

**THE AGREEMENT ON THE CONSERVATION OF
POPULATIONS OF BATS IN EUROPE
(EUROBATS)**

**Fourth National Report on the Implementation of the
Agreement**

Croatia

2004 - 2006

Croatian Natural History Museum
Ministry of Culture, Nature Protection Directorate
August 2006

A. General information

Name of Party: Hrvatska (Croatia)

Date of report: 26 August 2006

Period covered: April 2004 – August 2006

Competent Authority: The Ministry of Culture of the Republic of Croatia, Nature Protection Directorate (MC, NPD)

Competent expert group: Croatian Natural History Museum (CNHM) Bat Group (D. Hamidovic, D. Holcer, I. Pavlinic and N. Tvrtkovic)

Appointed members of the Advisory Committee: Mr Nikola Tvrtkovic, PhD, Croatian Natural History Museum, Demetrova 1, 10000 Zagreb, Hrvatska (scientific focal point); Ms Andrea Stefan, Ministry of Culture, Nature Protection Directorate, Runjaninova 2, 10000 Zagreb, Hrvatska (national focal point)

B. Status of Bats within the Territory of the Party

1. Summary Details of Resident Species

Table 1. List of bats recorded in Croatia.

No.	Species	Resident	Evidence of Breeding	Evid. of Wintering	Supposed status
1.	<i>Rhinolophus blasii</i>	Yes	Yes Rare	Yes Rare	Rare
2.	<i>Rhinolophus euryale</i>	Yes	Yes Common	Yes Rare	Common
3.	<i>Rhinolophus ferrumequinum</i>	Yes	Yes Very common	Yes Common	Very common
4.	<i>Rhinolophus hipposideros</i>	Yes	Yes Common	Yes Rare	Very common
5.	<i>Rhinolophus mehely</i>	Vagrant ?	No	No	Probably extinct
6.	<i>Barbastella barbastellus</i>	Yes	Yes Rare	Yes Rare	Common
7.	<i>Eptesicus serotinus</i>	Yes	No*	No*	Common
8.	<i>Eptesicus nilssonii</i>	Hibernation	No*	No*	Rare
9.	<i>Hypsugo savii</i>	Yes	Yes Common	Yes Rare	Very common
10.	<i>Miniopterus schreibersii</i>	Yes	Yes Common	Yes Common	Common
11.	<i>Myotis alcathoe</i>	Yes	No*	No*	Rare
12.	<i>Myotis aurascens</i>	Yes	Yes Common	Yes Rare	Common
13.	<i>Myotis bechsteinii</i>	Yes	Yes Rare	Yes Rare	Common
14.	<i>Myotis (blythii ?) oxygnathus</i>	Yes	Yes Very common	Yes Rare	Very common

15.	<i>Myotis brandtii</i>	Yes	Yes Common	Yes Rare	Common
16.	<i>Myotis capaccinii</i>	Yes	Yes Common	Yes Rare	Common
17.	<i>Myotis dasycneme</i>	Hibernation	No*	Yes Rare	Rare
18.	<i>Myotis daubentonii</i>	Yes	No*	Yes Rare	Very common
19.	<i>Myotis emarginatus</i>	Yes	Yes Very common	Yes Rare	Very common
20.	<i>Myotis myotis</i>	Yes	Yes Common	Yes Rare	Common
21.	<i>Myotis mystacinus</i>	Yes	Yes Common	Yes Rare	Common
22.	<i>Myotis nattereri</i>	Yes	Yes Rare	Yes Rare	Rare
23.	<i>Nyctalus lasiopterus</i>	Migration?	No*	Yes? Rare	Rare
24.	<i>Nyctalus leisleri</i>	Yes	No	Yes Rare	Common
25.	<i>Nyctalus noctula</i>	Yes	No	Yes Common	Very common
26.	<i>Plecotus austriacus</i>	Yes	Yes Rare	Yes Rare	Rare
27.	<i>Plecotus auritus</i>	Yes	Yes Common	Yes Rare	Very common
28.	<i>Plecotus kolombatovici</i>	Yes	Yes Common	No*	Common
29.	<i>Plecotus macrobullaris</i>	Yes	Yes Common	Yes Rare	Common
30.	<i>Pipistrellus kuhlii</i>	Yes	Yes Common	Yes Rare	Very common
31.	<i>Pipistrellus nathusii</i>	Hibernation	No	Yes Rare	Common
32.	<i>Pipistrellus pipistrellus</i>	Yes	No*	No*	Common
33.	<i>Pipistrellus pygmaeus</i>	Yes	Yes Very common	Yes Rare	Very common
34.	<i>Tadarida taeniotis</i>	Yes	Yes Common	Yes (but active)	Common
35.	<i>Vespertilio murinus</i>	Hibernation	No*	No*	Rare

* = scarce field data; Status: *Rare, Common, Very common*

35 bat species in total have been recorded in Croatia: 29 residents, 4 only came for hibernation, 1 probably in migration, 1 probably vagrant in the past. For 23 species breeding was confirmed, and for 28 wintering was registered. In Annex II of Habitats Directive are 13 species.

Only *Rhinolophus mehelyi* has not been confirmed in the recent studies, and new data on *Nyctalus lasiopterus* needs confirmation. In the field survey in 2003, two specimens of *Myotis alcaethoe* were registered (male collected and female released) and confirmed on the basis of molecular methods and morphology.

2. Status and Trends

Status and trends of species have been estimated on the basis of historical data (wintering and maternity colony counts) in the notes of Professor B. Djulic's (dated cca. 50 years ago) and new data from the same localities gathered since 2002. For more accurate status and trends inventory and monitoring must be conducted in relevant number of

samples (sites). In autumn 2005 the State Institute for Nature Protection (SINP) started monitoring (permanent data loggers for temperature and humidity, monthly counts of bat species) at four sites with large breeding and wintering colonies (Visticina pothole, Tradanj cave, Matesica cave, Kustrovka cave).

Table 2. List of threatened bat species in Croatia with provisional status and trends (species from Annex II of Habitats Directive included).

No.	Species	Supposed population trend	Number of known maternity roosts	Supposed number of breeding specimens	IUCN Category	Regional Category	Percent of whole species population
1.	<i>R. blasii</i>	decline	1	1.500	NT	VU A1a;E	Small
2.	<i>R. euryale</i>	decline	9	10.000	VU	VU B2b(iv)	?
3.	<i>R. ferrumequinum</i>	stable ?	30	35.000	NT	NT	?
4.	<i>R. hipposideros</i>	stable ?	8	?	VU	NT	Small
5.	<i>B. barbastellus</i>	unknown	0	?	VU	DD	Small
6.	<i>M. schreibersii</i>	decline ?	13	33.000	NT	EN A1ac	Small
7.	<i>M. bechsteini</i>	unknown	1	?	VU	VU A2c;B2b(iii)	Small
8.	<i>M. capaccinii</i>	decline	9	15.000	VU	EN B2ab(iii)	Significant
9.	<i>M. dasycneme</i>	unknown	0	?	VU	DD	Small
10.	<i>M. emarginatus</i>	unknown	15	48.000	VU	NT	Significant
11.	<i>M. myotis</i>	decline ?	4	35.000	NT	NT	Small
12.	<i>N. leisleri</i>	unknown	0	?	NT	DD	Small
13.	<i>P. austriacus</i>	decline	1	?	LR	EN A1e	Small
14.	<i>P. kolombatovici</i>	decline ?	3	1.500	NE	DD	?
15.	<i>P. macrobullaris</i>	decline ?	5	?	NE	DD	?
16.	<i>M. blythii oxygnathus</i>	unknown	16	60.000	LR	LR	?

3. Habitats and Roost Sites

Locations (coordinates) of sites were deposited in database of T. Mitchell-Jones, but only to be used as points in mapping projects, without the permission to use exact coordinates for other purposes. Croatian biogeographical regions (**Alpine**, **Continental**, **Pannonian**, **Mediterranean**) were added according to the Emerald Network.

Table 3. List of the most important natural multi-species roost sites in Croatia with more than 200 specimens/site in nursing or/and hibernation roosts - a selection from 82 known underground sites with bats (methodology and categories after EUROBATS Habitats group, but proposed column *location* is changed with column *region*).

No	Site name	Region	Site Type	Usage	Max count	Species recorded; Target species
1.	Spilja Kustrovka	Alp	Cave	Hibernation	30.250	4; MS
2.	Spilja Trbusnjak	Con	Cave	Maternity	> 30.000	2; MS, MM
3.	Visticina jama	Med	Pit	All year RF Hibern. MS	20.150	5; MS, RF, MC
4.	Spilja Tradanj	Med	Cave	Maternity	20.000	5; ME, RF, RE, MO
5.	Jamina	Med	Pit	Hibernation	6.000	1; MS
6.	Culumova pecina	Med	Cave	All year	6.000	6; MS, MC, RF, MM
7.	Spilja Miljacka II	Med	Cave	All year	6.000	8; MC, MS
8.	Medova buza	Med	Sea-cave	Maternity	4.270	5; MS, ME, RE, MO
9.	Markova jama	Med	Pit	Maternity	3.000	4; MS, MM, RF, MO
10.	Spilja Golubinka	Med	Cave	Maternity	3.000	2; ME, RF
11.	Skarin Samograd	Med	Cave	All year	1.590	5; MS, RF, MO
12.	Zagorska pec	Med	Cave	All year	1.300	5; RF, MO, MS
13.	Dragina spilja	Con	Cave	Maternity	1.200	4; RE, MC, ME, MO?
14.	Draskova spilja	Med	Sea-cave	Maternity	1.200	2; ME, RF
15.	Matesica pecina	Con	Cave	All year	1.177	5; MC, MS, RE
16.	Jama Suhi Rumin	Med	Pit	All year	1.000	4; ME, RF
17.	Vilina pec	Med	Cave	Maternity	910	5; MS, ME, RE, MO
18.	Spilja Tounjcica	Alp	Cave-spring	Maternity	700	3; MS
19.	Spilja Veternica	Con	Cave	All year	500	13; MS, RF, RE
20.	Jopiceva jama	Con	Cave	All year?	404	3; RF
21.	Medvidja ropa	Med	Sea-cave	Maternity	400	3; ME, RF
22.	Rogovac spilja	Con	Cave	Maternity?	400	1; RE
23.	Uviraljka	Pan	Swallow hole	Hibernation	> 370	11; MD, MDas, RF
24.	Boltekova spilja	Med	Cave	Maternity	300	1; ME
25.	Spilja Bela voda	Med	Cave-spring	Maternity	300	1; MO
25.	Modra pecina	Alp	Lake-cave	Maternity	250	5; MS, MC, MO
26.	Bariceva cave	Alp	Spring-cave	Maternity	234	9; RE, MS
27.	Spilja near Krupa	Med	Cave	Maternity	200	2; MO, MS
28.	Spilja na rtu Kabel	Med	Sea-cave	Maternity?	200	2; RF, ME

MS= *Myotis*; ME= *M. emarginatus*; MO=*M. oxygnathus*; MM=*M. myotis*; MC=*M. capaccinii*; MD=*M. daubentoni*; MDas=*M. dasycneme*; RF=*R. ferrumequinum*; RE= *R. euryale*

Table 4. Roost sites in attics and other artificial shelters with more than 150 bats.

No.	Site name	Region	Site type	Usage	Max count	Species recorded
1.	Sibenik	Med	Old factory	Maternity	5.000	2; ME, RF
2.	Metkovic	Med	Building	Maternity	4.000	1; ME
3.	Boljun	Med	Church loft	Maternity	400	2; PM, PK, RH
4.	Rudnik Vora	Med	Mine	Hibernation	400	1; RF
5.	Donji Miholjac	Pan	Building	Maternity	300	1; PP
6.	Zagreb	Con	Hospital	Hibernation	300	1; NN
7.	Sisak	Con	Factory	Maternity	300	1; NN
8.	Karlovac	Con	Building	All year	250	1; NN
9.	Ozalj	Con	Old castle	Maternity	250	1; RF
10.	Donji Miholjac	Ung	Building	Maternity	200	2; PP, PN
11.	Novigrad	Med	Old house	Maternity	200	2; MO
12.	Metkovic	Med	Building	Hibernation?	170	1; PK

NN=N.noctula; PK=P.kuhlui; PP=P. pygmaeus; PM=P. macrobullaris; PK=P.kolombatovici

There is only scarce new data on forest foraging habitats of *M. bechsteinii*, *B. barbastellus*, *P. macrobullaris*, *P. kolomatovici*, *N. leisleri* and *M. brandtii*.

4. Threats

The same as in the last report (use of pesticides and use of insecticides for coating timber are the top causes of threat).

5. Data collection, analysis, interpretation and dissemination

Croatian Natural History Museum and State Institute for Nature Protection.

C. Measures Taken to Implement Article III of the Agreement

6. Legal measures taken to protect bats, including enforcement action

All bat species are strictly protected by the Nature Protection Act (OG 70/05) and the Ordinance on Proclamation of Wild Taxa as Strictly Protected and Protected (OG 7/06) and Ordinance on Habitat Type, Habitat Maps, Endangered and Rare Habitat Types and Measures to Protect Habitat Types (OG 7/06), same as all cave fauna including bat colonies

in caves. The Ministry of Culture as a competent authority issues permits for bat research and all activities in speleological objects.

17 bat species are listed on the Red List of Endangered Plants and Animals of the Republic of Croatia (2005) and Red Book of Mamals of the Republic of Croatia (2006). Special protection measures for bats are only occasionally applied (e.g. bats protection measures are included in Forest Management Plans).

In 2005 first bat-friendly fence was installed in front of the entrance in the Veternica cave which allows free passage of all 14 bat species (in specific maternity colony of *Miniopterus schreibersi*) but not people. In the past there were grilles in the entrance part of the cave in which there are permanent wintering colonies of *Rhinolophus ferrumequinum*.

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

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

No.	Site name	Target species	Threats
1.	Trbusnjak cave Maternity, > 30.000 bats, 2 species	<i>M. schreibersi</i> <i>M. myotis</i>	Disturbance
2.	Tradanj cave Maternity, 20.000 bats, 5 species	<i>R. euryale</i> <i>M. emarginatus</i> <i>R. ferrumequinum</i>	Archaeological site; Disturbance
3.	Miljacka II cave All year, > 5.000 bats, 8 species Part of National Park Krka	<i>M. capaccinii</i>	Disturbance
4.	Ćulumova cave All year, 6.000 bats, 6 species	<i>M. myotis</i> <i>R. ferrumequinum</i> <i>M. capaccinii</i>	Touristic plans
5.	Golubinka cave Maternity, 3.000 bats, 2 species	<i>M. emarginatus</i> <i>R. ferrumequinum</i>	Disturbance; Touristic area
6.	Medova buza sea-cave Maternity, 2.900 bats, 5 species	<i>M. schreibersi</i> <i>R. euryale</i> <i>M. emarginatus</i>	Disturbance; Touristic area
7.	Skarin Samograd cave All year, 1.590 bats, 5 species	<i>M. myotis</i> <i>M. schreibersi</i> <i>R. ferrumequinum</i>	Archaeological site; Guano harvesting; Disturbance;
8.	Zagorska cave All year, 1.300 bats, 5 species	<i>R. ferrumequinum</i>	Touristic plans; Solid waste deposit

9.	Dragina cave Maternity, 1.200 bats, 4 species	<i>R. euryale</i> <i>M. capaccinii</i> <i>M. emarginatus</i> <i>M. oxygnathus</i> ?	Will be overflowed because of the construction of hydroelectric power plant;
7.	Matesica cave All year, 1.177 bats, 5 species	<i>R. euryale</i> <i>M. capaccinii</i> <i>M. schreibersii</i>	Disturbance
8.	Vilina cave Maternity, 910 bats, 5 species	<i>R. euryale</i> <i>M. emarginatus</i> <i>M. schreibersii</i>	Plans for hydroelectric power plant:
9.	Veternica cave All year, >500 bats, 13 species Part of Nature Park Medvednica	<i>R. ferrumequinum</i> (w) <i>M. schreibersi</i> (m) <i>R. euryale</i> (m, in past w)	Disturbance; Touristic area
10.	Uviraljka swallow hole Hibernation, > 270 bats, 11 species Part of Nature Park Papuk	<i>M. dasycneme</i> <i>M. daubentonii</i>	Cave is situated near military facilities; building of wider road and disturbance of water flow in the cave
11.	Bariceva cave, Maternity, > 200 bats, 9 species	<i>R. euryale</i> <i>M. schreibersi</i>	Cave is situated 0.5 km from National Park Plitvice Lakes and disturbance because of tourists was noted

The list of sites consists of the most important known and threatened bat sites (information from State Institute for Nature Protection – SINP), recorded mostly during the season 2000 / 2001, and revised in July 2006. Some of the sites are inside protected areas (National and Nature Parks) and have special management measures. Other important bat habitats will be included in the national ecological network and thus protected.

According to the Nature Protection Act all cave fauna including bats is strictly protected and all speleological objects represent natural values for the Republic of Croatia.

8. Consideration given to habitats which are important to bats

There is only scarce data on bat important habitats (except for water-surface foragers and cave-dwellers shelters).

Key foraging habitats are only identified for one maternity site of *Plecotus kolombatovici* and *P. macrobullaris*, and one maternity site of *Myotis bechsteinii*.

9. Activities to promote the awareness of the importance of the conservation of bats

- Events:

"Bat Night"

- 2004: 21st September in Nature Park "Papuk"; lectures and workshop for school children from Vocin municipality hosted and organized by Nature Park's staff, media coverage
- 2005: no "Bat Night" activities reported
- 2006: on 25th/ 26th August Ministry of Culture, Nature Protection Directorate in cooperation with Park Maksimir (city park), Medvednica Nature Park and experts from CNHM organised a walk with bat-detectors and lectures for general public and media (TV, radio, press) in Park Maksimir and excursion to cave Veternica where the visitors had an opportunity to "adopt" a bat; highest officials in nature protection in Croatia took part in this event to emphasise the importance of raising public awareness in bat conservation; a press release was issued and distributed to the media
- on 29th August Nature Park Kopacki rit in cooperation with Nature Park Papuk and NGO "Green Osijek" organised a presentation and lectures on bats; the event was covered by the media (TV, radio, press)

Nature Protection Day in Croatia and International Biodiversity Day 2005 (22th May) - the Ministry of Culture, Nature Protection Directorate organised the celebration / the round table with relevant stakeholders on the protection of bats in forests, presented booklet "Bats in Forests" and produced bat badge for that occasion.

- *Telephone* (CNHM number) with bat experts on line: 00385 1 4851 700
- *Media*: several reportages on radio stations, coverage of the Bat Night celebrations (TV, radio, press), press releases
- Booklet „Bats of Croatia with identification key“
- Booklet „Bats in Forests“ was translated and printed in 2005 (MC - NPD with support of EUROBATS Secretariat)

- Second edition of „Red Book of Mammals of Croatia“ (MC and SINP, 2006) includes 17 bat species: 1 species in the category Regionally Extinct, 6 Endangered species, 5 in the category Data Deficient, 5 Near Threatened on the local level
- Campaign “Adopt the bat” – activity is under way (from beginning of 2006) in the Medvednica Nature Park near Zagreb to raise public awareness on bats in Veternica cave

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

Responsible body has not been nominated, but it is, among other, the scope of work of the State Institute for Nature Protection and the Natural History Museum.

11. Additional action undertaken to safeguard populations of bats

- no special actions recorded

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

- *Scientific project* «The biology of indicator species of threatened habitats» (No. 183007) 2002-2004; Principal investigator: N. Tvrković; team: D. Holcer, D. Hamidović, I. Pavlinić; financed by the Croatian Ministry of Science: started in September 2002; contains taxonomy and ecology of several bat species, including ringing, radio-telemetry of foraging habitats and food analysis of *Plecotus kolombatovici* and *P. macrobullaris*, started in 2004 (Igor Pavlinić, dissertation);
- *Conservation project* “Conservation of the longfingered bat *Myotis capaccinii* for the protection of karstic habitat”, 1999-2004. Project leader D.Hamidovic, co-leader M. Jokic (Croatian Waters Company), funded by Whitley Laing Foundation (UK);
- *Conservation project* “Management of Veternica cave” with assessing influence of visitors on bat population too, 2003-2004, Croatian Biospeleological Society, financed by Medvednica Nature Park;
- *Inventory project*: „Bats in National Park Plitvice Lakes“; 2002 - 2004 (N. Tvrkovic, D. Kovacic, I. Pavlinic, D. Holcer); financed by National Park Plitvice Lakes;
- *Inventory project*: „Bats in Nature Park Zumberak - Samoborsko Gorje“; 2002-2004 (I. Pavlinic); financed by Nature Park Zumberak - Samoborsko Gorje;
- *Inventory project*: „Bats in Uviraljka cave“; 2005 (I. Pavlinic, D. Holcer); financed by Nature Park Papuk;

- *Inventory project*: „Forest bats in Nature Park Medvednica“; 2006 (I. Pavlinic, D. Holcer); financed by Nature Park Medvednica and KNIP/MATRA;
- *Inventory project*: “Karst Ecosystem Conservation project, Croatia” (IBRD/GEF TF N° 050539 HR); 2003 – 2006, financed by WB/GEF and State Government. Include bat inventory in four National Parks and Velebit Nature Park (N.Tvrtković, I.Pavlinić, M.Vuković, I.Mihoci);
- *Inventory project*: Dinaric Alps rare habitats and species conservation project Croatia (PINMATRA /2003/024); 2003-2005; financed by Dutch ministries of Agriculture, Nature and Food quality and of Foreign Affairs. Includes bat inventory of Velika Kapela Mt., Plješevica Mt., Dinara Mt, Biokovo Nature Park and Sniježnica Mt. (N.Tvrtković, I.Mihoci, I. Pavlinić);
- *Monitoring* of microclimatic conditions and monthly colony counts in four caves important for bats (State Institute for Nature Protection, from autumn 2005);

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 official information has been provided from the relevant institutions in order to fulfil EUROBATS questionnaire about the use of pesticides and timber treatment chemicals.

D. Functioning of the Agreement

14. Co-operation with other Range States

Co-operation with Switzerland (Bern University) in project on ecology of *Plecotus kolombatovici* and *P. macrobullaris*, and with Austria (Vienna Natural History Museum) on taxonomy and molecular genetic data on genus *Plecotus*.

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

Resolutions are implemented through the provisions in national legislation in sectors involved in nature protection – Nature protection Act (OG 70/05), Forest Act (OG 140/05), etc.

Resolutions are also implemented through the nature protection conditions embedded in management plans, physical-planning documentation, permit system for every intervention or research in speleological objects and other bats habitats.

Insufficient budget for nature protection makes difficulties in implementation of some Resolutions.

Project which includes inventory and mapping of bats from Annex II of Habitats Directive is planned for autumn 2006.