AGREEMENT ON THE CONSERVATION OF BATS IN EUROPE
(EUROBATS)

First Report to the National Implementation of the Agreement in Croatia

2000 - 2002

Croatian Natural History Museum
Ministry of Environmental Protection
and Physical Planning

April 2002

A. General information

Party: Hrvatska (Croatia)
Date of Report: April 2002
Period Covered by Report: February 2000 – February 2002
Competent Authority: The Ministry of Environmental Protection and Physical Planning
Competent expert group: Museum Bat Group (D. Hamidović, D. Holcer, I. Pavlinić and N. Tvrtković)
Appointed memmber of the Advisory Committee: Nikola Tvrtković, PhD, Croatian Natural History Museum (CNMH), Demetrova 1, 10000 Zagreb, Hrvatska; Nikola.Tvrtkovic@hpm.hr

B. Status of Bats within the Territory of the Party

1. ***Summary Details of Resident Species***

Table 1. List of resident bats of Croatia. No* = scarce field data; probably yes;

No.	*Species*	*Evidence of breeding*	*Evidence of wintering*	*Supposed status*
1.	*Rhinolophus blasii*	Yes	Yes	Rare
2.	*Rhinolophus euryale*	Yes	Yes	Common
3.	*Rhinolophus ferrumequinum*	Yes	Yes	Numerous
4.	*Rhinolophus hipposideros*	Yes	Yes	Numerous
5.	*Barbastella barbastellus*	No*	Yes	Rare
6.	*Eptesicus serotinus*	No*	No*	Common
7.	*Hypsugo savii*	Yes	Yes	Numerous
8.	*Miniopterus schreibersii*	Yes	Yes	Common
9.	*Myotis bechsteinii*	No*	Yes	Rare
10.	*Myotis blythii*	Yes	Yes	Numerous
11.	*Myotis brandtii*	Yes	Yes	Common
12.	*Myotis capaccinii*	Yes	Yes	Common
13.	*Myotis dasycneme*	No	Yes	Rare
14.	*Myotis daubentonii*	No*	Yes	Numerous
15.	*Myotis emarginatus*	Yes	Yes	Numerous
16.	*Myotis myotis*	Yes	Yes	Common
17.	*Myotis mystacinus*	Yes	Yes	Common
18.	*Myotis naterreri*	No*	Yes	Rare
19.	*Nyctalus leisleri*	No	Yes	Common
20.	*Nyctalus noctula*	No	Yes	Numerous
21.	*Plecotus austriacus*	Yes	Yes	Common
22.	*Plecotus auritus*	Yes	Yes	Numerous
23.	*Plecotus kolombatovici*	Yes	Yes	Common
24.	*Plecotus microdontus/alpinus*	No*	No*	Rare
25.	*Pipistrellus kuhlii*	Yes	Yes	Numerous
26.	*Pipistrellus nathusii*	No	Yes	Common
27.	*Pipistrellus pipistrellus*	No*	No*	Common
28.	*P. pygmaeus/mediterraneus*	No*	No*	Numerous
29.	*Tadarida taeniotis*	Yes	Yes	Common
30.	*Vespertilio murinus*	No	Yes	Rare

After first identifications of *Myotis brandtii* (1999), *M. dasycneme* (2000) and *Plecotus microdontus /alpinus* (Kiefer & Veith 2002), 33 bat species have been recorded in Croatia, but three species since 1950's hadn't been confirmed in recent studies: *Eptesicus nilssonii*, *Nyctalus lasiopterus* and *Rhinolophus mehelyi*. Probably one additional species (*Myotis alcathoe*) is expected, recent recorded from Hungary and Greece. Species status of *Myotis aurascens*

(Benda and Tsytsulina 2000) is in the question considering insufficient and not clear morphological differences, and lack of evidence on molecular level (Helversen and Mayer 2001). Over all 30 resident bat species are confirmed for Croatia at this moment.

2. ***Status and Trends***

It is difficult to determine population status and trend of Croatian bat species for now, because the existing reliable old data (Dulic 1953 -1989) pertain to some of the cave dwelling bat species and for the other species (especially forest bat species) data are insufficient and discontinuous. During last two years we tried to estimate endangerment categories of bats on the regional level (Tvrtkovic /ed./, in print) on the basis of field research compared to literature data from Đulić (1952-1989) and we believe that they are more accurate and realistic than the one published in the first Croatian Red Data Book (Dulić in Draganović /ed./1994).

Table 2. List of threatened bat species of Croatia

No.	*Species*	*Supposed population trend*	*Number of known roosts*	*Supposed number of specimens*	*IUCN Category*	*Regional Category*	*Percent of whole species population*
1.	*R. blasii*	decline	1	1.500	NT	**VU**	small
2.	*R. euryale*	decline	7	10.000	**VU**	**VU**	?
3.	*R. ferrumequinum*	stabile ?	30	35.000	NT	NT	?
4.	*R. hipposideros*	stabile ?	5	-	**VU**	NT	small
5.	*B. barbastellus*	?	0	-	**VU**	DD	small
6.	*M. schreibersii*	decline	13	13.000	NT	**VU**	small
7.	*M. bechsteini*	?	0	-	**VU**	**VU**	small
8.	*M. capaccinii*	decline	6	10.000/ 15.000	**VU**	**VU**	significant
9.	*M. dasycneme*	?	1	-	**VU**	DD	small
10.	*M. emarginatus*	increase?	11	48.000	**VU**	NT	significant
11.	*M. myotis*	decline?	5	9.000	NT	NT	small
12.	*N. leisleri*	?	1	-	NT	DD	small
13.	*P. kolombatovici*	?	2	1.500	-	DD	significant
14.	*P. microdontus / alpinus*	decline?	0	-	-	DD	?
15.	*M.blythii*	?	11	58.000	LR	LR	Small

It seems that *Rhinolophus hipposideros* and *Myotis emarginatus* in Croatia are not specially endangered considering the number of findings (*R. h.*) and size of subpopulations (*M. e.*). Data on *Myotis dasycnem, Plecotus kolombatovici, P. microdontus /alpinus* and *Barbastella barbastellus* are still insufficient.

Although the population trend in *Rhinolophus euryale* is unknown, we know that the species is very easily affected by disturbance and is much less abundant than *R. ferrumequinum* and *R. hipposideros*, so we assume that it is more endangered than former two species. In many caves we've found only osteological remains of *Rh. euryale* which leads us to the conclusion that the species area of distribution and abundance are in decline.

Small number of findings of *Mytis bechsteini* is probably connected with relatively small number of old trees with holes, so without necessary data we considered it's status to be the same as in Europe.

In the last 40 years we have recorded disappearance of summer roosts of *Miniopterus schreibersii* from five localities and overall decline of known summer population for about 50 %, although we found big wintering roost with over 18.000 bats, which probably contains part of foreign bat populations. Since the dynamics of roosting and eventually moving from one

roost to another is poorly known, we have changed regional category of endangerment to Vulnerable.

In the last 40 years we have recorded total disappearance of 6 subpopulations of *Myotis capaccinii* and decline of abundance for 2 subpopulations due to foraging habitat pollution and destruction. We estimate that 10 to 30% of local metapopulation has disappeared.

3. ***Habitats and Roost Sites***

Table 3. List of the most important multi-species roost sites with more than 200 specimens/site in nursing or/and hibernation roosts. It is a selection from 65 caves with bats. Methodology and categories after EUROBATS Habitats group.

No.	*Site name*	*Location*	*Site Type*	*Usage*	*Max. count*	*Species recorded*
1.	Špilja Tradanj		Cave	Maternity	20.000	5
2.	Vištičina jama		Pit	All year	18.000	3
3.	Ćulumova pećina		Cave	All year	6.000	6
4.	Špilja Miljacka II		Cave	All year	5.000	7
5.	Markova jama		Pit	Maternity	3.000	4
6.	Špilja Golubinka		Cave	Maternity	3.000	2
7.	Medova buža		Sea-cave	Maternity	2.900	5
8.	Škarin Samograd		Cave	All year	1.590	5
9.	Zagorska peć		Cave	All year	1.300	5
10.	Draškova špilja		Sea-cave	Maternity	1.200	2
11.	Jama Suhi Rumin		Pit	All year	1.000	4
12.	Matešića pećina		Cave	All year	1.177	5
13.	Vilina peć		Cave	Maternity	910	5
14.	Špilja Veternica		Cave	All year	500	10
15.	Jopićeva jama		Cave	All year	404	3
16.	Rudnik Vora		Mine	Hibernation	400	1
17.	Medviđa ropa		Sea-cave	Maternity	400	3
18.	Boltekova špilja		Cave	Maternity	300	1
19.	Uviraljka		Swallow hole	Hibernation	270	10

Knowledge about roost sites in attics and lofts is very poor, investigation on it must be priority in next period.

Table 4. Roost sites in attics and other artificial shelters

No.	*Site name*	*Location*	*Site Type*	*Usage*	*Max count*	*Species recorded*
1.	Šibenik		Old factory	Maternity	3.000	2
2.	Zagreb		Hospital	Hibernation	300	1
3.	Sisak		Factory	Maternity	300	1
4.	Karlovac		Building	All year	250	1
5.	Ozalj		Old castle	Maternity	250	1
6.	Novigrad		Old house	Maternity	200	2

Only some preliminary data on bat feeding habitats exist, and there are not enough informations for any conclusions. From the first observations in the field (mostly from netting and batboxes) we have prepared only hypothetical sheme about possible preferences of some species.

Table 4. Preliminary data on distribution of bats in some different feeding habitat types in Croatia

Habitat	*Species*	*Dominant species*
Over water surface (lakes, streams)	*M. daubentonii, M. capaccinii*, *M. dasycneme, P. pipistrellus, P. nathusii, P. pygmaeus/mediterraneus, N. noctula, N. leisleri*	*M. daubentonii, M. capaccinii*
Riparian oak forest	*P. pygmaeus/mediterraneus, P. pipistrellus, P. nathusii, N. noctula, P. auritus, M. brandtii, M. emarginatus, R. ferrumequinum*	*P. pygmaeus / mediterraneus*
Continental beech-fir forest	*M. brandtii, M. mystacinus, P. auritus, N. noctula, E. serotinus, M. bechsteinii, P. pipistrellus, M. myotis, M. nattereri*	
Dinaric karst beech-fir-spruce forest	*P. auritus, B. barbastellus, M. myotis, N. leisleri, M. mystacinus, H. savii*	*P. auritus*
Mediterranean pubescent oak and hornbeam forest	*R. hipposideros*, *R. ferrumequinum, R. euryale, M. myotis, M. blythii, M. emarginatus, M. mystacinus, M. nattereri*	*R. hipposideros*
Mediterranean evergreen oak and pine forest	*M. emarginatus*, *R. ferrumequinum, M. mystacinus, H. savii, P. kuhlii, M. blythii, R. blasii, P. kolombatovici*	*M. emarginatus M. blythii P. kuhlii, H. savii*
High aerial hunters	*M. schreibersi, N. noctula, N. leisleri, T. teniotis*	
Settlements	*P. kuhlii, H. savii, P. austriacus, P. auritus, N. noctula, R. hipposideros, E. serotinus, T. teniotis*	*P. kuhlii*
Cave dwellers (summer cave roosts)	Exclusive: *M. capaccinii, M. schreibersii* Fakultative: *R. ferrumequinum, R. euryale, M. emarginatus, M. blythii, M. myotis, R. blythii*	*R. ferrumequinum, M. emarginatus, M. blythii*

4. ***Threats***

1. Disturbance of the roosts (in caves, attics);
2. Destruction of the roosts (by reconstruction of old church lofts and building attics);
3. Loss of shelters for breeding in forests: forest management with harvesting of all old hollow trees, trees with craks in the trunk or crevices under bark;
4. Loss of feeding habitats and traditional prey;
5. The timber treatement with a toxic chemicals;
6. The toxic pesticides in common use (forestry, agronomy, antimosquitos program);

5. ***Data collection***

The exsisting sources of data, except for older papers of Đulić (1953-1998) and other authors, are Bat Collection of Depertment of Zoology (person in charge: prof. dr M.Mrakovčić) of Faculty of Science, Zagreb University, and Mammal Collection of Zoological Department of Croatian Natural History Museum in Zagreb (person in charge: dr.sc. N.Tvrtković). In both institutions exists simple Bat observations databases (first of mr.sc. D.Kovačić, and second of Museum Bat Group; both in excel). Third is Batsites database (CNHM) with elementary informations about all Croatian caves with bats and observed bat species, and Monitoring database of cave roosts (CNHM) which started in 2000. D. Hamidović has another database of monthly observations of the cave Miljacka II bats and data on summer roosts and status of surrounding area in Krka National Park and the town of Šibenik, started from 1999.

C. Measures Taken to Implementation Article II of the Agreement

6. ***Legal measurements taken to protect bats***

All bat species are legally protected since1969. Without license issued by Ministry of Environmental Protection and Physical Planning it is not possible to undertake any activities (capturing, keeping or killing bats for research, ringing, etc.) on bats. All cave fauna is also legally protected, including bat colonies in caves, but in praxis it is ignored.

7. ***Sites identified and protected which are important to the conservation of bats***

Following list contains of important threatened bat sites identified in 2000/2001.

Table 5. List of threatened multi-species sites which need special protection and conservation measures

No.	*Site name*	*Target species*	*Protection status*
1.	Tradanj cave Maternity, 20.000 bats, 5 species	*R. euryale* *M. emarginatus* *R. ferrumequinum*	
	Miljacka II cave All year, 5.000 bats, 7 species	*M. capaccinii*	Protected Part of NP Krka
2.	Ćulumova cave All year, 6.000 bats, 6 species	*M. myotis* *R . ferrumequinum* *M .capaccinii*	
3.	Golubinka cave Maternity, 3.000 bats, 2 species	*M emarginatus* *R. ferrumequinum*	
4.	Medova buža sea-cave Maternity, 2.900 bats, 5 species	*M. schreibersii* *R. euryale* *M. emarginatus*	
5.	Škarin Samograd cave All year, 1.590 bats, 5 species	*M. myotis* *M. schreibersii* *R. ferrumequinum*	
6.	Zagorska cave All year, 1.300 bats, 5 species	*R. ferrumequinum*	
7.	Matešića cave All year, 1.177 bats, 5 species	*R. euryale* *M. capaccinii* *M. schreibersii*	
8.	Vilina cave Maternity, 910 bats, 5 species	*R. euryale* *M. emarginatus* *M. schreibersii*	Permit for overflow!
9.	Veternica cave All year, >500 bats, 10 species	*M. schreibersii* *R. euryale* *R. ferrumequinum*	Protected Part of PP Medvednica
10.	Uviraljka swallow hole Hibernation, > 270 bats, 10 species	*M. dasycneme* *M. daubentonii*	Part of PP Papuk

From this list only some sites are protected (only with law) as a part of special protected reserve. The Ministry of Environmental Protection and Physical Planning accepted this list, and we expected conservation measurements.

8. ***Consideration given to habitats which are important to bats***

They are scarce information about local important habitats (except for water-surface foragers and cave-dwellers); but some measurements will be taken as part of new Nature Protection Law (in preparing) and Emerald Network.

9. ***Activities carried out to promote the awarness of the importance of the conservation of bats***

- Poster: NGO «Natura» (1999)
- Bat Nights, 1999 and 2000 (Zagreb Zoo); 23.09.2001. (CNHM, Zagreb)
- Telephone line (CNHM number) with bat experts: 00385 1 4851 700
- Newspapers: several articles; TV news: once
- Translation of booklet «Guide pour l'aménagement des combles et clochers des églises et d'autres bâtiments» par Fairon, Busch, Petit & Schuiten (ms Šetina): it is in phase of request for printing permit for possibly Croatian edition
- Preparation of text for booklet «Bats of Croatia: identification, handling, protection» (Tvrtković & Holcer): will be in print in 2002
- as a part of the project "Conservation of the longfingered bat *Myotis capaccinii* for the protection of karstic habitat", D.Hamidović had 5 multimedia presentations (100 educational slides on bats for different age groups), 7 articles in periodicals, 20 interviews for daily newspapers, 8 TV shows, 1 live TV show for children (age 5-12), 6 radio interviews etc.

10. ***Responsible bodies, in accordance with Article III.5 of the Agreement, nominated for the provision of advice on bat conservation and management***

It is not nominated

11. ***Additional action undertaken to safeguard populations of bats***

- Implementation of measures for protection of bat biodiversity of riparian forests in National Water Management Plan, with proposed monitoring of water quality with presence and number of *Myotis dasycneme* and *M. daubentonii* in ecoregion Pannonian (Hungarian) lowland, and *M. capaccinii* in karst Dinaric (Dinaric West Balkan) ecoregion (as a part of the project of CNHM for Croatian Waters, responsible institution for water management plans).
- Two expert reports of CNHM, with intention to stop destruction of two important bat sites: (1) Zagorska peć cave, Novi Vinodolski: local people whish to be a touristic cave; (2) Vilina peć cave, Dubrovnik: National Hydroelectric Company (Hrvatska Elektroprivreda) have a project to overflow a cave in case of new hydroelectric power station planed; they have a permit from Ministry of Environmental Protection and Physical Planning (gaps in procedure);

12. ***Recent and ongoing programmes relating to the conservation and management of bats***

- Scientific project «Fauna of Adriatic islands of Croatia» (No. 183003) 1996-2001
Principal investigator: N. Tvrtković; team: M.Vuković, M. Baltić; financed by Ministry of Science
- Conservation project "Conservation of the longfingered bat *Myotis capaccinii* for the protection of karstic habitat", 1999-2003, funded by Whitley Laing Foundation (UK). Project leader D.Hamidović, co-leader M. Jokić (Croatian Waters Company).
- Scientific project «The biology of indicator species of threatened habitats» (No. 183007) 2002-2004; Principal investigator: N. Tvrtković; team: D. Holcer, D. Hamidović, I. Pavlinić; financed by Ministry of Science
- Inventory of bats, NP Plitvička jezera; 2002-2004 (N. Tvrtković, D. Kovačić, I. Pavlinić); financed by National Park
- Inventory of bats, NP Paklenica; 2001-2002 (M. Grgurev, I. Pavlinić, N. Tvrtković); financed by National Park
- Permanent student table with bat boxes in riparian oak forest Turopolje near Zagreb, Faculty of Science; (D. Kovačić & D. Holcer)
- Papers: Tvrtković, N., Holcer, D. & Jalžić, B. (2001): The Pond bat *Myotis dasycneme* in Croatia. Nat. Cro., 10 (3), 221-227.
Spitzenberger, F., Haring, E., Tvrtković, N. (2002): *Plecotus microdontus* (Mammalia, Vespertilionidae), a new bat species from Austria. Nat.Cro., 11 (1), 1-18.
Tvrtković, N., Holcer, D., Vuković, M., Kletečki, E. & Jalžić, B. (in press): First findings of *Myotis brandtii* (Chiroptera) in Croatia.

13. ***Consideration being given to the potential effects of pesticides on bats, and their food sources and efforts to replace timber treatment chemicals which are highly toxic to bats***

No officially informations. The situation is probaly bad, but measurements absent.

D. Functioning of the Agreement

14. ***Co-operation with other Range States***

Poor. Only contacts of CNHM with one NGO (student bat group) from Slovenia with their help in inventory of Adriatic island bats, and first contact with one Hungarian Bat Research Group for possible cooperation in ringing project of some transboundary populations of bats.

15. ***Measures taken to implement Resolutions adopted by Meeting of Parties***

The Ministry of Environmental Protection and Physical Planning sponsored in 2000/2001 with 3.400 Euro first action « Finding of locations for monitoring of cave-dwelling bats», sponsored Bat Nights too and with 1.200 Euro will be a sponsor of booklet «Bats of Croatia: identification, handling, protection» (in preparing). Other expected measurements before report absent oneself.