gozda in pri robnih vplivih na notranje okolje gozda smo upoštevali tudi naselja ter vplivno območje okoli njih. Širina vplivnega območja je odvisna od velikosti naselja. Za naselje veliko nad 50 ha sega 1000 m navzven, za naselja med 5 in 50 ha je široko 300 m, naselja pod 5 ha pa nimajo vplivnega območja.

Kvalitativne predpostavke modela so narekovale takle izračun indeksa primernosti (HSI) za vsak oddelek: HSI = (RF*WRF+LZ*WLZ)*WB + (GV*WGV+DI*WDI)*WP
pri čemer je: WB+WP = 1, WRF+WLZ = 1, WGV+WDI = 1
(Wb in WP sta ponderja za bivalni in prehranski vidik habitata)
RF = delež drogovnjakov in debeljakov
LZ = LZ / (LZsred+2sLZ), LZ =A3 1
GV = (1, če je gl. dr. vrsta hr ali bu; sicer je O)
DI = delež listavcev

Potencialne koridorje za emigracije rjavega medveda iz osrednjega območja aktivnosti smo ugotavljali po metodi, ki jo razlaga Chou (1997). Najprej smo prostor razločili na jedro (področje habitata), matrico (kjer ima medved možnost prečkanja prostora) in bariere (prostor, ki je za medveda neprehoden). Pri matrici smo za vsako točko v prostoru določiti relativni upor, ki ga nudi pri prečkanju (t.im. grid cell equivalents - GCE). Npr. če ima področje A relativni upor GCE =10, to pomeni, da bo to področje medved 10-krat težje prečkal, kot enako veliko področje B, ki ima GCE = 1. Zato bo medved "pripravljen" od roba svojega habitata čez področje B potovati 10 krat dlje, kot čez A. Izbrali smo naslednje vrednosti relativnega upora: GCE =1 za gozd izven habitata, ki zadovoljuje prostorske kriterije (kategorija 2 na sliki 3), GCE =10 za preostali gozd izven habitata (kategorija 3) in GCE =100 za negozd (kategorija 4). Privzeli smo, da se je medved

pripravljen oddaljiti največ 300 m od habitata čez negozdno površino, čez ostali kategoriji matrice pa ustrezno več. Kot neprehodne bariere smo določili vsa naselja ter vplivno območje okoli njih. Ostale možne ovire v krajini smo zanemarili. Najpomembnejša je avtocesta, ki pa je le relativna bariera in sam potek koridorjev smo zato ugotavljali kot če ne bi bilo avtoceste.

Izračunani indeks primernosti habitatov HSI zavzema vrednosti od 0 do 1. Za ugoden habitat je bilo privzeto območje vseh tistih oddelkov, ki imajo HSI vsaj 0,5 in ki ležijo znotraj tistega dela gozda, ki zadovoljuje prostorske kriterije. Rezultati GIS analize nakazujejo najverjetnejše prehode rjavega medveda čez avtocesto v regionalnem merilu in so zato le podlaga za iskanje detajlnih rešitev z drugimi metodami. Karta potencialnih koridorjev prikazuje zgolj območja, ki so dovolj blizu medvedovemu habitatu in so za medveda dovolj prehodna. Potek dejanskih koridorjev pa je seveda odvisen tudi od lege ciljnega območja emigracije. Pri ugotavljanju možnih lokacij za gradnjo ekodukta nam stvar olajšuje dejstvo, da AC seka medvedovo bivalno območje prav na mestih, kjer je le-to najožje (to dejstvo je seveda manj ugodno za medveda). V grobem lahko iz rezultatov opravljenih analiz opredelimo 3 možne lokacije za postavitev ekoduktov:

1. Prva lokacija za postavitev ekodukta bi lahko bila na Logaški planoti, čez katero vodi koridor iz Menišije proti Hrušici in naprej v Trnovski gozd. Pomenske razsežnosti tega koridorja je potrdil tudi radiotelemetrijski projekt spremljave gibanja rjavih medvedov.. Ekodukt bi moral biti postavljen v območju med motelom Lom in Lešnikovim vrhom (kota 570) oziroma tam, kjer se železnica približa avtocesti. Za to lokacijo je kar nekaj razlogov in sicer:

-severno od motela Lom, na zahodni strani AC leži ozek, z gozdom porasel in nevznemirjen predel Kališe, ki medveda usmeri, da se takoj umakne vzdolž AC proti jugu ali pa proti severu, kjer je po ugotovitvah modela sodeč slep rokav (ponor).

-južno od Lešnikovega vrha teče železnica neposredno ob AC vse do izstopa iz gozda pri Rakeku, kar predstavlja za medveda dvojno tveganje, da ga nekaj povozi.

-južno od Lešnikovega vrha se začne Planinsko polje, ki zaradi odprtosti predstavlja oviro za migracijo medveda.

2. Pomemben koridor iz Snežniško-Javorniškega pogorja proti Trnovskemu gozdu teče med Postojno in Uncem. Glede na veliko zaledje gre za najpomembnejši koridor v proučevanem območju in hkrati za najbolj ogroženega. Na tem odseku je problematična velika kontaktna površina s človekom, saj so Postojnska vrata v prometnem pogledu ena najpomembnejših točk v Sloveniji. Avtocesta in železnica tečeta ves čas povsem skupaj, pri Ravbarkomandi pa se jima pridruži še magistralna cesta. Tu je še lokalna cesta, ki teče tik ob AC od Ravbarkomande do Unca. Oviro v funkcioniranjukoridorja predstavljata še velik vojaški kompleks zahodno od AC in smučišče Kalič na vzhodu. Zgostitev lokacij povozov rjavih medvedov blizu Unca in pri Ravbarkomandi nakazujejo, kje sta primerni lokaciji za postavitev ekodukta. Izboljšanje možnosti za varen prehod medveda pod viaduktom Ravbarkomanda oziroma razmer za varno prečkanje železniške proge in magistralne ceste,

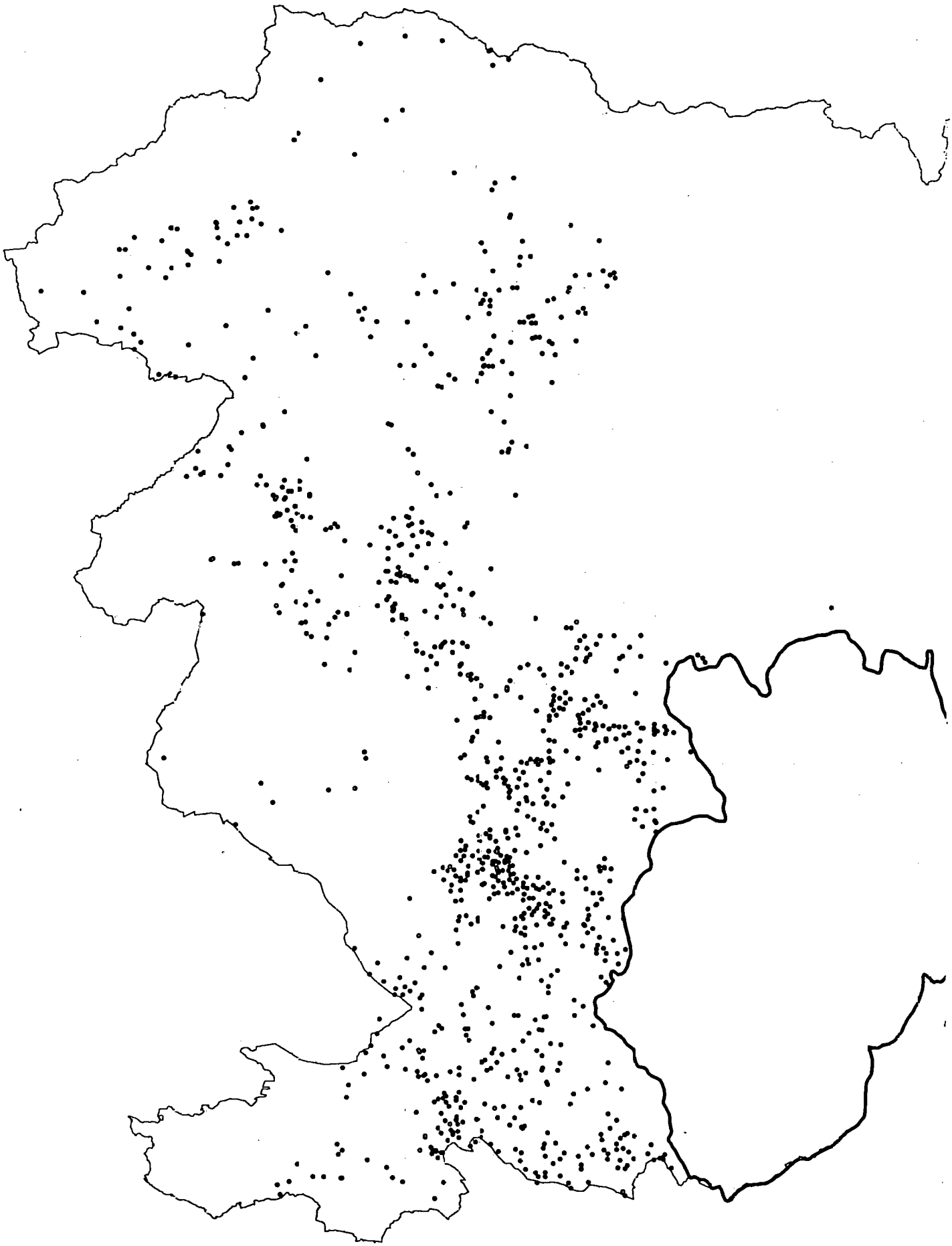
ki zapirata prehod, bi bil nedvomno bolj racionalen ukrep kot gradnja posebnega objekta za prehajanje velikih sesalcev. Ograjo zasebnega konjskega pašnika s hlevom, ki danes blokira prehajanje živali pod viaduktom Ravbarkomanda bi bilo treba v tem primeru odstraniti in okolico prehoda primerno urediti, prilagoditi prometni režim ter opremiti z ustreznimi prometnimi znaki.

3. Tretje pomembno področje je med Razdrtim in Senožečami. Tu teče koridor iz južnega območja Vremščice in še južneje iz Brkinov in Čičarije proti Nanosu in Trnovskemu gozdu. Koridor tu močno zožujeta na eni strani zaključek Vipavske doline in na drugi Postojnska kotlina.. Iz dosedanje lastne raziskave o prehajanju velikh sesalcev pod viaduktoma Bandera in Goli vrh pa ugotavljamo, da so rjavi medved, ris, volk in jelenjad odprte prehode pod obema viaduktoma že pričeli redno uporabljati. Domnevamo pa, da je povsem prekinjen prehod Mazni vrh, ki je pred gradnjo avtocestnega odseka Razdrto-Čebulovica predstavljal najpomembnejšo koridorsko povezavo na relaciji Javorniki-Košanska dolina-Vremščica-Senožeška brda-Rebrnice-Nanos. Sicer dovolj visok, vendar preozek most na tem prehodu ne more opravljati. koridorske funkcije. Gradnja ekodukta v bližini mosta na Maznem vrhu bi bila vsekakor smiselna. Bodoči odcep AC proti Podnanosu pa bo, v kolikor ne bodo upoštevane koridorske funkcije območja, postavil še drugo oviro prav na najožjem delu koridorja.

2.2.4. Proučevanje prostorskih okvirov za uveljavljanje ohranitvene strategije rjavega medveda v Sloveniji

Prostorski aspekt oziroma coniranje sprejemljivih prostorskih okvirov varstva sodi med ključne elemente strategije ohranitve velikih zveri v kulturni krajini Pri upravljanju s problematičnimi vrstami, ta pojem obsega tudi izključno varstveno naravnane odločitve, moramo najprej opredeliti kakšna naj bo najvišja, še sprejemljiva velikost populacij problematičnih vrst, ki se s svojim reprodukcijskim potencialom lahko uspešno upira pritiskom, ki nanjo učinkujejo. Za to pa je treba meje današnjega območja ustrezno korigirati in vanj vključiti habitate, ki jih je rjavi medved naseljeval že pred letom 1966, vendar iz različnih vzrokov takrat niso bili vključeni v osrednje varovalno območje, bodisi jih je na novo koloniziral šele po tem obdobju. V skladu s to ugotovitvijo smo že leta 1994, v okviru Komisije Ministrstva RS za kulturo za varstvo redkih in ogroženih živalskih vrst, predlagali ustrezno razširitev osrednjega varovalnega območja za rjavega medveda, ki pa je bila takrat sprejeta le kot pobuda, ki jo je treba še preveriti. V ta namen smo izdelali računalniško karto lokacij (x, y koordinate lokacij v karti 1:25.000) pojavljanja rjavega medveda izven osrednjega varovalnega območja (Ur.list SRS 25/66) v obdobju 1991-1997. V karti, ki je priložena poročilu sta združeni dve informacijski plasti in sicer recentna površina gozdov v zahodni polovici Slovenije in individualne lokacije znakov prisotnosti rjavega medveda, registriranih znotraj istega območja v obdobju 1.1991- 7.1997. Tako ugotovljeni vzorec robnega širjenja populacije rjavega medveda se povsem ujema s prognozo o konkretni širitvi osrednjega varovalnega območja, ki smo jo leta 1994 predložili Komisiji za varstvo redkih in ogroženih živalskih vrst pri Ministrstvu RS za kulturo. Le-ta je predlog "vzela na znanje", o njegovi konkretni uveljavitvi pa ni odločala. Zato smo predlog iz leta 1994, v razširjeni obliki leta 1997 posredovali Komisiji za divjad,

Točke opažanja medveda



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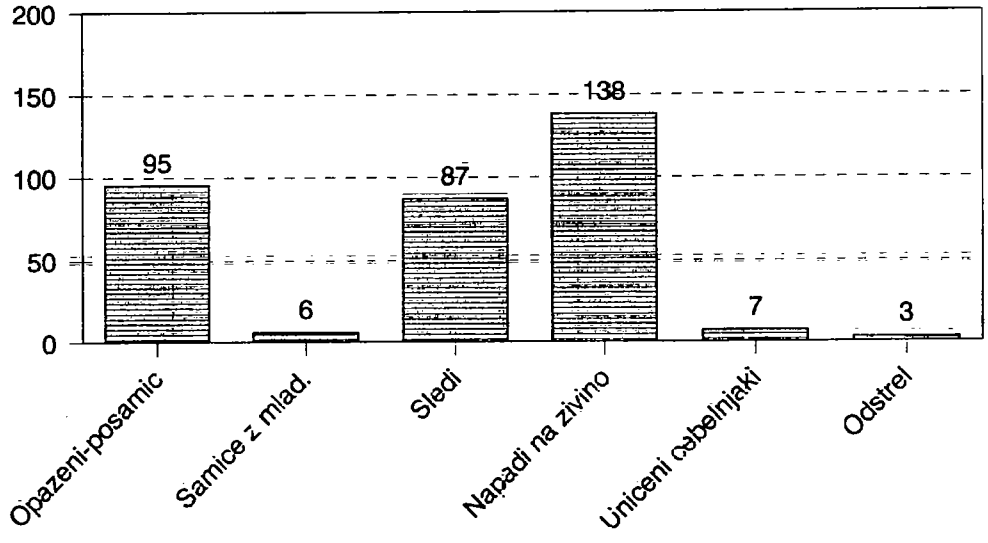
ki sta jo skupaj imenovala Ministrstvo RS za kmetijstvo,gozdarstvo in prehrano in Ministrstvo RS za okolje in prostor.

2.2.5. Rjavi medved v Alpah- ali so Alpe habitat rjavega medveda

Zaradi širokopoteznih raziskav o možnostih povratka rjavega medveda v historične habitate v Alpah, ki jih v okviru projekta Evropske unije Brown bear-Life opravljajo v sosednji Avstriji in Italiji, smo na mednarodnih in meddržavnih srečanjih pogosto izpostavljeni kritikam, da Slovenija premalo stori za povratek rjavega medveda v Alpe. Zato je bil pomemben del naših raziskav posvečen vprašanju ali so (slovenske) Alpe dejansko še primeren habitat za rjavega medveda in kako smiselni so poskusi za vrnitev vrste v Alpe. V ta namen smo s pomočjo mreže terenskih sodelavcev že v okviru znanstveno raziskovalnega projekta MZT »Ekologija in varstvo rjavega medveda v Sloveniji« pričeli sistematično zbirati in kartirati podatke o pojavljanju rjavih medvedov v severozahodni in zahodni Sloveniji. Iz podatkov, zbranih do sredine leta 1997 smo ločeno analizirali disperzijo različnih, registriranih znakov pojavljanja rjavega medveda v Alpah.

V grafu št. 1 so prikazane ugotovitve o distribuciji inventariziranih znakov prisotnosti rjavega medveda v slovenskih Alpah v obdobju 1.1991 - 7.1997. Iz grafa je razvidno prevladovanje konfliktnih znakov: napadov na živino, predvsem na drobnico (ovce!), primerov uničenih čebelnjakov ter odstrela »problematičnih« medvedov. Pogostnost plenjenja ovc na nenadzorovanih alpskih pašnikih in v ogradah pa opozarja, da je razsežnost tega problema večja kot je sicer mogoče soditi po številu registriranih primerov.



Graf. 1. Struktura registriranih znakov prisotnosti rjavega medveda v Alpah v obdobju 1.1991-7.1997 (n = 336).

Po ocenah predstavnikov Ministrstva RS za kmetijstvo, gozdarstvo in prehrano je ovčereja ena od perspektivnih dejavnosti, ki jc nameravajo v demografsko ogroženih območjih

pospeševati tudi v prihodnje. Opravljene ankete v alpskem prostoru (A.Zornik, M.Ličef, diplomski nalogi na Oddelku za gozdarstvo in obnovljive gozdne vire BF, v pripravi) opozarjajo, da ljudje v alpskem prostoru prisotnosti rjavega medveda ne sprejemajo. Razlogi za odklonilen odnos do medveda je mogoče pojasniti z ugotovitvami iz tabele 3. Večina pašnikov v alpskem prostoru je nenadzorovanih. Zato ne preseneča neugodno razmerje med ubitimi (najdeni ostanki!) in pogrešanimi ovcami, ki jih lastniki čred praviloma ne najdejo, izginotje pa pripisujejo posledicam strahu oziroma paničnih reakcij ovc ob pojavih rjavega medveda na pašnikih. Ministrstvo RS za okolje in prostor je z Uredbo o zavarovanju ogroženih živalskih vrst v Sloveniji (Uradni list RS št. 57/93) rjavega medveda zavarovalo na celotnem ozemlju Slovenije, tudi v Alpah. Nastale probleme poskušata obe ministrstvi reševati z izplačevanjem **že nastale škode** ter izdajanjem posebnih odstrelnih dovolilnic za izločitev »problematičnih medvedov«, ki so **škodo že povzročili.** Lahko pa se celo zgodi, da je zaradi načina izločitve, le-ta je prepuščena lovcem, članom lokalnih lovskih družin odstreljen neproblematičen medved, ki se je slučajno pojavil v območju in odstrel posledično nima nikakršnega ciljnega učinka. V državni strategiji razreševanja nastalih konfliktov z rjavim medvedom gre torej za izrazito neracionalen pristop. Poudariti je treba, da praviloma vsak odstrel rjavega medveda v Alpah sprošča neugodne reakcije nevladnih in vladnih naravovarstvenih organizacij v sosednjih državah. Očitno je tudi, da nekateri pogosto »obiskani« pašniki ležijo v samem območju posameznih krakov Alpsko-Dinarskega koridorja velikih zveri, n.pr. Dajnarska planina na Jelovici, Zatreska pri Srpenici, Drežniške in Podkrnske planine, planine v širši okolici Belce v Karavankah, itd. Ta ugotovitev pa dejansko opozarja, da se bodo problemi z rjavim medvedom ponovili praktično vsakič, ko se bo v območju pojavil medved.

Tabela 3. Primerjava učinkov plenilskih napadov rjavega medveda na ovce na ograjenih in neograjenih pašnikih na Kobariškem in Bovškem v obdobju 1994-1996.

Leto	Ograjeni pašniki			Neograjeni pašniki			Vse skupaj		
	Ubite	Pogre= šane	Skupaj	Ubite	Pogre= šane	Skupaj	Ubite	Pogre= šane	Skupaj
1994	18	20	38	9	39	48	27	59	86
1995	13	4	17	11	104	115	24	108	132
1996	16	0	16	6	50	56	22	50	72
Total	47	24	71	26	193	219	73	217	290
% delež	**66**	**34**	**100**	**12**	**88**	**100**	**25**	**75**	**100**

Zaključena je bila študija o primernost. širšega območja Triglavskega narodnega parka za življenje rjavega medveda. Triglavski narodni park predstavlja največje zavarovano območje v Sloveniji skozi katerega vodi tud. nekaj krakov severozahodnega Alpsko-Dinarskega migracijskega koridorja rjavega medveda. V okviru nalog varovanja in ohranitve avtohtone favne se v TNP srečujejo s problemi konfliktov med interesi lokalnega prebivalstva in cilji ohranitve avtohtonih vrst velikih zveri. Iz ugotovitev študije je očitno, da ima območje TNP zaradi prepletenosti antropogenih in ekoloških ciljev zgolj funkcijo koridorjev nižjega reda, skozi katere posamezne živali potujejo. Vsekakor pa bo potrebno

Napadi na živino

0 10 20 Kilometers

M = 1:500000

zaradi strateške lege območja, glede na mednarodno akcijo ponovne poselitve vzhodnih Alp z rjavim medvedom to funkcijo z ustreznimi ukrepi pomensko krepiti. Študija je bila objavljena kot specialistična naloga na Oddelku za gozdarstvo BF.

2.2.6. Ugotovitve raziskav prehranskih značilnosti rjavega medveda

Rezultate v letu 1996 zaključene raziskave prehranskih značilnosti rjavega medveda v osrednjem varovalnem območju, v kateri smo proučili 217 iztrebkov s Kočevskega, 146 iztrebkov s Snežniško-Javorniškega območja smo leta 1997 Ker so bili vsi do sedaj odlovljeni medvedi ulovljeni v neposredni okolici krmišč smo na območju radiotelemetrijskega projekta v Menišiji zbrali in analizirali 66 iztrebkov (pretežno od radiolociranih) medvedov, z namenom ugotoviti pomenski delež antropogenih virov hrane s krmišč v celoletnem prehranskem izboru te živalske vrste. Iz ugotovitev je razvidna visoka stopnja prehranske plastičnosti vrste, posebej v smislu adaptacije na antropogene vire hrane. Iz raziskave je razvidno, da je koruza (verjetno) iz krmišč za divje prašiče, le-te postavljajo lovske organizacije tudi v bližino naselij, pogosta in priljubljena celoletna prehranska sestavina. Domnevamo, da je prav nameščanje krmišč s koruzo v bližino naselij eden od pomembnejših vzrokov za približevanje rjavih medvedov k naseljem ter nastanek konfliktnih problemov med človekom in to živalsko vrsto.

2.2.7. Ugotovitve o prevladujočih vzrokih smrtnosti ter o starosti izločenih rjavih medvedov v Sloveniji

Po podatkih Osrednjega registra velikih zveri je bilo v obdobju zadnjih 6 let (1992 - 1997) v Sloveniji izločenih skupaj 257 rjavih medvedov. Glavni vzrok smrtnosti je trofejni odstrel z dobrih 88 % vseh izločitev. Med ostalimi vzroki je pomembnejši delež izgub v prometu s 7,8 % v skupni mortaliteti. Od sredine 80. let je v Sloveniji uveljavljen centralni sistem planiranja in določanja letnih kvot odstrela rjavega medveda, zato je glavni dejavnik mortalitete povsem obvladljiv. Pozitivna numerična in prostorska dinamika rjavega medveda v Sloveniji in naraščanje števila konfliktov med medvedom in človekom ter njegovo lastnino pa opozarjata, da bo morala kontrola populacije ostati redna sestavina ohranitvene strategije tudi v prihodnje. Zanimiv je značilno višji delež samcev med odstreljenimi oziroma med vsemi izločenimi medvedi (67%). S prevladujočim deležem samic v tako preoblikovani populaciji pa lahko pojasnimo tudi visoko reproduktivno stopnjo populacije rjavega medveda v Sloveniji.

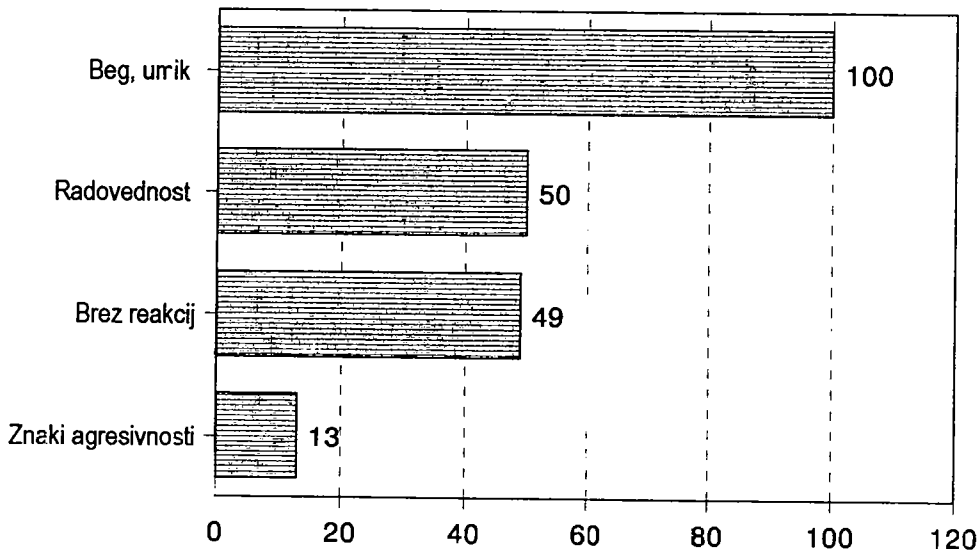
Sistematično ugotavljanje starosti izločenih rjavih medvedov je bila ena od pomembnih sestavin raziskovalnega projekta. V sodelovanju z Veterinarsko fakulteto v Ljubljani in Matson's Labs v ZDA je bila starost živali ugotovljena po metodi sekcije prvega predmeljaka (P1). V vzorcu je bilo vključenih 45 samic in 102 samca, odstreljenih v letih 1992-1996. Analiza starosti je pokazala, da se odstreljene živali nahajajo v starostnem razredu mlajših živali, s povprečno starostjo samcev: $S_{povpr.} = 3,87 \pm 2,57$ let in samic: $S_{povpr.} = 4,0 \pm 2,85$ let. Iz tega podatka je mogoče sklepati o visokem deležu osebkov iz

mlajšega starostnega razreda v populaciji rjavega medveda v Sloveniji. Slednje je tudi kazalec njene vitalnosti in visoke stopnje samoobnovljivosti.

Študija z naslovom: *Analiza ključnih vzrokov smrtnosti rjavega medveda (Ursus arctos L.) v Sloveniji v obdobju zadnjih 6 let (1.4.1991 - 31.3.1997)* je bila objavljena v Zbornik gozdarstva in lesarstva

2.2.8. Analiza konfliktov med človekom in rjavim medvedom v Sloveniji

Ker so nas podrobneje zanimale reakcije rjavega medveda ob srečanju z ljudmi, smo v okviru raziskovalnega projekta v letu 1994 in 1995 opravili anketo med revirnimi gozdarji, zaposlenimi v osrednjem območju razširjenosti rjavega medveda ter v območjih, ki jih ta vrsta v zadnjih letih pospešeno kolonizira. Med anketiranci, skupaj 193, so prevladovali slušatelji prvega letnika višješolskega študija gozdarstva ob delu. Eno od vprašanj na vnaprej pripravljenem anonimnem vprašalniku je bilo namenjeno reakcijam, kakršne so anketiranci opazili pri medvedih ob srečanjih v gozdu. Ugotovljene oblike in deleži reakcij rjavega medveda ob srečanju s človekom (n = 212) so prikazani v grafu št. 2.



Graf. št. 2. Delež ugotovljenih oblik reagiranja rjavih medvedov ob srečanju s človekom (rezultati ankete med revirnimi gozdarji z delovnim mestom znotraj osrednjega varovalnega območja rjavega medveda

O rezultatih študije, ki vključuje analizo opaženih reakcij medvedov ob srečanjih z ljudmi, oceno vpliva možnosti naključnega srečanja z medvedom na sposobnost izvrševanja delovnih nalog v gozdu, individualne obrambne taktike ob srečanju z medvedom, itn. smo poročali na 10th International Bear Conference, septembra 1995 v Mori na Švedskem.

2.2.9. Ostala dejavnostv okviru raziskovalnega projekta

Sodelovali smo pri pripravi 11th International Conference on Bear Research and Management (Graz, september 1997) ter pri izvedbi 3 dnevne, pokongresne ekskurzije v Slovenijo.. Na konferenci smo sodelovali z enim plenarnim referatom, 5 posterji ter vodstvom delavnice European Union and its source populations of the brown bear. Med tridnevno pokongresno ekskurzijo so si udeleženci lahko ogledali območje alpskih pašnikov s ponavljajočimi konflikti z rjavim medvedom v Posočju, odsek avtoceste Vrhnika -Razdrto ter območje mednarodnega radiotelemetrijskega projekta Braunbär - Ljubljanski vrh.

Sodelovali smo pri pripravi dokumenta A Large Carnivore Innitiative WWF - Action Plan for European Brown Bears (nosilca projekta Jon Swenson NINA Trondheim, Norveška in Andreas Zedrosser,WWF Austria). V projektu smo sodelovali z interpretacijo razmer, ki determinirajo možnosti ohranitve vitalne populacije rjavega medveda v Sloveniji.

Sodelovali smo pri ogledu in oceni primernosti območja Parco Naturale Adamello-Brenta, kjer nameravajo z dodajanjem v Sloveniji odlovljenih živali oživiti nevitalno reliktno populacijo rjavega medveda.

Sodelovali smo v delu medresorske Komisije za divjad, katere naloga je zagotavljati razmere za sonaravno usmerjanje dinamike populacij velikih zveri v Sloveniji ob upoštevanju možnosti nastankov konfliktov s človekom.

3. Izkoriščanje dobljenih raziskovalnih rezultatov

3.1. Potencialni pomen rezultatov raziskovalnega projekta

Kot pomembne rezultate projekta lahko naštejemo:

ad C. Izpolnitev oziroma razširitev metodološkega instrumentarija V širšem obsegu je bila v okviru radiotelemetrijskega projekta Braunbär - Ljubljanski vrh uporabljena tehnika sledenja in lociranja vzorca telemetriranih osebkov. Izpopolnili smo tehniko odlova medvedov v zanke tipa Aldrich. GIS analizo primernosti habitatov ter poteka migracijskih koridorjev smo opravili v okviro mega- blokov habitatov v osrednjem varovalnem območju rjavega medveda.

ad. D. Razvoj svojega temeljnega raziskovanja. Razvili smo prilagojeno mokro proceduro analize iztrebkov rjavega medveda v okviru prehranskih analiz in z njo do sedaj analizirali skupaj okoli 500 iztrebkov, zbranih v osrednjem območju razširjenosti rjavega medveda.

ad. F. Razvoj aplikativnega raziskovanja V okviru obravnavanega projekta smo oblikovali izhodišča za monitoring prisotnosti rjavega medveda v izbranih območjih osrednjega

območja razširjenosti rjavega medveda (Snežniško-Javorniško območje). V sodelovanju z Zavodom za gozdove Slovenije smo pripravili metodolcgijo za trajno inventarizacijo prisotnosti velikih zveri.

3.2 Sovpadanje rezultatov obravnavanega raziskovalnega projekta s področji 5. okvirnega raziskovalnega programa Evropske unije

Med naštetimi prednostnimi področji 5. okvirnega raziskovalnega programa Evropske unije ni takih s katerimi sovpadajo rezultati našega raziskovalnega projekta. Pač pa je naš projekt umeščen v okvire projekta Evropske unije Life, katerega cilj je ohranitev in restavriranje biotske pestrosti na meddržavnih in regionalnih ravneh. V tem smislu jepotekalo tudi naše sodelovanje v okviru mednarodnega radiotelemetrijskega projekta Braunbär-Ljubljanski vrh, sodelovanje s sosednjo Italijo priizboru primernih območij za dodatno naselitev rjavih medvedov iz Slovenije.

3.5. Kje obstaja verjetnost, da bodo Vaša znanstvena spoznanja deležna velikega odziva?

Odziv smo že doživeli **v mednarodnih znanstvenih krogih** in ga pričakujemo tudi v prihodnje. O tem priča povabilo Dipartimento di Zootecnica, Universita di Studi di Udine k prijavi skupnega projekta o modeliranju razmer za nastanek potencialnih konfliktov med človekom in rjavim medvedom ter drugimi velikimi plenilci v okviru projekta COPERNICUS(predlog leta1998 ni bil sprejet v financiranje). V isti okvir sodita tudi povabilo za oceno primernosti poteka trase avtoceste Egnatia-Odos skozi območja z rjavim medvedom v severni Grčiji spomladi 1997 ter vabilo za sodelovanje pri pripravi 11th International Conference on Bear Research and Management, jeseni1997 v Grazu vAvstriji. Tudi številna povabila za aktivno udeležbo na mednarodnih konferencah so dokaz odmevnosti naših raziskovalnih spoznanj.

3.7. Seznam diplomantov in naslovi diplomskih ter specialistične naloge, ki so nastale v okviru obravnavanega projekta

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Milan Podlogar 1997. Človek in medved na Krimsko-Mokrškem pogorju. Diplomska naloga: 70 str.+3 kartne priloge. Univerza v Ljubljani, Biotehniška fakulteta, Oddelek za gozdarstvo, Ljubljana 1997.

Uroš Flajs 1998. Rjavi medved na Dolenjskem in njegove selitvene poti. Diplomska naloga: 40 str.+1 karta. Univerza v Ljubljani, Biotehniška fakulteta, Oddelek za gozdarstvo, Ljubljana 1998.

Miha Marenče 1997. Rjavi medved *(Ursus arctos Linnaeus, 1758)* v Triglavskem narodnem parku. Specialistična naloga: 119 str. – 16 prilog. Univerza v Ljubljani. Biotehniška fakulteta, Oddelek za gozdarstvo, Ljubljana 1997.

4. Sodelovanje z inozemskimi partnerji

V okviru mednarodnega radiotelemetrijskega podprojekta Braunbär-Ljubljanski vrh (poročilo o poteku in dosedanjih ugotovitvah je sestavina tega poročila) smo sodelovali z prof.Hartmut Gossowom z Institut für Wildbiologie und Jagdwirtschaft der Universität für Bodenkultur Wien, Avstrija ter prof. Wolfgangom Schröderjem, Wildbiologische Gesellschaft München, e.V. Ettal, Namčija. Radiotelemetrijski podprojekt še ni zaključen.

Pri pripravi Action Plan for European Brown Bears smo sodelovali z WWF A Large Carnivore Innitiative (vodja podprojekta Jon Swenson NINA, Trondheim)

V procesu analize habitatov rjavega medveda smo sodelovali z ekipo prof.dr.Đure Hubra, Veterinarski fakultet Sveučilišta u Zagrebu,Hrvatska.

5. Bibliografski rezultati

MIHA ADAMIČ [03316]

Dela, ki so nastala v okviru obravnavanega projekta v obdobju 1995-1998

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Poročila o poteku mednarodnega radiotelemetrijskega projekta spremljave gibanja rjavih medvedov Braunbär - Ljubljanski vrh

Final Report

SLOVENIAN BEAR TELEMETRY PROJECT 1993 - 1995

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Final Report

SLOVENIAN BEAR TELEMETRY PROJECT 1993 - 1995

1. Introduction

The Slovenian bear population is of high international interest because of its importance as a source for the natural recolonization of the Alps and as a future link between the dinaric and the alpine bear population (ADAMIC 1994). In addition life conditions of bears in Slovenia are very similar to those in the other alpine ccuntries and management strategies developed there will be of high relevance elsewhere.

The fairly high population density of bears in Slovenia and adjacent Croatia (around 700 bears at a density of 7 bears per 100 km^2; HUBER 1990) enhances bear dispersal northward into the Alps. Single bears are known to travel into Austria and northeastern Italy. Dispersal corridors still exist but are threatened by road building and land development. Traffic axis like highways, intestates and railways may fragment an otherwise continuous enviroment due to: high mortality, avoidance and/or its border effect (SERVHEEN AND HUBER 1993, KACZENSKY ET AL. SUBMITTED).

Between 1972 and 1994 nine bears have been killed on the Ljubljana-Postojna highway, seven within the last four years (JONOZOVIC IN PREP). This highway cuts right through the most important migration corridor for bears towards the Alps (ADAMIC 1994). Presently an extension of this highway is under construction and will again cut through prime bear habitat. Technical solutions like viaducts, animal passages (green-bridge) and electric fencing are discussed but little data on the efficiency of these measures or the behavior of bears coming in contact with highways is available (PAQUET PERS. COM, KACZENSKY ET AL. SUBMITTED).

On the other hand attitude towards the large predators has changed and in several places habitat suitability has greatly increased due to reforestation, high numbers of wild ungulates and the abandonment of animal husbandry. Today bears are allowed to return into the Alps and other parts of their former range through natural recolonization, restocking and reintroduction (SCHRÖDER 1992). The economic development of the source countries and the return of bears into suitable but fairly densely settled areas makes it necessary to understand the impact of human land use practices on bears. Without this base line data it will be impossible to develop management strategies for long term survival of bears in cultivated landscapes.

The objectives of the study were:

1. initiate cooperation concerning brown bear between Austria and Slovenia
2. monitor movements and spatial requirements of brown bears in a cultivated landscape
3. evaluate the impact of the Ljubljana-Postojna highway on brown bear movements
4. work out future research needs and research focus to help understand the limitations and potentials of bear-people coexistence in a cultivated landscape

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3. Study area

The study area is located 20 km SW of Ljubljana, the capital of Slowenia and covers an area of about 2.000 km² (Fig. 1). It is on the main corridor which still allows bears from the Dinara Mountains disperse towards the Alps. Even though the area is not very densely populated (~ 80-90 inhabitants/km²), human impact on that brown bear population is high:

1. some areas of the forests are heavily used for recreation by people from Ljubljana
2. the Ljubljana-Postojna highway cuts through the western portion of the study area - since the construction in 1972 nine bears have been hit by vehicles.
3. forests are exploited by selective cutting, for which a high density of forest roads is necessary (20m/ha) - human access to these roads is unrestricted.
4. bears are fed on permanent feeding places (corn and/or meat) in spring and fall for hunting purpose

Concerning hunting management the study area is at the northwestern edge of the so called "bear core area" (Fig.8) which was established in 1966. Within this bear core area bears are fed and hunted on a quota system. Hunting is allowed only at bait stations and open season lasts from 1. October to 30. April. In all of Slovenia about 40 bears are shot annually out of an estimated population of 300 - 400, the population trend still being positive. Outside the "bear core area" there was no closed season for bears until recently. In 1991 this policy was reversed - the Slovene Hunters Association agreed on completely protecting the bears outside the core area to allow for an increased dispersal of bears into the Alps (SIMONIC 1994).

Geologically the study area is part of the Dinara Mountain Range, stretching from Slovenia over Croatia and Bosnia into Macedonia. The relief shows typical karst phenomena, dolines, caves and shallow soils. Elevations range from 300m to 1500m. Annual precipitation is 1500mm, snow cover lasts for 50-70 days and annual temperature averages 7-8°C. Bear habitat consists of mixed, uneven aged forests. The dominant tree species are beech (*Fagus silvatica*) and fir (*Abies alba*), intermingled with varying amounts of spruce (*Picea abies*), maple (*Acer pseudoplatanus*) and elm (*Ulmus spec.*).

4. Methods

Capture

We caught bears using Aldrich foot snares (JONKEL 1992) at established bait sites. These sites are normally used for hunting and have been in place for many years. Usually bait was provided by the local hunters and consisted of meat (game and domestic animals) and/or corn. During the first and second capture season we prepared small sand beds on bear trails and in front of traps to monitor bear activity and check for possible avoidance of traps and/or detect non-target animals that sprung snares without getting caught.

To minimize time bears were snared, traps were permanently surveyed using trap transmitters (Wagener, Germany). To allow a maximum of safety, trap sides were selected to provide access by car (for night handling) and to be within the range that signals of trap transmitters could be picked up from the field station or from a military base which is located on one of the high peaks within the study area. Trap transmitters were monitored every hour during daylight and every 30 min. at night.

We tranquilized bears using a CO_2 pressure gun (Telinject, Austria) with Zoletil 100 (Virbac, France), a mixture of Tiletamin and Zolazepam. We took standard body measurements, pulled a premolar for aging (Matson's Lab, USA) and fitted bears with radiocollars (Telonics, USA; Televilt, Sweden) and colored ear tags ("Prima-Flex", Germany) in both ears.

Radiotracking

Radiotracking was done almost exclusively from the ground using triangulation or homing in (WHITE AND GARROTT 1990). Depending on topography, distance and activity of the bear, we classified the accuracy of the locations as: *1ha, 1/4km², 1km²* or *more than 1 km²*. Only one location per day and bear with an accuracy of at least *1km²* was accepted for data analysis. Habitat parameters were only protocolled for 1ha locations and for *1/4km²* locations, when the habitat was seen to be continuos.

For calculating annual total ranges we used the 100% minimum convex polygon. We refer to annual home ranges as minimum convex polygons excluding excursions. Excursions were defined as single, long distance trips more than 5 km out of the area of usual presence.

Bears were considered resident, if they used the same or greatly overlapping areas in adjacent years. When monitoring of a bear was only possible for one season it had to come back to the vicinity of its capture site to be considered resident. Bears not showing these patterns and/or continuing to move in a certain direction were considered dispersers.

No systematic effort was conducted to find day beds due to financial and personal restrains. The beds found were protocolled: type of bed, topography, elevation, distance to civilization, canopy closure, coverage, forest composition. A visibility index

was calculated measuring the distance a bright colored plastic ball (0.75m diameter) was visible in all four directions of the compass. All scats collected near day beds of collared bears were visually checked for the presence and amount of corn. The percentual amount was determined by comparing scats with reference pictures of corn / mud mixtures of known percentages.

Highway crossings

Minimum number of highway crossings of collared bears was gained from the number and timing of locations on both sides of the highway.

To monitor the overall frequency of bear crossings via bridges and tunnels, we used sandbeds on three bridges and in three tunnels on a ten kilometer stretch of the Ljubljana-Postojna highway. In August 1993 and June 1994 we checked sandbeds a minimum of once a day, removing all tracks with a rake.

With financial support of IBA (Brevins memorial foundation) and in cooperation with Video Rapp, WGM and F. Kaczensky a remote camera system was developed for future monitoring of bridges and tunnels. Inexpensive 35mm cameras with internal flash and databack were connected with two infrared sensor and can be programmed with a timer. Cameras were locked in metal boxes and will be fixed to the tunnels and bridges.

5. Results

From 1993 - 1995 four capture seasons with a total of 1.033 trapnights resulted in the capture of 17 bears (13 different individuals, 4 recaptures). No non-target animals were captured but tracks on sand beds indicated triggering of traps by foxes, dogs, roe deer, wild boar and people. All bears were caught at night.

Tab.1: Trapping statistics, Slovenia 1993 - 1995.

month	trap nights	bears trapped	trap nights per bear	sprung traps
1993				
April	31	2	16	0
May	175	1	175	4
1994				
March	152	3	51	9
April	178	5	36	5
October	90	0	—	1
November	62	2	31	6
1995				
April	345	4	86	15
total	**1033**	**17**	**60**	**40**

The 17 captures were on the territory of four different hunting clubs, each covering an area of about 40 km². Of the thirteen different bears four were females (3 adults, 1 subadult) and nine were males (2 adults and 7 subadults) (Tab. 2). All bears captured were in perfect physical conditions and no capture related injuries occurred. Weights ranged between 35-42 kg for yearlings (n=5) and for animals older than one year between 74-120 kg for females (n=4) and between 80-162 kg for males (n=6).

Tab. 2: Bears captured from 1993 - 1994.

date	bear	name	sex	weight (kg)	age (a)	hunting club	collar
26.04.93	M1	Yogi	m	36	1	Ljubljanski Vrh	no
28.04.93	M2	Krabat	m	42	1	Ljubljanski Vrh	no
04.05.93	F1	Jana	f	40	1	Ljubljanski Vrh	yes
07.11.94		Jana	-	120	2	Krekovse	–
24.03.94	F2	Metka	f	85	13-14	Ljubljanski Vrh	yes
31.03.94		Metka	-	-	-	Rakek	–
25.03.94	M3	Clio	m	35	1	Ljubljanski Vrh	yes
07.04.94		Clio	-	-	-	Rakek	–
28.03.94	M4	Janko	m	118	2-3	Hotedrsica	yes
31.03.94	M5	Luka	m	35	1	Rakek	no
07.04.94	M6	Mishko	m	155	adult	Ljubljanski Vrh	yes
18.04.95		Mishko	m	160	adult	Ljubljanski Vrh	yes
23.04.94	F3	Anshka	f	73	4	Ljubljanski Vrh	yes
16.11.94	M7	Jure	m	154	subadult	Hotedrsica	yes
05.04.95	M8	Urosh	m	80-100	adult	Rakek	yes
16.04.95	M9	Milan	m	110	subadult	Rakek	yes
23.04.95	F4	Maja	f	101	adult	Ljubljanski Vrh	yes

Break away

For most bears the monitoring period was restricted because of premature breakage of the break away device. The first 5 collars had break aways made of 18 loops of 1.0 mm iron wire. Two came off prematurely: one after 6 month (F2) and one after 7 month (M6). One got embedded in the fat of the neck due to abnormal growth of the bear F1 and was still on when the bear was recaptured 18 month after collaring. One is still on the bear for now more than 12 month (F3). The fate of M4 and his collar is unknown because of dispersal into Croatia. Yearling males with the exception of M3, were not collared because of their potential for very rapid growth. M3, received a small collar (Televilt) with an extremely weak break away device (9 loops of 0.5 mm iron wire) - it fell off after 2 1/2 month.

All bears caught after spring 1994 received cotton spacers for break aways, on subadults spacers were cut to speed up breakage. The collar of M7 was found unscrewed 4 1/2 month after collaring, the break away not showing any signs of wear. The collar of M9 was found only two weeks after capture - the break away ripped apart. The collars of M8, M6, F3 and F4 are still on and will hopefully last for the expected 18 to 24 month (SERVHEEN PERS. COMM.).

Home Ranges

Of a total of 512 locations, 442 had an estimated error polygon of less than 1km² and were used for home range analysis (for bears with less than 10 fixes no range was calculated). Home range size was 56 and 67 km² for the two adult females F2 and F3 and 177 km² for an adult male during a six month period in 1994. The yearling male M3 covered 30 km² during a three month period in 1994, and the yearling female F1 covered 57 km² and 143 km² during a 6 month period in 1993 and 1994, respectively. The adult male M8, captured during the 1995 spring trapping season already covered 42 km² after one month of monitoring. The subadult male M4 first stayed near the capture side but than quickly dispersed into Croatia. The subadult male M7 collared in fall 1994 covered an area of 51 km² during the remaining three weeks before denning. The subadult M9 lost his collar after only two weeks of monitoring (Tab.3).

Tab. 3: Annual total ranges and home ranges (excluding excursions) of collared bears and highway crossings 1993 - 1995.

bear	time monitored	locations	total range	home range	loc. near hgw	highway crossings
F1	04.05.93 - 28.10.93[1]	49	57	57	23	3
	24.03.94 - 07.11.94[2]	60	143	143	0	0
F2	24.03.94 - 26.09.94[3]	67	56	56	19	0
M3	25.03.94 - 31.05.94[3]	30	30	30	8	0
M4	28.03.94 - 26.11.94[1]	6	–	–	0	?
M7	16.11.94 - 27.03.95[2]	10	51	51	0	0
M9	16.04.95 - 02.05.95[3]	5	–	–	0	0
M6	07.04.94 - 20.11.94[3]	81	418	177	2	2
	18.04.95 - ongoing	4	–	–	0	0
M8	05.04.95 - ongoing	13	42	42	2	0
F3	23.04.94 - ongoing	111	98	67	4	0
F4	23.04.95 - ongoing	6	–	–	0	0
total		**442**	–	–	**58**	**5**

[1] *bear not found any more,* [2] *killed,* [3] *collar lost,* hgw = highway

Ranges of bears overlapped greatly, regardless of age and sex (Fig. 2). The core trapping area (Ljubljanski Vrh, Borovnica, Rakek and Logatec) of about 120 km² is frequented by at least two resident males (M6, M8), three resident females (F2, F3, F4) plus their offspring (yearlings and cubs of the year) and an unknown number of subadults like F9.

Influence of the highway on bear movements

Adult bears

Data from the 1994 field season shows, that for the adult bears (F2, F3 and M5) the highway represented part of their western home range boundary (Fig.3). All three bears came close, 23 out of 183 locations (14%) were less than 1 km from the highway, but only M5 crossed. This happened twice during one excursion of eight days during the mating season. For the bears captured during the spring 1995 capture season not enough data is available yet.

Subadult bears

In 1993 the yearling female F1 crossed the highway in mid May and than lived very close to it until October. Twenty-three (47%) locations during this time were less than 1 km^2 from the highway, but she never crossed. By the end of October she was back on the east side, than we lost radio contact. In the begin of November F1 was seen several times at a feeding station back on the west side. We believe she crossed for the third time shortly after the last location in October and than denned on the west side. In spring we found a fresh winter den near the last sighting in November and near where we picked up the first radio signals in March 1994. In 1994 F1 did not cross the highway again and seemed to settle in an area somewhat west of her 1993 den side (Fig.4).

For the subadult males not much information is available. The yearling male M3 lost his radiocollar after only 2 1/2 month of monitoring the end of May. During this time he came within less than 1 km of the highway eight times (23%), but never crossed. The subadult male M4 was never located close (all locations $\geq$ 1 km away) to the highway, but it is not impossible that he came close or even crossed the highway when he dispersed into Croatia (Fig.2). Monitoring time of M7 and M9 was to short for interpretation.

Crossings by unmarked bears

Five crossings by unmarked bears via two tunnels were detected with the help of sandbeds during a two month period. No bear tracks were found on the bridges. In addition one bear was observed attempting to cross by climbing over the fence and two others were killed: one subadult male in June 1994 on the highway about 200m away from a viaduct and an other one in October 1994 on a railway bridge above the highway.

One prototype of the automatic cameras was tested at the lynx telemetry project in February 1995. The camera was set up on a forest road for four nights and produced pictures of: two hares, one badger and one wolf. In a second trial we installed the camera at a kill of two collared lynx and received at total of 32 pictures of: the female lynx, their two yearlings and the collared male. Little adaptations were still necessary but otherwise the system proved to work well. We will start monitoring animal crossings with 10 cameras at the Ljubljana-Postojna highway in July 1995.

Reproduction and mortality

Some data on reproduction could be gained from four collared females (F1-F4) and one collared male (M6).

Telemetry data suggests that mating season starts end of April and lasts till mid June. In 1994 the adult male M6 was located together with F3 from 26.4. - 13.5.94, together with F2 on the 1.6.94 and from 12.6 - 20.6.94 he went on an excursion out of his usual range. In 1995 he was together with F4 on the 27. and 28.4.95.

F1 was first collared as a yearling. Autopsy of the reproductive tract 18 month later revealed the presence of corpora lutea, meaning she would have come into estrus for the first time at age three, possibly producing cubs for the first time at age four (BIDOVEC PERS. COMM.).

For the adult female F2, cementum annuli analysis of a P1 suggested that she produced cubs for the first time at age four and than had litters at age 6,8,10 and 12 (Matson's Lab.).

F3 was caught at the beginning of the mating season in 1994 at age four. No signs of cub presence could be seen. In addition only three days later she was located together with the adult male M6 with whom she stayed for 18 days. The early den entrance and late den emergence suggests that she is accompanied by cubs for the first time in 1995 - at age five.

Heavy tooth wear and nipple condition (milk but minimal wear) of F4 suggests that she is an older female that just recently separated from yearling cubs.

Three marked bears are known to have died: F1 was destroyed on 7.11.94 because of an embedded collar, M2 was legally shot on 28.10.94 and M7 was illegally killed shortly after den emergence in March 1995. His collar was found on 23.3.95 23 km from the den site on the steep slope of the mountain Nanos. The security screws were opened on one side and we believe the collar was thrown over the edge.

Denning and day beds

Only three bears could be monitored through the denning season. In 1993 telemetry contact with F2 was lost before denning, but information from local hunters allowed us to estimate denning time. We probably even found her den: F1 was seen by several hunters on a feeding place and in a nearby doline seven times from July to September 1993 with the last sighting on 10.11.93. After receiving these information we picked up her signal near that feeding place 23.3.94. When she left the area we searched in the vicinity of the feeding place and found a fresh winter den in a nearby doline (the same she was seen in).

For F3 denning lasted almost six month from 31.10.94 - 27.4.95 (n=30). The den was located in the steep slopes of Borovnica Canyon.

M7 entered the den on 7.12.94. and stayed at least till 3.2.95 (2 month, n=5). The den was located high up in the steep and very rocky slopes of Bela Canyon. After the begin of February no signals were picked up any more and snow greatly hindered searching effort. Finally the end of March the collar was found.

In 1993 at 9 out of 21 1 ha locations of F1 bear signs could be found. Besides tracks we found 18 scats and 8 day beds. The daybeds were in the NW part of F1s' 1993 range and therefore close to the highway (Fig.4). Five daybeds were in a large doline in which F1 stayed for a minimum of 9 days/nights, one was in a spruce plantation and two were in a mixed forest stand.

During the 1994 and the begin of the 1995 field season not much time could be spend on searching for day becs. Only 8 beds were investigated: 1 was in a spruce plantations, 5 in one doline and 2 in mixed forest stands (of these 1 was on a very steep slope).

Cover and activity

For 155 *1ha* and *1/4km.²* location one or all of the following parameters were protocolled: forest type, topography, altitude and exposition (Fig.5). A use/availability analysis was not possible because habitat data of the whole study area has not been mapped, yet.

Telemetry effort was almost exclusively restricted to day time. Bears often seemed to be active but mostly without changing their location. Single observations suggest that large distances might be traveled mainly at night.

Feeding stations

Within the core trapping area on the east side of the highway we know of 17 feeding stations on a 10 x 10 km plot (Fig.6, almost 2 per 10 km²!). With such a high density bear use of feeding stations is difficult to quantify with daily locations because bears are always within easy reach of a feeding station. Sometimes bear use of feeding stations was obvious because bears were located nearby for extended periods of time and/or actual feeding was observed by the field team or local hunters (Tab.4).

Of the 33 scats found 6 contained corn and at least one contained meat from domestic animals (rabbit hair).

Growth rates of young bears were rather high. Within 18 month two yearlings increased their weights from 40 to 120 kg (F1) and from 42 to 99 kg (M2), respectively. Three subadult males between 2-3 years old already weighted 110 kg (M8) and 118 kg (M4) in spring and 154 kg (M7) in fall.

Tab.4: Periods when it was obvious that bears were at feeding stations.

bear	month / year	minimum days present	prove of presence
	1993		
F1	May	~ 8	observation, location
	June	2	observation, location
	July	2	observation, location
	August	4	observation, location
	September	2	observation
	November	1	observation
	1994		
F1	November	5	observation, location
M3	April	7	observation, location
	May	2	observation, location
M6	October	1	observation
	November	3	location, observation, collar found
	1995		
F3	May	8	location

Dispersal

Whereas the adult bears stayed within a defined area during monitoring time, two collared subadults dispersed. The male M4 moved a minimum of 55 km (capture site to most distant point) South to Cicarija Mountains in Croatia (Fig.7). Unfortunately the border and the unstable political situation in Croatia hindered continuos monitoring. Radio contact was lost in July, three month after capture. In August we received the last information on that bear - somebody had seen it, in the area of Ucka mountain, 15 km away from the last location.

For the female F1 the annual ranges in 1993 and 1994 were quite different, the only overlap being the den site (Fig.4). The geographic means of the 1993 and 1994 range were about 22 km apart and the most distant points of the two annual ranges were about 45 km apart. In comparison the most distant points for the three adults were only around 15 km for F2 and F3 and 20 km for M6.

For two other subadult bears not enough data is available to decide weather or not they dispersed. The yearling male M2 which was ear tagged in 1993 was legally shot 18 month later about 23 km from the capture site (Fig.7). The subadult male M9 lost his collar after only two weeks. Within these two weeks he first moved 25 km southeast of

his capture site, than came back half way and lost the collar. No information were available on the fate of M1, M3 and M5.

6. Discussion

Methods

For a more detailed study on behavior and requirements of bears in a cultivated landscape most technical problems were solved. Capture success and technique proved to be adequately successful and save.

The main drawback were the problems we had with the unreliability of break aways. The case of F1, who tripled her weight within 18 month, showed that yearlings of either sex may grow at an extremely fast rate. Selective recaptures of subadults are possible but can not be guaranteed due to dispersal, collar failure or just bad luck. We therefore feel that the risk to collar yearlings is too high. On the other hand a lot of information is lost by not monitoring this age class and with the next yearlings caught we will test the possibility of hair transmitters (transmitters glued to the fur). Because aging in the field is not very accurate and growth rate and pattern may greatly vary between individual bears we will go on using break aways on all collars, regardless of sex and estimated age. We feel that the risk to cause lifelong neck irritation is greater than to have collars fall off prematurely. Our experiences and data collected by GARSHELIS AND MCLAUGHLIN (in prep.) will help us to find the most suitable device - an important prerequisite for other studies as well.

Telemetry in the rugged, rocky terrain of the Dinara mountains proved to be very time consuming. Locations by triangulation are not very accurate because of multiple reflections. On the other hand the dense net of forest roads often allowed us to surround the bear and accurately pinpoint its location. Still, microscale habitat data is difficult to obtain without searching for signs of bear presence after the bear left. For any preference/avoidance analysis a detailed habitat mapping on a GIS base is needed.

Spatial requirements

A comparison of range sizes from different studies is difficult to interpret because home range size greatly depends on definition (exclusion of excursions and outlayers, resident versus dispersing animals), sampling frequency and number of locations. But the dimension of the size of home range/total range of collared adult bears in Slovenia was within the range reported from telemetry studies in Gorski Kotar and Plitvice, Croatia (HUBER AND ROTH 1993) and from the Italian Alps (ROTH 1983) but it was much smaller than the range of three bears reintroduced into the Austrian Alps (RAUER UND KRAUS 1993) or for bears in Scandinavia (BJÄRVALL ET AL. 1992).

Small ranges and the high bear density in the bear core area of Slovenia might be the result from the combination of a productive habitat (moderate temperature, mixed uneven aged forests) and intensive feeding of bears (Fig.6). The situation for bears in Croatia is similar. In the Italian Alps the habitat also seems very productive and the two

collared bears which were followed for at least four month both had access to the only bear feeding place in the area. Fast growth of young bears, early maturity and a high reproduction (about 10% of the estimated population size is harvested every year but the population is still expanding) further supports that carrying capacity for bears in Slovenia is high.

In spite of the high bear density bears are rarely seen by locals (only hunters see bears fairly regularly at feeding places). Many locals were surprised to learn that we followed bears not far from their homes. In addition to the shy behavior, bears only rarely cause damage. Within the core study area there are only few cattle and sheep but it is an important area for forest honey production. In summer time density of mobile bee houses is high and none is protected by electric fence. To our knowledge in 1994 there has not been any case of livestock depredation and only one bee house was destroyed (probably by M6).

No special care is taken to store garbage bear proved (many open garbage pits, easily accessible garbage cans, slaughtering remains near to villages) but there does not seem to be many problems with food conditioned bears. Bears that came to houses or approached people have been reported but were fairly rare - and normally are shot (Krze pers. comm..). Bears in Slovenia might heavily depend on food provided at feeding stations and they may be habituated to the smell and the sight of people - but habituation seems restricted to certain locations, only.

Bears are actually surprisingly rarely seen because the area is heavily frequented by people (recreationists from Ljubljana, mushroom pickers, forestry workers etc.) and the dense net of forest roads is accessible to everyone. These rare sightings of bears can only be achieved when bears actively avoid people. For this to be successful, bears would have to hide in inaccessible areas, areas of dense cover and/or be mostly nocturnal. In Croatia bears seemed to select areas of dense cover for denning and bedding (CICNJAK AND RUFF 1990) and our first data also suggests that steep canyons, large dolines and spruce plantations might be important habitat parameters (Fig.5).

Impact of the Ljubljana-Postojna highway

We are well aware of the fact, that our telemetry data were restricted to a small number of animals and a relatively short monitoring period. In addition, sandbeds did not provide quantitative data on crossing frequency of bears due to varying impacts by traffic, weather, and people. But these methodical shortcomings only made us underestimate the number of successful bear crossings. If during these 17 months of radiotracking and two months of sandbed monitoring we registered 10 successful bear crossings, it means that more bears successfully cross than get killed. The highway is not an absolute barrier. On the other hand, the home range boundaries and movement patterns of the adult bears clearly show, that the highway is at least a relative barrier (Fig.3). None of the bears had a home range with areas on both sides, crossing regularly back and forth.

To resident bears the highway presented a barrier, which they rarely crossed. They did not seem to avoid being close to it: many locations are less than 1 km away from the

highway, one time we even found a day bed of F1 only 15m from the highway. This is in contrary to findings from North America where grizzly bears show avoidance of heavily frequented roads (MCLELLAN AND SHACKLETON 1988). In contrary to North America, bears in Slovenia are shot only at established bait stations. Bear hunting while walking on the road or from a car is prohibited and might be a reason why bears do not mind being close to roads and cars. In addition a highway is a very constant and calculable source of disturbance, cars do not stop and people rarely hike next to a highway.

The radiomarked bears that crossed the highway were a dispersing yearling female (Fig.4) and a male (Fig.3) during the mating season. These dispersers are important for the recolonization of suitable habitat and for the gene flow between subpopulations. Long distance movements of adult males during the mating season give them access to additional females and also enhances gene flow between subpopulations. If a barrier still allows enough potential breeders to cross, the gene flow between the populations on both sides is secured (ALLENDORF AND LEARY 1986). The Ljubljana-Postojna highway does not yet threaten the continuity of the Slovenian bear population: actual losses are small (9 bears in 22 years), probably all bears killed were males (JONOSOVIC IN PREP.) and there are enough bears crossing successfully .

The situation is quite different if there is few bears and many or fairly impermeable barriers, a situation found in the Pyrenees (SERVEEHN AND HUBER 1993) or the Alps. In a fragmented landscape like the Alps bears will only be able to live in form of a metapopulation, a system of more or less isolated subpopulations, interconnected by dispersal corridors (GILPIN 1987). In such a setting single dispersers will be more valuable than in a continuous population. In the near future Slovenia will also have more highways (see KACZENSKY ET AL. SUBMITTED) and a denser infrastructure. Bear habitat will become more fragmented and the bear population more vulnerable.

For planned highways in bear country it will be necessary to map important bear corridors and to plan viaducts or "green bridges" at these locations. For already existing highways in actual or potential bear habitat critical points will have to be evaluated from knowledge on bear habitat requirements, present and historical dispersal data and landscape features (HOBBS ET AL. 1990). At important linkage points "green bridges" will have to be build. In addition it will be necessary to stop bears from climbing over the regular wildlife fences. Only providing attractive crossings will not be enough. The last bear accident on the Ljubljana-Postojna highway again showed this. The bear tried to cross over the highway only 200m away from a viaduct (300m long, mainly forest cover). Electric fencing might prove a cheap and effective method not only to stop bears from breaking into beehives, but also to stop them from climbing over highway fences. Care has to be taken not to stop bears from crossing the highway at all - no more dead bears can also mean no more crossing bears.

Dispersal

The dispersal data of F1 and M4 is in accordance with data from hunting/accident statistics from Slovenia (ADAMIC, JONOZOVIC UNPUBL.) and Austria which already suggests that it is predominantly subadult males that disperse longer distances. Subadult males also seem to be the most likely to get into trouble: e.g. in 1994 two male bears were shot in Austria, one in self defense (180 kg, 5 years old) and one because of livestock depredation (100 kg, 2 years old). Data from Norway (SWENSON AND WABAKKEN PERS. COMM.,) and North America (AUNE AND KASWORM 1989) also supports this. For a natural recolonization by bears like it is taking place in the eastern Alps this might mean that long before there will be a stable bear population there will be a period with few, mainly male bears but a high potential for damage. For prognoses regarding the expansion of bear populations into new areas, more data on patterns (sex and age classes), timing and possible distances of dispersal in a cultural landscape are needed.

As already mentioned in the introduction the Slovenian bear population is the source for the natural recolonization of the Alps and it will be a future link between the dinaric and the alpine bear population. The corridor function of Slovenia for dispersal north into the Alps and south along the Dinaric range is still working as the increased number of bears showing up in the eastern Alps and dispersal of collared bears from Slovenia into Croatia (M4) and vice versa (HUBER PERS. COMM.) shows.

The Slovenian bear population should be seen as the northernmost part of a continuos bear population stretching from Bosnia over Croatia into Slovenia numbering about 1600-2000 animals all together (before the war, HUBER 1990). Just seen by itself the Slovenian bear population (estimated size: 300-400 bears), even though it is very vital and expanding, is rather small for long term conservation. To avoid inbreeding and to allow for the full range of adaptability to changing enviroment an effective population size of 500 breeding individuals has been suggested (SOULÉ 1987). For bears this probably means an actual population size of more than 1000 individuals (KNAUER 1993). Therefore bear management can not be done on a national level alone - only cooperation of the countries sharing the same population will allow for long term conservation.

Future perspectives

Working on highly mobile, long living, potentially dangerous and politically "brisant" animals like bears means that you have to invest a lot before you get really started and produce good results. Stopping this project now, after we became familiar with the bears, solved most of the technical problems, built up the infrastructure necessary and established good contacts with the locals would mean stopping a project right when it gets into its most productive stage. There is still a lot to be learnt about bears and without a detailed understanding of bears living in a cultivated landscape most European population will vanish sooner or later.

From the results and the experiences gained during the course of this two year study we feel that future research should be especially focused on the following:

1. evaluate the influence of human land use on the activity, movements and habitat use patterns of individual bears
2. identify structures acting as barriers, evaluating their impact and testing measures to reduce the barrier effect
3. examine dispersal/expansion patterns of a bears population in a cultivated landscape

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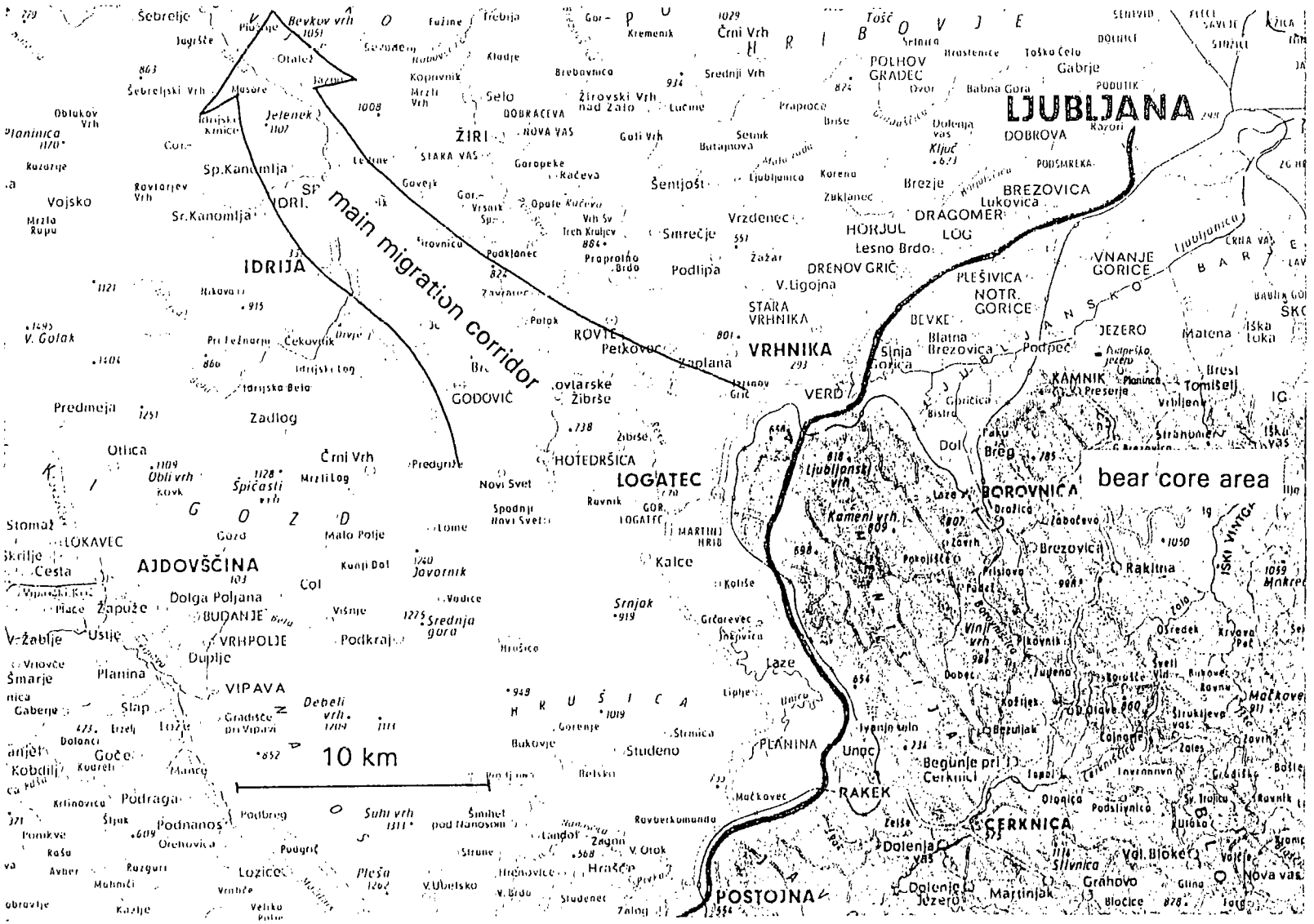

Fig.1: Study area in relation to bear core area, bear migration corridor and Ljubljana-Postojna highway.

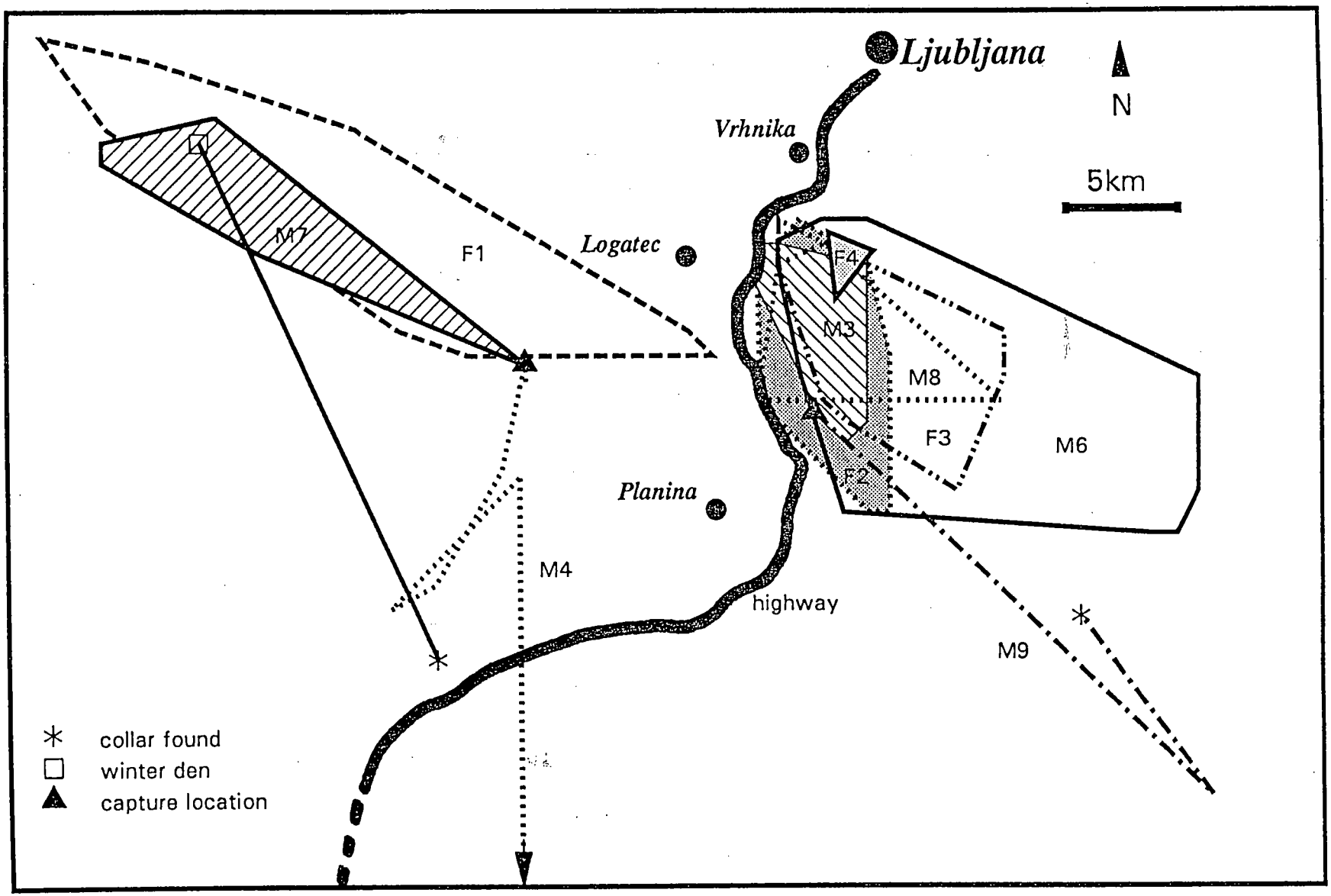

Fig.2: Location of the home ranges of all collared bears 1993 - 1995.

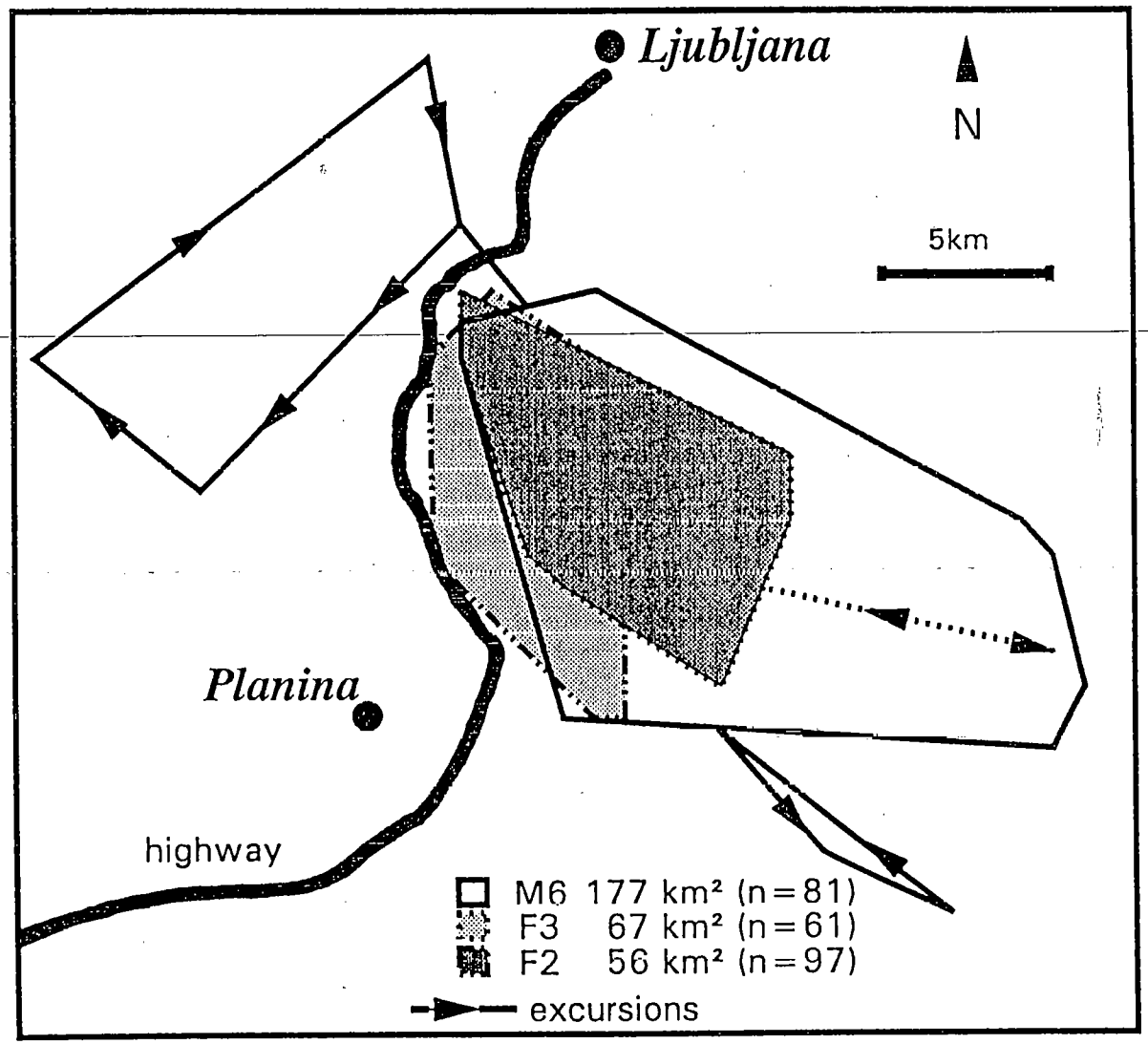

Fig.3: Home ranges and excursions of three adult bears relative to the Ljubljana-Postojna highway in 1994.

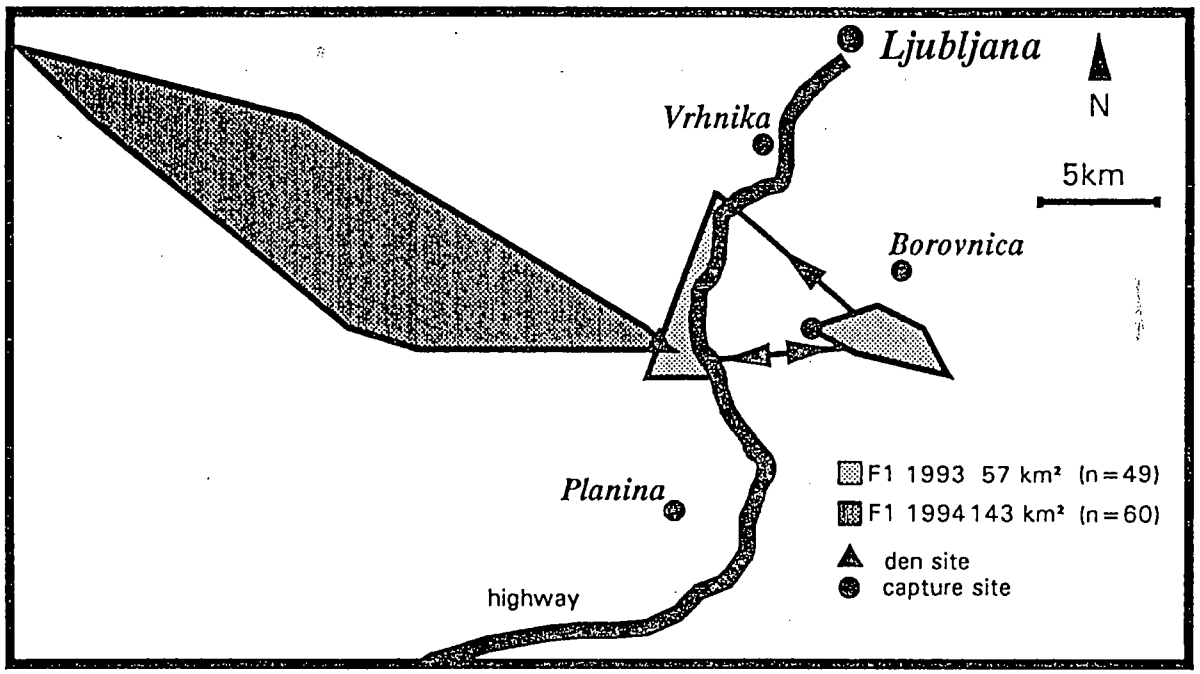

Fig.4: Annual home ranges of the subadult female F1 in 1993 and 1994 relative to the Ljubljana-Postojna highway.

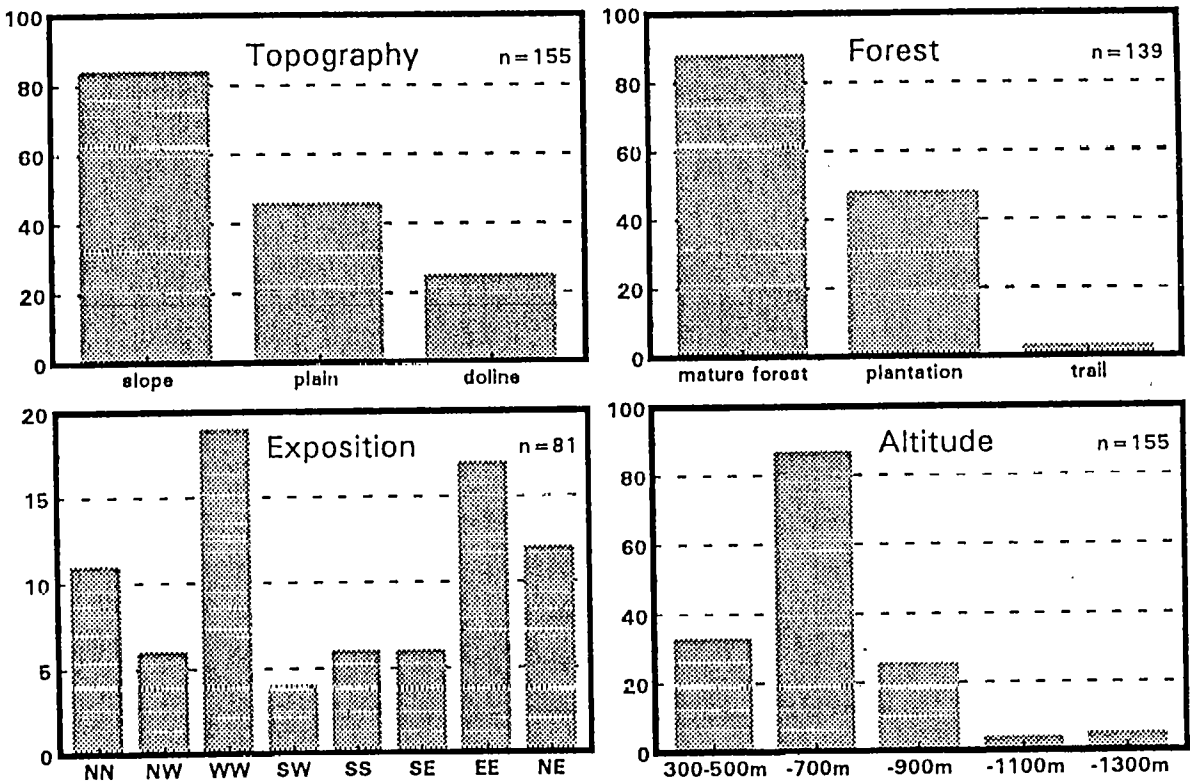

Fig.5: Some habitat parameters of bear locations
(mostly 1ha locations, 1/4 km² locations
only when habitat was continous)

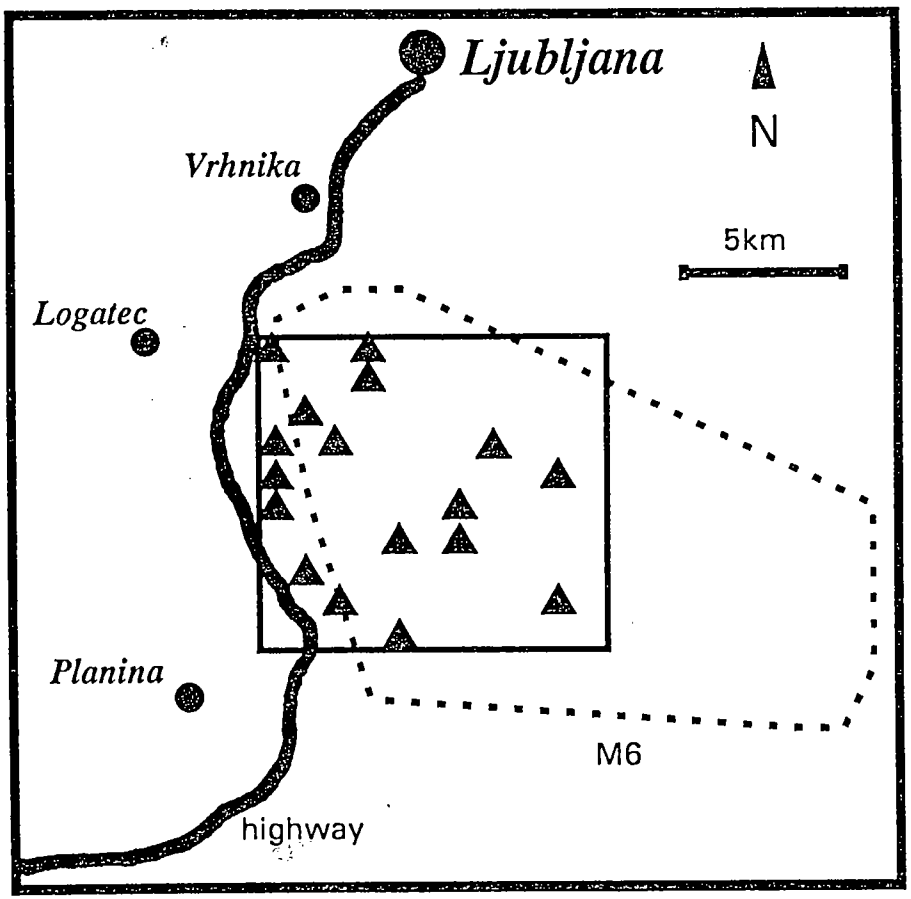

Fig.6: Distribution of feeding stations in the core trapping area and home range of M6 for reference.

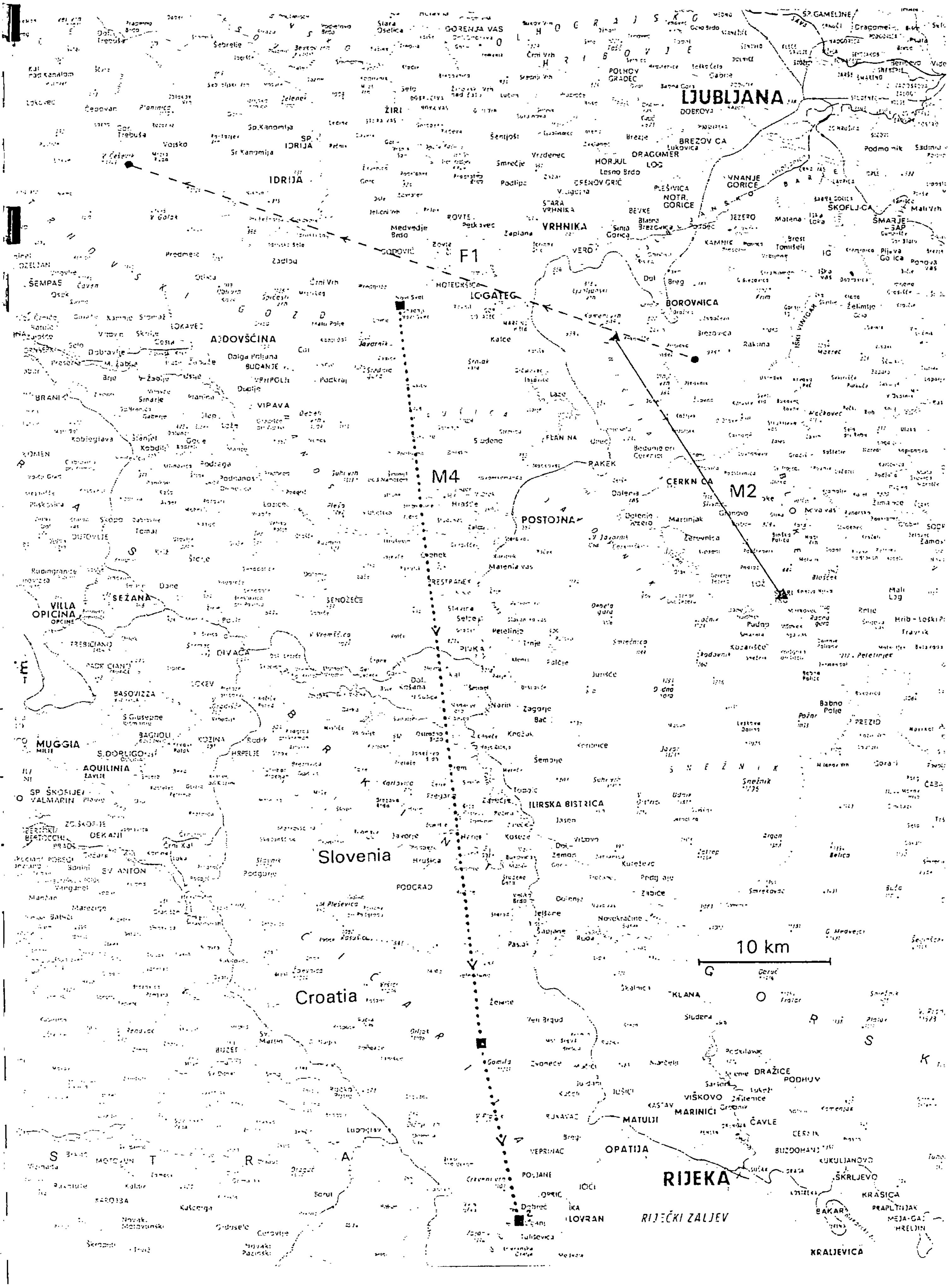

Fig.7: Dispersal of three subadult bears 1993-1994.

Bärenprojekt Slowenien - 4. Zwischenbericht

Petra Kaczensky, Juni 1996

I. Bisherige Ziele

1. Eine länderübergreifende Kooperation aufzubauen.
2. Die Raumnutzung und die Raumorganisation von Braunbären in einer dicht besiedelten Landschaft zu erforschen
3. Den Einfluß der Autobahn Ljubljana-Postojna auf die Raumnutzung der Bären abzuschätzen (Gefährdung und Barriereffekt).
4. Weitere Forschungsziele und -schwerpunkte zu erarbeiten.

II. Ergebnisse

1. Das Bärenprojekt ist zu einem Kooperationsprojekt mit vier Partnern aus drei verschiedenen Ländern geworden:

- Biotechnischen Fakultät der Universität Ljubljana - Slowenien.
- Institut für Wildbiologie und Jagdwirtschaft (IWJ), der Universität für Bodenkultur in Wien - Österreich.
- Slowenischer Jagdverband (SLD) - Slowenien.
- Wildbiologische Gesellschaft München. e.V. (WGM) - Deutschland.

2. Raumnutzung und Raumorganisation:

Seit Beginn der Feldarbeiten 1993 wurden 10 Bären radiotelemetrisch überwacht (Tab.1). Folgende Zwischenergebnisse zeichnen sich ab (siehe dazu auch 1-3 Zwischenbericht):

- Adulte Bären haben vergleichsweise kleine Streifgebiete.
- Dickungen, Dolinen und steile Hänge werden zum Ruhen (Tageslager / Winterlager) bevorzugt aufgesucht.
- Bären sind vornehmlich nachtaktiv.
- Fütterungen werden von den Bären häufig frequentiert.
- Die Autobahn Ljubljana-Postojna stellt eine relative Barriere da.
- Nur subadulte Bären scheinen abzuwandern, adulte Bären bleiben ihrem Streifgebiet treu.

Aktueller Stand der Feldarbeiten (seit Mai 1995):

Telemetrie:

Aufgrund der technischen Probleme mit den Sollbruchstellen ist seit November 1995 nur noch die Bärin F4 am Sender (Tab.1, Fig.1). Diese wird seit November 1995 von unserem slowenischen Mitarbeiter Marko Jonozovic eigenständig extensiv überwacht. Die Bärin kam Ende April aus dem Winterlager und führt drei Junge. Sie begeht das gleiche Gebiet wie 1995.

Die geplante intensive Fangsaison für das Frühjahr 1996 mußte auf Herbst 1996 verschoben werden: erst verzögerten finanzielle Unsicherheiten den Beginn der Fangsaison, dann kam es in Slowenien zu einem schweren Unfall mit einem Bären. Ein alter Mann war in der Dämmerung zwischen eine Bärin und ihre Jungen geraten und lebensgefährlich verletzt worden. In der Presse wurde der Vorfall hochgespielt und das Landwirtschaftsministerium kam unter großem Druck. In dieser Situation wollte man im Ministerium keinerlei Risiko eingehen und hat unsere Fangerlaubnis auf den Herbst verschoben. Inzwischen habe sich die Wogen geglättet und der alte Mann ist außer Lebensgefahr. Mit den Fangvorbereitungen werden wir spätestens Mitte September beginnen.

Tab.1: Raumnutzung der überwachten Bären von Mai 1993 - Dezember 1995.

Bär	Überwachungszeitraum	Peilungen	100% Polygon	95% Polygon	Hgw Querungen
	1993				
F1	04.05. - 28.10.93[1]	53	49	60	3
	1994				
F1	24.03. - 07.11.94[2]	60	140	137	0
F2	24.03. - 26.09.94[3]	67	59	54	0
F3	23.04. - 31.12.94	92	95	59	0
M3	25.03. - 31.05.94[3]	21	15	--	0
M4	28.03. - 26.11.94[1]	5	--	--	?
M6	07.04. - 20.11.94[3]	77	412	224	2
	18.04. - 06.11.95[3]	45	207	133	0
M7	16.11. - 27.03.95[2]	17	163	51	0
	1995				
F3	01.01. - 15.07.95[3]	45	24	18	0
F4	23.04. - 31.12.95	68	51	45	0
M6	18.04. - 06.11.95	45	207	133	0
M9	16.04. - 02.05.95[3]	4	--	--	0
M8	05.04. - 31.05.95[3]	19	86	--	0
	1996				
F4	01.01. - weiterhin am Sender	ca. 40	noch nicht berechnet	noch nicht berechnet	0
Summe		**613**	–	–	**5**

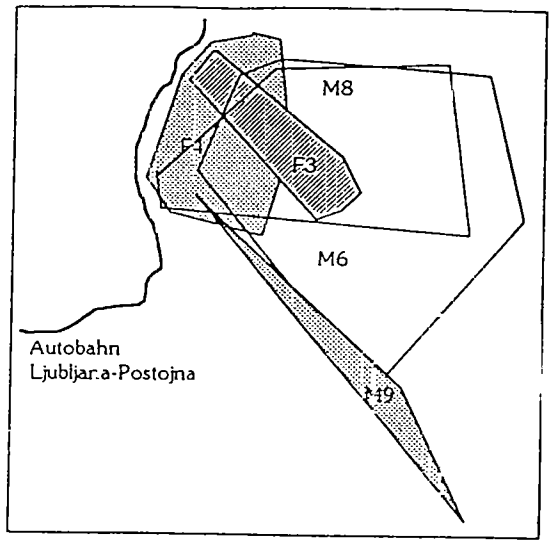

Abb. 1: Lage der Streifgebiete von fünf überwachten Bären 1995.

Altersbestimmung:

Die Zahnschliffe des Matson's Lab ergaben für die im Herbst 1994 und Frühling 1995 gefangenen Bären folgendes Alter: F4 - 7 Jahre, M7 - 2 Jahre, M9 - 3 Jahre.

Diesmal wurden außerdem 25 Zähne von geschossenen Bären mitgeschickt: 16 Tiere waren subadult (1-3 Jahren). 9 Tiere waren zwischen 4-10 Jahre und nur 1 Tier war älter (14 Jahre) als 10 Jahre.

Kotanalysen:

Über 50 Kotproben aus dem Untersuchungsgebiet wurden von einer slowenischen Diplomantin auf die Nahrungszusammensetzung hin ausgewertet. 42 der Proben stammten von besenderten Bären. Anteilmäßig standen Gräser und Kräuter an erster Stelle, gefolgt von Mais und Ameisen (Fig. 1).

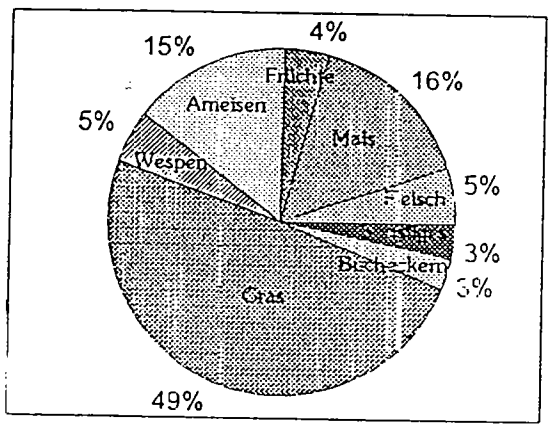

Fig. 2: Zusammensetzung von 54 Bärenkoten aus dem Untersuchungsgebiet (in Volumen %).

Bär und Biene:

Juli/August ist in unserem Kernuntersuchungsgebiet Haupterntezeit für Waldhonig. 1995 standen auf einer Fläche von 52 km² mindestens 47 große mobile Bienenhäuser (ca. 10-80 Völker pro Haus) (Fig.3). Die Streifgebiete von mindestens 5 bekannten residenten Bären (F2, F3, F4, M6, M8) überlagern dieses Gebiet und doch wurde kein einziger Stock von Bären zerstört. Und das obwohl nur ein einziges Bienenhaus mit Elektrozaun gesichert war. 1994 war ein Bienenhaus von M6 demoliert worden.

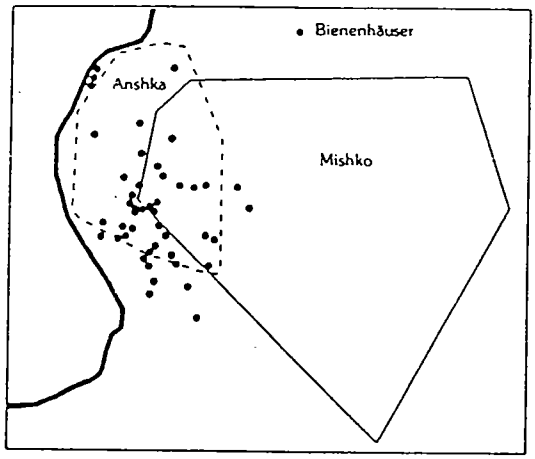

Fig.3: Streifgebiete der 1995 im Juli/August überwachten Bären und Lage der mobilen Bienenhäuser.

Kameraüberwachung:

Im Oktober 1995 konnten wir endlich mit der Kameraüberwachung in drei Autobahnunterführungen beginnen. Die Kameras wurden in etwa 4m Höhe an der Betonwand montiert und auf Nachtbetrieb (20:00-6:00) programmiert.

Leider traten diverse technische Probleme auf und nur 53 Bilder wurden regulär ausgelöst und belichtet: 13x Rotwild, 3x Fuchs, 4x Katze, 4x Hund, 1x Passant, 10x Autos und 17x leer.

Mitte November wurde dann eine Kamera gestohlen. Offensichtlich hatten sich die Diebe ein Gerüst aus Holz gebaut, das Metallgehäuse aufgebrochen und die Kamera inklusive Akkus rausgerissen.

Die beiden anderen Kameras blieben in Betrieb, die tiefen Temperaturen (bis -15 °C) sorgten jedoch für Probleme: der Shutterverschluß fror ein. Im Dezember verhinderte zudem tiefer Schnee eine reguläre Überwachung (bis zu 1 Stunde Fußmarsch mit Teleskopleiter). Trotzdem wurde uns eine weitere Kamera gestohlen.

Die technischen Probleme der Kameraüberwachung scheinen endlich gelöst zu sein, die diebessichere Befestigung bleibt ein Problem. Für August ist das Anbringen einer Kamera auf einem 4m hohen Masten an einer Autobahnbrücke geplant.

Überfahrene Bären:

Am 25.5.96 wurde an der Verlängerung der Autobahn Ljubljana-Postojna in der Nähe von Senozece ein toter Bär an der Autobahnböschung gefunden. Es handelte sich um ein junges Männchen, das nur 59 kg wog. Der Bär hatte diverse gebrochene Knochen. Da der Unfall nie gemeldet wurde ist anzunehmen, daß der Bär von einen Laster nur gestreift wurde.

4. Ausarbeitung weiterer Forschungsziele und -schwerpunkte:

Zwei große Anträge wurden gestellt. Einer beim Österreichischen Fond zur Förderung der Wissenschaftlichen Forschung (FFWF) und einer bei der Deutschen Forschungsgesellschaft (DFG). Der FFWF läßt international Begutachten und unser Antrag wurde im März genehmigt. Damit ist die halbe Finanzierung für die nächsten 2 bzw. 4 Jahre gesichert. Die DFG hat sich in einer Sondersitzung mit knapper Mehrheit gegen eine Förderung entschieden. Der Antrag wurde daraufhin im Mai 1996 beim Stifterverband eingereicht.

Im Rahmen des "Braunbär LIFE" Projektes für Österreich stehen außerdem Mittel für die Ausbildung einer Bäreneingreiftruppe zur Verfügung. Die Ausbildung von Bärenfachleuten im Umgang und Fang von Problembären wird großenteils in Slowenien stattfinden. Die Finanzierung der Herbstfangsaison 1996 wird aus diesen Mitteln gedeckt.

Zukünftige Forschungsschwerpunkte:

- Untersuchungen zur Auswirkung menschlicher Landnutzung auf Aktivität und Raumnutzung individueller Bären.
  Methoden: Telemetrie, Tageslager/Winterlagerkartierung, Habitatkartierung (GIS), Aktivitätsüberwachung, Einfluß von Fütterungen
- Identifizierung und Quantifizierung von Barrieren für Individuen und Populationen - Möglichkeiten zur Entschärfung solcher Barrieren.
  Methoden: Telemetrie, Fotofallen, Sandbetten, Elektrozaun
- Untersuchungen zur Ausbreitung und zum Dispersal einer Bärenpopulation in einer relativ dicht besiedelten Landschaft.
  Methoden: Telemetrie

stayed in the same location for almost three weeks (Fig.2, V1), but changed to an other location with the onset of a warm weather period (Fig.2, V2). In this new location he has already been for a week now and we expect him to finally den there. LUCIA started to den with the onset of the cold weather period and has stayed in the same location since than (Fig.2, L1). By the end of December, Hubert Potocnik a Zoology student at the Biological Faculty of the University in Ljubljana will start to monitor LUCIA'S activity pattern, using an automatic registration device.

Automatic Cameras

Klemen Jerina was again working with the automatic cameras to monitor wildlife use of bridges and underpassages. Unfortunately this project is handicapped by technical problems. It seems like the cameras are too exposed to moisture, even in the underpassages. A telescope pool on a bridge stopped people from stealing the camera, but the results were poor. Except for a car we only good pictures of the bridge surface and finally the camera stopped working at all - the whole inside of the protective box was moist. We will probably skip this experiment and just use the cameras to identify bears at known places of bear activity. If they are in place for just a few days at a time, cameras seem to work perfectly well. One camera is borrowed to Cveto Stanisa to identify predators at deer kills in the Kocevje area in southern Slovenia.

Education of an Austrian bear Emergency Team (ET)

The fall capture season was used to train Austrian bear stuff on how to catch, tranquilize and handle bears. The two so called "bear advocates" Jörg Rauer and Bernhard Gutleb from WWF Austria, as well as Thomas Huber, Hubert Zeiler and Rudi Hafellner from the Institute of Wildlife Biology and Game Management stayed with us.

Funding situation

After a long struggle to get the project going on, we finally managed to get the funding for an additional two years of field work. Money will come from: the Austrian Science Fond (FWF) and the German Stifterverband. In addition the Austrian Braunbär Life project, which is financed by the European Union, will support parts of the work.

Acknowledgment and Funding

We would like to thank the hunters from the hunting families Rakitna, Logatec and especially Rakek, where we already caught seven different bears! We would also like to thank the Military Station up on Ljubljanski Vrh. There soldiers were again surveying our trap transmitters which gave us a chance to sleep at night. And last but not least, we want to thank the bears for cooperating.

Funding was provided by the Austrian Ministry of Science, the Forestry Faculty at the University of Munich, the Stiftung Europäisches Naturerbe, the Slovene Hunters Association, the European Union and the John Sheldon Bevins Memorial Foundation of the IBA.

Slovenian bear telemetry project - progress report 1996

Petra Kaczensky, December 1996

The Slovenian bear telemetry project

The project was started in spring 1993 and is a cooperation project between the Forestry Faculty at the Biotechnical University in Ljubljana, the Slovene Hunters Association, the Institute of Wildlife Biology and Game Management in Vienna and the Munich Wildlife Society. The goal of the project is to study the coexistence of brown bears and man in a densely settled area.

Telemetry work from spring to fall 1996

Unsure funding made us postpone the trapping season until April 1996. Just when we wanted to start capturing, a bear attacked and severely wounded an old man near Zlebic, southern Slovenia. The emotions went high in the mass media and we were asked to postpone our trapping season even further. Because it had already started to green up everywhere, we decided not to start capturing before the fall. This left us with only one adult female (MAJA) being monitored from January to October 1996.

MAJA had produced three cubs in January in the NE part of her home range. On 15.2.96 Marko Jonozovic and three colleagues wanted to precisely locate her den in order to stop any forest work. Suddenly the telemetry signal indicated that the bear became active and left. After some steps further, Marko could hear the screaming of young bears. He went a bit closer and discovered 3 young cubs in an open nest. They took a few pictures and left. Fortunately MAJA came back and stayed an other six weeks in the same location. By 27.3.96 she had left the den.

Summer telemetry by Marko revealed that MAJA only used the northern part of her home range, preferably one area called Colska Dolina. The area she roamed over was only 16 km² (n=69). Frequent tracks at the nearby feeding places indicated her nightly visits. During the course of the summer she and her young where seen several times by the professional hunters of the Ljubljanski Vrh hunting area. In September she was still accompanied by her three cubs.

The fall 1996 capture season

On 30.9.96 we started the fall capture season. Natural food was scarce, as there was no beech nut production this year. We therefore were quite optimistic regarding capture success. Unfortunately the sanitary law regulating bear bait sides had changed and there were some difficulties in obtaining carcasses. This resulted in the Ljubljanski Vrh bear feeding side remaining unbaited throughout the whole capture season. Fortunately we had traps in five more locations:

- a corn feeding place in the hunting area of Rakitna
- a meat feeding place in the hunting area of Rakek
- a corn feeding place in the hunting area of Logatec
- and two corn feeding places in the hunting area of Ljubljanski Vrh

Traps were open during 38 nights and for a total of 687 trap nights. But trapping success was rather poor and resulted in the capture of only four bears, one of which managed to escape just prior to the attempted tranquilization. This makes up for 229 trapnights/sucessfully captured bear (Tab.1).

Tab. 1: Bear trapping statistics for fall 1996 (30.9.-11.11.96).

location	trap nights	bears	other	malfunctions	sabotage
Pokojisce	152	0	0	2	3
Jerenovec	172	2	1	18	0
Rjavi Kamen	129	0	1	8	0
Pranger	136	2	0	3	0
Logatec	15	0	1	0	0
Rakitna	83	0	0	3	0
total	**678**	**4**	**3**	**23**	**3**

As usual, the traps were permanently monitored using trap transmitters. The first capture was on the 5.10.96, when we caught two of MAJA's cubs. When we checked the traps at night, MAJA was next two her young and we decided to wait till daylight. When we checked again at dawn, MAJA was still next to her cubs, but suddenly one of the cubs managed to escape. After that, MAJA left with the two remaining cubs. We tranquilized the captured bear and fitted it with an eartag transmitter (Holohil, Canada). The cub is a female and was named VERA.

The second capture was a subadult female, which was collared with a regular radiocollar (Telonics, Arizona). She was named LUCIA and turned out to be the bear that was destroying beehives in the vicinity of Laze. We even got to see her three times next to a mobile bee hive. With one exception, this is the first occurrence of bee hive damage by a bear within the central part of our study area (see progress report 4).

The third and last bear capture was a male cub of an unknown female. We did not get to see the mother, but tracking in December revealed that the cub definitely is with a larger bear. Tracking conditions were not good enough to determine if there is more than one cub with this female. The cub was named VINKO and fitted with an ear tag transmitter.

Contrary to the previous four trapping seasons we captured non-target species for the first time. The first was a 20-25 kg wild boar, which we were able to release without tranquilizing. The boar was unhurt, except for a small scratch on the leg. The second was a 60 kg wild boar. It was too big and aggressive to handle without tranquilization. Something had gone wrong with the checking of the trap transmitters and we did not find the animal before double checking the traps in the morning. The boar was quite stressed and the leg was badly bruised, but otherwise the animal was unhurt.

The third non-target species was an adult red deer female. The animal must have stepped in the snare, jumped and fallen down. When we approached, it was still laying and there were absolutely no signs of struggling. The animal was very calm and we managed to free the front leg from the snare without having to tranquilize the deer. After it was free we tried to chase it away, but the deer was not able to move the front legs, they seemed paralyzed. We stayed the whole night nearby and hoped the animal would recover, but it did not. In the morning it was shot by the local hunters. Dr. Bidovec from the Veterinary Faculty in Ljubljana speculated that the deer hurt the *nervus brachialis* when falling down, apparently a problem typical for ungulates. After that accident we put pools over all snares around corn feeding sides to stop deer from using the paths. We were very frustrated about that accident

Telemetry in fall / winter 1996

This time trapping and radiotracking were easy to combine, as home ranges were rather small and all bears fairly close to the field station. MAJA and VERA were always together and in 1996 covered an area of 62 km² (n=106 MAJA and 30 VERA). LUCIA had a range of 16 km² (n=24) and VINKO of 21 km² (n=12) (Abb.2).

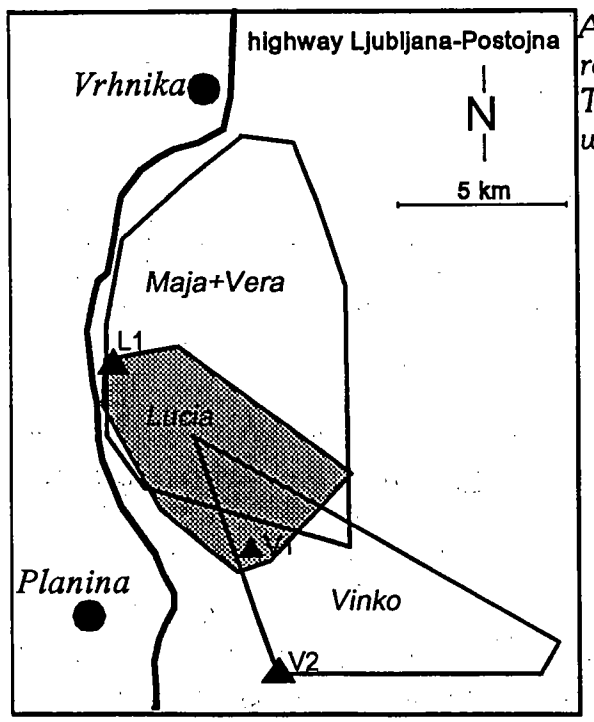

Abb. 2: Home ranges of the four radiomarked bears in 1996. Triangles mark the locations of the 1996/97 winter dens for LUCIA and VINKO.

We tried to follow bears during the night as often as possible and thereby discovered several additional feeding places. Some of which were probably just occasionally provided with corn in order to bait wild boar. All bears heavily frequented these corn feeding sides. We think that the poor capture success was related to the availability of many small wild boar feeding places (fall and early winter is the main season for boar hunting).

By mid November snow fell and a cold weather period started. Regardless of this change, MAJA and VERA did not show any signs of denning. VINKO on the contrary

Project Medved

Slovenian bear telemetry project progress report 1/1997

Petra Kaczensky, June 1997

The Slovenian bear telemetry project

The goal of the project is to study the coexistence of brown bears and man in a densely settled area. The project was started in spring 1993 and is a cooperation project between the Forestry Faculty at the Biotechnical University in Ljubljana, the Slovene Hunters Association, the Institute of Wildlife Biology and Game Management in Vienna and the Munich Wildlife Society.

The spring 1997 capture season

First traps were set on the 12.3.97, when snow condition allowed reliable access to the trap sites by car. Last traps were removed on the 25.5.97 after bear visits to feeding sites were greatly reduced. Traps were set in the hunting area of Ljubljanski Vrh, Rakek and Cerknica, all on the east side of the highway. With the end of the spring bear hunting season we additionally had traps in the hunting area of Hotedrscica, which is west of the highway. Like in previous years, trap transmitters where permanently surveyed by the military base on Ljubljanski Vrh.

During the peak of trapping we had up to 6 trap sites with a total of 24 traps operating simultaneously. In spite of this effort and plenty of bait, trapping success was slim. Within 1065 trap nights we only caught 3 bears, which makes for an average of 355 trap nights per bear! 40 times traps were released, without anything getting caught. Bears were responsible for sprung snares in 11 cases, while the others were sprung by wild boar, deer or by unknown species and unknown reasons. Two times bears got caught, but were able to free themselves before we reached the trap side. In Cerknica no bears ever visited the two feeding sites.

Except for the sites in Cerknica, bears regularly frequented the trap sites, but selectively avoided the traps. The only bears we caught were young ones, two yearlings and a subadult or young adult male. We are pretty convinced, that we already caught all adults in the core trapping area and that these bears have learnt their lesson.

Therefore we changed tactics and tried to free range tranquilize bears from the Hochstand (elevated hiding places) at the feeding sides. This was only possible because of Dr. Christian Walzer from the Salzburg Zoo Hellbrunn who helped with experience and equipment. With his CO_2 gun (Daninject, Germany) he is able to shoot up to 65m and with his transmitter darts tranquilized bears may be located. During the April moon we actually managed to free range tranquilize a yearling, VANJA. The bear came right at dusk. When it was hit by the dart (Pneudart, USA) it turned around towards the Hochstand and than took of full speed. It ran for about 600m before the drug took effect. Relocation of the tranquilized bear was not a problem due to snow cover.

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Project staff

Petra Kaczensky is now full time employed by IWJ for the bear work and Felix Knauer of WGM is working part time on the project. In addition, Matjaz Prosen was employed as a project assistant in April 1997. He has a diploma in Forestry and has done his Diploma thesis on GIS analysis of bear habitat in SW Slovenia. He will be employed until April 1999 by IWJ through the Forest Faculty at the University of Ljubljana. Marko Jonozovic, who is now working for the State Forest Service, is still helping with the bear captures but had to stop doing telemetry. Since May 1997 Axel Wagner, a biology student at the University in Bonn, is working for his diploma on bear activity pattern. He will be doing 6 months of intensive field work.

Housing situation

Thanks to our new field station, a former forestry worker barrack, we are actually able to host guest and give international students the ability to work on the project. It was hard work to do all the painting, repairing and cleaning while trapping and monitoring the bears. But we finally have enough space and we live right in the bear area, often locating the bears just a few hundred meters from the house.

Education of the Austrian bear Emergency Team (ET)

Like the previous fall capture season the spring capture season was used to train Austrian bear staff on how to catch, tranquilize and handle bears. Jörg Rauer of WWF Austria, as well as Thomas Huber, Hubert Zeiler, Andreas Zedrosser, Irene Glitzner and Rudi Hafellner from the Institute of Wildlife Biology and Game Management stayed with us

Testing of equipment for the Austrian Life project

New equipment needs to be tested and handling trained before use in emergency cases. Therefore we are presently testing equipment for the Austrian brown bear Life project under field conditions. The main focus is on the GPS collars (TELEVILT, Sweden) that were bought for Austria. The technique is promising and presently we are working on an optimal schedule for the VHF beaconing as well as the GPS reporting and test accuracy of the locations. Unfortunately the first collar had to be returned to Sweden, as the VHF beacon failed to work correctly. First experiences with a second collar will be available soon.

Acknowledgment and Funding

We would like to thank all the people that made this project work: the hunters of the hunting families Cerknica, Hotedrscica and especially Rakek, who let us trap on their bait sides. The soldiers of the Military Station up on Ljubljanski Vrh who again did a great job monitoring our trap transmitters. Dr. Chris Walzer of the Salzburg Zoo Hellbrunn for spending a lot of cold nights in different Hochstands. And last but not least the bears for allowing us an insight in their secret lifes.

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Including the bears that was free ranged, we were able to radiotag three new bears: two yearlings and a subadult or young adult male (Tab1).

Tab.1: Bears captured during the spring 1997 capture season.

date	bear	name	weight (Kg)	sex	age	area	transmitter type
28.03.97	M11	Srecko	120	male	subadult / young adult	Rakek	collar
21.04.97	F07	Vanja	40	female	yearling	Rakek	eartag
03.05.97	M12	Dushan	38	male	yearling	Rakek	eartag
09.05.97	F05	Vera[1]	28	female	yearling	Ljubljanski Vrh	glue

[1] recapture

Telemetry spring 1997

Towards the end of the spring trapping season we were monitoring seven bears (Fig.1, Tab.2). Unfortunately eartag transmitters (Holohil, Canada) seem to be too heavy (47g) and cause a slit in the ear which eventually allows the transmitter to drop off. This happened during the recapture of VERA. And 10 days later the eartag transmitter of VINKO came off as well. Both bears were tagged for almost 8 months, though. In the future we will use smaller eartag transmitters of the same brand developed for red deer, weighing just 29g. Because VERA already had one ear with a slit, she was just equipped with a glue transmitter.

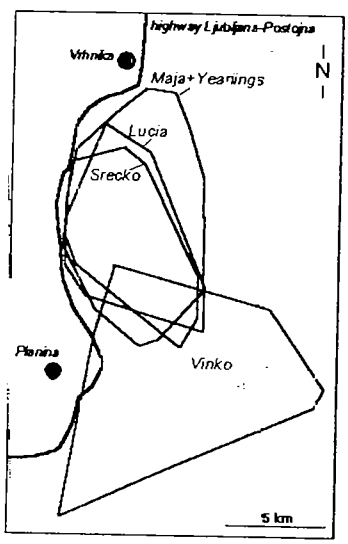

Fig1: Home ranges of the 7 bears followed in spring 1997. The ranges of VANJA, VERA and VINKO are not drawn separately as they have not yet left their maternal range (MAJA).

Tab.2: Bears monitored in spring 1997.

bear	sex	age	monitoring period	comments
MAJA	female	adult	23.04.95 - ongoing	cubs in 1996
VERA	female	yearling	05.10.96 - ongoing	cub of MAJA
LUCIA	female	subadult / adult	18.10.96 - ongoing	
VINKO	male	yearling	31.10.96 - 20.05.97	cub of unmarked female
SRECKO	male	subadult/ adult	28.03.97 - ongoing	
VANJA	female	yearling	21.04.97 - ongoing	most likely cub of MAJA
DUSHAN	male	yearling	03.05.97 - ongoing	most likely cub of MAJA

denning

VINKO changed his den site once after three weeks, but thereafter stayed in the same spot from the begining of December to the begining of March. On 7.3.97, after 3 months, he was located away from this site for the first time.

LUCIA started denning in mid November and stayed in the same spot until the begining of March. Unfortunately activity monitoring by Hubert Potocnik largely failed. First unfavorable snow conditions hindered access and than technical problems came up. When everything was solved, the bear had left the den.

MAJA and VERA stayed together all winter and tracks indicated, that the other two cubs were with her as well. The family moved around all winter and did not seem to really den. Several times hunters saw tracks of a bear family at the feeding sites.

family break up

VERA stayed with MAJA until the begining of April, that is up to the age of about 15 months. From 7.4.97 on she was moving around independently, but still within the maternal home range. So far we could only document a few short meetings (few hours) between her and MAJA.

When we caught VANJA and DUSHAN they were already separated from their mother, but we are pretty sure they are the other two young of MAJA. Like VERA they roam over MAJA's range. For VANJA we were able to document a short meeting with MAJA. And a larger yearling, possibly DUSHAN, was seen together with VERA at Rakek feeding site, just two nights prior to Dushan's capture there.

For VINKO, family break up could not be determined. We do not know his maternal range either, but the last three locations greatly increased his range and we suspect that he just had started to disperse when he lost his eartag transmitter. The transmitter was found 350m from the highway and just 500m from the spot where in 1995 a subadult bear was killed on the railway bridge over the highway.

LUCIA was seen together with a smaller bear several times by local hunters as well as members of the research team. It could possibly be a sister of hers.

courtship

Mating season seemed to have started in mid April. During a late snowfall around the 21.4.97 MAJA was tracked together with another bear and a week later was even seen together with a big dark colored bear. LUCIA keeps on meeting with SRECKO regularly since the end of April and since mid May stays with him for several days in a row.

highway/traffic accidents

On 12.5.97 UROSH, an adult male we had caught in spring 1995, was found dead next to the railway between Laze and Ivanje Selo. He had lost his radiocollar only 6 weeks after the capture, but was identified by his eartags. When we had caught him he was in rather poor condition, weighing less than 100 kg. Now, two years later, his weight was over 200 kg (171 kg without intestines) and he appeared in prime condition.

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Project Medved

Slovenian bear telemetry project
progress report 2/1997

Petra Kaczensky, December 1997

At what time do you want to be waked up at the begin of March?

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Slovenian bear telemetry project progress report 2/1997

Telemetry 1997

Fall capture 1996 and spring capture 1997 resulted in 7 bears being equipped with radiotransmitters (Tab.2). F4 shed her collar after a total monitoring time of 26 month (expected life time), F6 was killed by train after 12 month of monitoring and M11 shed his collar after 7 month of monitoring (Tab.1). The use of small eartag transmitters (47g, Holohil, Canada) allowed us to mark cubs and yearlings for the first time. We were able to document family breakup of F4 and her daughter F5 and the movements of all three of her cubs following separation from 6 weeks to 3 month. Monitoring time was restricted because ear tag transmitters seem to be too heavy and were lost after 3-8 month (see report 1997/1). In the future we hope to extend monitoring time of eartag transmitters by using an even smaller type (29g, Holohil, Canada).

Tab.1: Bears monitored from 1993 - 1997.

bear	bear name	age at capture	monitoring period	fate of bear	day loc.	add[1] loc.	highway crossings
F1	Jana	yearling	04.05.93 - 07.11.94	killed	113	19	3
F2	Metka	adult	24.03.94 - 26.09.94	shed collar	67	1	0
M3	Clio	yearling	25.03.94 - 31.05.94	shed collar	21	3	0
M4	Janko	subadult	28.03.94 - 26.11.94	radiocontact lost	5	0	?
M6	Misko	adult	07.04.94 - 06.11.95	shed collar	125	16	2
F3	Ancka	adult	23.04.94 - 15.07.95	shed collar	136	8	0
M7	Jure	subadult	16.11.94 - 27.03.95	poached	17	1	0
M8	Urosh	adult	05.04.95 - 31.05.95	shed collar killed by train	19	7	0
M9	Milan	subadult	16.04.95 - 02.05.95	shed collar	4	0	0
F4	Maja	adult	23.04.95 - 20.06.96	shed collar	245	72	0
F5	Vera	cub of F5	05.10.96 - 12.06.97	shed collar	89	75	0
F6	Lucia	subadult	18.10.96 - 09.10.97	killed by train	166	314	0
M10	Vinko	cub	31.10.96 - 20.05.97	shed collar	34	11	0
M11	Srecko	subadult	28.03.97 - 01.11.97	shed collar	135	199	2
F7	Vanja	yearling of F5	21.04.97 - 12.08.97	shed collar	63	120	0
M12	Dusan	yearling of F5	03.05.97 - 12.07.97	shed collar	42	56	0
	total				**1.281**	**902**	**7**

[1] more than 1 location per day

Home range size was extremely small for F4 and her cubs F5, F7 and M12, even after family breakup (Tab.2). F4, her cubs as well as F6 all used the same area, just separated in time (Fig.1). Meetings between collared bears (after family bear up of F4 and outside the mating season) were documented a few times, but were fairly rare and rather short.

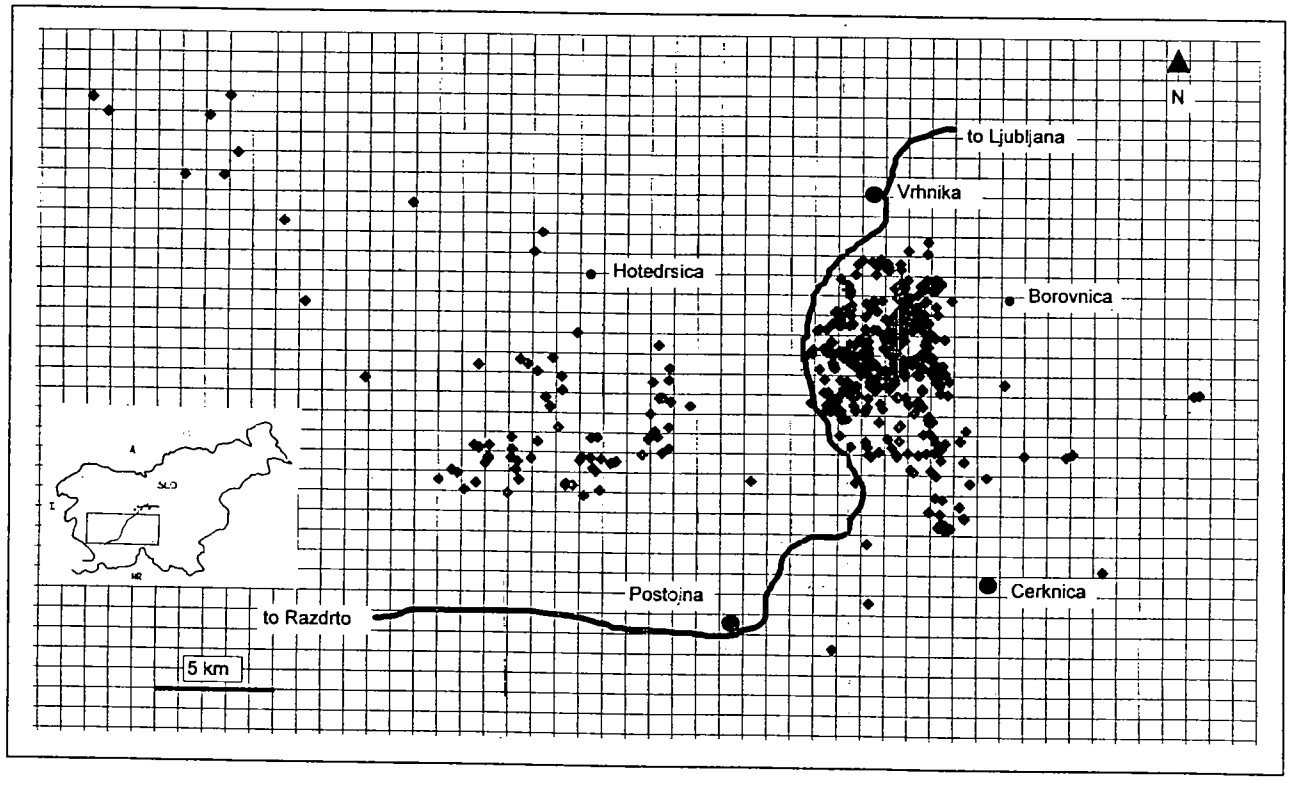
Tab.2: Home Range size of bears in 1997.

bear	number of locations	100% Polygon (km^2)
F4	62	51
F5	57	39
F6	141	43
F7	63	21
M10	22	100
M11	135	481
M12	42	31
total	**522**	

M10, the cub of an unmarked female seemed to start dispersing in May. Unfortunately he than lost his ear tag transmitter, which found only 375m away from the highway.

After courtship with F6, M11 crossed the highway between 7.6. and 10.6.97 and kept moving west almost up to Cepovan. He than turned back east and used the area of Trnovski Gozd, Hrusica and Javorniki (Fig.1). Between 15.10. and 32.10.97 he crossed the highway again and went straight east into Iskra Canyon, where he shed his collar on

Fig.1: Distribution of all day locations of radiocollared bears in 1997 (n=522).



Activity

Intensive 24 h activity monitoring was started from may 1997 on. From May to October a total of 9142 10 min. activity samples, equivalent to about 1.500 hours of continuous monitoring, was collected (Fig.2). A first rough analysis showed great individual differences in activity patterns, especially for yearlings. Only F4 and M11 showed what we expected to be the typical activity pattern of bears, with the main activity being at night (Fig.3). Presently Axel Wagner is analyzing the data in detail for his diploma thesis on bear activity pattern.

Fig.2: Total activity pattern of all bears in 1997.

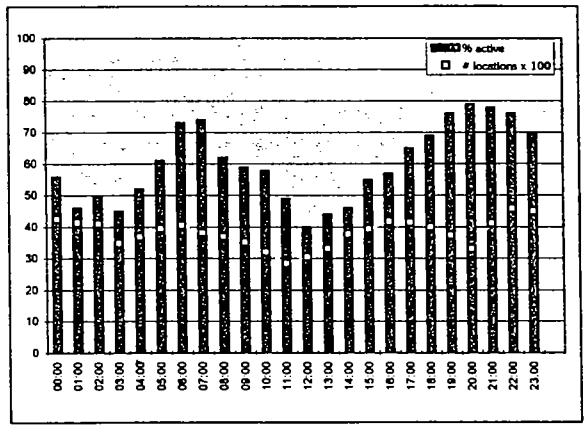
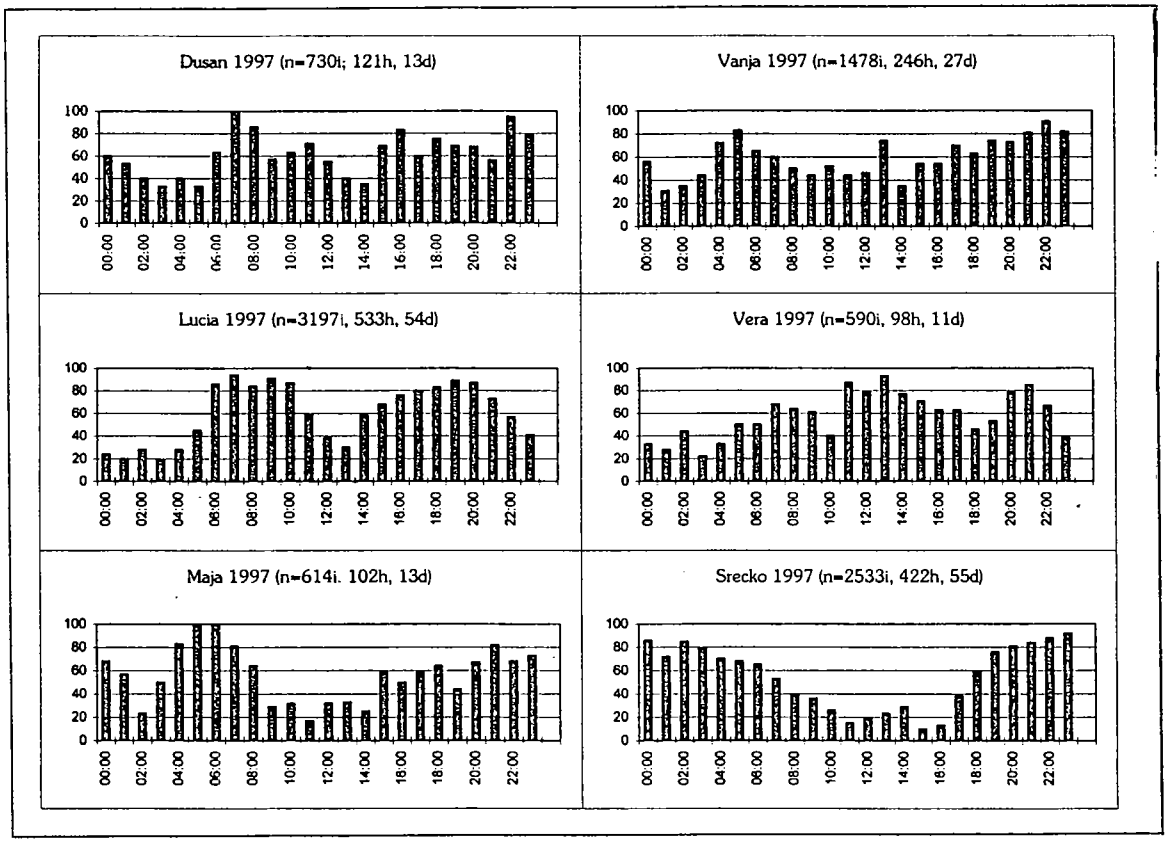


Fig.3: Activity pattern of individual bears monitored in 1997.



The accuracy of our activity monitoring was tested in the Salzburg Zoo in July 1997. There a bear was fit with a radiocollar and its activity observed and radiomonitored simultaneously in order to determine the most accurate activity criteria. By monitoring activity via time sampling every 10 min. for 1 min., activity could be best described when

using the fluctuation in signal strength. With an activity criteria of more than 4 fluctuations in signal strength the best fit of observed and radiomonitored activity was obtained (see Kaczensky et al. 1997a). Field methods were adapted accordingly.

Mortality

While M11 managed to cross the highway twice without getting hit, two bears got killed by train in our study area. M8, by now a male in prime condition, was killed on 12.5.97 (see report 1997/1) and F6 was killed on 8.10.97. F6 had slept between highway and railway and got active again at 7:00 and used the railway tracks as an easy travel corridor. The train surprised her at a spot where the track is cut into the limestone, with 5m high walls on each side. F6 appeared to be in very good condition. The collar did not show any wear and was still loosely around the neck, but she had lost both eartags.

Field trips

Our study was visited by two field excursions. From 16-17.7.97 by a group of forestry and biology students from the University of Munich under the supervision of Prof. Wolfgang Schröder. And from 6.9.97 by a group of international bear experts as part of the post-conference excursion following the 11th International Conference on Bear Research and Management in Graz, Austria, 1.-4.9.97.

Guest workers

In addition to our regular field crew (see report 1997/1) we had Avram Sandor (ROMSILVA, RO), Jennifer Clarke (Uni St. John, CAN), Ferry Pickavet (Uni Wagingen/BOKU, NL), Janez Adamic (SLO), Susanne Falkenstett (Uni Bonn, D), Thomas Speierl (Uni Bayreuth, D), Antonio Di Croce (Uni Rom, I), Alessia Gallastroni (Uni Rom, I) and Al Bratkovich (Montana Forest Service, USA) stay at the project and help with field work. In addition we hosted our first eco-volunteer, Inge Schmutzer from Austria. She came to us by the agency "TRAVEL'N CARE".

Project organization

Since 1993 Project Medved has been a cooperation project between the Forestry Faculty at the Biotechnical University in Ljubljana, the Slovene Hunters Association, the Institute of Wildlife Biology and Game Management in Vienna and the Munich Wildlife Society. With the end of the 1997 field season our Slovene partner, Miha Adamic from the Forestry Faculty at the Biotechnical University in Ljubljana will cancel his cooperation. A heavy workload and different interests led to this decision. The project will therefore go on as a cooperation project between the remaining partners and with the Hunters Association taking over the part of the main Slovene partner.

Acknowledgments and Funding

We would like to thank all the people that made this project work: the hunters, the soldiers of the Military Station up on Ljubljanski Vrh, Dr. Chris Walzer of the Salzburg Zoo Hellbrunn and all the students and guests that helped with field work.

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Written Outputs 1997 (see appendix)

Kaczensky, P., F. Knauer, M. Jonozovic, T. Huber and M. Adamic. 1996. The Ljubljana-Postojna highway - a deadly barrier for brown bears in Slovenia? J. Wildl. Res. 1(3):263-267.

Kaczensky, P., A. Wagner and Ch. Walzer. 1997a. Activity monitoring of brown bears - testing field methods in the Zoo. Poster at the 11th Int. Conf. Bear Res. and Manage., Graz Austria 1-4.9.97

Kaczensky, P., F. Knauer, M. Prosen, M. Jonozovic, T. Huber, A. Wagner, M. Adamic, B. Krze, W. Schröder and H. Gossow. 1997b. Project Medved - Studying the coexistance of brown bears and men in Slovenia. Poster at the 11th Int. Conf. Bear Res. and Manage., Graz Austria 1-4.9.97

Projekt Medved

- studying the coexistance of brown bears and men in Slovenia.

The Slovenian bear project - what is it all about?

The Slovenian bear population is of high international interest because of its importance as a source for the natural recolonization of the Alps and as a future link between the Dinaric and the Alpine bear population. In addition life conditions of bears in Slovenia are very similar to those in the Alps and management strategies developed there will be of high relevance elsewhere. Therefore a long term cooperation study, Project Medved, was launched in 1993, with the aim to study the coexistence of brown bears and man in a densely settled area.

The objectives of the study are:

- evaluate the influence of human land use on the activity, movements and habitat use patterns of individual bears
- identify structures that may present barriers for bears, evaluate their impact and test measures to reduce the barrier effect
- examine dispersal/expansion patterns of a bears population in a relatively densly settled landscape

Bears between Balkan and Alps

The study area area is located 20 km SW of Ljubljana, the capital of Slovenia. the area was chosen because:

- some areas are heavily used for recreation Ljubljana citizens
- it is at the NW edge of the bear core area
- the Ljubljana-Postojna highway cuts through the area
- it is on the edge of the main bear corridor from the Dinaric Mountain range towards the Alps

Bears keep us busy and away from the office

At a stage of the project where we put all our efforts into field work, we can not present hard fact results, yet. Here we want to give an overview about some of the things we have been doing so far.

Trapped bears learned their lesson

We caught 19 different bears, 7 females and 12 males. They were: 2 cubs, 7 yearlings, 4 subadults and 6 adults (Tab.1). All bears were caught with Aldrich snares, except one yearling that was free range tranquilized. Trapping becomes increasingly difficult, as we probably have already caught most resident bears in the area and they seem to have learned how to avoid the snares.

No data without driving, driving, driving....

Telemetry is done almost exclusively from the ground, which is made possible by a dense net of forest roads (20m/ha). Up to date, more than 1.000 day-time locations were sampled (Tab.1), as well as about 150 blocks of continuous 8 hour monitoring periods (day and night). Presently we are focusing on 24-hour monitoring to get better data on detailed habitat use and activity pattern.

Tab.1: Bears monitored in Slovenia from May 1993 to July 1997.

bear	age	monitoring period	day locations	100 % Polygon	highway crossings
		1993			
F1	yearling	04.05. - 28.10.93	53	60	3
		1994			
F1	subadult	24.03. - 07.11.94	60	140	0
F2	adult	24.03. - 26.09.94	67	59	0
F3	adult	23.04. - 31.12.94	92	95	0
M3	yearling	25.03. - 31.05.94	21	(15)	0
M4	subadult	28.03. - 26.11.94	5	–	?
M6	adult	07.04. - 20.11.94	77	412	2
M7	subadult	16.11. - 27.03.95	17	163	0
		1995			
F3	adult	01.01. - 15.07.95	45	24	0
F4	adult	23.04. - 31.12.95	83	51	0
M6	adult	18.04. - 06.11.95	48	207	0
M9	subadult	16.04. - 02.05.95	4	–	0
M8	adult	05.04. - 31.05.95	19	(86)	0
		1996			
F4	adult	01.01. - 31.12.97	101	45	0
F5	cub of F5	05.10. - 31.12.97	32	(45)	0
F6	subadult	18.10. - 31.12.97	25	(23)	0
M10	cub	31.10. - 31.12.97	12	(21)	0
		1997			
F4	adult	01.01. - 20.06.97	57	51	0
F5	yearling of F5	01.01. - 12.06.97	54	39	0
M10	yearling	01.01. - 20.05.97	22	100	0
M12	yearling of F5	03.05. - 12.07.97	39	31	0
F6	adult ?	01.01. - ongoing	75	33	0
F7	yearling of F5	21.04. - ongoing	44	17	0
M11	adult ?	28.03. - ongoing	66	375	1
		total	**1.180**		**6**

Large carnivores with relatively small ranges

Ranges of bears were rather small, 35-95 km^2 for adult females and 163-412 km^2 for adult males (100% MAM polygon) and overlapped completely between different age and sex classes. We believe that the bear density within the core of the study area is around 1 bear/10km^2.

How to monitor dispersers - a dilemma

Dispersal data is difficult to obtain, as we have not found a good method to fix transmitters on young, growing bears - radiocollars with breakaways (iron wire, cotton spacers) were not reliable, transmitters glued to the fur came off quickly and eartag transmitters (47g) also did not stay on as long as expected.

So far the dispersal of four bears could be monitored, a subadult female moved 22 km, a subadult male 55 km, a yearling male was shot 23 km from his capture site and presently a subadult or young adult male that moved as far as 40 km away from his capture site.

Land of Cockaigne?

Bears in our core study area (100 km^2) are living in luxury. Corn feeding sites for wild ungulates and three meat feeding sites for bears make up for at least one artificial feeding place per 1 km^2! In addition, natural food conditions are also very good. A first analysis of 54 scats showed the importance of grass (49%), social insects (20%) and human provided food (16-21%) in the diet of our bears (METHODE??). Visits of collared bears to the feeding sites are frequent, especially in spring and fall.

The highway - a partial barriere for bears

Our radiotelemetry data showed that bears, even though they do not avoid the vicinity of the highway, rarely crossed (Tab.1). The highway was the home range boundary and no bear had a range on both sides of the highway. Monitoring of bridges and underpasses with the help of sand beds proved what occasional observations by locals already suggested: that bears may cross safely and successfully. But bears were also seen to cross the highway by climbing over the fence - 11 bears killed by cars since 1972 (the opening of the highway) are a sad proof.

Systematic monitoring of the bridges and underpasses was not possible because sand beds where destroyed by wind, rain, cars and people. Therefore cameras, automatically triggered by an motion sensitive infrared sensor, were tested - unsuccessfully, as theft and technical problems handicapped the experiment. Further testing of other camera equipment is planed by our Slovenian partners in cooperation with the highway authorities.

Authors, project partners and funding

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Project Medved is a cooperation study between four institutions from three countries:

- [1]Institute of Wildlife Biology and Game Management at the University of Agricultural Science in Vienna, Austria
- [2]Munich Wildlife Society, Germany
- [3]Biotechnical Faculty at the University of Ljubljana, Slovenia
- [4]Slovenian Hunters Association, Slovenia

Funding was provided by the Austrian Science Fond (FFWF), Austrian Ministry of Science, the Donors Assosiation for the Promotion of Science and Humanities in Germany, Munich Wildlife Society, University of Munich, Slovenian Hunters Association, the Brevins Memorial Foundation (IBA).

International Bear News

Quarterly Newsletter of the International Association for Bear Research and Management (IBA) and the IUCN/SSC Bear Specialist Group

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Issue Highlights

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IBA Web Site: http://weber.u.washington.edu/~hammill/iba/iba.html

Project Medved in Slovenia

pigs in a stable. Although there was no similar database for the previous years, there is enough evidence that the frequency of unnatural bear behavior is on the increase. A total of three bears are known to have been destroyed due to unnatural behavior, one each in the years 1990, 1995 and 1996.

Response to the Media in 1996

The trend of bear-caused damage is decreasing. Attacks on humans were not recorded. There is no provocation for writing that bears are becoming "bloodthirsty". The bear population is smaller, or the same as before the Croatian Homeland War—it certainly hasn't grown. Bear range has not recently increased. Migrations from Bosnia and Herzegovina were possible only in the border region. Bear managers consider bears an important game species and see no reason to stop trophy hunting, but made recommendations for better management.

Recommendations

- Removal and/or fencing of garbage dumps. Closure of illegal dumps and construction of bear resistant garbage containers.
- Fencing of major roads and construction of "green bridges" on critical corridors. Removal of garbage and other attractants along travel ways.
- Winter closure for forestry operations and hunting in the areas with bear dens. Closure of forest roads for public use. Maintenance of the present share of mature beech trees in the forest population.
- Education of people on proper behavior in bear habitat by printing brochures and placing signs along roads and in the forest.
- Promote centralised bear management including the determination of yearly hunting quotas on the state level.

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With help from the John Sheldon Bevins Memorial Foundation in 1994, the Slovenian bear project continues to work on the coexistence of brown bear and humans in a typical human-dominated mid-European landscape.

The project is run in cooperation with the Forestry Faculty at the Biotechnical University in Ljubljana, the Slovene Hunters Association, the Institute of Wildlife Biology and Game Management in Vienna, and the Munich Wildlife Society.

Since spring 1993 we have caught 16 different bears during 20 capture events. Thirteen of these bears, six females and seven males, were radiocollared. Unfortunately, problems with breakaways caused most collars to be shed prematurely. Uncertain funding almost cost the 1996 field season. Our luck changed and we now have money to guarantee at least two more field seasons, yahoo! We immediately started to catch bears in fall. The capture season was also used to train Austrian bear staff to catch, tranquilize and handle bears.

Presently we monitor four bears: an adult female with three cubs born in 1996, one of her female cubs, a subadult female and a male cub of an unmarked female. Due to the rapid growth of cubs, we fitted them with eartag transmitters (Holohil, Canada). The transmitters are supposed to last for 18 months and so far they work great. We are looking forward to monitoring the separation and dispersal of the cubs from their mother.

With the money provided by the Bevins Memorial Foundation we developed a low cost automatic camera system to monitor wildlife use of highway underpasses. Ten cameras were built and tested in different passages starting in October 1995. Cameras were placed in protective metal boxes and locked to the underpass walls at a height of 4 m. Technical problems and theft of cameras left only 56 correctly exposed images of red deer, fox, cats, dogs, people and cars.

In 1996 Klemen Jerina, a forestry student at the University of Ljubljana, worked with the automatic cameras but was also handicapped by technical problems, particularly moisture and theft. In future, we will only use the cameras to identify bears at known places of activity. Cameras in place for just a few days at a time work perfectly well. We used cameras along animal trails or at lynx kills and got great results with images of lynx, fox, badger, hares and even a wolf.

For 1997 we plan to radiocollar more bears and intensively monitor their whereabouts, focus on the impact of human disturbance, barriers, artificial feeding, and collect more data on dispersal patterns. We will train Austrian bear staff on monitoring, catching and handling bears. And we will welcome any visitors to the two-day post conference field trip of the 11th IBA conference in Graz, Austria.

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Druga poročila o poteku raziskovalnega projekta J - 4297

Alenka Korenjak

RJAVI MEDVED V SLOVENIJI

JAVNOMNENJSKA RAZISKAVA

Ljubljana, avgust 1997

ZAHVALA

Pri zbiranju anket so mi pomagali Martin Šolar, Gregor Bolčina, Maruša Šulentič, Leon Behin, družina Kanalec, Mirko Perušek, Miran Bartol, Iztok Koren, Miran Hafner, Boštjen Škrlep in številni kolegi revirni gozdarji. Vsem se iskreno zahvaljujem. Hvala tudi prof. dr. Mihi Adamiču zc strokovne nasvete.

Alenka Korenjak

KAZALO

1. UVOD

Rjavi medved sodi na Rdeči seznam ogroženih sesalcev v Sloveniji. Kljub temu ne smemo prezreti dejstev, ki praviloma otežkočajo napore za varstvo velikih zveri v kulturni krajini. Z današnjega zornega kota sodijo namreč vse velike zveri v skupino **problematičnoh živalskih vrst**. Izraz so oblikovali v Združenih državah Amerike in z njim nadomeščajo arhaičen pojem **škodljivci**, ki ga žal še vedno srečujemo v besednjaku kmetijskih strokovnjakov. Kot problematične veljajo tiste vrste, ki zaradi načina prehranjevanja in drugih življenjskih značilnosti:

- pomenijo ljudem tekmeca pri izkoriščanju naravnih virov
- lahko povzročajo gospodarsko škodo
- so lahko izjemoma nevarne človeku
- ovirajo doseganje ciljev nekaterih dejavnosti

Dolgoročnega varstva problematičnih vrst v kulturni krajini ni mogoče osnovati samc na klasični dvosmerni ravni **populacija - habitat**, ampak moramo upoštevati tudi tretjo raven - **človeka**. Neupoštevanje odnosa tistih skupin lokalnih prebivalcev, ki so zaradi zakonskega varstva problematičnih živalskih vrst neposredno prizadete, lahko povsem izniči smisel varstvenih načrtov. Skozi okno mestnega stanovanja sta lepota in veličastnost več deset kilometrov oddaljenega medveda povsem drugačna kot ju vidi lastnik ovčje črede v osrednjem območju njegovega habitata. Tako v Ameriki in na Hrvaškem, kot v Avstriji in Sloveniji so ugotovili, da z naraščajočo oddaljenostjo od območij razširjenosti velikih zveri narašča pozitiven odnos do njih. Zato varovanje problematičnih živalskih vrst nikakor ne sme biti zgolj delo državnih uradnikov, ampak mora biti podprto s strani lokalnega prebivalstva. Prvi korak k oblikovanju tega t.im. **političnega habitata** so raziskave javnega mnenja in upoštevanje le-tega pri konkretnih odločitvah. Naravnane morajo biti na trajno spremljavo odnosa ljudi do problematičnih živalskih vrst in morajo zajeti vse ciljne skupine, ne le najglasnejših. Pri odločitvah je namreč enako nevarno upoštevati zgolj zagovornike utopično varstvenih načrtov, kot nasprotne skupine prizadetih ali celo sovražno razpoloženih prebivalcev. Z javnomnenjskimi raziskavami moramo začeti pravočasno in nikakor ne šele ob izbruhu konflikta. Ne smemo se zanašati, da se bodo prizadete skupine počasi sprijaznile s posledicami odločitev, ki so nastale zunaj njihovega okolja, same pa pri odločanju niso smele sodelovati. Neupoštevanje javnega mnenja praviloma vodi do

nelegitimnega samozaščitnega "modela", ki ga ameriške službe za varstvo živali poznajo kot **princip 3S:** Shot-Shovel-Shut up oziroma ustreli-zakoplij-molči.

Toleranca do škode, ki jo povzročajo problematične živalske vrste je odvisna od:

- vrste, obsega in ostrine škode
- sposobnosti prizadetih, da prenašajo ekonomske posledice škode
- tehničnih in materialnih možnosti zaščite
- osebnih nagnjenj do živali

Vsaj (zadnja) dva dejavnika tolerance sta povezana s poznavanjem nekaterih dejstev o problematičnih vrstah. To pa pomeni, da je javno mnenje mogoče uravnavati in vplivati nanj. Kako velik je razkorak med prevladujočim mnenjem prebivalcev in realnostjo pa je mogoče oceniti le z javnomnenjskimi raziskavami. Zato vključevanje le-teh v načrte upravljanja s prostoživečimi živalmi ni nepotrebno razkošje, ampak nuja. S tem namenom smo že leta 1995 izvedli obsežno javnomnenjsko raziskavo o odnosu človeka do velikih zveri v Sloveniji in Avstriji. Anketirali smo pet najbolj prizadetih ciljnih skupin: kmete, turiste, lovce, gozdarje in obiskovalce živalskih vrtov. Zaradi poldrugo stoletje trajajoče odsotnosti velikih zveri v Avstriji se reakcije avstrijskega prebivalstva mnogokrat značilno razlikujejo od mnenja enakih skupin v Sloveniji. Letos smo izvedli novo anketiranje, omejeno samo na odnos lokalnega prebivalstva do medveda. Želeli smo tudi preveriti, do kolikšne mere so dogodki kot npr. napad medvedke na človeka (Velike Lašče aprila 1996) ali občasne škode, ki so pogosto prikladno gradivo za popestritev monotonosti lokalnih medijev, vplivali na sicer dokaj tolerantno razpoloženo lokalno prebivalstvo.

BF Odd. za gozdarstvo in obnovljive gozdne vire
GOZDARSKA KNJIŽNICA
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Gozdarski inštitut Slovenije

2. METODE DELA

Za ugotavljanje odnosa lokalnega prebivalstva do medveda smo izbrali tri območja, kjer se medved redno ali občasno pojavlja:

- osrednje območje habitata rjavega medveda
- Gorenjsko, kot potencialni koridor za širjenje medveda v Avstrijo
- Tolminsko kot potencialni koridor za širjenje medveda v Italijo

V vsakem območju smo anketirali 150 lokalnih prebivalcev. Za metodo anketiranja smo se odločili zato, ker je časovno, stroškovno in izvedbeno najugodnejša. Popolnoma naključna izbira vzorca ni bila mogoča, zato smo anketirance izbrali s pomočjo revirnih gozdarjev in drugih sodelavcev, ki dobro poznajo tako teren, kot prebivalstvo. Anketarjem smo predhodno pojasnili pojem "lokalnega prebivalca". Za razliko od prve javnomnenjske raziskave smo se namreč izogibali diferenciaciji v ciljne skupine (npr. lovci, gozdarji, kmetje, turisti...).

Anketni vprašalnik smo sestavili tako, da smo z vprašanji zajeli afektivno, kognitivno in evaluativno komponento mišljenja in občutja. Afektivna komponenta se nanaša na čustveni vidik odnosa ljudi do medveda (vprašanje 9), kognitivna na spoznavanje in objektivno razumevanje (vprašanje 1, 2, 3, 5, 6, 9 in 12), evaluativna pa na prepričanje in vrednotenje medveda (vprašanje 4, 7, 10 in 11).

Anketirancem, ki so izpolnili anketni obrazec smo zagotovili popolno anonimnost, zato menimo, da niso zavestno potvarjali informacij, ampak so odgovarjali v skladu s svojimi mnenji, stališči, občutki in vedenjem.

3. REZULTATI

3.1 OPIS VZORCA

Preglednica 1: SPOLNA STRUKTURA ANKETIRANCEV

delež odgovorov (%)	Osrednje območje	Gorenjska	Tolminska
moški	49	55	57
ženske	51	45	43
skupaj	100	100	100

Preglednica 2: STAROSTNA STRUKTURA ANKETIRANCEV

delež odgovorov (%)	Osrednje območje	Gorenjska	Tolminska
do 20 let	7	11	6
21 do 40 let	61	39	41
41 do 60 let	29	36	43
nad 60 let	3	14	10
skupaj	100	100	100

Preglednica 3: STRUKTURA ANKETIRANCEV PO IZOBRAZBI

delež odgovorov (%)	Osrednje območje	Gorenjska	Tolminska
osnovna	24	20	30
srednja	59	55	48
visoka	17	25	22
skupaj	100	100	100

3.2 ANALIZA ODGOVROV

Preglednica 4: INFORMACIJSKI VIRI O MEDVEDU

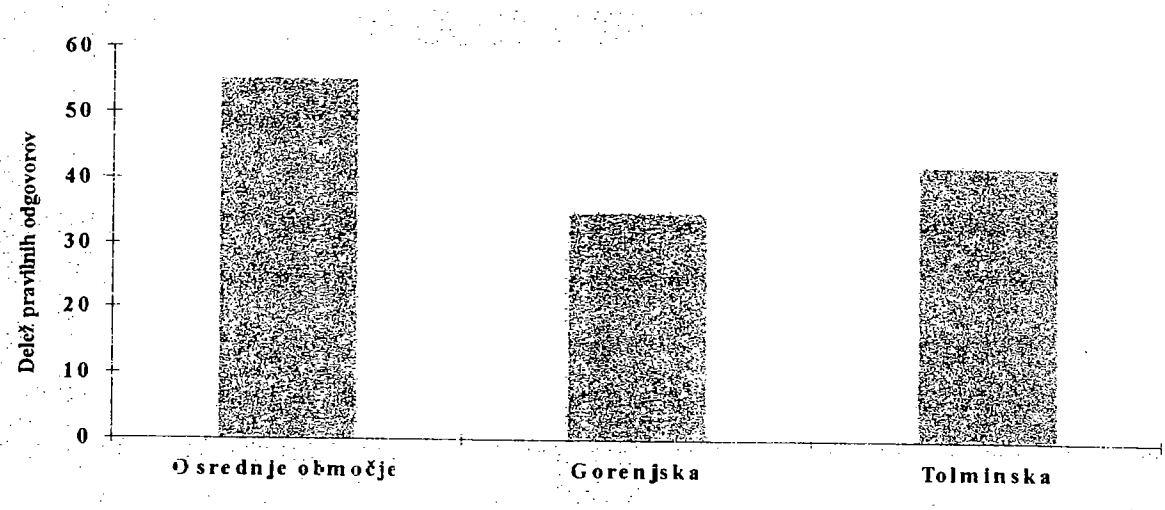
delež odgovorov (%)	Osrednje območje	Gorenjska	Tolminska
knjige	8	12	15
šola	3	5	3
časopisi	15	14	15
TV	64	53	48
strokovna literatura	8	13	13
pravljice	1	2	3
drugo	1	1	3
skupaj	100	100	100

Prevladujoč delež odgovorov, ki ga kot najpomembnejši informacijski vir o medvedu navajajo anketiranci vseh treh območij, kaže na velik pomen poljudnoznanstvenih in dokumentarnih oddaj za oblikovanje realne podobe medveda v očeh javnosti. Na drugo mesto se uvrščajo časopisi, ki z željo po senzaciji pogosto predimenzionirajo dogodke, povezane zlasti z gospodarsko škodo. Izkušnje kažejo, da lahko tovrstno ravnanje zelo škoduje živalski vrsti, v katero je uperjeno, zato je v varstvenih strategijah potrebno predvideti tudi (korektno) sodelovanje z mediji. Šola kot vir informacij je v odgovorih anketirancev vseh treh območij zastopana z zelo nizkim deležem. Vzgoja in izobraževanje sta pomemben korak pri oblikovanju odnosa ljudi do živali, še zlasti če gre za zakoreninjene predsodke (npr. o požrešnem volku ipd.). Otroci, ki danes sedijo v šolskih klopeh, bodo jutri morda imeli moč odločanja in vplivanja, zato vključevanje naravovarstvenega izobraževanja v šolstvo postaja vse pomembnejše.

Preglednica 5: OCENA ŠTEVILČNOSTI MEDVEDA V SLOVENIJI

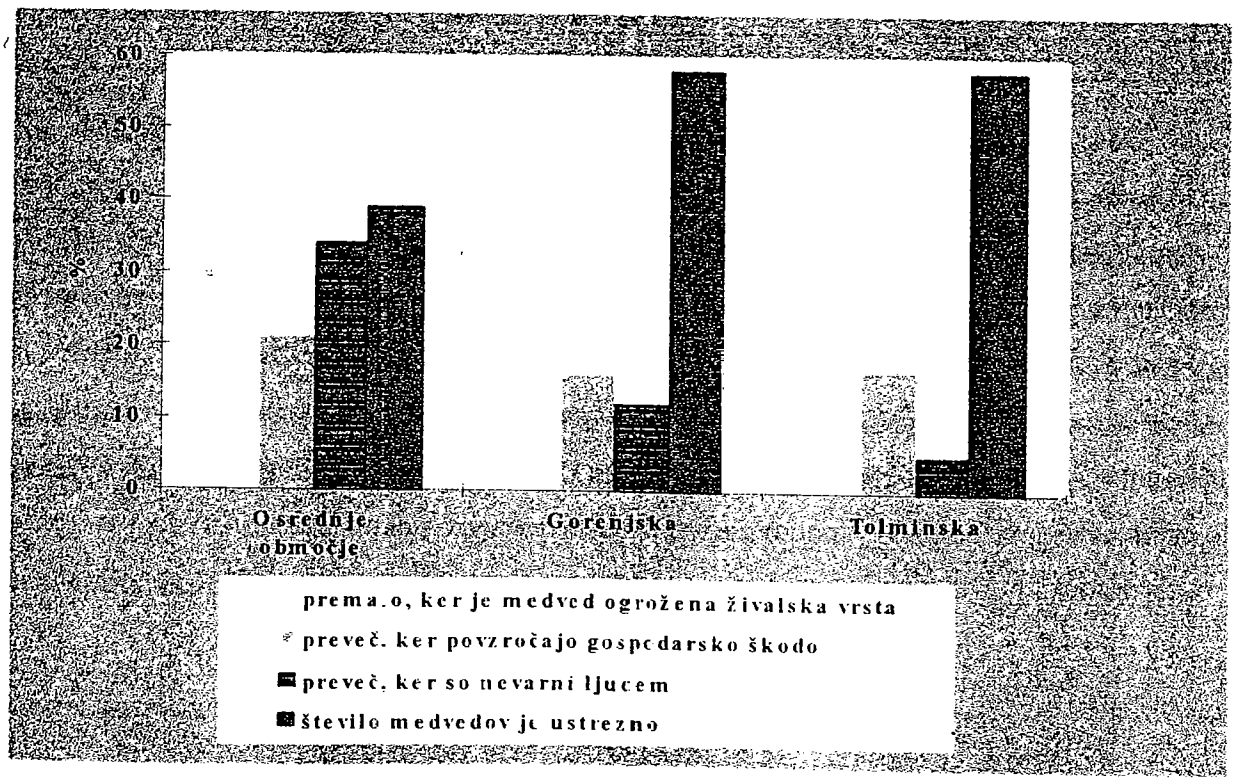
delež odgovorov (%)	Osrednje območje	Gorenjska	Tolminska
ne živi	0	0	1
do 300	30	57	52
300 do 500	55	35	42
nad 500	15	8	5
skupaj	100	100	100

Graf 1: DELEŽ PRAVILNIH ODGOVOROV O ŠTEVILČNOSTI MEDVEDA V SLOVENIJI



Dejstvo, da je delež pravilnih odgovorov največji v osrednjem območju, kjer je medveda največ, ne preseneča. Sama ocena številčnosti je bolj ali manj strokovno vprašanje, zato je za oceno naklonjenosti prebivalstva medvedu pomembnejše naslednje vprašanje.

Graf 2: MNENJE O USTREZNOSTI ŠTEVILČNOSTI MEDVEDA V SLOVENIJI



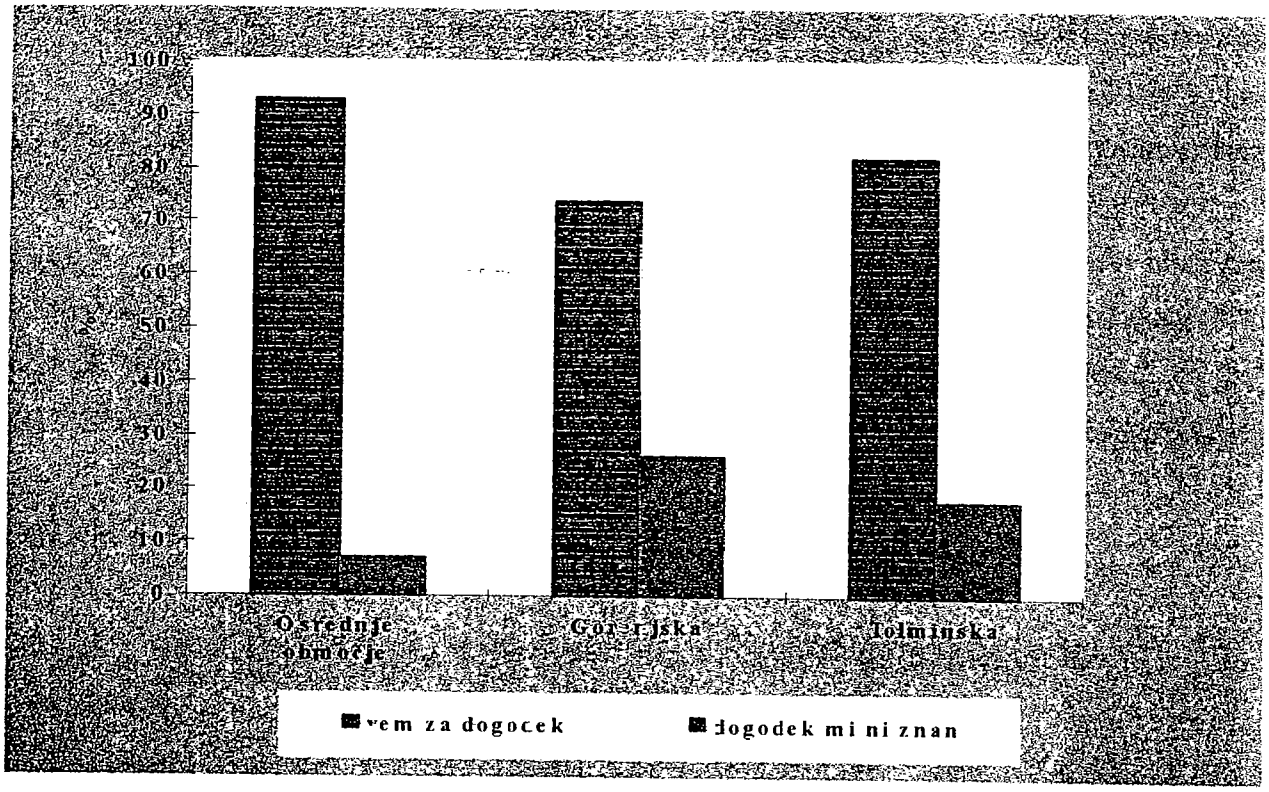
Mnenja anketirancev o številčnosti medveda so v osrednjem območju precej različna kot v obeh robnih območjih. Kar 55% vseh anketirancev osrednjega območja meni, da je medvedov v Sloveniji preveč. Na Gorenjskem se je za ta odgovor odločilo 28%, na Tolminskem pa 22% anketirancev. Da je število medvedov v Sloveniji ustrezno, je menilo le 39% anketirancev osrednjega območja, v obeh robnih območjih pa je delež teh odgovorov dosegel 58%. Odgovori ne presenečajo, saj je gostota populacije medveda v osrednjem območju habitata rjavega medveda res bistveno večja kot v robnih območjih, konfliktne situacije pa zato pogostejše. Pri načrtovanju gospodarjenja s prostoživečimi živalmi moramo zato določiti tudi prednostna območja za medveda, še sprejemljivo gostoto populacije na posameznih območjih, predvideti možno gospodarsko škodo in sredstva za kompenzacijo le-te. Lokalno prebivalstvo mora biti z ukrepi seznanjeno. Tehnokratsko ravnanje zbuja v ljudeh občutek, da so potisnjeni ob zid in zato odpor. Varstvo velikih plenilcev pa je lahko uspešno le, če le-te predstavljajo vrednoto za ljudi.

Preglednica 6: INFORMIRANOST O GOSPODARSKI ŠKODI, KI JO POVZROČI MEDVED

delež odgovorov (%)	**Osrednje območje**	**Gorenjska**	**Tolminska**
poznam primere gosp. škode	86	90	80
ne poznam nobenega primera gosp. škode	14	10	20
skupaj	100	100	100

Sobivanje medveda in človeka ima za posledico tudi občasno gospodarsko škodo. Osebke, ki jo redno povzročajo, je smiselno odstreliti. Obstaja pa tudi druga plat medalje. Škoda je najpogostejša in največja, če pašna živina ni ustrezno zavarovana. Zahteve po odškodninah v teh primerih niso upravičene. Za veliko odmevnost tovrstnih dogodkov so pogosto zaslužni (zlasti lokalni mediji), ki se (ne vedno ravno korektno) radi senzacionalno razpišejo o njih. Zato visok delež pozitivnih odgovorov anketirancev na vprašanje ali poznajo primer gospodarske škode, ki jo je povzročil medved, ne presenča. Rešitev se ponuja v organiziranosti in ustreznem zavarovanju pašne živine, v hitrem in učinkovitem sistemu izplačevanja kompenzacije za nastalo škodo, v odstrelu skrajno problematičnih medvedov in tudi korektnem sodelovanju z mediji.

Graf 3: ODMEVNOST DOGODKA NAPADA MEDVEDKE NA ČLOVEKA (VELIKE LAŠČE, APRIL 1996)



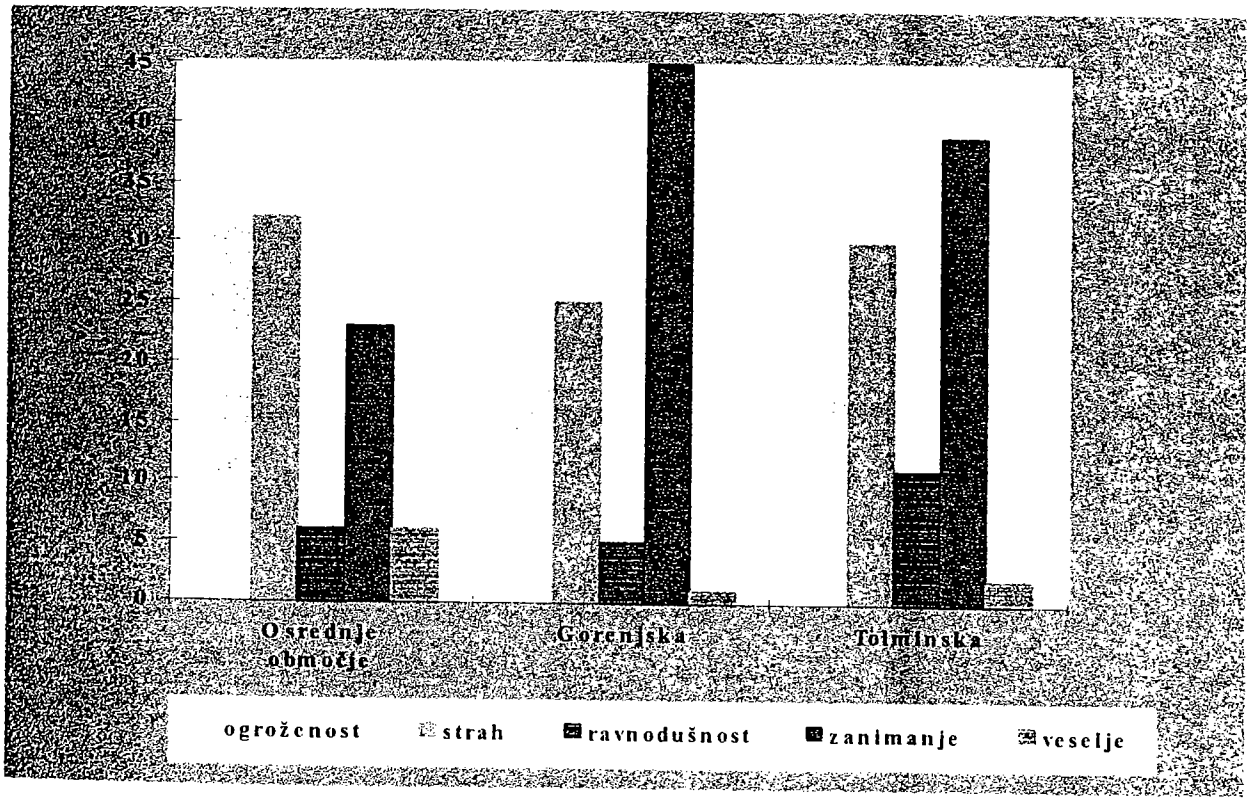
Ker je šlo v primeru pri Velikih Laščah za prvi napad medveda na človeka po daljšem času, velika odmevnost dogodka ne presenneča. Zardi bližine so bili o dogodku po pričakovanjih najbolje obveščeni anketiranci osrednjega območja habitata rjavega medveda (93% vprašanih je odgovorilo, da vedo za dogodek). Ker pa je napad medvedke na človeka močno odjeknil v celotnem slovenskem prostoru, je zanj vedelo tud 74% gorenjskih in 82% tolminskih anketirancev.

Preglednica 7: PRESOJA NEVARNOSTI MEDVEDA ČLOVEKU

delež odgovorov (%)	Osrednje območje	Gorenjska	Tolminska
da	26	21	21
izjemoma	56	6	68
ne	6	72	10
ne vem	2	1	1
skupaj	100	100	100

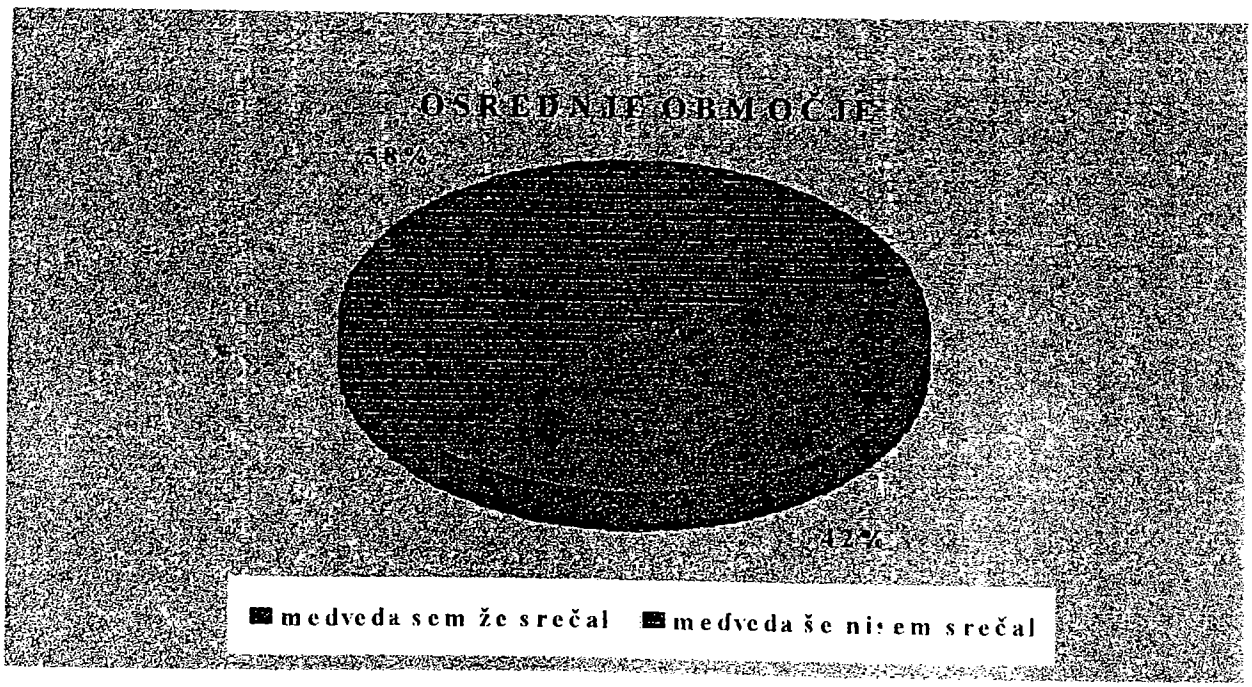
Medved je človeku izjemoma lahko nevaren. To dokazuje tudi neljubi dogodek aprila 1996 pri Velikih Laščah.. Odgovori na vprašanje: **»Ali menite, da je medved človeku nevaren?«** kažejo dokaj ustrezno, ne pa tudi optimalne informiranosti anketirancev. Pretiran strah občuti 26% anketirancev osrednjega območja in približno petina anketirancev robnih območij. Da je medved lahko izjemoma nevaren za človeka, sta vedeli več kot dve tretjini anketirancev osrednjega območja in Tolminske, medtem ko so bili gorenjski anketiranci v 72% prepričani, da medved človeku ni nevaren Tako kot lahko pretiran strah negativno vpliva na varovanje medveda, je lahko zelo nevarna tudi pretirana zaupljivost. Pomembno je, da so vsi ljudje, ki lahko pridejo v kakršenkoli stik z medvedom pravilno obveščeni o tem kdaj obstaja potencialna nevarnost napada medveda na človeka in kako se v takem primeru obnašati. V te namene bi bilo potrebno izdati zgibanko, prospekt, manjšo brošuro ali podobno publikacijo z vsemi pomembnejšimi informacijami in jo posredovati širši, še zlasti pa lokalni javnosti.

Graf 4: OBČUTKI OB BIVANJU MEDVEDA V BLIŽNJI OKOLICI

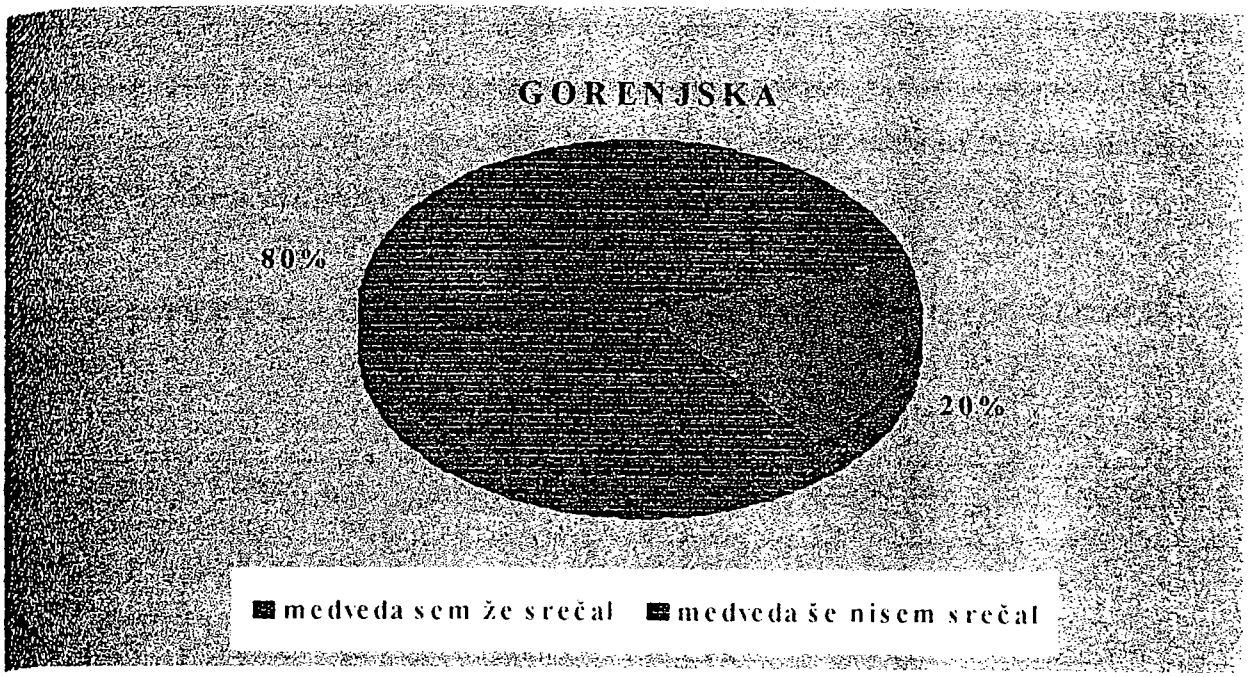


Vprašanje, kakšne občutke bi v vas izzvalo bivanje medveda v vaši bližnji okolici se nanaša na izrazito afektivno komponento odnosa človeka do medveda. Ogroženost in strah bi občutili kar dve tretjini anketirancev osrednjega območja, na Gorenjskem in Tolminskem pa malenkost manj kot polovica vseh vprašanih. Izrazito pozitivni čustv., zanimanje in veselje, bi v osrednjem območju občutilo 29% anketirancev, na Gorenjskem 46% in na Tolminskem 41% vseh vprašanih. Gre za skoraj zrcalno sliko; v osrednjem območju habitata rjavega medveda v afektivni komponenti odnosa do njega prevladujejo čustva strahu, v obeh robnih območjih pa čustvi zanimanja in veselja. Upoštevajoč rezultate ankete iz leta 1995, se z večjo oddaljenostjo od habitata rjavega medveda povečuje tudi pozitiven čustven odnos do njega. Skrajno vrednost doseže pri (pretežno mestni) ciljni skupini obiskovalcev živalskih vrtov. V ljubljanskem živalskem vrtu bi čustvi zanimanja in veselja občutilo 58% vprašanih obiskovalcev, v dunajskem (število medvedov v Avstriji je mogoče prešteti na prste) pa kar 83% vprašanih obiskovalcev.

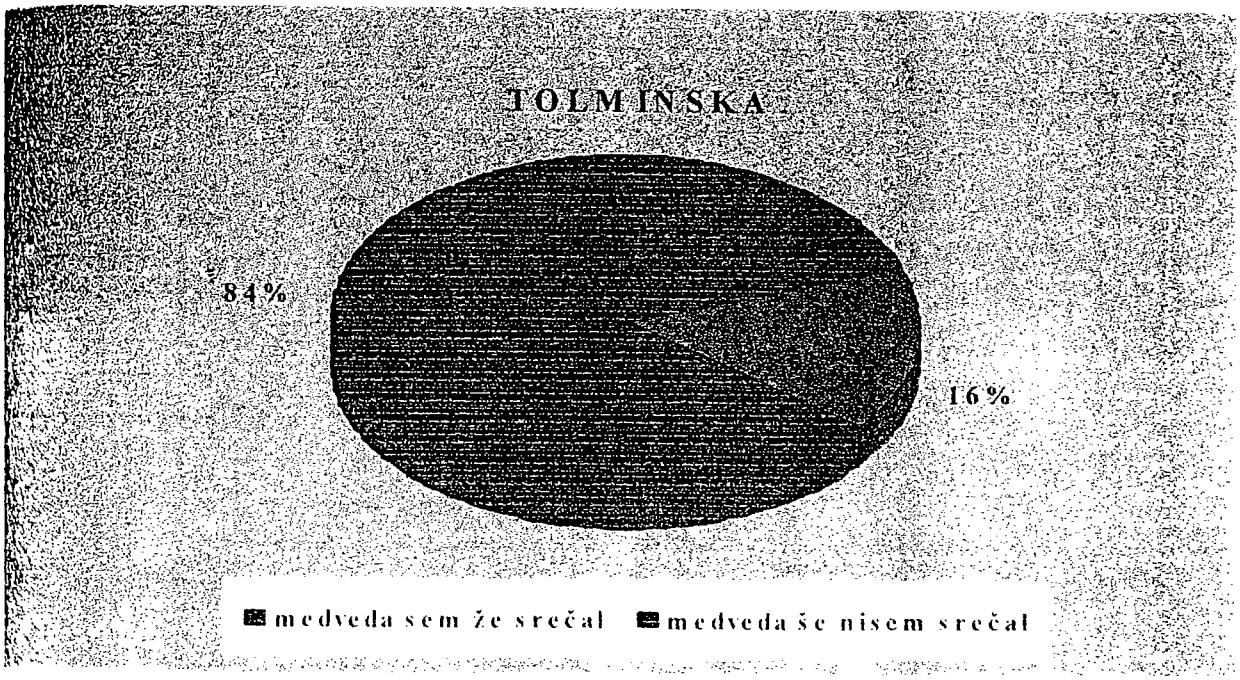
Graf 5: DELEŽ ANKETIRANCEV, KI SO SREČALI MEDVEDA V NARAVI - OSREDNJE OBMOČJE



Graf 6: DELEŽ ANKETIRANCEV, KI SO SREČALI MEDVEDA V NARAVI - GORENJSKA



Graf 7: DELEŽ ANKETRIANCEV, KI SO SREČALI MEDVEDA V NARAVI - TOLMINSKA

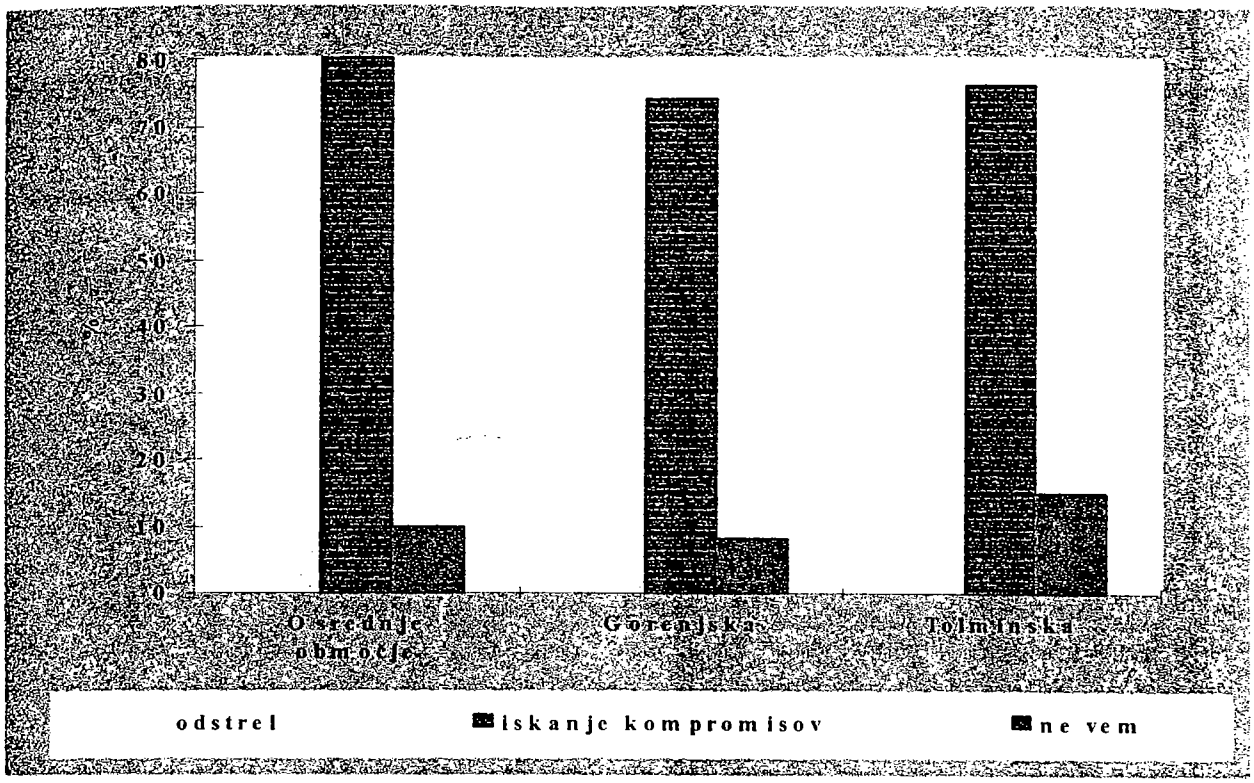


Verjetnost za srečanje z medevdom v prosti naravi je v obeh robnih območjih minimalna, v osrednjem območju pa dokaj velika. Zato pritrdilni odgovori na vprašanje: **»Ali ste že kdaj srečali medveda v prosti naravi?«** prevladuje v osrednjem območju, vendar tudi tu ne dosega niti polovice. Razlog za to bi lahko poiskali tudi v ne prepogostem zadrževanju »poprečnega lokalnega prebivalca« v gozdu. Diferenciacija anketirancev na gozdarje, lovce, turiste, kmete, ipd. pa bi najverjetneje pokazala statistično značilne razlike med ciljnimi skupinami.

Preglednica 8: PRESOJA OHRANJENOSTI ŽIVLJENJSKEGA PROSTORA V SLOVENIJI ZA MEDVEDA

delež odgovorov (%)	**Osrednje območje**	**Gorenjska**	**Tolminska**
dovolj življenjskega prostora	55	48	53
premalo življenjskega prostora	20	33	25
ne vem	25	19	22
skupaj	100	100	100

Graf 8: PREDLOGI ZA REŠEVANJE KONFLIKTOV OB POJAVLJANJU MEDVEDA V KULTURNI KRAJINI

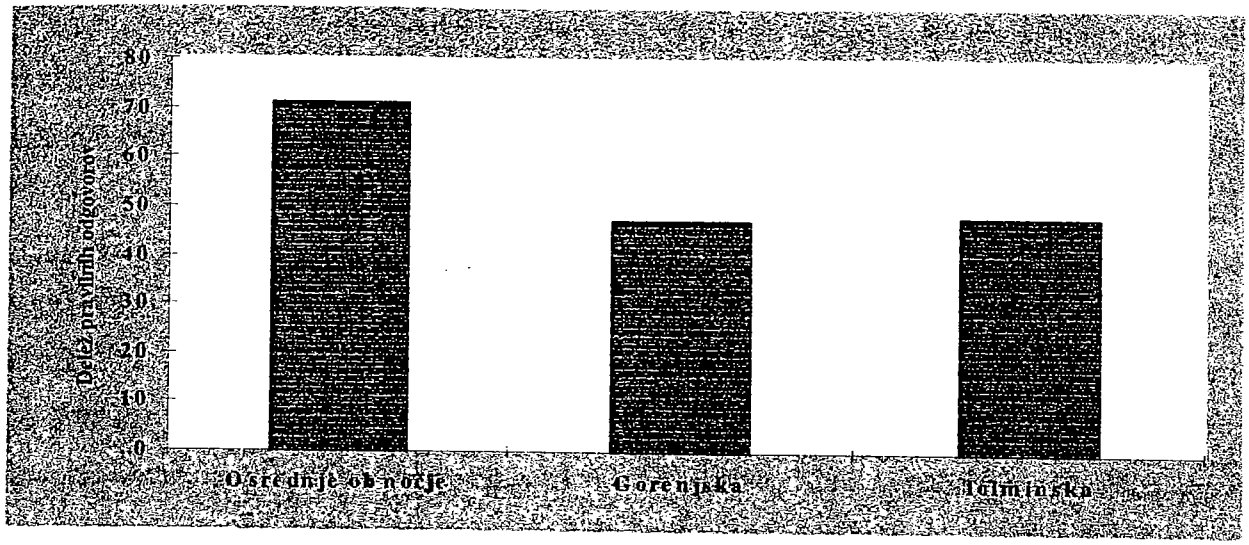


Približno polovica anketirancev vseh treh območij je na vprašanje **»Ali menite, da je v Sloveniji dovolj ohranjenega življenjskega prostora za medveda?«** odgovorila pritrdilno. Hkrati se jih približno tri četrtine zavezema za kompromisno reševanje konfliktov in zelo malo za radikalne rešitve (da bi bilo medveda treba odstreliti, češ da ne sodi v kulturno krajino, kakršna je slovenska, je menilo le 10% anketirancev osrednjega območja, 18% gorenjskih in 8% tolminskih anketriancev). Ti odgovori kažejo na relativno naklonjenost medvedu, kar kaže pri nadaljnem delu z lokalnimi javnostmi izkoristiti.

Preglednica 9: POZNAVANJE VARSTVENEGA STATUSA MEDVEDA V SLOVENIJI

delež odgovorov (%)	**Osrednje območje**	**Gorenjska**	**Tolminska**
medved je strogo zaščiten	21	46	38
dovoljen omejen odstrel	71	47	48
popoln lovopust	0	0	2
ne vem	8	7	12
skupaj	100	100	100

Graf 9: DELEŽ PRAVILNIH ODGOVOROV O VARSTVENEM STATUSU MEDVEDA V SLOVENIJI



Medved sicer sodi na Rdeči seznam ogroženih sesalcev, vendar je v celoti zaščiten le izven osrednjega območja. Znotraj osrednjega območja habitata rjavega medveda je dovoljen odstrel, skladno z lovnogospodarskim načrtom (40 do 50 osebkov letno). Na vprašanje o varstvenem statusu medveda je pravilno odgovorilo 71% anketirancev osrednjega območja in približno polovico anketirancev obeh robnih območij.

4. ZAKLJUČEK

Rezultati ankete potrjujejo dognanja podobnih domačih in tujih študij, češ da z naraščajojčo oddaljenostjo od območja razširjenosti medveda, narašča tudi pozitiven odnos do njega. Afektivna komponenta odnosa do medveda je pri anketirancih osrednjega območja bolj negativno obarvana kot pri anketirancih obeh robnih območij. Anketa, izvedena leta 1995 pa je pokazala, da pozitivna čustva do medveda dosežejo skrajno zgornjo vrednost pri pretežno mestni populaciji obiskovalcev živalskega vrta. Kljub konfliktnim situacijam, ki so v osrednjem območju medvedovega habitata takorekoč vsakdanji, v obeh robnih območjih pa relativno pogost pojav, so anketiranci medvedu dokaj naklonjeni. Večina jih namreč meni, da ima v Sloveniji dovolj življenjskega prostora in se zavzema za kompromisno, neradikalno reševanje konfliktov. To dejstvo kaže izkoristiti kot izhodišče za pozitivno uravnavanje javnega mnenja. Za to se ponujajo številne možnosti. Največjo odmevnost je nedvomno mogoče doseči z dokumentarnimi oddajami. Tudi akcije Lovske zveze Slovenije kot npr. tiskanje plakatov, majic, brošur, nalepk so gotovo prispevale k boljšemu razumevanju medveda. Kljub temu je poznavanje njegovih življenjskih potreb, načina obnašanja, potencialne nevarnosti ipd. pogosto pomankljivo, zato bi morali s tovrstno dejavnostjo nadaljevati in jo razširiti. Razmisliti velja tudi o vključevanju v šolske in druge vzgojnoizobraževalne programe, ki (po navedbah anketirancev) posredujejo zanemarljivo malo informacij o medvedu. Da se bo medved na lestvici vrednot povzpel nekoliko više pa niso dovolj samo predavanja, omizja, oddaje, literatura (čeprav so nepogrešljiv pripomoček pri tem), ampak je potreben tudi učinkovit sistem plačevanja kompenzacij za povzročeno škodo, ki je najpogostejši vzrok za negativno vrednotenje medveda. Konfliktni dogodki so namreč zelo odmevni in utegnejo, ob pomoči senzacionalno orientiranih medijev, dolgoročno škodovati medvedu.

5. LITERATURA

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Korenjak, A., 1995. Človek in velike zveri v Avstriji in Sloveniji. Diplomska naloga. Oddelek za gozdarstvo BF, Ljubljana.

Komisiji za divjad MKGP

AKCIJSKI PLAN ZA OHRANITEV VITALNE POPULACIJE RJAVEGA MEDVEDA *(Ursus arctos L.)* V SLOVENIJI

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1. PREDLOG ZA RAZŠIRITEV OSREDNJEGA VAROVALNEGA OBMOČJA ZA RJAVEGA MEDVEDA IZ LETA 1966

Ljubljana, januar 1998

Izvleček

RAZŠIRITEV OSREDNJEGA VAROVALNEGA OBMOČJA ZA RJAVEGA MEDVEDA V SLOVENIJI IZ LETA 1966 - PREDLOG

Izvleček

Slovenija leži na severozahodnem robu strnjenega območja Dinarske populacije rjavega medveda, obenem pa skupaj z Gorskim Kotarom v sosednji Hrvaški tvori tudi zahodni del areala te vrste v Srednji Evropi. Medvedi, ki zapuščajo osrednje območje in emigrirajo proti severu in zahodu, predstavljajo edini potencialni vir za ponovno naravno poselitev vzhodnih Alp. Zaradi naraščanja pritiskov, ki v osrednjem varovalnem območju učinkujejo na populacijo, postaja količina in kakovost habitatov znotraj le-tega premajhna. Cilj dolgoročne ohranitve populacije rjavega medveda bodo zagotovljeni le ob sočasnem vzdrževanju neodvisne, ekološko funkcionalne vitalne populacije ter zagotovitvi zadostne količine primernih habitatov, v katerih bo taka populacija lahko (pre)živela. S tem ciljem je predlagana variantna razširitev mej osrednjega varovalnega območja rjavega medveda iz leta 1966, z vključitvijo Nanoško-Hrušiškega območja, Idrijskih Golakov in Trnovskega gozda ter Vremščice, Slavnika in Čičarije v sistem načrtnega upravljanja s populacijo rjavega medveda. Po drugi varianti bi v osrednje varovalno območje vključili tudi celotno območje Bele Krajine in večji del Gorjancev. Z oblikovanjem meddržavnega ohranitvenega območja v dogovoru s sosednjo Hrvaško oziroma razširitvijo enotnega sistema varstva na območje Gorskega Kotara pa bi bilo zagotovljeno tudi dolgoročno, enotno varstvo Zahodno-Dinarske populacije rjavega medveda tudi pri naraščajočih pritiskih iz okolja. Ker je slovensko-hrvaška populacija rjavega medveda tudi najpomembnejši vir za odlov živali za ponovne naselitve v območja nekdanje razširjenosti te vrste v Alpah imata pomen ohranitve vitalne populacije rjavega medveda v osrednjem območju razširjenosti in zagotovitev prepustnosti emigracijskih koridorjev tudi mednarodne razsežnosti, saj je uspeh akcije za povratek rjavega medveda v območje nekdanjega evropskega areala v veliki meri odvisen prav od stanja populacije te vrste v Sloveniji.

Ključne besede: rjavi medved, dolgoročna ohranitev, vitalna populacija, razširitev osrednjega območja, primernost habitatov, emigracijski koridorji, Alpe, mednarodno sodelovanje.

1. UVOD

Rjavi medved je živalska vrsta, za katero je značilna velika telesna vzrast, zmožnost življenja v skromnih prehranskih razmerah, gibanje znotraj velikih individualnih arealov aktivnosti, pritajen, somračno poudarjen način življenja neredko v bližini človeka in sposobnost hitrega privajanja na nove, tudi antropogene prehranske vire.
Današnje območje razširjenosti rjavega medveda v Evropi predstavlja le skromen del prvotnega areala te vrste (ROTH 1986, MYSTERUD,MUUS FALCK 1989a, SERVHEEN 1990). Po navedbah istih avtorjev so:
-neposredno uničevanje in preganjanje v preteklosti,
-napredujoča fragmentacija nekdanjih obsežnih gozdnih območij ter upadanje primernosti habitatov,
-prisotnost ljudi v nekdaj nevznemirjenih območjih in
-zmanjševanje površine listnatih gozdov
glavni razlogi današnje skromne razširjenosti te vrste v Evropi. Na celotnem ozemlju Evrope so danes le še tri območja z ohranjenimi vitalnimi populacijami rjavega

medveda: Fenoskandijsko, Dinarsko-Balkansko in Karpatsko. Poleg teh pa v Evropi vztraja še nekaj majhnih, izoliranih ostankov populacij v Italiji, Franciji in Španiji (ROTH 1987).

Rjavi medved je živalska vrsta, ki danes v Evropi uživa izredno pozornost in simpatije. Veliko sredstev in naporov je usmerjenih v ohranitev izoliranih ostankov populacij v Pirenejih (Francija, Španija), v pokrajini Trentino in Abruzzih v Italiji, na Norveškem, Švedskem in Finskem. V Avstriji in Franciji so v teku projekti za ponovne naselitve in dodajanje, v naravi odlovljenih medvedov v območja nekdanje razširjenosti (KRAUS 1991). Raziskave o genetski distanci med vitalnimi populacijami ter izoliranimi nevitalnimi ostanki populacij rjavega medveda v Evropi, usmerjene so v iskanje najprimernejših donatorskih populacij za revitalizacijo slednjih, so opozorile na visoko genetsko vrednost zahodno-Dinarske populacije (BOUVET,TABERLET 1993) ter na primernost slovenskega genotipa rjavega medveda za oživljanje in združevanje razbitih fragmentov nekdanje panalpske populacije te živalske vrste. V projektu revitalizacije izoliranih populacijskih ostankov rjavega medveda v Narodnem parku Adamello-Brenta v pokrajini Trento-Alto Adige v Italiji (SCHRÖDER 1992) so te ugotovitve že praktično upoštevali oziroma so kot donatorsko populacijo za odlov osebkov za introdukcijo izbrali to iz Slovenije.

2. DANAŠNJA RAZŠIRJENOST RJAVEGA MEDVEDA V SLOVENIJI

Slovenija leži na zahodnem robu strnjenega Dinarsko-Balkanskega območja rjavega medveda, skupaj z Gorskim Kotarom v sosednji Hrvaški pa predstavlja tudi severozahodni rob areala te živalske vrste v srednji Evropi. Območje današnje razširjenosti rjavega medveda v Sloveniji tvorita dve, med seboj sicer povezani območji, ki pa se razlikujeta po primernosti in nosilni zmogljivosti habitatov, populacijski gostoti, pa tudi po zakonskih izhodiščih varstva te živalske vrste. Osrednje območje obsega južni del Slovenije oziroma ga sestavljajo širše območje Kočevske in Notranjske, južni in jugovzhodni del Dolenjske ter južno obrobje Ljubljanske kotline. Glavne značilnosti, ki opredeljujejo primernost habitatov v osrednjem območju so:

-obsežna gozdnata območja (Snežniško-Javorniško pogorje, Kočevska Mala gora s pogorjem Roga, Velika gora in Goteniški Snežnik, Krimsko-Mokrško pogorje, Menišija, itn.),

-mozaična prepletenost gozdnih in izvengozdnih površin ter razmeroma veliko površin v zaraščanju,

-majhna gostota poselitve oziroma koncentracija prebivalstva v večjih naseljih izven gozda,

-ugodne prehranske in varovalne razmere,

-kontinuirano sobivanje oziroma prekrivanje območij aktivnosti rjavega medveda in človeka ter tako vzpostavljena "tolerantnost" v medsebojnih odnosih.

Ugotovitve projekta radiotelemetrijske spremljave gibanja rjavega medveda na Hrvaškem (HUBER 1987) in rezultati mednarodnega radiotelemetrijskega projekta Rjavi medved - Ljubljanski vrh (KACZENSKY et al 1995) nedvomno dokazujejo, da obstojajo populacijske povezave med živalmi, ki naseljujejo habitate v Gorskem Kotaru in Čičariji na Hrvaškem ter tistimi v habitatih na Kočevskem, Notranjskem, Obalno-Kraškem območju in v Trnovskem gozdu v Sloveniji oziroma, da medvedi prehajajo iz enega območja v drugo. Obe, z državno mejo ločeni območji lahko torej obravnavamo kot enotno populacijsko območje rjavega medveda s skupno površino okoli 7000 km^2. Gostota medvedov v Gorskem Kotaru je po tamkajšnih ocenah (FRKOVIĆ et al 1987) približno 1 žival/10 km^2, v osrednjem varovalnem območju v Sloveniji pa je nekoliko nižja in jo ocenjujemo na 0.7-0.8 živali/10 km^2 (ADAMIČ 1990). Za celotno območje prisotnosti medveda na Hrvaškem, s površino okoli 3900 km^2 pa HUBER in ROTH (1986) navajata gostoto 0.8-0.9 živali/10 km^2.

Z **Odredbo o območju v SR Sloveniji na katerem je medved zaščiten** (Ur.list SRS 29/66), ki je bila oblikovana v okviru Zakona o lovstvu v SR Sloveniji iz leta 1966, so bile meje osrednjega varovalnega območja rjavega medveda v Sloveniji tudi zakonsko opredeljene. Osrednje varstveno območje meri, v okviru opisanih meja skupaj okoli **3000 km^2** (površina je bila ugotovljena s planimetriranjem mej območja na karti Slovenije v merilu 1:250.000) oziroma komaj 15% ozemlja Republike Slovenije. V tem območju uživa medved delno varstvo oziroma zaščito z zakonsko predpisano lovno dobo. Konkretne oblike trenutno veljavne zaščite, so zapisane v "Enotnih gojitvenih smernicah v Sloveniji" (LZS 1991). Meje osrednjega območja v glavnem potekajo po markantnih naravnih in induciranih krajinskih elementih: rekah, cestah in železniških progah. Če meje osrednjega območja funkcionalno razširimo oziroma poistovetimo z zunanjimi mejami tistih lovišč (n=60), ki se vsaj delno nahajajo v osrednjem območju oziroma ležijo na njegovem robu, se funkcionalna površina območja poveča na **3627 km^2**. Poudariti je treba, da se je slovenska lovska organizacija že v 70.letih sama odločila, da meje osrednjega varovalnega območja rjavega medveda poravna z mejami lovišč, ki se delno, vendar ne v celoti nahajajo znotraj le-tega.

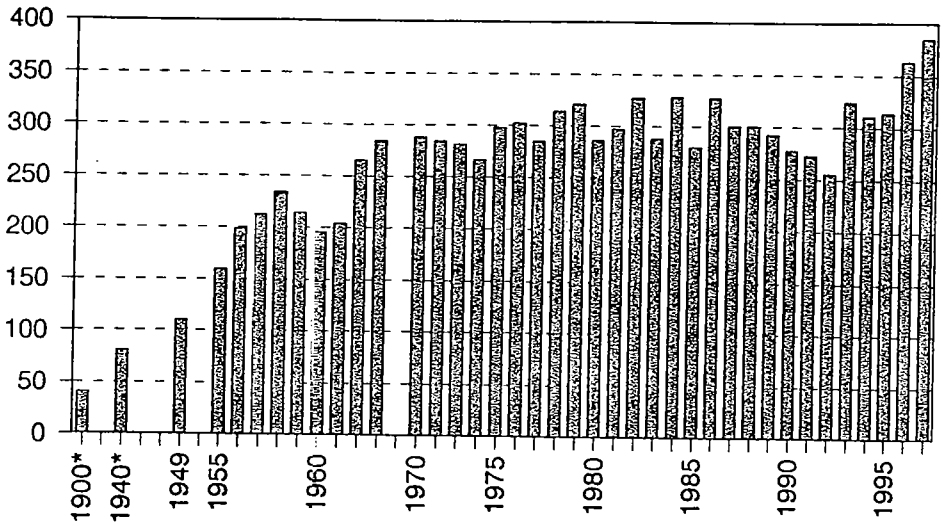
3. MEJE OSREDNJEGA VAROVALNEGA OBMOČJA ZA RJAVEGA MEDVEDA IZ LETA 1966 NE ZAGOTAVLJAJO DOLGOROČNE OHRANITVE VITALNE POPULACIJE TE VRSTE V SLOVENIJI !

Že pri določanju mej osrednjega varovalnega območja rjavega medveda leta 1966, niso bile v celoti upoštevane dejanske ekološke razmere oziroma primernost habitatov v Sloveniji. Zato je to območje (prerez) manjše od potencialnega območja primernosti. V osrednje območje namreč niso (bili) vključeni redko naseljeni, gozdnati predeli Hrušice, Nanosa, Idrijskega Javornika in Trnovskega gozda na severozahodu ter območje med Pivško kotlino, Brkini, Vremščico, Slavnikom in Kraškim robom na zahodu, kjer je bil rjavi medved že v 60.letih stalno prisoten ali pa se je razmeroma pogosto pojavljal.

Ključna hipoteka, ki obremenjuje pomen oblikovanja osrednjega območja pa je bila v tem, da Odredba iz leta 1966, razen določitve mej in konkretnih nalog lovskih organizacij v okviru varstva rjavega medveda, ni postavila nobenih omejitev tistim dejavnostim, ki lahko odločilno vplivajo na primernost habitatov. Zaradi naraščajočih sečenj, gradnje gozdnih cest in vlak, odpiranja do nedavnega "zaprtega območja" Kočevske Reke ter gradnje novih cestnih povezav med odmaknjenimi zaselki ob meji s Hrvaško, obujanja ovčereje in ekstenzivnih oblik paše goveda v okviru politično obarvanega projekta revitalizacije Kočevske iz konca 80.let ter drugih motečih vplivov človekove prisotnosti, se je primernost habitatov v osrednjem varovalnem območju od leta 1966 pa do danes, nedvomno poslabšala. Tovrstni negativni trendi se bodo verjetno nadaljevali tudi v prihodnje. Nedvomno bodo k temu prispevali tudi razvojni načrti ovčereje v Sloveniji (KOMPAN in sod.1992), ki premalo upoštevajo realnosti problemov, ki jih dejavnosti predstavlja prisotnost velikih zveri (medveda, risa in volka) povsod tam, kjer se aktivni habitati velikih plenilcev prekrivajo ali dotikajo večjih pašnih območij. Sodeč po reakcijah izpostavljenih skupin prebivalcev v prizadetih območjih, bodo inducirani plenilski odnosi v prihodnje verjetno zaviralno vplivali na možnosti varstva velikih zveri v Sloveniji, v kolikor pooblaščeni državni zavodi ne bodo sprožili širše akcije preventivnega varstva človekove lastnine.

Kljub naraščajočim pritiskom v življenjskem okolju se je velikost populacije rjavega medveda, v obdobju od leta 1966 do danes nedvomno povečala. O slednjem pričajo naraščanje števila registriranih opažanj medvedov v osrednjem in zunanjem območju ter postopno robno širjenje populacijskega območja proti severozahodu in zahodu (ADAMIČ 1993,1994,1996a,b, ŠTRUMBELJ,OŽBOLT 1992). Ta fenomen si lahko razlagamo z visoko stopnjo prilagodljivosti rjavega medveda na antropogene dejavnike v okolju oziroma sposobnostjo življenja v bližini človeka ob vzpostavljeni toleranci letega ter optimalnimi prehranskimi razmerami v osrednjem območju.

Iz analize smrtnosti rjavega medveda v Sloveniji (ADAMIČ 1997) je razvidno, da med izločenimi osebki izrazito prevladujejo samci, pa naj gre za izločitve z odstrelom ali iz ostalih vzrokov. Med preživelimi člani populacije zato vedno izraziteje prevladujejo samice. Ker predstavljajo različne oblike odstrelne ali lovske mortalitete dobrih 88% skupnih izločitev, lahko ugotovimo, da je visok delež samic in posledično visoka stopnja reprodukcije v lovljenih populacijah (ADAMIČ 1996a) lahko ena od pomembnih posledic kontroliranega lova. JANIK et al (1989) pa menijo, da je enostranski lov samcev in prevladujoč delež samic v populacijah odločilni razlog tudi za prostorsko širjenje večine lovljenih populacij rjavega medveda v Evropi. Podobna razmišljanja so upravičena tudi za populacijo rjavega medveda v Sloveniji. V obdobju od 1.1.1979 do 31.3.1997 je bilo v Sloveniji, po Statističnih podatkih LZS z odstrelom izločenih skupaj 718 medvedov, od tega 524 (73%) samcev in (le) 194(37%) samic. Očiten, z odstrelom oblikovan presežek samic znotraj reproduktivnega dela populacije, se nedvomno na podoben način odraža tudi na številčni in prostorski dinamiki rjavega medveda v Sloveniji (glej graf 1).



Graf 1. Ocena naraščanja velikosti populacije rjavega medveda v Sloveniji v obdobju 1949 - 1997 (viri: Statistični podatki Lovske zveze Slovenije in Uprave gojitvenih lovišč Slovenije, *starejši viri).

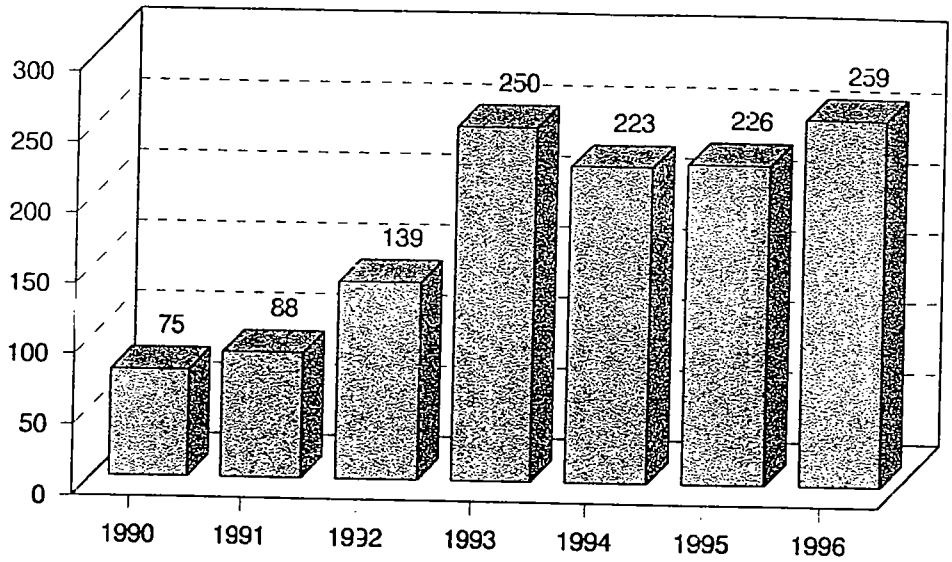
Pri današnji oceni primernosti izhodišč za oblikovanje in prostorsko omejitev osrednjega območja leta 1966 je treba upoštevati, da je bila velikost območja prilagojena takratni razširjenosti in velikosti populacije rjavega medveda ter takratnemu pomenskemu rangiranju vloge in položaja velikih plenilcev v gozdnih ekosistemih Slovenije. Kljub določenim pomanjkljivostim pa je treba poudariti, da je bilo oblikovanje varovalnega območja za rjavega medveda v sredini 60.let izrazito napredna odločitev tudi z vidika takratne razvitosti naravovarstvenih idej v Evropi.

Z napredovanjem prikrite fragmentacije oziroma z nadaljno degradacijo varovalne funkcije habitatov v osrednjem območju pa postaja rjavi medved, kljub današnji razmeroma visoki gostoti, potencialno ogrožena, ranljiva živalska vrsta tudi v Sloveniji. Ohranitev rjavega medveda je, razen od primerne varstvene zakonodaje zato odvisna predvsem od naklonjenosti ljudi in doslednega upoštevanja ekoloških značilnosti vrste na vseh ravneh načrtovanja rabe prostora. Vsekakor ne smemo pozabiti, da moramo strategijo ohranitve ranljivih vrst oblikovati in izvajati že takrat, ko imajo upravljane populacije še vse lastnosti vitalnih, samoobnovljivih populacij in ne šele takrat, ko dosežejo **spodnjo kritično raven številčnosti**. Zamujeno reagiranje namreč pogosto pomeni le še kratkotrajen odlog dokončnega lokalnega izginotja vrste.

4. PREDLOG ZA RAZŠIRITEV OSREDNJEGA VAROVALNEGA OBMOČJA RJAVEGA MEDVEDA V SLOVENIJI.

Zagotovitev potrebne količine vrstno primernih habitatov sodi med ključna izhodišča za dolgoročno ohranitev dovolj velike vitalne in ekološko funkcionalne populacije rjavega medveda, ki se s svojim reprodukcijskim potencialom lahko uspešno upira pritiskom, ki nanjo učinkujejo. Za to pa bo treba meje današnjega območja ustrezno korigirati in vanj vključiti habitate, ki jih je rjavi medved naseljeval že pred letom 1966, vendar iz različnih vzrokov takrat niso bili vključeni v osrednje varovalno območje, bodisi jih je na novo koloniziral šele po tem obdobju. Enako pomembna je tudi

vključitev vseh identificiranih krakov povezovalnih in bivalnih koridorjev (BENNETT 1990) v razširjeno varovalno območje.



Graf 2: Letna pogostnost registriranih znakov prisotnosti rjavega medveda v zahodnem in severozahodnem delu predlaganega razširjenega varovalnega območja v obdobju 1990-1996

V skladu s to ugotovitvijo predlagamo ustrezno razširitev osrednjega varovalnega območja za rjavega medveda. V razširjeno območje so pc tem predlogu na severozahodu dodatno vključeni Nanos, Hrušica, Idrijsko hribovje ter Trnovski gozd, na zahodu pa Brkini, Vremščica in Slavnik ter del Slovenske Istre. Meje razširjenega varovalnega območja rjavega medveda v Sloveniji bi po tem predlogu potekale:

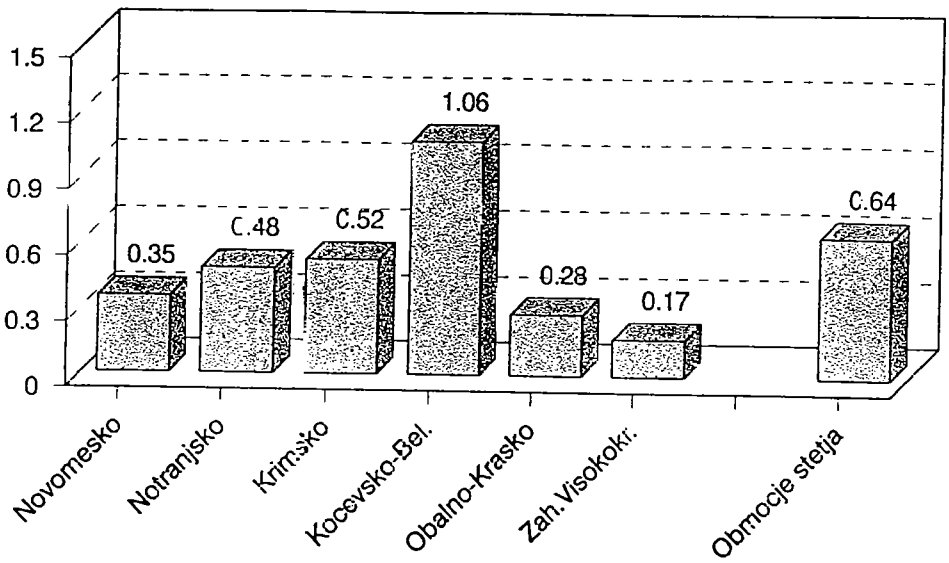
-po Istrski železniški progi od meje s Hrvaško, mimo Prešnice do Kozine, od tu po trasi nove avtoceste do križišča z magistralno cesto proti Sežani in po tej do vasi Štorje. Od tu po cesti do Vrabč in naprej do Podnanosa. Nato po cesti do Podbrega in naprej po cesti na Nanos, mimo Podraške bajte, Abrama do Sanabora in Starega gradu do Cola. Od tu po cesti do Otlice in Predmeje, nato pa po robu Trnovskega gozda čez Malo goro, Kucelj, Čaven in Vitovski vrh ter od tu po gozdni cesti do Trnovega. Nato po cesti do Čepovana in naprej do Dolenje Trebuše. Od tu po magistralni cesti do Idrije in naprej skozi Hotedrščico do Logatca in Verda pri Vrhniki, kjer se priključi na dosedanjo mejo območja, železniško progo Pivka-Borovnica; od Borovnice po cesti do vasi Podpeč, Tomišelj, Iška vas, Ig, Pijava gorica in Turjak. Od tu po cesti Veliko Apno, Ponova vas, Grosuplje; od tu cesta Veliko Mlačevo, Zagradec, Luče, vas Krka, s čimer sta v območje dodatno vključeni lovišči LD Taborska jama in LD Grosuplje. Od vasi Krka po dosedanji meji območja po reki Krki do Žužemberka: od tu po cesti do vasi Dobrnič, Rdeči kal, Mirna peč do Novega mesta. Od tu po železniški progi do Semiča in naprej po cesti do krajev Kot, Črnomelj, Kanižarica do Tanče gore. Zaradi vključitve lovišča LD Sinji vrh, ki je leta 1966, iz osrednjega območja izpadlo, poteka korigirana meja območja od Tanče gore, po cesti do vasi Obrh, Dragatuš, Stara lipa,

Drenovec in Vinica do reke Kolpe. Od tu po meji z Republiko Hrvaško do stika z železniško progo Pula-Prešnica.

S predlaganimi spremembami meje oziroma razširitvijo za dodatnih **1770 km^2** bi osrednje varovalno območje rjavega medveda v Sloveniji merilo skupaj nekaj več kot **5397 km^2.**

Po drugi varianti pa bi v razširjeno varovalno območje rjavega medveda vključili tudi celotno območje Bele Krajine in večji del Gorjancev. V obeh delih se rjavi medved redno pojavlja že dalj časa, opažene pa so bile tudi vodeče samice z mladiči. V tem primeru bi meja razširjenega varovalnega območja, od križišča Istrske železnice in meje s Hrvaško na skrajnem jugozahodu pa do Novega mesta potekala enako kot pri prvi varianti. Naprej od Novega mesta bi meja območja tekla po reki Krki do Čateža oziroma do sotočja Krke in Save, od tam pa po cesti do meje s Hrvaško pri Obrežju. Po tej varianti bi se površina **razširjenega varovalnega območja** povečala še za dodatnih **585 km^2** oziroma na skupaj **5982 km^2.**

Z legalno uveljavitvijo ene od obeh variantnih predlogov širitve osrednjega varovalnega območja (glej priloženo tabelo) se bo količina primernih habitatov znotraj le-tega pomembno povečala. Količina primernih habitatov namreč predstavlja enega od ključnih elementov dolgoročne ohranitve vitalne, samoobnovljive populacije rjavega medveda. FRANKLIN (1980) predlaga, da naj bo velikost dolgoročno uspešne populacije ameriške podvrste rjavega medveda, grizlija (Ursus arctos horribilis) 500 ali več osebkov. Isti avtor meni, da bi se genetska variabilnost pri manjših populacijah izgubljala hitreje, kot bi jo mutacije lahko nadomeščale. Zaradi premajhnih populacij in zaradi premajhnih strnjenih populacijskih območij rjavega medveda v Evropi, izračunov o velikosti vitalnih in dolgoročno samoobnovljivih populacij te vrste ni veliko. Pri oblikovanju dolgoročne konzervacijske strategije zahodno-Dinarske populacije rjavega medveda je zato vredno upoštevati priporočila (FRANKLIN 1980, GILPIN,SOULE 1986) o velikosti minimalne vitalne populacije. Tako velika populacija pa za uspešno življenje potrebuje večjo količino primernih habitatov kot jih je v Sloveniji tudi v okviru razširjenega varovalnega območja. Ocenjujemo namreč da povprečna populacijska gostota v celotnem razširjenem območju, zaradi prekrivanja interesov varstva rjavega medveda ter obstoječih in načrtovanih oblik rabe prostora ne bi bila večja od 0,6 - 0,7 žival./ 10 km^2. Izračunana velikost populacije v razširjenem varovalnem območju po 2.varianti bi bila 360 - 420 živali. Pri tako izračunani velikosti populacije je seveda treba upoštevati lokalne razlike v primernosti habitatov in s tem povezane razlike v lokalnih gostotah. Razlike, s pomočjo podatkov vsakoletnih preštevanj medvedov na krmiščih, izračunanih lokalnih gostot medvedov v posameznih lovskogojitvenih območjih so prikazane v grafu 3.



Graf 3: Grafični prikaz median gostote rjavega medveda (n/10 km^2) v posameznih lovskogojitvenih območjih, izračunanih iz podatkov preštevanja na krmiščih v letih 1995 (november), 1996 (maj, november) in 1997 (maj).

Pri iskanju razpoložljivih prostorskih okvirov za dolgoročno ohranitev vitalne zahodno-Dinarske populacije rjavega medveda bo treba prestopiti državno mejo in v dogovoru s Hrvaško postaviti skupno, meddržavno varovalno območje, ki bi, poleg razširjenega območja v Sloveniji vključevalo tudi večji del Gorskega Kotara, s tem bi količino primernih habitatov povečali za dodatnih 130.000 ha (FRKOVIĆ et al 1987) ter del hrvaške Čičarije. Tako oblikovano meddržavno območje za varstvo rjavega medveda bi merilo okoli **7500 km^2**, v njem pa bi bilo dovolj prostora za življenje vitalne populacije **450 - 550 živali**. Taka dolgoročna projekcija velikosti populacije v meddržavnem populacijskem območju rjavega medveda pa bi bila dovolj zanesljiv garant njene vitalnosti oziroma samoobnovljivosti tudi pri zmernem stopnjevanju recentnih pritiskov iz okolja. Z le-temi pa je v prihodnje, vsaj do polne uveljavitve predlaganih varstvenih norm v območju vsekakor treba računati. Predlog za oblikovanje Fenoskandijskega mega-rezervata za rjavega medveda (KOLSTAD et al 1986, MYSTERUD,MUUS FALCK 1989b), ki predvideva uveljavitev skupnih strateških izhodišč varstva te živalske vrste na Norveškem, Finskem in Švedskem nam pri tem lahko služi kot model.

5. ZAKLJUČKI

Zaradi širjenja ravni interaktivnih pritiskov, ki v kulturni krajini učinkujejo na populacije prostoživečih živali, danes dolgoročnega uspešnega varstva le-teh ni več mogoče zasnovati samo na klasični dvosmerni ravni: populacija - habitat, pač pa je v njem potrebno upoštevati tud tretjo raven -človeka. Neupoštevanje odnosa tistih skupin lokalnih prebivalcev, ki so zaradi zakonskega varstva problematičnih živalskih vrst neposredno prizadete, lahko namreč izniči smisel najboljših varstvenih projektov. Tisto kar enemu pomeni estetsko in naravovarstveno kakovost, drugemu povzroča škodo ali ga celo ogroža. Vse skupaj je povezano z različnimi načini preživljanja ter lokacijami prebivališč. Kljub geografski majhnosti Slovenije se načini preživljanja in s tem izpostavljenost škodi, ki jo lahko povzročajo problematične vrste, regionalno

močno razlikujejo. Pomembno motnjo za uveljavitev predlagane velikopovršinske dolgoročne strategije ohranitve rjavega medveda (in tudi drugih dveh vrst velikih plenilcev, volka in risa), zato predstavlja predvideni razvoj pašništva v Sloveniji, posebej oblike proste, nenadzorovane paše ovc v kraškem, predalpskem in alpskem svetu (KOMPAN in sod.1992). Na celotnem geografskem arealu rjavega medveda so ovce, med domačimi živalmi najpogostejša plenska vrsta (JANIK 1986, GENOV,GANČEV 1987, HELL,BEVILAQUA 1988, RAIČEV 1990, ADAMIČ 1996b). Vzroke za to je treba iskati v razširjenosti ovčereje, velikosti čred, velikosti ovc, njihovem socialnem obnašanju in pomanjkanju antipredatorske obrambne strategije. Primeri ponavljajočih napadov rjavega medveda na ovce v Triglavskem narodnem parku na Pokljuki in Mežakli, na Tolminskem, Bovškem in Kobariškem, na Jelovici, v Karavankah, na Menini itn. po letu 1990 pa tudi številni starejši dokumentirani primeri so jasen dokaz, da je treba s tem problemom resno računati tudi v Sloveniji in ga tudi upoštevati v strateških izhodiščih varstva velikih zveri. Ker je nosilna zmogljivost habitatov v zunanjem območju, posebej njen prehranski aspekt, v primerjavi z osrednim območjem majhna, je problem škode latentno trajno prisoten. Primeri plenjenja ovc ter druge značilne oblike prehranjevalnega vedenja (poškodbe čebelnjakov, itn.) so posledica lahke dostopnosti antropogenih prehranskih virov ter skromnejših naravnih prehranskih zmogljivosti habitatov v predalpskem in alpskem območju. Škoda, ki jo povzroča rjavi medved nedvomno proži odklonilna stališča prizadetih lokalnih prebivalcev do varstva te živalske vrste, kljub širšim mednarodnim pomenskim razsežnostim akcije povratka rjavega medveda v Alpe. Zaradi tradicionalnega negativističnega stališča do velikih plenilcev, ki izvira predvsem iz ekonomske navezanosti na pašno živinorejo pa soglasja lokalnih skupnosti, brez dodatnih investicij države v preventivno varstvo človekove lastnine in korektnega povračila nastale škode, ne bo lahko pridobiti.

Odstrel medvedov v zunanjem območju razširjenosti oziroma tistih živali, ki se gibljejo v širših območjih emigracijskih koridorjev, je v sosednjih deželah pogosto izpostavljen kot glavni vzrok (pre)počasnega širjenja te živalske vrste v Alpe. Dejansko pa je Slovenska lovska organizacija kot svoj konkreten prispevek k varstvu in nadaljnjemu širjenju rjavega medveda v Alpah, leta 1990 sprejela sklep o prepovedi odstrela v celotnem zunanjem območju. S tem sklepom, ki je stopil v veljavo 1.1.1991 (Enotne gojitvene smernice v Sloveniji) je bila dejansko odpravljena leta 1966 sprejeta Odredba o območju v SR Sloveniji na katerem je medved zaščiten (Ur.list SRS 29/66), po kateri je bil v zunanjem območju dovoljen celoletni odstrel medvedov. Po statističnih podatkih Lovske zveze Slovenije je bilo v obdobju 1977-1991, torej v 15 letih v Sloveniji odstreljeno 638 medvedov, od tega pa le 45 (7,1%) v zunanjem območju. V širšem območju severozahodnega koridorja je bilo v tem obdobju odstreljenih le 23 živali oziroma povprečno 1,5/ leto. Večinoma so bile odstreljene le "problematične" živali, ki so večkrat zapored plenile domače živali (ovce!) v istem območju. Kljub določilom o varstvu rjavega medveda iz Uredbe o zavarovanju ogroženih živaldskih vrst (Ur.list RS, št. 57/93) in recentnim protestom naravovarstvenih organizacij iz sosednje Italije, bo problematične osebke treba odstreljevati tudi v prihodnje, v kolikor ne bo možnosti za odlov in transplantacijo živih osebkov ter stalnega finančnega vira za povračilo (večjih) škodnih primerov. Za konkretno izvedbo odstrela problematičnih osebkov bi morali biti pooblaščeni državni uslužbenci oziroma predstavniki Območnih enot Zavoda za gozdove Slovenije. S tem bi se tudi izognili običajnim očitkom na račun lovcev o nepravilnosti izvršenega odstrela. Zavedati se moramo, da lahko neodstrelitev nekaj problematičnih osebkov, ki v zunanjem območju prodirajo v bližino

naselij, plenijo živino in ovce ter s svojo prisotnostjo prožijo nelagodje in strah med lokalnim prebivalstvom. ogrozi tudi uveljavitev nacionalne strategije konzervacije vrste, katere težišče bo tudi v prihodnje usmerjeno v osrednje varovalno območje. Varstvena politika, ki ne upošteva potreb in značilnosti lokalnih prebivalcev, je dolgoročno kontraproduktivna in še dodatno povečuje odpor do ukrepov v okviru varstva narave. Oblikovanje in izboljševanje političnega habitata (BURNS 1986) oziroma zagotavljanje varstvenega konsenza med prebivalci, postaja danes neobhodna sestavina uspešne dolgoročne strategije varstva problematičnih živalskih vrst.

Ob razmišljanju kako zagotoviti dolgoročno ohranitev vitalne populacije rjavega medveda v Sloveniji in istočasno upoštevati tudi mednarodne pomenske razsežnosti te naloge, je potrebno prestopiti okvire Odredbe iz leta 1966. V tem smislu je širjenje mej osrednjega območja in načrtno varstvo ključnih delov habitatov nedvomno pomembna naloga. Ker pa je taka akcija obremenjena s hipoteko nezaželjenih stranskih učinkov, ki jih je sicer večinoma mogoče vnaprej predvideti in tudi preprečiti ali vsaj omejiti, mora biti glavna kratkoročna naloga usmerjena v pridobivanje naklonjenosti lokalnega prebivalstva konkretnemu varstvu rjavega medveda. Ob tem je smiselno opozoriti na veljavna priporočila o varstvu rjavega medveda in zaščiti habitatov, ki jih je leta 1988 sprejel **Svet Evrope** (Council of Europe 1988), katerega članica je tudi Slovenija in jih naslovil na vse države članice. Med njimi so posebej pomembna priporočila o:

-oblikovanju posebnih skladov za povračilo škode, ki jo povzroča medved oziroma, ki bi nastala kot posledica predlaganih varstvenih ukrepov,

-organiziranju propagandnih akcij, ki naj prebivalstvo v območjih z rjavim medvedom seznanijo z izhodišči in konkretnim programom varstva ter vzbudijo njihovo sodelovanje pri predvidenih akcijah in spremljavi njihovega učinka,

-pospešeni aktivnosti za oblikovanje koridorjev med območji vitalnih populacij in izoliranimi jedri, s čimer bi vzpostavili fizično povezavo med njimi in možnosti za njihovo postopno zlitje, s čimer bi preprečili genetsko izolacijo in degradacijske procese v izoliranih (meta)populacijah,

-koordinaciji aktivnosti za ohranitev rjavega medveda na nacionalni, medregijski in mednarodni ravni, izmenjavi raziskovalnih dosežkov, itn.

-oblikovanju mreže narodnih parkov, krajinskih parkov in naravnih rezervatov ter drugih (neformalnih) oblik integralnega varstva ključnih habitatov znotraj območij z rjavim medvedom, v katerih morajo biti vse druge dejavnosti prilagojene ali tudi podrejene ciljem varstva te živalske vrste,

-oblikovanju skupnih mednarodnih in meddržavnih raziskovalnih projektov o ekologiji rjavega medveda in možnostih ponovnega širjenja vrste v območja, odkoder jo je izrinil človek.

Podobna priporočila so bila soglasno sprejeta tudi na posvetovanju delovne skupine "Rjavi medved" v okviru 5. komisije (za kmetijstvo in gozdarstvo) Delovne skupnosti Alpe-Adria, 30.6 1992 v Ljubljani (glej str.5-6 v Zborniku posvetovanja Rjavi medved v deželah Alpe-Adria, Ljubljana 1994)

Integrirana priporočila Sveta Evrope in sklepi 5.Komisije Delovne skupnosti Alpe-Adria dejansko predstavljajo univerzalna izhodišča za oblikovanje biopolitične strategije ohranitve rjavega medveda v Evropi oziroma v Alpah. V trenutku pospešenega približevanja Slovenije k Evropski uniji jih zato kaže resno upoštevati tudi pri oblikovanju strateških izhodišč varstva rjavega medveda v Sloveniji. V konkretnem primeru rjavega medveda pa bo nedvomno treba (po vzoru Švedske!) doma poiskati sprejemljivo ravnotežje med mednarodnimi pomenskimi razsežnostmi ohranitve rjavega medveda v Evropi in nacionalnim interesom ohranitve te živalske vrste v Sloveniji ter le-to v mednarodnih krogih tudi zagovarjati.

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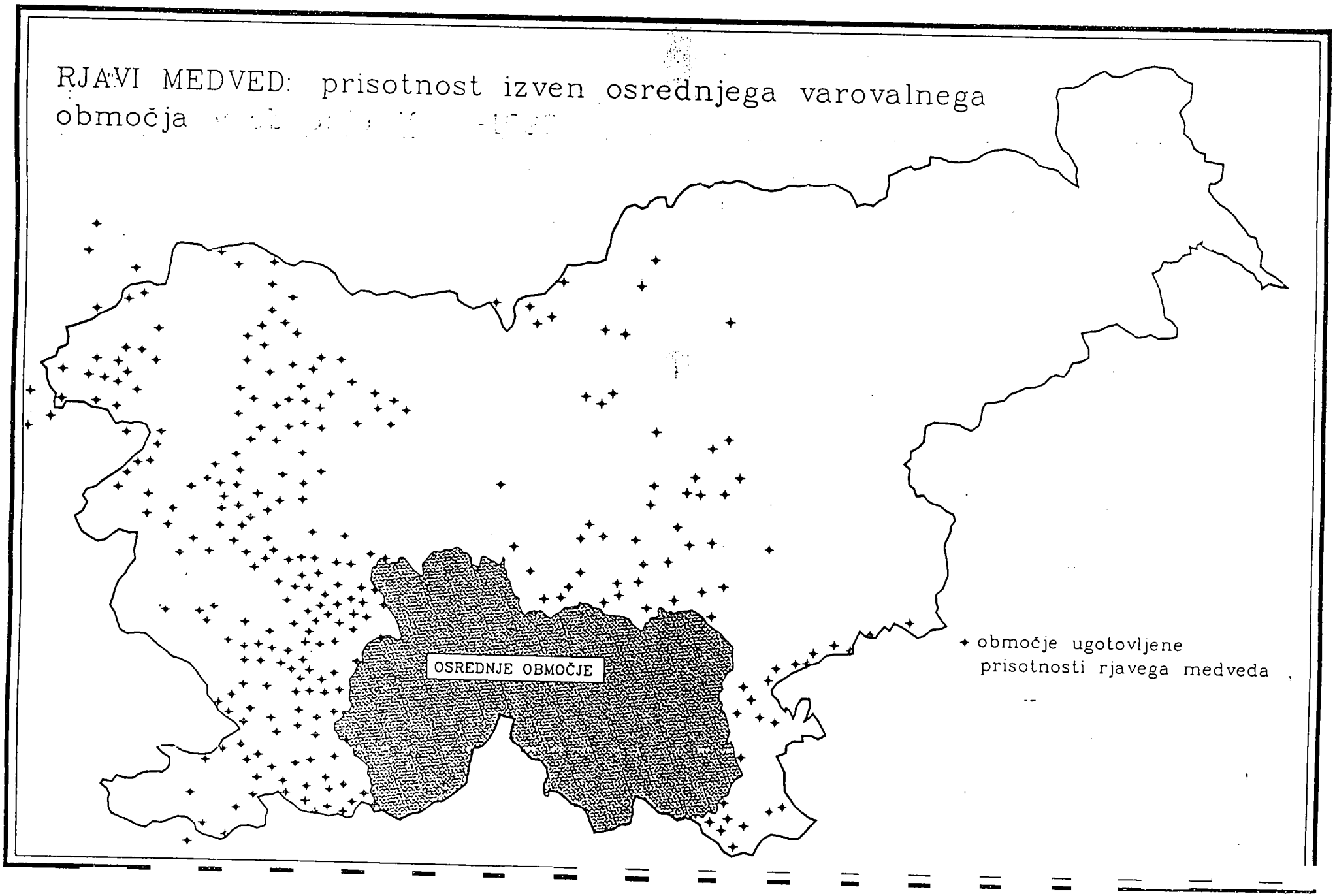
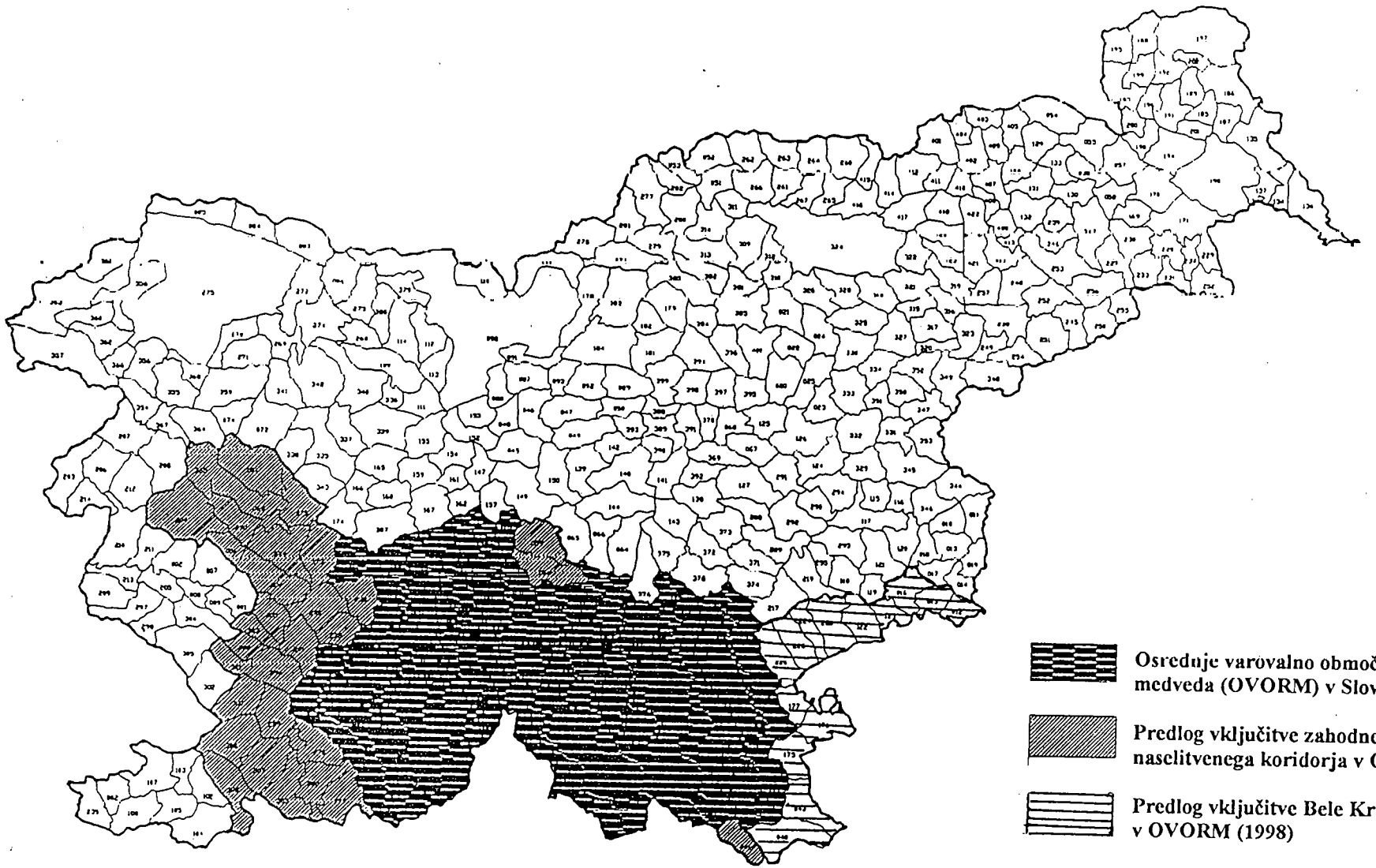
PRILOGE

1. Karta lovišč z vrisanim osrednjim varovalnim območjem rjavega medveda v Sloveniji iz leta 1966 in variantnima predlogoma za razširitev.

2. Seznam in površina lovišč, znotraj osrednjega varovalnega območja rjavega medveda v Sloveniji iz leta 1966 in območij obeh variantnih predlogov.

RJAVI MEDVED: prisotnost izven osrednjega varovalnega območja




Osreduje varovalno območje rjavega medveda (OVORM) v Sloveniji iz leta 1966
Predlog vključitve zahodnega in severozahodnega naselitvenega koridorja v OVORM (1994)
Predlog vključitve Bele Krajine in Gorjancev v OVORM (1998)

BEITRÄGE ZUR
POPULATIONSÖKOLOGIE VON LUCHS UND BÄR

Endbericht

zu einer
Kooperationsanbahnung zwischen dem
Institut für Wildbiologie und Jagdwirtschaft (IWJ)
und dem
Slowenischen Forstinstitut in Ljubljana (GIS)

mit Fördermitteln des
Bundesministerium für Wissenschaft und Forschung
(G.Z. 30.435/-23/92)

H. GOSSOW (PL)
1995

BEITRÄGE ZUR POPULATIONSÖKOLOGIE VON LUCHS UND BÄR

Endbericht

Inhalt:

Republika Slovenija
MINISTRSTVO ZA ZNANOST IN TEHNOLOGIJO
61000 Ljubljana, Slovenska 50

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LETNO POROČILO

O REZULTATIH OPRAVLJENEGA ZNANSTVENO-RAZISKOVALNEGA DELA NA PODROČJU TEMELJNEGA RAZISKOVANJA

Naslov projekta: Razsežnosti problemov ohranitve velikih zveri v kulturni krajini - primer rjavega medveda *(Ursus arctos L.)* v Sloveniji.

Izvajalec: Biotehniška fakulteta, Oddelek za gozdarstvo in gozdne vire, Večna pot 83, 61000 Ljubljana,
Gozdarski inštitut Slovenije, Večna pot 2, 61000 Ljubljana.

Odgovorni nosilec: dr.Miha Adamič, dipl.inž.gozd., izredni profesor, Oddelek za gozdarstvo Biotehniške fakultete v Ljubljani,

Številka pogodbe: J4 - 7297 - 488 - 95

Datum.: 30. Januar 1996

LETNO POROČILO ZA LETO 1995

Naslov projekta: Razsežnosti problema chranitve velikih zveri v kulturni krajini- primer rjavega medveda (Ursus arctos L.) v Sloveniji.

Številka pogodbe: J 4 - 7297 - 488 - 95

1. Cilji projekta: Rjavi medved (Ursus arctos L.) ter druge velike zveri so danes v Evropi redka in ogrožena sestavina biotske raznovrstnosti ter element naravne dediščine. Zaradi trofičnega položaja pa v kulturni krajini funkcionalno sodijo med problematične živalske vrste, ki človeku lahko povzročajo škodo, z njim tekmujejo v izkoriščanju istih naravnih virov ter so mu tudi nevarne. Rjavi medved ter druge vrste velikih zveri so v Sloveniji pod zakonskim varstvom Uredbe o varstvu redkih in ogroženih živalskih vrst. Z robnim širjenjem populacije rjavega medveda ter daljinskimi emigracijami posameznih osebkov se premikajo tudi težišča problemov v okviru palete odnosov človek-velike zveri. Osnovni cilj projekta je iskanje vzdržnih oblik sobivanja človeka in rjavega medveda ter ostalih predstavnikov velikih zveri v kulturni krajini, ob sočasnem zagotavljanju samoobnovljivosti ter dolgoživosti njihovih populacij ter varstvu ključnih delov habitatov in povezovalnih koridorjev med njimi. Del projekta je usmerjen tudi v primerjalne analize vzpostavljenih ravni problemov, ki jih povzroča rjavi medved v osrednjem območju razširjenosti v Sloveniji ter v novo poseljenih območjih v Avstriji in Italiji.

2. Opisno poročilo o realizaciji predloženega programa dela:
(povzetek objavljenih in neobjavljenih del).

V marcu in aprilu 1995 smo odlovili 4 medvede (3 M + 1F) in jih opremili z radiotelemetrijskimi oddajniki Telonic. Lokacije opravljamo 2x tedensko. Pripravili smo datoteko koordinat lokacij za vnos v tematsko karto. V ta namen je bila na Gozdarskem inštitutu Slovenije (oddelek GNP) izdelana tematska karta v merilu 1 : 100 000 , ki obsega področje opredeljeno s kordinatami:

X_{min} = 5423014 Y_{min} = 5030852
X_{max} = 5470984 Y_{max} = 5109032

Osnova karte je satelitski posnetek (Landsat TM, poletje 1993). Vir satelitskih podatkov:EURIMAGE, Frascati, Italija. Uporabljen je RGB kompozit s kombinacijo TM7, TM5 in TM43, ki povdarja vegetacijske razlike in razlike v količini biomase. Vsebina tematske karte vključuje (1) meje območja radiotelemetrijske spremljave ter ločeno meje gojitvenega lovišča Zavoda za gozdove Slovenije, Jelen - Snežnik, v katerem teče študija o prisotnosti velikih zveri, (2) omrežje cest, (3) 10 kilometrsko GK mrežo in (4) 1 kilometrsko GK mrežo. Karta bo uporabljena kot baza za vnos dnevnih lokacij radiotelemetriranih medvedov ter inventariziranih znakov prisotnosti velikih zveri.

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LETNO POROČILO

O REZULTATIH OPRAVLJENEGA ZNANSTVENO-RAZISKOVALNEGA DELA NA PODROČJU TEMELJNEGA RAZISKOVANJA

Naslov projekta: Razsežnosti problemov ohranitve velikih zveri v kulturni krajini - primer rjavega medveda *(Ursus arctos L.)* v Sloveniji.

Izvajalec: Biotehniška fakulteta v Ljubljani, Oddelek za gozdarstvo in obnovljive gozdne vire, Večna pot 83, 1000 Ljubljana,

Gozdarski inštitut Slovenije, Večna pot 2, 1000 Ljubljana

Odgovorni nosilec: Dr.Miha Adamič, izredni profesor, Oddelek za gozdarstvo BF v Ljubljani,

Številka pogodbe: *J4 - 7297 - 488 - 96*

Datum: *30. januar 1997*

LETNO POROČILO ZA LETO 1996

Naslov projekta: Razsežnosti problema ohranitve velikih zveri v kulturni krajini- primer rjavega medveda (Ursus arctos L.) v Sloveniji.

Številka pogodbe: J 4 - 7297 - 488 - 96

1. Cilji projekta:

Rjavi medved (Ursus arctos L.) ter druge velike zveri so danes v Evropi redka in ogrožena sestavina biotske raznovrstnosti ter element naravne dediščine. Zaradi trofičnega položaja pa v kulturni krajini funkcionalno sodijo med problematične živalske vrste, ki človeku lahko povzročajo škodo, z njim tekmujejo v izkoriščanju istih naravnih virov ter so mu tudi nevarne. Rjavi medved ter druge vrste velikih zveri so v Sloveniji pod zakonskim varstvom Uredbe o varstvu redkih in ogroženih živalskih vrst. Z robnim širjenjem populacije rjavega medveda ter daljinskimi emigracijami posameznih osebkov se premikajo tudi težišča problemov v okviru palete odnosov človek-velike zveri. Osnovni cilj projekta je iskanje vzdržnih oblik sobivanja človeka in rjavega medveda ter ostalih predstavnikov velikih zveri v kulturni krajini, ob sočasnem zagotavljanju samoobnovljivosti ter dolgoživosti njihovih populacij ter varstvu ključnih delov habitatov in povezovalnih koridorjev med njimi. Del projekta je usmerjen tudi v primerjalne analize vzpostavljenih ravni problemov, ki jih povzroča rjavi medved v osrednjem območju razširjenosti v Sloveniji ter v novo poseljenih območjih v Avstriji in Italiji.

2. Opisno poročilo o realizaciji predloženega programa dela:

(povzetek objavljenih in neobjavljenih del).

V septembru in oktobru 1996 smo odlovili 3 medvede (2 mladiča + 1 samico) in jih opremili z radiotelemetrijskimi oddajniki. Mladičem smo namestili ušesne oddajnike, ki so bili ob tej priliki v Sloveniji prvič uporabljeni. Poleg 3 živali, odlovljenih v jeseni 1996 redno spremljamo še 1 odraslo samico (Maja), ki je bila opdlovljena v jeseni 1995. Le-ta je v januarju 1996 skotila 3 mladiče. S kontinuiranim lociranjem v obdobju januar-april 1996 smo ugotovili, da so bili mladiči rojeni izven brloga v klasičnem smislu oziroma so bili skoteni v posebej pripravljenem gnezdu v mlajšem smrekovem nasadu. O slednjem posedujemo dokumentarne fotoposnetke. Lociranje vseh telemetriranih živali smo opravili 2x tedensko. Podrobnejše ugotovitve so razvidne v poročilu vodje terenske ekipe dipl.biol. Petre Kaczensky (Institut für Wildbiologie und Jagdwirtschaft BOKU Wien).

Zaključena je bila študija primernosti habitatov rjavega medveda v širšem območju Brkinov in Slavnika. Medved se v tem območju pogosteje pojavlja po letu 1970. Iz ugotovitev je očitno, da imajo Brkini oziroma gozdnati deli tega območja funkcijo

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MOŽNOSTI POVRATKA VELIKIH ZVERI V ALPE

PROSPECTS OF THE RETURN OF LARGE CARNIVORES TO THE ALPS

Miha ADAMIČ*, Iztok KOREN**

Izvleček

Ekspanzijske tendence populacij velikih zveri in njihovo postopno vračanje v historične habitate v Alpah vzbujajo pozornost in pričakovanje v deželah Alpskega loka. Vloga Slovenije kot mostišča med populacijami velikih zveri v Dinaridih in Alpami je pri tem pogosto izpostavljena. Vitalni populaciji rjavega medveda in risa z izraženimi emigracijskimi tendencami in obnavljajoča se populacija volka, dajejo tovrstnim pričakovanjem realne okvire. Gozd, kot ključni del habitatov vseh treh vrst bo tudi pri povratku v Alpe predstavljal funkcionalno najpomembnejši del življenjskega prostora velikih zveri, tako v varovalnem kot v prehranskem aspektu. Sistem trajnostnega gospodarjenja z gorskim gozdom vključuje večino za življenje velikih zveri pomembnih prvin. Oba cilja pa se konfrontirata v določanju dopustne velikosti populacij velikih rastlinojedcev, ki volku in risu predstavljajo najpomembnejši plenski vir, istočasno pa imajo razbremenilno funkcijo pri zmanjševanju plenilskega pritiska na živino na alpskih pašnikih. Povečane gostote rastlinojedcev pa praviloma zavirajo naravno obnovo gorskega gozda. Odločanje o povratku velikih zveri v Alpe mora zato temeljiti na tehtanju nasprotnih učinkov akcije.

Ključne besede: velike zveri, Alpe, historični habitat, gorski gozd, plenske vrste, Slovenija

Abstract

The expansion trend of the population of large carnivores and their gradual return to their traditional Alpine habitats attract attention and raise expectations in the countries of the Alpine arc. Slovenia's significant role as the bridge between the populations of large carnivores between the Dinaric range and the Alps is often emphasised in this context. Given the thriving populations of the brown bear and the lynx, displaying pronounced emigration tendencies and the recovery of the wolf population, these expectations are quite realistic. In terms of conservation, living space and feeding habits, the forest, as the key part of the habitat of the three animal species, will play a functionally significant role in their return to the Alps. Sustainable management of mountain forest includes most of the elements indispensable for the survival of large carnivores. Both objectives however must reach a compromise in an acceptable size of the population of large herbivores which are the main source of prey for the wolf and the lynx. At the same time large herbivores have an alleviating function in terms of decreasing the number of Alpine livestock killed by large carnivores. The increased density of herbivores has, as a rule, an inhibiting effect on mountain forest and its natural regeneration. The decision on the return of large carnivores to the Alps must therefore be based on the assessment of adverse effects of this action.

Key words: large carnivores, the Alps, traditional habitat, mountain forest, prey species, Slovenia

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UVOD

Evropa se danes sooča z izzivom, s kakršnim so se v Severni Ameriki srečali že pred desetletji, vendar nanj še niso dokončno odgovorili (TUCKER / PLETSCHER 1989, CRAVEN in sod. 1992, BATH 1993, MECH 1995, HABER 1996), in sicer, kako ob koncu 20.stoletja zagotoviti razmere za povratek nekdanjih človekovih konkurentov in sovražnikov, velikih zveri v kulturno krajino. Pri ocenjevanju današnje stopnje primernosti historičnih habitatov so si številni evropski avtorji edini, da primernega prostora ni več veliko (GOSSOW / HONSIK-ERLENBURG 1986, ROTH 1987, ADAMIČ 1990,1996, SERVHEEN 1990, MARENČE 1997) Velikansko območje Alp z majhno gostoto poseljenosti in koncentracijo večjega dela prebivalstva v alpskih dolinah, veliko gozdnatostjo ter gostoto velikih rastlinojedcev, plena velikih zveri, zato sodi glede tega med najperspektivnejše dele Evrope. Alpe, največje gorstvo v Evropi, se v dolžini 1200 km v loku raztezajo med Ligursko obalo in Panonsko nižino, čez ozemlje Francije, Italije,Švice, Avstrije in Slovenije ter ločujejo SrednjoEvropo od Mediterana (LAH 1987).

Realnost pa je ponavadi drugačna kot želje. Alpe, v preteklosti velikopovršinski historični habitat rjavega medveda in drugih velikih zveri, so svojo prvinsko funkcijo do danes dodobra izgubile. Ne samo, da so prebivalci Alp zaradi nekompatibilnosti pašne živinoreje, le-ta je v preteklosti alpskemu človeku predstavljala pomemben vir za preživljanje, s prisotnostjo velikih zveri le-te večinoma iztrebili že sredi 19. stoletja, pač pa danes tudi druge posledice doseženega razvoja otežujejo restavriranje habitatne funkcije Alp v prvinskem smislu ter spontan ali induciran povratek zveri v ta prostor. V okviru projektov Evropske unije za restavriranje prvinske biotske pestrosti so velike zveri uvrščene na prioritetne liste. Poskusi revitalizacije reliktnih ostankov populacij ali celo njihovega ponovnega formiranja z naselitvami v izpraznjene dele historičnih habitatov so aktivnosti, ki danes v državah Evropske unije angažirajo velikanska denarna sredstva v okviru projektov Life. V njih sodelujejo Avstrija, Italija, Francija, in Švica, ki sicer ni članica EU, od nealpskih dežel, članic EU pa še Španija in Grčija.

V biogeografskem smislu predstavlja ozemlje Slovenije funkcionalno povezavo med Alpami in Dinaridi. Na pomembnost Slovenije v procesu mednarodne akcije za povratek velikih zveri v Alpe poleg današnje razširjenosti opozarja tudi ugoden populacijski status teh vrst pri nas:

rjavi medved *(Ursus arctos L.)* - ekološko funkcionalna, visoko reproduktivna populacija z izraženimi tendencami prostorskega širjenja areala,

ris *(Lynx lynx L.)* - leta 1973 ponovno naseljen v Sloveniji. Današnji populacijski status je enak kot pri rjavem medvedu in priča o uspešnosti naselitve, in

volk *(Canis lupus L.)* - populacija v ponovnem nastajanju na celotnem osrednjem območju razširjenosti v Dinaridih, izražena tendenca povratka v historične dele habitatov.

Na mednarodnih srečanjih od sredine 80.let dalje (Trento 1986, Ossiach 1991, Ljubljana 1992, Oberammergau 1992, Engelberg 1996, Tarvisio 1996, Graz 1997, itn.) so bile na Slovenijo naslovljene konkretne pobude, da na svojem ozemlju uveljavi sistem "mehkejšega" upravljanja s populacijami rjavega medveda in risa. Konkretno bi to pomenilo, da naj v Sloveniji znižamo letno odstrelno kvoto obeh vrst ter ju v obmejnih

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ANALIZA KLJUČNIH VZROKOV SMRTNOSTI RJAVEGA MEDVEDA *(URSUS ARCTOS* L.) V SLOVENIJI V OBDOBJU ZADNJIH 6 LET (1.4.1991 - 31.3.1997)

Miha ADAMIČ*

Izvleček:

Po podatkih Osrednjega registra velikih zveri je bilo v obdobju zadnjih 6 let v Sloveniji izločenih skupaj 257 rjavih medvedov. Glavni vzrok smrtnosti je trofejni odstrel z dobrih 88% vseh izločitev. Med ostalimi vzroki je pomembnejši delež izgub v prometu s 7,8% v skupni mortaliteti. Od sredine 80. let je v Sloveniji uveljavljen centralni sistem planiranja in določanja letnih kvot odstrela rjavega medveda, zato je glavni dejavnik mortalitete povsem obvladljiv. Pozitivna numerična in prostorska dinamika rjavega medveda v Sloveniji in naraščanje števila konfliktov med medvedom in človekom ter njegovo lastnino opozarjata, da bo moral nadzor populacije ostati redna sestavina ohranitvene strategije tudi v prihodnje. Zanimiv je značilno višji delež samcev med odstreljenimi oziroma med vsemi izločenimi medvedi (67%) S prevladujočim deležem samic v tako preoblikovani populaciji lahko pojasnimo tudi visoko reproduktivno stopnjo populacije rjavega medveda v Sloveniji.

Ključne besede: rjavi medved (*Ursus arctos* L.), mortaliteta, trofejni odstrel, promet, Slovenija

THE ANALYSIS OF KEY SOURCES OF MORTALITY OF THE BROWN BEAR (URSUS ARCTOS L.) IN SLOVENIA IN THE LAST 6 YEARS PERIOD (1.4.1991 - 31.3.1997)

Abstract:

According to The Slovenian Central Register of Large Carnivores, 257 brown bears have been extracted in Slovenia in last 6 years period. Shooting mortality with good 88% of all extractions is the key factor of bear mortality. Traffic collisions with 7,8% of extracted animals are the only other noticeable source of bear mortality. But due to central planninng of yearly harvest quotas of brown bear in Slovenia since mid-80ties, the very crucial source of bear mortality might be politically restrained. Positive numerical and spatial trends of the population, as well as increasing human bear-interactions prove that prudent control harvest of brown bears will have to be kept among the conservation management tools in future, too. It is important to stress that the shooting mortality with prevailing share of males (67%) among extracted bears and thus changed sex structure of adult animals, represent important triggers of detected high rates of the reproduction of the brown bear population.

Key words: *brown bear (Ursus arctos* L.), *mortality, trophy hunting, traffic, Slovenia*

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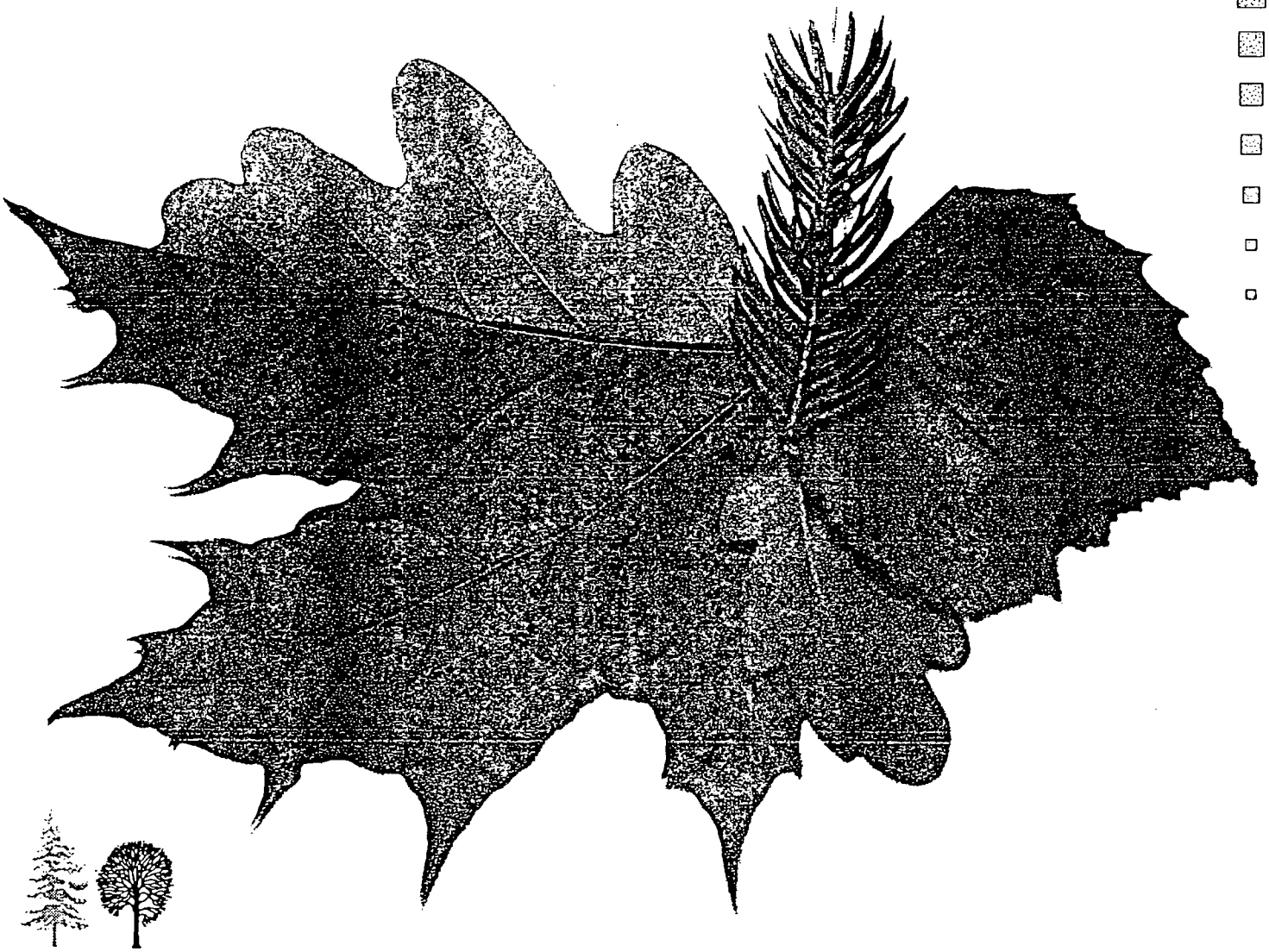
ZBORNIK
gozdarstva in lesarstva
53



GOZDARSKI INŠTITUT SLOVENIJE

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GDK 149.74 Ursus arctos L.: 156.1: 917: (497.12)

NEKATERI VIDIKI EKOLOŠKE NIŠE RJAVEGA MEDVEDA V OBMOČJU AC VRHNIKA–POSTOJNA: GIS ANALIZA TELEMETRIČNO ZBRANIH PODATKOV

Andrej KOBLER*, Marko JONOZOVIČ**, Miha ADAMIČ***

Izvleček

Z radiotelemetrijsko spremljavo so bili zbrani podatki o gibanju 9 rjavih medvedov (*Ursus arctos* L.) v širšem območju ob avtocesti. S pomočjo GIS smo podrobneje analizirali podatke 2 odraslih živali - samca in samice. Ugotovili smo areala aktivnosti obeh osebkov in ju združili s podatki popisa gozdov. Avtocesta vpliva na obliko in lego areala, vendar pa ne predstavlja absolutne bariere za migracijo. Samice se avtoceste bolj izogibajo od samcev, še posebej v obdobju paritve in izven vegetacijske dobe. Habitat je vezan na strnjene komplekse gozda kjer prevladujejo jelova bukovja starejših razvojnih faz. Odsotnost antropogenih motenj je pomembnejši vidik habitata kot pa tip gozda. Samec je bolj aktiven od samice: ima 4 - krat večji areal in vsak dan v povprečju prehodi 1,8 - krat večjo razdaljo.

Ključne besede: Ursus arctos L., *habitat, avtocesta, GIS, Slovenija*

SOME ASPECTS OF THE BROWN BEAR ECOLOGICAL NICHE IN THE AREA OF THE VRHNIKA–POSTOJNA HIGHWAY: A GIS ANALYSIS OF THE RADIOTRACKING DATA.

Abstract

Data on the movements of 9 bears (*Ursus arctos* L.) in the broader highway area were gathered using radiotracking. A GIS was used for a detailed analysis of 2 adult animals - a male and a female. The home ranges were identified for both animals and subsequently integrated with the forest inventory database. The highway influenced both the shape and location of each home range although the highway cannot be considered an absolute barrier to migration. The females seemed to avoid the highway more than the males, especially during the mating season and during winter. The bear habitat is characterized by continuous forest, with predominantly mature stands of silver fir and beach. Among various aspects of habitat the absence of human-induced disturbances is more important than the type of forest. The male was more active than the female: it's home range is 4 times more extensive and it covers a daily distance 1.8 times greater than that of the female.

Key words: Ursus arctos L., *habitat, highway, GIS, Slovenia*

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1 UVOD

Proučevanje habitatov živalskih vrst z velikimi areali aktivnosti in z redko disperzijo ter prikritim načinom življenja je danes samo na klasičen način težko zadovoljivo izpeljati. Posebej v kulturni krajini je mogoče identificirati dovolj velike krpe habitatov in načrtovati njihovo funkcionalno združevanje le s pomočjo geografskega informacijskega sistema (GIS). GIS je pomembno orodje za oceno vplivov rabe prostora na primernost habitatov in za napovedovanje posledic načrtovanih posegov v prostor na živalske populacije. Uporaba GIS v velikopovršinski strategiji ohranitve prostoživečih živali se je posebej uveljavila v ZDA v okviru projektov varstva velikih plenilcev (MLADENOFF s sod. 1995, VAN MANEN PELTON 1993, HIRSCH HAUFLERT 1993, AGEE s sod. 1989). Postopki za oceno habitata rjavega medveda (*Ursus arctos* L.) na podlagi empiričnih podatkov so bili do sedaj v Evropi le redko uporabljeni (CLEVENGER PURROY CAMPOS 1992). Zaradi prikritega načina življenja lahko nemoteče zbiranje podatkov pri rjavem medvedu predstavlja precejšen logističen problem, radiotelemetrična metoda pa omogoča neomejeno in neovirano spremljanje živali.

V okviru raziskovalnega projekta Ekologija in varstvo rjavega medveda v Sloveniji, ki ga je financiralo Ministrstvo RS za znanost in tehnologijo, smo v aprilu leta 1993 skupaj s sodelavci dunajskega Institut für Wildbiologie und Jagdwirtschaft, Wildbiologische Gesellschaft München in Lovsko zvezo Slovenije pričeli s projektom radiotelemetrijske spremljave gibanja in obnašanja rjavega medveda v širšem območju avtocestnega odseka med Verdom in Razdrtim. Cilj tu predstavljene raziskave je analizirati nekatere vplive na vedenje medveda ter ovrednotiti habitat v območju avtocestnega odseka Vrhnika - Postojna. Z uporabo GIS in statističnih metod smo poskušali te vidike zajemati kvantitativno.

2 METODE

Območje raziskave leži med Vrhniko, Bloško planoto in Postojno. Predel večinoma spada v dinarsko fitogeografsko območje (MARINČEK 1987) in predstavlja nadaljevanje osrednjega območja razširjenosti rjavega medveda pri

GDK:156

Ravnanje s problematičnimi živalskimi vrstami v Sloveniji na osnovi spoznanj raziskovalnega dela

Decision making in the Conservation Management of Problem Wildlife Species in Slovenia, based on the Knowledge gained through Current Research Projects

Miha ADAMIČ*

Izvleček

Adamič, M.: Ravnanje s problematičnimi živalskimi vrstami v Sloveniji na osnovi spoznanj raziskovalnega dela. V slovenščini, cit. lit. 17.

Slovenija sodi med nekaj srednjeevropskih držav, ki jih še naseljujejo vsi avtohtoni veliki sesalci, med njimi tudi predstavniki velikih zveri: rjavi medved, volk in ris. Kljub temu, da so vse tri uvrščene v Rdeči seznam ogroženih sesalcev v Sloveniji ter, da predstavljajo dragocen element narodove naravne dediščine in biotske raznovrstnosti pa ne smemo prezreti dejstev, ki praviloma otežujejo napore za njihovo varstvo v kulturni krajini. Zaradi načinov prehranjevanja ter drugih vedenjskih značilnosti sodijo v skupino problematičnih živalskih vrst, ki človeku povzročajo škodo na imetju in so mu lahko tudi nevarne. Ohranitev teh vrst v kulturni krajini je zato odvisna od splošnega javnega mnenja, le tega pa je mogoče pozitivno kondicionirati s hitrim vključevanjem koristnih ugotovitev raziskovalnih projektov.

Ključne besede: problematične vrste, velike zveri, odnos javnosti, raziskovalno delo, Slovenija

Synopsis

Adamič, M.: Decision making in the Conservation Management of Problem Wildlife Species in Slovenia, based on the Knowledge gained through Current Research Projects. In Slovene, lit. quot. 17.

Slovenia is among few Central european countries with preserved native stock of large mammals, including carnivore species, brown bear, wolf and lynx. Although the late represent valuable part of natural heritage and biotic diversity, and were also put on the List of threatened mammals in Slovenia, the problems arising from the management of viable populations of large carnivores should not be overlooked. According to their food strategies and behavioural patterns, they are treated as problem species. The chances for long term preservation of those species in cultural landscapes, which in fact the greatest part of Slovenia belongs to, is therefore closely related to the acceptance of general public. Since, the late might be positively supported by the results of current research projects on large carnivores, it is therefore very important for new knowledges to be promptly implicated in problem species conservation strategies.

Key words: problem species, large carnivores, public acceptance, research results, Slovenia

1. UVOD
1. INTRODUCTION

Slovenija sodi med tiste nekaj srednjeevropskih držav, ki jih še naseljujejo vsi avtohtoni veliki sesalci, med njimi tudi predstavniki velikih zveri: rjavi medved, volk in ris. Kljub temu, da so vse tri uvrščene v Rdeči seznam ogroženih sesalcev v Sloveniji ter, da predstavljajo dragocen element narodove naravne dediščine in biotske raznovrstnosti pa ne smemo prezreti dejstev, ki praviloma otežujejo napore za njihovo varstvo v kulturni krajini. Gledano skozi današnjo človekovo optiko sodijo namreč vse tri vrste v skupino problematičnih živalskih vrst. S tem izrazom danes nadomeščamo arhaično zveneči pojem *škodljive živali* ki je *per se* opozarjal na nedvoumno škodljivost nekaterih živalskih vrst in torej posredno spodbujal k njihovemu zatiranju. V to skupino lahko sodijo velike in srednjevelike zveri, veliki rastlinojedci, ribojedi ptiči ter nekateri ptiči pevci oziroma tiste vrste, ki zaradi načina prehranjevanja ter drugih življenjskih značilnosti: (1) človeku povzročajo škodo, (2) z njim tekmujejo v izkoriščanju istih naravnih virov in (3) izjemoma so ljudem lahko tudi nevarne.

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POSVETOVANJE

GOZD IN ŽIVALSKI SVET

Nazarje 1995

SAVINJSKO GOZDARSKO DRUŠTVO

KAZALO

Miha ADAMIČ[4]

NARAVA NE POZNA ŠKODLJIVIH IN KORISTNIH ŽIVALI - O RAZSEŽNOSTIH KONFLIKTOV PRI UPRAVLJANJU S POPULACIJAMI PROBLEMATIČNIH ŽIVALSKIH VRST V KULTURNI KRAJINI

Povzetek:

Arhaično zveneči pojem škodljive živali, ki je bil uveljavljen tudi v starejši lovski zakonodaji, nakazoval pa je eksplicitno škodljivost nekaterih vrst in tako posredno spodbujal k njihovemu zatiranju, danes nadomeščamo s pojmom problematične živalske vrste (Dorrance 1983). Med le.te uvrščamo tiste vrste, ki:

- ki zaradi načina prehranjevanja ter drugih značilnosti tekmujejo s človekom pri izkoriščanju istih naravnih virov,
- nekaterim dejavnostim povzročajo pomembno ekonomsko škodo,
- lokalno oviraio ali celo onemogočajo doseganje dolgoročnih ciljev in
- so lahko človeku fizično nevarne.

V srednjeevropskem prostoru tvorijo to skupino veliki rastlinojedi sesalci, jelenjad in divji prašič ter velike zveri, rjavi medved, volk in ris. Lokalno pa lahko v to skupino uvrstimo tudi srnjad ter oba alohtona rastlinojedca, muflona in damjaka. V tabeli št. 1 so prikazana vplivna področja problematičnih živalskih vrst v Sloveniji.

Tabela št. 1. Vrstno sprecifična vplivna oziroma konfliktna področja med človekom in problematičnimi živalskimi vrstami

Živalska vrsta	*Ekonomska*	*Tekmovanje*	*Oviranje ciljev*	*Neposredna*
jelenjad	+	+		
divji prašič	+			
rjavi medeved	+			+
volk	+	+		
ris	+	+		

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Zbornik povzetkov referatov 2. slovenskega festivala znanosti

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Urednika:
dr. Edvard Kobal
in
Marko Frelih

Ustanova
Slovenska znanstvena fundacija
Ljubljana, september 1996

MEDNARODNI RADIOTELEMETRIJSKI PROJEKT RJAVI MEDVED - RIS V SLOVENIJI

Miha Adamič
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Leta 1993 je Gozdarski inštitut Slovenije v sodelovanju z raziskovalno skupino, ki jo vodi prof.dr. Hartmut Gossow, Institut für Wildbiologie und Jagdwirtschaft der Universität für Bodenkultur z Dunaja ter sodelavci Institut für Wildforschung der Forstliche Fakultät iz Münchna, ki jo vodi prof. Wolfgang Schröder pričeli radiotelemetrijski projekt, ki smo ga poimenovali kot Radiotelemetrijski projekt rjavi medved-ris v Sloveniji (Bär-Luchs-Telemetrie Projekt Slowenien). Vsebina projekta, ki že teče je bila usmerjena k naslednjim ciljem:

- spoznati pomembne značilnosti v življenjski strategiji rjavega medveda v gosteje naseljenih območjih,
- proučiti dinamiko in smeri širjenja rjavega medveda iz osrednjega območja razširjenosti proti severozahodu in zahodu, zgradbo emigracijskih koridorjev ter vpliv avtocest in drugih induciranih ovir na disperzijo vrste,
- proučiti ključne lastnosti populacije rjavega medveda v Sloveniji, med katerimi so posebej pomembni reprodukcijski status s prirastkom, spolna in starostna struktura, mortaliteta, prehranske značilnosti, itn.,
- spoznati povezave med deli (enovitega!) populacijskega območja na severozahodnem delu Dinarskega Visokega Krasa,
- analizirati razsežnosti interakcij med človekom in rjavim medvedom in (po)iskati ukrepe za njihovo preprečevanje oziroma blažitev,
- ugotoviti velikost individualnih teritorijev risa ter stopnjo prekrivanja le-teh,
- lociranje prehranjevalnih območij in spoznati plenski izbor,
- proučiti disperzijo mlajših osebkov, ki sodi med ključne elemente prostorskega širjenja vrste.

Radiotelemetrijska spremljava gibanja rjavih medvedov poteka vzdolž avtoceste Ljubljana-Razdrto, na območju med Verdom, Rakitno in Hotedršico. Del projekta o risu pa teče na Kočevskem, v območju med dolino Kolpe, Kočevskim Rogom in Grčaricami. Medvedi, opremljeni z radiotelemetrijskimi oddajniki so bili odlovljeni z Aldrichovimi zankami, rise pa smo odlovili v kletke s samosprožilnimi vratci. Pri odlovu in imobilizaciji ni bila poškodovana nobena od odlovljenih živali. Podrobnosti o poteku projekta ter dosedanjih ugotovitvah bodo na predavanju prikazane z diapozitivi ter videoposnetkom.

Značilnosti današnje razširjenosti rjavega medveda v Sloveniji in problemi dolgoročnega, velikopovršinskega varstva ranljive (problematične) živalske vrste.

Prof.dr.Miha Adamič, Oddelek za gozdarstvo in gozdne vire Biotehniške fakultete v Ljubljani (raziskovalni projekt "Razsežnosti problemov varstva velikih zveri v kulturni krajini: primer rjavega medveda v Sloveniji").

Slovenija leži na zahodnem robu strnjenega Dinarsko-Balkanskega območja razširjenosti rjavega medveda, skupaj z Gorskim Kotarom v sosednji Hrvaški pa predstavlja tudi severozahodni rob areala te živalske vrste v srednji Evropi. **Območje današnje razširjenosti** rjavega medveda v Sloveniji tvorita dve, med seboj sicer povezani območji, ki pa se razlikujeta po primernosti in nosilni zmogljivosti habitatov, populacijski gostoti, pa tudi po zakonskih izhodiščih varstva te živalske vrste.

Osrednje območje varstva rjavega medveda obsega južni del Slovenije oziroma ga sestavljajo širša območja Kočevske in Notranjske, del severne Dolenjske ter južna, visokokraška obrobja Ljubljanske kotline. **Telemetrijske raziskave** rjavega medveda na Hrvaškem in v Sloveniji dokazujejo, da obstojajo povezave med Gorskim Kotarom in južnim delom Slovenije oziroma, da medvedi (redno) prehajajo iz enega območja v drugo. Obe območji lahko torej obravnavamo kot enotno populacijsko območje s skupno površino okoli 4500 km2. **Z Odredbo o območju v SR Sloveniji na katerem je medved zaščiten** (Ur.list SRS 29/66) v okviru Zakona o lovstvu v SR Sloveniji iz leta 1966, so bile meje osrednjega območja razširjenosti rjavega medveda v Sloveniji tudi zakonsko opredeljene. Osrednje varstveno območje meri skupaj okoli 3000 km2 oziroma komaj 15% ozemlja Republike Slovenije. V tem območju uživa medved delno varstvo oziroma zaščito z zakonsko predpisano lovno dobo. Konkretne oblike trenutno veljavne zaščite, so zapisane v 'Enotnih gojitvenih smernicah v Sloveniji" (LZS 1991). Zaradi takratnih razmer in površnih pogledov na varstvo naravne dediščine pa pri določanju mej osrednjega območja leta 1966, niso bile v celoti upoštevane dejanske ekološke razmere oziroma primernost habitatov v Sloveniji. Zato je takrat oblikivano osrednje varovalno območje manjše od potencialnega območja primernosti. V osrednje območje namreč niso (bili) vključeni redko naseljeni, gozdnati predeli Nanosa, Idrijskega Javornika, Trnovskega gozda, slovenskega dela Čičarije in Gorjanci. Zaradi naraščajočih sečenj, gradnje gozdnih cest in vlak, propadanja gozdov, gradnje prometnega omrežja, obujanja ovčereje in ekstenzivnih oblik paše goveda ter drugih motečih vplivov človekove prisotnosti, se je **primernost habitatov** od leta 1966 pa do danes nedvomno poslabšala. Tovrstni negativni trendi se bodo verjetno nadaljevali tudi v prihodnje. Z napredujočo fragmentacijo in degradacijo varovalne funkcije habitatov v osrednjem območju postaja rjavi medved, kljub današnji razmeroma visoki gostoti, **potencialno ogrožena, ranljiva živalska vrsta tudi v Sloveniji. Ohranitev rjavega medveda je zato, razen od primerne varstvene zakonodaje odvisna predvsem od naklonjenosti ljudi in doslednega upoštevanja ekoloških značilnosti vrste na vseh ravneh načrtovanja rabe prostora**. Vsekakor ne smemo pozabiti, da moramo varstveno strategijo ranljivih vrst oblikovati in izvajati že takrat, ko imajo populacije še vse lastnosti vitalnih, samoobnovljivih populacij in ne šele takrat, ko dosežejo **spodnjo kritično raven številčnosti**. Zamujeno reagiranje namreč pogosto pomeni le še kratkotrajen odlog dokončnega lokalnega izginotja vrste.

Zunanje območje razširjenosti rjavega medveda, ki je po površini precej večje od osrednjega, se razteza preko jugozahodnih, zahodnih in severozahodnih delov Slovenije in se navezuje na obmejna območja na južnem avstrijskem Koroškem (Ziljska, Dravska dolina ter severna stran Karavank) in vzhodnem delu Furlanije-Julijske Krajine (Kanalska dolina, Karnijske Alpe, Trbiški gozdovi, Tržaški Kras) v Italiji. To obsežno območje pa po deležu

primernih habitatov in njihovi nosilni zmogljivosti zaostaja za osrednjim območjem. **Glavne smeri koridorjev**, po katerih se izseljujejo živali iz osrednjega območja vodijo proti severu, zahodu in severozahodu. Medvedi, ki iz osrednjega območja potujejo po **severozahodnem** koridorju morajo prečkati ograjeno avtocesto med Vrhniko in Razdrtim. Pri tem izkoriščajo železniške in cestne podvoze in mostove ter prostor pod viadukti, pogosto pa splezajo čez zaščitno ograjo ob avtocesti. O slednjem priča tudi več primerov prometnih nezgod oziroma trkov avtomobilov z medvedi na avtocesti. Le-to prečkajo na stalnih mestih, in to podnevi in ponoči (Alojz Černač, Avtocestna baza Postojna, ustno sporočilo 1992). Na severni strani avtoceste se napotijo proti Nanosu in naprej v Trnovski gozd ali preko Logaške planote, Idrijskega in Cerkljanskega v Jelovico ter od tu v obrobje in osrčje Julijskih Alp ter naprej v Karavanke. Na potovanjih prestopijo tudi državno mejo z Italijo in Avstrijo. O slednjem pričajo opazovanja v obmejnih območjih v Kanalski dolini in okolici Trbiža ter na avstrijskem Koroškem. Iz emigrantov, ki se postopno naseljujejo v obmejnem območju Avstrije, Italije in Slovenije nastaja mikopopulacija, katere obstoj pa je (še) odvisen od kontinuiranih imigracij iz osrednjega območja Slovenije. Živali, ki se iz osrednjega območja napotijo v smeri proti **severu**, morajo prečkati reki Krko in Savo. Nato verjetno nadaljujejo pot čez Zasavsko hribovje v Menino ter naprej proti Savinjskim Alpam. V območju med Jezerskim in Solčavo prestopijo avstrijsko mejo in nadaljujejo pot po Koroški v smeri proti severu in severovzhodu. Posamezne živali, ki potujejo po severnem koridorju zaidejo celo na Pohorje, ali še dlje proti severovzhodu do Prekmurja. Iz starejših podatkov o pojavljanju medvedov v zunanjem območju je očitno, da je bil **severni koridor v preteklosti najpomembnejša smer emigriranja medvedov iz osrednjega območja v Alpe**. Danes je njegova vloga, v primerjavi s severozahodnim in zahodnim koridorjem nepomembna. Vzrokov za to pomensko spremembo ne poznamo. Če torej upoštevamo, da v obmejnem območju med Slovenijo, Avstrijo in Italijo nastaja mikropopulacija rjavega medveda, ki ima kljub svoji današnji majhnosti **visoko ekološko vrednost**, predstavlja namreč mostišče za nadaljnje širjenje medveda v Alpe, je treba pomen funkcioniranja in optimalne prepustnosti koridorjev ocenjevati izključno s tega vidika. Koridorji namreč predstavljajo **zvezo med vitalno populacijo** rjavega medveda v osrednjem območju Slovenije in mikropopulacijo v obmejnem območju in zato sta od njihove prepustnosti odvisna preživetje mikropopulacije in hitrost njenega napredovanja.

Po izračunani oceni živi v Sloveniji med 310 - 390 rjavih medvedov. Kot osnovo za izračun ocene smo uporabili rezultate jesenskega štetja medvedov na krmiščih v celotnem območju razširjenosti vrste. Le-ta smo organizirali v letih 1993, 1994 in 1995 na isti dan (ponoči!) v času oktobrske polne lune, ki omogoča boljšo vidljivost in razločevanje osebkov na krmiščih po velikosti (odrasle živali, istoletni in enoletni mladiči). Vsakoletno štetje so, v sodelovanju s Komisijo LZS za veliko divjad in zveri, opravili terenski sodelavci - člani lovskih družin in uslužbenci gojitvenih lovišč.

Odstrel medvedov v zunanjem območju razširjenosti je v sosednjih deželah pogosto izpostavljen kot glavni vzrok (pre)počasnega širjenja te živalske vrste v Alpe. Dejansko pa je Slovenska lovska organizacija, kljub določilom Odredbe iz leta 1966, ki je dovoljevala celoletni odstrel medvedov v zunanjem območju razširjenosti, z internimi predpisi in dogovori odstrel v zunanjem območju omejevala. Po statističnih podatkih Lovske zveze Slovenije je bilo v obdobju 1977-1992, v širšem območju severozahodnega koridorja odstreljenih le 23 živali oziroma povprečno 1,5/ leto. Večinoma so bile odstreljene le "problematične" živali, ki so večkrat zapored plenile domače živali (ovce!) v istem območju. Take živali bo, kljub citirani Uredbi iz leta 1993, nedvomno treba odstreljevati tudi v prihodnje, v kolikor ne bo možnosti za oblikovanje stalnega finančnega vira za povračilo škode od medveda ter za širšo strokovno organizirano uporabo preprečevalnih sredstev, posebej električnih ograj.

Pomembno motnjo ideji velikopovršinskega varstva rjavega medveda v Sloveniji, pomeni ponoven, **nagel razvoj ovčereje**, posebej oblike proste, nenadzorovane paše v predalpskem in alpskem svetu. Po današnjih grobih ocenah se v Sloveniji že pase preko 45.000 ovc in kakih 15.000 koz. Na celotnem geografskem arealu rjavega medveda so ovce med domačimi živalmi najpogostejša plenska vrsta. Vzroke za to je treba iskati v razširjenosti ovčereje, velikosti čred, načinu paše in nadzora ovc, velikosti živali ter pomanjkanju protiplenilske obrambne strategije. Ponavljajoči se primeri plenjenja ovc na Kobariškem v letih 1994 in 1995, na Pokljuki in

Mežakli v Triglavskem narodnem parku leta 1991 in 1992, na Jelovici, v Zgornji Savinjski dolini, na Solčavskem itn., so resno opozorilo, da je treba ta problem upoštevati v strateških izhodiščih varstva rjavega medveda v Sloveniji. Le-ta je z Uredbo o varstvu redkih in ogroženih živalskih vrst v Sloveniji, od oktobra 1993 v Sloveniji celo leto zavarovan. Odločbe za vsakoletni odstrel izdaja minister za kmetijstvo in gozdarstvo v soglasju s priporočili Komisije za veliko divjad in zveri (trenutno še) pri Lovski zvezi Slovenije.

Varstvo problematičnih živalskih vrst v manj primernih habitatih je praviloma obremenjeno s hipoteko neželjenih stranskih učinkov, ki jih je sicer mogoče predvideti in tudi pravočasno omejevati. Zato pa mora biti varstvena strategija usmerjena **v izboljšanje političnega habitata** oziroma v pridobivanje naklonjenosti lokalnega prebivalstva konkretnim nalogam varstva rjavega medveda. Ob tem je smiselno opozoriti na priporočila skupine Rjavi medved, ki deluje v okviru Delovne skupnosti dežel Alpe-Adria. Priporočila, ki so bila sprejeta na posvetovanju v Ljubljani, 29.-30. junija 1992 in so bila posredovana vladam dežel članic, se nanašajo na konkretne oblike varstva rjavega medveda ter na zaščito habitatov. Med njimi so posebej pomembna priporočila o:

-oblikovanju posebnih **skladov za povračilo škode**, ki jo povzroča medved oziroma, ki bi nastala kot posledica predlaganih varstvenih ukrepov,

-organiziranju **propagandnih akcij**, ki naj prebivalstvo v območjih z rjavim medvedom seznanijo z izhodišči in konkretnim programom varstva ter vzbudijo njihovo sodelovanje pri predvidenih akcijah in spremljavi njihovega učinka,

-pospešeni aktivnosti za **ohranjevanje prepustnosti koridorjev med območji vitalnih populacij in izoliranimi jedri**, s čimer bi vzpostavili fizično povezavo med njimi in možnosti za njihovo postopno zlitje in preprečili genetsko izolacijo ter degradacijske procese v izoliranih (meta)populacijah,

-koordinaciji aktivnosti za **ohranitev rjavega medveda na nacionalni, medregijski in mednarodni ravni**, izmenjavi raziskovalnih dosežkov, itn.

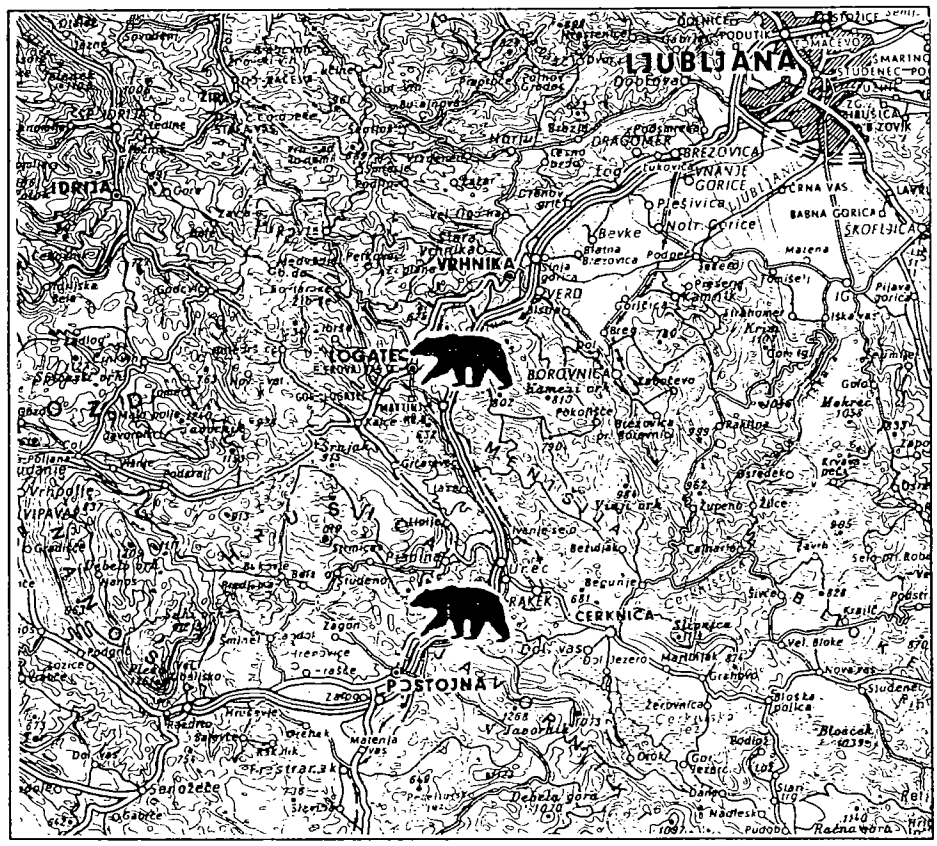
-oblikovanju **skupnih mednarodnih in meddržavnih raziskovalnih projektov** o ekologiji rjavega medveda in možnostih ponovnega širjenja vrste v območja, odkoder jo je izrinil človek.

Varstvo problematičnih vrst, ki zaradi svoje prehranske strategije človeku lahko predstavljajo tekmeca v izkoriščanju istih naravnih virov (rjavi medved nedvomno sodi v to skupino), je lahko uspešno le ob vzpostavljenem soglasju lokalnih prebivalcev glede varstva takih vrst. Varstvena politika, ki ne upošteva potreb in značilnosti lokalnih prebivalcev, je dolgoročno **kontraproduktivna** in še dodatno povečuje odpor do ukrepov v okviru varstva narave. Ker je prihodnost rjavega medveda v Alpah najtesneje povezana s stanjem slovenske populacije v osrednjem območju ter prepustnostjo emigracijskih koridorjev za širjenje v alpski prostor, je treba **partnerje** za skupne varstvene akcije iskati v okviru meddržavnih sporazumov. Varstvo rjavega medveda v širšem alpskem prostoru namreč proži številne **nepričakovane in nezaželjene stranske učinke**, ki lahko resno ovirajo približevanje osnovnemu cilju. Zato tovrstne aktivnosti ne smejo potekati na ravni amaterskih naravovarstvenih skupin, čeprav je njihova vloga vsaj na začetku lahko zelo pomembna. Samo akcijo pa lahko skupaj izpeljejo le državne agencije in raziskovalne institucije ob vnaprej pripravljenih zakonskih in strokovnih izhodiščih. Varstvo problematičnih vrst v evropski kulturni krajini je namreč zahtevna naloga, zato njenega uspeha ne smemo prepuščati naključju.

Kobarid, 20.junija 1996

"EKODUKT" - ZELENI MOST ZA PREHAJANJE RJAVEGA MEDVEDA IN DRUGIH VELIKIH SESALCEV ČEZ AVTOCESTO LJUBLJANA - RAZDRTO

Prof.dr.Miha Adamič, Marko Jonozovič, dipl.ing.gozd., Ljubljana



Ljubljana, oktober 1996

"EKODUKT" - Zeleni most za prehajanje rjavega medveda in drugih velikih sesalcev čez odsek avtoceste Ljubljana - Razdrto.

Zaključno poročilo I. faze projekta

Prof.dr.Miha Adamič, Marko Jonozovič, dipl.ing.gozd.

Izvleček: Avtocesta Ljubljana-Razdrto, zgrajena v 70.letih, je presekala kontinuirane habitate velikih rastlinojedcev in velikih zveri na Dinarskem Visokem Krasu. Številnim vrstam predstavlja ograjena avtocesta ekološko oviro, s katero so bili ustvarjeni novi odnosi med populacijskimi enotami in prekinjena izmenjava genov, drugim, bolj gibljivim pa predstavlja prečkanje ograjene avtoceste povečan rizični dogodek v življenju. Rjave medved, ki brez težav spleza čez ograjo avtoceste je pri tem posebej izpostavljen. Kombinirani ukrepi za preprečevanje nekontroliranega prečkanja avtoceste z električno ograjo, usposabljanje obstoječih mostov in podvozov tudi za prehajanje živali, ter gradnja dveh zelenih mostov, ekoduktov so predlagane možnosti za blažitev učinkov fragmentacije habitatov ter za povečanje prometne varnosti na avtocesti.

Ključne besede: avtocesta, fragmentacija, veliki sesalci, rjavi medved, zeleni most, prometna varnost

1. UVOD

Kot elementi življenjskih skupnosti so prostoživeče živali sestavina krajinskih sistemov, kar pomeni, da živali v njih prebivajo oziroma, da le-ti predstavljajo njihove habitate. Sposobnost gibanja med različnimi sistemskimi enotami omogoča prostoživečim živalim, posebno velikim sesalcem, da izkoriščajo funkcionalne splete habitatov v krajini. Oblikovitost in velikost krajinskih enot ter prehodnost med enotami skupaj opredeljujejo količino in primernost habitatov in zato odločilno vplivajo na sposobnost populacij, da se upirajo pritiskom iz okolja (Oppdam 1990). Populacije večine gibljivih živali naseljujejo različne habitate oziroma njihove splete. Ker naravne sile in človek spreminjajo količino, primernost in dostopnost habitatov, se spreminjajo tudi velikost in dinamika populacij ter vzorec razporeditve v pokrajini. Primernost habitatov v pokrajini torej prostorsko in časovno variira, v odvisnosti od teh sprememb pa se spreminja tudi splošna in vrstno specifična primernost življenjskih razmer za divje živali (Fagen 1988, Pulliam et al 1992). Fragmentacija primarnih, velikopovršinskih habitatov v manjše izolirane krpe (Fowler 1981, Wilcove et al 1986, Stenseth,Steen 1987, Wiens 1990, Oppdam 1991) ter onesnaženost okolja, sodita med najpogostejše funkcionalne motnje, katerim so izpostavljene populacije prostoživečih živali v kulturni krajini. Gradnja avtocest ter drugi večji posegi v prostor, habitate divjih živali prožijo nove pritiske, katerim se lokalne populacije dolgoročno težko upirajo. Ograjena in prometno obremenjena avtocesta brez dodatnih blažilnih objektov, dejansko pomeni težko prehodno ali celo neprehodno oviro za večino terestričnih vrst. Med pritiski na populacije velikih sesalcev in drugih prostoživečih živali, ki jih prožijo prometno obremenjene avtoceste (Adamič 1993a) je potrebno posebej izpostaviti:

-zmanjšanje uporabne površine habitatov, njihovo notranjo fragmentacijo oziroma razpad v izolirane krpe. Populacije v fragmentiranih habitatih razpadejo na manjše (sub)populacijske enote z oviranim medsebojnim komuniciranjem ter pogosto blokirano izmenjavo osebkov (genov!!),

-izvor lokalnega onesnaževanja okolja in degradacije kakovosti habitatov,

-direktno mortaliteto živali zaradi povozov in trkov z vozili.

ZAVOD ZA GOZDOVE SLOVENIJE
OBMOČNA ENOTA LJUBLJANA
KRAJEVNA ENOTA VRHNIKA

RADIOTELEMETRIČNA SPREMLJAVA RJAVEGA MEDVEDA (*Ursus arctos* L.)

Pričavniška naloga

Vrhnika, 1996

Marko Jonozovič dipl.ing.gozd.

KAZALO VSEBINE

KAZALO PREGLEDNIC

1 PREDGOVOR

Pisati o Njih je hkrati lahko in težko. Mislimo, da vemo vse o Njih, a v bistvu ne vemo veliko. Če bi Oni lahko govorili, bi nas hkrati v isti sapi hvalili in grajali; pri nas so živeli od "nekdaj" in si pridobili svojo "domovinsko pravico in državljanstvo", katero bi jim danes marsikdo rad odvzel. Z nami so od malega, za večino so bili prva velika ljubezen še preden je spregovoril, pa vendar niso in ne morejo biti naši hišni ljubljenčki. Za "ljubitelje" živali, kvazi naravoslovce jih je vedno in povsod premalo, za prizadetega rejca živine ali prestrašenega obiskovalca gozdov je eden preveč. Letos so zvezda stalnica in se vedno pojavljajo v vseh medijih, čeprav vse prepogosto z negativnim prizvokom, večkrat radi kaj ušpičijo, tudi kaj zelo neprijetnega.
In vendar so zame in vse tiste, ki jih imamo radi, mogočni in vsega strahospoštovanja vredni.
To so Medvedi, da Medved z veliko začetnico.
In ker jih imamo radi, ker jih spoštujemo, ker so z nami od malega, ker ne morejo govoriti, ker so dobri in malo manj dobri in nenazadnje ker so naši, smo poskušali vgraditi majhen kamenček v mozaik spoznanj o njihovem življenju in navadah, zato, da bodo tudi naši potomci čez nekaj desetletij vedeli kako izgledajo in kaj počnejo, Medvedki in Medvedi. Saj oni so naše naravno bogatstvo.

2 UVOD

Slovenija leži na severozahodnem robu Dinarskega območja rjavega medveda. Gozdovi Kočevske in Notranjske predstavljajo osrednje območje v Sloveniji, manjše lokalne populacije pa nastajajo tudi na Nanoško-Hrušiškem območju, področju Trnovskega gozda in na pogorju Slavnika in Vremščice. Osrednje območje, ki meri okoli 3000 km^2 se funkcionalno navezuje na gozdove v Gorskem Kotarju na Hrvaškem, oziroma skupaj z njim predstavlja enotno Zahodno Dinarsko populacijsko območje s površino okoli 5500 km^2 (Acamič, 1994a), hkrati pa predstavlja tudi Zahodni rob srednjeevropske razširjenosti te vrste in edino vitalno potencialno jedro za ponovno spontano naselitev JugoZahodnih Alp z rjavim medvedom. Gostota medvedov v Gorskem Kotarju je po ocenah (Frković et al, 1987) približno 1 žival / 10 km^2, v osrednjem varovalnem območju medveda v Sloveniji pa je le-ta nekoliko manjša ter se ocenjuje na 0,7-0,8 živali / 10 km^2 (Adamič, 1994b).

Po trenutno veljavni zakonodaji sodi rjavi medved po Uredbi o zavarovanju redkih in ogroženih živalskih vrst v Sloveniji (Uradni list, št 57/93) na Rdeči seznam, med ranljive vrste s posebnim varstvenim režimom.

Zaradi naraščajočih sečenj, gradnje gozdnih cest in vlak, propadanja gozdov, gradnje prometnega omrežja (zlasti avtocestnega), čezdalje večje urbanizacije in zato raznoraznega pritiska ljudi na Naravo ter tudi zaradi "revitalizacije" podeželja in dosedaj zaprtih področij, obujanja ovčjereje in ekstenzivnih oblik paše govedi, se je kumulativa teh pritiskov odrazila tudi na primernost in obstoj življenjskega okolja-habitatov za medveda. Le-ta se je torej bistveno zmanjšala, obenem pa se je kot posledica tega pojavila čezdalje pogostejša slika medveda kot glavnega krivca za vse težave, ki so prepogosto nastale kot posledica nespretnih in nesrečnih političnih odločitev. Posledice takšnega reševanja nasprotij med človekom in velikimi zvermi (v našem primeru z medvecom) pa je zelo pogosto odpor ljudi do sobivanja z njimi. Varovanje in ohranitev problematičnih živalskih vrst, kamor medved prav gotovo sodi, pa je dolgoročno lahko uspešno le, če jim poleg ustreznega naravnega okolja lahko zagotovimo tudi ustrezen "politični habitat", soglasje zlasti lokalnega prebivalstva (Korenjak, 1996).

Vloga znanstveno-raziskovalnega dela kot strokovne podlage za sprejemanje nacionalnih strategij o usodi neke vrste, o življenju ali smrti, pa je bistvenega pomena. Naša radiotelemetrična študija biologije rjavega medveda je zasnovana kot mednarodni projekt in odkriva le del resnice o kralju naših gozdov. Ker imajo podatki pridobljeni s takim načinom dela določeno objektivno težo, v veliki meri so namreč izključeni subjektivni faktorji in ocene, je potrebno s takim delom nadaljevati, ni pa nujno, da ravno z medvedi in ravno na tem območju, kjer proučujemo to vrsto sedaj.

Naše delo, ki je v bistvu zastavljeno iz dveh delov:

1. terenskega dela - pridobitve in odlova "objektov" za raziskavo (medvedov) in radiotelemetrične spremljave osebkov
2. obdelave pridobljenih podatkov s telemetrijo

THE EXPANDING BROWN BEAR POPULATION OF SLOVENIA: A CHANCE FOR BEAR RECOVERY IN THE SOUTHEASTERN ALPS

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Abstract: Slovenia is the northwestern edge of the Balcano–Dinaric brown bear (*Ursus arctos*) population area. A viable population of about 250 bears inhabits a core management area in southcentral Slovenia. A smaller population, established by bears emigrating from the core area toward the northwest, exists in adjacent border areas of Slovenia, Austria and Italy. Interstate cooperation is necessary to further increase brown bear numbers and range of this southeastern alpine population. Preserving main emigration corridors and improving the political habitat for the future welfare of bears in the Alps are among the most important tasks facing bear managers. The problems arising from increased sheep predation by bears in corridor areas, interstate highway construction, and other human influences affecting the spread of bears are discussed.

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Key words: Alps, brown bear, expanding population, Slovenia, *Ursus arctos*.

The Republic of Slovenia is a transition area between the Balcano-Dinaric brown bear range and the Alps. Slovenia represents the northwestern edge of the Balcano–Dinaric brown bear population, which encompasses parts of southcentral Slovenia and the mountainous areas of Croatia, Bosnia and Herzegovina, Montenegro, Kosovo, and Macedonia (Fig. 1). The population also extends south into bear range in Albania and Greece (Mertzanis 1989).

Between 1981 and 1990, the brown bear population in Slovenia was roughly estimated at 250–320 animals by the Slovenian Hunters Association. In the same period, this organization reported 421 bears legally harvested. This data suggests that the population in the western part of the Dinaric area is stable.

Since the brown bear was exterminated in the Alps before the beginning of the 20th century (Roth 1987), the Slovenian bear population is the closest source for bear population recovery in the southeastern Alps. During the 19th century the brown bear was less persecuted on the Slovenian side of the Alps and in the Karavanke and Julian Alps, as was the case in the rest of Europe (Simonic 1994). Immigrant bears from the southeast frequently penetrated the Alps because of preserved habitats in the Balcano–Dinaric population area, the low density of bears in this area, and preserved migration corridors. Although most of these bears were killed by local people, the brown bear never completely disappeared from the Slovenian Alps (Adamic 1994).

The brown bear now holds the attention and sympathies of people in Europe. Great efforts are being made to conserve isolated remnant populations of bears in the Spanish and French Pyrenees, the Trentino area in the Italian Alps, and in Norway. In Austria and France, reintroduction of wild bears into areas of their former range are in progress (Adamic 1994).

MANAGEMENT AREAS

Because of pronounced differences in ecological characteristics, habitat suitabilities, and brown bear densities, 2 different systems of brown bear management were implemented in Slovenia in 1966. An area of about 3,000 km² in southcentral Slovenia was declared a core management area (Fig. 2). About 70% of this core area is covered by mixed Dinaric beech–fir (*Fagetum*

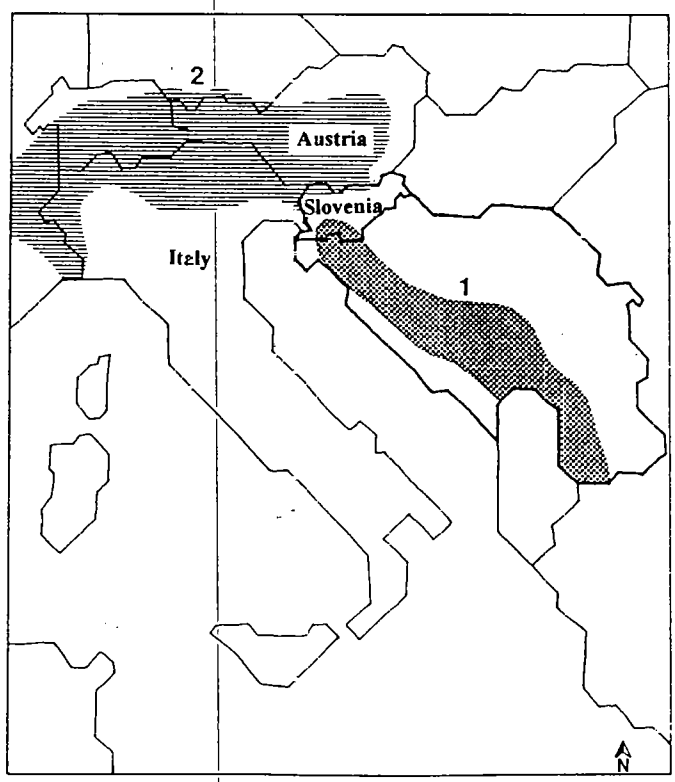

Fig. 1. Relationship between Slovenia as a transition area between the Balcano–Dinaric brown bear range (1) and the Alps (2).

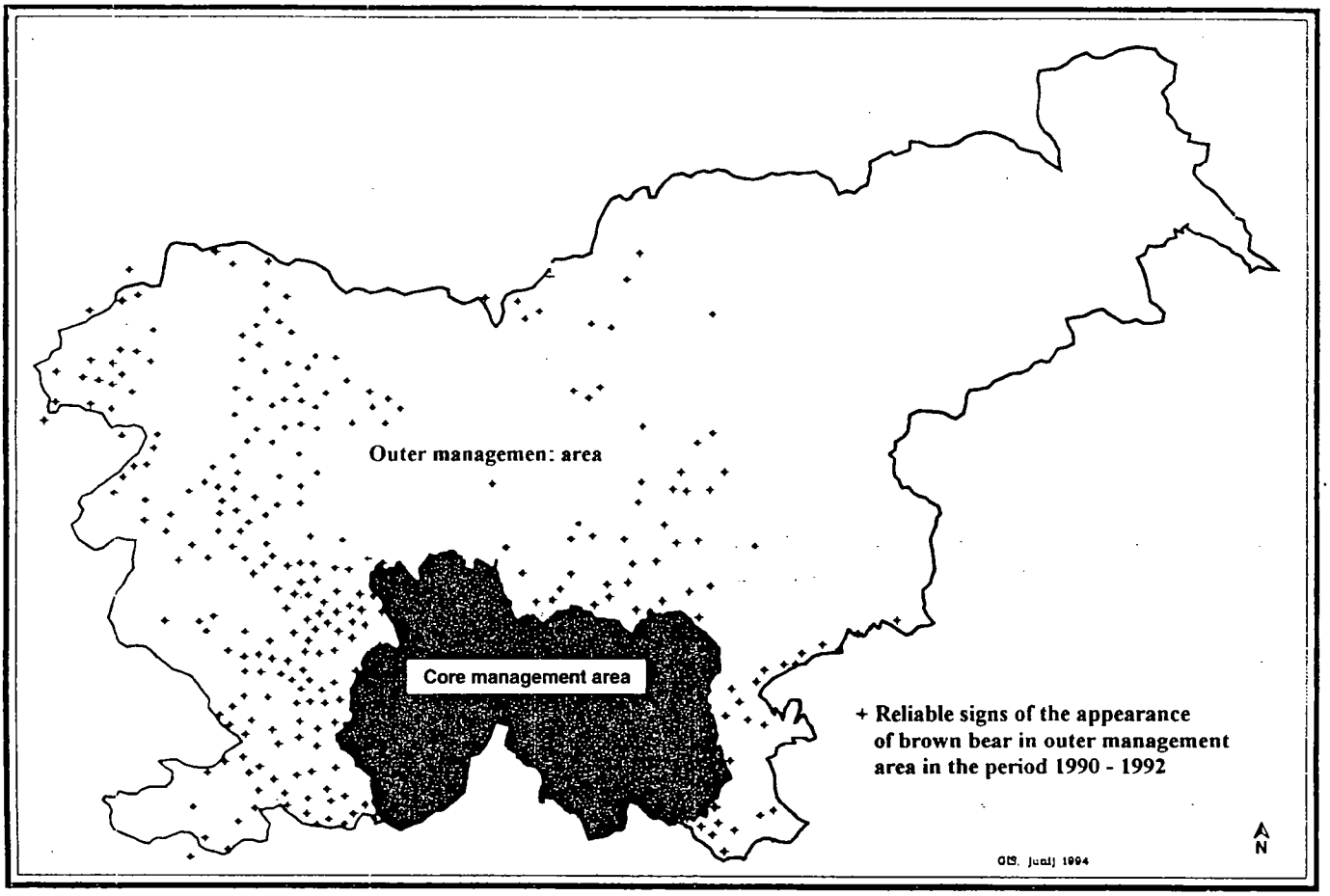

Fig. 2. Brown bear management areas in Slovenia.

dinaricum–Abies spp.) and oak–beech (*Quercus–Fagus*) forests with good feeding and denning sites (Adamic 1990). Most of this core area is sparsely settled or uninhabited by humans (Ciglar 1979). Recent telemetry studies of brown bear movements in adjacent Gorski Kotar in the Republic of Croatia (Huber 1987) demonstrated that areas on both sides of the border represent continuous brown bear habitat covering approximately 5,000 km². It is estimated that 400–450 bears live in this joint area (Adamic 1992). According to the 1976 Act on Hunting in Slovenia (Uradni list SRS 25/76), brown bear management in the core area must include the following: (1) central planning of the yearly harvest and its spatial distribution, (2) regulation of legal hunting methods, including the shooting season (October 1–April 30) and legal hunting weapons and calibers, (3) reimbursement to local farmers for damages caused by brown bears, (4) supplemental feeding at permanent feeding sites, (5) protection of key habitat, and (6) recording data collected on harvested bears into the Central Slovenian Bear Register.

A second area of about 17,000 km² (85% of Slovenia) was designated the outer management area (Fig. 2). The density of bears in this outer area is much lower than that found in the core area. Based on crude estimates, about 10% of the population of Slovenian bears is found in the outer management area, primarily in the northwestern and western region. The main source of bears in this outer population appears to be emigrants that leave the core area and disperse in several directions (Adamic 1990). According to the 1976 Act on Hunting in Slovenia (Uradni list SRS 25/76), brown bears in this outer area were declared unprotected. Members of local hunters clubs were allowed to shoot bears year-round, but the taking of females with cubs was illegal. Bears were unprotected in the outer management area because of frequent bear predation on sheep and cattle and damage to beehives, fruit trees, corn fields, and other crops. Although these damages were promptly reimbursed, local farmers were against protecting the brown bear. Despite its unprotected status, on average only 3 bears were shot annually in the outer area (Fig. 3).

EXPANDING BROWN BEAR POPULATION OF SLOVENIJA CHANCE FOR BEAR RECOVERY IN SOUTHEASTERN ALPS

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Abstract : Slovenija represents the northwestern edge of Balcano-Dinaric brown bear population area. A viable population of about 250 bears live in southcentral Slovenija. A micropopulation of bears in adjacent border areas of Slovenija, Austria and Italy was spontaneously established by the bears, which emigrated from the core area towards northwest. Interstate cooperation is necessary to accelerate the further increasing and extension of southeastern alpine micropopulation. Preservation of main emigration corridors and improving the political habitat for the future welfare of the bears in the Alps are among the most important tasks. The problems arising from the increased sheep-farming and thus elevated bear predation in corridor areas, interstate-highway constructions and other human impacts on further spreading of bears are discussed.

Key words : brown bear, expanding population, Slovenija, Alps.

Republic Slovenija represents the very northwestern edge of Balcano-Dinaric brown bear area, which extends over southcentral parts of Slovenija and mountain areas of Croatia, Bosnia and Herzegovina, Montenegro, Kosovo and Macedonia (Fig. 1). The area is connected with bear range in Albania and Greece (Mertzanis 1989).

The size of brown bear population in Slovenija was roughly estimated to be about 250-320 animals in the period 1981-1990 (source : Statistical Yearbook of the Slovenian Hunters Association, Ljubljana 1992). In the same period (same source) 421 bears have been legally harvested. Following those data, the population in western part of the Dinaric area seems to be stable.

LEGAL STATUS OF BROWN BEAR IN SLOVENIJA

Because of pronounced differences in ecological characteristics, distinct habitat suitabilities and brown bear densities, two different territorial systems of brown bear management in Slovenija have been put on power in 1966 (Fig. 2). The area of about 3000 km^2 in southcentral Slovenija has been declared as core management area. About 70% of it is covered by mixed beech-fir and oak-beech forests with good feeding and denning circumstances (Adamic 1990). The greatest part of the area is sparsely settled or even uninhabited (Ciglar 1979). Recent telemetric studies of brown bear movements in adjacent Gorski Kotar in Republic Croatia (Huber 1987) demonstrated that the areas on both sides of the frontier actually represent the unified brown bear habitat with joint surface of about

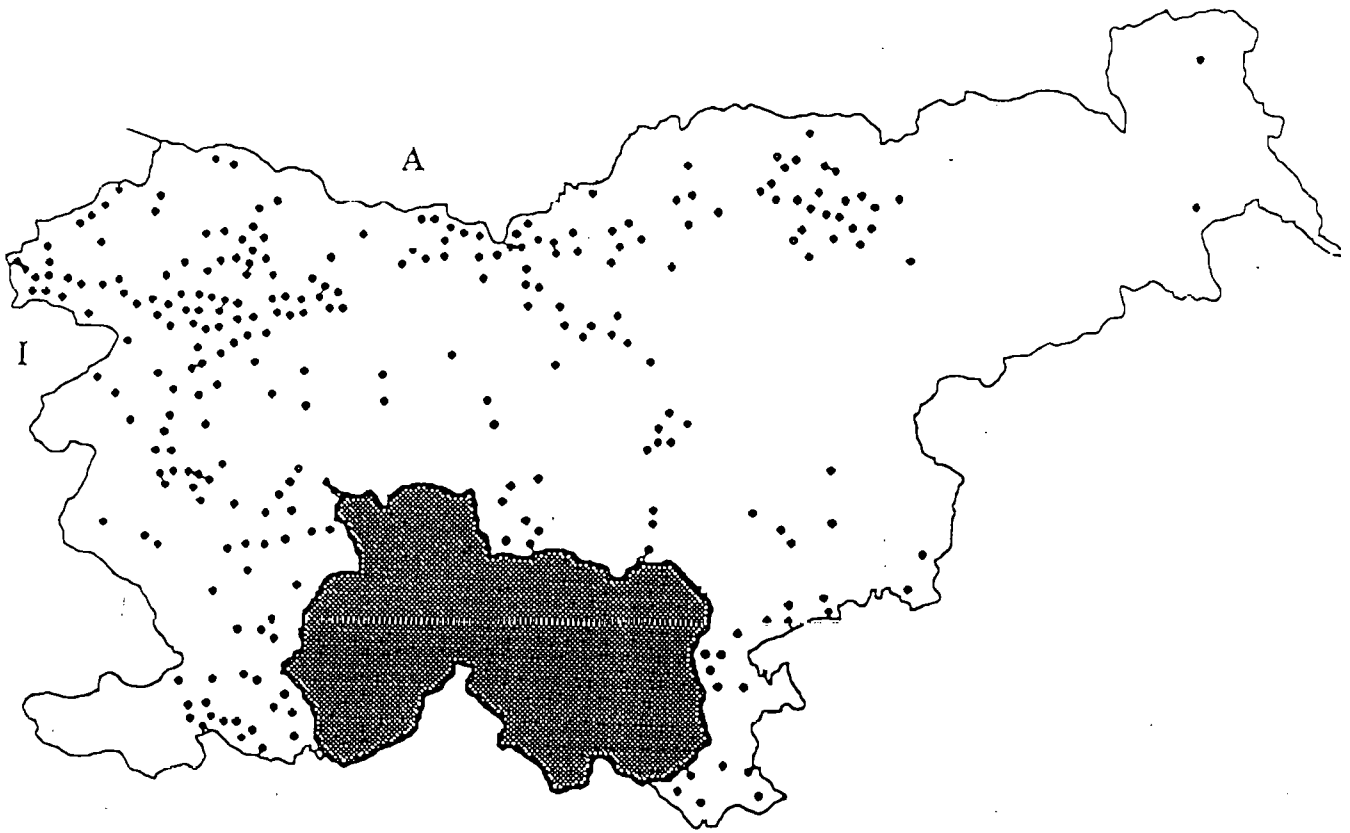

Figure 1. *Brown bear range in Slovenija: core area (shaded), and outer area (dots shoving the areas of bear sightings in the period 1980-1991)*

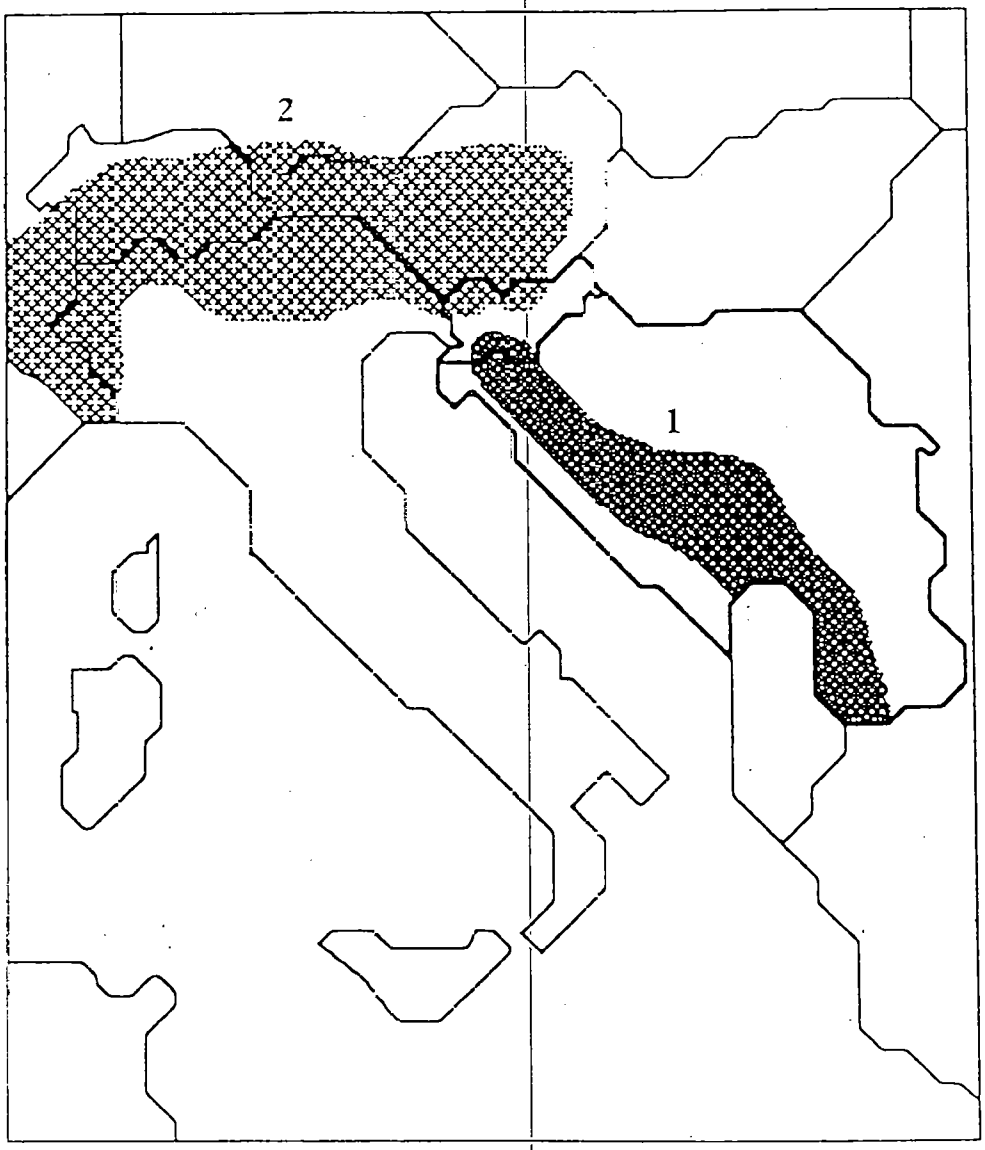

Figure 2. *Territory of Slovenija is in the function of transition corridor between Balcano-Dinaric brown beech range (1) and the Alps (2)*

4500 km^2. 400 - 450 bears are estimated to live in this joint area. By the Act on Hunting in Slovenija from 1976, recent system of brown bear management in core area includes : (1)central planning of the yearly harvest rates, (2) regulations on legal hunting methods, including shooting season (October 1 - April 30), rifle calibres, etc., (3) reimbursement of the damages caused by brown bears to local farmers properties, (4) supplementary feeding on permanent feeding places, (5) protection of key habitat parts, and (6) collection of the data on harvested bears in central bear register.

By the Act on Hunting from 1966, the brown bears in outer area, which covers about 17.000 km^2 (85% of Slovenija), were declared unprotected. The members of local Hunters Clubs were allowed to shoot the bears yearlong, but the culling of females with cubs was illegal also in outer area. The reasons for unprotected status of bears in outer area should be sought in frequent cases of bear predations on sheep and cattle, and damages on bee-hives, fruit trees, corn fields, etc.. Although the damages have been promptly reimbursed, the aversion of local farmers against the protection of brown bear was also an important reason for that. But despite of its unprotected status, only about 1-3 bears were shot in outer area yearly (Fig. 3).

BROWN BEAR DENSITY IN OUTER AREA

The densitiy of bears in outer area is much lower than that in southcentral Slovenija. By crude estimations about 10% of the population of slovenian bears is to be found in it, mostly in the southwestern and western parts. The main source of this outer population represent the emigrants, which leave the core area and extend in several directions (Adamic 1990). Although the cases of bear emigrations from southcentral Slovenija were registered in the periods of low bear density in post-war period (Erzen 1953, Pirc 1954, Svigelj 1961, Amon 1961, etc.), the penetrations of bears into northwestern Slovenija and in neighbour areas of Austria and Italy became more frequent in mid sixties (Anderluh 1972, Bozic 1972, Gaspersic 1973, Perco, Boscagli 1987, Adamic 1987, Strumbelj 1989), increasing simultaneously with the population growth in southcentral Slovenija. When considering specific expanding mechanisms of bear populations (Pulliainen 1983a, b, Rogers 1987), the presence of females with cubs in newly occupied areas is actually the only reliable sign of extension of bear populations (Servheen 1987). Frequent sightings of females with cubs in outer area indicate that the population of brown bear in Slovenija is progressively expanding (Table 1).

period	all signs	sightings	o with cubs	no cubs	litter size
1946-1959	37	25	1 (4,8)	1	1,00
1960-1969	42	39	4 (10,3)	5	1,25
1970-1979	54	52	6 (11,5)	9	1,50
1980-1989	174	124	18(14,5)	31	1,72
1990-1992	62	40	7 (17,5)	14	2,00

Table 1. ***The signs of bear presence in outer area, sightings of females with cubs (% share of females with cubs among sighted bears in brackets) and average litter sizes in the period 1946-1992.***

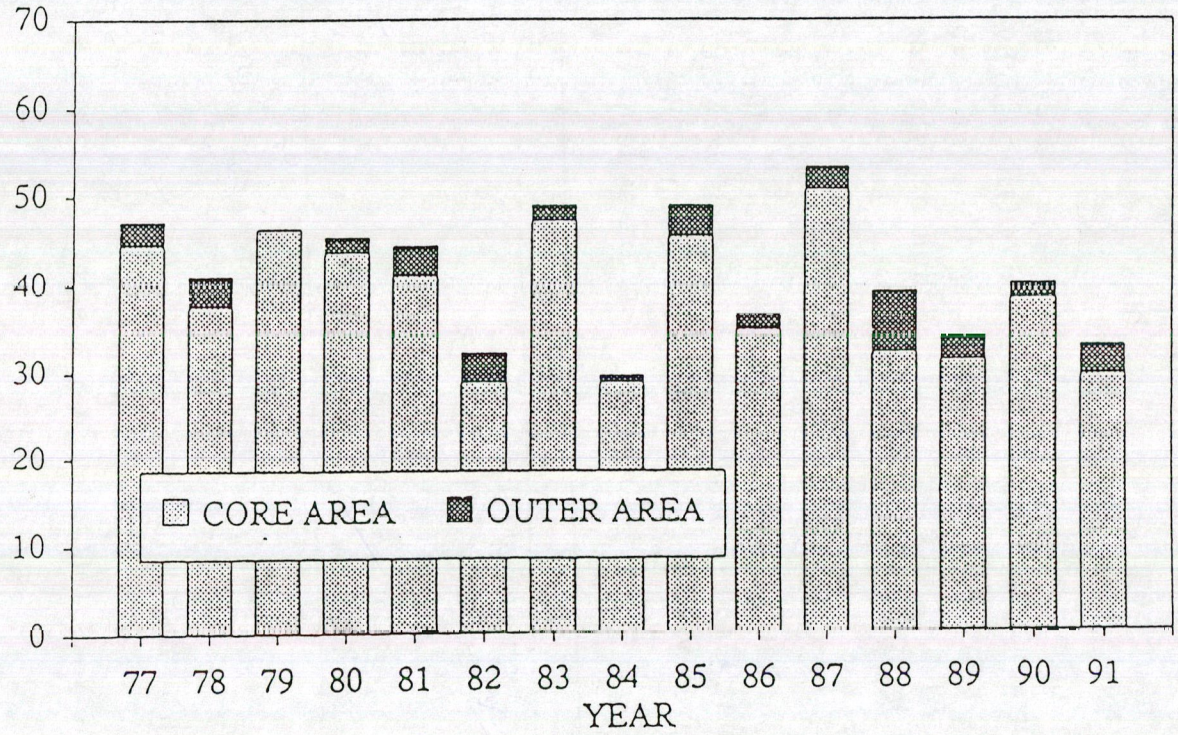

Figure 3. *Brown bear harvest in Slovenija in the period 1977-1991 (total 638): core area (593) and outer area (45)*

BF Odd. za gozdarstvo in obnovljive gozdne vire
Gozdarski inštitut Slovenije
GOZDARSKA KNJIŽNICA
Večna pot 2
LJUBLJANA

Following the recommendations of WWF Conference on brown bear in the Alps, he in 1986 in Trento (Italy), the Hunters Association of Slovenija restricted the shooting of the bears in outer area in 1987. The main reason was to support the transfrontier extension c bears in neighbour areas in Italy and Austria. Since 1990 only problem bears, whic repeatedly attacked the cattle or sheep on open pastures were allowed to be shot. Shooting permissions are given selectively in each single case of bear damages by the Ministry c Agriculture and Forestry of the Republic Slovenija.

Several cases of bear predation on sheep in 1991 in northwestern Slovenija triggered th rising opposition of farmers against the protection of brown bear and other big predators i outer area, although the damages have been promptly reimbursed. During the preparation of the draft of future hunting legislature this aversion, which might seriously affect th efforts for further transfrontier expansion of the species, became very clear.

The important problem which will doubtless affect the further spreading of bears b northwestern corridor is the recent construction of Osimo highways Razdrto-Nova Goric and Razdrto-Koper. Those highways will split the main emigration corridor on two different places. Although the bears skillfuly climb over the fence, they seldom manage t escape the vehicles on the highway and thus often suffer in vehicle collisions. It usuall takes long time after they learn to use safer ways of crossing new barriers on their traditional pathways, which is evident from our former observations on the behaviour o the bears along the fenced highway Ljubljana-Razdrto. Three bear caused accidents took place in 1992 on it. One bear was killed and another two were wounded, but managed t escape. A car driver was also seriously wounded in one of the cases. In 1992 one bear was also killed by train and another by car on the motorway Idrija-Gorica (Table 2).

date	area	cause	fate of the bear
May, 02	highway (Unec)	car	wounded (escaped)
May, 21	motorway (Idrija)	car	killed (female 55 kg)
May, 25	railway (Divaca)	train	killed (female 30 kg)
July, 16	highway (Logatec)	car	killed (female 49 kg)
August, 17	highway (Logatec)	car	wounded (escaped)

Table 2. ***Registered bear-traffic collisions in outer area in 1992.***

Traffic-caused bear mortalities in Gorski Kotar in Croatia were studied by Frkovic et al (1987). The authors stressed the problems of increasing bear mortality, emerging from highway and railway constructions in bear habitats.

CONCLUSIONS

What will be the future fate of brown bear in Slovenija is yet unclear. Despite of moderate hunting pressure and negative environmental impacts triggered by man, the population dynamics of the bear in Slovenija is not yet seriously affected (Berce, Strumbelj in press). But despite of it, brown bear has been declared as vulnerable species in the recent Red list of mammals of Slovenija (Krystufek 1992).

The planned highway and railway corridors which have to be built in Slovenija in next 15 years represent serious threat for future status of brown bear in core area, and especially for its future expansion. The future conservation strategy of brown bear in Slovenija should therefore include : (1) protection of key habitats in core area, (2) preservation and improving of natural food sources, (3) supression of hunting mortality, (4) education of local people in the sense of better cohabitation with the bear and (5) taking in consideration the bear presence in spatial planning operations on statewide levels.

The public attitudes are of crucial importance for the survival of vital bear population in Slovenija. Being actually the only existing source population (Pulliam, Danielson 1991) for the spontaneous return of the bear into Alps, its protection is thus also of international importance. We hope that our ideas on the future conservation of the brown bear will be accepted and supported also on the international level.

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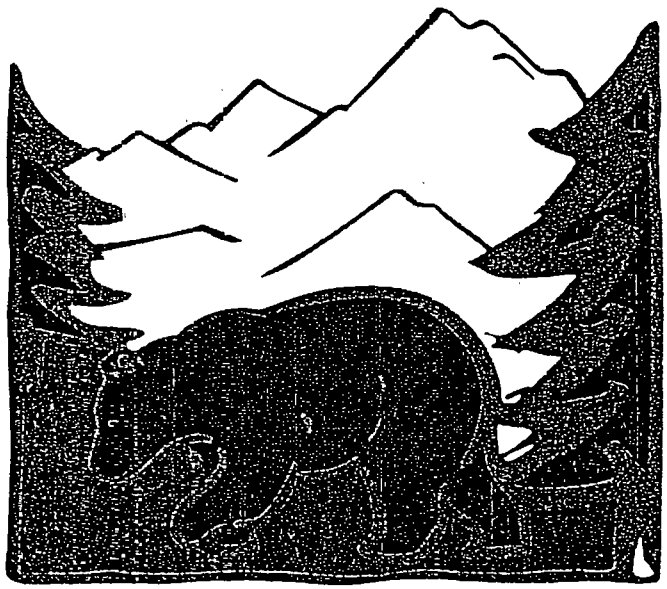
COMPTE RENDU DE LA IX[e] CONFÉRENCE INTERNATIONALE SUR LA CONNAISSANCE ET LA GESTION DES POPULATIONS D'OURS

GESTION ET RESTAURATION DES PETITES POPULATIONS ET DES POPULATIONS RELIQUES D'OURS



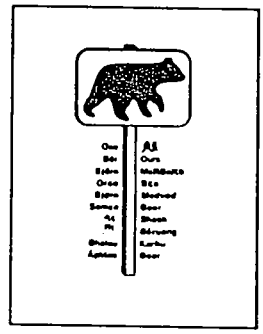
PROCEEDING OF THE NINTH INTERNATIONAL CONFERENCE ON BEAR RESEARCH AND MANAGEMENT

MANAGEMENT AND RESTORATION OF SMALL AND RELICTUAL BEARS POPULATIONS

Colloque organisé du 19 au 22 octobre 1992 à Grenoble par le Ministère de l'Environnement et le Museum d'Histoire Naturelle de la ville de Grenoble en collaboration avec le Parc Naturel Régional du Vercors.

En liaison avec

L'Association Internationale
pour la Recherche et la gestion des Ours



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M.C. Saint Girons †

Ce compte rendu est dédié à la mémoire de Monsieur Bourlière et de Madame Saint Girons, aujourd'hui décédés, pour qui cette conférence était une importante contribution à la connaissance et à la conservation des mammifères et de l'ours en particulier.

Conference organized by french Ministry of the Environnement and the Natural History Museum of Grenoble City (France) in collaboration with the Regional Nature Park of the vercors.

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These proceedings are dedicated tothe memories of late professor Bourlière and Madame Saint Girons, for whom this conference was of very high interest for the knowledge and conservation of mammals, especially bears.

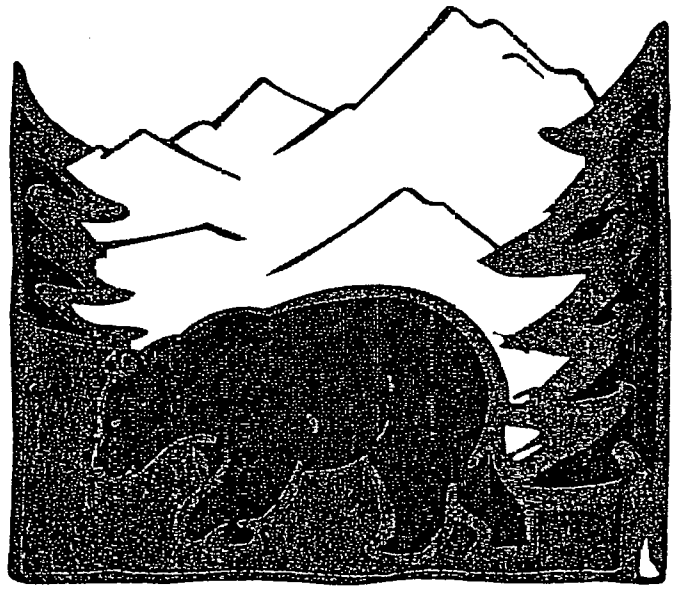
Conseil Général de l'Isère

MINISTÈRE DE L'ENVIRONNEMENT

Office National des Forêts

COMPTE RENDU DE LA IXe CONFÉRENCE INTERNATIONALE SUR LA CONNAISSANCE ET LA GESTION DES POPULATIONS D'OURS

GESTION ET RESTAURATION DES PETITES POPULATIONS ET DES POPULATIONS RELIQUES D'OURS



PROCEEDING OF THE NINTH INTERNATIONAL CONFERENCE ON BEAR RESEARCH AND MANAGEMENT

MANAGEMENT AND RESTORATION OF SMALL AND RELICTUAL BEARS POPULATIONS

MITOCHONDRIAL DNA POLYMORPHISM IN EUROPEAN BROWN BEAR POPULATIONS

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Abstract: Some small European populations of the brown bear *(Ursus arctos)* are threatened by the possibility of extinction in the near future. The reinforcement of these populations with bears from another origin could be a possible solution to avoid extinction. Before any population transfer, the phylogeography of the European brown bear must be known. Using hairs as a source of DNA, 269 base pairs of the mitochondrial DNA control region were sequenced for 41 individuals from most of the European populations. A genetic break separates the Romanian, Russian and Lapland bears from the other European populations (d = 7.5 %), which are differentiated into three main lineages: (i) populations from the Pyrenees and the Cantabrian Mountains, (ii) populations from Trento, Abruzzo, Slovenia, Croatia and Bosnia, (iii) populations from South Scandinavia. Therefore, bears from Romania, Russia or Lapland are not suitable for the reinforcement of other European populations. We also suggest that bears belonging to the three main European lineages should not be mixed.

Key words: brown bear, hair, intraspecific phylogeography, mitochondrial DNA, polymerase chain reaction, population translocation, *(Ursus arctos)*.

In Europe, the brown bear exhibits a patchy geographical distribution (Sorensen, 1990). Some of these small populations face the threat of extinction in the near future. This is the case for the Pyrenean population which, according to recent estimates, consists of only 9 to 13 individuals, and for the Trento population which may number less than 10 individuals (Höss et al. 1992). One possible solution to avoid extinction is to reinforce these small populations with bears from another origin. However, before any population transfer, the precise intraspecific phylogeography of the European brown bear must be known: the eventual introduction of genetically different bears into an endangered population may cause, via hybridization, the permanent loss of the genotypes that have to be preserved.

The fact that mitochondrial DNA (mtDNA) sequences of mammals evolve rapidly (Brown et al. 1979, 1982) has been widely used to resolve problems of conservation biology (Laerm et al. 1982, Avise and Nelson 1989, Bowen et al. 1991, Wayne and Jenks 1991). The study of mtDNA sequence variations could indeed clarify the intraspecific phylogeography of European brown bears (see reviews on mtDNA in Wilson et al. 1985, Avise 1986, Avise et al. 1987, Moritz et al. 1987, Harrison 1989) and therefore could assist in the choice of origin of bears to be introduced into a threatened population.

The capture of wild bears to obtain tissue for genetic analysis entails risks and disturbance, while the use of animal from zoos may be problematic due to uncertainties as to the bear's true origin. The sampling problem can be in part overcome by using the polymerase chain reaction (PCR). This technique was first discovered in 1985 (Saiki et al. 1985), however, it was not widely used until the discovery of a thermostable polymerase: Taq polymerase (Saiki et al. 1988). Using a very small amount of DNA, it is possible to amplify one million-fold a target sequence which may contain up to several hundred base pairs (reviews in White et al. 1989, Erlich et al. 1991). Higuchi et al. (1988) used human hair roots for genetic analysis. Similarly, we have recently demonstrated that hairs collected in the field are a potentially valuable source of DNA for bear genetic studies via the polymerase chain reaction (Taberlet and Bouvet 1992).

In this paper, we present the results of our investigations concerning mtDNA polymorphism among several European populations of brown bear. Management implications are deduced and discussed in the light of the phylogeography of these populations.

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MATERIAL AND METHODS

Sampling

Only hairs from wild, captive, or killed animal were used as a source of tissue for the genetic analysis. Hairs were preserved either in 70% alcohol, or dry in paper envelopes. (Table 1) gives the origin of at least 41 individuals included in this study.

number of individuals	country	region	collector name	genotype
3	France	Pyrenees	J.J.. Camarra	Pyr
			C. Plisson	
			G. Caussimont	
			H. Laborde	
			M. Clemente	
			J. Herrero	
2	Spain	Cantabrian Mountains	G. Palomero	Spa
			A. Fernandez	
4	Italy	Abruzzo	G. Boscagli	Abr
			H. Roth	
			L. Gentile	
1	Italy	Trento	F. Osti	Slo
8	Slovenia		M. Adamic	Slo
			D. Huber	
1	Croatia		A. Frkovic	Slo
1	Croatia		D. Huber	Cro
2	Bosnia		D. Huber	Slo
7	Sweden	Dalarna	R. Franzen	Lap
2	Russia	Karelia	P. Danilov	Lap
1	Romania		N. Lestienne	Ro1
2	Romania	Covasna	L. Kalaber	Ro2

Table 1. ***Geographical origin of the bears studied. We have analysed 6 hair samples from free ranging bears in the Pyrenees. They gave exactly the same mtDNA sequences, and based on field data we can conclude that these six samples originate from at least two bears. For explanations concerning genotypes, see text and Table 2, Table 3, Figure 2.***

Laboratory Procedure

Total DNA was extracted from the root part of hairs as described for humans by Walsh et al. (1991). Approximately 2.5 % of the total DNA extract was used as template in the polymerase chain reaction. Two nested sets of primers (Figure 1) were used to amplify a portion of the mtDNA control region (D-loop). 40-45 cycles were performed, each of which consisted of denaturation at 93 °C for 60 s, annealing at 50 °C for 60 s, and extension at 72 °C for 60 s. The PCR product was then purified on low-melting agarose gel as described by Kocher et al. (1989), and used as template for an asymetric PCR (Gyllensten and Erlich 1988) to generate single-stranded DNA suitable for direct sequencing after the elimination of excess nucleotides and primers using an Ultrafree-MC

AN EXPANDING BROWN BEAR POPULATION IN SLOVENIA: CURRENT MANAGEMENT PROBLEMS

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Abstract: Current strategy for the conservation of brown bears (*Ursus arctos*) in Slovenia was adopted in 1966. A combination of harvest regulations, protection for females with young, and supplemental feeding appeared to stimulate population growth and range expansion from a core area in southcentral Slovenia northwestward into former habitats in the southeastern Alps. From 1967–93, more frequent sightings and predation incidents contributed to concern among human residents about the presence of bears in the newly colonized habitats. Recent efforts to improve management of the expanding brown bear population are discussed.

Key words: brown bear, conservation strategy, emigration, management, precation, Slovenia.

J. Wildl. Res. 1(3): 297–300

INTRODUCTION

The vast forests of southcentral Slovenia are inhabited by a population of 310–390 brown bears (manuscript in preparation). The area is contiguous with similar terrain in Croatia, forming a nearly unbroken block of occupied bear habitat. While preservation of this landscape as a network of natural parks and reserves has been proposed, government agencies and local political interests are now pressing to revitalize farming in the sparsely settled region. It is likely that expanded farming will threaten not only brown bears, but also the wolves (*Canis lupus*) and lynx (*Lynx lynx*) that occur in this unique and valuable area.

Of particular concern is the creation of livestock pastures within the extensively forested environment of the region. For example, only about 1% of Kocevski Rog, a mountain ridge of about 200 km^2 in southcentral Slovenia, is presently occupied by sheep farms. Experience reveals that converting additional forests to domestic sheep pastures is certain to attract predators from the surrounding forests. As a result, the farming activity on a small part of the landscape holds potential for impacting brown bears throughout the region. In turn, a reduction in the human acceptance capacity for the bears is likely to occur (Decker and Purdy 1988).

Timber extraction may add to the negative impacts anticipated from sheep farming. Kosir et al. (1989) reported that from 1980–89, 2,809 km of roads were built in Slovenia, most of which were within the southcentral beech-fir forests. These forests represent a core habitat from which brown bears are currently expanding their range southwest into the young forests of the Littoral Karst (Adamic 1986) and northwest into the Alps. Through increased bear mortality, new forest roads, encroaching settlements, farming activities, and human encounters reduce the potential for the core area to serve as a critical source for emigrating brown bears in central Europe.

STRATEGIES FOR THE CONSERVATION OF BROWN BEARS

Brown bears are an important part of the national heritage of Slovenia. In addition, the viable status of the indigenous population extends this special value to other countries in central Europe. National conservation strategy is therefore focused on the maintenance of a biologically viable and ecologically functional population, one where excess natality leads to both replacement of unnatural mortality and emigration (Samson et al. 1985, Belovsky 1987, Ewans et al. 1987, Conner 1988, Koenig 1988).

Given the productive nature of the Slovenian brown bear population, we propose that conservative management will ensure the persistence of the species even under increasing pressures in key habitats. In fact, the current level of productivity seems to allow for moderate hunter harvest as well as management removals to help restore populations in other habitats of central Europe. At the same time, emigration among the remaining surplus of bears would be encouraged.

In Slovenia, a brown bear core conservation area with a functional range of about 3,500 km^2 was established in 1966 (Fig. 1). Creation of the core area at that time was visionary not just for Slovenia but for all of Europe. Unfortunately, there were no simultaneous limitations on human activities such as forest cutting, farming,road construction, and the opening of former military reserves to public access. And as these activities increase and perhaps accelerate, progressive harm is anticipated for the large predator habitats of Kocevje.

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Table 1. Analysis of 62 bear attacks on sheep in prealpine and alpine habitats adjacent to the core conservation area in Slovenia.

Size and type of pasture	No. of Registered cases of predation	Median No. of killed sheep/1 attack	Total No. of killed sheep	Range	
				Min.	Max
Community, Pasture unguarded	37	2.0	88	1	7
Medium sized, enclosure 2–10 ha	15	5.0	66	1	9
Small sized, enclosure < 1 ha	10	11.0	146	6	52
TOTAL	62	3.0	300	1	52

In view of the potentially destructive impacts of current and planned human activities in southcentral Slovenia, a formal strategic plan for improved brown bear conservation was proposed (Adamic 1994). It emphasized extension of the existing core bear area of about 3,500 km^2 into both the northwestern Dinarics and the southwestern Littoral Karst (Fig. 1). The proposed changes added 1,800 km^2 to the existing core area and thus created a new brown bear conservation area with total surface of about 5,300 km^2 in Slovenia. All current management programs, including supplemental feeding and harvest control would extend to the larger area.

An additional important step in regional bear conservation is restoration of the former cooperative management plan for the border area of Slovenia and Croatia. A cooperative effort with a focus on brown bear habitat would result in joint management for a 7,100 km^2 area; 5,300 km^2 in Slovenia and 1,800 km^2 in Gorski Kotar, Croatia (Huber and Roth 1986, Frkovic et al. 1986, Huber 1987). A Joint Slovenian-Croatian Bear Conservation Area (JSCBCA) would provide enough space for a population of about 500 bears (projected acceptance density of average 7 bears/100 km^2), assuming effective management of human activities within the area. Establishment of a functional JSCBCA follows the concept of a Fenoscandian Reserve proposed by Mysterud and Muus-Falck (1989) and would require support from the European Community if its potential role in international brown bear conservation is to be fully realized.

STATUS OF EMIGRANT BEARS IN THE ALPS

An unresolved part of the proposed conservation strategy is the future status of brown bears beyond the boundaries of the new core area. In 1993 the Ministry of Culture issued the Act on the Protection of Endangered Species (UL. RS 57/93). The Act protects brown bears in these peripheral habitats and the Ministry of Culture is responsible for reimbursing farmers and landowners for damages caused by the species. Only those bears that repeatedly prey on sheep or cause significant property damage may be killed by special shooting permission. Unfortunately,evidence indicates that even where bears densities are low, livestock predation and property damage are often increasing. More surprisingly, the few emigrants reaching the Alps are also causing problems, thus raising questions about the ability of the Act to provide for brown bear conservation.

Domestic sheep are the main target of bear attacks, although cattle are also taken where poor pasturing practices encourage predation by wildlife. There are several possible explanations for increasing bear predation on sheep. For example, the bears are extending their foraging and denning to yearlong use of alpine habitats where foraging opportunities are poor at times. Sheep owners are not accustomed to this new challenge and have been reluctant to change traditional pasture regimes. Even where devices such as electric fences have been used, standards required to deters bears have not been applied, thus limiting their effectiveness. And finally, it is not unusual to find small enclosure improperly fenced and guarded at night. Table 1 and Figs 2–4 characterize bear predation in the prealpine and alpine areas of Slovenia.

While brown bear recovery in the European Alps is of international interest, recent efforts toward that goal seemingly have less than a realistic chance for success in the Slovenian Alps. This bleak outlook results from a human culture that emphasizes a tradition of community pastures where contemporary methods are not used to keep predators from their livestock. Instead, local farmers simply continue to oppose the permanent presence of brown bears and other predators just as they have done in the past.

Effective methods for preventing brown bear predation include electric fences, especially those with a current potentia'

Fig. 1. Current range (est. in 1966) and proposed extension (1994) the conservation management area for brown bear in Slovenia.

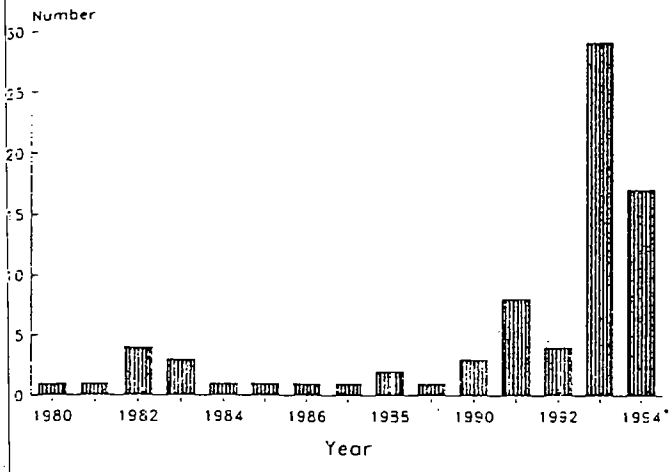

Fig. 2. Registered cases of brown bear predation in Slovenia in outer area in the period 1980 — August 1994. Total = 77 cases.

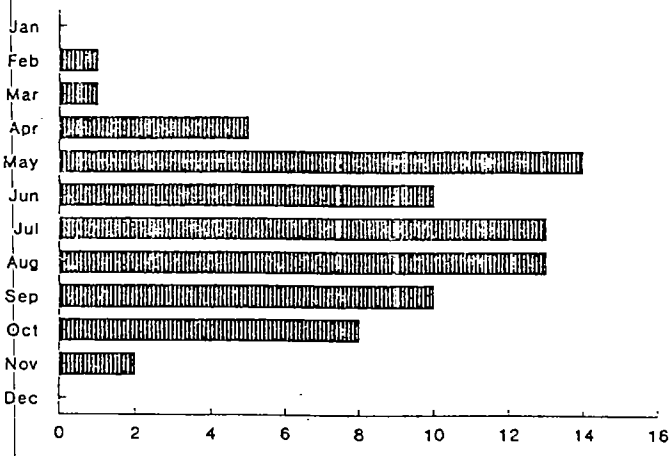

Fig. 3. Monthly distribution of 77 registered cases of brown bear predation in subalpine and alpine area of Slovenia.

greater than 4,500 volts. However, when the State offered to provide both fencing and guard dogs to farmers near Dreznica in northwestern Slovenia, they refused assistance and asked that the offending bear be killed. A permit was issued but local hunters were not successful in removing the bear, suggesting that problems were likely to continue.

There is some evidence that the traditional aversion of local people toward bear predation may actually be increasing, even where they are compensated for their losses by the government. One example is the pastureland near the Austrian and Italian border where frequent bear predation resulted in protest petitions written by the farmers of Tolminsko and Slovene Carinthia. The petitions reached a variety of interest groups, effectively thrusting the bear predation issue into the political arena. As a result, even the few bears emigrating to new habitats threaten the proposed conservation strategy (Adamic 1993, 1994) and may ultimately cause rejection by Parliamental Commissions.

The issue of permission to shoot individual problem bears contributes to the conservation dilemma in northern Slovenia. Since predatory bears generally fear local people, direct removal seems unwise if the management advantage of avoidance behaviour is to be maintained in the colonizing population. Interventions in this process, triggered by the European Parliament Resolution A3–0154/94, April 22, 1994, present insufficient arguments for single problem bears to be tolerated in the areas of alpine pastures.

Until recently, the State of Slovenia and Slovene Hunters Association cooperatively funded the reimbursement of farmers for bear predation damages. However, a lack of additional regional and international funds is often used as an argument by those opposed to further expansion of brown bears in Slovenia. This lack of fund does, in fact, impede implementation of preventative management such a electric fences, guard dogs, protective herders, and scare devices. Perhaps even more important are lost educational opportunities which in many respects shape the future of brown bear conservation. Funding support was a major reason for preparing and proposing the brown bear conservation strategy to the Commission of the Ministry of Culture of Slovenia.

CONCLUSIONS

New conservation strategies, based on conservation biology and landscape ecology (Oppdam 1990, Wiens 1990, Hansson and Angelstam 1991), are required for the preservation of biodiversity that includes a viable populations of brown bears and other large predators in Slovenia. In that sense, existing and planned national parks and reserves should be declared as conservation centres that are functionally linked to surrounding landscapes and large enough to provide for the habitat needs of indigenous predators. Within these conservation areas, human use should be zoned and activities limited to those friendly

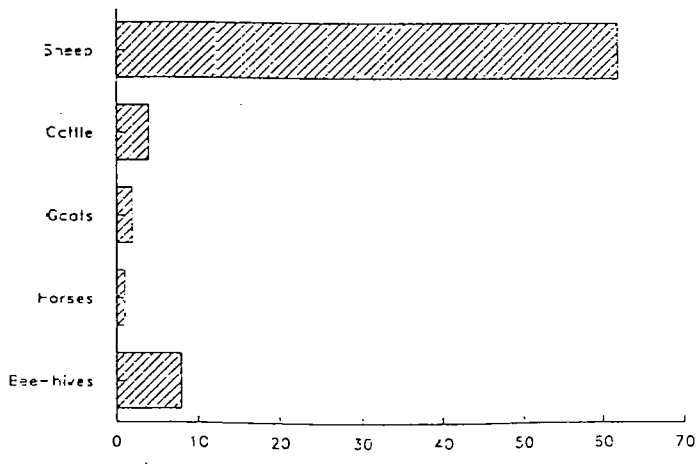

Fig. 4. Targets of 77 registered cases of brown bear predation in subalpine and alpine area of Slovenia in the period 1980–1994.

toward the large predators. The following goals are proposed:

1. Preservation of diverse forest habitats in the conservation area, especially those surrounding the natural parks and reserves, but also those near new predator population centres.

2. Establishment between Slovenia and Croatia of a cooperative conservation strategy for brown bears and other large native predators.

3. Planning for a sustainable natural resource economy that includes timber extraction, livestock farming, human activities, and viable predator populations.

4. A harvest strategy based on population facts that limits the number and distribution of brown bears to designated conservation areas.

5. Obligatory use of state granted anti-predator protection devices on sheep pastures and other areas frequented by brown bears and other large predators.

6. Direct removal of problem bears which repeatedly prey upon domestic animals, enter human settlements, or pose threats to human live.

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THE LJUBLJANA-POSTOJNA HIGHWAY — A DEADLY BARRIER FOR BROWN BEARS IN SLOVENIA?

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Abstract: Since the opening of the Ljubljana-Postojna highway in 1972, nine bears have been hit by cars. To evaluate the impact of the highway on brown bear movements we monitored six radiocollared brown bears (*Ursus arctos*) between spring 1993 and fall 1994. For two adult females and an adult male the highway clearly represented the home range boundary. Only the male crossed once for a short trip during the mating season. Of the three subadult bears two dispersed: a male probably without hitting the highway and a female crossing the highway three times. In addition to telemetry, sandbeds were used over a two month period on three bridges and in three tunnels on a ten kilometer stretch along the highway. Five crossings of unmarked bears in two tunnels were documented. During the study period there was a minimum of ten successful crossings, but also one male was killed very close to a viaduct. The highway seems to be a barrier that is rarely crossed by resident bears but still might be crossed several times a month by "trespassing" bears. The more fragmented the landscape and the smaller the bear population, the more important it will be to provide attractive and save bear crossings ("green bridges") and at the same time prevent bears from crossing elsewhere.

Key words: barrier, brown bear, gene flow, "green-bridge", home range, road mortality, Slovenia, *Ursus arctos*

J. Wildl. Res. 1(3): 263–267, 1996

INTRODUCTION

The 300–400 bears living in Slovenia are of great international interest. This population is the only source for a natural recolonization of the Alps. To enhance dispersal northward, Slovenia changed its bear management practice in 1992. Bear management (quota hunting, feeding) is still restricted to the 3.500 km^2 "core area" in southern Slovenia, but outside this area bears are not shoot any more, but fully protected.

Dispersal corridors still exist, but are cut through by several major roads, one being the Ljubljana-Postojna highway (Adamič 1994). This highway is fenced but the fence does not pose a serious obstacle to bears. Since its opening in 1972, nine bears have been hit by vehicles. The problem will worser in the future. Presently an extension of the Ljubljana-Postojna highway is under construction, cutting again through the main dispersal corridor (Fig. 1).

Every bear reaching the Alps will be confronted with an other net of state roads and highways. Two bears have already been hit, one in 1989 in Italy and one 1994 in Austria. Because suitable bear habitat is fragmented in the Alps, the successful re-establishment of brown bears will only be possible in form of a metapopulation. Dispersal of bears between subpopulations will be crucial and has to be secured — roads will be one major obstacle to deal with (Lehmkuhl 1984).

Most studies looking at the impact of roads on wildlife have been on small carnivores (Camby and Maizeret 1985) or ungulates (Reed 1981). For these species, first steps have been taken to reduce mortality and allow exchange between populations, by providing "green bridges": roads are fenced and wide bridges or tunnels covered with natural vegetation provide the only but safe opportunity for crossing (Roth and Klatt 1991). When construction and location are suitable "green bridges" are well accepted by wildlife. First steps in this direction have been taken in Florida. On the Orlando beltway, where there have been multiple black bear (*Ursus americanus*) accidents, a crossing is presently built and tested for its efficiency (Wooding 1990).

On the Ljubljana-Postojna highway no "geen bridges" exist but ocasionally, bears have been observed using regular bridges and tunnels. However no data is available on where and how often what bears cross the highway. In this paper we provide the first results on the impact of the Ljubljana-Postojna highway on movement patterns of resident and dispersing bears followed by radiotelemety. In the following we discuss the meaning and impact on the bear population and propose measures reducing negative highway impacts.

Table 1. Bears monitored from May 1993 to September 1994.

Bear	Start monitoring	End monitoring	Age at capture	Radiolocation	Locations/week	Home range[a] (km^2)	100% polygon (km^2)	Loc. close to highway[b]
F1	04.05.93	29.10.93	1	49	1.9	57	57	23
F1	24.03.94	continuing	2	41	1.6	120	120	0
F2	24.03.94	continuing	13–14	67	2.5	56	56	19
F3	23.04.94	continuing	4	61	2.7	67	98	4
M3	25.03.94	31.05.94	1	30	3.1	30	30	8
M4	28.03.94	continuing	2–3	5	0.2	—	—	0
M6	07.04.94	continuing	adult	55	2.2	160	398	2

[a] minimum convex polygon excluding single, long distance excursions; [b]number of locations (loc.) within <1 km of the highway.

Funding was provided by the Austrian Federal Ministry of Science and Research (project: Lynx/Bear — Austria/Slowenia), additional funding came from the Slovenian Hunters Association, the Munich Wildlife Society, and the University of Munich. We thank B. Krze for his tireless commitment to the bears and our work. A. Zrimec, G. Bolcina, R. Bürglin, T. Meze and several students gave valuable assistance with fieldwork, the hunting clubs of Hotedrsica, Logatec, Rakek and Borovnica provided permission and assistance for bear trapping, and the military station on Ljubljanski Vrh monitored our trap transmitters. Without all that help, this project would not have been possible. For the preparation of this paper, we thank I. Storch for her valuable comments on the manuscript and G. Schwab for his help with the illustrations.

STUDY AREA

The study area is located about 20 km SW of Ljubljana, the capital of Slowenia (Fig. 1). This area was chosen because: (1) it is part of the bear "core area" (high density bear population for successful trapping), (2) it is on the main dispersal corridor for bears towards the Alps and (3) the Ljubljana-Postojna highway cuts through.

Geologically it is part of the Dinara Mountain Range, stretching from Slovenia into Macedonia. The relief shows typical karst phenomena, dolines, caves and shallow soils. Elevations range from 300 m to 1,500 m. Annual precipitation is 1.500 mm, snow cover lasts for 50–70 days and yearly temperature averages 7–8°C.

Bear habitat consists of mixed, uneven aged forests. The dominant tree species are beech (*Fagus silvatica*) and fir (*Abies alba*), intermingled with varying amounts of spruce (*Picea abies*), maple (*Acer pseudoplatanus*) and elm (*Ulmus* spec.). Due to single tree harvest management, density of forest roads is high (20 m per ha). Access to roads is almost unlimited.

METHODS

We caught bears using Aldrich foot snares (Jonkel 1992) a established bait sites, normally used for hunting. Snares were

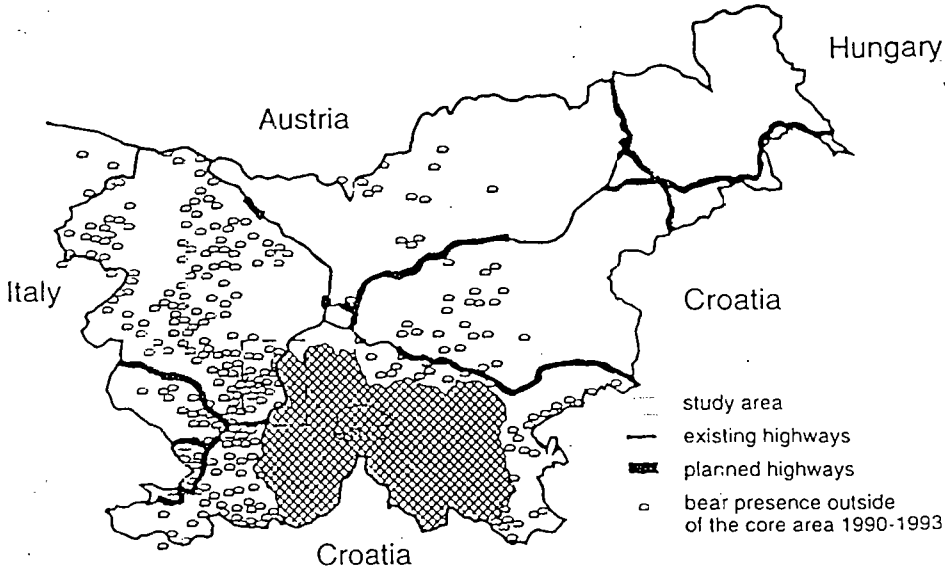

Fig. 1. Existing and planned highways in relation to bear distribution in Slovenia.

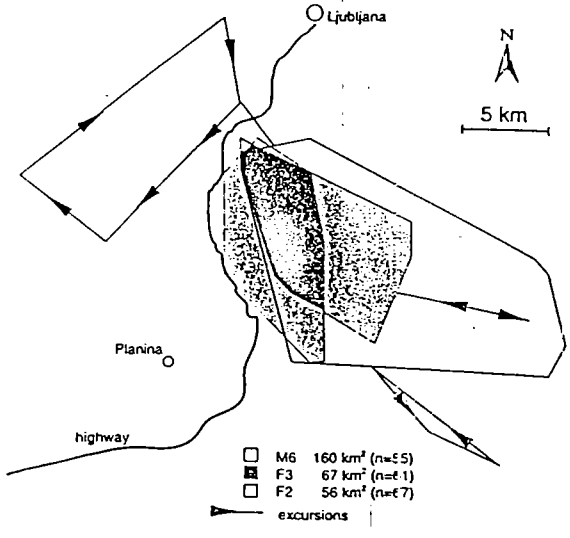

Fig. 2. Home ranges and excursions of three adult bears relative to the Ljubljana-Postojna highway.

permanently surveyed using trap transmitters (Wagener, Germany) so handling started a maximum of one hour after the bear was caught and usually took place at night. We tranquilized bears with Zoletil (equals Telazol), a mixture of Tiletamin and Zolazepam. We took standard body measurements, pulled a premolar for aging (Matson's Lab, USA) and fitted bears with radiocollars (Telonics, USA; Televilt, Sweden). In addition, all bears got colored ear tags ("Prima-Flex", Germany) in both ears.

We radio-tracked almost exclusively from the ground using triangulation or homing in (White and Garrott 1990). Depending on topography, distance and activity of the bear, we classified the accuracy of the locations as: 1ha, 1/4 km², 1 km² or less than 1 km². Only one location per day and bear with an accuracy of >1km was accepted for data analysis.

For calculating total ranges we used the 100% minimum convex polygon. We refer to home ranges as minimum convex polygons excluding excursions. Excursions we defined as single, long distance trips more than 5 km out of the usual area. Minimum number of highway crossings for each bear was gained from the number and timing of locations on both sides. To get an idea about the frequency of bear crossings via bridges and tunnels, we used sandbeds in August 1993 and June 1994. On three bridges and in three tunnels on a ten kilometer stretch of the highway we checked sandbeds a minimum of once a day, removing all tracks with a rake.

RESULTS

During the two spring capture seasons in 1993 and 1994, nine different bears were caught of which three females and three males were radiocollared. Five of these bears (F1, F2, F3, M3, M6) were caught on the east side and one (M4) on the west side of the highway. Bears were located a total of 309 times from May 1993 to September 1994. For the four most intensively monitored bears F1, F2, F3 and M6 the frequency of the monitoring varied between 1.6 to 2.7 locations per week and bear. Size of total ranges for these bears varied between 56–398 km² and size of home ranges between 56–160 km²; the adult male occupying the largest areas (Table 1).

Adult bears

For the two adult females (F2, F3) and the adult male (M5) the highway represented part of their western home range boundary. All three bears came close, 23 out of 183 locations (14%) were less than 1 km from the highway, but only M5 crossed the highway. This happened twice during one excursion of eight days during the mating season. (Fig. 2).

Subacult bears

In 1993 the yearling female F1 crossed the highway in mid May and than lived very close to it until October. Twenty-three (47%) ocations during this time were less than 1 km² of the highway, but she never crossed. By the end of October she was back on the east side, than we lost radio contact. In the begin of November F1 was seen several times at a feeding station back on the west side. We believe she crossed for the third time shortly after the last location in October and than denned on the west side. In spring we found a fresh winter den near the last sighting in November and near where we picked up the first radio signals in March 1994.

In 1994 F1 did not cross the highway again and seemed to settle in an area somewhat west of her 1993 den side (Fig. 3).

For the subadult males not much information is available. The yearling male M3 lost his radiocollar after only 2.5 month of monitoring the end of May. During this short time he occupied an area of 30 km². Eight times (23%) he came within less than 1 km of the highway, but never crossed. The subadult male M4 never came close (all locations 1 km away) to the highway. Shortly after his capture he dispersed into Croatia, where the political situation hindered intensive monitoring.

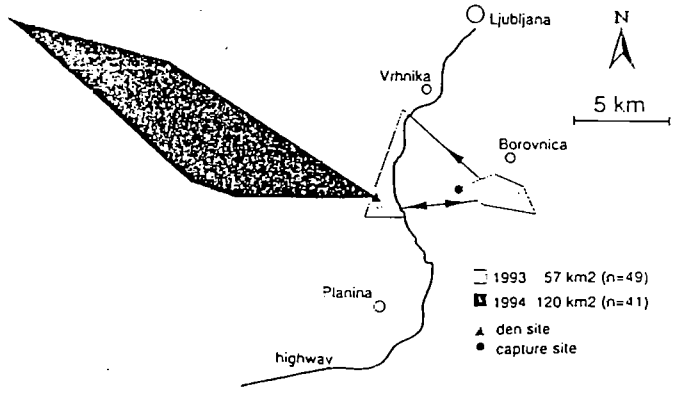

Fig. 3. Home ranges of the subadult female F1 in 1993 and 1994 relative to the Ljubljana-Postojna highway.

Crossings by unmarked bears

In addition to the five crossings registered by radiocollared bears, five crossings by unmarked bears via two tunnels were detected with the help of sandbeds. No bear tracks were found on the bridges. One subadult male was killed in June 1994 on the highway about 200 m away from a viaduct.

DISCUSSION

We are well aware of the fact, that our telemetry data were restricted to a small number of animals and a relatively short monitoring period. In addition, sandbeds did not provide quantitative data on crossing frequency of bears due to varying impacts by traffic, weather, and people. But these methodical shortcomings only made us underestimate the number of successful bear crossings. If during these 17 months of radiotracking and two months of sandbed monitoring we registered 10 successful bear crossings, this means that many more bears successfully cross than get killed. The highway is not an absolute barrier. On the other hand, the home range boundaries and movement patterns of the adult bears clearly show, that the highway is at least a relative barrier. None of the bears had a home range with areas on both sides, crossing regularly back and forth.

To resident bears the highway presented a barrier, which they rarely crossed. They did not seem to avoid being close to it: many locations are less than 1 km away from the highway, one time we even found a day bed of F1 only 15m from the highway. This is in contrary to findings from North America where grizzly bears show avoidance of heavily frequented roads (McLellan and Shackleton 1988). In contrary to North America, bears in Slovenia are shot only at established bait stations. Bear hunting while walking on the road or from a car is prohibited and might be a reason why bears do not mind being close to roads and cars. In addition a highway is a very constant and calculable source of disturbance, cars do not stop and people rarely hike next to a highway.

The radiomarked bears that crossed the highway were a dispersing yearling female and a male during the mating season. In mammals inbreeding is avoided by the dispersal of subadult animals out of their natal range. These dispersers are important for the recolonization of suitable habitat and for the gene flow between subpopulations. Long distance movements of adult males during the mating season give them access to additional females and also enhances gene flow between subpopulations. If a barrier still allows enough potential breeders to cross, the gene flow between the populations on both sides is secured (Allendorf and Leary 1986). The Ljubljana-Postojna highway does not yet threaten the continuity of the Slovenian bear population: actual losses are small (9 bears in 22 years), probably all bears killed were males (Jonozovic, in prep.) and there are enough bears crossing successfully.

The situation is quit different if there is few bears and many or fairly impermeable barriers, a situation found in the Pyrenees (Servheen and Huber, unpubl. data) or the Alps. In a fragmented landscape like the Alps bears will only be able to live in form of a metapopulation, a system of more or less isolated subpopulations, interconnected by dispersal corridors (Gilpin 1987). In such a setting single dispersers will be more valuable than in a continuous population. In the near future Slovenia will also have more highways (Fig. 1) and a denser infrastructure. Bear habitat will become more fragmented and the bear population more vulnerable.

For planned highways in bear country it will be necessary to map important bear corridors and to plan viaducts or "green bridges" at these locations. For already existing highways in actual or potential bear habitat critical points will have to be evaluated from knowledge on bear habitat requirements, present and historical dispersal data and landscape features (Hobbs et al. 1990). At important linkage points "green bridges" will have to be build afterwards. In addition it will be necessary to stop bears from climbing over the regular wildlife fences. Only providing attractive crossings will not be enough. The last bear accident on the Ljubljana-Postojna highway again showed this. The bear tried to cross over the highway only 200 m away from a viaduct (300 m long, mainly forest cover) Electric fencing might prove a cheap and effective method not only to stop bears to break into beehives, but also to stop them from climbing over highway fences. Care has to be taken not to stop bears from crossing the highway at all — no more dead bears can also mean no more crossing bears. Further research is needed in order to develop measures that allow for a maximum of bear crossing and a minimum of dead bears.

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Mora Conference Highlights

The Food of Bears

Miha Adamic, Session Chair
Ljubljana University
Ljubljana, Slovenia

Four papers, all related to European brown bears were presented in this session. The paper "Food habits and habitat use by brown bears in the Bieszczady Mountains, Poland" (Frackowiak, Gula and Perzanowski) discussed the wide variety of seasonal habitats used by bears and the pronounced seasonal differences of key food sources consumed. Hard mast, mainly beechnuts, but also pears and apples from orchards of abandoned farms, predominated in the fall diet. The greatest parts of spring and summer foods were composed of grasses, herbs and blueberries, collected on alpine meadows and in remote forests far from roads and settlements. Also, human generated food sources, e.g., foods from baiting stations set up by hunters in fall, and agricultural crops in late summer were consumed.

Excavation of large ant hills and feeding on ants and ant hill material is an important feeding strategy of southern Scandinavia brown bears in early spring, as discussed in the paper "Behavior of brown bear when feeding on large ant hills during spring" (Elgmork and Unander). Ant hills with the density up to 3.3 per ha in the study area, of which many were excavated, represented a crucial spring food source for bears upon emergence from their dens. Excavations ranged from merely a touch, to complete destruction of the hills. The tops of the hills were most frequently affected. The authors suspect that excavated ant hills contained more active colonies than unmolested ones. They did not find any significant preference as to the size of ant hills dug by the bears, nor were the excavations related to the elevation of the area.

Bear predation on domestic sheep in Norway and problems related to conservation management of brown bear in sheep pasture areas were discussed in two papers. Increasing conflicts due to predation on sheep in southeastern Norway by the expanding bear population were discussed in the paper "Brown bear-domestic sheep interactions: research and management in southeastern Norway" (Wabakken, Swenson, Sandegren, Bjärvall, Maartmann, Franzén and Söderberg). Efforts to increase the density of bear populations is among the high priority conservation goals of the Scandinavian bear project. Therefore, finding ways of suppressing bear-sheep interactions is an important part of successfully reintroducing bears to the area. Working with sheep farmers to develop improvements in traditional ways of sheep pasturing in bear areas is among the promising solutions to the problem.

Predation on sheep by bears in Norway was also the topic of the paper "Bear-sheep interactions in Norway: Can we both increase the number of bears and reduce sheep losses?" (Sagor, Swenson and Roskaft). Predation rates during the study period, 1981-1993 have risen considerably with the increase of the Scandinavian bear population, but they were found to be unrelated to the density of sheep on pastures. The authors agree that the separation of sheep and bears in pasture areas, although not easily achieved, would be the most successful support for future conservation management of the brown bear in Norway.

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International Bear News

Quarterly Newsletter of the International Association for Bear Research and Management (IBA) and the IUCN/SSC Bear Specialist Group

November 1995 vol. 4, no. 4

Highlights of this issue

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ABSTRACTS

INTERNATIONAL CONFERENCE ON THE SUSTAINABLE USE OF BIOLOGICAL RESOURCES

Organized in conjunction with:

NATUR EXPO '96
HUNGARY

Budapest, Hungary
August 26-29, 1996

Conservation management of brown bear in Slovenia - is harvest of surplus animals necessary?

Miha ADAMIČ, Division: Wildlife Ecology, Department of Forestry and Forest Resources of Biotechnical Faculty, University of Ljubljana, Večna pot 83, SLO-1000 Ljubljana, Slovenia (Phone: +386 61 123-11-61, Fax: +386 61 271-169).

Abstract:

According to the Act on Protection of Endangered Animal Species in Slovenia (APEASS), adopted in October 1993 large predators including brown bear (Ursus arctos L.) were put on the list of yearlong protected species. The facts on progressive spatial expansion of brown bear out of its core range in southcentral Slovenia towards Prealps and Alps in the period 1967-1992 ($r=0,8690-4^{***}, n=26$) were thus overlooked, although met by elevated cases of predation on sheep, but also with fear and aversions of local inhabitants. The facts on the dynamics of the population inside species core range with the area of about 3500 km^2, especially those concerning high reproductive rates, as well as low non-hunting mortality of adult bears with less than 12% of all extracted animals in the period 1992-1994, were also not taken into account. But to supress the rising cases of human-bear interactions, limited yearly harvest of bears was made legal with the annex to the APEASS. In the course of regular autumn counts of brown bears visiting the feeding sites in core range, the shares of 36,6 - 41,1 % of the cubs of the year and yearling cubs were registered inside the stock of sighted bears in 1993,1994 and 1995 respectively. Calculated size of bear population in Slovenia was, according to the autumn countings among 310-390 animals. Taking into account the there facts, yearly harvest of about 40 bears in the core range of the species in Slovenia was established by the Bear Specialist Commission. According to the statement that Slovenia should actively support transfrontier emigrations of brown bears into their historical ranges in the Alps, the species was protected in northern parts of the country although problem bears, penetrating close to human settlements and adjacent pasture areas have been extracted since special, single case State permissions have been issued. The late will have to be of practical importance also in future, although Slovenia was often blamed for that by non-governmental naturalist agencies of neighbour alpine countries, which were active in enabling the spontaneous recovery of the Alps with brown bears. We believe that prudent control harvest, based on the facts of population dynamics will have to be implicated among management tools, if successful long term conservation of problem wildlife species in cultural landscapes would be achieved.

Key words: brown bear, conservation management, harvest, Slovenia, cultural landscapes

Key words: brown bear, Slovenia, management, expansion, Alps, predation, vehicle cclisions, highways, mitigation.

ÉTUDE SUR LES EFFETS SOCIO-ÉCONOMIQUES DE L'EXISTENCE DE L'OURS BRUN DANS LE DÉPARTAMENT D'HARGHITA-ROUMANIE

Ing. Ion MICU

(Resumée)

D'aprés les recherches et les observations effectuées les derniers 24 ans (1971-1994), autant que basées sur les données statistiques officiels sur les pertes causées par les ours de département d'Harghita dans le domaine des activités

spatial expansion from core Dinaric High Karst area in southcentral Slovenia towards northwest, into former prealpine and alpine range of the species. Increasing frequencies of sightings and other reliable signs of bear presence in the areas of penetrations often triggered the fear and aversions of the there inhabitants, yet unaccustomed to the presence of bears. Elevated cases of predation on sheep, but also increased bear-traffic collisions, were among the consequences of expansion. Efforts for the improvement of conservation management strategies in the core area, but also for the mitigation of the problems connected with the penetrations of brown bears into densely settled areas in Slovenia, preservation of main emigration corridors and improvement of political habitat for the bears in the Alps are among the most important tasks. The problems arising from the increased sheep-farming in corridor areas, interstate-highway constructions and other human impacts on further spreading of bears are also discussed in the paper.

BROWN BEAR (Ursus arctos L.) POPULATION OF SLOVENIA: PROBLEMS OF ITS CONSERVATION AND MANAGEMENT.

Blaž KRJE[1], Miha ADAMIÈ[2].

Abstract

Slovenija represents the northwestern edge of Balcano-Dinaric brown bear population area. A viable population of about 300-350 bears live in southcentral Slovenija. A micropopulation of bears in adjacent border areas of Slovenija, Austria and Italy was spontanecusly established by the bears, which emigrated from the core area towards northwest. Current strategy on the conservation management of the population of brown bear in Slovenia was adopted in 1966. Regulations on planned yearly harvest quotas, hunting practices, with yearlong non-shooting of females with cubs, as well as on supplemental feeding of bears as the part of the management, were probably among important triggers of the population growth and its progressive

3. PARTICULARITÉS DANS LA MORPHOLOGIE, BIOLOGIE ET LA PATOLOGIE DE L'OURS BRUN.

1. Problémes concernant les recherches sur le management des populations de l'ours (Ursus arctos L.) en Roumanie - H.ALMĂŞAN; O.IONESCU.
2. La population de l'ours brun (Ursus arctos L) en Slovénie. Problémes de la conservation et du management - Blaz KRJE; Miha ADAMIC.
3. Considerations concernant la popu-lation d'ours de Monts Bodoc, Baraolt et Vrancea - Aurel NEGRUŢIU.
4. Etude sur les effets socio-economiques de l'existence de l'ours dans le district de Harghita, Roumanie - Ion MICU.
5. Considérations sur la dentition de l'ours brun des Carpates - N.GOICEA.
6. Aspects neurohistologiques du cer-veau de l'ours brun - J.KELEMEN; I.MICU.
7. Les ours danseurs et leurs propiétaires. La confiscation représente-t-elle la seule réponse? - Alison AMES
8. Observations - ayant de possibles implications cynégétiques sur les relations intraspécifiques dans le cadre d'une population d'ours brun avec des individus connus individuelement - Peter WEBER.
9. Contributions á une meilleure connaissance de la situation des confrontations homme-ours en Roumanie. COmmentaires sur l'agressivité de l'ours - N. ŞERBAN-PÂRÂU; H.ALMĂŞAN.
10. L'ascaridiose et son traitement chez l'ours brun de Roumanie - V.NESTEROV.

II. DIMANCHE 30 AVRIL 1995

17^{00} - 19^{00} LA SITUATON DES EFFECTIFS, MESURES DE CONSERVATION DANS LES ZONES OÚ LES POPULATIONS NE SONT PAS PÉRICLITÉES

1. Statut de l'ours brun en Finlande - Juna-Pekka RIPATTI.
2. Ensemble des problémes de l'ours brun (Ursus arctos, L.) dans le Parc National Tatra - Josef KOVAC .
3. Dynamique des populations de l'ours en Roumanie - N.ŞELARU, E.ILIE, A.M.COROŞ.
4. Les paramétres de la population des ours bruns (Ursus arctos) dans les Carpates de l'ouest, dans l'année 1992 - Pavel HELL.
5. Management de l'ours brun en Croatie - Djuro HUBER.
6. Conservation et management des populations de l'ours brun (Ursus arctos) en Roumanie - C.ISUF; C.POPESCU; O.IONESCU.
7. Capture et l'élevement en captivité des ours en vue de la population des terrains de chasse - Mitică GEORGESCU.

III. LUNI 1 MAI 1995

9^{00}-14^{00} 1. LA SITUATION DES EFFECTIFS, MESURES DE CONSERVATION ET LE MANAGEMENT DANS LES ZONES OÚ LES POPULATIONS NE SONT PAS PERICLITÉES.

2. LES METHODES DE CONTROLE DES DOMMAGES PROVOQUÉES PARMI LES EFFECTIFS DES ANIMAUX DOMESTIQUES.

PROGRAM DES EXPOSÉS AU SYMPOSIUM INTERNATIONAL C.I.C. "PROBLEME ET GESTION DE L 'OURS BRUN EN PALEARCTIQUE"

29 aprilie - 1 mai 1995
POIANA BRAŞOV - ROMÂNIA

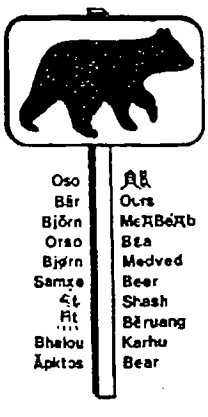
I. DIMANCHE 30 AVRIL 1995

10^{00}-14^{0C} SITUATION DES EFFECTIFS, MESURES DE CONSERVATION ET MANAGEMENT DANS LES ZONES OÚ LES POPULATIONS SONT PERICLITÉES.

1. Histoire et management de l'ours brun en Suéde et en Norvége - Finn SANDEGREN şi Jon E. SWENSON.
2. Le projet de la reintroduction de l'ours - Ursus arctos - dans les Alpes Français - Jean Pierre CHOISY.
3. Le statut et les nécessités de la conservation de populations de l'ours en Pologne - Blaz KRJE; Miha ADAMIČ.
4. Informations sur l'ours brun (Ursus arctos L. 1758) en Bulgarie - Georgy MARKOV.
5. Conservation de l'ours basée sur des recherches de la population et du habitat - Christopher SERVHEEN.

Tenth International Conference on Bear Research & Management

ABSTRACTS



Mora, Sweden

September 11 – 14, 1995

FIRST PLENARY SESSION:

THE FOOD OF BEARS

Chair: Miha Adamič,
University of Ljubljana, Slovenia

SECOND PLENARY SESSION:

WHEN MAN AND BEAR MEET

Chair: Finn Sandegren,
Swedish Hunters' Association

Bear (non) acceptance by the public in newly resettled habitas: Austrian case studies and experiences

Hartmut Gossow, Irene Glitzner, Britta Gossow, Bernhard Gutleb, Thomas Huber, Susanne Krammer & Georg Rauer. Universität für Bodenkultur and WWF, Austria.

The last brown bears in Austria were killed nearly 100 years ago; only the southern-most parts of Carinthia have shown continously at least a peripheral and transient use by bears immigrating from Slovenia. In the more northern and northwest parts of Austria, with no longer-lasting concrete bear experiences, the recent reappearance of this big wildlife component released different and controversial reactions in the public. But obviously these reactions and attitudes of the rural as well as of the urban public were highly influenced by the print and the electronic media information practices. Especially the circumstance that «Mira» (one of the two females transplanted by WWF) died by accident and left behind three orphaned cubs before their first winter without maternal assistance, released a wave of public sympathy. But in the subsequent summer 1994, one (or probably several) bears became a nuisamce because of reduced shyness toward man and his various arrangements (like sheep pasture enclosures, trout ponds, bee hives etc.) - reasons enough for killing licences or open seasons for «problem bears» or «in case of emergency»: The three cubs survived their first winter, and two bears were killed. We have tried to evaluate more in detail what emotions exist, what knowledge and prejudices, and what information gaps and demands can be evidenced - via structured interviews, during both the pro-phase and the contra-phase, and after the contra-phase, in bear regions and outside of those, as well as by media analysis /for emotional versus informal key words etc.).

Is the Central European brown bear (*Ursus arctos* L.) dangerous to humans?

Miha Adamič. University of Ljubljana, Slovenia.

Accelerated penetrations of brown bear into densely settled areas of Slovenia since 1990, triggered new problems for conservation managament of the species. People in those areas, being previously unaccustomed to the presence of large predators, were affected by the appearance of the bears, not only through increased damage on livestock, especially attacks on sheep, but also by the fear for their lives. The fear of local inhabitants was frequently stressed as among key reasons of the claims for removing bears in outer areas of the range of brown bear, but this was not the case in core habitats with established traditional cohabitation of people with brown bear. These economic aspects of the damage were key reasons for claims for removing bears.

Bear managers were often asked about the degree of risk to the people entering forests occupied by brown bear. In the course of current research on brown bear in Slovenia, we have attempted to understand actual risks of human-bear encounters. District foresters usually working in forests alone or in small groups and not being allowed to carry hunting weapons in the course of their service, were chosen as target group. We inquired 146 foresters working in the core area of brown bear in southcentral Slovenia and 47 individuals from the areas of new penetrations of the species. Altogether 211 encounters of people and brown bear in core and outer area were ranked by their intensity. Only in the course of 13 encounters (about 6.2%) was any type of aggressive behaviour of involved bears noticable. All cases of aggressiveness occured in the core bear area and exclusively by the females accompanied by the cubs of the year. None of the people involved were really harmed. Detailed facts on the cases of aggressive behavior of bears and individual tactics of inquired foresters to avoid it are described.

FOURTH PLENARY SESSION:

THE INCREASING BROWN BEAR POPULATIONS IN EUROPE

Chair: Vemund Jaren,
Directorate for Nature Management, Norway

Source, sink and dispersal aspects of the brown bear situation in Slovenia - Austria

Hartmut Gossow. Universität für Bodenkultur, Austria.
Miha Adamič. University of Ljubljana, Slovenia.

The brown bear population of the Dinaric Karst (chalky formations) of Slovenia-Croatia is the most probable source for a potentially natural (viable) repopulation of the Alps: and that should happen especially via Carinthia/Austria. Former and recent dispersal trends from Slovenia support this expectation as well as the more recently increasing records of bears in Carinthia, and also in more northern and north-western parts of Austria. But this quite natural development - supported by a few bear introduction efforts of WWF in the Northern Limestone Alps of Austria - causes locally acceptance problems in Slovenia as well as in Austria. Because of this, several potential habitats become potential, or even predisposed, sink areas. From the Slovenian core area to the Northern Limestone Alps of Austria, there exists something like a gradient of land use practises and habitat suitabilities, of hunter attitude and public interests or ignorance, and of bear problems. Several aspects of these relationships (which are studied in various research projects and cooperations, and which shall partially be presented as more detailed contributions) are discussed synoptically with regard to their meaning for the sustainable existence and acceptance of bears in their present Slovenian core habitats as well as for a subsequent bear reimmigration into the Eastern Alps of Austria.

The 2nd International Symposium on

COEXISTENCE OF LARGE CARNIVORES WITH MAN

『大型肉食獣と人類との共存』

第2回国際シンポジウム

PROGRAM

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SAITAMA, JAPAN

財団法人 日本生態系協会
ECOSYSTEM CONSERVATION SOCIETY-JAPAN

Problem bears - myth or reality in Slovenia.

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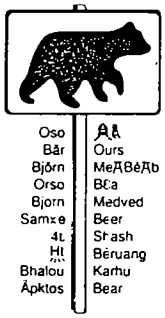
The phenomenon of problem bears is frequently discussed in Slovenia. Brown bears that did not show immediate flight behaviour during the encounters with people, as well as those approaching to close to human settlements, were treated as problem animals. The extent of problematic behaviour of the bears comprehends: (1)approaching to the settlements, (2)intruding into houses, cottages and stalls, (3)causing uncommon size of damage to human properties, and (4)attacking people and even killing them. The fate of problem bears were often terminated by special shooting permissions issued by the governmental agencies. Subadult males prevailed among problem bears which have been shot. Formerly, the greatest part of problem bears was met inside the core range of the species in southcentral Slovenia. Since the bears in core range have been supplementary fed, the late was believed to trigger the loss of fear of bears towards the people. With accelerated expansion of the bears into Slovenian Alps, which being met by rising predation upon free-pastured sheep, the phenomenon of problem bears was in fact transfered towards northwest into the areas with no supplemental feeding of bears. Therefore the late is hardly the reason for adaptive problem behaviour. For, public attitudes towards the conservation of brown bear and other large predators in Slovenia are strongly impacted by the predation effects caused by single problem animals, the Government will have in future to encourage the extended use of electric fences and other effective protective devices in exposed areas, but also to enable legal extraction of problem animals.

Braunbär
Life



Eleventh International Conference on Bear Management & Research

European Session, September 1–4, 1997, Graz, Austria

Bildungszentrum Raiffeisenhof

BUNDESMINISTERIUM
FÜR UMWELT
JUGEND UND FAMILIE

Life

European Session

Book of Abstracts

Bear-human conflicts in Slovenia. Do we adjust the environment for the problem behavior of the bears?

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The phenomenon of human-bear conflicts was frequently discussed in Slovenia. Brown bears that did not show immediate flight behavior during the encounters with people, as well as those approaching too close to human settlements, were immediately labeled as problem animals. The extent of bear-human conflicts, triggered by problem behavior of the bears comprehends: (1)hanging around at the human settlements and frightening people, (2)aggressive food seeking, met by the intrusions into houses, cottages and stalls, (3)causing uncommon size of the damage upon human properties, and (4)attacking people and even killing them. The fate of problem bears were often brought to the end by special shooting permissions, issued by the governmental agencies. The total numbers of the bear-permissions, issued in Slovenia since 1950 is unknown. According to the data on 28 extracted problem bears, subadult males prevailed in the group. Up to 1990 the greatest part of problem bears was met inside the core range of the species in southcentral Slovenia. The supplemental feeding in the core range was believed to trigger the loss of fear in bears of the people. With accelerated expansion of the bears into Slovenian Alps, followed by increased predation upon free-pastured sheep, the phenomenon of problem bears was transferred towards northwest, into the areas with no supplemental feeding of the bears. The latter was therefore hardly to be the only reason for problem behavior in bears. According to the reactions of the public, it is evident that the attitudes towards the conservation of brown bears and other large predators in Slovenia are to a great extent affected by the troubles, caused by single problem animals. In this sense it is important that the Government will encourage the use of electric fences and other effective protective devices in exposed areas in future, but also to enable legal extraction of problem animals.

Key words:

problem bears, Slovenia, public attitudes, conservation human-bear conflicts

Are viaducts enough to enable safe crossing of the highways by Brown Bears

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In 1992, the campaign for accelerated construction of the highway network in Slovenia was launched by the Government of Slovenia. In the same year 5 bears have been involved in traffic collisions on 30 km fenced highway section Vrhnika-Razdrto, which was put on traffic in 1972. Feasibility studies, concerning the planned highway sections which would touch and/or split continuous brown bear range and migration corridors, have therefore paid much attention towards the mitigation of negative impacts of the highways upon large mammals, with brown bear in particular. Following the attempts, including civil inobedience and protests of local inhabitants, the members of the Hunters Association of Slovenian Littoral and those of the Green Party, two viaducts of 169m and 252m have been constructed on about 10 km long highway section Razdrto-Cebulovica. In mid-1995, soon after the section was opened for the traffic, bear movements beneath the viaducts have been registered. Electric fencing of the highway section, as anticipated in the feasibility study has not been built. Due to unrealized project, free crossing of the highway fence by the bears was proceeded. In May 1997 one subadult male bear was killed on the highway lane and another bear was sighted inside the highway fence by the car drivers. Planned steps towards safer crossing of the highway section Vrhnika-Razdrto-Cebulovica by the bears, will be started in 1997. It is to be achieved by additional electric fencing of the highway, adjustment of existing bridges and underpasses and by building two additional ursiducts bear bridges with the widths of 50 m each.

Key word:

brown bear, highway, viaducts, electric fence, bear bridge, Slovenia.

Are viaducts enough to enable safe crossing of the highways by the brown bears

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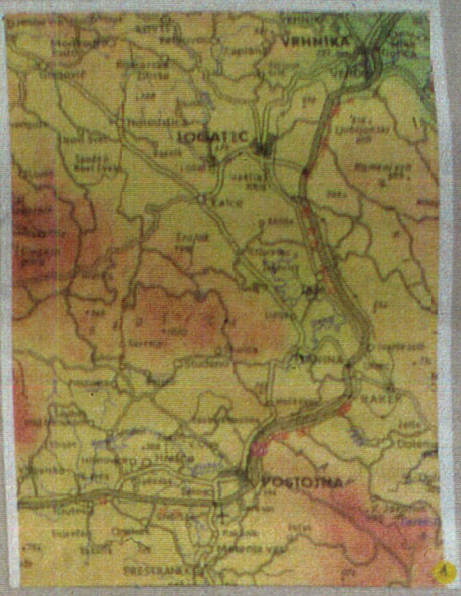

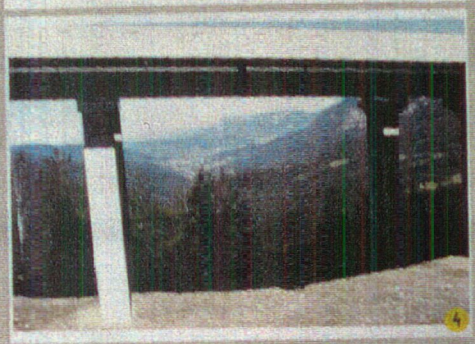

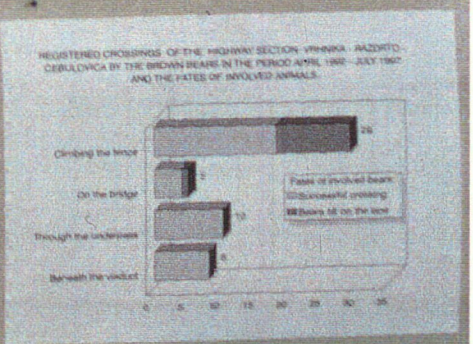

Did the Brown Bear (Ursus arctos) ever disappear from the southeastern Alps?

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In the last years cocperation between researchers of the three state tringle Austria, Italy and Slovenia were intensified and all available observations from 1860 to 1997 were put together. In the time before 1860 bears were regularly harvested and observed in the region and counted to be present in most hunting areas. The new date collection lead us to the opinion, that it is more a question of definition whether the brown bear had ever been extirpated in our region or not. Bears have been shot in Austria / Carinthia in 1860, 1384, 1950 and 1965 (2, - all males. In Italy / Friuli the last bear shot in 1911 was also male. In the border areas of Slovenia in 1868 a small bear was captured, in 1871 a female with two cubs shot, and until 1950 another 9 bears harvested. Between 1830 and 1971 bears were observed in 28 of 111 years with maximum 16 years discontinuation (average observation all 4 years; longest discontinuations: 1895-1911, 1871-1884, 1884-1895, 1940-1950). The discontinuation in observations of females being more pronounced. It took almost 100 years from the last shot of a female with two cubs in 1871 to the next proof of a female with one cub in 1963. The observation of a very small bear in 1938 could indicate, that ever females might not have been completely out of the range in this decades. Counting that data from war times (1914-1918, 1938-1945) are almost unavailable and not all observations became public we think it is admissible to say, that the brown bear never disappeared from the southeastern Alps and continued to survive here similar and actual even more vital than the bears in Adamello-Brenta in Italy. At the moment there are about 15 bears in the triangle of Austria, Italy and Slovenia with regular reproduction on the Slovenian side and incessantly proofs of bears with occasional observation of females with cubs in the other two states.

Did the brown bear ever disappear from the southeastern Alps ?

Mag. Bernhard GUTLEB, Austria, Wien
Dr. Miha ADAMIC, Slovenia, University of Ljubljana
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Introduction

Results

Study area & Method

Discussion & Conclusions

Bear observations 1951-1971

Bear observations 1840-1950

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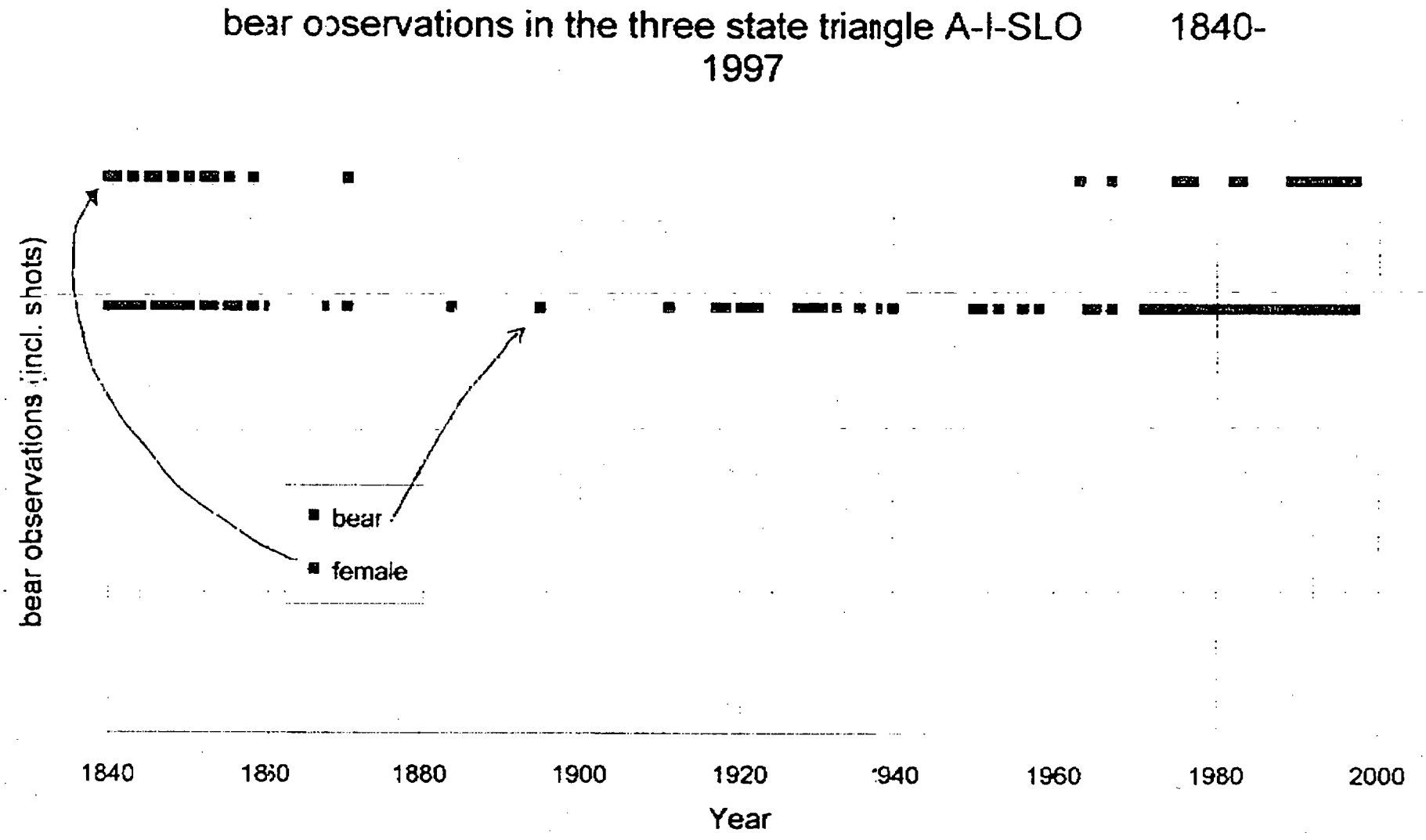

Brown Bear - sheep interactions, unresolved obstacle for further recovery of the population of Brown Bear in the Slovenian Alps

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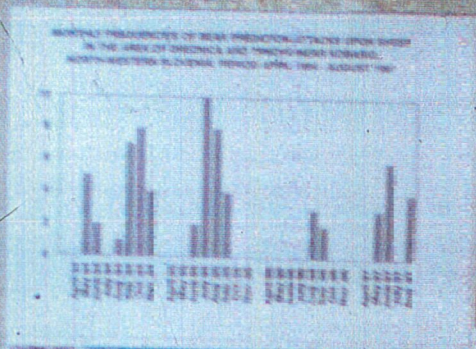
In 1994 and in 1995 just one single bear killed more than 60 sheep on three distinct locations of alpine pastures in the area of Kobarid, northwestern Slovenia. Another hundred sheep were reported to be missing, due to the attacks of the same animal. In post-World War II period, first bears intruded in the area in mid-60ties, but first reported harvest took place in 1976. Real invasion of the bears, which took place in post-1990 period was a shock for local people. More than hundred years they have been living in predator-free area, thus unaccustomed to the presence of carnivore species in the vicinity of their living spaces. Although the brown bear is yearlong protected in northern Slovenia since 1993, local communities in the there area do not accept it and have been
opposing the interstate efforts for the joint conservation of the initial population of the brown bear in the Alps.

Traditional free pasturing of sheep and cattle on open alpine pastures above the timberline, was related to low grassland productivity in high altitudes. The efforts to introduce safer ways of pasturing on reduced pasture surfaces inside the electric fences would thus seriously reduce the available food for sheep and consequently the size of the flock. The latter would be unfavourable, for the sheep pasturing in the Alps is broadly supported by the governmental agencies. Therefore the electric fencing of the pastures would be the solution only for higher productive meadows in the valleys. Extraction of problem bears which would repeatedly prey sheep on the pastures in higher altitudes, should thus be kept among the tools of the future conservation management of the brown bear in Slovenia.

Key words:
bear-sheep relations, Alps, pasturing, Slovenia,

Brown bear predation upon sheep, yet unresolved obstacle for further recovery of the bear population in Slovenian Alps



Investigations of the public opinion on the conservation management of the brown bear (Ursus arctos L.) in Slovenia.

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Several investigations on the human attitudes upon the brown bear and other large carnivores have been carried out in Slovenia since 1993. According to the Decree on the Protection of Rare and Endangered Animals in Slovenia, from October 1993, all carnivore species are now year-long protected. The last investigation of public opinion was performed in autumn-winter 1996/97. Two distinct sample areas, one in the area of initial Alpine bear population in northwestern Slovenia, and the second one in the core bear range in southcentral Slovenia have been selected. The answers were stratified by the gender of investigated persons from both areas. According to the answers, the people were aware of the consequences arising from the protection of the brown bear. Accelerated predation on sheep on the whole bear range in Slovenia, but also the attack of a female bear upon the local inhabitant of the village in the core bear range in April 1996 (the latter, heavily wounded, spent six months in the hospital) were among the key reasons of the human aversions towards the bear in the species core range. People in the core area who often met the bears, either during their work or in the course of the recreation in forests, shared the opinion that the bears became too numerous and their densities have therefore to be reduced. The answers on the same questions, put to the sample persons from the outer bear range, were to a great extent different from those in the core area.

Key words:
public opinion, brown bear, conservation management, Slovenia

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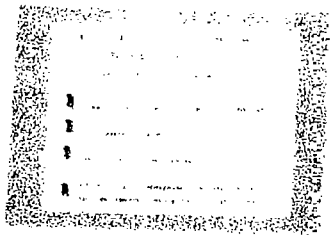
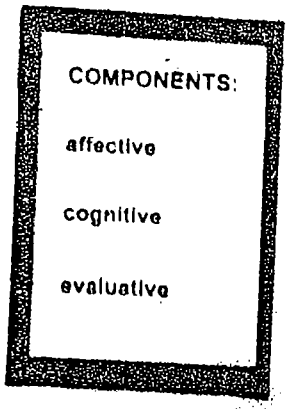
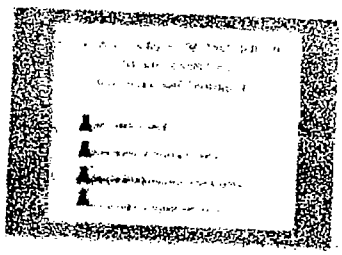
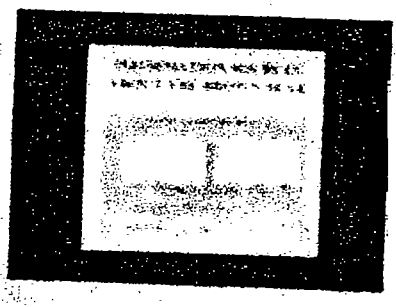
ALENKA KORENJAK

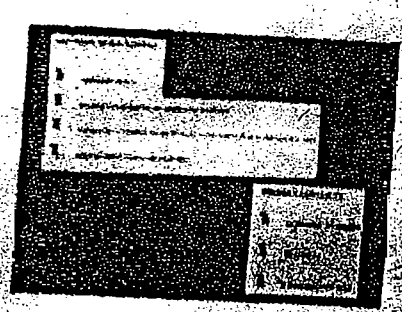
HUMAN ATTITUDES TOWARDS THE BROWN BEAR

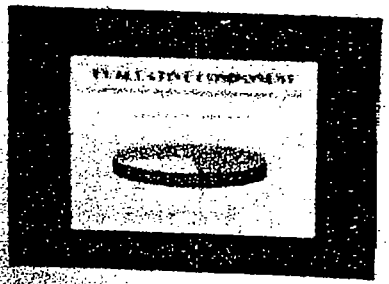












Brown Bear Habitat Modeling with Geographic Information System

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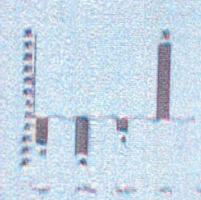
The Brkini and the Cicarija are situated along the south west edge of the central brown bear protection area. The two areas are crossed by bear migration corridors, from the SW Slovenia to the Alps. Both areas have a fairly densely human population. Knowledge of the critical factors in the habitat is essential for the successful management of bear habitats. Therefore the critical factors need to be identified, and the priority areas determined. Such a priority area must be protected and continuously evaluated. In this study, the priority was determined by Brown Bear Inventory data, from field analysis in Summer 1994, and data provided by the Office for Forestry, the Ministry of the Republic of Slovenia for Environment, and the Institute for Forestry. Spatial analysis was made possible by means of Geographic Information System at the Faculty of Forestry.

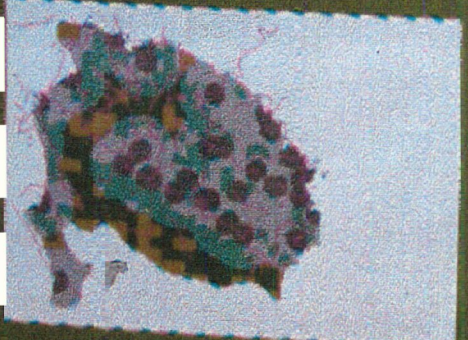
The biggest problem that emerged during our analysis of habitat suitability by means of the GIS was the discrepancy between the accuracy of the provided data and the methodical demands for data processing. Locations of brown bear spotting had been only roughly located by the hunters, and data on the bears was only partial and often incomparable. On the other hand, the GIS demands comparable input data with precise locations given in the form of co-ordinates. The problem has been solved by subjective abstraction and simplification of input data. I defined the co-ordinates of individual spotting of brown bear and compared them with precise data from the GIS during the analytical process.

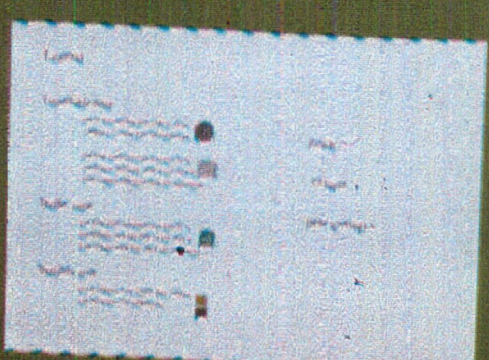
The interpretation of the results is only a rough one because a size of analysed area was to small to take any statistical test, and the series of abstractions did not allow for a more defined interpretation. The only purpose of the study was to construct a method of habitat evaluation. In this way an optimal habitat model has been described on the basis of two factors: the distance from the villages ranged according to the number of the inhabitants, and the percentage of the forest coverage.

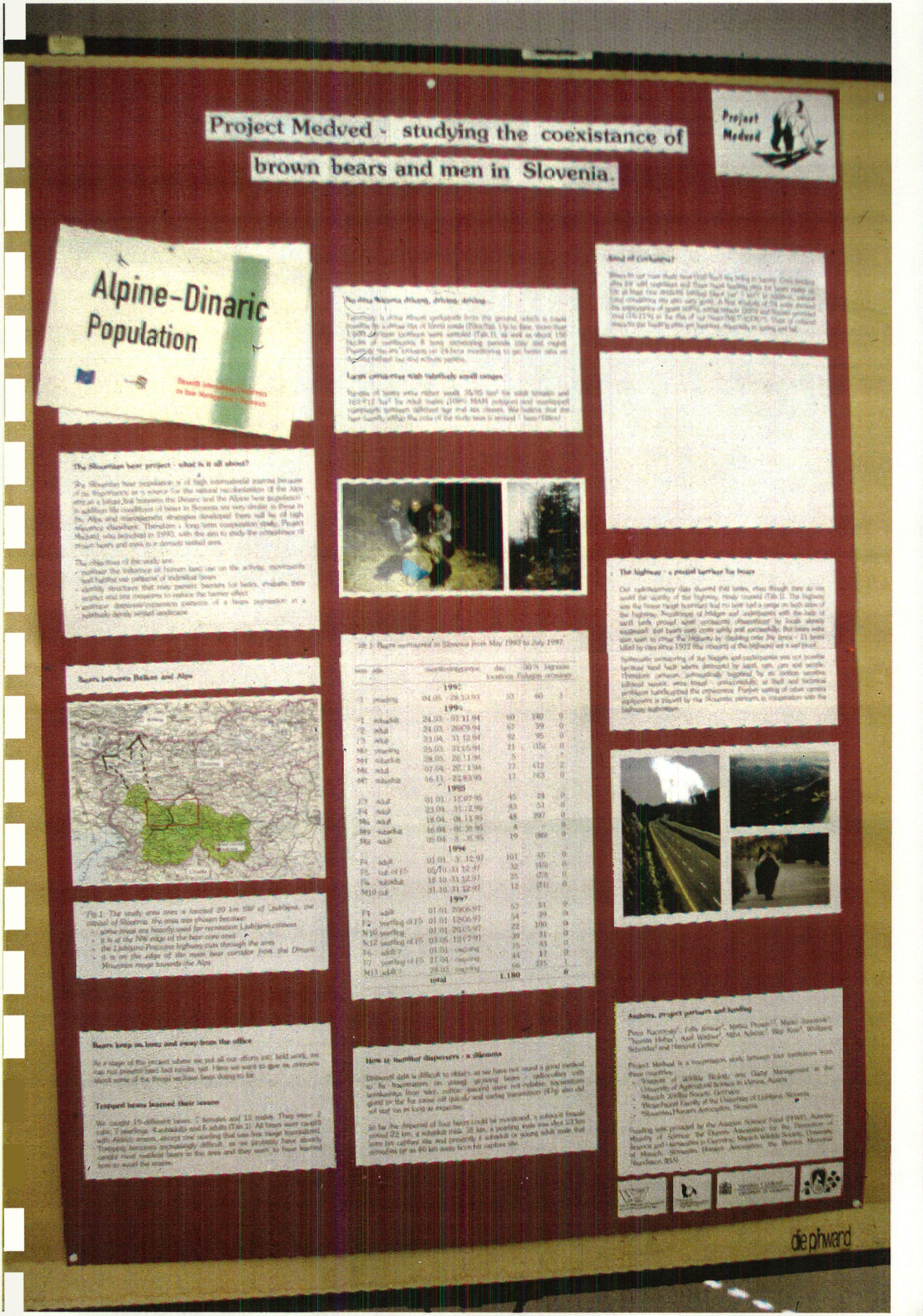
Brown Bear Habitat Modelling

In Southwest Slovenija








Project Medved - studying the coexistance of brown bears and men in Slovenia.
Project Medved
Alpine-Dinaric Population
The Slovenian bear project - what is it all about?
Large carnivores with relatively small ranges
Bears between Balkan and Alps
Bears keep us busy and away from the office
Trapped bears learned their lesson
How to monitor dispersers - a dilemma
The highway - a partial barrier for bears
Authors, project partners and funding

mai 1995

(2)

LA SLOVENIE

RAPPORT D'ENQUETE

en vue de

la réintroduction de l'ours brun

dans les Pyrénées centrales

réalisé par

Alain ARQUILLIERE, vétérinaire et Roland GUICHARD

(Association ARTUS)

MINISTERE de l'ENVIRONNEMENT

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DOCUMENTS ANNEXES

N.B. : L'étude des moyens de transport de l'ours de son lieu de capture au lieu de lâcher dans les Pyrénées centrales fait l'objet d'un autre document.

ASPECT ECOLOGIQUE DU PAYSAGE DANS LA CONSERVATION DES GRANDS PREDATEURS DE SLOVENIE

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Traduction Française

James Crinier - ARTUS 1994

RESUME :

La Slovénie est un des rare pays Européens à avoir une population de grands prédateurs protégée : le loup, l'ours brun et le lynx. Ce dernier a été en fait réintroduit en 1973 après avoir disparu pendant environ une centaine d'années suite à une totale extermination . Après avoir étudié l'histoire des différents prédateurs du centre-sud de la Slovénie sur une période allant de la moitié du 18 ème siècle-fin de la 1ère guerre mondiale, il apparaît évident, malgré la non dégradation de l'habitat à cette époque, que les trois espèces citées plus haut, ont toutes été presque entièrement exterminées. Ces leçons de l'histoire devraient être prises en compte dans les actuelles et futures stratégies de conservation concernant les espèces en compétition avec l'homme dans l'exploitation des mêmes ressources. Bien que ces trois espèces aient été classées sur la liste rouge des mammifères menacés de Slovénie, aucune mesure de protection de l'habitat n'a encore été adoptée. En Europe Centrale, les grands prédateurs sont en fait les occupants de la forêt, leur destin se trouve lié à la préservation de cet habitat.Une dissémination planifiée de pâturages à moutons dans l'environnement forestier du centre-sud de la Solvénie, une revitalisation de la manière traditionnelle de garder les troupeaux de moutons dans les Alpes et la construction de routes sont devenues des menaces principales aux efforts de protection à venir. Une approche écologique du paysage devrait être intégrée à la future stratégie de protection de ces prédateurs, comme le sont les problèmes d'habitat ou autres problèmes rencontrés par les différentes espèces sauvages vivant en Slovénie.

Introduction :

Le paysage dans les études des populations d'animaux (Mysterud, Muus Falck, 1989 ; Rolstad, Wegge, 1989 ; Oppdam, 1990 ; Wiens, 1990 ; Hanson, Angelstam, 1991 ; Pulliam, Danielson, 1991 ; Franklin, 1993 ; etc...) est devenu une part importante des efforts récents en faveur de la protection de la bio-diversité des espèces sauvages et de la réalisation de parcs nationaux et réserves naturelles. La possibilité de circuler dans des zones habitées en s'attaquant aux animaux domestiques (caractéristiques communes aux grands prédateurs), ont rendu inefficace les méthodes classiques de protection uniquement basées sur la planification des réserves naturelles et parcs nationaux. Certaines études télémétriques réalisées sur la dispersion et les déplacements des ours bruns dans le parc national de Plitvice en Croatie (Huber, Roth, 1986), dans le parc national des Abruzzes en Italie (Fabri et al, 1983 Boscagli, 1987) prouvent que les parcs nationaux européens de taille moyenne ainsi que les réserves, offrent peu l'opportunité d'une protection viable des populations de grands carnivores. (Samson et al 1985; Belovsky, 1987; Ewens et al, 1987; Conner 1988; Koenig, 1988). L'idée de suppression de toutes activités humaines dans les parc nationaux, est une idée complètement irréaliste. Les prédations sur les animaux domestiques, la chasse et les collisions avec des véhicules, sont les coûts de l'émigration individuelle de certains animaux quittant de petites zones protégées pour venir dans un environnement hostile et d'habitat peu favorable. De nouvelles stratégies de protection, basées sur la connaissance de la biologie de la protection et l'écologie du paysage, devraient être développées pour la protection future de la bio-diversité et plus spécialement, la protection des grands prédateurs. Dans ce sens, les réserves naturelles et parc nationaux existants et envisagés "islands" devraient être déclarés : centre de protection, fonctionnellement attaché au paysage environnant, afin de former ensemble des endroits uniformes et assez spacieux pour assurer la sauvegarde des grands prédateurs. En ce sens, toutes activités humaines dans ces zones de protection devraient être déterminées et limitées au bien être des prédateurs.

STATUT DES GRANDS PREDATEURS DE SLOVENIE ET PROBLEMES COURANTS POSES PAR LEUR PRESERVATION

La Slovénie est l'un des rares pays européens à posséder une population viable de grands prédateurs protégée : l'ours brun (Ursus arctos), le loup (Canis lupus), le lynx (Lynx). De larges forêts du centre-sud de Slovénie, représentent le noyau où vivent ces quatre espèces. Ce noyau est en relation avec le noyau du Gorski Kotar en Croatie, par l'intermédiaire d'une série d'habitats non-uniformes.

En 1973, c'est à dire environ 100 ans après son extinction dans cette contrée, le lynx (Lynx lynx), fut réintroduit avec succès dans son milieu historique de Slovénie. A l'origine, six animaux (3 mâles et 3 femelles) provenant des Carpates Slovaques furent lâchés dans le Kočevski Rog dans le centre-sud de la Slovénie. La réintroduction fut un immense succès, l'espèce s'est maintenant étendue sur une grande partie du territoire Slovène, dans le sud de la Croatie, dans le nord-est de l'Italie et de la Carinthie en Autriche (Čop 1990). Son territoire actuel représente environ 8000 km2 avec un noyau central de 3700 km2 J.Čop,1993). Depuis leur réintroduction, 247 cas de morts de lynx ont été enregistrés, et malgré les pressions de la chasse, la population est encore à l'heure actuelle en état d'expansion.

Le territoire actuel du loup (Canis lupus) couvre les forêts du Dinarique de Notranjska et Kočevje. Ce territoire est bien plus petit qu'il le fût dans le passé. Les révélations apportées par des données sur l'histoire de la vie sauvage en Slovénie (Freyer, 1842; Schollmayer 1889; Hiltl, 1893; Skjolte, 1909; etc...) jusqu'à la fin du 18ème siècle, nous apprend que le loup autrefois habitait une grande partie des régions boisées. D'après certaines données historiques concernant les tueries de loups dans l'état de Duke Auersperg dans le Kočevje, un territoire de 280 km2, la persécution des loups de Slovénie fut semblable à leur persécution dans le reste de l'Europe. A compter de la seconde moitié du 18ème siècle, sous couvert de la législation autrichienne sur la chasse : le loup, l'ours brun, le lynx et autres prédateurs tels que le sanglier (Sus scrofa) et le cerf (Cervus elaphus) furent systématiquement persécutés. La campagne anti-prédateur fut si efficace que le lynx disparut complètement vers le milieu du 19ème siècle, le loup et l'ours brun échappèrent à une extermination totale (Šivic 1926). De la même manière, le loup et les autres espèces prédatrices furent persécutées sur le territoire de la Croatie (Frančiškovič, 1963). Il est important de noter que jusqu'à la fin du 19ème siècle, la plupart des régions boisées n'étaient pas encore exploitées (Hufnagl, 1898; Mohorič, 1958). L'habitat de ces régions n'était pas encore atteint de fragmentation. L'histoire de la vie des grands prédateurs dans les régions de Kočevje et Notranjski, Snežnik, Schollmayer, 1889) prouve que l'attitude humaine consistant à accepter ou à refuser la vie animale sauvage joue un grand rôle dans la qualité de l'habitat de bien des espèces et plus spécialement les espèces à problèmes.

Ces faits, très importants, doivent être pris en considération dans la stratégie de sauvegarde actuelle et future des espèces sauvages en compétition avec l'homme dans l'exploitation des mêmes ressources ou ressources communes (Adamič, 1993). Les régions couramment habitées par les loups sont les régions du Dinarique à grandes plantations de hêtres dans le centre-sud de la Slovénie et plus particulièrement les régions proche de la frontière Croate. Les loups vivant dans cette région, circulent dans la forêt sur les deux côtés de la frontière. Des traces de circulation peuvent être aisément détectées pendant les hivers neigeux. Le loup est un habitant typique de la forêt évitant, en général, les zones à présence humaine permanente comme le montre l'étude de trois ans sur l'habitat des loups utilisé dans la réserve de jelen Snežnik (Adamič, Berce, en préparation) d'une grandeur de 279 km2. On a pu détecter les signes fiables (appels, traces fraîches, de la présence des loups pendant 41 jours sur un total de 2289 jours (1.8%) d'observation. Ces manifestations de la présence des loups se produisirent en des endroits très éloignés, proche de la frontière Croate. Aujourd'hui, la population des loups de Slovénie fait partie de la population commune d'une zone qui s'étend du centre-sud de la Slovénie vers le Gorski Kotar et Lika en Croatie. La création d'une stratégie

Neuvième conférence internationale de Grenoble
consacrée à l'Ours

L'EXPANSION DE LA POPULATION D'OURS BRUNS DE SLOVENIE : UNE OPPORTUNITE POUR LA REHABILITATION DE L'OURS DANS LES ALPES DU SUD-EST

par

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Traduction Française
James Crinier - ARTUS (1994)

RESUME

La Slovénie représente le bord nord-ouest de l'ensemble de la population ursine Balcano - Dinarique. Une population viable d'environ 250 ours vit au coeur de la région sud de Slovénie Centrale. Une micro-population d'ours qui quittèrent le noyau central et émigrèrent vers le nord-ouest s'établît spontanément aux frontières de Slovénie, d'Autriche et d'Italie. Une coopération inter-Etats est nécessaire à l'extension et à la progression du nombre d'individus de la micro-population des Alpes du sud-est par la préservation de la transition des principaux corridors d'immigration et par l'amélioration de la politique de l'habitat pour le bien-être futur des ours des Alpes. Les problèmes surgissant de l'accroissement du pastoralisme dans les zones de passages du nord-ouest de la Slovénie, la construction d'autoroutes inter-Etats et bien d'autres facteurs humains sur la répartition future des ours se trouvent traités.

Mots clés : Ours bruns, population en expansion, Slovénie, Alpes.

INTRODUCTION

La zone de population d'ours bruns de la République de Slovénie se situe de l'extrémité nord-ouest de la zone de population balcano-Dinarique et s'étend depuis le sud de la Slovénie centrale jusqu'aux régions montagneuses de Croatie, Bosnie Herzegovine, Monténégro, Kosovo et la Macédoine qui composaient l'ancienne Yougoslavie. Cette zone est reliée aux zones ursines d'Albanie et de Grèce (Mertzanis 1989).

Entre les périodes 1981-1990, la taille de la population d'ours bruns de Slovénie était estimée grossièrement entre 250-320 animaux (source : rapport annuel de l'association de chasse de Slovénie, Ljubljana 1992). Au cours de la même période (source identique) 421 ours ont été légalement capturés. D'après ces données, la population ursine de la partie ouest des Dinariques semble stable.

STATUT LEGAL DES OURS BRUNS DE SLOVENIE

A cause de différences profondes dans les caractéristiques écologiques de certaines régions particulières de Slovénie (mettant ainsi en évidence le déséquilibre entre le besoin en habitat et la densité d'ours actuelle), deux systèmes territoriaux de gestion des ours ont été mis en place en 1966. La région située au sud de la Slovénie centrale représentant une surface de 3000 km^2 a été déclarée zone principale de gestion. Près de 70 % de cette région est couverte d'un mélange de hêtres et de chênes, idéal pour la nourriture et les tanières (Adamič 1990). La plus grande partie de cette région est à peine occupée, voire même complètement inhabitée par l'homme (Ciglar 1979).

EXTENSION DE LA POPULATION URSINE

De récentes études télémétriques sur les déplacements des ours bruns dans le " Gorski Kotar" zone adjacente, située en République de Croatie (Hubert 1987) prouvent que les zones situées de part et d'autre de la frontière représentent en fait l'habitat unifié des ours bruns avec une surface commune de 4500 Km2. On estime que 400 à 450 ours vivent dans cette région commune.

Après la rédaction d'un acte sur la chasse en Slovénie en 1976, le système récent de gestion des ours dans la zone principale comprend :

1 . Un planning centralisé du taux de prélèvements annuels autorisés.
2 . Des règles concernant les méthodes légales de chasse
   - période de chasse autorisée (du 1er Octobre au 30 Avril),
   - calibre des armes etc...
3. Remboursement des dommages causés par les ours aux biens des agriculteurs.
4. Nourrissage supplémentaire en des endroits permanents.
5. Protection des zones d'habitat principal.
6. Conservation dans un fichier central des données obtenues sur les ours prélevés.

Les mesures prisent sur la chasse en 1966 déclarent les ours vivant à l'extérieur de la zone de protection (ce qui représente quelque 17.000 Km^2, c'est à dire 85% de la Slovénie) comme non protégés. Les membres des clubs locaux de chasse furent autorisés à chasser l'ours toute l'année. Les raisons de ce statut d'ours non protégé en dehors de la zone réglementée, s'explique par :

1. par un habitat inadéquat comparé à l'habitat rencontré dans la zone protégée ;
2. de fréquents dommages causés par les ours, sur les moutons, le bétail, les ruches, les arbres fruitiers. les champs de blé, etc..., hors de la zone protégée ;
3. l'aversion des agriculteurs locaux, envers la protection des ours (ceci malgré le remboursement immédiat des dommages).

Malgré leur statut d'ours non protégés, 1 à 3 ours seulement furent abattus annuellement. La capture de femelles avec oursons était illégale même hors de la zone protégée, de même que l'utilisation de pièges.

POPULATION D'OURS BRUNS HORS DE LA ZONE DE PROTECTION

La densité d'ours vivant hors de la zone protégée est beaucoup plus faible que la densité d'ours vivant dans la région du centre-sud de Slovénie. Une rapide estimation indique que 10% de la population ursine de Slovénie vit hors de la zone protégée, la plupart vivant dans les parties sud-ouest et ouest. La source principale de cette population hors zone représente des animaux émigrants qui quittèrent le noyau central pour se disperser en différentes directions (Adamič 1990). Bien que certains cas d'émigration à partir du noyau central furent enregistrés pendant des années à faible densité (Eržen 1953, Pirc 1954, Švigel 1961, Amon 1961, etc...), la pénétration des ours dans le nord-ouest de la Slovénie et les régions avoisinantes d'Autriche et d'Italie devint plus fréquente vers

LA FUTURE SITUATION DE LA CONSERVATION DE L'OURS BRUN EN SLOVENIE

VUES PERSONNELLES

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De par sa position géographique et sa population d'ours bruns viable et préservée, le rôle de la Slovénie dans la future santé de l'espèce en Europe centrale est sans aucun doute très important. Mais, à côté de son importance régionale, la population d'ours bruns est une part importante de l'héritage national de la Slovénie. Nos intérêts de conservation et de décision doivent être ajustés aux problèmes précis et ne doivent pas être affectés ou dépassés par des problèmes d'importance régionale. Notre future stratégie de sauvegarde est dirigée non seulement vers une conservation vigoureuse (viable), mais également vers une population d'ours bruns écologiquement fonctionnelle avec des taux de reproduction excédentaires. Un taux excédentaire assurerait la persistance de l'espèce même sous des menaces étendues. Des prélèvements modérés pourraient être effectués dans le surplus d'animaux et/ou capturés vivants afin d'être transplantés dans les Alpes ou autres zones ursines. L' émigration en serait également accélérée. Puis peut-être qu'un jour, on nous demandera de fournir des ours pour repeupler l'ancienne (surabondante mais probablement dévastée) population d'ours bruns de Bosnie. Dans ce but, je trouve d'une importance capitale l'extension de l'espace (établi en 1966) réservé à la protection de l'ours brun. Aucune mesure de limitations des activités (influençant la qualité de l'habitat de l'espèce) ne vint accompagner la mise en place, dans le milieu des années 60, d'une zone de protection et de gestion des ours bruns qui fut pourtant un acte moderne d'un point de vue Européen. L'intensification des coupes forestières et les activités qui y sont liées, et plus particulièrement des campagnes pour la relance de l'agriculture, la construction de nouvelles routes et l'ouverture au public de larges zones militaires autrefois interdites, causent des dommages à l'habitat des grands prédateurs dans la région de Kočevje. Etant au courant de l'existence d'opinions destructrices et d'une orientation programmée de l'aménagement de l'espace de Slovénie centre-sud, j'ai élaboré une nouvelle stratégie de sauvegarde des ours bruns. Cette stratégie met l'accent sur l'extension à environ 3500 km2 de la zone ursine protégée existante, vers les Dinariques du nord-ouest (comprenant Nanos, Hrušica, Idrijski Javornik et Trnovski gozd) ainsi que vers Karst (entourant Brkini, Vremščica et Slavnik et la région environnante. Avec ces 1800 km2 d'habitat supplémentaire "nouvelle zone de sauvegarde des ours bruns de Slovénie", cela créerait un territoire de 5300 km2. L'actuel programme de gestion de la zone protégée y compris le nourrissage et le contrôle des prélèvements devront être appliqués dans la zone étendue. L'étape suivante la plus importante est le rétablissement et le renforcement de l'ancienne coopération de gestion des ours bruns Slovène-Croate, dans les régions frontalières. Avec cette coopération inter-états, une zone commune de protection pourrait être établie : 5300 km2 du côté Slovène et 1800 km2 dans le Gorski Kotar. Ce projet inter-états porterait la zone commune Slovène-Croate de gestion et de

protection des ours (JSCBCMA) à environ 7000 km2. Avec la réalisation de ce projet, il y aurait assez d'espace pour la protection d'une population vigoureuse d'environ 500 ours (la moyenne de densité espérée est de 0,7 ours / 10 km2 JSCBCMA). Des limites de l'activité humaine devront être instaurées dans toute la zone. A ce point précis, un support fonctionnel et non seulement verbal de la communauté Européenne sera d'une importance décisive. La taille espérée de la population remplira alors les critères d'une viabilité à long terme ; et son effet positif, d'importance régional et international sera garantit.

La seconde partie de la stratégie, non encore résolue, est relative au futur statut des ours bruns évoluant en zone non protégée. Bien que sachant très bien que les dommages causés par les ours n'ont aucun rapport avec la densité locale de l'espèce, nous avons été surpris par l'intensité croissante des dommages causés dans les zones à faible densité ou à faible pénétration d'ours. Le problème ne se cantonne pas aux seuls problèmes économiques et aux remboursements immédiats des dommages causés. La traditionnelle aversion des habitants des Alpes pour les ours bruns est en train de grandir en même temps que la pénétration de l'espèce dans les Alpes. Ce dernier point s'est révélé particulièrement évident lorsqu'en Mai 1994, eut lieu la réunion organisée par les représentants des communautés de Kranj et Škofja Loka, consacrée aux problèmes posés par la répétition des cas de prédation causée par les ours dans les pâturages de Gorenjsko. En Mai et Juin, des lettres de protestations furent envoyées par les fermiers d'une zone s'étendant de Tolminsko (environs de Tolmin, Kobarid, Bovec, etc..., dans le nord-ouest de la Slovénie) à Slonene Carinthia (proche de la frontière Austria-Črna, Prevalje, Mežica, etc...), non seulement : au ministère de la Culture, de l'Agriculture et des Forêts, des Sciences et de la Technologie, de l'Environnement, au Parlement de Slovénie, à l'Association des Chasseurs de Slovénie, mais également à l'adresse personnelle des personnes jugées responsables de la présence des ours. Le problème fut renforcé par l'implication des partis politique (par des programmes pro-fermiers) dans des campagnes anti-ours. Je suis parfaitement conscient qu'à cause des quelques ours semant la pagaille dans des zones non protégées, la stratégie de protection des ours de Slovénie que nous préconisons sera rejetée au Parlement par la commission responsable. De ce fait, je ne peux être d'accord avec l'inspecteur de la chasse en Slovénie, Mr Simonič qui refuse d'accorder la permission d'éliminer les ours qui créent individuellement des problèmes en s'introduisant dans des zones éloignées de pâturages du nord et nord-ouest de la Slovénie. Ces animaux, non seulement s'attaquent aux moutons, mais effraient les populations locales inaccoutumées à la présence de l'ours. M. Simonic défend sa position sous la pression politique exercée sur la Slovénie par la résolution A3-0154/94 du 22.04.1994 du Parlement Européen, par d'anciennes résolutions du Parlement Européen et du Conseil de l'Europe, par de fréquentes interventions du WWF Italien, par la délégation Friuli-Venezia, etc... Le manque de fonds inter-régionaux et internationaux pour le remboursement des dommages causés par les ours, est un argument souvent avancé par les politiciens et les personnes anti-ours, aux cours de discussions de portée internationale concernant les populations d'ours bruns de Slovénie, par les politiciens et les personnes anti-ours. Il est bien connu que, mise à part la somme de 10.000 DEM accordée par WW Autriche au cours de la réunion de Ljubljana de 1992, aucun autre fonds de remboursement n'a été jusqu'à maintenant débloqué. Peut-être que les différentes résolutions du Parlement Européen ainsi que les conclusions de la réunion Alpes-Adria de Ljubljana n'ont pas jugé ces fonds importants !...

Malgré cela, l'état de Slovénie et l'Association des Chasseurs slovènes ont fondé une coopérative de remboursement des dommages qui fonctionne bien, à moins que les plaintes grandissantes des fermiers locaux et même de chasseurs inquiets par le gaspillage à leur sens non fondé des deniers de l'Etat ne viennent y mettre un terme. Le manque d'argent supplémentaire nous empêche de mettre en place des campagnes de préventions (clôtures électriques, utilisation de chiens entraînés, rémunération de personnes pour garder les moutons, utilisations d'engins pour effrayer les ours, etc...). Hélas, nous sommes également incapables de supporter financièrement les programmes d'éducation destinés aux populations locales et autres mesures d'accompagnement dans les zones exposées aux ours, à moins que leur importance n'ait été également régulièrement soulignée dans les écrits de la Communauté

KLJUČNA DOKUMENTACIJSKA INFORMACIJA

ŠD Dn

DK GDK 149.74 : 151 : 945.29 : (497.12) : (436) : (043.2)

KG velika zver / odnos človeka / javnomnenjska raziskava / Avstrija / Slovenija

AV KORENJAK, Alenka

SA ADAMIČ, Miha ment. / BIDOVEC, Andrej soment. / GOSSOW, Hartmut soment.

KZ 61000 Ljubljana, SLO, Večna pot 83

ZA Univ. v Ljubljani, Biotehniška fak., Odd. za gozdarstvo

LI 1995

IN ČLOVEK IN VELIKE ZVERI V AVSTRIJI IN SLOVENIJI (Javnomnenjska raziskava o medvedu, volku in risu kot ocena možnosti varstva problematičnih živalskih vrst).

TD diplomska naloga

OP XI, 74 s., 32 tab., 13 graf., 3 fot., 4 pril., 51 ref.

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JI sl / en

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ŠD Vdn

DK GDK 149,74 (Ursus arctos) + 15 (497,12 * 04 Krimsko - mokrško pogorje) (043,2)

KG rjavi medved / odnos človeka / javnomnenjska raziskava / anketa / brlog / krmišče / Krimsko-mokrško pogorje

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ZA Univ. V Ljubljani, Biotehniška fak., Odd. za gozdarstvo in obnovljive gozdne vire

LI 1997

IN ČLOVEK IN MEDVED NA KRIMSKO-MOKRŠKEM POGORJU

TD Višješolska diplomska naloga

OP X, 74 s., 62 tab., 14 graf., 2 fot., 3 pril.

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JI sl / en

AI

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KLJUČNA DOKUMENTACIJSKA INFORMACIJA

ŠD Dn

DK GDK 149.74 Ursus arctos (L.) + 151.21 (497.12 * 07)

KG rjavi medved / zver / areal razširjenosti / selitvene poti / emigriranje / Alpe / osrednji življenski prostor / lovsko gojitveno območje Novo mesto

KK

AV FLAJS, Uroš

SA ADAMIČ, Miha ment.

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ZA Univ. v Ljubljani, Biotehniška fak., Odd. za gozdarstvo in obnovljive gozdne vire

LI 1998

IN RJAVI MEDVED NA DOLENJSKEM IN NJEGOVE SELITVENE POTI

TD višješolska diplomska naloga

OP VII, 40 s., 3 pril., 7 fot., 1 k.

IJ SL

JI sl / en

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KLJUČNA INFORMACIJSKA DOKUMENTACIJA

ŠD Sn
DK GDK 149.74 Ursus arctos L. : 907.11 Triglavski narodni park : 156.2
KG Ursus arctos L., Triglavski narodni park, upravljanje s populacijo divjadi
KK
AV MARENČE, Miha
SA ADAMIČ, Miha ment.
KZ 1000 Ljubljana, SLO, Večna pot 83
ZA Univerza v Ljubljani, Biotehniška fakulteta, Oddelek za gozdarstvo
LI 1997
IN RJAVI MEDVED (URSUS ARCTOS LINNAEUS, 1758) V TRIGLAVSKEM NARODNEM PARKU.-
TD specialistično delo
OP 38 preg , 34 graf., 16 pril.
IJ SL
JI sl, an
AI Iz pisnih virov in ustnih sporočil je ugotovljeno, da se je rjavi medved (Ursus arctos Linnnaeus, 1758) redno pojavljal v Triglavskem narodnem parku (TNP), in to neredno in v različnih letnih časih; nekateri medvedi so verjetno tudi prezimili. Za obrobje zunaj TNP so zanesljivi dokazi o prisotnosti medvedk z mladiči, kar zelo verjetno kaže na prezimovanje v neposredni bližini TNP. Z analizo nekaterih prostorskih značilnosti je ugotovljeno, da je bivalna in prehranska primernost za rjavega medveda v TNP premajhna za trajnejšo naselitev. Pokazalo se je tudi, da TNP ni najpomembnejši prostor za prehajanje medvedov v Alpe, ampak tečejo glavni koridorji zahodneje na Tolminskem in Kobariškem. Ne glede na to pa ima rjavi medved v TNP vso domovinsko pravico. Ekološko in etično pripada vsaki rastlinski in živalski vrsti življenjski prostor, ki si ga izbere, ne glede na to, ali gre za trajno ali začasno bivanje. To še toliko bolj velja za naravovarstveno zavarovana območja.

BF Odd. za gozdarstvo in obnovljive gozdne vire
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