MINISTÉRIO DA AGRICULTURA, DO MAR, DO AMBIENTE E DO ORDENAMENTO DO TERRITÓRIO

ICNF Instituto da Conservação da Natureza e das Florestas

AGREEMENT ON THE CONSERVATION OF POPULATIONS OF EUROPEAN BATS

Report on implementation of the Agreement in Portugal

- 2013 / 18 Advisory Committee Meeting -

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A. General Information

- *Name of Party*: Portugal
- *Date of Report*: 15 March 2013
- *Period Covered*: March 2012 to February 2013
- *Competent Authority for Mainland Portugal*: Instituto da Conservação da Natureza e das Florestas (ICNF)
- *Compiler of report*: Luísa Rodrigues
- *Compiler of report - Azores Archipelago*: Maria José Bettencourt
- *Compiler of report - Madeira Archipelago*: Sérgio Teixeira
- *Contributors Mainland Portugal*: Adelaide Ferreira, Almargem, Ana Lino, Ana Rainho, Bio3, Bruno Pinto, Bruno Silva, Bruno Simões, Denis Medinas, Eduardo Mendes, Francisco Amorim, Gabriel Mendes, Gioconda Silva, Helena Ceia, Hugo Rebelo, Inês Fernandes, Jorge Palmeirim, José Carlos Figueiredo, Henrique Pereira, Laboratório de Ecologia Aplicada, Lúcia Antunes, Luísa Rodrigues, Luzia Sousa, Maria João Ramos Pereira, Maria João Silva, Maria Manuela Marcelino, Marina Sequeira, Mário Carmo, Miguel Fevereiro, Milene Matos, Olímpio Martins, Pedro Alves, Pedro Casaleiro, Pedro Silva-Santos, NOCTULA, Nuno Pinto, Paulo Barros, Regina Bispo, Ricardo Silva, Sílvia Pereira, Tiago Marques
- *Contributors Azores Archipelago*: Raquel Ferreira
- *Contributors Madeira Archipelago*: José Jesus, Sérgio Teixeira

B. Status of Bats within the Territory of the Party

1. Summary details of Resident Species

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). *Pipistrellus nathusii* was not evaluated because its presence in mainland was reported in 1910 but there are no recent observations for this species. Genetic data suggest that *Plecotus auritus* may be replaced by *Plecotus begognae*, but this species is not yet accepted by the scientific community.

Mainland Portugal

25 species are currently known in mainland (Table 1).

After the publication of the Portuguese Red Data Book, the presence of *Eptesicus*

isabellinus and *Myotis escalerai* (replacing *M. nattereri*) was confirmed in mainland; it is still uncertain if *M. nattereri* is also present.

Azores Archipelago

According to Portuguese Red Data Book, two species are currently known for Azores (Table 2): *Nyctalus azoreum* (endemic to Azores) and *Pipistrellus maderensis* (endemic to Macaronesia). A reference is made to old observations of *Myotis myotis*, but its actual occurrence is not confirmed.

Madeira Archipelago

In Madeira archipelago, Madeira pipistrelle *Pipistrellus maderensis*, Savi's pipistrelle *Hypsugo savii*, Madeira's Leisler's bat *Nyctalus leisleri verrucosus,* Grey long-eared bat *Plecotus austriacus* and the European free-tailed bat *Tadarida teniotis* were listed based on nineteenth century work, essentially developed by Dobson and Bowdich. In 2000 and 2001, the GEBM –" Grupo de Estudo da Biodiversidade Madeirense" (Madeira's Biodiversity Study Group) composed by Sérgio Teixeira, David Teixeira, Ricardo Antunes and Tamira Freitas, funded by Associação Juvenil de Ciência (AJC), collected data comprising search for roost, inquiries to population, bat recordings using Het/TE ultrasound detectors and captured specimens morphology using mist-nets and sweep nets, which confirmed the presence of *Pipistrellus maderensis*, *Nyctalus leisleri verrucosus* and *Plecotus austriacus.* In relation to the other two species reported to Madeira based in XIX century literature, it's our conviction that in the case of the *Tadarida teniotis*, was referred to Madeira due to locality mislabelling. However, considering that a labelled specimen captured in 1872 exists in the BMNH, this species was included in the Portuguese Red Data Book as NE, whereas *Hypsugo savii* was removed from recorded species list, since no specimens are known and its record was most probably due to misidentification. In 2002 the GEBM group shared all collected data and cooperated with ICNB on the evaluation of Madeira archipelago bat species, included in the revision of the Portuguese Red Data Book using the new IUCN criteria, which confirmed the findings of the GEBM in 2000 and 2001. Based on echolocation data, S. Teixeira presented its thesis defending the presence of two pipistrelle species and two long-eared bats in Madeira Island. The research work was carried out since by Sérgio Teixeira, David Teixeira and Tamira Freitas, but without success on capturing any of these unknown species. In 2008 José Jesus (University of Madeira) and Danilo Russo (University of Naples, Italy) joined the bat research group, allowing increasing sampling effort, data analysis and extend data to molecular work. The substantially superior sampling effort, revealed the presence of an additional pipistrelle species, with echolocation characteristics of *Pipistrellus kuhli*. The recordings were sent to bat echolocation specialist

Danilo Russo, which confirmed that the echolocation calls belonged to Kuhl's pipistrelles. During field work in the summer of 2004, Sérgio Teixeira recorded and observed a *Myotis* like bat leaving its roost. However, although echolocation was *Myotis* like, the low intensity of the recording hindered any possibilities of acoustic identification. Later attempts to capture the individual at roost exit with mist nets failed, although the bat hit the net, but didn't get entangled and escaped. This allowed taking a better look at the individual at its large wingspan and its distinctiveness from previous recorded species. In August of 2005, Sérgio Teixeira and David Teixeira had visual contact with a large winged specimen. In 2010, several echolocation recordings and observations of a *Myotis* sp bat were made. Although this individual wasn't captured, it displayed echolocation call characteristics and feeding behaviour of *Myotis myotis*. It is important to note that two skulls of this species found in the Azorean archipelago (located farther away from the mainland Europe than Madeira archipelago) were identified by Palmeirim in 1979. However until morphological and molecular confirmation, we will consider *Myotis* sp. In conclusion, based on old records and recent data collection using ultrasound recordings, morphology and ethology, 6 species are currently listed in Madeira archipelago (Table 3).

2. Status and Trends

Mainland Portugal

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

*Table 1 - Status and population trends of the species known in mainland (status and trends calculated using simple linear regression and graphic analysis for species with status other than Least Concern included in Portuguese Red Data Book. *: Portuguese Red Data Book refers to M. nattereri, the presence of M. escalerai was confirmed after 2005. **: not evaluated because its presence was confirmed after 2005.*

Species	Status	Trend calculated using simple linear regression and graphic analysis (1988-2002)	Trend calculated by TRIM (1988-2012)
Rhinolophus ferrumequinum	Vulnerable	Indeterminate	Stable
Rhinolophus hipposideros	Vulnerable	Indeterminate	Indeterminate
Rhinolophus euryale	Critically Endangered	Declining	Indeterminate
Rhinolophus mehelyi	Critically Endangered	Severe declining	Indeterminate
Myotis mystacinus	Data Deficient	Unknown	
Myotis emarginatus	Data Deficient	Indeterminate	
*Myotis escalerai**	Vulnerable	Seems to be increasing	
Myotis bechsteinii	Endangered	Unknown	
Myotis myotis	Vulnerable	Declining	Stable

Myotis blythii	Critically Endangered	Severe declining	Significant moderate declining ($p<0.05$) *
Myotis daubentonii	Least Concern		
Pipistrellus pipistrellus	Least Concern		
Pipistrellus kuhli	Least Concern		
Pipistrellus pygmaeus	Least Concern		
Hypsugo savii	Data Deficient	Unknown	
Nyctalus leisleri	Data Deficient	Unknown	
Nyctalus noctula	Data Deficient	Unknown	
Nyctalus lasiopterus	Data Deficient	Unknown	
Eptesicus serotinus	Least Concern		
*Eptesicus isabellinus***			
Barbastella barbastella	Data Deficient	Unknown	
Plecotus auritus	Data Deficient	Unknown	
Plecotus austriacus	Least Concern		
Miniopterus schreibersii	Vulnerable	Stable	Stable
Tadarida teniotis	Data Deficient	Unknown	

Azores Archipelago

Table 2 shows the status and the apparent population trends of the species known in Azores archipelago.

Table 2 - Status and apparent population trends of the species known in Azores archipelago (data published in the Portuguese Red Data Book.: not evaluated because its current presence is not confirmed.*

Species	Status	Apparent Trend
Nyctalus azoreum	Critically Endangered	Unknown
Pipistrellus maderensis	Critically Endangered	Unknown
*Myotis myotis**	Not Evaluated	

Madeira Archipelago

Table 3 shows the status and the apparent population trends of the species known in Madeira archipelago.

Table 3 - Status and apparent population trends of the species known in Madeira archipelago (data published in the Portuguese Red Data Book.: no records since 1872; **: not evaluated because its presence was confirmed after 2005.*

Species	Status	Apparent Trend
Myotis sp** (*Myotis myotis*?)	Not Evaluated	
Nyctalus leisleri verrucosus	Critically Endangered	Declining
*Pipistrellus kuhli***	Not Evaluated	Unknown
Pipistrellus maderensis	Critically Endangered	Declining
Plecotus austriacus	Critically Endangered	Declining
*Tadarida teniotis**	Not Evaluated	Unknown

3. Habitats and Roost Sites

Mainland Portugal

In mainland there are many identified roosts (caves, mines, buildings, cliffs, bridges and a few trees). Around 50 underground roosts are identified as National Importance in each critical season (hibernation and maternity) and have been monitored annually since 1987.

Azores Archipelago

In Azores archipelago roosts detected were located on houses, rocks and trees. For hunting, bats use different habitats often exploring insect's concentrations around street lights.

Madeira Archipelago

Most of known roosts are located in anthropogenic structures such as pierced grey brick walls, stone walls, barns, storages and roofs. A few natural structures are used by bats as roosts, which comprise mainly hollow trees and tree barks. In relation to the previous report, no new roosts have been identified, except for an abandoned pipistrelle roost on Porto Santo Island, located in an empty building.

As to habitats, street lamps in urban or rural areas are the most frequently used by bats.

4. Threats

Mainland Portugal

Major threats occurring in mainland Portugal are:

Disturbance

In the last years there has been an increase in the number of people involved in outdoor activities and signs of recent presence of visitors inside caves are frequently found. Disturbance is particularly malefic during hibernation and maternity seasons.

Roost destruction

Currently this problem seems to be rare in underground roosts, but there are certainly problems regarding building demolition (including inappropriate timing of works) and woodland management and tree work.

Loss of feeding areas

Due to anthropogenic pressures, the habitat composition has greatly changed in many regions of Portugal in the last decades. Most of these changes are due to negatively affect bat species, particularly the threatened ones. Impacts are not yet quantified for most situations, but it is already known the negative impact resulting from the destruction of many kilometres of riparian vegetation, cut and flooded during the construction of numerous large dams all over the country. Similarly, agro-forestry intensification is due to affect many species, namely through the use of dense swards that impede access to food, the degradation of water quality, the destruction of riparian vegetation or the use of alien species for forestry production. The lack of knowledge and the lack of specific bat friendly landscape management measures make feeding habitat loss even a greater threat to bats.

Pesticides

Although not yet quantified, the overall use of agricultural chemicals, namely of broad-spectrum pesticides, is known to reduce food abundance to bats, which are also subject to poisoning by these chemicals, through the ingestion of contaminated food and water.

Traffic injuries

Since 2009 to 2012, a total of 715 bat casualties of at least 14 species, including *R. mehelyi*, *R. ferrumequinum, R. hipposideros, P. kuhli, P. pipistrellus, P. pygmaeus, P. austriacus, E. serotinus, M. daubentonii, M. bechsteinii, M. escalerai, M. schreibersii, N. leisleri, B. barbastellus* were found roadkills in the South (António Mira, com. pess.; Medinas *et. al*. 2012 (reference under point 12). Results showed that bats are more vulnerable during specific life-history periods, as lactation, mating and migration to swarming and autumn roosts. Road stretches crossing or in vicinity of high-quality habitats for bats, including dense Mediterranean woodland ("montado") areas, water bodies yielded a significantly higher number of casualties.

Between June and December 2012, a total of 34 bat casualties of at least 6 species (15 *R. ferrumequinum,* 3 *R. hipposideros,* 2 *P. kuhlii,* 6 *P. pipistrellus,* 2 *P. pygmaeus,* 8 *P. auritus/austriacus*) were found dead in roads in the North (NOCTULA com. pess.).

Wind-turbines

Since 2001, 812 carcasses of at least 11 species were found (*P. pipistrellus, P. pygmaeus, P. kuhli, H. savii, N. leisleri, N. noctula, N. lasiopterus, T. teniotis, M. daubentonii, E. isabellinus, M. schreibersii*; description under point 15 - Resolutions on Wind Turbines and Bat Populations) but it is not possible to evaluate its impact on populations.

Azores Archipelago

Major threats occurring in Azores archipelago include:

Geographical isolation

Geographic isolation is one of the major threats, turning bats more susceptible to natural disasters and other threats (namely, disturbance of colonies, changing and destruction of roosts, and destruction of feeding habitats).

Pesticides and other pollutants

Although not yet quantified, the overall use of agricultural chemicals, namely of broad-spectrum pesticides, is known to reduce food abundance to bats, which are also subject to poisoning by these chemicals, through the ingestion of contaminated food and water.

Poor knowledge

Poor knowledge about biology and ecology of this isolated species raises serious limitations to the establishment of conservation and management measures.

Madeira Archipelago

The major threats that occur in Madeira archipelago are:

Disturbance

Disturbance is still a major factor affecting bat populations in Madeira, especially due to the lack of environmental education initiatives towards the general public, but chiefly to natural park and forestry rangers who deal frequently with wild species or towards inhabitants of the rural areas, where most known roosts are located. Additionally the increase of outdoor activities practitioners, urban growth are also disturbance factors to consider. The disturbance factors are numerous and hard to control.

Roost destruction

Roost destruction in predominantly result of indirect anthropogenic action such has building rehabilitation or reconstruction. The impacts caused on bat populations by the destruction of roosts could be severely reduced by the regulation of building rehabilitation and destruction and also by the instruction of construction companies and contractors how to deal with bat roosts during construction or rehabilitation work. Alternative roosts should be provided by mutual work between the competent authorities and construction companies.

Loss of feeding areas

Similarly to past years, during 2012, several severe forest fires destroyed large areas of woodland and scrubland, affecting deeply the wildlife and also bat feeding areas. The extent of area affected is difficult to ascertain.

As observed during the previous year, the number of untrained and subsistence farmers have increased dramatically in result of unemployment growth. Many feeding areas are

located on abandoned farmland. These areas have been reused for farming activities, causing changes in the landscape and habitat composition. Inversely, an increase of organic farming areas results in the increase of suitable feeding areas and the functional connectivity of contiguous biotopes.

Pesticides

Although several cases of bat poisoning as a result of agrochemicals use have been recorded in Madeira Island, a positive factor was the recent implementation of strict rules on the use of phytopharmaceuticals by farmers, both in kind and quantity, as well as method of use. This regulation might lead to the decrease of insect secondary poisoning of wild bats by the consumption of intoxicated food sources.

Wind-turbines

The implementation of wind-farms continues to increase mainly in the mountainous areas of the central mountain massif. Although the central mountainous area is mostly used by Madeiran leisler's bats, several species have been observed using the central mountains to commute between the island's northern and southern areas. The increase in density of the wind-turbines may, at some extent, affect the bat's commuting paths.

5. Data Collection, analysis, interpretation and dissemination

Mainland Portugal

Data collection, analysis, interpretation and dissemination are done by "ICNF", Universities ("Universidade de Lisboa", "Universidade do Porto", "Universidade de Trás-os-Montes e Alto Douro", "Universidade de Aveiro" and "Universidade de Évora"), speleologists (from several Speleologists Associations belonging to "Federação Portuguesa de Espeleologia", namely "Associação dos Espeleólogos de Sintra", "Núcleo de Espeleologia da Costa Azul", "Grupo Protecção Sicó", "Grupo de Espeleologia e Montanhismo", "Centro de Estudos e Actividades Especiais", "Alto Relevo – Clube de Montanhismo", "Núcleo de Espeleologia de Leiria", "Espeleo Clube de Torres Vedras", "Núcleo de Espeleologia de Alcobaça", "Núcleo de Espeleologia da Associação Académica da Universidade de Aveiro" and "Geonauta") who are doing roost monitoring, and technicians who are developing roost and habitat local monitoring of projects subjected to environmental impact assessment (particularly wind farms and dams).

There is a database ("SIPNAT: Sistema de Informação do Património Natural"; http://www.icn.pt/sipnat//) which includes information on occurrence and characterization of vertebrate species and areas included in Natura 2000 network.

There is a plan ("Plano Sectorial da Rede Natura 2000"; http://www.icnf.pt/portal/naturaclas/rn2000/plan-set) which comprehends cartography and conservation and management measures of 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 SCI´s (covering species included in annexes II and IV).

The first National Report of Habitats Directive (2001-2006) on the conservation status of the relevant habitat types and species prepared in the framework is available at http://www.icnf.pt/portal/naturaclas/rn2000/dir-ave-habit/Rel-Nac-Dir-habit.

Azores Archipelago

Data collection, analysis, interpretation and dissemination are done by "Universidade dos Açores" under developed projects, including scientific expeditions, in which some studies are conducted to confirm species presence and to extend its distribution knowledge.

Data are available for species that occur in Azores archipelago, including distribution, in Azorean Biodiversity Portal (http://www.azoresbioportal.angra.uac.pt/).

There are Management Plans for the 23 SCI´s (classified as Special Areas of Conservation by Decreto Regulamentar nº 5/2009/A, 3rd June 2009) and the 17 SPA´s classified in Azores archipelago. These plans comprehend SCI´s and SPA´s environmental characteristics, measures to ensure effective management, preservation and conservation of its natural values.

There is a plan ("Plano Sectorial da Rede Natura 2000", published by Decreto Legislativo Regional n.º 20/2006/A, 6th June 2006, amended by Declaração de Retificação n.º 48-A/2006, 7th August 2006 and by Decreto Legislativo Regional n.º 7/2007/A, de 10th April 2007; http://www.azores.gov.pt/gra/sram-natureza) applicable to all SCI´s and SPA´s in order to safeguard natural habitats and wild fauna and flora that occur in Azores archipelago.

Madeira Archipelago

Data collection is now restricted to the "Madeira Island Bat Monitoring Scheme" made by an ecotourism company "Madeira Fauna & Flora". Presently the dissemination is made by Madeira Fauna & Flora, University of Madeira and supported by Direcção Regional do Ambiente (Regional Environmental Directorate), Direcção Regional das Florestas (Regional Forestry Directorate), Centro de Ciência Viva of Porto Moniz and Municipality of Porto Moniz.

All collected bat records are being inserted in the Madeira Biodiversity database BIOBASE, under the responsibility of Direcção Regional das Florestas (Regional Forestry Directorate). The management and update of BIOBASE is being carried out by Madeira Fauna & Flora. This company has programmed educational bat watching nights for families and schools and as acquired equipment such as videoscopes to prospect roosts and hence increase the knowledge about roost selection on the archipelago. Yearly, Madeira Fauna & Flora

biologists will compose and submit a report to European bat conservation organizations and local authorities, including to local EUROBATS focal point.

C. Measures Taken to Implement Article III of the Agreement

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

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.

Mainland Portugal

A few incidents involving bats were reported to the police.

Azores Archipelago

National legislation is applied.

However on 25th January 2012 Regional Parliament approved, on proposal of the Government, a new legal framework that establishes nature conservation and biodiversity.

This document transposes Birds and Habitats Directives and various International Conventions and Regulations to regional law. This legislation waits for publication.

Madeira Archipelago

No specific measures have been taken during the last year.

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

Mainland Portugal

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 were poorly known, but the Atlas of Portuguese bats (mainland), which is being finalizing will change this situation.

Azores Archipelago

Regional Network of Protected Areas of the Azores, was reformulated according to the IUCN criteria, leading to the creation of 9 Natural Island Parks and 1 Azores Marine Park (Decreto Legislativo Regional n.º 15/2007/A, 25th June 2007).

Natural Island Parks are the basic management unit of the Regional Network of Protected

Areas in Azores archipelago.

This structure allows territory management to the conservation of biological and geological diversity as well to the sustainable use of natural resources (http://www.azores.gov.pt/Gra/sram-natureza/menus/secundario/Áreas+Protegidas/ and http://parquesnaturais.azores.gov.pt/).

Natural Island Parks include the most important terrestrial habitats, from coastal to mountain areas including many different habitats that are essential to bats.

Madeira Archipelago

Although several important feeding areas or roosts were identified in Madeira Island outside protected areas boundaries none is protected. In the management plans of Madeira's Natura 2000 SCI´s, there isn't any reference to bat populations, roosts or feeding areas present within the area. However the large extent of Madeira Natural Park and Natura 2000 sites might provide some degree of protection.

8. Consideration given to habitats which are important to bats

Mainland Portugal

In Mainland 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 protect directly or indirectly feeding habitats (as well as roosts). Under the implementation of environmental impact assessment regulation there is also compensation and minimization measures, as well as monitoring, specifically for bats feeding habitats (and also roosts).

Azores Archipelago

In Azores the landscape is not managed specifically to protect bat-feeding habitats. However, Natural Island Parks equipped with management and action tools for conservation of the most representative components of the natural heritage and biodiversity and which occupy a significant proportion of the land territory (around 25%), include various habitats that are essential for bat species**.**

Control of Invasive flora species in sensitive areas with natural vegetation and its restoration are measures that directly and indirectly influence the availability of habitats.

In this context we stress the *Regional Plan for Eradication and Control of Invasive flora species in sensitive areas – PRECEFIAS*, approved by the resolution 110/2004 of July 29 and "LIFE Laurissilva Sustentável" Project.

Madeira Archipelago

No specific consideration is made towards important bat habitats and there aren't any

management measures on the move.

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

Mainland Portugal

16th Bat Night was celebrated together with the second year of the "Year of the Bat" campaign.

The website of the Portuguese campaign (http://www.wix.com/anodomorcego/icnb) was regularly updated, and includes general information on Portuguese bats, many activities for children, histories, many activities for teachers including three *PowerPoint* presentations with support texts for different ages, divulgation of events, information on bats and forests (including a Portuguese version of the EUROBATS forestry leaflet), divulgation materials (including Portuguese versions of EUROBATS YOB resources), scientific and technical reports, information on the Atlas of Portuguese bats (mainland), a FAQ section, and the possibility for asking questions. In February 2013 the website was already visited by more than 17402 persons and dozens of questions were answered.

Regular bulletins (with news, summaries of some activities and announcement of events) were prepared (http://www.wix.com/anodomorcego/icnb/noticias-eventos#!__docs/newsletter).

A facebook profile was created ("Morcegos de Portugal"; http://www.facebook.com/people/Morcegos-de-Portugal/100002664247843). This profile proved a fundamental tool to publicise the events that were organised during the campaign 2011-2012 Year of the Bat. A large number of people from distinct parts of the country follow the publications on this profile, making it also a useful vector for educational and scientific contents about bats. The feedback on the posts is overall very positive, and the sharing rate is high, increasing this way the number of people we are reaching through this social network.

During 2012 more than 40 persons and entities organized many dozens of activities, attend by more than 12000 participants (Table 4 and Figure 1). Activities included talks in schools and Universities, ateliers in schools, talks for general public, talks in National Conferences, walks with bat detectors, exhibitions, workshops on morphological and acoustic identification of bats, visit to Museum´s bat collection´s, and divulgation papers in magazines and newspapers.

Table 4 – Events organized between March 2012 and February 2013.

Date	Local	Participants	Monitor	Organization	Support
Nov11-Mar12	Vila Real	834	H Pereira A Rosa	PNAI-ICNF	

Jan-Jun	Sabugal	100	L Saloio	RNSM, ICNF	
Jan-Jun	Bragança	100	C Régua	PNM, ICNF	
6-Mar	Aveiro	25	M Matos	Esc Sec Mário Sacramento	
16-Mar	Alcácer do Sal	50	T Marques	EB Bernardim Ribeiro, Eco-Escolas	
19-Mar	Vila Real	100	C Silva	Esc.Sec./3 Camilo Castelo Branco e LEA/UTAD	
24-Mar	Porto	10	L Sousa	UP Porto	
31-Mar	Bragança	20		CCV Bragança	
29-Mar	Almada	30	P Miguel	CM Almada, ICNF	
Mar-Apr, Sep	Porto	4298	L Sousa	MHNUP	
Mar-Oct	several	275	L Sousa	Several	
Mar-Dec	Buçaco	100	M Matos	MN Buçaco	
22-Apr	Leiria	150	A Rainho, F Amorim	FAPAS, ICNF, CIBIO	CM Leiria
Apr-May	Lisboa	150	Several	ICNF	
Apr-Sep	Mondim de Basto	660	M Anjos	PNAI-ICNF	
1-May	Lagos	20	M Carmo	A Rocha	
2-May	Ovar	210	M Carmo	Agrupamento Escolas Ovar	
4-May	Paranhos	70	L Sousa	EB2,3 Paranhos	
5_May	Porto	10	L Sousa	Aneis do Porto	
6-May	Alcochete	50		CM Alcochete	
15-May	Amadora	20	M Carmo	JI Venteira	
19-May	Porto	250		Serralves	
25-May	Vila Franca do Lima	40	F Hintze, V Duro	CMIA Viana do Castelo, SPVS	
25-May	Sintra	20	G Mendes	AES, Fund. CulturSintra	
25-May	Guia	20	P Alves	GPS, Clube Ambiente / Agrupamento Escolas Guia	Plecotus
25-May	Baguim do Monte	20	L Sousa	EB2,3 Baguim do Monte	
May	Almada	100	P Miguel	CI Mata dos Medos, ICNF	
May-Jun	Mondim de Basto	100	H Pereira	PNAI, ICNF	
May-Jul	Feijó	100	P Miguel	PPAFCC, CM Almada	
1-Jun	Buçaco	30	M Matos	Fund. Mata do Bussaco	
2-Jun	Vale Gonçalinho	20	M Carmo	LPN	
5-Jun	Caminha	60	L Sousa	Escola Sidónio Pais	
9-Jun	Vila Real	50	P Barros	ACANUC, Paulo Barros	LEA
20-Jun	Sintra	150	G Mendes	Colégio Vasco da Gama	
29-Jun	Portel	30	M Carmo	CM Portel, ADA, Cremilde	
29-Jun	Lisboa	15	M Matos	Universidade de Lisboa	
30-Jun	Porto	15	L Sousa	Ciência 2.0, UP	
Jun-Sep	Alviela	210	MJ Silva	CCV Alviela, CV no verão	ICNF
6-Jul	Arrouquela	30	S Barreiro	Associação H2O	Plecotus
8-Jul	Ovar	8	N Pinto	SPVS, Otília Tavares, Associação Amigos do Cáster	
13-Jul	Tibães	30		Quercus	
14-Jul	Duas Igrejas	30	F Amorim	Aldeia	
15-Jul	Buçaco	10	M Matos	Fund. Mata do Bussaco	
18-Jul	Lisboa	40	G Mendes	Centro Educativo Navarro Paiva	
21-Jul	Costa Caparica	20	M Carmo	Grupo Flamingo	ICNF, CIBIO
21-Jul	Coimbra	30	M Matos	Museu Ciência Univ Coimbra	
27-Jul	Buçaco	25	M Matos	Fund. Mata do Bussaco	
28-Jul	Lousal	100	M Carmo	CCV Lousal	
30-Jul	Vila do Conde	25	L Sousa	CMIA Vila do Conde	
Jul-Sep	Lisboa	100	MJ Pereira	Natuga, Ass. Amigos do Castelo	
Jul-Sep	Porto	300	H Santos	FAPAS, CV no verão	
4-Aug	Tomar	30	MJ Pereira	Quercus	SEC/DGPC /Conv. Cristo

4-Aug	Montejunto	30	P Alves S Barreiro	Plecotus, CM Cadaval	GPS
4-Aug	Lousal	100	M Carmo	CCV Lousal, CV Lousal	
18-19-Aug	Palhais	25	M Carmo	CM Barreiro	
25-Aug	Redinha	50	P Alves	GPS	Plecotus, CM Pombal
25-Aug	Arouca	18	C Silva	Associação Geopark de Arouca, LEA/UTAD	
Aug	Lagos	300		Zoo de Lagos	
Aug	Porto	300		FAPAS, CV verão	
Aug	Alviela	100	MJ Silva	CCV Alviela	ICNF
Aug-Sep	Porto	100		CIBIO, CV no verão	
1-Sep	Portimão	20		CM Portimão	
1-Sep	Loulé	20	M Carmo	Almargem	
2-Sep	Buçaco	5	M Matos	Fund. Mata do Bussaco	
2-Sep	Macedo de Cavaleiros	20	SB Ribeiro	PPAA, CV no verão	
8-Sep	Cascais	10	M Carmo	CM Cascais, CIAPS	
14-Sep	Ovar	12	N Pinto	SPVS, Otília Tavares, Associação Amigos do Cáster	
14-Sep	Ermesinde	20		Lipor de Baguim do Monte	
4-Oct	S Brás Alportel	180	M Carmo	CM S Brás Alportel	
4-Oct	Viso	65	L Sousa	EB2,3 Viso	
5-6 Oct	Candal	15	M Matos	Living Place, Trilhos de Xisto, Casa Cimeira	
6-Oct	Lagos	20	M Carmo	Zoo de Lagos	
12-Oct	Panóias	22	C Silva	DRCN, LEA/UTAD, PNAl	
14-Oct	Serpa	8	M Carmo	Agrupamento Escolas Serpa	
18-Oct	Montijo	20		Casa do Ambiente, Montijo	
20-Sep	Braga	15	F Hintze, V Duro	Minho University, SPVS	
31-Oct	Aveiro	12	N Pinto	Jael Palhas, SPVS	
Oct	Penamacor	70		RNSM, ICNF	
Oct-Dec	Vila Real	432	H Pereira A Rosa	CII PN Alvão, ICNF	
Oct-Dec	Lisboa	30	B Pinto	MNHN, GEM, ICNF	
1-Nov	Fátima	50		Grutas da Moeda	
10-Nov	Ajuda	20	M Carmo	ISA	
11-Nov	Freixo do Meio	20	M Carmo	Herdade do Freixo do Meio	
15-Nov	Sintra	50	G Mendes L Rodrigues	CM Sintra, PNSC	
19-Nov	Braga	20	F Hintze, V Duro	Colégio João Paulo II	
20-Nov	Braga	22	N Garrido, V Duro	Colégio João Paulo II	
23-Nov	Condeixa-a-Nova	130	N Pinto	SPVS, Sónia Cotrim, EB nº1 Condeixa-a-Nova	
Nov-Dec	Sintra	50	M Marcelino	PNSC, CMS, ICNF	
21-Fev	Matosinhos	20	M Matos	Centro de Monitorização e Interpretação Ambiental de Matosinhos	
23-Fev	Tibães	6		SPVS	

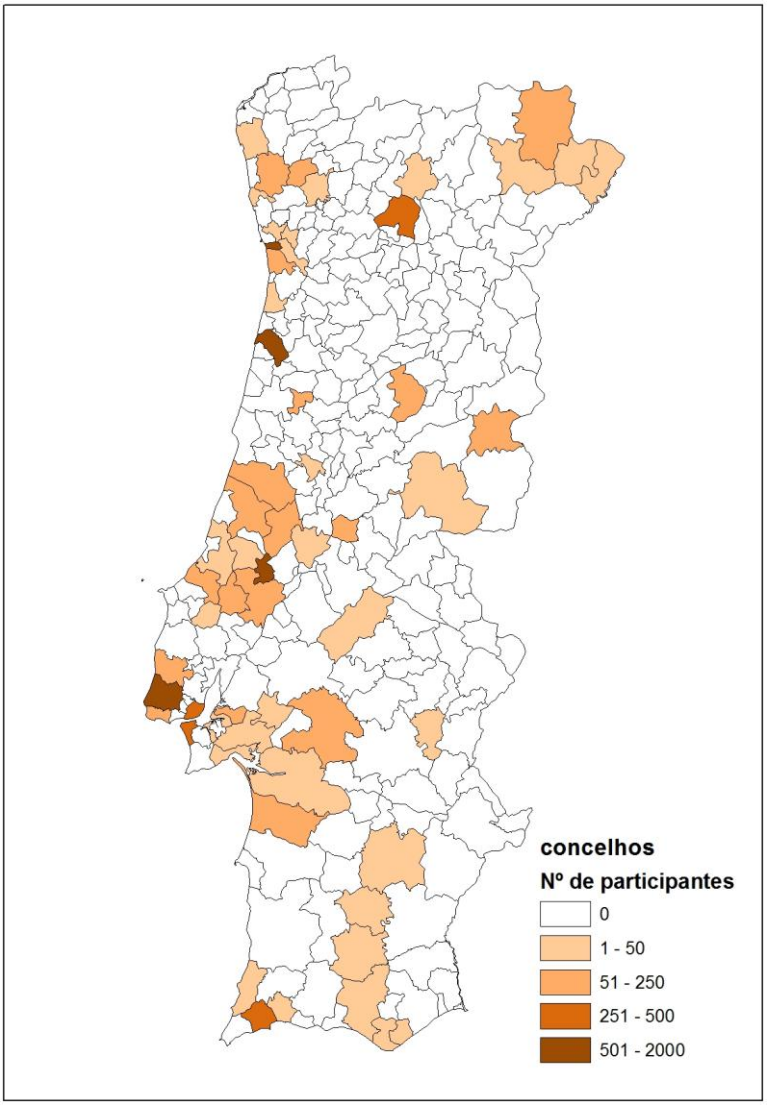

Figure 1 – Events organized per county in 2012 (map prepared by Ana Rainho).

Three courses on morphological and acoustic identification for the general public were organized by Mário Carmo (50 participants).

Two workshops on morphological identification for speleologists were organized by Gabriel Mendes (41 participants).

Four big exhibitions with materials prepared by schools were organized (PN Alvão, PN Sintra-Cascais, PPAF Costa da Caparica and RN Serra Malcata).

The Municipality of Sintra and the Sintra-Cascais Natural Park promoted an illustration contest about bats ' Bring bats to daylight", directed to all the schools in the municipality. Twenty schools participated with a total of 105 illustrations. The exhibition was held in Vila Alda, in Sintra.

One book for children was published (Dias L. & M Matos. 2012. Os Duendes na Mata do Bussaco. Departamento de Biologia da Universidade de Aveiro e Edições Afrontamento).

This book was born from the idea of presenting the Forest of Bussaco to children of preschool and basic education levels of education, within the scope of environmental education and co-responsabilization for the protection and sustainable use of natural resources. It combines aspects of the imaginary with real historical facts and identifies species of flora and fauna considered of high conservation value.

A flyer regarding fauna of Mata Nacional do Buçaco was published (http://www.fmb.pt/bright/images/galeria/ff.pdf) within the Life + BRIGHT Project. This flyer indicates the most valuable species of the fauna of Bussaco Forest, in terms of conservation.

Many schools studied bats and organized activities, such as talks, contests and exhibitions (examples in http://www.wix.com/anodomorcego/icnb/morcega-te#!__morcega-te/escola11 and http://anodomorcego.wix.com/icnb/noticias-eventos#!__morcega-te/escola12).

The *photographic exhibition "Portuguese Bats"* was presented in the National Museum of Natural History and Science (Lisbon) between 29 October 2012 and 31 March 2013. It´s main goals were to show part of the Portuguese bat diversity, as well as some of the methods used to study them. The exhibition included some photos of bats in flight made by two professional photographers that graciously contributed with photos, and other images about research methods that were done by amateur photographers during fieldwork in Portugal. The target audience of the exhibition were teenagers and families, which are the usual visitors of the museum.

The University of Évora, in association with the Municipality of Évora, with the Faculty of Science of the University of Lisbon, with the Biodiversity chair at the University of Évora and the Portuguese National Museum of Natural History, organized the *exhibition "Bats of Portugal (mainland and islands)"* illustrated by Lúcia Antunes. The opening was on the 28th of February, at 6 pm, at Évora´s Dom Manuel Palace and the exhibition will be open to the public until March 31. This exhibit aims to present the 27 bat species found in the Portuguese territory through scientific illustrations that will compose the book A Guide to Bats of Portugal (mainland and islands) - Morphology and ethology of the Chiroptera in National Territory. These illustrations, joining scientifically accurate information with aesthetically appealing drawings, are an accessible and more captivating means of transmitting knowledge seeking to create greater empathy with the bats. It is the aim of the exhibition to not only create a greater familiarization with this group of mammals but also to reveal their environmental importance and role as indicators of biodiversity. In doing so, it will hopefully contribute to the reversion of the endangered status in which nine of the twenty-seven species present in Portugal are presently. In addition to the exhibition´s catalogue launch, the opening ceremony included a series of lectures on topics relevant to the subject of bats.

Several news on the Year of the Bat were published.

Two documentaries about bats were produced by Universidade Aberta in collaboration with ICNF (http://www.adrive.com/public/Zcd72T/UnivAberta1.mpg; http://www.adrive.com/public/nAQqkK/UnivAberta2.mpg).

A private company, Natuga, led by biologists created touristic walks with bat detectors in a partnership with São Jorge Castle in Lisboa. In the period included in this report twelve walks were done throughout the summer with a total of about 200 participants.

There is a website (http://static.publico.pt/morcegosnaweb/) which includes online images collected in a maternity roost by four infrared cameras and videos. Visitors may ask questions, which are answered by specialists.

A blog about Portuguese Wildlife fauna was created (http://umdiadecampo.blogspot.com/). It intends to be a space of divulgation (biology, ecology, distribution and status conservation) and public opinion. The blog hopes divulgate and give an important contribution to the knowledge of the Portuguese wildlife heritage, with a particular interest in bats.

A new research Centre (Centro de Investigação da Regaleira – CIR, referred under point 12) created a website (http://bats.regaleira.pt) which aims to highlight the importance of the conservation and environmental information related to bats and the studies that are being developed at the centre in partnership with several Portuguese universities.

A time-table regarding the seasons when caves should not be visited due the presence of important bat colonies is presented in the website of "Federação Portuguesa de Espeleologia" (http://www.fpe-espeleo.org/index.php?option=com_content&view=article&id=30:abrigos-de-importancia-nacional-epocas-de-hibernacao-e-de-criacao&catid=36:quiropteros-cavernicolas&Itemid=65).

Azores Archipelago

Several environmental awareness sessions were made during the year 2012. These sessions took place in São Miguel, Terceira, Graciosa and Santa Maria islands. A total of 70 participants became more acknowledgeable of the importance of bats and which species can be found in Azores Archipelago.

As part of the new education tool launched in September 2012 – Azores Biodiversity Kit (Kit da Biodiversidade dos Açores), a child story was created, in which the main character is named after *Nyctalus azoreum*. This story has in the end a picture to be coloured. A poster was done, having a picture of the Azores Bat and was distributed in all primary schools of the archipelago. Both were given to a total of 158 primary schools, 740 professors and 12.672 students.

Moreover, the project of Furnas Landscape Restoration Project, being implemented in São Miguel Island, offered bat shelter to each of the partners engaged in this project. Together with the bat shelter offered it was given a text explaining a bit more on the Azores bat, the only endemic mammal species, on what to they feed and where they can be found.

Madeira Archipelago

Several activities have been carried out in Madeira to promote awareness and importance of conservation, mainly:

Porto Santo Island Municipality in association with Porto Santo Verde dedicated its VII Environmental Symposium to Bats, under the theme “À descoberta do morcego do Porto Santo”

Under the program Ecoescolas (Ecoschools), the “Escola Básica do 1º Ciclo do Porto Santo” School displayed the movie “O Morcego – A extinção é para sempre” on the symposium. The movie was made by its students and supported by the teacher Rosa Afonso.

Lecture at the VII Environmental Symposium of Porto Santo Island by Sérgio Teixeira.

On the 30th of December, under the EUROBATS International Bat Night event, the ecotourism company Madeira Fauna & Flora organized an open Bat watching night to the closing of the International Year of Bat on Madeira Archipelago.

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

“ICNF” is the body responsible for the provision of advice on bat conservation and management. Regional bodies for archipelagos of Madeira and Azores will be designated.

11. Additional action undertaken to safeguard populations of bats

Mainland Portugal

No recent developments in this area. 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 (recommended by EUROBATS Publication Series nº 2) are adopted. Galleries colonized by important bat colonies are being closed by fences, galleries used by some bats are being closed by bat friendly gates with doors (to allow monitoring) and galleries not used by bats are being closed by walls with large respiration holes (this will allow a future colonization but not their monitoring). Vertical shafts are being protected with grilles.

Azores Archipelago

No additional actions were undertaken to protect bat populations in Azores archipelago.

Madeira Archipelago

No additional actions were undertaken to protect bat populations in Madeira archipelago.

12. Recent and ongoing programmes (including research and policy initiatives) relating to the conservation and management of bats

Guide to Bats of Portugal (mainland and islands) - Morphology and ethology of the Chiroptera in National Territory. Final Project of a Master´s degree in Scientific Illustration currently being developed by Lúcia Antunes is a fully illustrated publication/guide regarding bats in Portugal. Apart from focusing on the morphological representation of all species present in the Portuguese mainland and islands, it will also feature illustrations of graphical identification keys, feeding habits, reproduction, habitats, representations of echolocation, et cetera. Tasks include drawing scientifically accurate illustrations and infographics, developing the layout and pagination of the guide and the treatment and insertion of illustrations into specific layouts. Scientific information will be accompanied by illustrations appealing to readers from a wide universe, alerting to the hazards that affect bats and creating familiarity with this special group of animals. Joining the celebration of the Year of the Bat 2011-2012, this guide is primarily a physical object that will also be applied and adapted to digital mediums like a website and apps for tablets and smartphones providing a whole new level of accessibility to information about bats.

Mainland Portugal

"Centro de Investigação da Regaleira - CIR)". Associated to the alternative roost "Morcegário da Regaleira", the research centre is developing research lines in partnership with several universities and other entities of scientific expertise to study of biodiversity in general and bats in particular.

Alviela Ciência Viva Centre ("Carsoscópio"). The Centre is located in the proximities of one of the country's most important maternity roosts and holds an interactive exhibit totally dedicated to bats – The Quiroptário (http://www.alviela.cienciaviva.pt/home/). This Ciência Viva Centre also includes a Cave Bat Observatory composed by 4 infrared cameras placed in the inside of the cave which allows users to follow live, 24 hours per day the bat colony that uses this cave as a maternity roost (referred under point 9). This Centre has an annual visitation rate of about 17000 visitors. The building and the exhibition have been requalified, in order to improve the conditions. Bat´s exhibition will be larger and new interactive activities will be available. The requalification was done by Câmara Municipal Alcanena, Agência Ciência Viva, "ICNF" and Instituto Politécnico Leiria.

Monitoring programme of cave-dwelling species. A monitoring programme of the cave-dwelling species is in progress since 1987, coordinated by "ICNB". This programme

involves the estimation of bat numbers present in the most important wintering and maternity roosts. The surveys are carried out annually in most of the roosts. An analysis of the data is under preparation. Co-funded by "ICNF", “Faculdade de Ciências de Lisboa”, “Universidade do Porto”, “Universidade de Évora”, “Universidade de Trás-os-Montes e Alto Douro” and “Federação Portuguesa de Espeleologia” (namely, “Associação dos Espeleólogos de Sintra”, “Núcleo de Espeleologia da Costa Azul”, “Grupo Protecção Sicó”,”Grupo de Espeleologia e Montanhismo”, “Centro de Estudos e Actividades Especiais”, “Alto Relevo – Clube de Montanhismo”, “Núcleo de Espeleologia de Leiria”, “Espeleo Clube de Torres Vedras”, “Núcleo de Espeleologia de Alcobaça”, “Núcleo de Espeleologia da Associação Académica da Universidade de Aveiro” and “Geonauta”).

Bat exclusion. Whenever necessary, licenced exclusion activities are accompanied by rangers or accredited professionals. There is a document with general advices on cohabitation with bats and information on bat exclusion (*“Tenho morcegos em casa, o que devo fazer? - Guia de apoio a situações de coabitação e exclusão de morcegos em edifícios”;* http://portal.icnb.pt/NR/rdonlyres/AE340217-C2C3-4F30-9FB2-D0C0EBFB5FC3/0/Guia_coabit_exclus_morceg.pdf).

Studying of the alternative roost “Morcegário da Regaleira”. The new roost is occupied all over the year by *R. hipposideros* and the maternity colony is one of the biggest known in the country. Monitoring system includes the register of climatic variables using temperature and relative humidity data loggers and the observation of the room using IR video cameras with remote access and data storage. The project was funded by “Associação dos Espeleólogos de Sintra” and “Fundação Cultursintra”, and is being conducted by “Centro de Investigação da Regaleira - CIR”, aiming to: determine the seasonal occupation of alternative roost, determine when the births occur and the period that goes from the birth to the weaning and first flights of the pups, describe roosting behaviour of *R. hipposideros* and its interaction with other species that use the roost, study the influence of climatic conditions on roost occupation, and use all information in order to improve alternative roosts which may need to be created.

Studying of a complex of roosts of R. euryale in Sintra. In 2009, speleologists discovered in Sintra Mountain Range a maternity roost of this threatened species with nearly 200 animals. In 2010 bats disappeared from there but a maternity colony was discovered at a near location in 2011. Given Sintra’s Mountain Range importance for this threatened species, this project aims to: determine the seasonal occupation of the roosts, determine the period between the birth and the weaning and first flights of the pups, relate the roost usage with the surrounding environment and landscape variables, and describe roosting behaviour of this species. The project is being conducted by “Centro de Investigação da Regaleira (CIR)”.

Agro-forestry management practices of montados and its impact on biodiversity: bats and

birds as models. Montado is an agro-forestry-pastoral system that consists of cork or holm oaks scattered on a matrix of mostly grassland. This grassland is artificially maintained, often with grazing. Montado is one of the most important type of land cover in Portugal, dominating much of the landscape in the southern half of the country. It is also very important in Spain and in other Mediterranean regions. Although montado is an economically valuable system, it is also one of the most biodiversity rich ecosystems in Iberia. This makes it one of the best examples of a balance between conservation and development, and a resource that most stakeholders want to preserve. The biodiversity value of montados varies considerably, and this is to a great extent depends of how they are managed. However, little is known about how different management regimes influence their biodiversity. This is a serious limitation at a time when, due to various EU agricultural and environmental instruments, the obligations and opportunities to maximize the nature value of farmland are expanding. The overall aim of this project (which is being conducted by Jorge Palmeirim, Ana Rainho, Tiago Marques, Christoph Meyer, Ana Leal and some students) is to contribute to the identification of management practices that promote the biodiversity value of montados, while maintaining their economic importance, using passerine birds and bats as models. Both groups are well suited for this investigation because they have a high diversity of species, can reach fairly high densities, and are known to respond to environmentally friendly agricultural practices. In addition, their abundances are relatively easy to estimate, and our team has good experience working with both groups on farmland in southern Portugal. The influence of various montado management options on its richness in birds and bats will be tested. Since this influence is often mediated by the availability of food resources, in several tasks particular attention to insects, the most important food for all our bats and for most passerine birds, will be given. Funded by "Fundação para a Ciência e a Tecnologia".

Wind & Biodiversity: integrated solutions for managing biodiversity in wind farms. This project aims to develop integrated solutions for managing biodiversity in wind farms. Between 2011 and 2015 a set of technologies, methodologies and know-how will be develop in order to help reconciling wind farms with biodiversity, in particular with birds and bats. The project's goals are to: 1) understand bird and bat communities' behaviour and dynamics, 2) understand the causes and accurately quantify bird and bat mortality, 3) develop equipments and technology to mitigate or eliminate bird and bat fatalities, and 4) develop, adapt and validate compensation measures to implement in wind farms with high mortality impacts. The project is led by Bio3, a private company, in partnership with the University of Aveiro, which participates mainly with two research units - the Associated Laboratory CESAM (Centre for Environment and Marine Studies) and IEETA (Institute of

Electronics and Telematics Engineering of Aveiro). Co-funded by European Regional Development Fund (ERDF) and the National Strategic Reference Framework (QREN).

Factors affecting terrestrial vertebrate diversity and activity patterns at the lagoon system of Baixo Vouga and Ria de Aveiro. This ongoing project aims to study the spatio-temporal dynamics of several vertebrate communities at the lagoon system of Baixo Vouga and Ria de Aveiro, and is being conducted by four MSc students, and is scientifically coordinated by Carlos Fonseca, Maria João Ramos Pereira, Joaquim Ferreira, Eduardo Ferreira, Rita Rocha and Milene Matos. The landscape consists of traditional forms of agriculture, locally called Bocage, mostly characterized by small areas of crop and pasture surrounded by autochthonous tree and shrub hedgerows and freshwater courses – which is unknown elsewhere in the country –, marshlands, reed areas, and by a highly humanized landscape. In fact, the area as a whole forms a buffer zone between several urban and industrial centres. External pressure on this area, including heavy metal pollution from the surrounding industries and changes in water balance resulting from the synergistic action of human intervention, especially in the form of infrastructure development, and climate change increases the complexity of habitat management in this unique area and calls out for the need to understand the regional patterns of biodiversity. The sustainable management of the Baixo Vouga Lagunar complex wetland system lies in protecting its ecological integrity and biodiversity from the negative impacts associated to the strong human pressure they are under. In the specific case of bats, the aim is to assess spatio-temporal patterns in bat diversity and activity in this complex wetland system and to understand the main factors behind those patterns, including climatic variables, micro-habitat diversity, food availability and sources of human pressure. Funded by Aveiro University and Observatoire Hommes-Millieux - Estarreja, and partially logistically supported by the Municipality of Estarreja.

Bussaco´s Recovery from Invasions Generating Habitat Threats (BRIGHT project). This project, included in Life + Programma (NAT/P/075), is taking place in Bussaco National Forest and consists of a series of actions aimed at preserving the natural heritage of the Forest - namely, the 'adernal' - an unique habitat in the world – through habitat management and invasive species eradication. The University of Aveiro is in charge of monitoring the results of the projects and assess the impact forestry work on fauna and flora communities. In this context, monitoring of Bussaco bats is ongoing since July 2012. The project also includes a strong component of information and awareness of the general public, corporations, volunteers, schools, etc., comprising regular workshops, lectures, field work, etc. Thus, given the importance that bats have for nature conservation, they are a recurrent theme in many events held within the project (www.fmb.pt/bright).

Atlas of Portuguese bats (mainland). Bats are a frequent target of conservation owing to both their status and sensitivity to environmental change. The current knowledge on many species distribution in mainland Portugal is nevertheless scarce. This lack of knowledge has obvious consequences on bat conservation and management that often hinge upon information on species presence. The main goal of this project (which is being conducted by dozens of volunteers and coordinated by "ICNF") is thus to overcome this issue, specifically: (a) map the present distribution of the 25 bats species known to occur in mainland Portugal; (b) understand and model some factors that may hinder bat distribution and richness; (c) populate a database that will make this information to all interested parts; (d) gather data on the knowledge that Portuguese population has on bats, through ethnozoological enquiries; and (e) in conjunction with the campaign 2011-2012 Year of the Bat, to mobilize and stimulate bat professionals into educating the populations regarding the importance of bats in the ecosystems and in their life.

Wildlife Fatality Estimator: from bias correction factor to corrected fatality estimates. The Wildlife Fatality Estimator is totally free on-line platform that can be used to estimate bat mortality associated with wind farms or other human infrastructures (www.wildlifefatalityestimator.com). It was created by Bio3 in partnership with Regina Bispo and aims to help users to properly apply the state-of-the-art methodologies and save time in the data analysis. The platform is still under development, yet with 2 of the 3 application modules ("Carcass Persistence", "Search Efficiency" and "Fatality Estimation") already fully operational.

Pilot-project to assess the use and impact of management activities for the promotion of biodiversity on farms in the Portuguese mainland. This project aims to select management practices that promote biodiversity on farms. In the first phase, which ended in April 2012, the specific objective was to establish base line data for the biodiversity indicator taxonomic groups. Five taxonomic groups were selected as biodiversity indicators: bats, birds, reptiles, amphibians and butterflies. The study was conducted on 16 farms located throughout the country. The farms selected include the traditional olive grove, two vineyards on terraces (one irrigated and one not irrigated) and a chestnut production in the Douro, corn for silage in Baixo Vouga, cherry at Cova da Beira, rice in the lower Mondego, crops of vegetables and pear in the West, corn in the lezíria of the Tagus river , olives and tomato-intensive industry in the Alentejo, a lowland vineyard in the peninsula of Setúbal, pastures for sheep and cattle in the southern and central Alentejo and citrus grove in the Algarve. A report with the baseline data was produced and farm specific management actions were included as an advice for farmers to increase biodiversity on their farms. These included the construction of small ponds, putting up bat boxes and the plantation of trees to close gaps along tree lines. The farmers and managers have implemented these actions and the

evaluation of the results will start soon. The study on bats was conducted by Tiago Marques. Funded by “PRRN – Programa para a Rede Rural Nacional” do “Ministério da Agricultura, Mar, Ambiente e Ordenamento do Território” e pelo “Fundo Europeu Agrícola de Desenvolvimento Rural da União Europeia”.

Effects of fragmentation and habitat loss on bat (Chiroptera) populations: Unveiling the need for biodiversity off-sets. A project that is being developed by Francisco Amorim (CIBIO – University of Porto), focusing on how the crevice-dwelling species *Tadarida teniotis* will respond to the loss of roosts and habitat fragmentation that will result from the building of a large dam. The Baixo Sabor dam will flood about 50km of the Sabor river valley, together with the lower reaches of some of its main tributaries, and is considered particularly suited to assess the impacts of habitat loss and fragmentation on bats, particularly on crevice-dwelling and forest species. As soon as the Baixo Sabor reservoir starts flooding many crevices on cliffs will be permanently lost. In fact, due to the orography of the area it is highly likely that rupicolous fauna will be one of the most affected groups due to the disappearance of larges extents of this habitat. *T. teniotis* is one of the bat species in Portugal known to use such roosts thus having a high potential to be affected by the reservoir. The ecological characteristics of *T. teniotis* make it a perfect surrogate for other rupicolous species, helping to understand the consequences of the dam to their populations. Research at the population level will focus on crevice dwelling bat, the free-tailed bat *T. teniotis*, assessing how populations respond to the loss of breeding habitats, and how these responses are moderated by the availability of new anthropogenic breeding sites such as bridges. Surveys have been carried out since 2011in order to locate bridges harbouring *T. teniotis* roosts. A trap specifically designed for trapping bats roosting in bridges was developed and successfully experimented in more than 10 roosts. During this period more than 700 individuals were captured of which around 600 have been individual marked. For population genetic studies tissue samples have also been collected from all individuals. Funded by “Fundação para a Ciência e a Tecnologia” (LTER/BIA-BEC/0004/2009) and “EDP – Energia de Portugal”.

Finding a new world – Endoscopy of cryptic habitats. This R&D project was developed by NOCTULA – Modelling and Environment and presented on the International Conference of IAIA 2012; it was awarded and highlighted at the closing ceremony. Although features such as old woodpecker holes, cracks and crevices are usually recognized as potentially important habitats for cryptofauna communities, these small cavities have been almost entirely neglected, being the available cryptofauna studies mostly concentrated on easily accessible environments such as large caves and tunnels. Environmental impact studies often neglected cryptic species justifying technical difficulties associated with their location or arguing that they tend to exhibit low fidelity to individual crevices being the absence of

data in many cases responsible for animal roosts destruction during the construction works of several projects. The bat species roosting in small cryptic habitats are an example of a group that has been neglected in Portugal, in spite of some of them currently faces high risk of extinction. During this R&D project, a large number of groups of vertebrates and invertebrates were registered which led NOCTULA to conduct studies in a broader framework. When compared to other methodologies to study the species that live in small cryptic habitats, endoscopy is relatively easy and quick to apply on the field and the amount of data that can be registered and stored is enormous. Moreover, video documentation saves expensive working time and the analysis can be done any time.

Winter Influence on bat activity: a contribution to understand the influence of climate changes on bat phenology. The principal objective of this PhD (co-tutoring PhD programme between the University of Aveiro and the University of Lisbon), in preparation by Nuno Pinto, is to evaluate the impact of global changes in bat communities. Funded by "Fundação para a Ciência e a Tecnologia.

Unveiling bat cryptic diversity in Iberia: analysing the influence of population history and ecological niche on the isolation and differentiation of species. Over the last decade several bat cryptic species' complexes were described throughout Europe. Notably, the Iberian Peninsula alone showed that over 20% of recognized species exhibited evidence of cryptic diversity. This project, conducted by Hugo Rebelo, proposes to investigate the genetical and ecological characteristics that promoted reproductive isolation in five bat cryptic species complexes. This research will develop species distribution models for present, past and future climate change scenarios. Results will allow the estimation of population movements throughout time and the identification of ecological conditions that promoted species separation. Additionally, through genetic analysis (mtDNA, nuclear sequences and microsatellites) it is intended to investigate species' population structure and demography, and possible hybridization where sympatry or parapatry between cryptic species occurs. By combining genetic analysis with predictive modelling it is also expect to study how ecological niches and population movements have an influence on the species' genetic variability, reproductive isolation and speciation. Funded by "Fundação para a Ciência e a Tecnologia".

Living on the edge: studying bat colonization of bridges in northern Portugal. Bridges play a relevant role as roosting opportunities for several bat species in the U.S.A. However, in Europe that role has seldom been studied with only sporadic and scarce information available. In the scope of several environment impact assessments being carried out in Portugal, it was found that some bridges in the north harboured substantial numbers of individuals and bat species. In this context, this MSc, in preparation by Pedro Alves, proposes to study which factors promote the colonisation of bridges by bats in northern

Portugal (mainly at Sabor river watershed). In this area a large dam is being constructed and consequently new bridges are being built to compensate the loss of bridges that are going to be submerged by the reservoir. This provides a unique opportunity to analyse bridges with different ages.

Factors affecting bat diversity and activity patterns at the lagoon system of Baixo Vouga and Ria de Aveiro. This MSc, in preparation by Eduardo Mendes, aims to assess spatio-temporal patterns in bat diversity and activity in the Baixo Vouga Lagunar complex wetland system and to understand the main factors behind those patterns, including climatic variables, micro-habitat diversity, food availability and sources of human pressure. The study is integrated in a larger-scale, long-term monitoring project within the Baixo Vouga Lagunar wetland, aiming to inventory and describe diversity patterns of several vertebrate taxa including bats, amphibians, small nonvolant mammals, carnivores, and birds. Funded by Aveiro University and partially logistically supported by the Municipality of Estarreja.

Temporal patterns of roost use and food selection by Rhinolophus hipposideros (Chiroptera, Rhinolophidae). This MSc, in preparation by Ana Lino, aims to understand temporal patterns of roost use by *R. hipposideros* and determine if there is food selection. Funded by Aveiro University and partially logistically supported by Centro de Investigação da Regaleira – CIR.

Factors determining the activity of bats in pine forests. The different characteristics of pine forests, such as the size and fragmentation of parcels, age and composition of the understorey, are considered limiting factors of the different faunal communities present in natural areas. This MSc, in preparation by Mário Carmo, aims to determine the importance of forest management in the use of space by the bats in the study area. To this end, it was sampled the activity of this faunal community in pine forests and in their edges.

Behavior and social structures in Miniopterus schreibersii and Rhinolophus hipposideros in maternity roosts. The main goal of this MSc, in preparation by Maria João Silva, is the study of the social behaviour and structure of bats in maternity roosts, establishing behavioural patterns that lead to the preservation of bats during a critical season of their annual life cycle. This document is based on imagery collected from The Alviela Bat Observatory (equipment installed in the inside of a cave) and The Quinta de Regaleira Observatory (equipment installed in an abandoned building) between April and September 2010, and 2011.

Automated acoustic identification of bat species. Recent improvements in bat survey methods in Portugal, especially automatic recording stations, have led to an analysis problem due to the amount of data obtained. This MSC, in preparation by Bruno Silva, proposes a possible solution for this: an automated identification R script based on artificial neural networks and using a reference database of recordings obtained in Portugal. The

compiled database already includes 748 recordings from 20 different species, made after hand release of captured bats or outside known roosts. The R script for detection of bat calls in a recording, extraction of the calls from the background noise and measuring the 19 parameters used for classification is implemented. The artificial neural networks are still being adjusted but they are already showing very encouraging results with approximately 95% of correct identifications to genus level and approximately 80% to species level.

Influence of water availability in bats activity and diversity in the Mediterranean landscapes – the importance of distance to ponds in the South of Portugal. With climatic changes, the water availability becomes a limiting factor for the presence of fauna; further more in dry regions, such as the Mediterranean region, which is characterized by high ambient temperature combined with low relative humidity. This MSc, in preparation by Inês Fernandes, aims to determine how the water availability and the distance to water bodies influences the bats activity and diversity, by comparison of a "normal" year (2011) with a year of severe drought (2012), in the study area. The activity of the bat community has been sampled in the surroundings of sixteen ponds, during the past two years. So far, as expected, the preliminary results in vicinity of water bodies indicate that bats general activity increased from "typical" year (2011) to extremely dry year (2012), and it is significantly higher in the first fifty meters radius from the ponds.

Estimating wildlife mortality at wind farms: accounting for carcass removal, imperfect detection and partial coverage. One of the main concerns in monitoring wind farms is related to the mortality of birds and bats directly caused by collision with the wind farm structures. The methods used to estimate mortality are still not consensual and in many cases there are limitations and considerable estimation errors associated with it. Additionally, in most cases, the field monitoring process is logistically and financially limited. As such, it becomes urgent to use efficient methods, to reduce the logistical and the financial efforts, without compromising the quality of results. This PhD, prepared by Regina Bispo, was a contribution to the study of methodologies for monitoring wind farms in particular regarding the methods to estimate mortality and optimize the monitoring strategies.

Bat communities: potential predators of the Pine Processionary population in the Pine Forest of Leiria. Final project of a Biology Graduation, developed by Ricardo Laranjo in May 2012, with Denis Medinas, Manuela Branco and Mário Carmo as project mentors and supervisors. The main goal of this study was to understand which bat species were active during the flight period of an insect called "Pine Processionary Moth" (*T. pityocampa*), more specifically of a population with a phenology shift that occurs in Leiria, Portugal, known as "Summer Population", and to analyze their predatory potential over this population. The level of activity of bats would be analyzed according to an increase in the number of Pine

Processionary Moths, in a specific location, depending on the “attraction rate” caused by different amounts of pheromone diffusers. Since the Pine Processionary is a defoliating pest that causes serious environmental, economic and health issues (in both humans and animals), it would be of great significance to understand how these results could be used in a biological control of the pest. However, due to adverse weather conditions during the monitoring period, such as low temperatures and rain, very few moths were observed, thus making the results unreliable.

Publications

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Bispo R., J. Bernardino, T. Marques & D. Pestana. 2012. Modeling carcass removal time for avian mortality assessment in wind farms using parametric survival analysis. *Environmental an Ecological Statistics*. doi: 10.1007/s10651-012-0212-5.

Bispo R., J. Bernardino, T. Marques & D. Pestana. 2013. Discrimination between parametric survival models for removal times of bird carcasses in scavenger removal trials at wind turbines sites. In J.L. da Silva et al. (eds.), *Advances in Regression, Survival Analysis, Extreme Values, Markov Processes and Other Statistical Applications*, Studies in Theoretical and Applied Statistics.

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Rebelo H., E. Froufe, N. Ferrand & G. Jones 2012. Integrating molecular ecology and predictive modelling: implications for the conservation of the barbastelle bat (*Barbastella barbastellus*) in Portugal. *Eur J Wildl Res*, 58: 721-732.

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Silva-Santos P, H Raposeira H & P Horta. 2012. Finding a new world – endoscopy of cryptic habitats. *IAIA12 Conference Proceedings. Energy Future The Role of Impact Assessment.* 32nd Annual Meeting of the International Association for Impact Assessment. 27 May- 1 June 2012, Centro de Congresso da Alfândega, Porto – Portugal.

Azores Archipelago

The region considered important to study the conservation status of bats in the Azores archipelago by promoting a regional Bat Census in 2012. The census aimed to: confirm the results obtained in 2002, promote an internship for nature watchers and technicians, acquire new knowledge about the species, increase the sampling area, evaluate bats population's conditions and identify potential sources of threats, and promote environmental awareness with local communities. Census were held in five of the nine Islands (São Miguel: 37 points surveyed per sampling period, it was possible to confirm the presence of *Nyctalus azoreum* and *Pipistrellus maderensis*; suspicion of the presence of *Tadarida teniotis*. Santa Maria: 15 points surveyed per sampling period, it was possible to confirm the presence of *Nyctalus azoreum* and *Pipistrellus maderensis*. Faial: 25 points surveyed per sampling period, it was possible to confirm the presence of *Nyctalus azoreum*. Terceira: 24 points surveyed per sampling period, it was possible to confirm the presence of *Nyctalus azoreum*. Pico: 26 points surveyed per sampling period, it was possible to confirm the presence of *Nyctalus azoreum*. Additionally, awareness sessions were held on São Miguel, Terceira, Faial and Graciosa islands. In 2013, bat census will take place on the following Islands: São Jorge, Graciosa, Pico, Flores and Corvo.

Madeira Archipelago

No information.

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

Mainland Portugal

No recent developments in this area. Pest control agencies were contacted in order to explain that bats cannot be harmed during their operations.

Azores Archipelago

No developments in this area.

Madeira Archipelago

No considerations have been made.

D. Functioning of the Agreement

14. Co-operation with other Range States

Mainland Portugal

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

Several Portuguese bat workers attended national and international conferences: *Annual Meeting of the* Society of Molecular Biology and Evolution (Ireland, 2012: Bruno Simões), *Congreso Ibérico sobre Energia Eólica y Conservación de la Fauna* (Spain, 2012: Luísa Rodrigues, Regina Bispo), *IENE 2012* (Gerrmany, 2012: Denis Medinas), International symposium on the importance of bats as bioindicators (Spain, 2012: Hugo Rebelo), *International Statistical Ecology Conference* (Norway, 2012: Regina Bispo), *London Evolutionary Research Network* (UK, 2012: Bruno Simões), *Polish Wind Energy Association Conference* (Poland, 2012: Joana Bernardino), *Portuguese Conference* on Pattern Recognition (Portugal, 2012: Carlos Faneca, Carlos Bastos, Ricardo Correia, José Vieira), *Workshop on Sampling and Experimental Design with Applications* (Portugal, 2012: Regina Bispo), *5th White Nose Syndrome Symposium* (USA, 2012: Hugo Rebelo), *32nd Annual Conference of the International Association For Impact Assessment* (Portugal, 2012: Joana Bernardino), *IV Jornadas de la SECEMU* (Spain, 2012: Milene Matos), *IVth International Wildlife Management Congress* (South Africa, 2012: Joana Cruz), *IX Wind Wildlife Research Meeting* (USA, 2012: Joana Bernardino), *Conference on Wind Power and Environmental Impacts* (Sweden, 2013: Filipa Peste, Joana Bernardino, Miguel

Mascarenhas).

Luísa Rodrigues participated in several EUROBATS Intersessional Working Groups: *IWG on Conservation of key underground sites, IWG on Monitoring and Indicators*, *IWG on Monitoring of daily and seasonal movements of bats*, *IWG on Autecological studies for priority species*, *IWG on Man-made Purpose-built Bat Roosts*, *IWG on Impact of roads and other traffic infrastructures on bats*, *IWG on Lethal fungal infections*, and *IWG on Wind turbines and bat populations*, convening the last one.

The questionnaire sent by "IWG on Bat Conservation and Sustainable Forest Management" was analysed by Ana Rainho and relevant information was sent.

Azores Archipelago

No information.

Madeira Archipelago

Sérgio Teixeira and José Jesus cooperate with Italy (Università degli Studi di Napoli Federico II) regarding data collection for conservation in Madeira Island.

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

Considering the recent extension of the geographical scope of EUROBATS and the inclusion of Azores and Madeira archipelagos, none of the resolutions has been implemented yet.

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

Mainland Portugal

In mainland Portugal, since 1987 there has been a programme to monitor cave-dwelling species, coordinated by "ICNF" and developed in collaboration with "Faculdade de Ciências de Lisboa", "Universidade do Porto", "Universidade de Évora", "Universidade de Trás-os-Montes e Alto Douro" and "Federação Portuguesa de Espeleologia" (referred under point 12). Maternity and hibernation underground roosts considered being of National importance and some buildings that harbour important colonies of "cave-dwelling species" such as *R. ferrumequinum* and *R. hipposideros* are monitored, in a total of around 40 places each season. Observations inside the roosts are done, counting the individuals or estimating the area of the colonies (visually and with photographs), using the methods described for *M. myotis/blythii* and *M. schreibersii* in the resolution approved in 2MoP and recommended by EUROBATS Publication Series nº 5. These methods can be successfully applied to *R. euryale, R. mehelyi, M. myotis, M. blythii* and *M. schreibersii*, which 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*, there are 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 other species. In the case of *M. escalerai* and *M. emarginatus*, although most maternity colonies are known in underground roosts, since normally they use hidden places (especially *M. escalerai*), very often they are not observable inside. Often, only the capture of flying juveniles enables the identification of maternity sites.

Roosts inventoried during local monitoring programmes established as minimization measures of projects subjected to environmental impact assessment (particularly wind farms and dams) are monitored by promoters. If any underground roost of National importance is found, it is included in the programme coordinated by "ICNF".

A database including all observations done during the Monitoring Programme was updated.

Resolution 2.4 – Transboundary Programme: Habitat Proposals

Mainland Portugal

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.

An analysis of the data of the Monitoring programme of cave-dwelling species is under preparation.

Resolution 2.5 – Geographical Scope of the Agreement

Mainland Portugal

A study of migratory patterns of some cave-dwelling species (*M. schreibersii*, *M. myotis* and *M. blythii*) is being conducted.

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, 5.10 and 6.16 – On the implementation of the conservation and management plan

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

Resolution 3.7 – Amendment of the Agreement

This point has not been implemented yet.

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

Mainland Portugal

No recent developments in this area. Several important underground roosts were already protected with fences. Abandoned mines are being protected with bat friendly methods (referred under point 11). Recommendations included in EUROBATS Publication Series nº 2 are being followed.

Resolutions 4.4 and 6.12 – Bat Conservation and Sustainable Forest Management

Mainland Portugal

In Portugal forests are not managed specifically to protect bat-feeding habitats. However, some planning/management and regulatory rules protect directly or indirectly feeding habitats and roosts.

Two schemes of sustainable forest management certification (PEFC – Programme for the Endorsement of Forest Certification and FSC – Forest Stewardship Council) started to be applied in 2005 and certified area has been growing. These schemes include the identification of protected/threatened natural values and its protection, as well as the monitoring of the actions.

Guidelines for the elaboration of forestry projects were recently prepared. The purpose of this document is to assist owners, project designers and machine operators in the development of forestry projects and implementation of forest operations, in view of its compatibility with conservation of natural values.

A Best Practice Guide to assist SCI of Monfurado and SCI of Cabrela land owners to preserve habitats and species was prepared. Conservation measures to protect *Myotis myotis* and *Rhinolophus* sp related to agricultural and forest investments are identified.

Mainland Portugal's rural development program includes roosts protecting compliance. The applicants who commit voluntarily to agri-environmental and forest-environmental schemes, in Nature 2000 areas, must not disturb or destroy the existing roosts. Non-productive investment support for maintaining traditional buildings like watermills, traditional corrals and other old buildings used for roosting, as well as funding for correcting field fences are also available.

Support is available for investments in forests which enhance the public amenity value of forest and wooded land. Funding forest investment plans targeted to woodland management promoting adaptation to natural conditions, protecting biodiversity and features like hedgerows, scattered bushes, indirectly protects bats habitat.

An intervention plan for one SCI (Intervention Plan for the rural space of the SCI of

Monfurado; http://www.cm-montemornovo.pt/pmot/PIER/Relatorio.pdf) has already come into force. In this management plan several conservation priority areas were defined and mapped, based on their value to bats, particularly forest bats. Strict forest habitats and tree preservation measures were implemented within these areas: preservation of riparian woodland, preservation of montado areas, limits to livestock density, promotion of ground cover diversity, fire control, restriction to the use of barbed wire, and the preservation of drinking water sources.

Other points have not been implemented yet.

Azores Archipelago

In Azores forests are not managed specifically to protect bat-feeding habitats. However, some support measures directly or indirectly help to improve forest including the promotion of sustainable forest management through the use of forest without compromising its environmental and economic functions.

Under the Rural Development Programme of the Azores (PRORURAL) - 2007-2013 (http://prorural.azores.gov.pt/) there are measures support for the afforestation of agricultural and non -agricultural and for forest areas improvement.

Even in this program there are support measures for forest - environmental payments in Natura 2000 forest areas.

There are also agri-environmental measures granted under this program which are intended to preserve traditional rural landscape, thus protecting environment and maintaining natural areas.

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

Mainland Portugal

All issued permits (n=33) and field work activities have taken these guidelines into consideration.

Azores Archipelago

In Azores there is a specific form (“Pedido de Licença para estudo e/ou manuseamento de animais selvagens”) for those interested in obtaining licenses for works that have scientific, education or conservation goals. License applications are analyzed under Decreto-Lei nº140/99, 24th April 1999, adapted to Azores by Decreto Legislativo Regional nº18/2002/A,

16th May 2002, amended by Decreto-Lei nº49/2005, 24th February 2005 and by Decreto-Lei nº316/89, 22nd September 1989.

Resolutions 4.7, 5.6 and 6.11 – Wind Turbines and Bat Populations

Mainland Portugal

Divulgation of the impacts that some wind farms may have on bat populations has been done.

Current recommendations for Environmental Impact Assessment of wind turbines projects (document ICNB 2009 in http://www.wix.com/anodomorcego/icnb/docs#!__docs/diversos) include three components: habitat survey (ground bat detectors surveys), roost inventory/monitoring and mortality (including Carcass Removal and Searcher Efficiency rates). The two first components should be studied 1 year before and 3 years after the construction of the wind farm (as well the third one), to allow comparisons. Depending on the results, the monitoring will continue.

A report on the effect of wind farms on bats in continental Portugal (data 2001-2008) is available online (document ICNB 2010 in http://www.wix.com/anodomorcego/icnb/docs#!__docs/diversos*).* The document comprises the analysis of 171 reports regarding 49 wind farms.

Due to close locations regarding important underground roosts, two projects were authorized with cut-in speed increased. A project including 7 turbines, one located 158 m from one important hibernating roost (around 4000 *Miniopterus schreibersii* and 150 *R. ferrumequinum*), was authorized with cut-in speed increased to 5 m/s in October, November, December, March and April. A project including 4 turbines located less than 7 km from the most important underground roost known in mainland, occupied all over year by many thousands of bats of several species, was authorized with cut-in speed increased to 3.3 m/s.

Some papers were published, and PhD and projects have been prepared or are under preparation (referred under point 12).

Three companies are already using dogs in carcass searches.

Since 2001, 812 carcasses of at least 11 species (*P. pipistrellus, P. pygmaeus, P. kuhli, H. savii, N. leisleri, N. noctula, N. lasiopterus, T. teniotis, M. daubentonii, E. isabellinus, M. schreibersii*) were found (Table 5), but it is not possible to evaluate its impact on populations. Data were recorded by several companies: AgriPro Ambiente, Bio 3, Biota, Ecomind, Colmus, Ecosativa, Ecosfera, EDP, EolFlor, ENEOP 2, LEA/UTAD, Lestenergia, Naturibérica, Plecotus, Procesl, Profico Ambiente, ProSistemas, NOCTULA, Strix and Tecneira.

Table 5 – Fatalities observed in Portuguese wind farms, per species.

Species	Fatalities number	% mortality/species
P. pipistrellus	229	28,3
N. leisleri	192	23,6
not identified	96	11,9
Pipistrellus sp	81	10,0
H. savii	40	4,9
P. pipistrellus/pygmaeus	34	4,2
P. kuhli	32	4,0
P. pygmaeus	28	3,5
T. teniotis	19	2,3
P. pipistrellus/kuhli	18	2,2
Nyctalus sp	16	2,0
Eptesicus sp	15	1,9
N. lasiopterus	6	0,7
M. daubentonii	2	0,2
M. schreibersii	2	0,2
E. isabellinus	1	0,1
N. noctula	1	0,1

Most fatalities belong to more abundant species, with “Least concern” status (52,3%), indicating a reduced effect in species known to be threatened. However, the relative high percentage belonging to “Insufficient information” species (33,6%) may indicate worrier negative impacts on species that may have a unfavourable status.

Observed fatalities occurred between February and November, with a major peak in September and a smaller peak in May (Table 6 and Figure 2).

Table 6 – Fatalities observed in Portuguese wind farms, per month.

Month	Number of searches / month	Fatalities number	% mortality/month
September	165	245	30,2
August	159	183	22,5
May	144	101	12,4
June	155	76	9,4
April	137	76	9,4
October	160	75	9,2
July	153	47	5,8
March	96	4	0,5
November	45	4	0,5
February	29	1	0,1
January	24	0	0,0
December	32	0	0,0

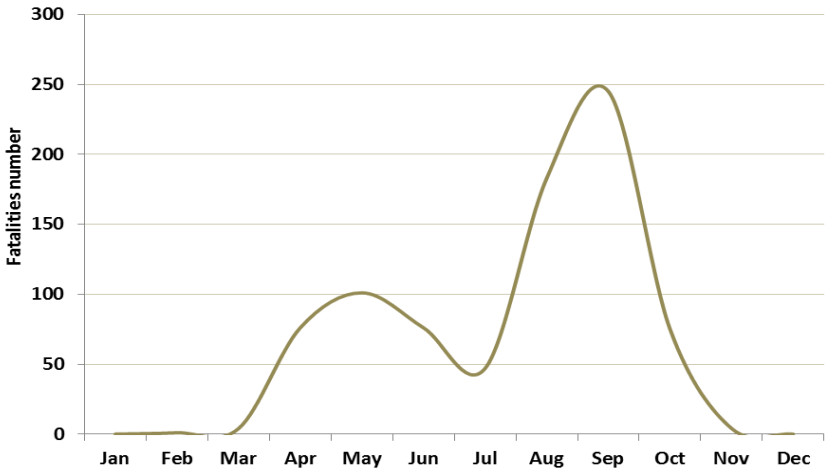

Figure 2 – Variation of observed mortality along the year.

Resolution 5.2 – Bats and Rabies in Europe

Mainland Portugal

The analysis of several species was carried out by "Instituto Nacional de Investigação Agrária e Veterinária (INIAV)"; all the samples tested negative by RT-PCR for classical rabies and rabies-related bat lyssaviruses.

All bat workers are advised to handle bats in the expectation that they may have rabies and are encouraged to get rabies vaccinations and to use gloves.

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

Mainland Portugal

The known overground roosts are included in the database on bat observations. The roosts occupied by important colonies of 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.

Two alternative overground roosts were built in the past. One roost ("Morcegário de Tróia") was built in 2003 to compensate the destruction of one building that harboured *T. teniotis, Eptesicus* sp and *Pipistrellus* sp; the roost is currently used by *T. teniotis*, *Eptesicus serotinus* and *Pipistrellus pipistrellus*, but there is no confirmation on its use as a maternity. The other roost ("Morcegário da Regaleira") was temporarily created in 2008 and definitely created in 2009; the roost is used all over the year by *R. hipposideros*, and the maternity colony is one of the biggest known in the country.

An informative guide for the general public regarding cohabitation with bats and bat

exclusion was prepared and is available on-line (referred under point 12).
Suggestions contained in EUROBATS Publication Series nº 4 are being followed.
Other points have not been implemented yet.

Resolution 6.5 – Guidelines on Ethics for Research and Field Work Practices

Mainland Portugal

This Resolution was divulgated among investigators from Universities and Natural History Museums and technicians who are doing field work.

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

Mainland Portugal

Relevant information on fungal infection in bats has been forwarded to investigators, technicians doing field work and speleologists.
Particular care is being taken regarding the identification of signs of potential fungal infection in bats during field work.
Realization of MSc, PhD and projects in this area are being fostered.
Other points have not been implemented yet.

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

Mainland Portugal

Divulgation of the importance of critical feeding areas, core areas around known colonies and commuting routes for bats has been done.
An effort for environmental impact assessments take into consideration bats´ needs has been made.
Other points have not been implemented yet.

Resolution 6.8 – Monitoring of Daily and Seasonal Movements of Bats

Mainland Portugal

A study of migratory patterns of some cave-dwelling species (*M. schreibersii*, *M. myotis* and *M. blythii*) is being conducted, using capture-recapture data of banded individuals. Cooperation with Spain regarding the shares of information about recaptured bats is being carried out.
Banding is being done accordingly to Resolution 4.6.
Other points have not been implemented yet.

Resolution 6.9 – Year of the Bat

Mainland Portugal

Year of the Bat campaign achieved excellent results in 2012, as referred under point 9. Besides the materials provided (website, newsletters, resources), the success of the campaign relied particularly on the tremendous work done mainly by volunteers. During 2012 more than 40 persons and entities organized many dozens of activities, attend by more than 12000 participants. Activities included talks in schools and Universities, ateliers in schools, talks for general public, talks in National Conferences, walks with bat detectors, exhibitions, workshops on morphological and acoustic identification of bats, visit to Museum´s bat collection´s, and divulgation papers in magazines and newspapers. Aditionally, many schools studied bats and organized activities, such as talks, contests and exhibitions.

Resolution 6.10 – Synergies between the Agreement and Other European Treaties for Nature Conservation

An effort to implement this Resolution has been made, as presented in this Report.

Resolution 6.13 – Bats as Indicators for Biodiversity

Mainland Portugal

The only action was the participation in the project “Streamlining European Biodiversity Indicators (SEBI): Development of a prototype indicator of European bat population trends” (prepared by Karen Haysom, Jasja Dekker, Jon Russ, Tom van der Meij and Arco van Strien, 2011).

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

Mainland Portugal

An effort for environmental impact assessments of roads and other traffic infrastructures take into consideration bats´ needs has been made.

There is a manual (“Manual de apoio à análise de projectos relativos à implementação de infra-estruturas lineares”; http://portal.icnb.pt/NR/rdonlyres/999BBAF3-41CE-40DD-9697-DBAC22AB3F38/0/manual_apoio_infra_linear.pdf) which aims to be a guideline for the analysis of new infrastructures (roads, railway lines and canals) projects. The manual gathers referenced information on impacts, minimization measures, compensation and monitoring of natural values.

Other points have not been implemented yet.

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

Mainland Portugal

This Resolution was divulgated to “Direcção-Geral de Alimentação e Veterinária”, the entity in charge of this subject.