

THE AGREEMENT ON THE CONSERVATION OF  
POPULATIONS OF EUROPEAN BATS  
(EUROBATS)

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

**Croatia**

**June 2010 – June 2014**

Ministry of Environmental and Nature Protection of the Republic of Croatia,  
Nature Protection Directorate

&

State Institute for Nature Protection

July 2014

## A. GENERAL INFORMATION

<b>Name of Party:</b>	Hrvatska (Croatia)
<b>Date of report:</b>	July 2014
<b>Period covered:</b>	June 2010 – June 2014
<b>Competent Authority:</b>	Ministry of Environmental and Nature Protection of the Republic of Croatia, Nature Protection Directorate www.mzoip.hr  Ms Zrinka Domazetović (administrative focal point) Republike Austrije 14, HR-10000 Zagreb Tel: + 385 1 48 66 127; +385 1 48 66 102 Fax: + 385 1 48 66 100 e-mail: zrinka.domazetovic@mzoip.hr
<b>Appointed member of the Advisory Committee:</b>	M Sc Daniela Hamidović State Institute for Nature Protection www.dzpz.hr Trg Mažuranića 5, HR-10000 Zagreb Tel: + 385 1 55 02 952 Fax: + 385 1 55 02 901 e-mail: daniela.hamidovic@dzpz.hr

### Membership of other committees/working groups:

Advisory Committee Intersessional Working Groups members (according to the list of Advisory Committee Members, Advisors and Observers on the Advisory Committee Workspace):

- Conservation of Key Underground Sites - M Sc Daniela Hamidović, Mirna Mazija
- Monitoring & Indicators - M Sc Daniela Hamidović
- Autecological Studies for Priority Species - M Sc Daniela Hamidović, Dr Sc Nikola Tvrtković, Mirna Mazija
- Wind Turbines and Bat Populations - M Sc Daniela Hamidović, Dina Kovač, Zrinka Domazetović, Mirna Mazija
- Light Pollution - M Sc Daniela Hamidović
- Communication, Bat Conservation and Public Health - M Sc Daniela Hamidović
- Bat Rescue and Rehabilitation - M Sc Daniela Hamidović, Mirna Mazija
- EPI Selection Working Group - M Sc Daniela Hamidović
- Bat Conservation and Sustainable Forest Management - M Sc Daniela Hamidović, Zrinka Domazetović, Mirna Mazija
- Man-made Purpose-built Bat Roosts - M Sc Daniela Hamidović
- Monitoring of Daily and Seasonal Movements of Bats - M Sc Daniela Hamidović, Mirna Mazija
- Conservation & Management of Critical Feeding Areas & Commuting Routes - M Sc Daniela Hamidović
- Bats, insulation and roofing membranes - M Sc Daniela Hamidović

## B. STATUS OF BATS WITHIN THE TERRITORY OF THE PARTY

### 1. Summary Details of Resident Species

Out of 35 bat species recorded in Croatia 29 are resident, 1 is probably extinct and for remaining 5 species status is uncertain. Breeding is confirmed in 27 species and hibernation in 24 species (Table 1). 13 species recorded in Croatia are listed in the Annex II of the Habitats Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora).

**Table 1.** List of bat species recorded in Croatia (changes from the last National report are marked in **bold**).

No.	Species	Resident	Evidence of breeding	Evidence of wintering	Supposed status
1.	<i>Rhinolophus blasii</i>	Yes	Yes	Yes	Rare
2.	<i>Rhinolophus euryale</i>	Yes	Yes	Yes	Common
3.	<i>Rhinolophus ferrumequinum</i>	Yes	Yes	Yes	Very common
4.	<i>Rhinolophus hipposideros</i>	Yes	Yes	Yes	Very common
5.	<i>Rhinolophus mehely</i>	No (probably extinct)	No	No	Probably extinct
6.	<i>Barbastella barbastellus</i>	Yes	Yes	Yes	Common
7.	<i>Eptesicus serotinus</i>	Yes	Yes	Yes	Common
8.	<i>Eptesicus nilssonii</i>	Migration/resident?	No	No	Rare
9.	<i>Hypsugo savii</i>	Yes	Yes	<b>No</b>	Very common
10.	<i>Miniopterus schreibersii</i>	Yes	Yes	Yes	Common
11.	<i>Myotis alcathoe</i>	<b>Yes</b>	<b>Yes</b>	No	Rare
12.	<i>Myotis aurascens</i>	Resident?	<b>No</b>	<b>No</b>	Common
13.	<i>Myotis bechsteinii</i>	Yes	Yes	Yes	Common
14.	<i>Myotis blythii</i>	Yes	Yes	Yes	Very common
15.	<i>Myotis brandtii</i>	Yes	Yes	<b>Yes</b>	Common
16.	<i>Myotis capaccinii</i>	Yes	Yes	Yes	Common
17.	<i>Myotis dasycneme</i>	Hibernation/resident?	No	Yes	Rare
18.	<i>Myotis daubentonii</i>	Yes	<b>Yes</b>	Yes	Very common
19.	<i>Myotis emarginatus</i>	Yes	Yes	Yes	Very common
20.	<i>Myotis myotis</i>	Yes	Yes	Yes	Common
21.	<i>Myotis mystacinus</i>	Yes	Yes	<b>No</b>	Common
22.	<i>Myotis naterreri</i>	Yes	Yes	Yes	Rare
23.	<i>Nyctalus lasiopterus</i>	Migration/resident?	No	<b>No</b>	Rare
24.	<i>Nyctalus leisleri</i>	Yes	No	<b>No</b>	Common
25.	<i>Nyctalus noctula</i>	Yes	Yes	Yes	Very common
26.	<i>Plecotus austriacus</i>	Yes	Yes	<b>Yes</b>	Rare
27.	<i>Plecotus auritus</i>	Yes	Yes	Yes	Very common
28.	<i>Plecotus kolombatovici</i>	Yes	Yes	No	Common
29.	<i>Plecotus macrotus</i>	Yes	Yes	Yes	Common
30.	<i>Pipistrellus kuhlii</i>	Yes	Yes	Yes	Very common
31.	<i>Pipistrellus nathusii</i>	Yes	<b>No</b>	<b>Yes</b>	Common
32.	<i>Pipistrellus pipistrellus</i>	Yes	<b>Yes</b>	<b>Yes</b>	Common
33.	<i>Pipistrellus pygmaeus</i>	Yes	Yes	<b>Yes</b>	Very common
34.	<i>Tadarida taeniotis</i>	Yes	Yes	<b>No</b>	Common
35.	<i>Vespertilio murinus</i>	Migration/resident?	No	No	Rare

Data on some species is scarce. References for information on breeding and wintering in Table 1 are stored in the State Institute for Nature Protection (SINP).

## 2. Status and Trends

Out of 17 bat species listed in the *Red Book of Mammals* (Tvrčković N., ed., 2006), 12 are included in the Annex II, and all bat species recorded in Croatia are in the Annex IV of the Habitats Directive (Table 2). Population trend of selected species cannot be specified in statistically significant way yet. However, there are several sites (caves mostly) that are being regularly monitored for the past 15 years and provisional results indicate that the number of bats in these sites is stable for some species. Currently, development of monitoring methodology for the purpose of reporting to the European Commission according to the Article 17 of the Habitat Directive is in progress.

**Table 2.** List of threatened bat species in Croatia (species listed in the Annex II of the Habitats Directive marked in **bold**).

No.	Species	IUCN National Category*
1.	<b><i>Rhinolophus blasii</i></b>	VU
2.	<b><i>Rhinolophus euryale</i></b>	VU
3.	<b><i>Rhinolophus ferrumequinum</i></b>	NT
4.	<b><i>Rhinolophus hipposideros</i></b>	NT
5.	<b><i>Rhinolophus mehelyi</i></b>	RE?
6.	<b><i>Barbastella barbastellus</i></b>	DD
7.	<b><i>Miniopterus schreibersii</i></b>	EN
8.	<b><i>Myotis bechsteini</i></b>	VU
9.	<b><i>Myotis capaccinii</i></b>	EN
10.	<b><i>Myotis dasycneme</i></b>	DD
11.	<b><i>Myotis emarginatus</i></b>	NT
12.	<b><i>Myotis myotis</i></b>	NT
13.	<i>Nyctalus leisleri</i>	NT
14.	<i>Nyctalus lasiopterus</i>	DD
15.	<i>Plecotus austriacus</i>	EN
16.	<i>Plecotus kolombatovici</i>	DD
17.	<i>Plecotus macrobullaris</i>	DD

\* Tvrčković N., ed. (2006): Red book of mammals of Croatia. Ministry of Culture, Nature Protection Directorate & State Institute for Nature Protection. Zagreb

## 3. Habitats and Roost Sites

Underground sites are used throughout the year either for maternity roosts, hibernacula, swarming sites or transient roosts. Number of underground sites important for bats is increasing from year to year because of the growing number of bat researchers and ongoing bat research done by several organisations. Number of important underground sites is larger for maternity roosts and these are mostly located in the submediterranean karstic area. There are also some recorded in the continental region, containing several thousand individuals of a few bat species. High number of bats in underground sites is expected since karst is spread on 51% of Croatian land territory. Additionally, some sites are recorded in man-made objects, such as abandoned houses, attics, mines, caverns, castles, churches etc. Forest dwelling bat species are not thoroughly researched and data on these species is scarce or lacking. Data on most sites with bat colonies is deposited in the State Institute for Nature Protection database and is continuously updated.

#### 4. Threats

Bats in Croatia are facing threats recorded in many European countries, with the most significant being focused on roosts destruction and hunting habitat deterioration:

- destruction of underground habitats due to infrastructural projects
- destruction of roosts in man-made objects due to reconstruction of houses, factories, castles, churches (demolition, maintenance or alterations)
- wind farms
- habitat destruction, deterioration and fragmentation (roads and highways, inadequate spatial planning in regards to bats): loss of commuting routes and feeding habitats
- inadequate water management: emission of waste waters without proper purification treatment into the waterways or directly into karst, alteration of waterways and drainage
- illegal waste disposal in caves and pits
- intensive agriculture: pesticides overuse (loss of prey, loss of hunting habitats, bioaccumulation in bats)
- inappropriate forest management (felling of old and dead trees or trees with holes)
- environmental pollution
- light pollution
- lack of knowledge on successful mitigation approaches
- disturbance in roosts (e.g. visits to caves easily approached by people).

#### 5. Data collection, analysis, interpretation and dissemination

The Ministry of Environmental and Nature Protection - Nature Protection Directorate is the responsible authority for nature conservation in Croatia. According to the Nature Protection Act (OG 80/2013) and the Ordinance on Strictly Protected Species (OG 144/2013), all bat species in Croatia are strictly protected. For bat research which includes direct contact with animals, disturbance or destruction of bat habitats, a permit allowing derogation from the measures of strict protection needs to be issued by the Ministry. The permit sets out the requirements and the reporting obligation.

State Institute for Nature Protection (SINP) is responsible for expert tasks in nature protection – data collection and processing, establishing and maintaining relevant data bases, monitoring conservation status of biological and landscape diversity and proposing conservation measures, drawing up reports on the state of nature and conservation, educational and promotional activities in nature protection.

Consistent and standardized monitoring methodology on national level isn't established yet, although SINP made the Manual for Inventarisation and Monitoring of Bats in 2008. The Manual has protocols and field forms for surveillance and basic monitoring of species or groups of species which are easily recognised or identified by a bat detector, so data can be gathered using non-invasive techniques. Currently, development of monitoring methodology for the purpose of reporting to the European Commission according to the Article 17 of the Habitat Directive is in progress with technical protocols covering underground and overground maternity roosts and hibernacula. Monitoring schemes for *Rhinolophus ferrumequinum* and *Rh. blasii* are under revision with the aim to cover all underground and overground sites for nurseries and hibernacula in the next 5 years period. National monitoring schemes are coordinated by SINP.

Inventory of bats in continental region of Croatia, in the scope of the EU NATURA 2000 Integration Project - NIP financed by the Loan Agreement with the World Bank (<http://www.zastita-prirode.hr/Aktivnosti-projekti-i-medunarodna-suradnja/Projekti/Projekt-integracije-u-EU-Natura-2000-NIP>), started in 2014 and is expected to last until the end of 2016. Each of the 52 selected 10x10 km square grid cells will be surveyed using mist netting, bat detector survey, survey of underground and overground sites and the additional information on bat presence (dead bats or their parts).

Croatian Fauna Database (CRO fauna) as a part of the National Information System is still under development. All relevant data on bats should be entered and stored into this database. Preparation for data input into CRO Fauna is still ongoing – by 15<sup>th</sup> May 2014 more than 5000 bat records from recent bat research (reports from 2000 to 2013) was entered in a prepared format and is awaiting validation. SINP uses this data for defining Natura 2000 sites, evaluation of potential impact of certain environmental interventions on bats, proposals for new protected areas and management of the existing ones etc. In terms of data interpretation SINP is contacting Croatian bat experts/organisations depending on the analysis demand and target group/topic.

Public institutions which govern protected areas or other protected natural values on county level also collect data on bats in their area and finance projects on bats.

## **C. MEASURES TAKEN TO IMPLEMENT ARTICLE III OF THE AGREEMENT**

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

Croatia became a new EU member state on 1st July 2013. Main changes in nature protection legislation are the new Nature Protection Act (OG 80/2013), the Regulation on the Ecological Network (OG 124/13) and the Ordinance on Strictly Protected Species (OG 144/2013).

According to the Nature Protection Act and the Ordinance on Strictly Protected Species all 35 bat species recorded in Croatia are strictly protected, as well as all other Chiroptera species that may naturally occur on the territory of Croatia. Nature Protection Act prohibits all forms of deliberate capture or killing, deliberate disturbance particularly during the period of breeding, rearing, hibernation and migration, deterioration or destruction of breeding sites or resting places. Derogation from these prohibitions can only be granted if there is no satisfactory alternative and if derogation is not detrimental to the maintenance of the populations of the species concerned at a favourable conservation status in their natural range. Derogation permits, which specify the conditions and reporting obligations, are issued by the Ministry of Environmental and Nature Protection.

Misdemeanour provisions of the Nature Protection Act prescribe fines from 3.300 to 26.500 € for deliberate capture, holding or killing of strictly protected animals, deliberate disturbance, deterioration or destruction of breeding or resting sites, as well as for conducting these activities without a derogation permit or not in accordance with the requirements set in the permit. According to the Ordinance on the Amount of Indemnity for Damage Inflicted by Unauthorised Action on Protected Animal Species (OG 84/96, 79/02), the indemnity tariff for killing a single bat is from 140 to 550 Euros, depending on the species.

The Criminal Code (OG 125/2011 and 144/2012) prescribes imprisonment from 6 months up to 5 years for conducting prohibited activities on a larger number of specimens of strictly protected species and for destruction or substantial deterioration of their habitats.

Seventeen bat species are listed in the Red List of Endangered Plants and Animals of the Republic of Croatia.

In the Strategy and Action Plan for the Protection of Biological and Landscape Diversity of the Republic of Croatia (OG 143/2008), which is currently under revision, there are general bat conservation actions, especially in regards to wind farms. However, there is still no management plan for any bat species in Croatia.

Ecological Network of the Republic of Croatia, proclaimed on 36,67% of the land territory and 16,39% of the coastal sea by the Regulation on the Ecological Network, represents EU Natura 2000 areas in Croatia. It includes 742 Proposed Sites of Community Importance (pSCI) for habitat types and species from Annex I and Annex II of the Habitats Directive.

The Ecological Network Impact Assessment needs to be carried out for every plan, programme or project that can have a considerable impact on the conservation objectives and the integrity of the Ecological Network.

Since bats are strictly protected, they are also being viewed in a scope of the Environmental Impact Assessment (EIA) for projects that can have an impact on bats. EIA then

needs to assess the impact on bats and propose mitigation measures to avoid negative impact. For certain types of projects the obligation to conduct the EIA study is prescribed by law, and for some the screening procedure is obligatory to determine whether the EIA needs to be done. The EIA procedure is under the jurisdiction of the national or local government, depending on the size of the project. The investors are obliged to finance the EIA study in order to obtain the relevant permits and to finance the mitigation measures and monitoring if prescribed by the EIA.

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

Most of sites important for bats are recorded in the State Institute for Nature Protection database (both man-made and underground sites). Ecological Network of the Republic of Croatia (Natura 2000) includes 74 Proposed Sites of Community Importance (pSCI) for 12 bat species from Annex II of the Habitats Directive (70 polygon and 4 point types). An interactive map of the Natura 2000 sites can be found on the website of the State Institute for Nature Protection (<http://natura2000.dzpz.hr/natura/>) with standard data forms available in English.

Sufficiency of Croatian Natura 2000 Proposed Sites of Community Importance will be assessed by the European Commission at the bilateral bio-geographical seminar in September 2014.

Some of the sites important for bats are inside protected areas (strict reserves, national or nature parks, special nature reserves, nature monuments, important landscapes), where additional protection measures and management exist.

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

As highlighted previously, many habitats important for bats are included in the Ecological Network of Republic of Croatia – in some bats are listed as key species, and some are important as hunting or roosting habitats for bats, although conservation objective of the site is not directly connected to bats. Some of the examples of habitats included in the Ecological Network which are important to bats are:

- speleological objects
- aquatic habitats – rivers, lakes, marshes, ponds, streams
- karst fields
- forest habitats

Ecological Network of the Republic of Croatia is covering 36,67% of the land territory. This large percentage, together with the conservation objectives and guidelines for the protection measures aimed at maintaining or establishing a favourable status of threatened and rare habitat types and species, contributes to the conservation of habitats important to bats.

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

### **International Bat Night events:**

In the reporting period the International Bat Night events, the Year of the Bat celebrations and other bat-related events were organised by Krka National Park, Brijuni National Park, Medvednica Nature Park, Kopački rit Nature Park, public institutions for governing protected natural values on county or local level (Krapinsko-zagorska, Primorsko-goranska and Vukovarsko-srijemska county, Park Maksimir, Cape Kamenjak), Zagreb ZOO, Osijek ZOO, City of Rijeka, Natural History Museum Rijeka, City of Koprivnica, in cooperation with State Institute for Nature Protection (SINP), Croatian Biospeleological Society, Association for Bat Conservation Tragus and Biology Students Association - BIUS. Each activity was covered by the media on both national and regional level, as well as in social networks on the Internet.

For the Year of the Bat, a booklet on “Bats of Croatia” and a poster for the general public were published by the State Institute for Nature Protection and are available in pdf on SINP webpage ([http://www.dzpz.hr/dokumenti\\_upload/20110315/dzpz20110315111180.pdf](http://www.dzpz.hr/dokumenti_upload/20110315/dzpz20110315111180.pdf);

<http://www.dzpp.hr/publikacije/posteri/sismisi-nocni-vladari-neba-886.html>). Information on the International Year of the Bat was active on SINP official web page ([www.dzpp.hr](http://www.dzpp.hr)), giving general information on bats and their importance.

## Rehabilitation

Based on contract with the Ministry of Environmental and Nature Protection, there are currently 5 rescue centres in Croatia authorised for keeping, healing and recovery of injured or diseased strictly protected animals, but not all are able to take in mammals and provide veterinary care for them. Two authorised rescue centres (one for wildlife in general and one for birds of prey), two zoological gardens (Zagreb ZOO and Osijek ZOO) and volunteers from bat NGOs rehabilitated bats, mostly pipistrelles and noctules.

## Education, lectures, exhibitions, publications:

13th European Bat Research Symposium will be held in Solaris, Šibenik, 01 - 05 September 2014. It is organised by the Croatian Biospeleological Society (CBSS) in cooperation with 5 other organisations under the patronage of the State Institute for Nature Protection (<http://13ebrs2014.com/>).

Facebook Open Community Page "Bats in Croatia":

<https://www.facebook.com/pages/%C5%A0i%C5%A1mi%C5%A1i-u-Hrvatskoj-Bats-in-Croatia/188082514629005>

Facebook Open Group "Bats in Croatia": <https://www.facebook.com/groups/244790558935444/>

## Education, lectures, exhibitions:

State Institute for Nature Protection (SINP):

- every year SINP organises Nature Protection Day and International Day for Biological Diversity on May 22<sup>nd</sup>. Bats are always represented through posters, bookmarks, photos, bat quiz and questioners, etc
- during last four years SINP organised lectures on bats for libraries, high schools, elementary schools and kindergardens both in the capital Zagreb and other towns in Croatia (Gračac, Grdanjci, Island of Pag)
- articles on two bat species of the month were published on the SINP webpage: *Myotis capaccinii* as Natura 2000 species of September 2013 (<http://www.dzpp.hr/novosti/k/natura-2000-vste-rujan-dugonogi-sismis-myotis-capaccinii-1240.html>) and *Barbastella barbastellus* as Bat species of April 2011 (<http://www.dzpp.hr/novosti/k/vrsta-mjeseca-sirokouhi-mracnjak-barbastella-barbastellus-schreber-1774-933.html>)
- two articles on bats were published in GEO Magazine (endangered and Natura 2000 species)
- exhibition on Natura 2000 species was organised together with the Croatian Environment Agency in 2013 (<http://www.dzpp.hr/novosti/k/otvorena-izlozba-%E2%80%9Enatura-2000-vrste%E2%80%9C-1264.html>)
- exhibition on Natura 2000 species was organised together with the Botanical Garden (University of Zagreb, Faculty of Science) in 2013 (<http://www.dzpp.hr/novosti/k/otvorena-izlozba-u-hrvatskoj-se-fura-natura-2000-u-botanickom-vrtu-1219.html>)
- new SINP bookmarks were printed covering Natura 2000 species, with *Myotis capaccinii* representing bats
- Elementary School Grdanjci was given an acknowledgment as a bat friend - school by SINP for keeping Lesser Horseshoe nursery in the attic (<http://www.dzpp.hr/novosti/k/priznanje-skoli-%E2%80%93-prijatelju-sismisa-%E2%80%93-podrucnom-razrednom-odjelu-grdanjci-za-doprinos-u-zastiti-sismisa-1027.html>)
- media coverage on national TV, national radio stations, newspapers, regional and local web portals on a regular basis

Croatian Biospeleological Society (CBSS, [http://www.hbsd.hr/Onama\\_eng.html](http://www.hbsd.hr/Onama_eng.html))



- lectures on bat fauna were held in several schools
- coverage in national and local media
- in 2013 members of CBSS participated in organizing permanent exhibition (which also includes bat fauna) in the Museum of Baredine cave
- members of CBSS participated in development of the protocol for *Geomyces destructans*
- bat rehabilitation assistance

#### Association for Bat Conservation Tragus:

- lectures on bats and their conservation were held in schools, libraries and on the events organised by the public institutions governing protected areas
- coverage in national and local media
- bat rehabilitation assistance
- leaflet on bat houses

#### Other:

- in 2013 bat expert Norma Fressel held lectures and workshop about bat ecology and biodiversity at the "2nd Week of Natural History" on the Island of Korčula organised by ADIPA - Croatian Natural History Research and Conservation Society
- in 2013 bat expert Mirna Mazija (Oikon Ltd., Geonatura Ltd., Association for Bat Conservation Tragus) participated as a panellist covering nature protection themes (especially bat conservation) on Panel discussion/round table "Importance of collaboration of stakeholders in planning of local and regional renewable energy development", Renewable energy policies advocacy and monitoring – REPAM project Conferences
- in 2013 bat expert Mirna Mazija (Oikon Ltd.) held lecture for Croatian Association of Professionals in Nature and Environmental Protection (HUSZPO) titled "Impact of wind farms on bat population" (<http://www.huszpo.hr/multimedija/prezentacija/utjecaj-vjetroelektrana-na-populacije-sismisa-mirna-mazija/>)

#### Publications:

- Bilgin R., Maraci Ö., Puechmaille S., Presetnik P., Hamidović D., Fressel N., Karapandža B., Paunović M., Ibañez C., Allegrini B., Gürün K., Georgiakakis P., Uhrin M., Benda P., Juste J. (2010): The distribution of genetic diversity of *Miniopterus schreibersii* in Europe and Anatolia. 15th International Bat Research Conference, August 2010, Czech Republic, Book of Abstracts
- Fressel N., Žvorc P., Kipson M., Zrnčić V., Hamidović D. (2010): Activity and roosting ecology of a mixed colony of *Miniopterus schreibersii* and *Rhinolophus euryale* in a cave near Zagreb: Improving current bat monitoring and cave management. 15th International Bat Research Conference, August 2010, Czech Republic, Book of Abstracts
- Kovač D., Drdar Ž., Randi D., Josić D., Hamidović D. (2010): Bat fauna research of Paklenica National Park with special emphasis on altitude distribution. 15th International Bat Research Conference, August 2010, Czech Republic, Book of Abstracts
- Hamidović D., Žvorc P. (2010): Bats of Balkans and Eastern Mediterranean: implementation of monitoring schemes and conservation measures. CEI Workshop held within the 15th International Bat Research Conference, August 2010, Czech Republic
- Hamidović D. (2010): Importance of communication and popularization of scientific research in protection and conservation of bats – one of the most endangered groups of mammals. Lecture. Symposium on 125 years of communication and popularization of science in public, December 2010, Zagreb, Book of Abstracts
- Hamidović, D., Žvorc, P., Kipson, M., Fressel, N., Kovač, D., Josić, D. & Zrnčić, V. (2010): White nose syndrome in bats, how speleologists can help. Lecture. Speleological Meeting of Croatia in regarding to 110 anniversary of Speleological Section „Liburnija“, November 2010, Biograd na Moru, Book of Abstracts
- Kipson, M., Hamidović, D., Žvorc, P., Fressel, N., Kovač, D., Josić, D. & Zrnčić, V. (2010): Bats in caves – conservation and monitoring. Lecture. Speleological Meeting of Croatia in

- regarding to 110 anniversary of Speleological Section „Liburnija“, November 2010, Biograd na Moru, Book of Abstracts
- Žvorc, P., Hamidović, D., Fressel, Kipson, M. & Zrnčić, V. (2010): Monitoring of bats in the Veternica cave. Lecture. Speleological Meeting of Croatia in regarding to 110 anniversary of Speleological Section „Liburnija“, November 2010, Biograd na Moru, Book of Abstracts
  - Bedek, J., Lukić, M., Jalžić, B., Ozimec, R., Bilandžija, H., Dražina, T., Hamidović, D., Patarčić, I. & Rnjak, G. (2010): New species of cave fauna as the results of explorations of Croatian deep pits. Lecture. Speleological Meeting of Croatia in regarding to 110 anniversary of Speleological Section „Liburnija“, November 2010, Biograd na Moru, Book of Abstracts
  - Dina Kovač (2011): Echolocation and wing morphology in *Nyctalus noctula* (Schreber, 1774) and *Nyctalus leisleri* (Kuhl, 1817) (Mammalia, Chiroptera). Diploma Thesis, University of Zagreb, Faculty of Science
  - Norma Fressel (2011): Echolocation in the Schreiber's Bat (*Miniopterus schreibersii*) (Kuhl, 1817) (Mammalia, Chiroptera). Diploma Thesis, University of Zagreb, Faculty of Science
  - Mazija M. & Domazetović Z. (2011): Research of forest bat species in the Nature Park Medvednica. Report, Association for Bat Conservation Tragus, pp. 43
  - Mazija, M., Domazetović, Z., Elez, L., Randić Potkonjak, B., Šunjić, H. (2011.): The integration of nature protection into environmental wind farm assessment procedures in Croatia. Poster presentation, Conference on Wind Energy and Wildlife Impacts, Trondheim, Norway, Book of Abstracts ([http://www.oikon.hr/Portals/0/wind\\_farm.pdf](http://www.oikon.hr/Portals/0/wind_farm.pdf))
  - D. Kovač, M. Mazija, D. Hamidović (2011): Echolocation analysis as a method for monitoring and identification of bats (Chiroptera, Mammalia). Oral presentation, International Conference “Nature protection in XXI<sup>st</sup> Century”, Žabljak, Montenegro, Proceedings of the Conference
  - M. Mazija & D. Kovač (2011): Assessment of wind power plants on bird and bat populations. Poster presentation, International Conference “Nature protection in XXI<sup>st</sup> Century”, Žabljak, Montenegro, Proceedings of the Conference (<http://www.oikon.hr/posteri/M.%20Mazija%20i%20D.%20Kova%C4%8D%20-%20%20Procjena%20utjecaja%20vjetroelektrana%20na%20populacije%20ptica%20i%20%C5%A1i%C5%A1mi%C5%A1a.pdf>)
  - Hamidović, D. (2011): Importance of speleological cadastre in research and protection of bats. Lecture. Seminar on cave cadastre, January 2011, Perušić, Book of Abstracts
  - Biology Students Association - BIUS (2011): Bat research on the Island of Hvar. In print
  - Bedek J., Lukić M., Jalžić B., Ozimec R., Bilandžija H., Dražina T., Hamidović D., Pavlek M., Patarčić I. & Komerički A. (2012): Subterranean community from Lukina jama – Trojama cave system, the deepest cave in Dinaric Karst (Northern Velebit Mt., Croatia). 21th International Conference on Subterranean Biology, September 2012, Slovakia, Book of Abstracts
  - M. Mazija, H. Peternel, D. Kovač, A. Pasarić, M. Magajne, E. Patčev, S. Kapelj, O. Antonić (2012): Space use degree in assessing the impact of wind power plants on birds and bats. Oral presentation, 11th Croatian biological congress, Šibenik, Croatia, Book of Abstracts
  - M. Mazija, Z. Domazetović, D. Kovač (2012): Bat fauna research in forest habitats of Medvednica Nature Park. Poster presentation, 11th Croatian Biological Congress, Šibenik, Croatia, Book of Abstracts
  - D. Hamidović (2012): Findings of bats in deep speleological sites in Croatia. Lecture. Scientific symposium “Special values of deep karst”, April 2012, Krasno, Book of Abstracts
  - J. Bedek, M. Lukić, B. Jalžić, R. Ozimec, H. Bilandžija, T. Dražina, D. Hamidović, M. Pavlek, I. Patarčić, A. Komerički (2012): Fauna of deep pits in Northern Velebit. Lecture. Scientific symposium “Special values of deep karst”, April 2012, Krasno, Book of Abstracts
  - Marguš, D., Barišić, T., Bedek, J., Dražina, T., Gracin, J., Hamidović, D., Jalžić, B., Komerički, A., Lukić, M., Marguš, M., Menđušić, M., Miculinić, K., Mihelčić, G., Ozimec, R., Pavlek, M. (2012): Secrets of the underworld. Monograph, Public Institution National Park Krka, pp. 238

- Vida Zrnčić, (2013): Bat ectoparasites in the Republic of Croatia. Diploma Thesis, supervisor: Prof. A. Marinculić, University of Zagreb, Faculty of Science.
- Škunca M., Đanić A., Mazija M., Peternel H., Kovač D., Patčev E., Kapelj S., Antonić O. (2013): Mapping the physiognomic types of vegetation in determining the space use degree of bird and bat fauna while assessing the impact of wind power plants. 4th Croatian Botanical Symposium with international participation, Split (Croatia), Book of Abstracts
- D. Kovač, M. Mazija, G. Rnjak, V. Zrnčić (2013): The importance of biospeleological component in bat fauna monitoring during pre-construction of wind farms. Poster presentation, First Regional Conference on Environmental Impact Assessment, Zadar, Croatia, Book of Abstracts
- Đud, L., Bedek, J., Jalžić, B., Bilandžija, H., Dražina, T., Pavlek, Lukić, M., Komerički, A., Žvorc, P. (2013): Hidden life inside of Velebit. Leaflet, Public Institution Nature Park Velebit and CBSS ([http://www.hbsd.hr/vijesti/20130430\\_pdf.pdf](http://www.hbsd.hr/vijesti/20130430_pdf.pdf))
- Marina Kipson: Investigating habitat utilization, roosting requirements and recent range shift in lithophilic bat species, *Hypsugo savii*, in the Mediterranean biodiversity hotspot and Central Europe. PhD Thesis, supervisor: Prof. I. Horáček, Charles University, Prague, Czech Republic
- Public Institution for management of protected natural values of Karlovačka County: Cave in stone-pit Tounj. Monograph

#### **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 for the provision of advice on bat conservation and management has not been nominated yet. Questions and problems in regards to bats in buildings and other human settlements usually get directed to bat experts and NGOs, Croatian National History Museum, zoos, State Institute for Nature Protection, Nature Protection Inspection or Nature Protection Directorate in the Ministry of Environmental and Nature Protection.

Important bat habitats and roost sites inside the Ecological Network of the Republic of Croatia or protected areas are managed by public institutions governing protected natural values on county level or national and nature parks. These public institutions are responsible for adoption and implementation of management plans and annual programmes for protection, maintenance and conservation of the Ecological Network site or protected area. Management plans and annual programmes are subject to the approval of the Ministry and prior opinion of the State Institute for Nature Protection. However, no management plans for the Ecological Network sites outside national or nature parks were adopted so far.

State Institute for Nature Protection provides expert basis for the conservation measures and gives opinion in the Ecological Network Impact Assessment (ENIA) procedure for plans and programs that could have an impact on the Ecological Network.

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

In regards to caves with bats open for tourism, the nature protection conditions prescribed by a concession approval to use a speleological object for economic purposes include a requirement for a bat friendly entrance. In Veternica cave there are visiting restrictions due to the hibernation colony of several species. The cave is closed for visitors in winter period (from November until April). For several other caves the doors were changed to bat friendly (examples are cave Lokvarka and Biserujka cave).

Available EUROBATS publications are distributed to Public Institutions responsible for nature protection either in hard copy or through EUROBATS links on pdf versions. Three bat houses were placed on a private house in the city of Rijeka as a mitigation measure for roof renovation in cooperation of State Institute for Nature Protection (SINP), the Ecological section of the Cultural Centre Dubrava from Zagreb (that provided the bat houses) and the Public Institution for Managing Protected Nature Areas in Primorsko – goranska County. The restoration of the

Castle Bosiljevo is followed by the Ministry and SINP since 2010 in order to preserve nursery of several bat species.

Croatian Scientific Focal Point was appointed to participate in the development of Action Plan for the Conservation of the Bat Species in the European Union, and gave expert input and general recommendations as required, following the Meeting of Experts in DG Environment, Brussels, held on 18th November 2013.

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

- EU NATURA 2000 Integration Project – NIP (<http://www.zastita-priode.hr/eng/Projects-International-Cooperation/Projects/EU-NATURA-2000-Integration-Project-NIP>). Bats are to be covered in the following goal: Biological inventory, habitat mapping, upgrading of data systems to fulfil EU reporting requirements and harmonizing data systems with the EU INSPIRE Directive requirements to improve whole Ecological Network Data Systems and future NATURA 2000 network. Inventory of bats in continental region of Croatia started in 2014 and is expected to last until the end of 2016. Each of the 52 selected 10x10 km square grid cells will be surveyed using mist netting, bat detector survey, survey of underground and overground sites and the additional information on bat presence (dead bats or their parts).
- “Development of faunistic and speleological databases (CRO fauna and CRO speleo)”, as part of the NPIS (Nature Protection Information System) is still under development. All relevant data on bats should be entered and stored in this database. It is being coordinated and prepared by State Institute for Nature Protection (SINP) – see also section 5. of this Report

State Institute for Nature Protection (SINP):

- Hamidović, D. (2012): Preliminary research on bats on the area of ornitological value Jezero nearby Njivice on the island of Krk. SINP, funded by Public Institution „Priroda“
- DZZP (2012): Proposal for the Natura 2000 Ecological Network – baseline study
- DZZP (2013): Spatial database of Natura 2000 sites with Natura 2000 Standard Data Forms for Special Protection Areas (SPA), Proposed Sites for Community Importance (pSCI), Sites of Community Importance (SCI) and for Special Areas of Conservation (SAC) (<http://natura2000.dzpz.hr/natura/>)
- SINP (2013): Background study for the protection of regional park Hrvatsko zagorje
- SINP (2013): Nature Park Dinara – background study for protection

Croatian National History Museum:

- Pavlinić, I. i Đaković, M. (2010): Scientific analysis of 12 bat species from the Annex II of the Habitats Directive for the purpose of proposing potential NATURA 2000 sites for bats. Croatian National History Museum, Zagreb, funded by SINP
- Tvrtković, N. (2011): Report on the condition and previous research of bats in Graduša cave near Velika Graduša in Banovina area. Croatian National History Museum, Zagreb

Centre for Research and Protection of Nature - Fokus

- Pavlinić, I. i Đaković, M. (2012): Continuation of monitoring of bat species from the Annex II of the Habitats Directive (*Rhinolophus ferrumequinum* and *R. blasii*) in 2011 according to the methodology developed in 2009 for the purpose of reporting under Article 17 of the Habitats Directive and the assessment of conservation status of *R. ferrumequinum* and *R. blasii*. Final report, Centre for Research and Protection of Nature – Fokus, Zagreb

Croatian Biospeleological Society:

- Žvorc P. (project leader): Bat monitoring in the Veternica Cave in 2011, 2012, 2013, 2014. Funded by Public Institution Nature Park Medvednica. Reports in 2011, 2012 and 2013

- Žvorc P. (project leader): Monitoring of bats in caves Baldina jama, Banšenova jama and Špilja kod Vrane (Nature Park Vransko jezero) in 2010, 2011, 2012. Funded by Public Institution Nature Park Vransko jezero. Reports in 2011, 2012 and 2013.
- Žvorc P. (project leader): Monitoring of bats in caves Izvor rijeke Bijele and Golubnjača in 2011 and 2012. Funded by Public Institution for Management of Natural Values in Zadar County. Reports in 2011 and 2012.
- Žvorc P. (project leader): Monitoring of bats in cave Izvor rijeke Bijele in Zadar County in 2013. Funded by Public Institution Natura Jadera. Report in 2013.
- Protection of cave Špilja u kamenolomu Tounj (2011) – Funded by Public Institution for Management of Protected Natural Values in Karlovačka county. CBSS is an associate for biospeleological part of the project. Report in 2011.
- Kipson M. (project leader): Civil Initiative "Blind for bats". Donation of Regional Foundation for local development – Zamah. Report in 2011.
- Fressel N. (project leader): Research and preliminary analysis of Bats in cave Manita peć Funded by National Park Paklenica. Report in 2014.

#### Association for Bat Conservation Tragus:

- Mazija, M. et al. (2014): Monitoring of hibernating colonies of *Rhinolophus ferrumequinum* on eight localities in Croatia. Funded by the State Institute for Nature Protection (cooperation with Sebastien Puechmaille).
- Mazija, M. et.al. (2013): Monitoring of maternity colonies of *Rhinolophus ferrumequinum* and *Rhinolophus blasii* on thirteen localities in Croatia. Funded by the State Institute for Nature Protection
- Mazija, M. & Domazetović Z. (2011 – 2012): Bat fauna in National Park Brijuni. Funded by the Public institution "National Park Brijuni".
- Mazija, M. & Domazetović Z. (2010 – 2011): Research on forest bat species in Nature Park Medvednica. Funded by the Public institution „Nature Park Medvednica“.
- Mazija, M. & Domazetović Z. (2010): Preliminary research on bat species in National Parka Brijuni, Funded by the Public institution "National Park Brijuni".

#### Other:

- Kipson, M. (2012): Bat fauna (Chiroptera) in the selected areas of Mura-Drava regional park. Funded by the State Institute for Nature Protection.
- Kipson, M. (project leader), 2011 – 2012: Strengthening the Support and Scientific Evidence for Conservation of 'Europe's Amazon' through Monitoring of Bats as Bio-indicators and Involvement of Community. Funded by the Rufford Small Conservation Grants ([http://www.rufford.org/rsg/projects/marina\\_kipson](http://www.rufford.org/rsg/projects/marina_kipson)).
- Mazija, M. (2014): Monitoring of maternity colonies of *Rhinolophus ferrumequinum* on eight localities in Croatia. Funded by the State Institute for Nature Protection.
- Mazija, M. (2014): Inventarisation of bat species in Strahinjščica and Ivanščica area in Krapinsko - zagorska County. Funded by the Public Institution for the Management of Protected Natural Values in Krapinsko - zagorska County.
- Mazija, M. et.al. (2012): Impact assessment of hydropower plant Ombla construction on bat fauna. Project conducted by Oikon Ltd. (<http://www.hep.hr/hep/grupa/razvoj/ombla/Sektorska%20Studija%20utjecaja%20izgradnje%20HE%20Ombla%20na%20faunu%20sismisa.pdf>)
- Tvrtković, N. (2012): Documented findings of mammals in National Park North Velebit.

### **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 surveys and actions have been undertaken in this field since the last report. State Institute for Nature Protection always gives expert opinion not to use timber treatment chemicals toxic for mammals (for example for the castles and roof renovations etc.)

## **D. FUNCTIONING OF THE AGREEMENT**

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

Croatian bat experts have carried out joint projects and cooperated with colleagues from Czech Republic, Slovenia, Serbia, Turkey, United Kingdom, Switzerland Austria and France.

Croatian Natural History Museum cooperates with:

- Dr. Raphaël Arlettaz, University of Bern, Division of Conservation Biology, Institute of Zoology, Bern, Switzerland
- Dr. Friederike Spitzenberger, Natural History Museum, Mammal Department, Vienna, Austria

Croatian Biospeleological Society cooperates with:

- MSc Radek K. Lučan, Department of Zoology, Faculty of Science, Charles University in Prague, Czech Republic
- Mr. Primož Presetnik, Centre for Cartography of Fauna and Flora (CKFF), Ljubljana Office, Slovenia
- Dr. Ibrahim Raşit Bilgin, Boğaziçi University, Institute of Environmental Sciences, Istanbul, Turkey
- Dr. Henry Schofield, Vincent Wildlife Trust, United Kingdom.
- Mr. Jasmin Pašić, Centre for karst and speleology, Bosnia and Herzegovina
- Mr. Jasminko Mulaomerović, Centre for karst and speleology, Bosnia and Herzegovina.
- Mr. Ivan Napotnik, Speleological society Ponir, Bosnia and Herzegovina.
- In 2013. D. Hamidović and P. Žvorc participated in the first European Bat Night organized in Bosnia and Herzegovina by the Centre for karst and speleology. European Bat Night was held in Čapljina in August 2013
- At the end of 2013 CBSS, in joint venture with Vincent Wildlife Trust, became a member of BatLife Europe

Association for Bat Conservation Tragus cooperates with Mr Branko Karapandža, Wildlife Conservation Society “Mustela”, Serbia.

State Institute for Nature Protection cooperates with Dr. Sebastien Puechmaille, Zoological Institute and Museum, J.-S.-Bach-Str. 11/12, Greifswald, Germany.

D. Hamidović is a member of the IUCN Bat Specialist Group (<http://www.batconservancy.org/75.php>).

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

*Resolution 2.2: Consistent Monitoring Methodologies followed by Resolution 5.4: Monitoring Bats across Europe*

See Section 5 of this Report.

*Resolution 2.3: Transboundary Programme: Species proposals*

There are currently no transboundary co-operation projects in Croatia to identify the distribution and migration patterns of *Myotis dasycneme* and *Pipistrellus nathusii*.

*Resolution 2.4: Transboundary Programme: Habitat proposals*

In regards to bats in underground sites and forests, research and monitoring are on-going. The list of important underground sites for bats is increasing from year to year because of growing number of bat researchers and on-going bat research done by several organisations, especially in the scope of Natura 2000 proposal and management. Forest dwelling bat species are not so thoroughly researched and data on these species is scarce and occasional.

Natura 2000 sites important for bats according to the criteria of the Annex II of the Habitat Directive were defined. For bat species not listed on the Annex II of the Habitats Directive clear criteria for defining the important sites on the national level are not yet established.

Underground sites important for bats in Croatia were identified and included in EUROBATS Publication Series No. 6: Conservation of Key Underground Sites. ([www.eurobats.org/publications/eurobats\\_publication\\_series](http://www.eurobats.org/publications/eurobats_publication_series)). Since then, the list is being revised and updated regularly, derived from the current data that was gathered for the Natura 2000 proposal. Last update was submitted in March 2014 with 55 underground sites listed, and 2 underground sites erased from previous version.

Assessment of conservation problems and protection measures for bats in forests and underground habitats on national level hasn't been made.

#### Resolutions 1-J, 2.7 and 3.3: Format of National (Implementation) Reports

This report has been prepared in accordance with the adopted format.

#### Resolutions 1-K, 2.8, 3.8, 4.9, 5.10, 6.16: Implementation of the Conservation and Management Plan

All relevant activities are elaborated in points 1 to 14 of this report.

#### Resolution 3.4: Guidelines for the Issue of Permits for Bat Ringing Activities; incorporated in Resolution 4.6: Guidelines for the Issue of Permits for the Capture and Study of Captured Wild Bats, Resolution 5.5: Guidelines for the Issue of Permits for the Capture and Study of Captured Wild Bats and Resolution 6.5: Guidelines on Ethics for Research and Field Work Practices

According to the Nature Protection Act (OG 80/2013) and the Ordinance on Strictly Protected Species (OG 144/2013), all bat species in Croatia are strictly protected. The Ministry of Environmental and Nature Protection, as the responsible authority for nature protection in Croatia, issues permits for bat research which includes direct contact with animals, disturbance or destruction of bat habitats and other derogations from measures of strict protection based on the expert opinion of the State Institute for Nature Protection. The permit sets out the conditions (permitted activities and the period when they can be performed, techniques, equipment, etc.). It also sets out the reporting obligation. Infringement of the conditions prescribed or carrying out bat research and activities without a permit is subject to misdemeanour provisions of the Nature Protection Act.

Bat ringing hasn't been licensed since Croatia became a party to EUROBATS in 2000.

#### Resolution 3.7: Amendment to the Agreement

Croatia hasn't deposited an instrument of acceptance to the Amendment yet.

#### Resolution 5.1: Financial and Administrative Matters (Budget 2007 – 2010)

Croatia has paid all annual contributions to EUROBATS in the reporting period as requested by the Resolution.

#### Resolution 4.3: Guidelines for the Protection and Management of Important Underground Habitats for Bats

Projects on cave dwelling bats and underground sites important for bats are listed in point 12 of this Report.

According to the Nature Protection Act (OG 80/2013), prior to performing any activity or research in a speleological object or above it, that can affect fundamental features, conditions and natural flora and fauna, it is necessary to obtain a permit from the Ministry.

Many speleological objects are in the Ecological Network.

For caves open for tourism a bat friendly entrance is being prescribed. Veternica cave is closed for visitors in winter period (from November until April) due to hibernation of several bat species.

#### Resolution 4.4 and Resolution 6.12: Bat Conservation and Sustainable Forest Management

Forest dwelling bat species are not thoroughly researched and data on these species is scarce or lacking. Bat assembly in different forest habitat types has yet to be evaluated. For species listed on the Annex II of the Habitats Directive, Natura 2000 sites were defined.

In regards to forest management practices and conservation of biological diversity, Nature Protection Act prescribes it is necessary to safeguard wild species and habitats and that nature protection requirements issued by the Ministry of Environmental and Nature Protection - Nature Protection Directorate constitute an integral part of forest management plans based on expert opinion by the State Institute for Nature Protection (SINP). In last couple of years, bat conservation measures suggested are not to disturb bat roosts found in trees and any such finding should be reported to SINP and the relevant public institution responsible for nature conservation. Additionally, trees with confirmed bat roosts should be excluded from forest management. So far SINP received data only occasionally.

According to the Forestry Act, national forest and woodland management company »Hrvatske šume«, as well as private forest owners, are obliged to manage forests by preserving and improving biological and landscape diversity and taking care of forest ecosystem (taking care of other species in the ecosystem which are tied to dry or rotting trees i.e. leaving a required number of old, hollow and rotten trees in such a pattern and number to preserve the biological diversity).

#### Resolution 4.5: Guide for the Use of Remedial Timber Treatment

No specific measures or actions undertaken. See also section 13, of this Report.

#### Resolution 5.2: Bats and Rabies in Europe

No specific measures undertaken.

At the Second Symposium on Rabies in Croatia with International Participation held in December 2006 in Zagreb, Croatia, it was concluded that during last 42 years no human rabies incident was recorded. It is compulsory to conduct anti-rabid treatment on a person bitten by bat suspicious of rabies.

Occasionally, bat corpses and museum specimens were analyzed for rabies at the Croatian Veterinary Institute and proved to be negative (Pavlinić I., Čač Ž., Lojkić I., Đaković M., Bedeković T., Lojkić M. (2009): Bats-biological reservoirs and potential lyssavirus carriers, Veterinarska stanica: Scientific Veterinary Journal (0350-7149) 40 (2009), 5; 297-304.)

#### Resolution 5.7: Guidelines for The Protection of Overground Roosts, with particular reference to roosts in buildings of cultural heritage importance

The current data on overground roosts important for bats is stored in SINP database.

Cooperation between the cultural heritage conservation departments or managers and nature protection sector in regards to bat roosts in cultural heritage buildings has been sporadic. In a few cases restoration works have been conducted in cooperation and under supervision of bat experts. Conservation measures for bats, to be undertaken during restoration of cultural heritage buildings, were given by bat experts in a few cases. National guidelines for the protection of bat roosts in historical buildings do not exist. Through forms prepared for recording bats in buildings of cultural heritage State institute for Nature Protection didn't obtain any feedback (from two counties they were distributed to).



The Protocol on inventory and conservation of bats in overground roosts with particular reference to roosts in buildings of cultural heritage importance has been under development since 2011. Since then, cca 30 surveys were carried out and two roosts were recorded in attics – one of the largest nurseries of *Rhinolophus hipposideros* in an elementary school and a *Myotis emarginatus* nursery in a business building.

Resolution 5.12: 2008 – Global Year of the Bat and 6.9 Year of the Bat

See section 9 of this Report.

Resolution 6.11 Wind turbines and bat populations

*(Repeals Resolution 4.7: Wind Turbines and bat Populations and Resolution 5.6: Wind Turbines and Bat Populations: guidelines for the planning process and impact assessments)*

According to the Regulation on Environmental Impact Assessment (OG 61/2014), the Environmental Impact Assessment (EIA) is obligatory for the installation of wind turbines of 20 MW or more, while screening procedure is prescribed for all other wind turbine installation. The EIA procedures are under the jurisdiction of the national or local government, depending on the size of the project.

The wind energy investors are obliged to finance the EIA study in order to obtain the relevant permits and to finance monitoring after installation. In the EIA procedure the measures are prescribed to avoid the negative impacts of wind turbines on bats. These measures include the obligation of monitoring. After the installation of wind turbines the monitoring is prescribed and new mitigation measures can be prescribed if the negative impact occurs. The summaries of all EIA studies are available on the web site of the Ministry of Environmental and Nature protection.

Ministry of Environmental and Nature Protection has published guidelines for environmental impact assessment of wind turbines on birds and bats, which set minimal standards for the EIA study and monitoring programme. In the guidelines it is specified that the measures proposed in the EIA for the avoidance of negative impact on bats during the operation of the wind turbines should include the adaptation of time of operation or stopping of wind turbines in the peaks of bat activity (identified by the EIA and monitoring).

For plan, program or project that independently or together with other plans, programs or projects, might have a significant impact on conservation objectives and on the coherence of the territory of the Ecological Network of Republic of Croatia, Ecological Network Impact Assessment is performed and needs to take into account cumulative effects of the installation.

Potential wind farm sites are identified in the Physical Plan. So far, the choice of potential locations for wind farms in Croatia has mainly been based on wind potential of specific locations, and no account has been taken of cumulative effects of installation of a substantial number of wind farms in a certain area.

Despite the existence of national guidelines for EIA regarding bats and wind turbines, more specific measures, update and clarification of guidelines are necessary. The number of wind power plants continues to grow and in the sub-Mediterranean region of the Dinaric Arc several wind turbines are planned, posing a serious threat to bats, particularly during the migratory season. Most of the large bat nurseries (on the List of Internationally Important Underground Sites, UNEP/EUROBATS) are located in that region.

One report on wind farm bat mortality in the period from March till October 2013 recorded 148 bat carcasses of at least 5 species. The final report was submitted in March 2014 and mitigation measures will be prescribed. For the other wind farm, monitoring report for the period April 2013 to March 2014 recorded 18 bat carcasses (11 *Hypsugo savii*, 4 *Pipistrellus kuhlii*, 2 *P. pipistrellus* and 1 *Tadarida teniotis*). The monitoring methodology for both windfarms is not comparable.

Resolution 6.4 Guidelines for the implementation of the EUROBATS Project Initiative (EPI)

Croatian Scientific Focal Point is a member of the EPI Assessment Committee.

Resolution 6.6: Guidelines for the Prevention, Detection and Control of Lethal Fungal Infections in Bats

During a regular winter monitoring at the Veternica Cave in 2011 a bat with a white nose was discovered and sent to Dr. Sébastien Puechmaille's for DNA analysis to determine was the white nose caused by *Geomyces destructans*. Based on this, a Protocol for survey of lethal fungal infections in bats was developed. The coordinator of the Protocol is the State Institute for Nature Protection and bat experts and NGOs from Croatia, Croatian Veterinary Institute, and Speleological Societies and Clubs are involved. In addition, a quick survey was also organized. More than ten caves were surveyed and in two caves bats with white noses were found and samples were taken. Regular winter monitoring at the Veternica Cave didn't report on new cases with White Nose Syndrome (WNS) suspected bats since then. During the winter monitoring 2014 seven different caves were sampled for *Geomyces destructans* according to the protocol prepared by Dr. Sebastien Puechmaille for the pan-european project.

Resolution 6.7: Conservation and Management of Critical Feeding Areas, Core Areas around Colonies and Commuting Routes

See Section 6 of this Report

Resolution 6.8: Monitoring of Daily and Seasonal Movements of Bats

There has not been any progress yet.

Resolution 6.13: Bats as Indicators for Biodiversity

Croatia still develops National Information system and monitoring schemes.

Resolution 6.14: Impact of Roads and Other Traffic Infrastructures on Bats

See Section 6 of this Report.

Resolution 6.15: Impact on Bat Populations of the Use of Antiparasitic Drugs for Livestock

No information so far.