ICNB
Instituto da Conservação da Natureza e da Biodiversidade, I.P.

Ministério do Ambiente e do Ordenamento
do Território e do Desenvolvimento Regional

AGREEMENT ON THE CONSERVATION OF POPULATIONS OF EUROPEAN BATS

Report on implementation of the Agreement in Portugal

- 13 AC Meeting-

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A. General Information

- *Name of Party*: Portugal
- *Date of Report*: 30 June 2008
- *Period Covered*: March 2006 to June 2008
- *Competent Authority*: Instituto da Conservação da Natureza e da Biodiversidade (ICNB)

B. Status of bats within the territory of the party

1. *Summary details of Resident Species*

24 species are known in Continental Portugal (Table 1).

The revision of the Portuguese Red Data Book, using the new criteria of IUCN, was published in 2005 (Cabral MJ (coord.), Almeida J, Almeida PR, Dellinger T, Ferrand de Almeida N, Oliveira ME, Palmeirim JM, Queiroz AI, Rogado L & Santos-Reis M (eds). 2005. *Livro Vermelho dos Vertebrados de Portugal*. Instituto da Conservação da Natureza. Lisboa. 660pp.). *Pipistrellus nathusii* was not evaluated in the continent because its presence was reported in 1910 but there are no recent observations for this species.

2. *Status and Trends*

Table 1 shows the status and the apparent population trends of the species known in Continental Portugal.

Table 1 - Status and apparent population trends of the species known in Continental Portugal. Trends were calculated only for species with status other than Least Concern. Data published in the Portuguese Red Data Book (Cabral *et al.*, 2005).

Species	**Status**	**Apparent Trend**
Rhinolophus ferrumequinum	Vulnerable	Indetermined
R. hipposideros	Vulnerable	Indetermined
R. euryale	Critically Endangered	Declining
R. mehelyi	Critically Endangered	Severe declining
Myotis mystacinus	Data Deficient	Unknown
M. emarginatus	Data Deficient	Indetermined
M. nattereri	Vulnerable	Seems to be increasing
M. bechsteinii	Endangered	Unknown
M. myotis	Vulnerable	Declining
M. blythii	Critically Endangered	Severe declining
M. daubentonii	Least Concern	
Pipistrellus pipistrellus	Least Concern	
P. kuhli	Least Concern	
P. pygmaeus	Least Concern	
Hypsugo savii	Data Deficient	Unknown
Nyctalus leisleri	Data Deficient	Unknown

N. noctula	Data Deficient	Unknown
N. lasiopterus	Data Deficient	Unknown
Eptesicus serotinus	Least Concern	
Barbastella barbastella	Data Deficient	Unknown
Plecotus auritus	Data Deficient	Unknown
P. austriacus	Least Concern	
Miniopterus schreibersii	Vulnerable	Stable
Tadarida teniotis	Data Deficient	Unknown

3. *Habitats and Roost Sites*

In Portugal there are many habitats that can be used by bats. We have extensive limestone zones, with many caves, that are used by cave-dwelling species both in the winter and during the maternity season. In the last decades, with the declining of the mining activities, new potential roosts became available and are now occupied.

There are also many known roosts in buildings, cliffs, bridges and a few trees used by bats were identified.

4. *Threats*

The major threats that occur in Portugal are:

Disturbance

In the last years there has been an increase in the number of people involved in outdoor activities, including caving, and we often find signs of the recent presence of visitors inside the caves. The disturbance is particularly bad during the hibernation and maternity seasons. In some caves we even found signs of fires and shotgun cartridges.

Roost destruction

Shepherds sometimes blocked the entrance of vertical caves to keep their animals from falling in them; there are no data on the numbers of holes closed for this reason, but the practice does not seem to continue. In accordance with Portuguese law the entrances of inactive mine galleries should be closed for security reasons; there has been an effort that methods compatible with the continuation of their use by bats are adopted. Several mines were already closed with bat friendly methods.

Loss of feeding areas

Portugal´s landscape changed, due to the integration in EU. The traditional land use practices (low intensity grazing, large areas of holm oak "montados", and little use of pesticides) were overall better for the bats. Clearing of riparian vegetation is still a common practice.

Pesticides

Pesticides probably affect bats, but there is no data on the subject.

Traffic injuries

In particular low-flight bat species can be killed by cars. There are a few records of several species (*R. ferrumequinum*, *R. hipposideros, P. kuhli*, *P. pipistrellus* or *P. pygmaeus*, *P. austriacus, B. barbastellus*) that were found dead in roads, but there are no quantitative data on this subject.

Wind-turbines

In particular high-flight species can be killed by wind turbines. There are some records of several species (*H. savii, N. leisleri, P. pipistrellus* or *P. pygmaeus*, *M. daubentonii*) that were found dead in wind farms, but there are no quantitative data yet on this subject.

5. *Data Collection, analysis, interpretation and dissemination*

All activities related with data collection, analysis, interpretation and dissemination are done by “ICNB” in collaboration with “Faculdade de Ciências de Lisboa”.

There are some databases prepared by "ICNB" and "Faculdade de Ciências de Lisboa": (a) Bat observations (based on bibliography and fieldwork), (b) Underground roosts monitoring programme, and (c) Banding (captures and recaptures).

The web site of “ICNB” (www.icnb.pt) contains a database called SIPNAT (“Sistema de Informação do Património Natural”) that includes information of all bat species that occur in Portugal.

The web site of “ICNB” also contains a plan (“Plano Sectorial da Rede Natura 2000”) that comprehends cartography and conservation and management measures of Portuguese SCI´s. The plan includes information on natural values included in the annex II of Habitats Directive and data on the species present in the Portuguese SCI´s (covering species included in annexes II and IV).

C. Measures taken to implement Article III of the Agreement

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

Portuguese law protects all bat species since 1967. They are also covered by international legislation that was transferred to national legislation, such as Bern Convention, Bonn Convention, and Habitats Directive.

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

The survey of the underground roosts is already quite complete. The actual list of Portuguese SCI´s includes the majority of underground important roosts.

The roosts of the remaining species are still poorly known.

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

In Portugal the landscape is not managed specifically to protect bat-feeding habitats. However, since most of the main important known roosts are inside SCI´s, some planning/management and regulatory rules will protect directly or indirectly feeding habitats (as well as roosts). Under the implementation of environmental impact assessment regulation there are also compensation and minimization measures, as well as monitoring, specifically for bats feeding habitats (and also roosts).

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

10th Bat Night was organised by "Grupo de Protecção do Sicó", on 26 August 2006. A few dozens of participants (including speleologists) participated in a session with several presentations on bat ecology and conservation. After dusk there was a walk with bat detectors.

11th Bat Night was organized by "Fundo para a Protecção dos Animais Selvagens" on 22 June 2007. Around 400 students participated in several activities. After dusk there was a walk with bat detectors, preceded by a talk.

12th Bat Night was organized by "Fundo para a Protecção dos Animais Selvagens" on 20 June 2008. Around 350 students participated in several activities. After dusk there was a walk with bat detectors, preceded by a talk.

Five talks about bat conservation and three workshops were done in schools and universities.

Several talks were presented in Conferences.

One field trip with students from a university was organised.

Several articles about bats were published in magazines and newspapers.

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

This point has not been implemented yet.

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

A highway close to a maternity roost was constructed. The roost was fenced to avoid its disturbance. The promoter paid the fence.

12. *Recent and ongoing programmes (including research and policy initiatives) relating to the conservation and management of bats. In the case of research, summaries of completed projects should be provided, giving references where possible and acknowledging the sources of funding.*

a) Monitoring programme of cave-dwelling species. A monitoring programme of the cave-dwelling species is in progress since 1987. This programme involves the estimation of bat numbers present in the most important wintering and parturition roosts. The surveys are carried out annually in most of the roosts. An evaluation of the evolution along the

years was published. Co-funded by "ICNB", “Faculdade de Ciências de Lisboa” and Speleology Associations.

b) Control of the vegetation in the entrances of some roosts. There has been an effort to cut the vegetation in the entrances of some roosts, which sometimes become blocked. Funded by "ICNB".

c) Fencing of underground roosts. One cave was protected; funded by the promotor of a highway constructed close to the roost. Several pits of an abandoned mine used by several species for hibernating were fenced; funded by “Environmental Planning Programme” and “ICNB”.

d) Creation of an Interpretation Centre in a Natural Park. An Interpretation Centre was built in the “Natural Park of Serras de Aire and Candeeiros”, near a cave that harbours maternity colonies of several species. The Centre has an interactive exhibition and an observatory, where visitors can observe the bats inside the cave using infrared cameras. Co-funded by "Structural Funds for Environment” and Local Authority (“Câmara Municipal de Alcanena”).

e) The impact of parasitism on the condition of bat hosts. Parasites can have a profound affect on their hosts, influencing their immune responses, energy budgets, behaviour and physical condition. Although bats harbour a wide range of ectoparasites, their effects on bat’s condition are still poorly documented. The main aim of this PhD was to look at the ectoparasite community of the Schreiber’s bat *Miniopterus schreibersii* and to determine if these parasites can affect the fitness of their bat hosts, and consequently play a role in the organization of their social structure. Simultaneously, different aspects of this host-parasite interaction were studied, such as host specificity, sensory mechanisms of host location by parasites, and parasite community patterns. Funded by “Foundation for Science and Technology”.

f) Ecology of the barbastelle bat, *Barbastella barbastellus*. The purpose of this PhD is to investigate the ecological characteristics of one of the least known and most threatened species of tree-dwelling bats (*B. barbastellus*) and also consider other tree-dwelling species. This study will focus on developing habitat-suitability maps that highlight areas of likely occupancy by this bat. Subsequently, new trapping techniques will be tested in these areas to improve capture efficiency. From captured individuals a non-lethal biopsy punch will be collected for genetic analysis to characterize the population structure and species’ evolutionary history. Individuals will be released and followed to their roosts by radio-tracking. This research will try to identify patterns of resource utilization and demographic structure that can be used in effective conservation strategies for tree-dwelling bats. Besides these objectives, this research will also focus on investigating barbastelle phylogeography and European post-glacial colonization

routes combining mtDNA analysis with GIS predictive modelling. Moreover, using predictive modelling this research will also try to asses the impact of climate change on 28 European bat species considering their biogeographic patterns. Funded by "Foundation for Science and Technology".

g) Genetic structure and gene flow of fragmented bat populations. In this PhD, mtDNA sequences and nuclear microsatellite loci were used to increase the knowledge about the fragmented populations of the two threatened bat species: the Azorean bat (*Nyctalus azoreum*) the continental Schreiber's bent winged bat (*Miniopterus schereibersii*). This study included an examination of the phylogenetic relationships among several species within the genus Nyctalus, and of the genetic divergence between *N. azoreum* and its mainland ancestor, *N. leisleri*. It also involved the analysis of the genetic diversity within populations, and genetic differentiation among the studied fragmented populations, thus revealing new insights about their population structure, history and behavioural dispersal. This thesis provided important information to define biologically meaningful conservation units for the studied species. For *N. azoreum*, two management units were suggested (S. Miguel island and the Central Group), while for *M. schreibersii* four units were defined (North, West Centre, Marvão and South). These units should be taken into account when planning conservation and management actions. Funded by "Foundation for Science and Technology".

h) Population ecology of *Miniopterus schreibersii* and *Myotis myotis*. All bats presently considered as threatened in Portugal are cave-dwellers, which show that the conservation of this group of species requires an active management programme. However, the planning of management measures requires a good knowledge of some aspects of the biology of species, including their population ecology. Much of this critical knowledge is still missing, as bats are among the least studied of vertebrates. To contribute to overcome this limitation, four general objectives were planned for this PhD: (1) understand bat migration patterns and their causes, (2) determine how spatial behaviour influences population structure and potential gene flow among maternity colonies, (3) determine if there are critical times during the yearly cycle of bats, and (4) understand how roosting behaviour and phenology relate to ambient and roost climate. The two first objectives were studied with *Miniopterus schreibersii* and the latter with *Myotis myotis*. Results are discussed in the perspective of planning of management measures, particularly in the Portuguese context.

i) Patterns of genetic diversity in Portuguese populations of *Myotis daubentonii daubentonii* and *Myotis d. nathalinae*. The aim of this study was to examine genetic variation within populations of *M. d. daubentonii* and *M. d. nathalinae* from known glacial refugia, the Iberian Peninsula, using cytochrome *b* sequence data. Additional samples from northern Europe and Japan were included to assess how the species

spread from this refugium. The data should also be useful in determining the distinction between *M. daubentonii* and *M. d. nathalinae*, and thus make a contribution towards a better understanding of European bat diversity. Funded by "CIBIO – University of Porto".

j) Publications

Rainho A. 2005. How does land use change affect colonial bats? A methodology to compare alternative land use scenarios. MSc Thesis on Geographical Information Science. School of GeoSciences, Edinburgh. 30 pp.

Marques J.T. & Rainho A. 2006. Monitorização de impactos das actividades agro-silvo-pastoris sobre as populações de quirópteros do sítio Monfurado com vista à elaboração de planos de gestão. Relatório Técnico e Financeiro Final Acção A5 GAPS – Gestão Activa e Participada do Sítio de Monfurado (LIFE03/NAT/P/000008) 30 p + Anexos.

Rainho A., Lourenço S., Rebelo H. & Freitas A. 2006. Bats and dams. Conservation actions in the region of the reservoir of Alqueva and Pedrógão. ICN / EDIA. 40pp.

Rodrigues, L. 2006. EUROBATS: 15 years helping bat conservation in Portugal. Pp. 75-78. *In 1991-2006 EUROBATS celebrates its 15th anniversary*. EUROBATS Publication Series nº 1.

Rainho A. 2007. Summer foraging habitats of bats in a Mediterranean region of the Iberian Peninsula. Acta Chiropterologica, 9(1): 171-181

Zahn A., Rodrigues L., Rainho A. & Palmeirim J.M. 2007. Critical times of the year for *Myotis myotis,* a temperate zone bat: roles of climate and food resources. *Acta Chiropt.*, 9(1): 115-125

Lourenço S. & Palmeirim J.M. 2007. Can mite parasitism affect the condition of bat hosts? Implications for the social structure of colonial bats. *J. Zool. (Lond.)* 273**,** 161-168.

Salgueiro P., Ruedi M., Coelho M.M. & Palmeirim J.M. 2007. Genetic divergence and phylogeography in the genus Nyctalus (Mammalia, Chiroptera): implications for population history of the insular bat Nyctalus azoreum . Genetica, 130, 169-181.

Salgueiro P. 2007. *Genetic structure and gene flow of fragmented bat populations: consequences for conservation.* PhD Thesis. University of Lisbon, Portugal.

Simoes B.F., Rebelo H., Alves P.C. & Harris D.J. 2007. Patterns of genetic diversity within and between *Myotis d. daubentonii* and *Myotis d. nathalinae* derived from cytochrome b mtDNA sequence data. *Acta Chiropterologica*, 9(2): 379–389

Mitchell-Jones A.J., Bihari Z., Masing M. & Rodrigues L. 2007. *Protecting and managing underground sites for bats*. EUROBATS Publication Series nº 2.

Rodrigues L. 2008. *Population ecology of two species of cave-dwelling bats (Miniopterus schreibersii and Myotis myotis)*. PhD Thesis. University of Lisboa, Portugal.

Rodrigues L. & Palmeirim J.M. 2008. Migratory behaviour of the Schreiber's bat: when, where, and why do cave bats migrate in a Mediterranean region? *Journal of Zoology*, 274: 116-125

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

Pest control agencies have been contacted, so that bats will not be harmed during their operations.

D. Functioning of the Agreement

14. Co-operation with other Range States

Cooperation with Spain concerning the recapture of banded bats is being carried out.

Cooperation with Spain and Germany on the project “Tracing bat migrations through the isotopic fingerprint in hair” is being carried out.

Luísa Rodrigues participated in a workshop organised by DEFRA/BCT, held in London in April 2006, on Monitoring and Surveillance Guidelines and Setting up a Pan-European Monitoring Scheme for Underground Sites.

Luísa Rodrigues participated in several EUROBATS Intersessional Working Groups (IWG on Transboundary Programme – Habitats: Data Compilation, IWG on Geographical Scope of the Agreement, IWG on Review of Guidelines for the Issue of Permits for the Capture and Study of Captured Wild Bats, IWG on Producing Guidelines on Bat Monitoring Methods to Assess Population Trends at Different Levels, IWG on Autecological Studies for Priority Species, IWG on Impact of Roads and Other Traffic Infrastructures on Bats, and IWG on Wind Turbines and Bat Populations, convening the last one.

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

Resolution 2.2 - Consistent Monitoring Methodologies and *Resolution 5.4 – Monitoring bats across Europe*

In Portugal, since 1987 there has been a programme to monitor cave-dwelling species, coordinated by ICNB. We monitor both maternity and hibernation roosts. We try to monitor every year all the underground roosts considered to be of National importance (around 30 each season) and some buildings that harbour important colonies of "cave-dwelling species" such as *R. ferrumequinum* and *R. hipposideros*. We always make observations inside the roosts, counting the individuals or estimating the area of the colonies (visually and with photographs). We use the methods described for *Myotis myotis/blythii* and *Miniopterus schreibersii* in the resolution approved in 2MoP. We believe that these methods can be successfully applied to *R. euryale, R. mehelyi, M. myotis, M. blythii* and *M. schreibersii*, that are very faithful to their roosts and hang from the ceiling, making the observations very reliable. In the case of *R. ferrumequinum* and *R. hipposideros*, we have more problems since they use many roosts to breed, in small numbers. Even during the winter, when they are expected to use only underground sites, they are not as philopatric as the other species. In the case of *M. nattereri* and *M. emarginatus*, although we only know maternity colonies in underground roosts, since normally they use hidden places (especially *M. nattereri*), very often we cannot observe the colonies. Often, only the capture of flying juveniles enables the identification of maternity sites. Details of monitoring programme have been forwarded to the relevant IWG.

Roosts inventoried during local monitoring programmes established as minimization measures of projects subjected to Impact Studies (particularly wind farms) are monitored by promoters. If any underground roost of national importance is found, it is included in the programme running by ICNB.

Portugal participates in the preparation of the Pan-European Monitoring Scheme for Underground Sites.

Resolution 2.4 – Transboundary Programme: Habitat Proposals

Since underground habitats are particularly important in Portugal, a special attention has been given to them. In the National Conservation Plan of Cave-dwelling Bats (1992), information about the most important roosts is available. A database of all roosts was prepared.

Details of the most important underground roosts have been forwarded to the relevant IWG.

Resolution 2.5 – Geographical Scope of the Agreement

A study of migratory patterns of some cave-dwelling species (*Miniopterus schreibersii*, *Myotis myotis* and *Myotis blythii*) is being conducted in a few roosts.

Resolutions 2.7 and *3.3 – Format of National Reports*

The reports have been prepared accordingly to the new formats.

Resolutions 2.8, 3.8, 4.9 and *5.10 – On the implementation of the conservation and management plan*

An effort to implement the Article III of the Agreement has being taken, as presented in this Report.

Resolution 3.7 – Amendment of the Agreement

This point has not been implemented yet.

Resolutions 4.3 – Guidelines for the Protection and Management of Important Underground Habitats

Portugal already sent information to the IWG. Several roosts were already protected with fences; other roosts should be protected.

Resolution 4.4 – Bat Conservation and Sustainable Forest Management

This point has not been implemented yet.

Resolution 4.5 – Guidelines for the Use of Remedial Timber Treatment

Remedial Timber Treatment is not commonly used in Portugal.

Resolutions 4.6 and *5.5 – Guidelines for the Issue of Permits for the Capture and Study of captured wild Bats*

New permits have been prepared taking into consideration these guidelines.

Resolutions 4.7 and 5.6 – Wind Turbines and Bat Populations

Portuguese recommendations for Environmental Assessment of wind turbines projects were completed with the guidelines prepared by EUROBATS.

Resolution 5.2 – Bats and Rabies in Europe

Passive surveillance is being carried out. Vaccination of people regularly handling bats is being reccomendend.

Other points have not been implemented yet.

Resolution 5.7 – Guidelines for the protection of overground roosts, with particular reference to roosts in buildings of cultural heritage importance

The known roosts are included in the database on bat observations. The roosts occupied by species with cave-dwelling habits (*R. ferrumequinum* and *R. hipposideros*) are being monitored, and an agreement about its maintenance has been achieved with the owners.

Other points have not been implemented yet.