

# Action Plan for the Conservation of All Bat Species in the European Union

## 2018 – 2024

### Additional information



European  
Commission



# Action Plan for the Conservation of all Bat Species in the European Union

## 2019 - 2024

### EDITORS:

- BAROVA Sylvia (European Commission) & STREIT Andreas (UNEP/EUROBATS)

### COMPILERS:

- MARCHAIS Guillaume & THAURONT Marc (Ecosphère, France/The N2K Group)

### CONTRIBUTORS (in alphabetical order):

- BOYAN Petrov \* (Bat Research & Conservation Centre, Bulgaria)
- DEKKER Jasja (Animal ecologist, Netherlands)
- ECOSPHERE: JUNG Lise, LOUTFI Emilie, NUNINGER Lise & ROUÉ Sébastien
- GAZARYAN Suren (EUROBATS)
- HAMODOVIĆ Daniela (State Institute for Nature Protection, Croatia)
- JUSTE Javier (Spanish association for the study and conservation of bats, Spain)
- KADLEČÍK Ján (Štátnej ochrany prírody Slovenskej republiky, Slovakia)
- KYHERÖINEN Eeva-Maria (Finnish Museum of Natural History, Finland)
- HANMER Julia (Bat Conservation Trust, United Kingdom)
- LEIVITS Meelis (Environmental Agency of the Ministry of Environment, Estonia)
- MARNELI Ferdia (National Parks & Wildlife Service, Ireland)
- PETERMANN Ruth (Federal Agency for Nature Conservation, Germany)
- PETERSONS Gunārs (Latvia University of Agriculture, Latvia)
- PRESETNIK Primož (Centre for Cartography of Fauna and Flora, Slovenia)
- RAINHO Ana (Institute for the Nature and Forest Conservation, Portugal)
- REITER Guido (Foundation for the protection of our bats in Switzerland)
- RODRIGUES Luisa (Institute for the Nature and Forest Conservation, Portugal)
- RUSSO Danilo (University of Napoli Frederico II, Italy)
- SCHEMBRI GAMBIN Lisa (Malta Environment and Planning Authority)
- SPITZENBERGER Friederike (Batlife, Austria)
- SZODORAY-PARADI Abigel (Romanian Bat Protection Association, Romania)
- TAPIERO Audrey (Federation of the French Wildlife trusts, France)
- VLASAKOVA Libuse (Ministry of the Environment, Czech Republic)

### COVER PHOTOS:

- Top-left corner: *Rhinolophus ferrumequinum* – L. Spanneut (Ecosphère)
- Bottom-left corner: *Nyctalus leisleri* – G. Marchais (Ecosphère)
- Top-right corner: *Pipistrellus pipistrellus* – L. Spanneut (Ecosphère)
- Bottom-right corner: *Nyctalus leisleri* – N. Flamand (Ecosphère)

---

**Boyan Petrov**, an eminent bat expert, who will stay forever somewhere in the Himalayas' peaks, provided an invaluable contribution to this action plan.

<b>1 -</b>	<b>EU and EUROBATS co-funded projects.....</b>	<b>1</b>
1.1 -	<b>LIFE projects dedicated to bats .....</b>	<b>2</b>
1.1.1 -	Szachownica - Carrying out necessary conservation work on a territory of Szachownica Cave designated within Natura 2000 (nr LIFE12 NAT/PL/000012).....	2
1.1.2 -	Bats Romania 31/8/2004 - Conservation program for Bat's Underground Habitats in SW Carpathians (LIFE00 NAT/RO/007187).....	2
1.1.3 -	Bat-Conservation-RO - Bat conservation in Padurea Craiului, Bihor and Trascau Mountains (LIFE08 NAT/RO/000504).....	3
1.1.4 -	Preserving management of the habitats 8310 from the Site Natura 2000 Semenic – Cheile Carasului" - PMH8310SN2000SCC (LIFE07NAT/RO000680) .....	3
1.1.5 -	Onferno - Bats and their foraging habitats conservation at R.N.O. of Onferno and homonymous SIC (LIFE00 NAT/IT/007216) .....	4
1.1.6 -	Chiroterri II (Campo dei Fiori - Bats, calcareous habitats and petrifying sources in the Park of Campo dei Fiori (LIFE00 NAT/IT/007139).....	4
1.1.7 -	LIFE PODKOWIEC+ - Protection of the Lesser Horseshoe bat and other bat species in southern Poland (Lesser Horseshoe +) (LIFE12 NAT/PL/000060).....	4
1.1.8 -	Quirópteros Extremadura - Conservation of threatened chiropters of Extremadura (LIFE04 NAT/ES/000043) .....	4
1.1.9 -	Quirópteros Valencia - Bats conservation plan in the Valencian community (LIFE00 NAT/E/007337) .....	5
1.1.10 -	Quirópteros/Castilla León - Priority actions to protect bats in Castilla y León Communitary interesting zones (LIFE96 NAT/E/003081) .....	6
1.1.11 -	Quirópteros/cav.volcánicas - Conservation of chiropters and invertebrates in volcanic cavities (LIFE98 NAT/E/005306) .....	6
1.1.12 -	Life plateau de Montselgues - Preservation of the heathlands, peatlands and bats of Montselgues (LIFE05 NAT/F/000135).....	8
1.1.13 -	CHIROFRSUD - Conservation of 3 cave-dwelling bats in Southern France (LIFE04 NAT/FR/000080).....	8
1.1.14 -	Life Chiro Med - Conservation and integrated management of two bat species in the French Mediterranean region. (LIFE08 NAT/F/000473).....	9
1.1.15 -	Bat action - Action plan for three threatened bat species in Flanders (LIFE06 NAT/B/000095) .....	9
1.1.16 -	Life at night in Slovenia (LIFE09 NAT/SI/000378) .....	10
1.1.17 -	Protection of Common Swift ( <i>Apus apus</i> ) and bats in buildings in Slovakia (LIFE10 NAT/SK/079).....	10
1.2 -	<b>Interreg.....</b>	<b>11</b>
1.2.1 -	Interreg III A Project "Bat Protection in the Alpine and Adriatic Regions" ....	11
1.2.2 -	Interreg IVA "Lorraine" .....	11
1.4 -	<b>Leader .....</b>	<b>11</b>
1.4.1 -	Leader 4a-F-P8568 "Protection of the maternity of a large colony of Geoffroy's bat in Lockenhaus, Burgenland, Austria" .....	11
1.5 -	<b>EUROBATS Project Initiative (EPI).....</b>	<b>11</b>
<b>2 -</b>	<b>Bat rabies cases in europe .....</b>	<b>12</b>
<b>3 -</b>	<b>Species fact sheets .....</b>	<b>14</b>
3.1 -	<b><i>Barbastella barbastellus</i> - Western barbastelle bat .....</b>	<b>16</b>
3.2 -	<b><i>Eptesicus bottae</i> - Botta's Serotine.....</b>	<b>17</b>
3.3 -	<b><i>Eptesicus isabellinus</i> - Isabelline Serotine bat .....</b>	<b>18</b>

3.4 -	<i>Eptesicus nilssonii</i> - Northern bat.....	19
3.5 -	<i>Eptesicus serotinus</i> - Common Serotine Bat .....	20
3.6 -	<i>Hypsugo savii</i> - Savi's pipistrelle .....	21
3.7 -	<i>Myotis alcathoe</i> - Alcathoe whiskered bat.....	22
3.8 -	<i>Myotis aurascens</i> - Steppe Whiskered bat .....	23
3.9 -	<i>Myotis bechsteinii</i> - Bechstein's bat .....	24
3.10 -	<i>Myotis blythii</i> - Lesser mouse-eared bat.....	25
3.11 -	<i>Myotis brandtii</i> - Brandt's bat .....	26
3.12 -	<i>Myotis capaccinii</i> - Long-fingered bat .....	27
3.13 -	<i>Myotis dasycneme</i> - Pond bat .....	28
3.14 -	<i>Myotis daubentonii</i> - Daubenton's bat.....	29
3.15 -	<i>Myotis emarginatus</i> - Geoffroy's bat.....	30
3.16 -	<i>Myotis escalerai</i> - Escalerai bat.....	31
3.17 -	<i>Myotis myotis</i> - Greater mouse-eared bat .....	32
3.18 -	<i>Myotis mystacinus</i> - Whiskered bat .....	33
3.19 -	<i>Myotis nattereri</i> - Natterer's bat.....	34
3.20 -	<i>Myotis punicus</i> - Maghreb mouse-eared bat .....	35
3.21 -	<i>Miniopterus schreibersii</i> - Schreiber's bat.....	36
3.22 -	<i>Nyctalus azoreum</i> - Azorean bat .....	37
3.23 -	<i>Nyctalus lasiopterus</i> - Greater noctule bat.....	38
3.24 -	<i>Nyctalus leisleri</i> - Leisler's bat .....	39
3.25 -	<i>Nyctalus noctula</i> - Common noctule.....	40
3.26 -	<i>Pipistrellus hanaki</i> - Hanaki's Dwarf Bat.....	41
3.27 -	<i>Pipistrellus kuhlii</i> - Kuhl's pipistrelle .....	42
3.28 -	<i>Pipistrellus maderensis</i> - Madeira pipistrelle .....	43
3.29 -	<i>Pipistrellus nathusii</i> - Nathusius's pipistrelle.....	44
3.30 -	<i>Pipistrellus pipistrellus</i> - Common pipistrelle .....	45
3.1 -	<i>Pipistrellus pygmaeus</i> - Pygmy or Soprano pipistrelle .....	46
3.2 -	<i>Plecotus auritus</i> - Brown long-eared bat.....	47
3.3 -	<i>Plecotus austriacus</i> - Grey long-eared bat .....	48
3.4 -	<i>Plecotus kolombatovici</i> - Kolombatovic's Long-eared bat.....	49
3.5 -	<i>Plecotus macrobullaris</i> - Mountain long-eared bat.....	50
3.6 -	<i>Plecotus sardus</i> - Sardinian long-eared bat .....	51
3.7 -	<i>Plecotus teneriffae</i> - Tenerife long-eared bat .....	1
3.8 -	<i>Rhinolophus blasii</i> - Blasius' Horseshoe Bat.....	2
3.9 -	<i>Rhinolophus euryale</i> - Mediterranean Horseshoe Bat.....	3
3.10 -	<i>Rhinolophus ferrumequinum</i> - Greater Horseshoe bat .....	4
3.11 -	<i>Rhinolophus mehelyi</i> - Mehely's Horseshoe bat.....	5

3.12 -	<i>Rhinolophus hipposideros</i> - Lesser Horseshoe Bat.....	6
3.13 -	<i>Rousettus aegyptiacus</i> - Egyptian fruit bat .....	7
3.14 -	<i>Tadarida teniotis</i> - European free-tailed bat .....	8
3.15 -	<i>Vespertilio murinus</i> - Parti-coloured bat.....	9
<b>4 -</b>	<b>Bibliography.....</b>	<b>10</b>

## 1 - EU AND EUROBATS CO-FUNDED PROJECTS

There are many actions implemented for bat conservation by local NGOs with the support of local administration and sponsors. It is not the right place here to list them all. However EU or EUROBATS supported projects may well illustrate needs and possibilities.

Table 1 - List of EU funded projects related to bat conservation (non exhaustive)

Type of EU fund	Project Title	Project Code	Web page
Life	Carrying out necessary conservation work on a territory of Szachownica Cave designated within Natura 2000	LIFE12 NAT/PL/000012	<a href="#">Link</a>
Life	Bats Romania 31/8/2004 - Conservation program for Bat's Underground Habitats in SW Carpathians	LIFE00 NAT/RO/007187	<a href="#">Link</a>
Life	Bat-Conservation-RO - Bat conservation in Padurea Craiului, Bihor and Trascau Mountains	LIFE08 NAT/RO/000504	<a href="#">Link</a>
Life	Preserving management of the habitats 8310 from the Site Natura 2000 Semenic – Cheile Carasului” - PMH8310SN2000SCC	LIFE07NAT/RO000680	<a href="#">Link</a>
Life	Onferno - Bats and their foraging habitats conservation at R.N.O. of Onferno and homonymous SIC	LIFE00 NAT/IT/007216	<a href="#">Link</a>
Life	Chiroterri II (Campo dei Fiori - Bats, calcareous habitats and petrifying sources in the Park of Campo dei Fiori	LIFE00 NAT/IT/007139	<a href="#">Link</a>
Life	PODKOWIEC+ - Protection of the Lesser Horseshoe bat and other bat species in southern Poland (Lesser Horseshoe +)	LIFE12 NAT/PL/000060	<a href="#">Link</a>
Life	Quirópteros Extremadura - Conservation of threatened chiropters of Extremadura	LIFE04 NAT/ES/000043	<a href="#">Link</a>
Life	Quirópteros Valencia - Bats conservation plan in the Valencian community	LIFE00 NAT/E/007337	<a href="#">Link</a>
Life	Quirópteros/Castilla León - Priority actions to protect bats in Castilla y León Community interesting zones	LIFE96 NAT/E/003081	<a href="#">Link</a>
Life	Quirópteros/cav.volcánicas - Conservation of chiropters and invertebrates in volcanic cavities	LIFE98 NAT/E/005306	<a href="#">Link</a>
Life	Life plateau de Montselgues - Preservation of the heathlands, peatlands and bats of Montselgues	LIFE05 NAT/F/000135	<a href="#">Link</a>
Life	CHIROFRSUD - Conservation of 3 cave-dwelling bats in Southern France	LIFE04 NAT/FR/000080	<a href="#">Link</a>
Life	Chiro Med - Conservation and integrated management of two bat species in the French Mediterranean region	LIFE08 NAT/F/000473	<a href="#">Link</a>
Life	Bat action - Action plan for three threatened bat species in Flanders	LIFE06 NAT/B/000095	<a href="#">Link</a>
Life	Life at night in Slovenia	LIFE09 NAT/SI/000378	<a href="#">Link</a>
Life	Protection of Common Swift ( <i>Apus apus</i> ) and bats in buildings in Slovakia	LIFE10 NAT/SK/079	<a href="#">Link</a>
Interreg	Interreg III A Project “Bat Protection in the Alpine and Adriatic Regions“	KAR 111026	<a href="#">Link</a>
Interreg	Interreg IVA “Lorraine”	008 WLL-2-3-013	<a href="#">Link</a>
Leader	“Protection of the maternity of a large colony of Geoffroy’s bat in Lockenhaus, Burgenland, Austria”	Leader 4a-F-P8568	<a href="#">Link</a>

## **1.1 - LIFE projects dedicated to bats**

LIFE is the EU's financial instrument supporting environmental and nature conservation projects throughout the EU, as well as in some candidate, acceding and neighbouring countries. Since 1992, LIFE has co-financed some 3,954 projects, contributing approximately € 3,1 billion to the protection of the environment.

### **1.1.1 - Szachownica - Carrying out necessary conservation work on a territory of Szachownica Cave designated within Natura 2000 (nr LIFE12 NAT/PL/000012)**

The object of the LIFE SZACHOWNICA/PL project is to undertake active conservation measures consisting in a strengthening of the ceilings and walls of the Szachownica Cave. Project was coordinated by Regional Directorate for Environmental Protection in Katowice, Poland. The Szachownica Cave is located in the northern part of the Śląskie Voivodeship. The Szachownica Cave is one of the longest cave systems in the Wieluń Upland. The underground corridors are located in the peak area of the limestone hill named Krzemienna Góra (approx. 227 metres above sea level).

The primary purpose of the project is to preserve an important bat habitat and ensure suitable habitat conditions to the species. The project outcomes will be as follows:

- securing the ceilings in the Szachownica Cave halls,
- preservation of the number and cubature of cavities used by bats,
- preservation of the existing bat entrances to the cave, and
- ensuring a suitable micro-climate for bats in the Szachownica Cave

In order to put a halt to the destruction of the Szachownica Cave works will be carried out, consisting in a consolidation of the orogen inside which the Cave is located. A combination of specialist methods commonly applied in the mining industry to support underground dog headings in mines will be employed in order to secure the cave, including pressure injections, installation of injection bolts and roof bolting.

The rock blocks forming the cave ceiling, bonded and strengthened with bolting, will ensure stability of the entire rock massif affected by underground work. Also possible water leakages through the cave ceiling will be removed.

The cave is a site of particular concentration of bats from the central and southern part of the country and an extremely important one for the preservation of the bat population in Poland and the European Union. In a longer term, preservation of the Szachownica Cave in a desired condition, due to its being a bat habitat, can be of key importance to the survival of these animals.

### **1.1.2 - Bats Romania 31/8/2004 - Conservation program for Bat's Underground Habitats in SW Carpathians (LIFE00 NAT/RO/007187)<sup>1</sup>**

As a result of the project, gates, panels and trails have been installed at eight caves. Initial inventories of bat populations were also carried out and management plans were approved. These measures, amongst others, have contributed to an increase of the effectiveness of in-situ conservation of bats population. The project also equipped and refurbished two monitoring centres (in Topolnita and Closani), which can now be used for scientific purposes and as information points for awareness raising campaigns. The project established good cooperation with local authorities, communities and schools and improved the knowledge of the target species through the implementation of education campaigns. Initial results for the cave at Bistrica, for example, indicate that bats populations have increased due to the management actions carried out. The project has also been successful in bringing about a change of attitude in the local populations, especially amongst children. For example, locals living near the cave of Isverna have adopted a more a positive attitude towards bats.

---

<sup>1</sup>

[http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n\\_proj\\_id=1748&docType=pdf](http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=1748&docType=pdf)

### **1.1.3 - Bat-Conservation-RO - Bat conservation in Padurea Craiului, Bihor and Trascau Mountains (LIFE08 NAT/RO/000504)<sup>2</sup>**

This project was coordinated by the Environmental Protection Agency of Bihor County in association with Romanian Bat Protection Association and “Emil Racoviță” Institute of Speleology in the period 2010-2014.

The objectives of the project were:

- ensure the long term conservation of the bat populations in the project area;
- increase awareness among the general public of the ecological importance of bats and the need to protect them;
- creating a network of specialists and organizations which can contribute to the long-term monitoring of bat populations in the project area;

Results:

- 300 artificial bat boxes for bats were placed in the targeted16 Natura 2000 sites of the project;
- 15 caves were closed in a bat-friendly way, to minimize the disturbance of bat colonies;
- 9 important underground habitats were cleaned up of waste;
- in the most important tourism oriented caves, were created alternative visitor routes with no bat disturbance;
- lighting conditions were modified in three caves;
- warning sign were placed at 40 caves in the area, to strictly prohibit the access to bat colonies located in the cave;
- information boards were placed in front of 15 caves, which show the importance of bats and the main objectives of the project;
- a management plan of seven bat species for the project area was prepared;
- a guideline for the elaboration of management plans of underground bat roosts and surrounding habitats was prepared, which could be used in the future at national level;
- the project focused on the public aware using ecological education on young. During the four years of the project pupils from 33 schools from the area of interest were contacted permanently in the project’s activities. Interactive presentations in classrooms, drawing competitions and trips to different locations in the project area helped in changing the negative attitude of pupils about bats and also informed them how to protect bats;
- trainings were organised in each year about the most important monitoring technics on bats. People which have participated to the trainings will be able to assure the long term monitoring of bats in the future.
- informative materials (books, brochures, leaflets, website) were created, which contributed in changing the negative attitude against bats and to disseminate the project’s results;
- A documentary film was prepared (in Romanian, Hungarian and English) about the life of bats, following the footsteps of the bat conservation team, who is trying to map and solve the problems which threat the bat population in Romania.
- a network of specialists was created in the project implementation area in the frame of several meetings with experts, participation on conferences, that will increase the sustainability and efficiency of future bat survey, monitoring and conservation actions.

### **1.1.4 - Preserving management of the habitats 8310 from the Site Natura 2000 Semenic – Cheile Carasului” - PMH8310SN2000SCC (LIFE07NAT/RO000680)<sup>3</sup>**

The main outcomes of this Life project were:

- 753 cavities evaluated from the conservation point of view;
- 122.6 km<sup>2</sup> of karstic area evaluated from the pollution degree point of view;
- 13 species of bats evaluated;

<sup>2</sup> [www.batlife.ro/?cat=6&paged=3](http://www.batlife.ro/?cat=6&paged=3)

<sup>3</sup> [www.salvatililieci.ro/docs/rezultate/Laymans-Report-EN.pdf](http://www.salvatililieci.ro/docs/rezultate/Laymans-Report-EN.pdf)

- the establishment of a waste collection system for households located in karst areas outside the settlements. For protecting the rehabilitated habitats, specific protection devices were installed (grills, gates, fences). These were projected so that the bats who want to reoccupy their roosts can easily access them;
- measures were applied for 84 cavities and 36 sinkholes and karst formations;
- Meeting the land administrators of the Romanian state, in Resita;
- Meetings with private land owners in Carasova, Iabalcea and Anina;
- Meeting with representatives of the nongovernmental sector and other interested persons.

#### **1.1.5 - Onferno - Bats and their foraging habitats conservation at R.N.O. of Onferno and homonymous SIC (LIFE00 NAT/IT/007216)<sup>4</sup>**

One of the main objectives of this project was the introduction of a better management of grasslands through controlled grazing by local breeds of sheep and cattle in order to favour species which are the prey of bats. However, such experimental controlled grazing could not be implemented because it was neither feasible nor cost-effective, due to logistic reasons. The beneficiary replaced this action by periodic mowing and sowing, thus reaching the same expected results in terms of an increase of grasslands and a reduction of shrubs. As a result, the surface of the Annex I Habitats Directive habitats "semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)" was enlarged from 12.3 ha to 39.2 ha.

#### **1.1.6 - Chiroterri II (Campo dei Fiori - Bats, calcareous habitats and petrifying sources in the Park of Campo dei Fiori (LIFE00 NAT/IT/007139)<sup>5</sup>**

This project is a continuation of a similar LIFE project (LIFE96 NAT/IT/003075). It provides for a series of actions to conserve the habitats and species of Community interest which can be found at the sites. For the bats, structures will be erected aimed at reducing the impact of tourism in the caves and rocky habitats, some of the major wetlands will be restored to enable the bats to forage, action to manage the meadow habitats will be carried out and the bat and amphibian populations will be monitored.

#### **1.1.7 - LIFE PODKOWIEC+ - Protection of the Lesser Horseshoe bat and other bat species in southern Poland (Lesser Horseshoe +) (LIFE12 NAT/PL/000060)<sup>6</sup>**

Main purposes are focusing on securing shelter for winter and summer *Rhinolophus hipposideros* bat colonies and species monitoring through purchase of antennas and telemetric transmitters, navigational and communication devices, noctovizors, a digital camera, a borescope and an ultrasonic detector. Inventory of positions of this bat is conducted in areas so far poorly identified, where that species existence can be expected. The project is promoted by hanging out posters, putting up information boards and handing out pamphlets.

#### **1.1.8 - Quirópteros Extremadura - Conservation of threatened chiropters of Extremadura (LIFE04 NAT/ES/000043)<sup>7</sup>**

The beneficiary successfully carried out Extremadura's first comprehensive census of bats. This revealed that the region's bat populations were larger than originally anticipated and also had a wider range than expected. Useful information was gained, and integrated within a GIS, about conservation factors such as water availability, human disturbance, pesticide presence and security at refuges. Other important biological baseline information was also collected and the combination of new

---

<sup>4</sup> [http://ec.europa.eu/environment/nature/natura2000/calendar/it\\_malta.htm](http://ec.europa.eu/environment/nature/natura2000/calendar/it_malta.htm)

<sup>5</sup> [http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n\\_proj\\_id=1733](http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=1733)

<sup>6</sup> [www.bestpractice-life.pl/en/bats/protection-of-lesser-horseshoe-bat-in-poland.html](http://www.bestpractice-life.pl/en/bats/protection-of-lesser-horseshoe-bat-in-poland.html)

<sup>7</sup>

[http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n\\_proj\\_id=2624&ocType=pdf](http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=2624&ocType=pdf)

knowledge proved crucial for establishing appropriate conservation strategies within species' recovery plans, which were approved for *Rhinolophus mehelyi*, *Rhinolophus euryale* and *Myotis bechsteinii*.

Tangible bat conservation actions were also carried out to address urgent threats. These included: using bat-sensitive fencing at the entrances of refuges to prevent habitat disturbance by humans or other species; installing nest boxes; improving the suitability of abandoned mines for bat colonisation; providing water points; and constructing alternative refuges for bat colonies located in the Yuste Monastery. The latter required a considerable amount of stakeholder participation and the approach applied offers beneficial demonstration value for similar circumstances seeking to balance the needs of species conservation with human settlements.

Sustainability of the project's outcomes has been assisted by LIFE's investment in the region's monitoring capacities for bat species. These skills and methodologies are being integrated into the beneficiary's conservation mandate, and the good practice conservation guidelines produced by the project are also helping regional stakeholders mainstream chiropteran management considerations in their activities.

Other important legacies include the establishment of a new national working group for chiropterans, which was created during the project's final seminar, and public awareness about bat conservation requirements has been raised throughout the region.

### **1.1.9 - Quirópteros Valencia - Bats conservation plan in the Valencian community (LIFE00 NAT/E/007337)<sup>8</sup>**

This LIFE project provided new and valuable information on the targeted bat species, allowing for specific species conservation measures to be undertaken. It also initiated crucial dialogue with relevant bodies including local authorities and ramblers associations around the need for bat conservation that should deliver long-term benefits to bat populations.

Forest-dwelling bat species were monitored consistently in five pSCIs for two years. This confirmed the status, phenology and distribution of the populations of five species. Cave-dwelling species were also intensively monitored in all the project's refuges for three years. The research provided updated census data for both the long-fingered and *Rhinolophus mehelyi* in the project area, which revealed that population figures were even lower than previously estimated: 2,700 and 70 individuals respectively. Totally new data for some forest species was obtained.

The data gathered during the preparation and early implementation of the project led to the enlargement of the pSCI network: 18 new pSCIs for bats were designated, with the project area enlarged to cover 29 pSCIs. These include 30 key refuges for the conservation of the 22 Annex II bat populations present in Valencia. Five new refuges, two of them hosting important colonies of long-fingered bat, were identified.

The research also identified feeding preferences and patterns - including outstanding insights into their fishing - and habitat-use patterns down to the microhabitat level. This helped identify the most likely causes of the sharp decrease of the two populations: the intensification of citric orchards for *Rhinolophus mehelyi* and inadequate management of riparian habitats for the long-fingered bat.

The project enclosed and signposted 15 important refuges at most risk to human disturbance. These were then maintained on an ongoing basis to ensure their continuing adequacy as a habitat for bats. Bat boxes were introduced in five forest pSCIs to complement natural bat habitat. The occupation rate two years after installation was 26%, a promising result despite the lack of actual breeding in them during the project timeframe.

To assist long-term increases in bat populations, statutory protection was provided to two refuges as 'Wildlife Reserves', and another as a 'Local Natural Site', necessitating the incorporation of the caves into land-use planning. Additional procedures were launched to designate a further two wildlife reserves and one more local site. The beneficiary also started work towards agreement with local authorities, landowners and land users on specific Recovery Plans for the two key species - a draft Decree was already approved.

<sup>8</sup>

[http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n\\_proj\\_id=1784&ocType=pdf](http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=1784&ocType=pdf)

The project team published ten papers, held expert seminars and presented at international conferences. The monitoring, research and management approaches have become a reference model and have already generated similar regional strategies in Extremadura and Andalusia.

### **1.1.10 - Quirópteros/Castilla León - Priority actions to protect bats in Castilla y León Community interesting zones (LIFE96 NAT/E/003081)<sup>9</sup>**

Thanks to the project, the knowledge about bat species at the regional level was considerably increased, especially concerning cave-dwelling species. Some of the most outstanding project results include:

- The inventory and distribution atlas of bats in the region of Castilla y León, including detailed cartography, was one of the main products obtained. This was the basis for the designation of all the important refuges for bats in the region as pSCIs, with their exact location, threats and protection needs being identified. This is a valuable tool that enables the rapid supply of information to prevent negative effects on bat populations that could arise from planning projects (e.g. restoration of old buildings, closure of caves or old mines and opening of new climbing routes) or other potentially damaging activities.
- Six of the most important refuges for cave-dwelling species were protected during the project, and the beneficiary's intention was to continue with the protection of the rest of refuges classified as 'important' and to implement other conservation measures identified.
- The adequacy of artificial refuges for forest-dwelling bat species was tested and about 5.000 were installed in places of Community interest. The results obtained showed that this measure was effective for the protection of forest-dwelling bats, and proved the total suitability of the design developed for the refuges. The beneficiary's intention was to continue this measure after the LIFE project.
- The social outcome of this project was also very important. The local population was invited to collaborate in the location of refuges, whilst it was also necessary to raise their awareness on the value of these animals and the importance of the ecological role they play, for instance as insect-eaters. Nice, good quality information material was produced (e.g. a video, a leaflet, posters and stickers) which contributed to the achievement of this objective.
- The integration of bat conservation into other socio-economic activities was also addressed, and the frequent use of human infrastructures by bats was tackled. For instance, a negotiation on management of abandoned railway lines took place with the National Railways Company, and the restoration of historic buildings (e.g. churches and convents) and sites (Royal Gardens of 'La Granja') in keeping with the bat conservation needs was discussed with the National Heritage Authority ('Patrimonio Nacional'), which even contributed financially.

This project represented an important incentive for the government of Castilla y León to dedicate resources for the conservation of bats. The beneficiary's intention was to consolidate bat conservation measures within their overall conservation policy, and promote that other institutions and private owners take care of the bat populations existing in human-made constructions. Regarding the continuity of the project measures, the first priority was to ensure the maintenance of the 6 refuges protected within the project and continue with the protection of the rest of the 39 refuges classified as 'important'. Since the existing knowledge of the distribution of forest-dwelling species is still scarce, and most efforts were dedicated to cave-dwelling species in this project, the beneficiary itself pointed at the need to develop a specific methodology, including radio-tracking, for these species. Innovative solutions should be also applied, such as compensation to owners of buildings that host bat populations. Finally, awareness raising should be continued.

### **1.1.11 - Quirópteros/cav.volcánicas - Conservation of chiropters and invertebrates in volcanic cavities (LIFE98 NAT/E/005306)<sup>10</sup>**

<sup>9</sup> [http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n\\_proj\\_id=424](http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=424)

<sup>10</sup> [http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n\\_proj\\_id=320](http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=320)

The foundations for the conservation of the Canarian lava tubes and their singular species were laid thanks to this project, and the difficulties to protect these insufficiently known and barely understood habitats were fairly overcome; therefore the general objective was met. The management measures and the scientific and technical work carried out in this project set solid bases to draft and implement adequate management measures for these fragile habitats and their dwelling species. This will allow that the design of protected area networks take into account the presence of these caves, hence contributing to implement an adequate management of the Natura 2000 network.

The main measures implemented in the project were:

- The installation of protective gates in 9 lava tubes and the upholding of the gates of caves that were already protected are to be highlighted. The protective measures focused mainly on prominent caves with valuable natural features that were subject to human pressure, so that at the end of the project 14 of the most significant Canarian tubes were physically protected. As this kind of safe mechanisms are sometimes unpopular and subject to wreckage, some interesting alternative measures, initially not foreseen, were tried, such as blurring the hints about the presence of certain caves (pathways, tracks, indications) to ease their integration in the local landscape and make their detection difficult.
- The installation of informative signposts, the closure of trails with barriers to avoid the access to caves and the closure of secondary mouths to better control the access were tried with significant success.
- A reinforced surveillance complemented the above mentioned protective measures. Two wardens were hired and equipped to survey the caves of Tenerife and El Hierro Islands. A reduction in the activity of potentially harmful groups (of tourists, cavers, etc) and a lower frequency of inadequate use was recorded as a consequence of their work. Complementing this specific surveillance and to continue with it after the project, all the staff related to cave management and, particularly, the wardens belonging to the official corps (regional wardens, national corps) were trained in cave conservation issues. As a consequence, they improved their attention towards these habitats, as shown by an increase in the number of reports received from them. Other authorities, such as the Teide National Park managers, committed themselves to monitor more tightly the public use in the caves under their competency.
- A very good research work was done to improve the knowledge about the status of the lava tubes and the threats they were subject to, thus filling an important knowledge gap as regards these habitats of Community interest. A lot of valuable information was collected about the Canarian bat populations and their use of the subterranean habitats.

One of the main products generated as a compendium of the works mentioned was the "Catalogue of the Caves Important for Fauna in Tenerife, El Hierro and La Palma". A database of the 60 most important caves identified, containing information about the location, degree of protection, biological features, threats, management measures implemented, conservation status and management recommendations. All this information was incorporated to the Regional Biodiversity Bank, a very important initiative of the Canarian Government that will be essential for the management planning of the Natura 2000 network in the archipelago.

Another important achievement was the preparation of a pilot document on integral management of full basins draining into the caves, through a work called Audit of the Leaks into the "El Viento - Sobrado" Cave System. Following a very complete study that analysed the leaks and the sources of wastewater, agro-chemicals, dangerous products and urban waste into the longest cave system of the Canary Islands, a proposal of solutions and technical management recommendations and a study of economic viability were proposed, thus creating a valuable strategy for action aimed at removing the threats for this cave. The results of the study were disseminated among the main competent authorities (local, water managers, Cabildo - island administration -, etc.), which started to prepare a project and to seek funds to implement corrective measures and stop the threats identified. The awareness raising of the administration managers had a very high impact, and the future implementation of this project would be an important step for sustainable development, with a very important socio-economic impact.

A series of excellent quality awareness raising materials were produced. An output to highlight in this regard is a video film of superb quality that was produced and internationally distributed, which is available in 2 languages (Spanish and English). There is also a monograph book of very high quality,

which is a primer to the rare environments focused by the project. The beneficiary carried out a very satisfactory networking activity with other LIFE-Nat projects and, in general, with cave ecosystems specialists worldwide.

#### **1.1.12 - Life plateau de Montselgues - Preservation of the heathlands, peatlands and bats of Montselgues (LIFE05 NAT/F/000135)<sup>11</sup>**

The project demonstrated the value of the targeted abandoned mines: the site provides habitats for what then became known as the largest hibernation colony of *Rhinolophus hipposideros* in the Rhône-Alpes region. After two years of intense discussions and negotiations with all interested parties –the mines' owner and the ministry of environment among other stakeholders, the project succeeded in ensuring that national regulations would be implemented and that the galleries would allow the passage of bats while being inaccessible to the public. Again, however, there was not enough time to assess the impact of this action: the colonies were not found in the galleries during the inventories carried out the first year after the works were done. The galleries will continue to be monitored after the end of the project.

Nevertheless, the project demonstrated that preserving bat colonies and securing galleries of abandoned mines can be compatible. The project was implemented at the same time discussions took place at national level regarding the integration of biodiversity issues into policy on abandoned mines. Today, this project is seen as a good technical reference.

Finally, the project developed many high-quality tools and communications and organised activities and events targeting different stakeholders – local inhabitants, elected representatives, school teachers, technicians and experts. These contributed to making stakeholders more aware of the natural heritage of Plateau of Montselgues and its value for local development.

The commitment of local stakeholders was evident during the project lifetime and will continue in the future: they are closely involved with the management of the Natura 2000 site and agri-environmental measures.

#### **1.1.13 - CHIROFRSUD - Conservation of 3 cave-dwelling bats in Southern France (LIFE04 NAT/FR/000080)<sup>12</sup>**

This other French project successfully combined modern technology with the efforts of an estimated 190 volunteers to follow 31 roosts and achieve impressive results. Overall, 19 roosts were permanently protected in some form and encouraging bat population increases were observed during the four-year programme.

The partnership carried out numerous studies to better understand the three following bat species; *Miniopterus schreibersii*, *Rhinolophus euryale* and *Myotis capaccinii*. They regularly monitored population numbers at all sites and even installed a device at two sites to automatically count bats in and out of the roost. Another device was used to count human visits to two sites to evaluate the extent of human interference.

The team studied the animals' diets through three separate analyses of their guano to show their dietary preferences. An experimental pond was also established to reintroduce insect prey for the bats. Meanwhile they used radio tracking of a sample of 20 females at six sites to map their hunting areas and identify preferred habitats.

The project blocked access to 12 roosts either permanently or at certain key times of the year. Management conventions were also signed to offer long-term protection of nine roosts. These were agreed between local representatives, landowners, associations and the municipalities to provide for the management of the bats' habitats. Successful long-term partnerships were established between conservation and caving associations.

---

<sup>11</sup>

[http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n\\_proj\\_id=2914&ocType=pdf](http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=2914&ocType=pdf)

<sup>12</sup>

[http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n\\_proj\\_id=2654&ocType=pdf](http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=2654&ocType=pdf)

This conservation work led to, for example, a record number of *Rhinolophus euryale* (2,238) being observed in hibernation in 2005 at one site in Aquitaine. Other sites saw the return of bats to previously abandoned roosts, such as in a cave in Languedoc-Roussillon, which had been unused by bats for 15 years, but had a population of 80 *Myotis capaccinii* by 2007.

Meanwhile, the project reopened an abandoned mine and secured it from public access. This directly led to the mine being used as a roost by increasing numbers of bats: 650 *Miniopterus schreibersii* were observed in late 2007. An important tunnel used by *Rhinolophus* bats was also acquired by a local conservation agency.

The project published its findings in a technical handbook, which was widely distributed across France and is of use to all agencies interesting in protecting bat roosts. The handbook presents the three bat species, the hows and whys of conserving their roosts and recommendations for management of hunting areas. It was well supported by exhibitions, information panels, pamphlets and a film, used to raise general awareness of the bats and their conservation. The 31 minute film (which can be viewed via the read more section below) won the nature conservation prize at the 2007 International Ornithological Film Festival held in Menigoute (France).

#### **1.1.14 - Life Chiro Med - Conservation and integrated management of two bat species in the French Mediterranean region. (LIFE08 NAT/F/000473)<sup>13</sup>**

Currently being carried out, this project aims to strengthen, improve and monitor the conservation status of both *Rhinolophus ferrumequinum* and *Myotis emarginatus* populations in the Camargue region of France. It aims to conserve and improve the quality of at least eight nursery colonies and hibernation roosts, through physical and/or regulatory protection. It will create a network of nursery roosts by fitting out 15 additional unoccupied buildings, and will prospect 80 buildings and 250 caves to discover new colonies.

It will create a minimum of 20 km of wooded corridors as additional foraging areas. Management capacity of foraging areas will be improved by extending Natura 2000 sites to include suitable habitats, and by proposing management actions on foraging sites that will be identified through telemetry. An innovative and predictive data-processing tool will be created to support enhanced management. The project will also improve food availability by promoting and evaluating bat-friendly pastoral practices for cattle owners and stock breeders.

Road mortality will be targeted by testing road-crossing systems at high-risk points near nursery colonies or between key sites. The project will work to raise the awareness of managers, scientists and the general public concerning bats and their conservation, particularly regarding their roosting and feeding requirements. It will produce communication tools ranging from leaflets and exhibitions for the general public to technical seminars and guides for specialists.

#### **1.1.15 - Bat action - Action plan for three threatened bat species in Flanders (LIFE06 NAT/B/000095)<sup>14</sup>**

The aim of the project was to achieve a substantial increase in numbers of bats, with emphasis *Myotis emarginatus*, *Myotis dasycneme* and *Myotis bechsteinii*. Important habitats for bats like fortresses were acquired and special attention was given to the breeding roosts, hibernating grounds and hunting habitats. A detailed management plan was drawn up based on the roost requirements of each site. Strategic objects such as fortresses near Antwerp and marl caves in Limburg were chosen as the main targets for conservation. These strategic sites are linked by large water bodies that are used by the bats for long distance migration. Furthermore, other elements located in between these objects

---

<sup>13</sup>

[http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n\\_proj\\_id=3582&ocType=pdf](http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=3582&ocType=pdf)

<sup>14</sup>

[http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.createPage&s\\_ref=LIFE06%20NAT/B/000095&area=1&yr=2006&n\\_proj\\_id=3117&cfd=29961&cftoken=85a2d807f56210a4-00DBC7AC-BB24-6BD8-882160155D9C1C19&mode=print&menu=false](http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.createPage&s_ref=LIFE06%20NAT/B/000095&area=1&yr=2006&n_proj_id=3117&cfd=29961&cftoken=85a2d807f56210a4-00DBC7AC-BB24-6BD8-882160155D9C1C19&mode=print&menu=false)

were protected and made suitable for bats. An innovative aspect of the project, which may serve as an example for habitat improvement for bat species in a dense urban region, is the placing of specially designed bat roosts under bridges along main migration routes. The public attitude to all bats species was largely negative, and a suitable, targeted educational campaign based on habitat preservation and improvement was prepared and conducted. The aim of these awareness campaigns was to generate a positive support for bats among the public and to highlight their conservation needs.

### 1.1.16 - Life at night in Slovenia (LIFE09 NAT/SI/000378)<sup>15</sup>

The Life+ Life at Night project is a European project that is trying to find appropriate technical solutions for the nature-friendly and energy efficient illumination of cultural heritage sites. There are six partners participating in the project, which started in September 2010 and lasted until February 2014: Euromix Ltd., Društvo Temno nebo Slovenije (Dark-Sky Slovenia), University of Ljubljana (The Biotechnical Faculty, Department of Biology), Društvo za proučevanje in ohranjanje metuljev Slovenije (Society for the Conservation and Study of Lepidoptera in Slovenia), Slovensko društvo za proučevanje in varstvo netopirjev (Slovenian Association for Bat Research and Conservation), and Baza Media 2.1 Ltd.

The main goal of the project is to decrease in the long term the negative impact caused by illuminating churches and thus improve the conservation status and biological diversity of nocturnal animals such as bats and moths. Inappropriate lighting is damaging to many nocturnal animals. Increased illumination of the natural environment changes the normal behavioural patterns of many animals, thus disturbing their feeding, reproduction, orientation and reaction to predators.

As part of the Life at Night project, the partners expect the following results:

- 21 churches will be illuminated with ecological, nature-friendly reflectors and shall serve as a model for solving this issue in the future;
- The consumption of electricity for lighting churches will decrease;
- The awareness of decision-makers and the general public of the issue of light pollution and its importance for biodiversity shall increase;
- Technical guidelines shall be prepared for the energy efficient and nature-friendly illumination of cultural heritage.

### 1.1.17 - Protection of Common Swift (*Apus apus*) and bats in buildings in Slovakia (LIFE10 NAT/SK/079)<sup>16</sup>

The project main objective is to stop the recent decline of the Common Swift (*Apus apus*) and the Common Noctule (*Nyctalus noctula*) populations in Slovakia due to the insulation and reconstruction of buildings in human settlements and to enhance their local populations through the protection of their nesting and roosting habitats especially in urban areas, introduction of suitable management and reaching the favourable conservation status.

In recent years, the greatest threats for the swifts and noctules have been the reconstructions and thermal insulations of buildings which are occupied by swifts and bats for nesting or roosting, respectively. This kind of work often results in clogging the entrances to the actual or potential nesting and roosting cavities. Described problem has been solved with only minimal attention by the competent institutions up to date. As described above, majority of target species populations are recently facing serious threat, and hence, they should be assumed as endangered species in Slovakia.

The project therefore aims to reverse the current negative trends of target populations. Especially raising awareness and improved communication with state authorities, owners, users and managers of buildings, construction companies and workers, but also innovative technical solutions will be used to promote and to conserve swifts and bats in urban areas of Slovakia. Fortunately, there are several technical solutions available to maintain swift nesting sites and bat roosts in insulated and/or reconstructed buildings, including the possible installation of special nesting or roosting boxes.

<sup>15</sup> [http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n\\_proj\\_id=3855](http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=3855)

<sup>16</sup> [http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n\\_proj\\_id=4046](http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=4046)

## **1.2 - Interreg**

Interreg is an initiative that aims to stimulate cooperation between regions in the European Union. It started in 1989, and is financed under the European Regional Development Fund (ERDF).

### **1.2.1 - Interreg III A Project “Bat Protection in the Alpine and Adriatic Regions”<sup>17</sup>**

On the initiative of the Arge NATURSCHUTZ (Carinthia) cross-border bat conservation projects with Slovenia and South Tyrol/Italy were initiated in 2002. The aim was extensive bat conservation with special emphasis on the conservation of summer and winter roosts as well as foraging habitats of endangered bat species. Further aims were the development and implementation of standardised monitoring schemes, carrying out conservation measures, assistance at acute actions and accompanying public relation activities.

### **1.2.2 - Interreg IVA “Lorraine”<sup>18</sup>**

This project aimed at the conservation of natural heritage in the Lorraine region of France and Belgium. It involved amongst other things the construction of artificial roosts in attics and a derelict house<sup>19</sup> near Virton (Belgium) for *Rhinolophus hipposideros*, *R. ferrumequinum* and *Myotis myotis*.

## **1.3 - Leader**

### **1.3.1 - Leader 4a-F-P8568 “Protection of the maternity of a large colony of Geoffroy’s bat in Lockenhaus, Burgenland, Austria”**

The aim of this BatLife Österreich-project was the sustained protection of an internationally important maternity roost in a privately owned castle through offering a touristic incentive. A large permanent exhibition “Friends of the Night” was established in the castle, presenting biology, ecology and conservation of bats. It contains interactive stations, a rich array of videos and films, a library, a photo gallery of Austrian bats and facilities for young bat explorers. Guided tours and events took place. Guides presenting the exhibition were educated and teachers were instructed how to include bats in school lessons.

## **1.4 - EUROBATS Project Initiative (EPI)**

The following projects received a support from EUROBAT within EU<sup>20</sup>:

- 1st Tabachka Bat Workshop in Bulgaria (2012)
- Bat Survey and Public Relation Project in Strandja Nature Park, Bulgaria (2009)
- Raising awareness of bats and the necessity for their protection in Cyprus (2009)
- Estimation of effects of pesticides on bats – Residue analysis, Germany (2009)
- Evaluation of riparian forests as guidelines and feeding areas in bat migration (2010-2012)
- Exploring the feeding & roosting habits of *Pipistrellus hanaki* (Greece, current project)
- The Conservation of Vulnerable Floodplain Forests with the Help of the Pond Bat and the Barbastelle (Hungary, current project)
- The research of forest dwelling bat species and their ensembles in mountain forest areas with different characters and states, with special respect to *Nyctalus lasiopterus* (Hungary, 2009)
- Bats and Lighting of Monumental Buildings (Italy 2010)
- Conservation aimed inventory of the Mediterranean horseshoe bat *Rhinolophus euryale* effectives in South-Western Romania (Romania, 2009-2010)
- New chance to Romanian bats Completion of the proposed Sites of Community Interest in Romania with chiropterological data, Romania (2009-2010)

<sup>17</sup> Final report downloadable from [www.naturmuseum.it/downloads/final\\_report\\_bat\\_protection.pdf](http://www.naturmuseum.it/downloads/final_report_bat_protection.pdf)

<sup>18</sup> [www.interreg-lorraine.eu](http://www.interreg-lorraine.eu)

<sup>19</sup> A report can be read from <http://www.interreg-lorraine.eu/index.php?id=1991>

<sup>20</sup> [www.eurobats.org/summaries\\_of\\_conducted\\_projects](http://www.eurobats.org/summaries_of_conducted_projects)

## 2 - BAT RABIES CASES IN EUROPE

The following current situation, known from passive surveillance only, is extracted from (1) : “to date, four different lyssavirus species are the causative agents of rabies in European bats: the European Bat Lyssaviruses type 1 and 2 (EBLV-1, EBLV-2), the recently discovered putative new lyssavirus species Bokeloh Bat Lyssavirus (BBLV) and the West Caucasian Bat Virus (WCBV). In Europe, 959 bat rabies cases were reported to the Rabies-Bulletin-Europe in the time period 1977–2010 with the vast majority characterized as EBLV-1, frequently isolated in the Netherlands, North Germany, Denmark, Poland and also in parts of France and Spain. Most EBLV-2 isolates originated from the United Kingdom and the Netherlands, and EBLV-2 was also detected in

Germany, Finland and Switzerland. Thus far, only one isolate of BBLV was found in Germany. Published passive bat rabies surveillance comprised testing of 28 of the 52 different European bat species for rabies. EBLV-1 was isolated exclusively from Serotine bats (*Eptesicus serotinus* and *E. isabellinus*), while EBLV-2 was detected in 14 *Myotis daubentonii* and *Myotis dasycneme*”.

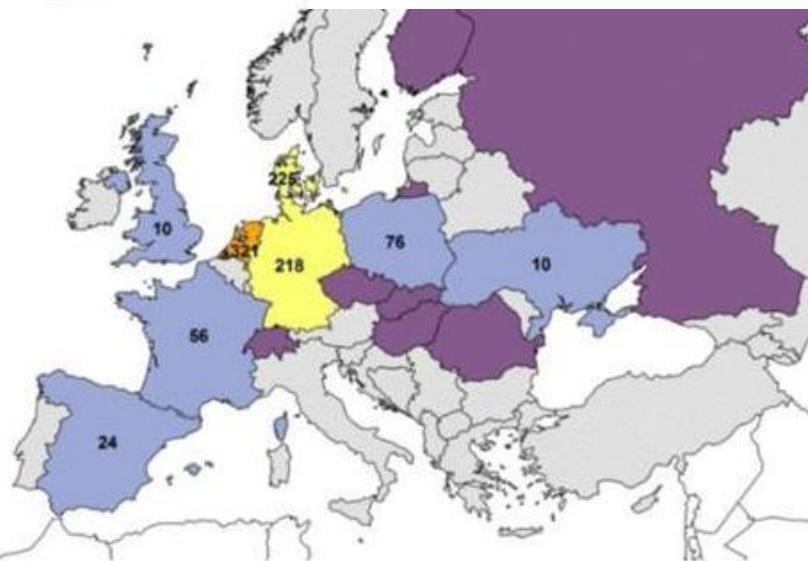
It should be noted the island of Ireland (Republic of Ireland and Northern Ireland) are rabies free for the last over 95 years<sup>21</sup>

EBLV-1 has recently been identified in a Spanish specimen of *Myotis escalerai* (2) and also in *Myotis capaccinii* (3). The first case of a bat infected with rabies in Luxembourg has been reported in May 2013 (4); while another case was reported for the first time in France (Savoie) in August 2013 (5). Unfortunately, no details on the species were given.

More recently, additional cases of BBLV have been described in France and Germany and a new putative lyssavirus, the LLeida bat lyssavirus (LLEBV) has been described in *Miniopterus schreibersii* in Spain (6). The virus is phylogenetically related to the WCBV, also found in *M. schreibersii*. Both are genetically distant of rabies virus and the remaining lyssaviruses found in Europe belonging to the phylogroup 1 and neutralised by rabies vaccines. The WCBV has proved not to be neutralised by antibodies induced by rabies vaccines

Cases of rabies were also reported in Fruit bats (*Rousettus aegyptiacus*) sold in Europe from a zoo in The Netherlands which were infected by a local strain of EBLV-1 (7). A bat was bought (illegally?) in Bordeaux (France) in 1999 and died two month later was infected by the African Lagos Bat Virus (LBV). Around 130 people were considered at risk of infection and preventively treated. Other pets from the shop were eliminated (8). Currently available rabies vaccines are not effective against LBV. Indeed, *Rousettus aegyptiacus* has been found as the putative reservoir of Marburg virus (9) which causes severe haemoragic fever.

Figure 1 - Bat Rabies cases in Europe 1977-2010: grey = 0, violet >=1, blue>=10, yellow >=100, orange >=300 (from (103))



© FLI Wusterhausen, administrative boundaries ARC - GREENLAB GmbH /ArcGIS 9

<sup>21</sup> <http://www.imt.ie/clinical/infections-immunology/rabies-a-new-awareness-in-ireland-17-07-2009>

Passive surveillance has been complemented in Europe by active surveillance on healthy bats captured by bat experts. In the course of such studies made in Spain, France, Germany, Switzerland, Belgium, Sweden and Finland, EBLV1 antibodies have been found in 17 different bat species, as well as EBLV-1 RNA in 18 species. Cases are reviewed in tables on (1) and (3). They provide evidence of non-fatal even subclinical infections of EBLV-1 in bats, as well as a much wider range of hosts for EBLV1 than *E. serotinus* and *E. isabellinus*.

Unfortunately, sequencing data on EBLV-1 from active surveillance data are very limited, so that the phylogenetical relationships among the EBLV1 strains, or even the precise nature of the viruses detected in species different than *Eptesicus spp.* are largely ignored. In one of the studies (3), EBLV-1 seroprevalence was significantly associated with colony size and species richness. Higher seroprevalence percentages were found in large multispecific colonies, suggesting that intra- and interspecific contacts are major risk factors for EBLV-1 transmission in bat colonies. Although bat-roosting behaviour strongly determines EBLV-1 variability, they also found some evidence that bat phylogeny might be involved in bat-species seroprevalence. EBLV-2 RNA and antibodies have been found through active surveillance studies made in the United Kingdom, Switzerland, Sweden and Finland. At the present, neither the World Health Organisation (WHO) nor the World Organisation for Animal Health (OIE) allow case declaration based exclusively on RT-PCR results<sup>22</sup>, so that only positive cases detected by the fluorescence antibody test, viral isolation in cell culture or mouse inoculation test can be officially declared. Most studies on active surveillance found very low sensitivity on viral RNA detection and conclude that bat rabies surveillance should continue relying on passive surveillance with active surveillance as a complement.

#### Rabies active surveillance in Spain (3)

An active surveillance work began in 1992 on Spanish bat colonies. In a recent study (3), authors analysed ecological factors that might affect the infection dynamics observed in those colonies. Between 2001 and 2011, they collected and tested 2,393 blood samples and 45 dead bats from 25 localities and 20 bat species in Spain. The results for dead specimens confirmed the presence of EBLV-1 RNA in six species analysed (for the first time in *Myotis capaccinii*). Samples positive for European bat lyssavirus-1 (EBLV-1)-neutralising antibodies were detected in 68 % of the localities sampled and in 13 bat species, seven of which were found for the first time (even in *Myotis daubentonii*, a species to date always linked to EBLV-2). EBLV-1 seroprevalence (20.7 %) ranged between 11.1 and 40.2 % among bat species and seasonal variation was observed, with significantly higher antibody prevalence in summer (July). EBLV-1 seroprevalence was significantly associated with colony size and species richness. Higher seroprevalence percentages were found in large multispecific colonies, suggesting that intra- and interspecific contacts are major risk factors for EBLV-1 transmission in bat colonies. Although bat-roosting behaviour strongly determines EBLV-1 variability, they also found some evidence that bat phylogeny might be involved in bat-species seroprevalence. The results of this study highlight the importance of life history and roost ecology in understanding EBLV-1-prevalence patterns in bat colonies and also provide useful information for public health officials.

<sup>22</sup> RT-PCR stands for reverse-transcript Polymerase Chain Reaction. It's a two steps PCR: first there is a transcription of the RNA of interest (in this case the rabies virus RNA) into its DNA complement (cDNA) through the use of a specific enzyme named reverse transcriptase. Subsequently, the newly synthesized cDNA is amplified using traditional PCR. The rabies virus is a RNA virus; therefore we have to use this technique in order to amplify it.

## 3 - SPECIES FACT SHEETS

Each fact sheet presents the taxonomy, the most important threats, and its conservation status according to the 2007-2012 reporting period (article 17 of the Habitats Fauna Flora Directive). The world IUCN red list statuses were updated in 2013<sup>23</sup>, while the statuses for terrestrial Europe and for EU were published in 2007 (only 25 Member States then, 28 in 2013) (10).

Species are sorted by alphabetical order of their scientific names (starts with *Barbastella barbastellus* and ends with *Vespertilio murinus*).

A map of the European Union shows the different conservation status with the corresponding colour for each country, except for the Croatia that only recently joined the EU.

It should be also be noted that only 8 species occur in Northern Ireland<sup>24</sup> – *Pipistrellus pipistrellus*, *P. pygmaeus*, *P. nathusii*, *Myotis mystacinus*, *M. nattereri*, *M. daubentonii*, *Plecotus auritus* and *Nyctalus leisleri*.

More detailed data and maps are available from the website of the European Topic Centre on Biological Diversity: <http://bd.eionet.europa.eu/article17/reports2012/species/summary/>

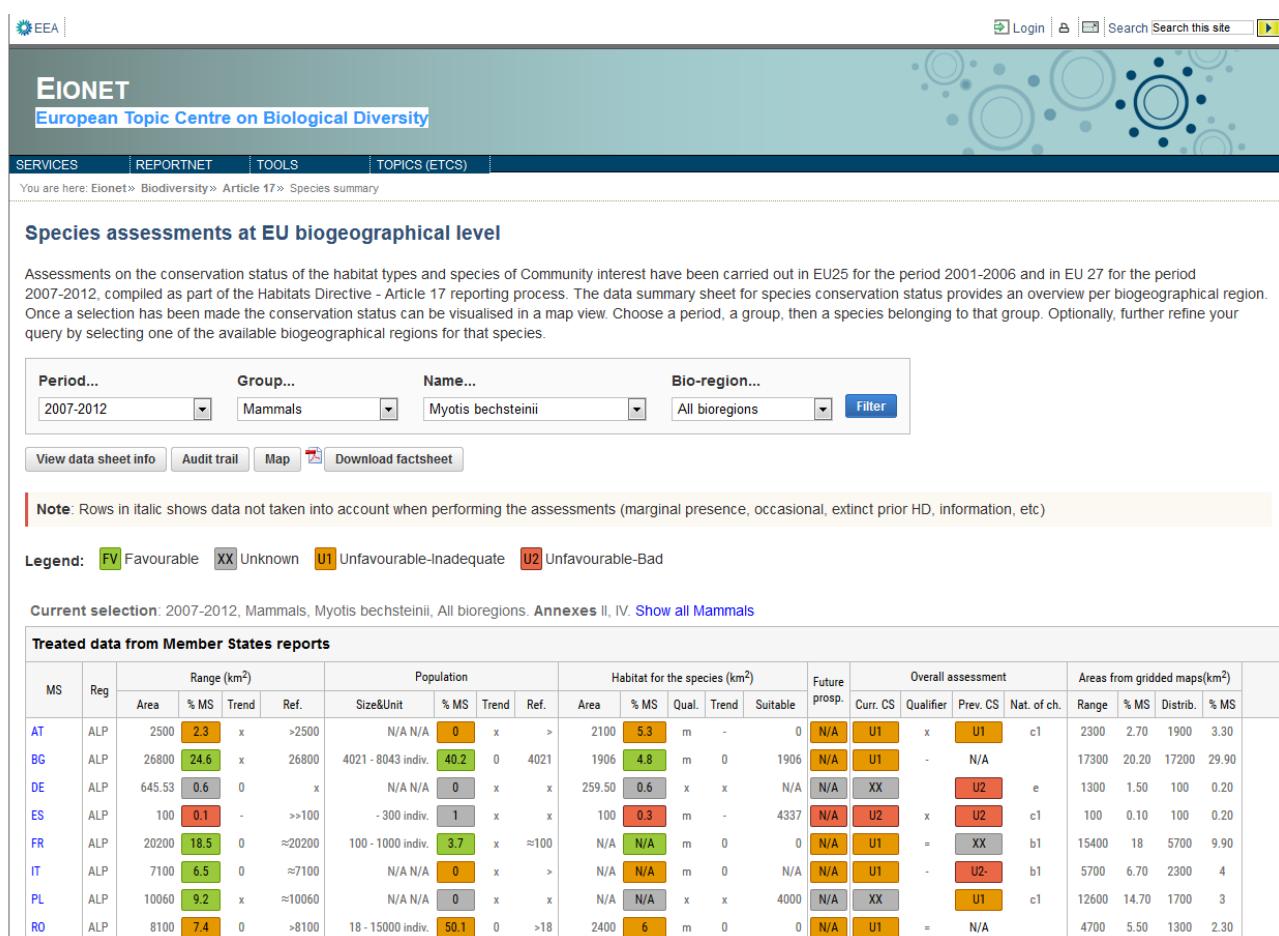


Figure 2 - The Art 17 web tool

<sup>23</sup> Source: [www.iucnredlist.org](http://www.iucnredlist.org)

<sup>24</sup> The colouring on the distribution maps is per country, but on the island of Ireland (Republic of Ireland and Northern Ireland) there are only 9 species 8 of which occur in Northern Ireland. Therefore not all species indicated on the maps for the UK actually occur in Northern Ireland.

The assessments of the conservation status are based on a common methodology detailed within the Technical paper 3/2014<sup>25</sup> and resumed in the table below.

Also available is an audit trail which gives details on the methodology used by each MS for assessing the conservation status of a species within a biogeographic region. This information can help to understand the apparent discrepancies between neighbouring countries for a particular species.

Table 2 - Assessing conservation status of a SPECIES  
General evaluation matrix (per biogeographical region within a MS).

Parameter	Conservation Status			
	Favourable ('green')	Unfavourable - Inadequate ('amber')	Unfavourable - Bad ('red')	Unknown (insufficient information to make an assessment)
<b>Range<sup>26</sup></b>	Stable (loss and expansion in balance) or increasing <u>AND</u> not smaller than the 'favourable reference range'	Any other combination	Large decline: Equivalent to a loss of more than 1% per year within period specified by MS <u>OR</u> more than 10% below favourable reference range	No or insufficient reliable information available
<b>Population</b>	Population(s) not lower than 'favourable reference population' <u>AND</u> reproduction, mortality and age structure not deviating from normal (if data available)	Any other combination	Large decline: Equivalent to a loss of more than 1% per year (indicative value MS may deviate from if duly justified) within period specified by MS <u>AND</u> below 'favourable reference population' <u>OR</u> More than 25% below favourable reference population <u>OR</u> Reproduction, mortality and age structure strongly deviating from normal (if data available)	No or insufficient reliable information available
<b>Habitat for the species</b>	Area of habitat is sufficiently large (and stable or increasing) <u>AND</u> habitat quality is suitable for the long term survival of the species	Any other combination	Area of habitat is clearly not sufficiently large to ensure the long term survival of the species <u>OR</u> Habitat quality is bad, clearly not allowing long term survival of the species	No or insufficient reliable information available
<b>Future prospects</b> (as regards to population, threats to the species)	Main pressures and	Any other combination	Severe influence of pressures and threats	No or insufficient reliable information

<sup>25</sup> [http://bd.eionet.europa.eu/activities/Reporting/Article\\_17/Documents/ART17%20public%20consultation%20guide.pdf](http://bd.eionet.europa.eu/activities/Reporting/Article_17/Documents/ART17%20public%20consultation%20guide.pdf)

<sup>26</sup> Range within the biogeographical region concerned

Parameter		Conservation Status		
	Favourable ('green')	Unfavourable - Inadequate ('amber')	Unfavourable - Bad ('red')	Unknown (insufficient information to make an assessment)
range and habitat availability)	not significant; species will remain viable on the long-term		to the species; very bad prospects for its future, long-term viability at risk.	available
<b>Overall assessment of CS<sup>27</sup></b>	All 'green' OR three 'green' and one 'unknown'	One or more 'amber' but no 'red'	One or more 'red'	Two or more 'unknown' combined with green or all "unknown"

<sup>27</sup> A specific symbol (qualifier +/-=x) is to be used in the unfavourable categories to indicate an overall trend in conservation status

### 3.1 - *Barbastella barbastellus* - Western barbastelle bat

#### A-1 Taxonomy

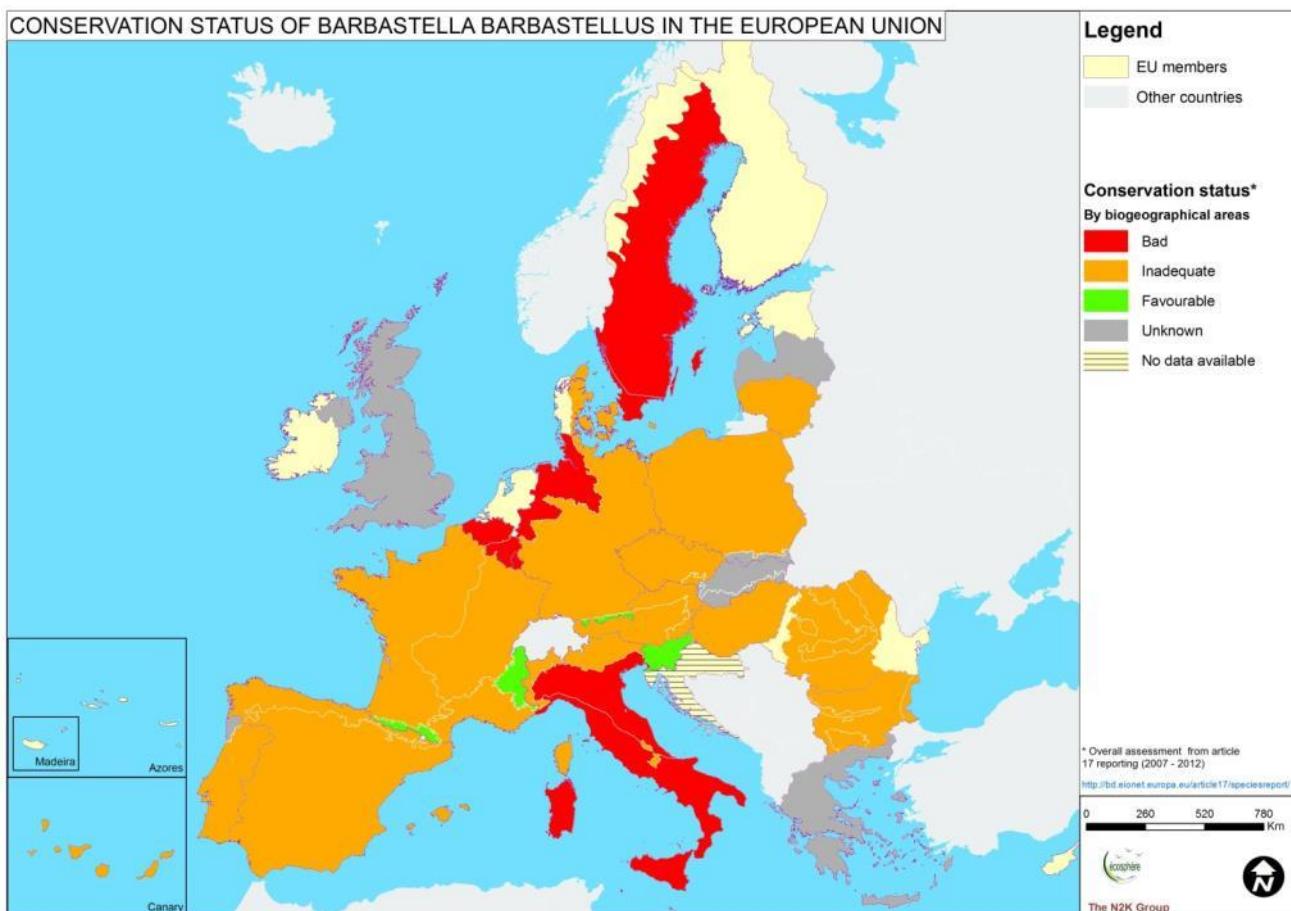
Family: *Vespertilionidae*; Genus: *Barbastella*; Species: *barbastellus* (Schreber, 1774)

#### A-2 Threats

The Western barbastelle bat may be threatened by the loss of dead trees due to the intensification of forestry management (10), as well as habitat disturbance in wooden areas (11) and in underground sites (12).

IUCN Red List Category		
2013 (World): NT	2007 (Europe): VU	2007 (EU 25): VU

#### A-3 Species conservation status



*Barbastella barbastellus* is common in north-western Hungary, Poland and Lithuania (11) and fairly frequent in western Caucasia (13). However, it is considered threatened in many range states and the general trend is for a decrease in populations. It is rare in Ukraine, Germany and Switzerland. It is extremely rare in Belgium (14) and has nearly gone extinct in the past 50 years. It is extinct in the Netherlands since 1994 (11; 15) and hasn't been recorded in Norway since 1949 (13). The massive use of pesticides in woodlands in the 1960s has a significant part in the decline of the Western Barbastelle bat population. This decline stopped in 1990 and the numbers grow back slowly since then in some countries (11). It is considered as a common species in Slovakia (16).

## 3.2 - *Eptesicus bottae* - Botta's Serotine

### A-1 Taxonomy

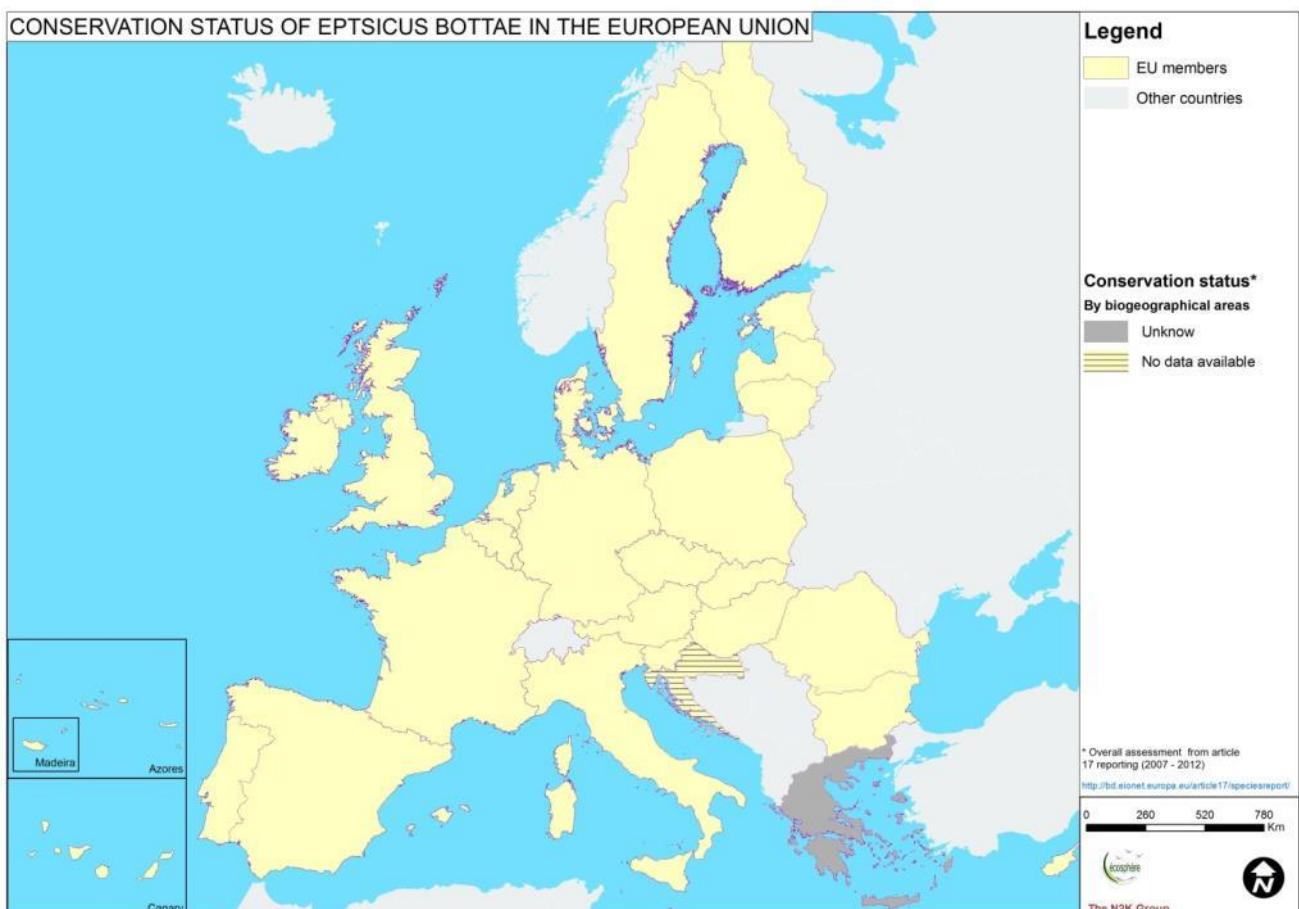
Family: *Vespertilionidae*; Genus: *Eptesicus*; Species: *bottae* (Peters, 1869)

### A-2 Threats

There are no major known threats for this species.

IUCN Red List Category		
2013 (World): LC	2007 (Europe): N/A	2007 (EU 25): N/A

### A-3 Species conservation status



The species is relatively common in Rhodes (10).

### **3.3 - *Eptesicus isabellinus* - Isabelline Serotine bat**

#### **A-1 Taxonomy**

Family: *Vespertilionidae*; Genus: *Eptesicus*; Species: *isabellinus* (Temminck, 1840)

Using molecular techniques, it has recently been shown the existence of this species which was previously taxonomically classified as a subspecies of *Eptesicus serotinus* (17).

#### **A-2 Threats**

IUCN Red List Category		
2013 (World): LC	2007 (Europe): N/A	2007 (EU 25): N/A

#### **A-3 Species conservation status**

No information available.

## 3.4 - *Eptesicus nilssonii* - Northern bat

### A-1 Taxonomy

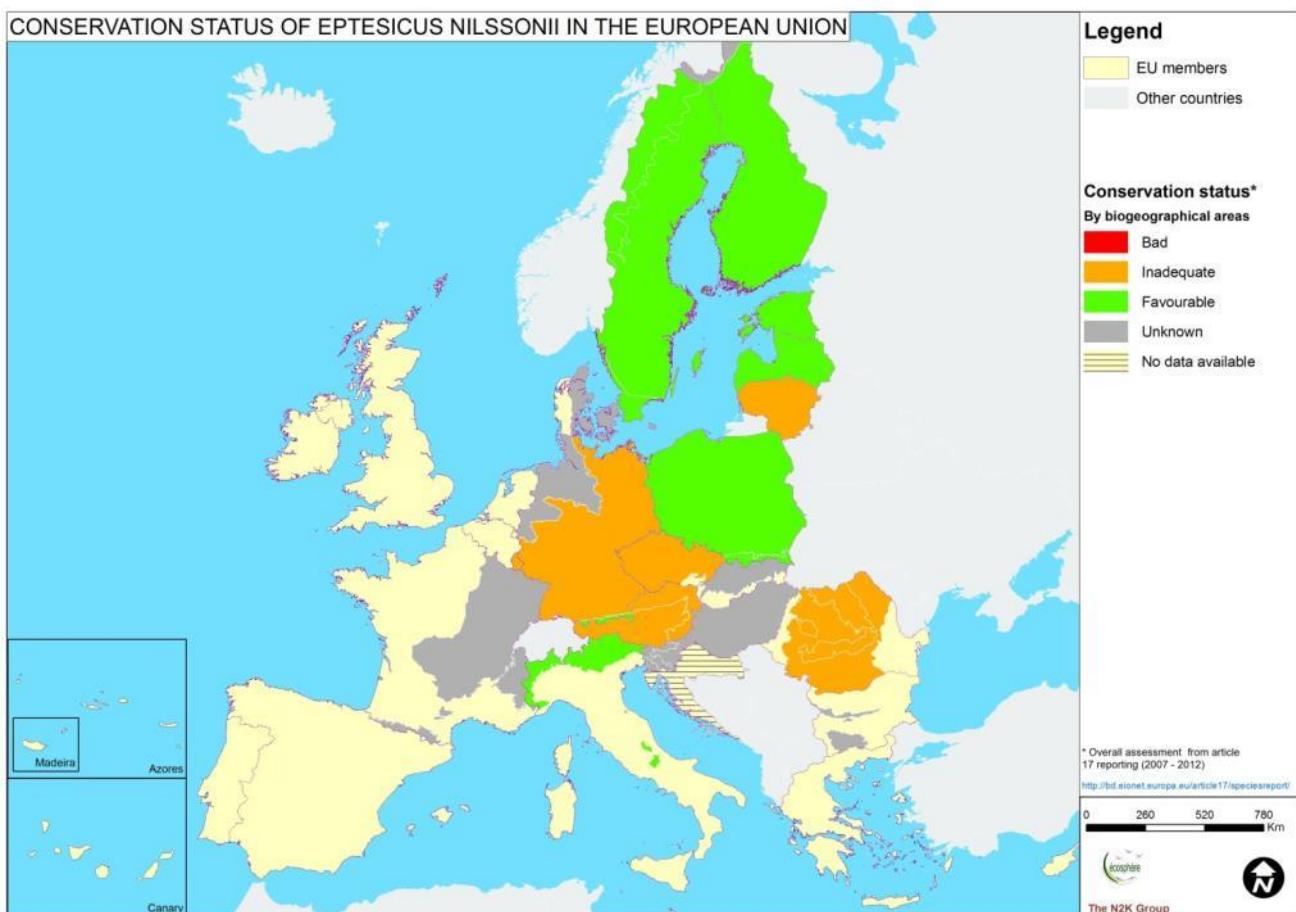
Family: Vespertilionidae; Genus: *Eptesicus*; Species: *nilssonii* (Keyserling et Blasius, 1839)

### A-2 Threats

There are no major known threats for this species.

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

### A-3 Species conservation status



The European population for this species is stable. It is globally common all over its range with some exceptions: in Hungary, it is the rarest bat species (18). It is the most abundant species in northern Europe (19).

### 3.5 - *Eptesicus serotinus* - Common Serotine Bat

#### A-1 Taxonomy

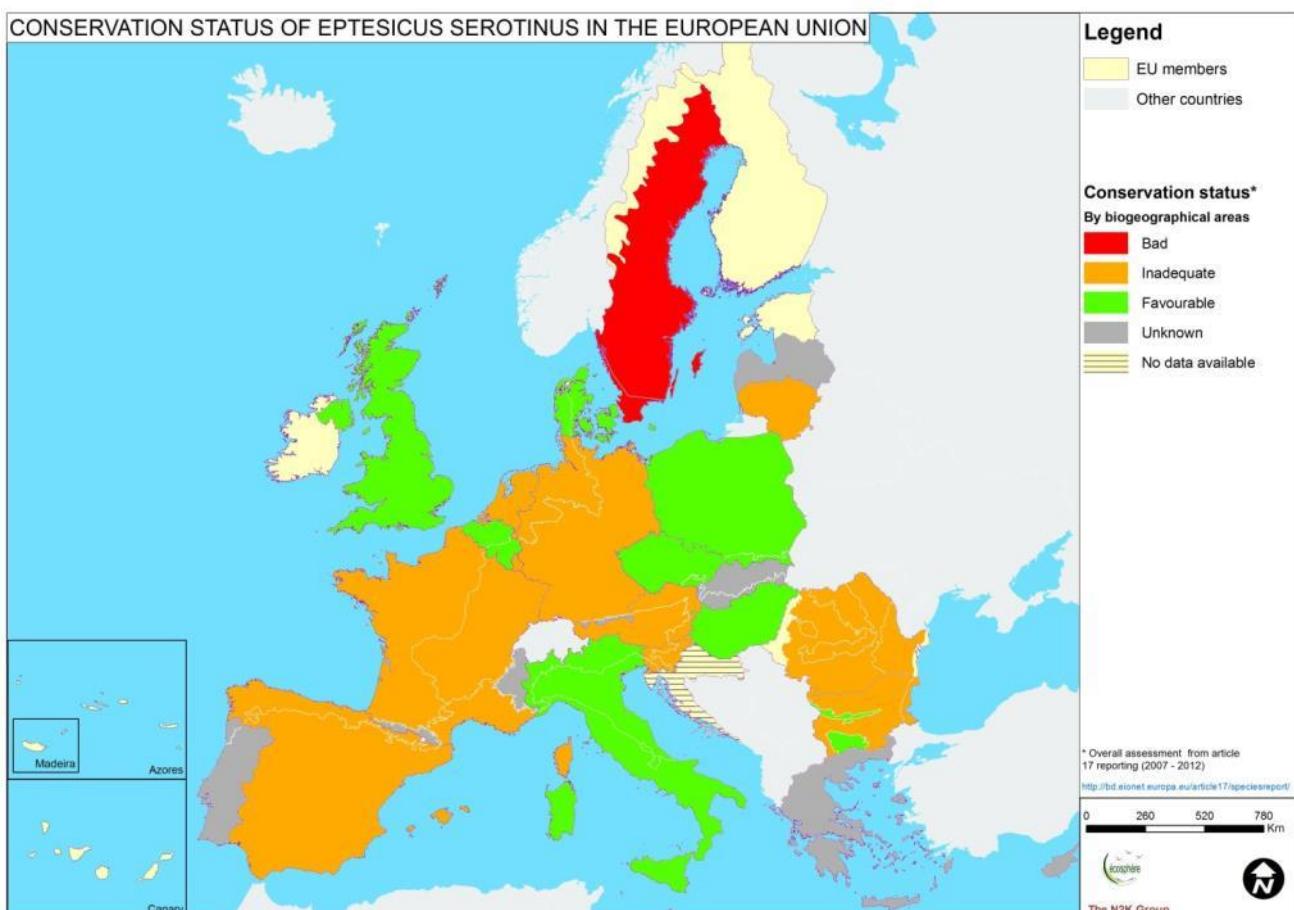
Family: Vespertilionidae; Genus: *Eptesicus*; Species: *serotinus* (Schreber, 1774)

#### A-2 Threats

Populations may be locally threatened by the use of pesticides or building renovations (10). The species can carry the rabies-related virus EBLV1 (20).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

#### A-3 Species conservation status



*Eptesicus serotinus* can be locally common or abundant (11). There is a trend for a decrease in few areas, and for an increase in others. In Austria, it has gone extinct over the last 15 years in lowland regions with bare arable land (20). Populations seem to slowly extend towards north (10).

## 3.6 - *Hypsugo savii* - Savi's pipistrelle

### A-1 Taxonomy

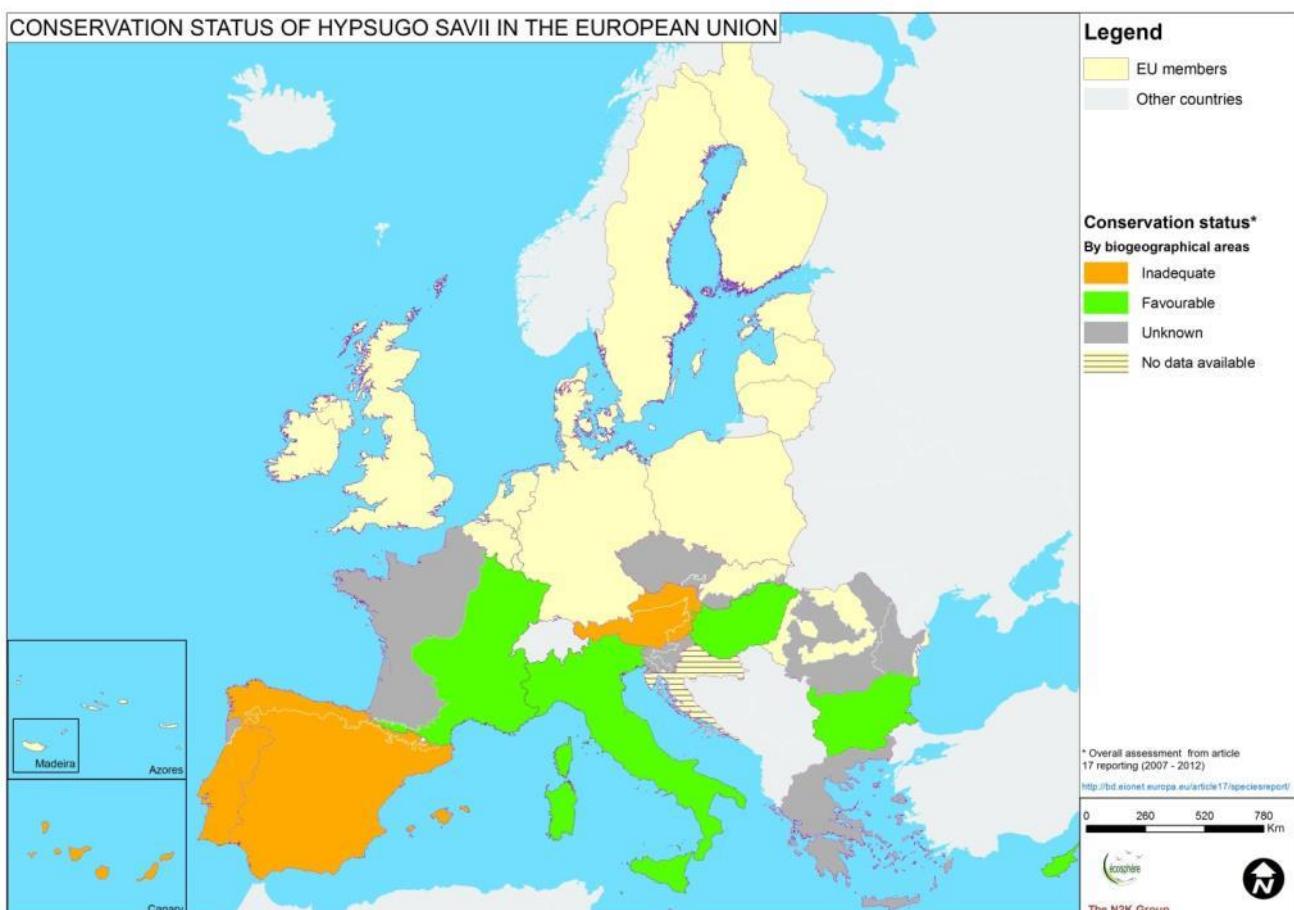
Family: *Vespertilionidae*; Genus: *Hypsugo*; Species: *savii* (Bonaparte, 1837)

### A-2 Threats

This species is not directly threatened but may have to locally face buildings renovations and the use of pesticides (12).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

### A-3 Species conservation status



The Savi's pipistrelle populations are globally stable. This species is locally common, sometimes abundant, although colonies are hard to find (11). In the Canary Islands, it is the most common species. The Savi's pipistrelle bat is restricted by its habitat requirements in the western part of its range and thus is less common (21).

### 3.7 - *Myotis alcathoe* - Alcathoe whiskered bat

#### A-1 Taxonomy

Family: Vespertilionidae; Genus: *Myotis*; Species: *alcathoe* (von Helversen & Heller, 2001)

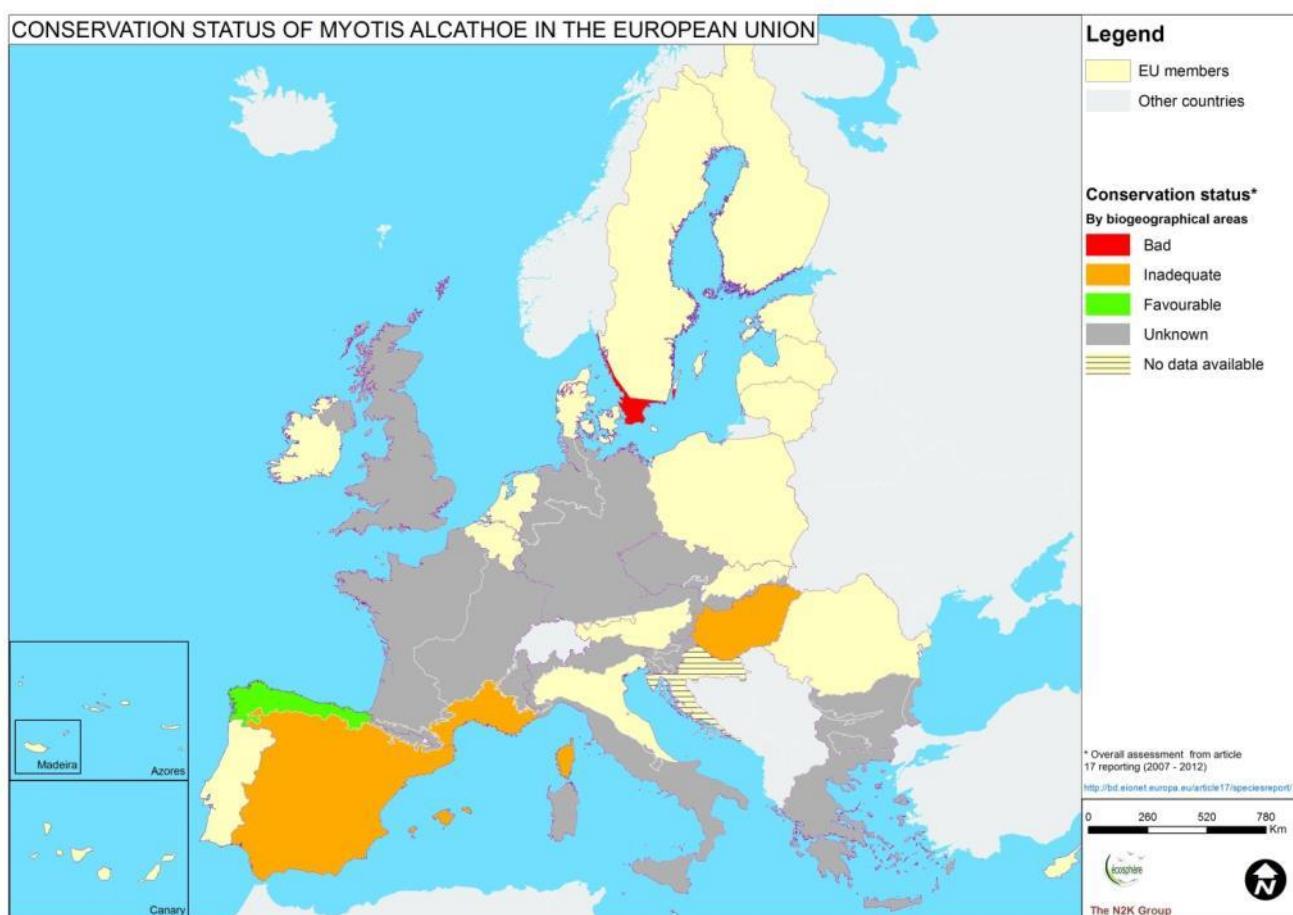
Formerly included in *Myotis mystacinus* (Kuhl, 1817); the species was differentiated on the base of karyological, genetic and echolocation characters (22).

#### A-2 Threats

Because of its habitat requirements, the Alcathoe whiskered bat may be threatened by damages to riparian woodlands and loss of tree-roosting sites (23).

IUCN Red List Category		
2013 (World): DD	2007 (Europe): DD	2007 (EU 25): DD

#### A-3 Species conservation status



Its population size and trend is unknown (23). However, new localities continue to be found.

### 3.8 - *Myotis aurascens* - Steppe Whiskered bat

#### A-1 Taxonomy

Family: *Vespertilionidae*; Genus: *Myotis*; Species: *aurascens* (Kuzjakin, 1935)

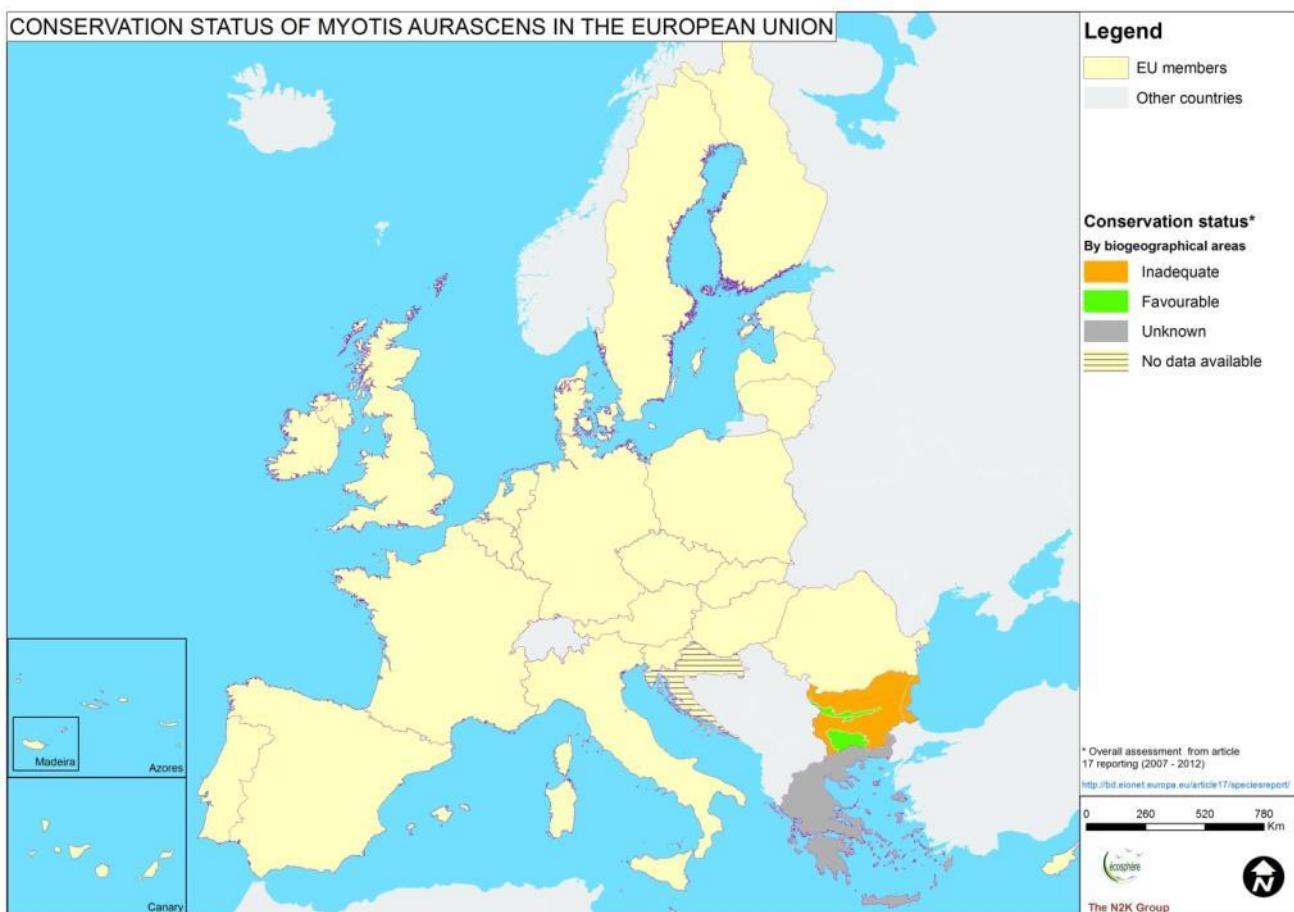
Formerly included in *Myotis mystacinus*; it was differentiated on the basis of morphology (24)

#### A-2 Threats

The Steppe whiskered bat is not directly threatened, but might be exposed to habitat loss and underground roosts disturbance (12).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

#### A-3 Species conservation status



The population trend is stable. It is a widespread species but common locally only (25).

### 3.9 - *Myotis bechsteinii* - Bechstein's bat

#### A-1 Taxonomy

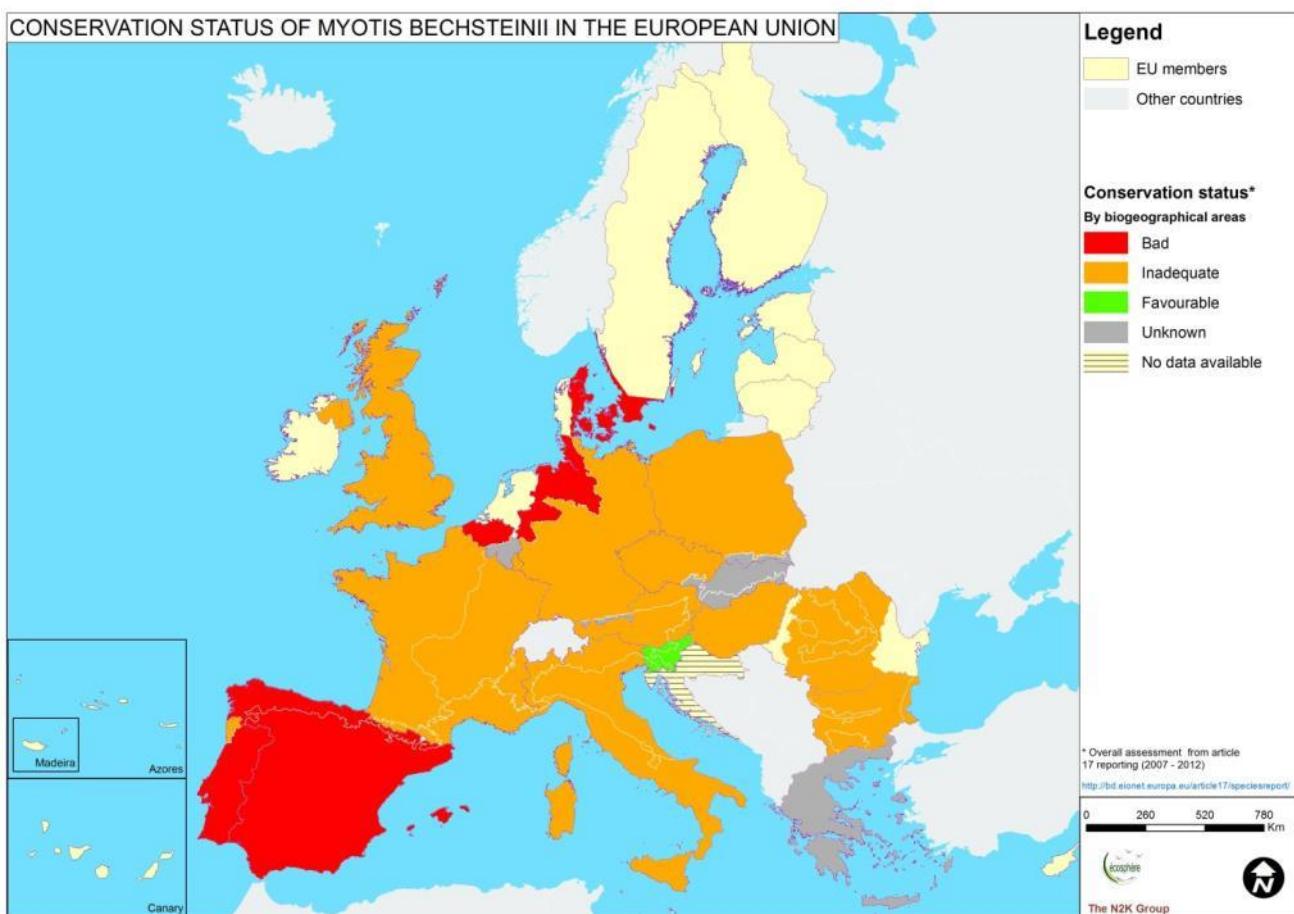
Family: Vespertilionidae; Genus: *Myotis*; Species: *bechsteinii* (Kuhl, 1817)

#### A-2 Threats

This species may be threatened by forests bad managements and habitat fragmentation (11), but also agricultural intensification and human disturbance of roosting sites. Trees with hollows and old trees in woodland are also declining (26).

IUCN Red List Category		
2013 (World): NT	2007 (Europe): VU	2007 (EU 25): VU

#### A-3 Species conservation status



This species is declining and is found regularly only if conditions are optimal; otherwise it is quite rare throughout its range. It is considered rare in southern Europe, the Caucasus, and Iran (only 1 individual confirmed). Small groups of up to six individuals in six localities have been recorded in Turkey and a colony has disappeared in Spain due to human disturbance. Woodland loss has fragmented this species population (26).

### 3.10 - *Myotis blythii* - Lesser mouse-eared bat

#### A-1 Taxonomy

Family: Vespertilionidae; Genus: *Myotis*; Species: *blythii* (Monticelli, 1855)

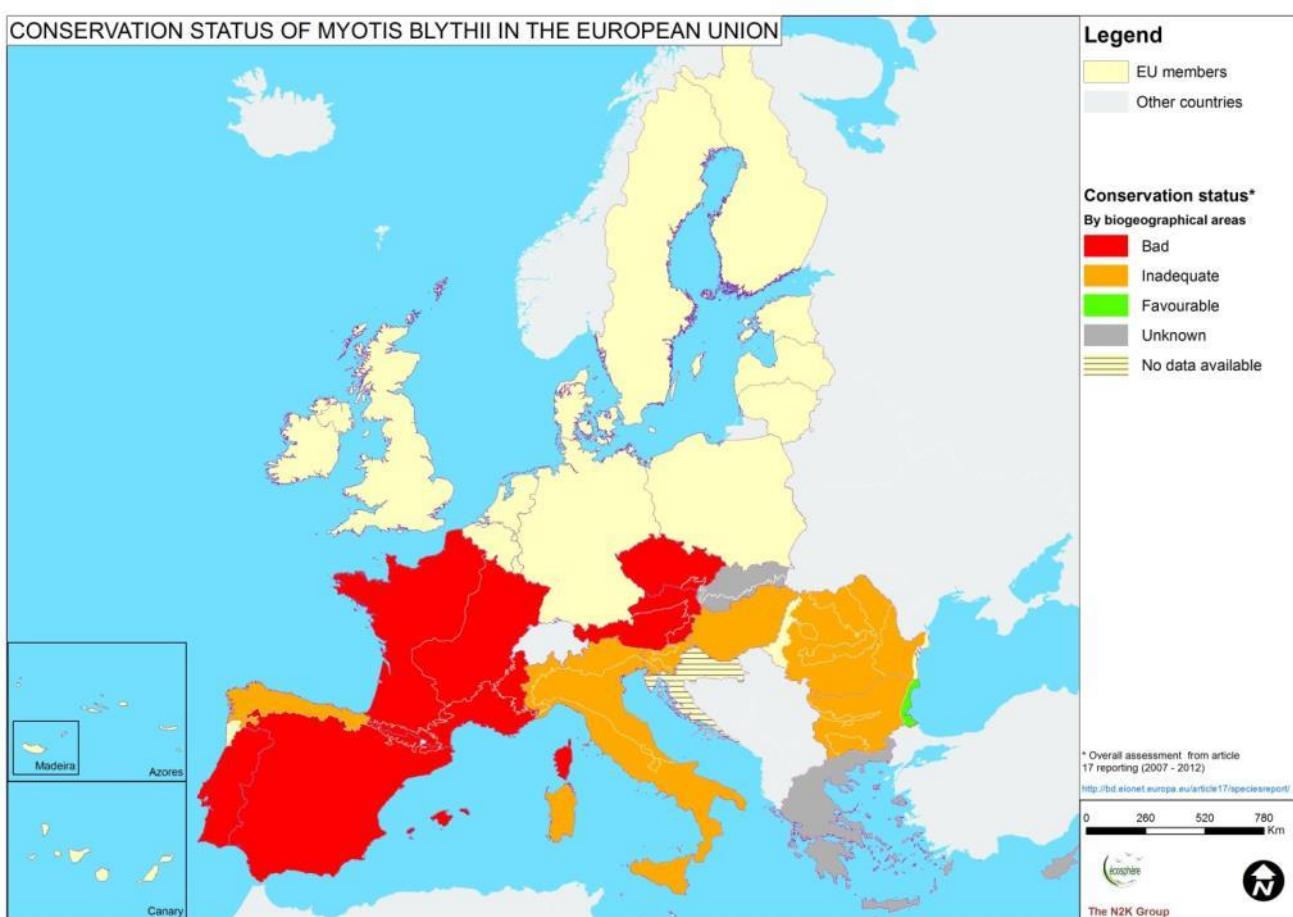
Simmons in Wilson and Reeder (2005) treated *Myotis myotis*, *M. blythii*, *M. oxygnathus* as separate species (27).

#### A-2 Threats

This species can be threatened by a bad land management (agricultural pollution) and roost disturbance in caves (partly due to tourism) and buildings. In Spain, 90 % of the population is disturbed by speleologists which has lead colonies to disappear. Caves are also used as shelter for livestock in Turkey and Syria, which causes disturbance for bat colonies as fires are often lighted in those caves (28).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): NT	2007 (EU 25): NT

#### A-3 Species conservation status



The lesser mouse-eared bat have been declining since 1950 in some parts of its range, but it seems stable in other areas and remains locally abundant. It is uncommon in Portugal and in the northern part of its range. Andalucian population decreased from 30,000 individuals to 14,000 between 1994 and 2002 (unpublished report submitted to Junta Andalucia government). In France, the population has been declining since 1960, but may now be more stable (28).

### 3.11 - *Myotis brandtii* - Brandt's bat

#### A-1 Taxonomy

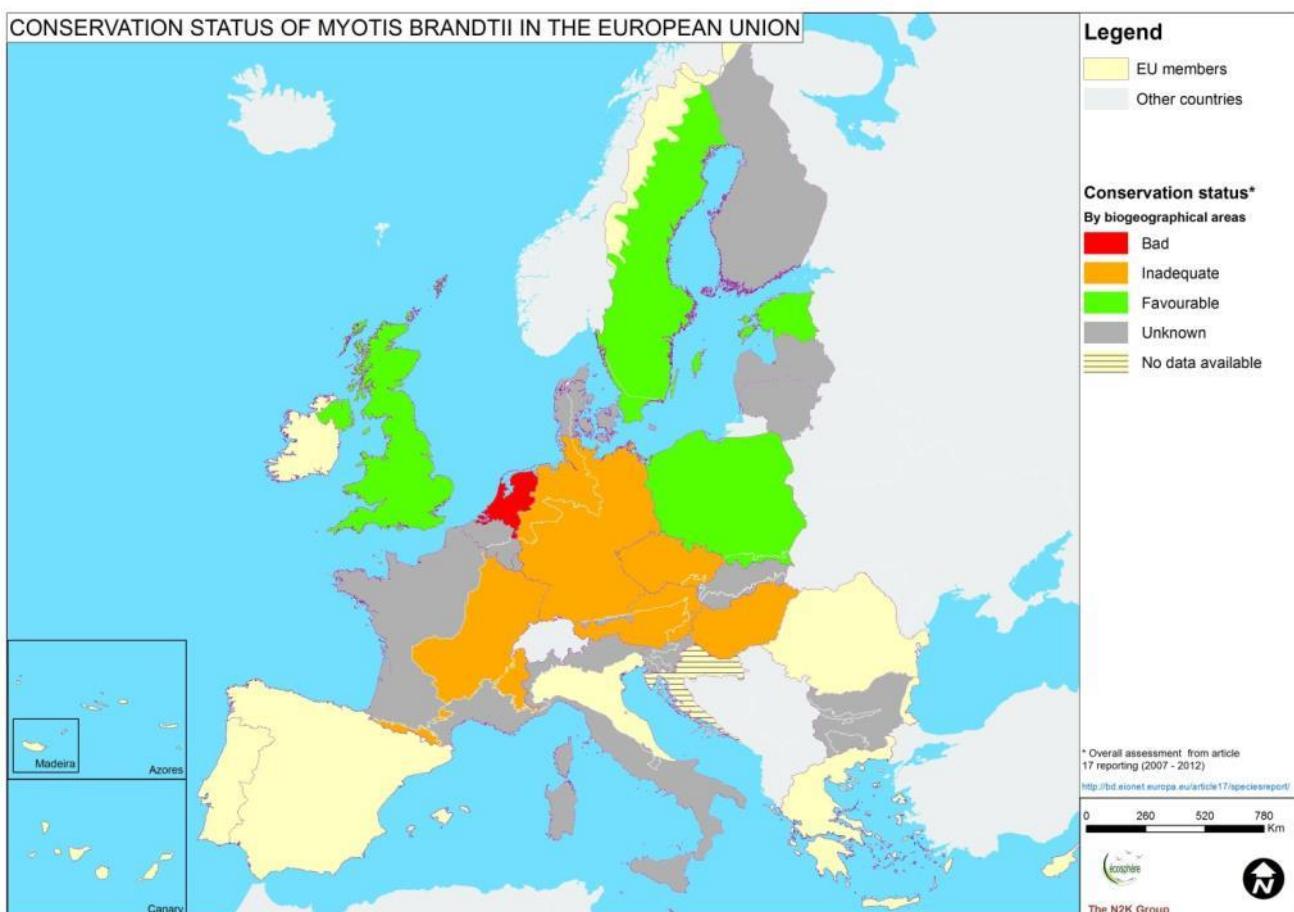
Family: Vespertilionidae; Genus: *Myotis*; Species: *brandtii* (Eversmann, 1845)

#### A-2 Threats

There are no major threats known for this species, although its habitats may be locally disturbed by human activities or changes in land-use practices (29).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

#### A-3 Species conservation status



The Brandt's bat population is globally stable (29). The species is quite common in Eastern Europe and in Russia, and is also regularly seen in Belgium, Luxemburg and Switzerland (11). It is decreasing on the southern edge of its range (29).

### 3.12 - *Myotis capaccinii* - Long-fingered bat

#### A-1 Taxonomy

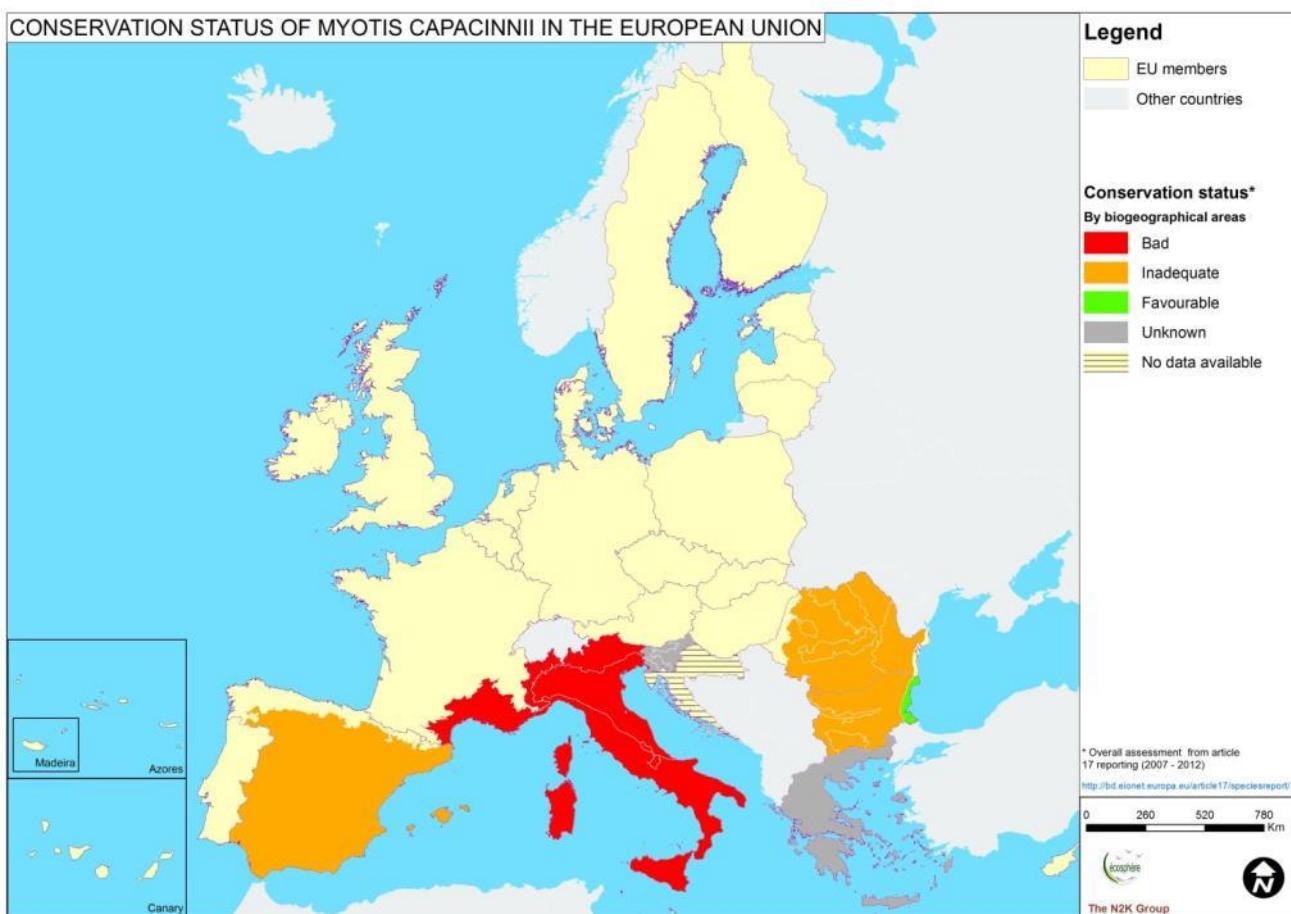
Family: Vespertilionidae; Genus: *Myotis*; Species: *capaccinii* (Bonaparte, 1837)

#### A-2 Threats

Water is a vital element for the Long-fingered bat. Thus, pollution and the loss of water bodies and rivers can threaten it. Damages and disturbance to roosts due to human activities are also significant threats. In North Africa, this species is collected for medicinal purposes (30).

IUCN Red List Category		
2013 (World): VU	2007 (Europe): VU	2007 (EU 25): VU

#### A-3 Species conservation status



The global population has been declining in the northern part of its range and has gone extinct in some parts of Switzerland, Italy and Romania. Only few maternity colonies remain in Spain and France (10). There were extinctions in the western part of the range as well. However, this species can be locally abundant, for example in Croatia, even though these colonies are threatened by water pollution (30).

### 3.13 - *Myotis dasycneme* - Pond bat

#### A-1 Taxonomy

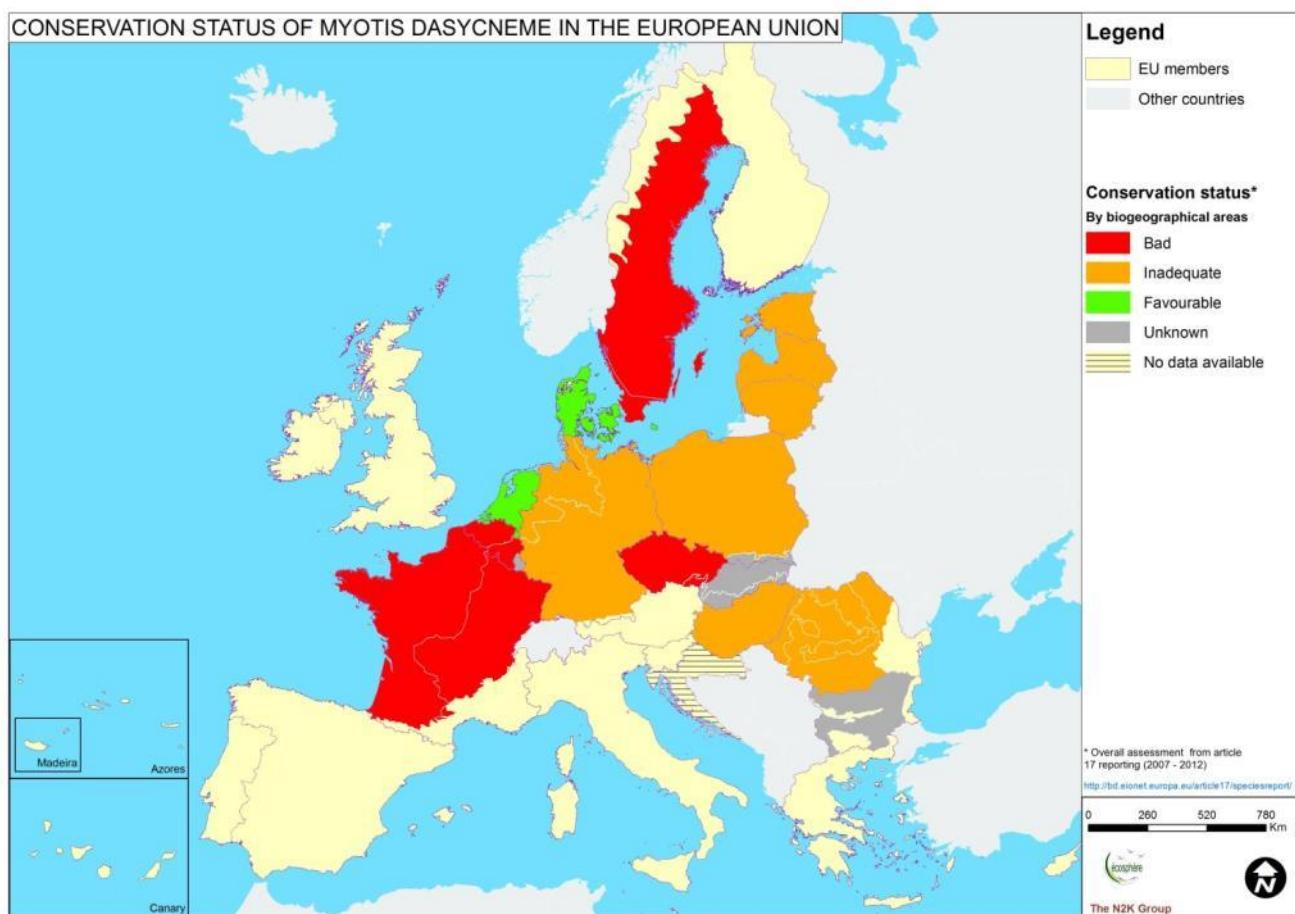
Family: *Vespertilionidae*; Genus: *Myotis*; Species: *dasycneme* (Boie, 1825)

#### A-2 Threats

This species is particularly threatened. In the 1950s, populations have declined due to the use of toxic timber treatments and roost obstruction (10). Nowadays, the species faces habitat change through building renovations, water pollution (31), and preys loaded with toxins (10).

IUCN Red List Category		
2013 (World): NT	2007 (Europe): NT	2007 (EU 25): NT

#### A-3 Species conservation status



The Pond bat population is generally decreasing. There are probably around 200,000 individuals in Europe unequally distributed throughout the range (11). This species is rarely abundant and probably declining in much of Europe (31).

### 3.14 - *Myotis daubentonii* - Daubenton's bat

#### A-1 Taxonomy

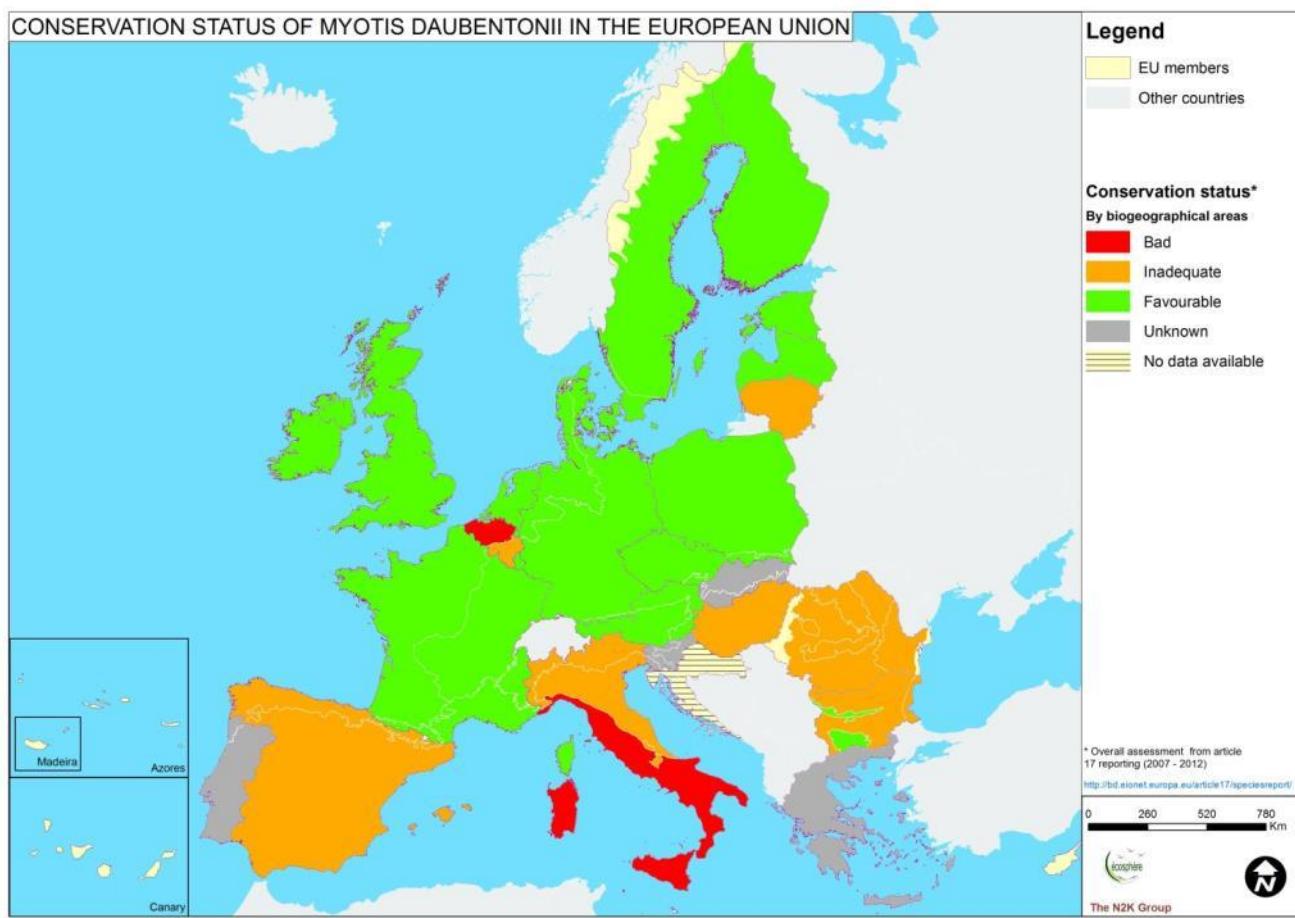
Family: Vespertilionidae; Genus: *Myotis*; Species: *daubentonii* (Kuhl, 1817)

#### A-2 Threats

Daubenton's bat is not directly threatened. However, it may have to face the reduction of food supply due to water pollution, the loss or disturbance of roost sites (32). Habitat loss due to irrigation (wetland draining), harmful bridges refurbishment works, and loss of old trees in forests can be detrimental too (11).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

#### A-3 Species conservation status



*M. daubentonii*'s population trend is increasing. It has been since 1950 in Europe and is nowhere threatened. It is abundant in many parts of its range and is very common in central and eastern Europe (32; 10).

### 3.15 - *Myotis emarginatus* - Geoffroy's bat

#### A-1 Taxonomy

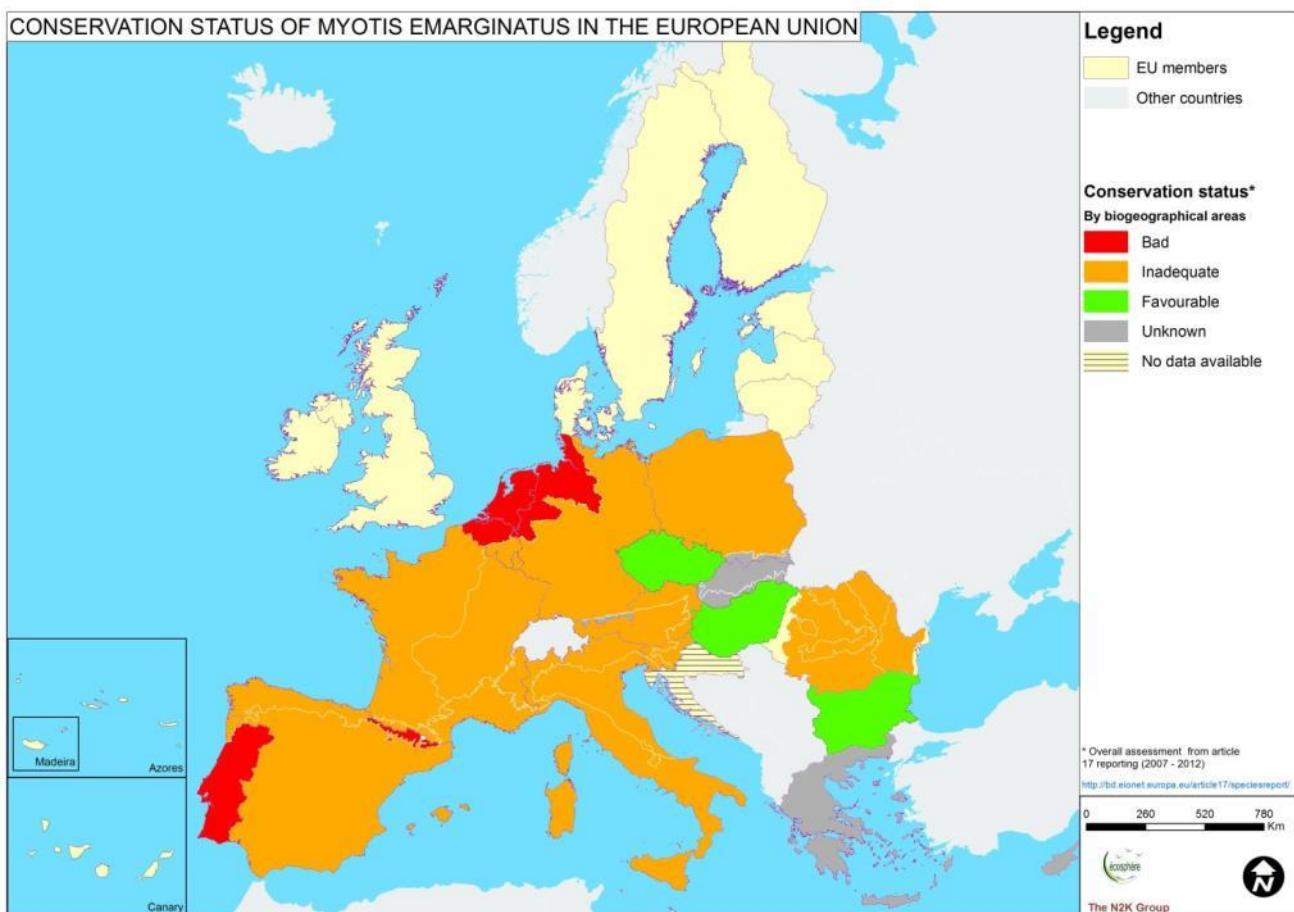
Family: Vespertilionidae; Genus: *Myotis*; Species: *emarginatus* (Geoffroy, 1806)

#### A-2 Threats

*M. emarginatus* has to face agricultural intensification and habitat fragmentation (12). It can be threatened by roosts disturbance and loss of underground sites. This species is also used for traditional medicine practices in North Africa (33; 34).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

#### A-3 Species conservation status



Geoffrey's bat populations are globally stable. This species can be locally rare or common (33), and has a rather heterogeneous distribution over its range (11). It is abundant in Austria, but very rare in Germany. In France, the species can be common in some areas and rare in others (11). Since the 1950s, numbers have been declining in the northern part of the range, probably due to habitat loss. Nowadays, populations are increasing and new areas are getting colonized by this species (35; 34).

### **3.16 - *Myotis escalerai* - Escalerai bat**

#### **A-1 Taxonomy**

Family: *Vespertilionidae*; Genus: *Myotis*; Species: *escalerai* (Cabrera, 1904)

A study found in 2006 that *Myotis nattereri* included several cryptic species with highly distinctive DNA sequence characteristics, even though morphological differences were small or nonexistent. One, which they recorded in the southern Iberian Peninsula, was identified as *Myotis escalerai* (36). A 2009 study using data from the mitochondrial genes cytochrome b and ND1 found that *Myotis escalerai* is most closely related to an unnamed species from Morocco previously included in *M. nattereri*, and more distantly to other members of the *Myotis nattereri* group. *M. escalerai* and the Moroccan species are estimated to have diverged about 2 million years ago (37). The common name "Escalera's bat" has been used for *M. escalerai* (38).

#### **A-2 Threats**

No information available.

IUCN Red List Category: Not assessed

#### **A-3 Species conservation status**

No information available.

### 3.17 - *Myotis myotis* - Greater mouse-eared bat

#### A-1 Taxonomy

Family: Vespertilionidae; Genus: *Myotis*; Species: *myotis* (Borkhausen, 1797)

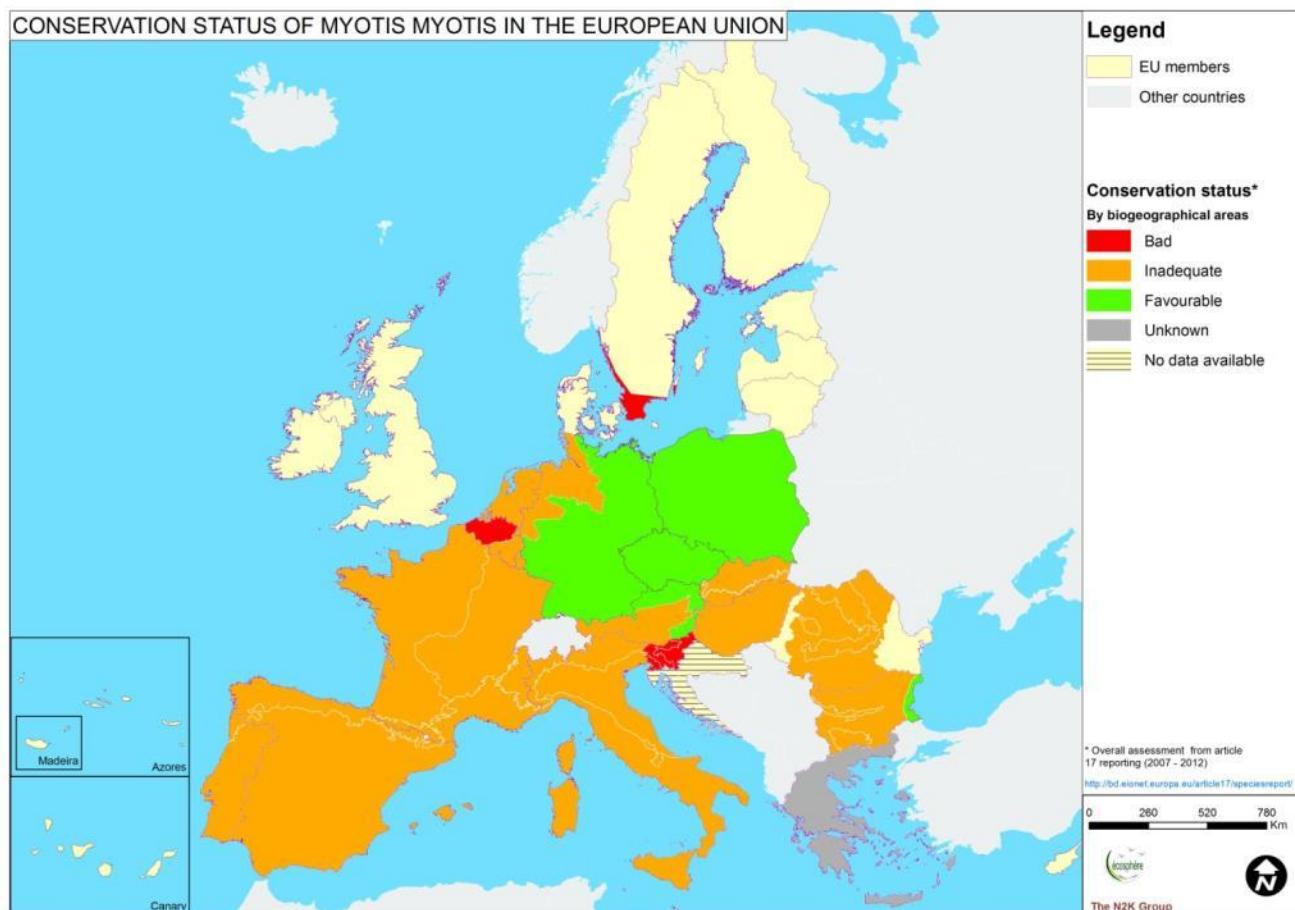
Simmons in Wilson and Reeder (2005) treated *Myotis myotis*, *M. blythii*, *M. oxygnathus* as separate species (27).

#### A-2 Threats

*Myotis myotis* has experienced a large decline in Germany until the 1970s, which was probably due to roosts destruction, the use of highly toxic pesticides (DDT) and timber treatment in buildings (10). Today, it also has to face agricultural intensification (important use of pesticides and increase in farmland areas to the detriment of semi-natural woodlands), and also losses of or damages to roost sites, both underground and in buildings (39), including problems due to cave tourism, building renovation, etc. (12). Habitat fragmentation is also a significant threat (10).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

#### A-3 Species conservation status



The Greater mouse-eared bat population is globally stable (39). It has been declining over the past century. This decline stopped at the end of the 1980s, and a recolonisation has started in Europe. It can locally be the most common cave bat (e.g. in Germany) (11) and is a common species in most of its distribution area. It has gone extinct in Great-Britain, but one individual has been discovered there in 2002 (40). Populations are increasing in Austria and are stable in the Balkans and in Turkey (39).

### 3.18 - *Myotis mystacinus* - Whiskered bat

#### A-1 Taxonomy

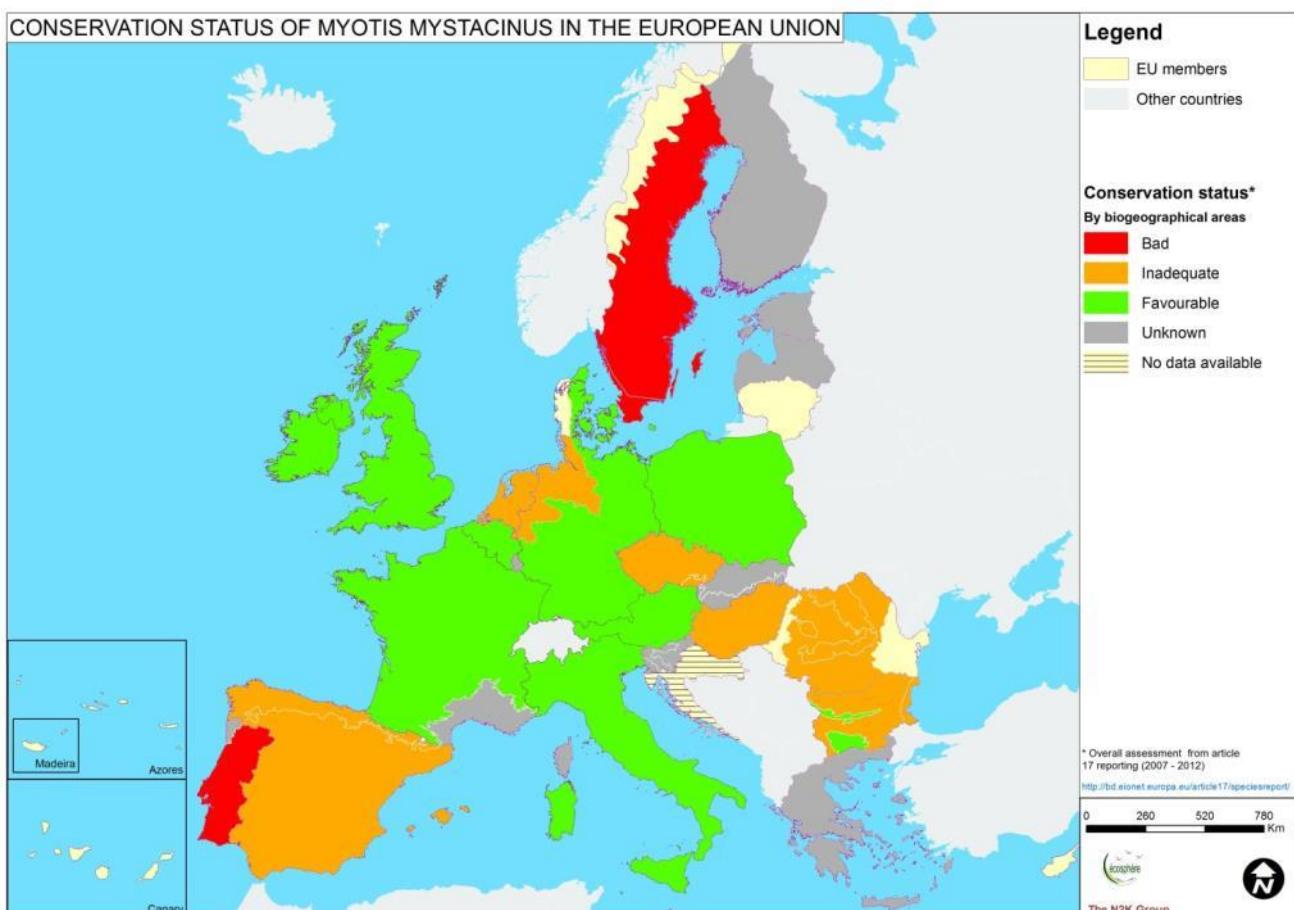
Family: Vespertilionidae; Genus: *Myotis*; Species: *mystacinus* (Kuhl, 1817).

#### A-2 Threats

*M. mystacinus* isn't directly threatened. However, it can be locally affected by a poor woodland management and loss of or damages to roosts (41).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

#### A-3 Species conservation status



This species is locally common but rarely abundant (11). Population figures are stable in Germany and Great-Britain. However, declines have locally occurred due to village renovations and urban sprawling (10).

### 3.19 - *Myotis nattereri* - Natterer's bat

#### A-1 Taxonomy

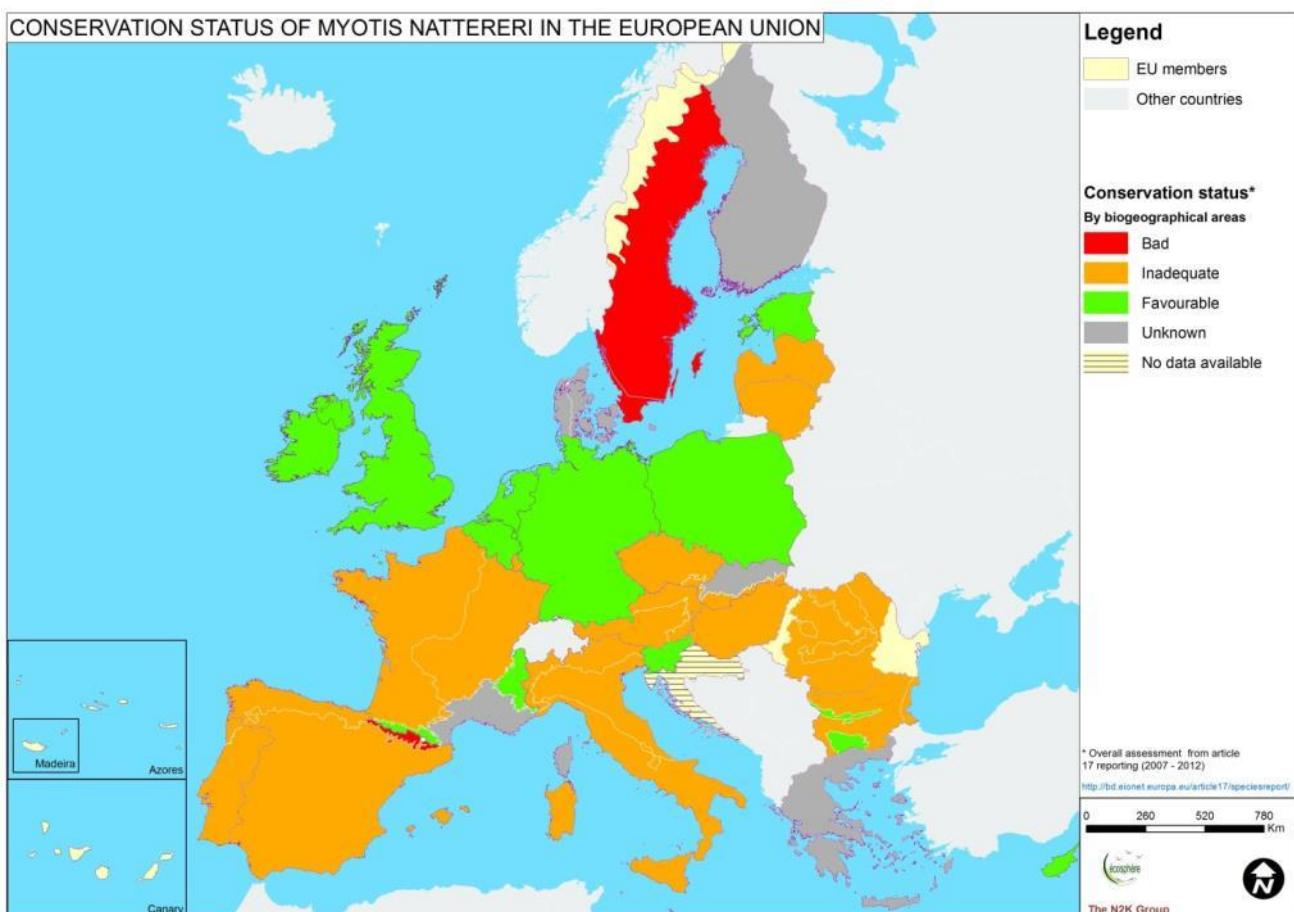
Family: *Vespertilionidae*; Genus: *Myotis*; Species: *nattereri* (Kuhl, 1817)

#### A-2 Threats

This species has no major threats, although it may have to face habitat loss and loss of or damages to roosts. In northern Africa, *M. nattereri* is collected for medicine (42).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

#### A-3 Species conservation status



*M. nattereri*'s population is stable. This species is quite common in Europe but it usually occurs in small numbers (42).

### 3.20 - *Myotis punicus* - Maghreb mouse-eared bat

#### A-1 Taxonomy

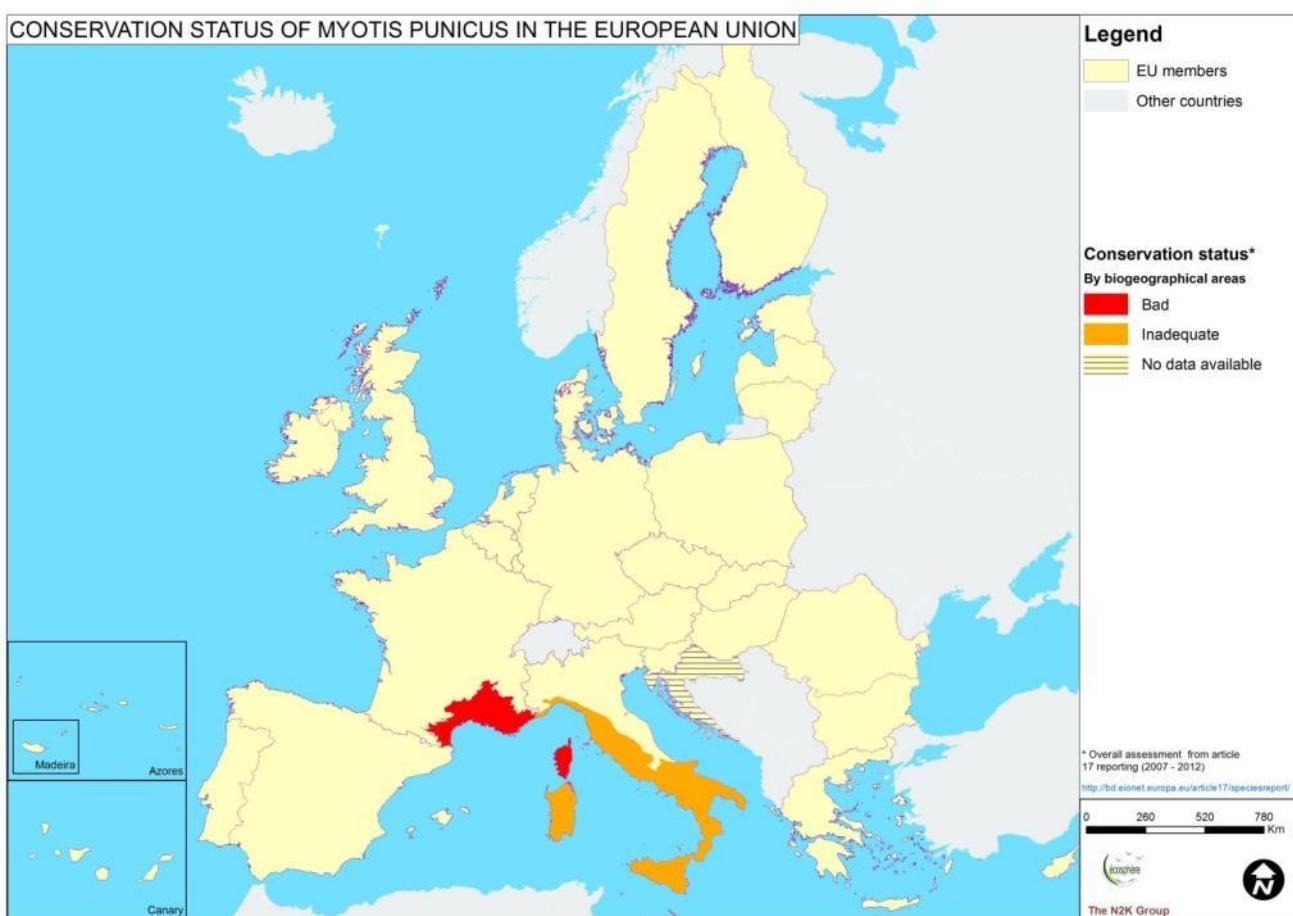
Family: *Vespertilionidae*; Genus: *Myotis*; Species: *punicus* (Felten, 1977), Simmons in Wilson and Reeder (2005) treated *Myotis myotis*, *M. blythii*, *M. oxygnathus* as separate species (27).

#### A-2 Threats

Threats include roost disturbance (especially due to cave tourism), changes in land management, agricultural pollution, collects for medicinal use in North Africa (12).

IUCN Red List Category		
2013 (World): NT	2007 (Europe): NT	2007 (EU 25): NT

#### A-3 Species conservation status



The Maghreb mouse-eared bat population is globally decreasing. The population is estimated to over 10,000 individuals, mostly located in Malta, Corsica and Sardinia. This species is not common in Corsica. In the 1980s and 1990s, 50% of the Maltese population has disappeared (11; 43).

### 3.21 - *Miniopterus schreibersii* - Schreiber's bat

#### A-1 Taxonomy

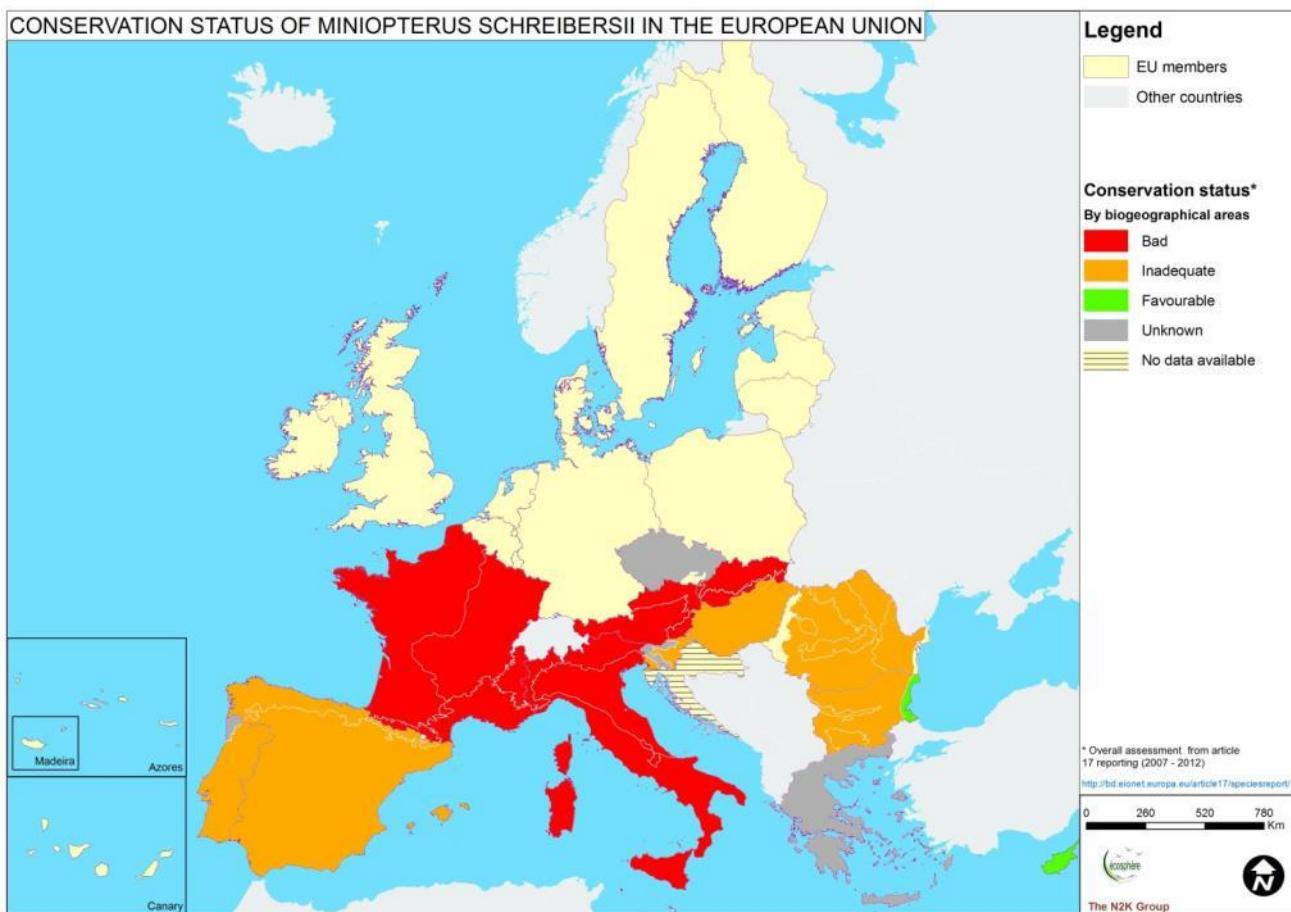
Family: Vespertilionidae; Genus: *Miniopterus*; Species: *schreibersii* (Kuhl, 1817)

#### A-2 Threats

In Europe, this species has to face the disturbance to and loss of underground habitats and the use of pesticides (12; 10; 44). Cave tourism may also be an issue (10; 11; 44). Recently, there were massive mortalities in France, Spain, and Portugal, due to an unidentified cause. Subsequent investigation revealed interstitial pneumonia as the cause of the death (44).

IUCN Red List Category		
2013 (World): NT	2007 (Europe): NT	2007 (EU 25): NT

#### A-3 Species conservation status



Schreiber's bat population is globally decreasing, although this species is widely distributed and common in southern Europe and Asia Minor. Populations' trends vary depending on the localisation. It seems stable in most of south-eastern Europe and Turkey. In south-west Europe there were recent mass mortalities (France, Spain and Portugal). Such deaths had already occurred in Italy. Thus, numerous sites were deserted, and since the 1960s this species has lost the northern parts of its range. It has gone extinct from Germany and Ukraine. It is close to extinction in Switzerland. Hibernating populations are strongly declining in Austria. Roosts are also quickly disappearing since the 1960s in Romania. However, in Croatia and Bulgaria, large colonies are still intact (44).

## 3.22 - *Nyctalus azoreum* - Azorean bat

### A-1 Taxonomy

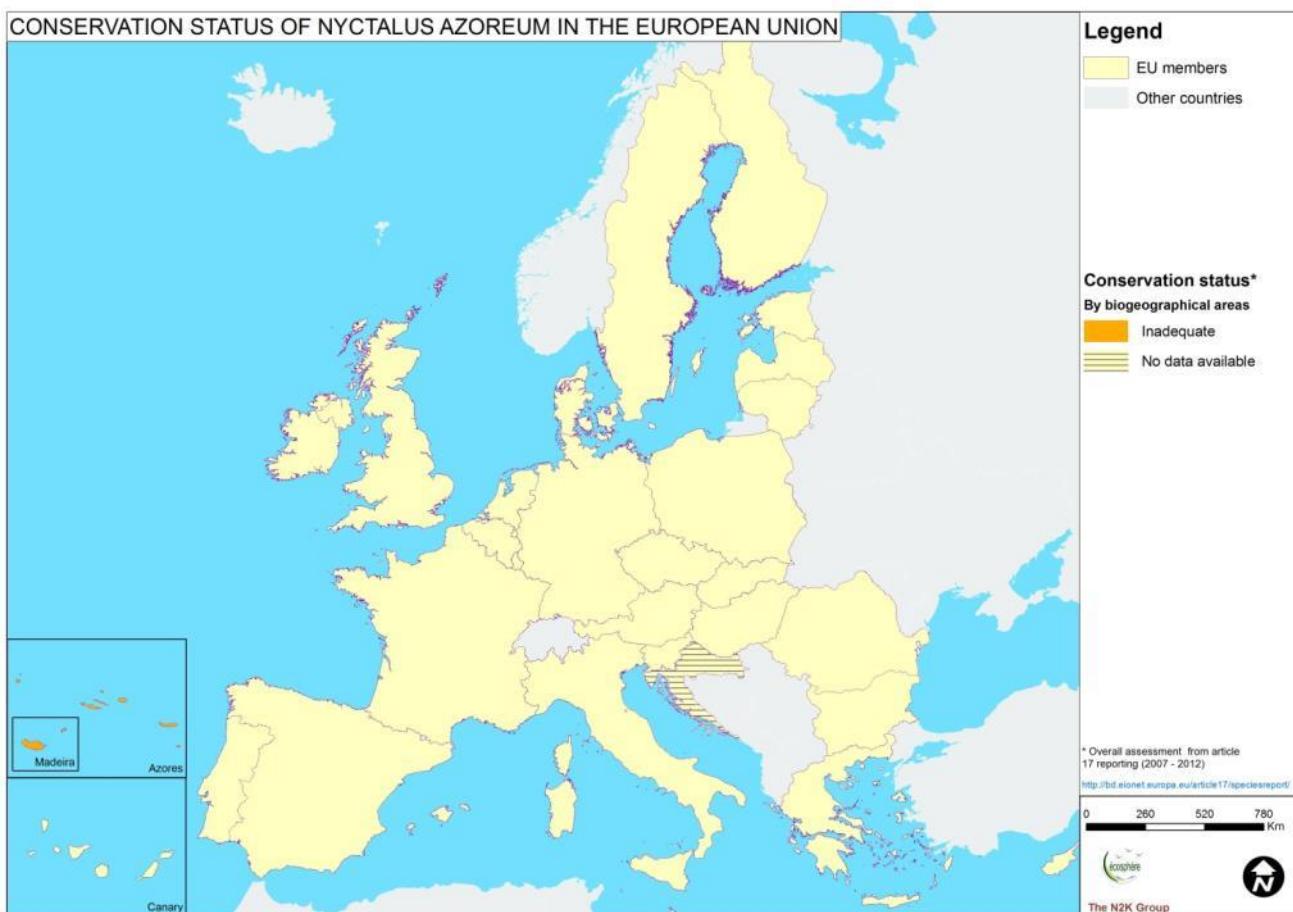
Family: Vespertilionidae; Genus: *Nyctalus*; Species: *azoreum* (Thomas, 1901)

### A-2 Threats

The main threats are the loss or degradation of habitat, the exclusion from roosts and human persecution (roosts are easy to spot because the species flies during the day), and also the use of pesticides and spread of exotic plant species (45).

IUCN Red List Category		
2013 (World): EN	2007 (Europe): EN	2007 (EU 25): EN

### A-3 Species conservation status



The Azorean bat is relatively abundant in the Azores (10 individuals /km<sup>2</sup>) (10). Its abundance is variable: it is abundant on San Miguel, Faial, Terceira and San Jorge; rare on Graciosa and extremely rare on Santa Maria. This species is suspected to be declining and some colonies seem to have disappeared lately. The total population is estimated at 2,000 to 5,000 individuals (45).

### 3.23 - *Nyctalus lasiopterus* - Greater noctule bat

#### A-1 Taxonomy

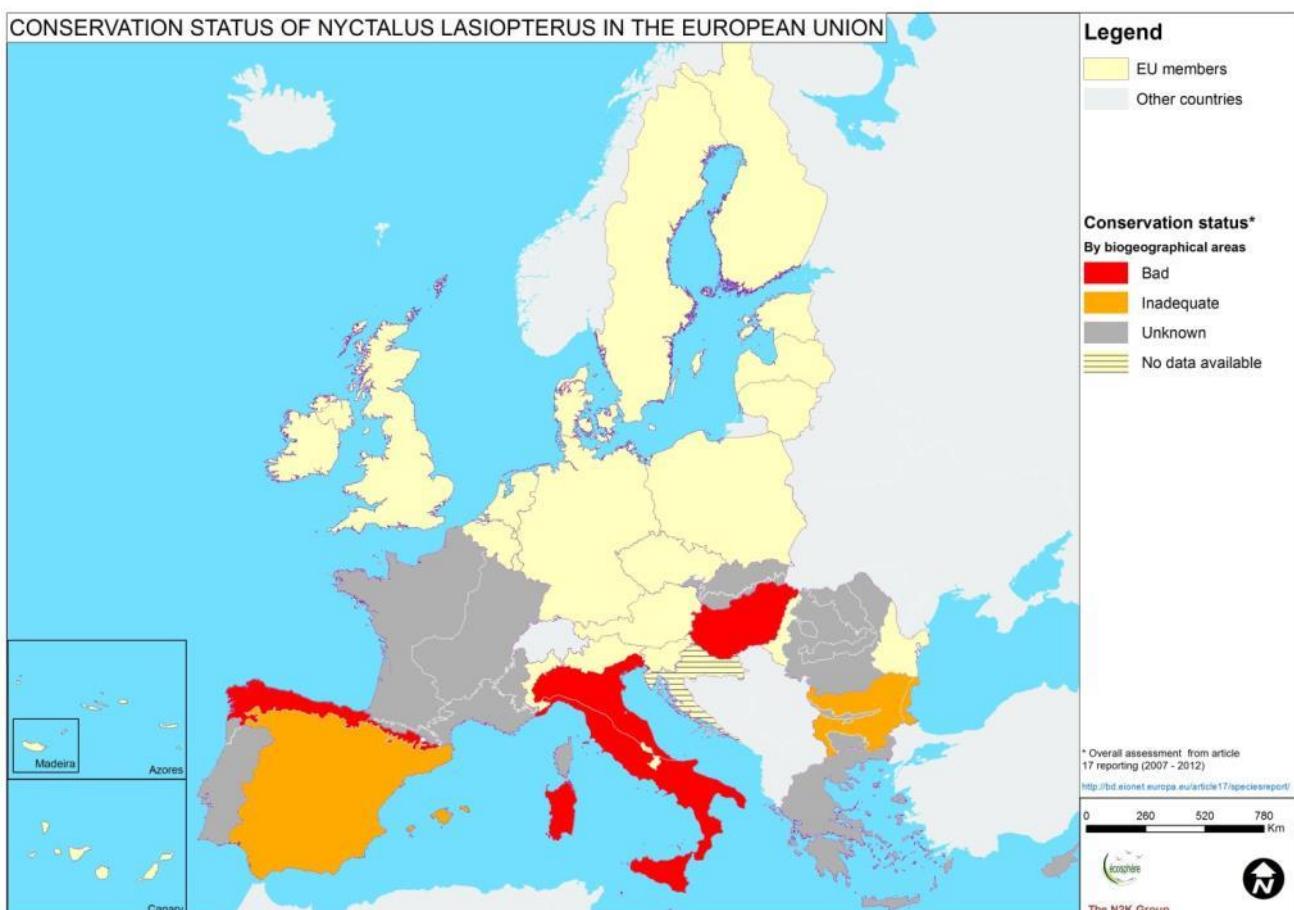
Family: Vespertilionidae; Genus: *Nyctalus*; Species: *lasiopterus* (Schreber, 1780)

#### A-2 Threats

The loss of mature woodlands and roost disturbance are potential threats to this species. Wind farms may also be harmful (46).

IUCN Red List Category		
2013 (World): NT	2007 (Europe): DD	2007 (EU 25): DD

#### A-3 Species conservation status



The Greater noctule bat's population trend is decreasing (46). Its patchy distribution and low population density in most of its range suggest a relatively small global population. The species is quite abundant in Hungary, Greece and Spain (11). Only a few individuals have been observed in Switzerland and Germany. It is rare in Russia (46).

### 3.24 - *Nyctalus leisleri* - Leisler's bat

#### A-1 Taxonomy

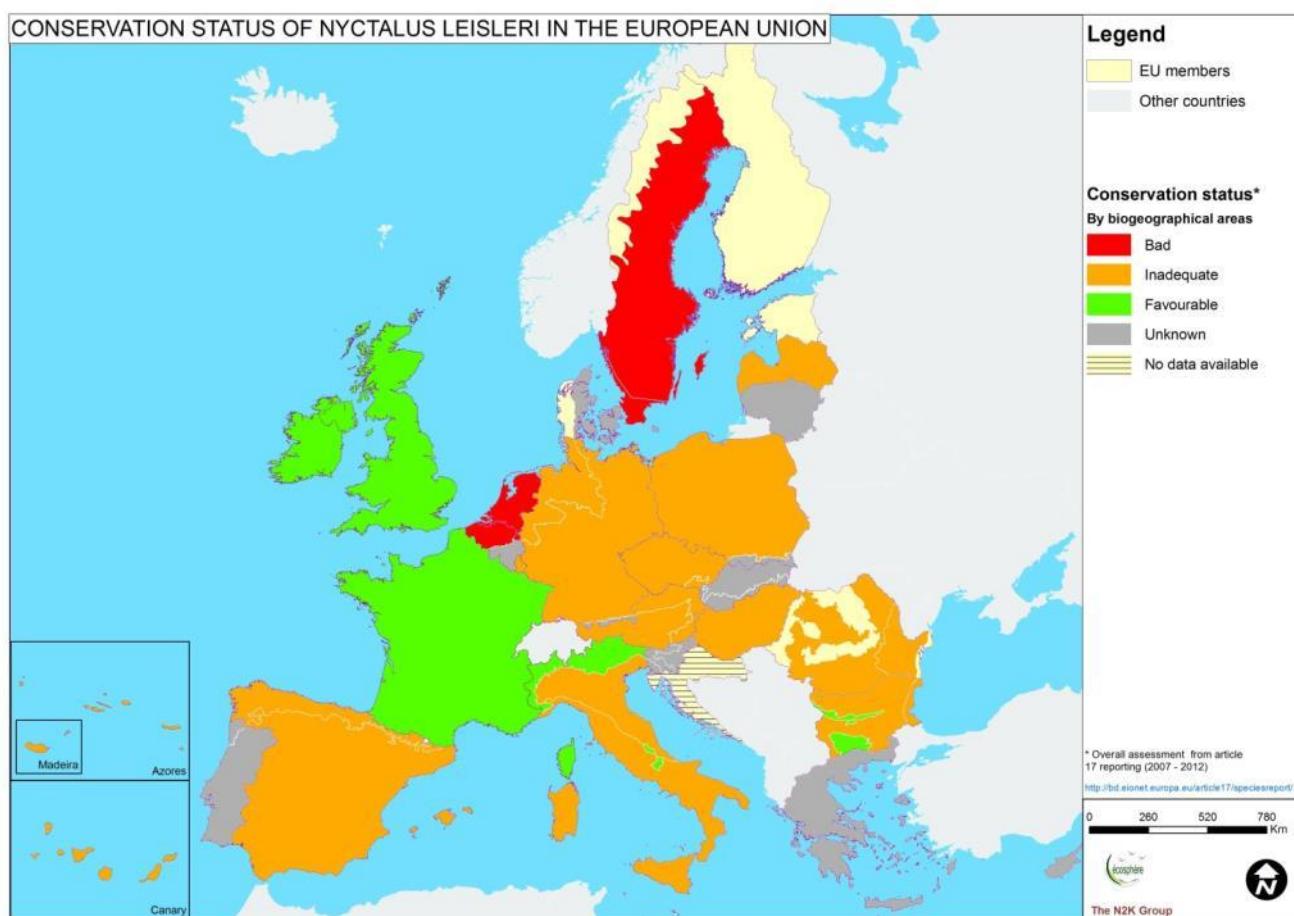
Family: Vespertilionidae; Genus: *Nyctalus*; Species: *leisleri* (Kuhl, 1817)

#### A-2 Threats

*N. leisleri* may be threatened by the loss of habitat and roosts through tree cuts and building renovations. Foraging habitats may be lost or damaged (47). Wind farms located near flyways can also be considered as a threat (10).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

#### A-3 Species conservation status



The distribution of *N. leisleri* is quite heterogeneous. It is common in Ireland. It has gone locally extinct in some parts of Russia, but remains common in others (47).

### 3.25 - *Nyctalus noctula* - Common noctule

#### A-1 Taxonomy

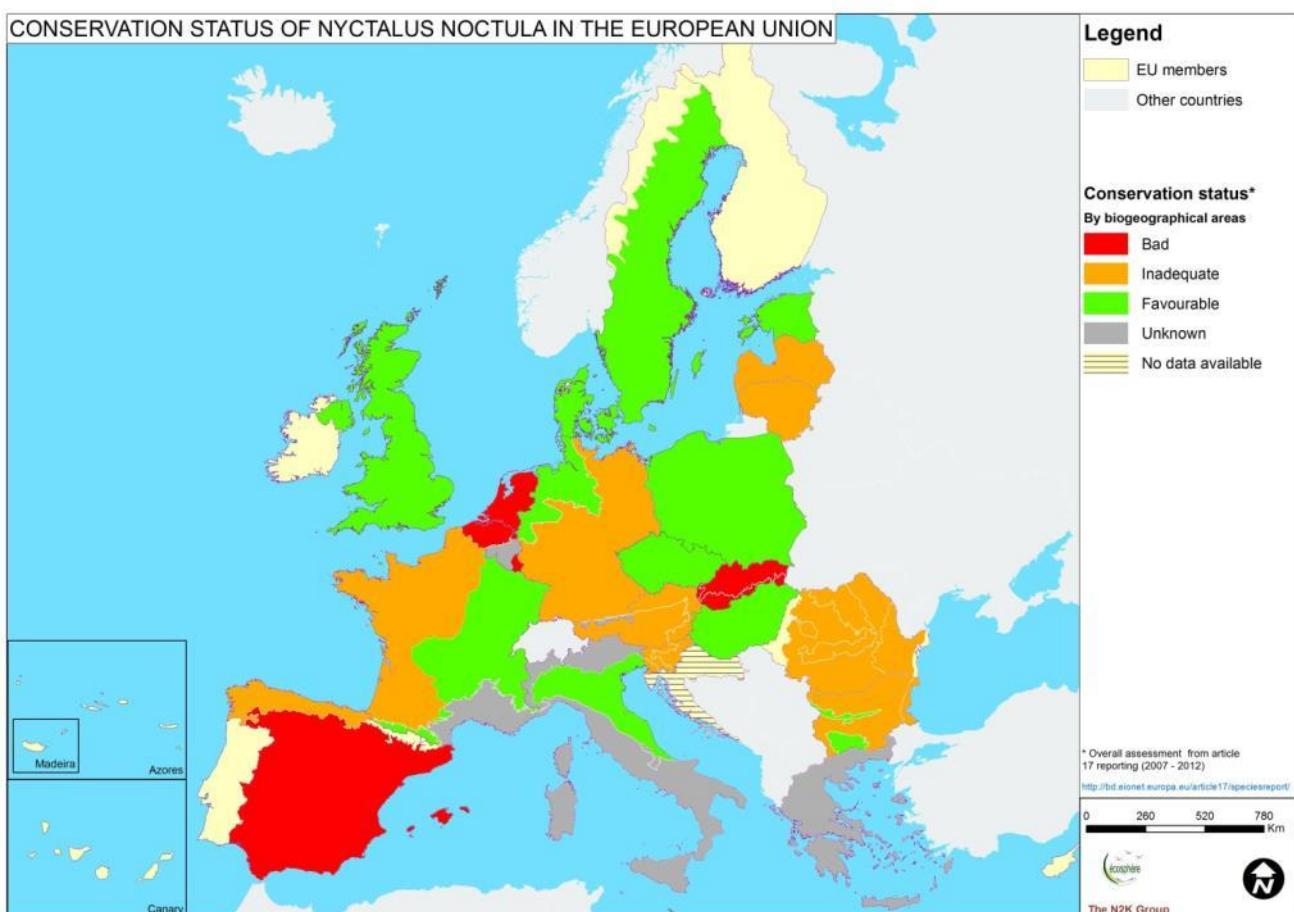
Family: Vespertilionidae; Genus: *Nyctalus*; Species: *noctula* (Schreber, 1774)

#### A-2 Threats

There are no major threats on this species (48). However, the Common noctule may have to face the loss of roost sites. For example, a hibernation colony had to be removed from a Gerdzhika Bridge in Bulgaria, during its reconstruction (49). Preys may also be declining due to the use of pesticides. It can also die because of windmills during migrations (10).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

#### A-3 Species conservation status



The Common noctule is common in a wide part of its range (48).

### **3.26 - *Pipistrellus hanaki* - Hanaki's Dwarf Bat**

#### **A-1 Taxonomy**

Family: *Vespertilionidae*; Genus: *Pipistrellus*; Species: *hanaki* (Hulva & Benda, 2004)

This new dwarf bat from Libya differs from its nearest relatives *P. pipistrellus* and *P. pygmaeus* chromosomally, and by its larger skull and teeth, and a number of other characters (50). However, an individual belonging to the *P. hanaki* lineage has been very recently discovered in Crete (51). Cretan form of *Pipistrellus hanaki* was found to be morphologically and genetically unique and therefore described as a separate subspecies, *P. hanaki creticus* subsp. nov. (52)

#### **A-2 Threats**

No information available.

IUCN Red List Category		
2013 (World): DD	2007 (Europe): N/A	2007 (EU 25): N/A

#### **A-3 Species conservation status**

No information available.

### 3.27 - *Pipistrellus kuhlii* - Kuhl's pipistrelle

#### A-1 Taxonomy

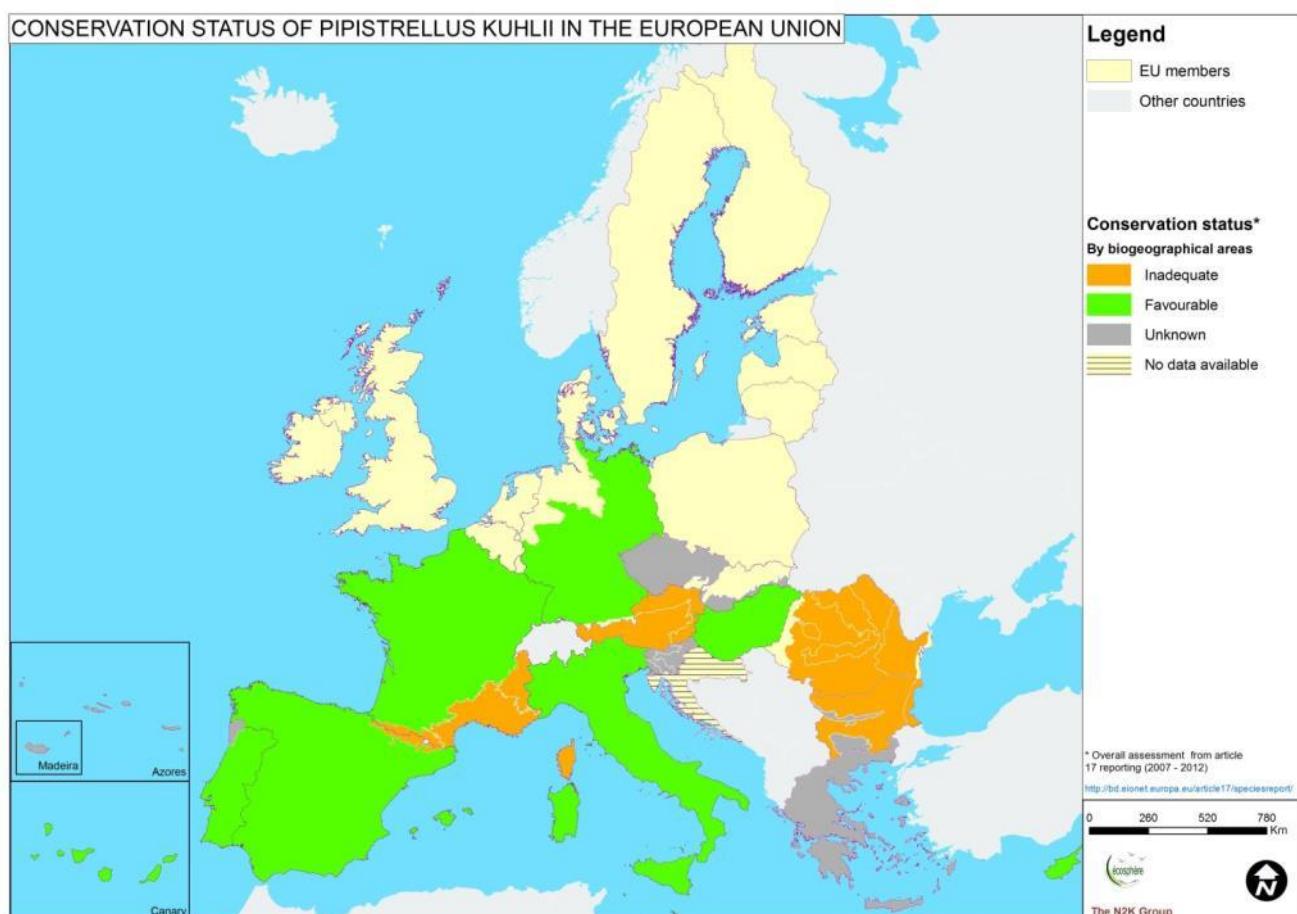
Family: Vespertilionidae; Genus: *Pipistrellus*; Species: *kuhlii* (Kuhl, 1817)

#### A-2 Threats

This species isn't directly threatened, although it may locally face the important use of pesticides against mosquitoes in urban areas (53). It can possibly be threatened by building renovations (10).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

#### A-3 Species conservation status



This species is very common in urban areas of the Mediterranean region (12). It is also relatively abundant in the Middle East and populations in South Asia are stable (53). Its distribution area has been extending towards northern Europe over the last 50 years (11).

### 3.28 - *Pipistrellus maderensis* - Madeira pipistrelle

#### A-1 Taxonomy

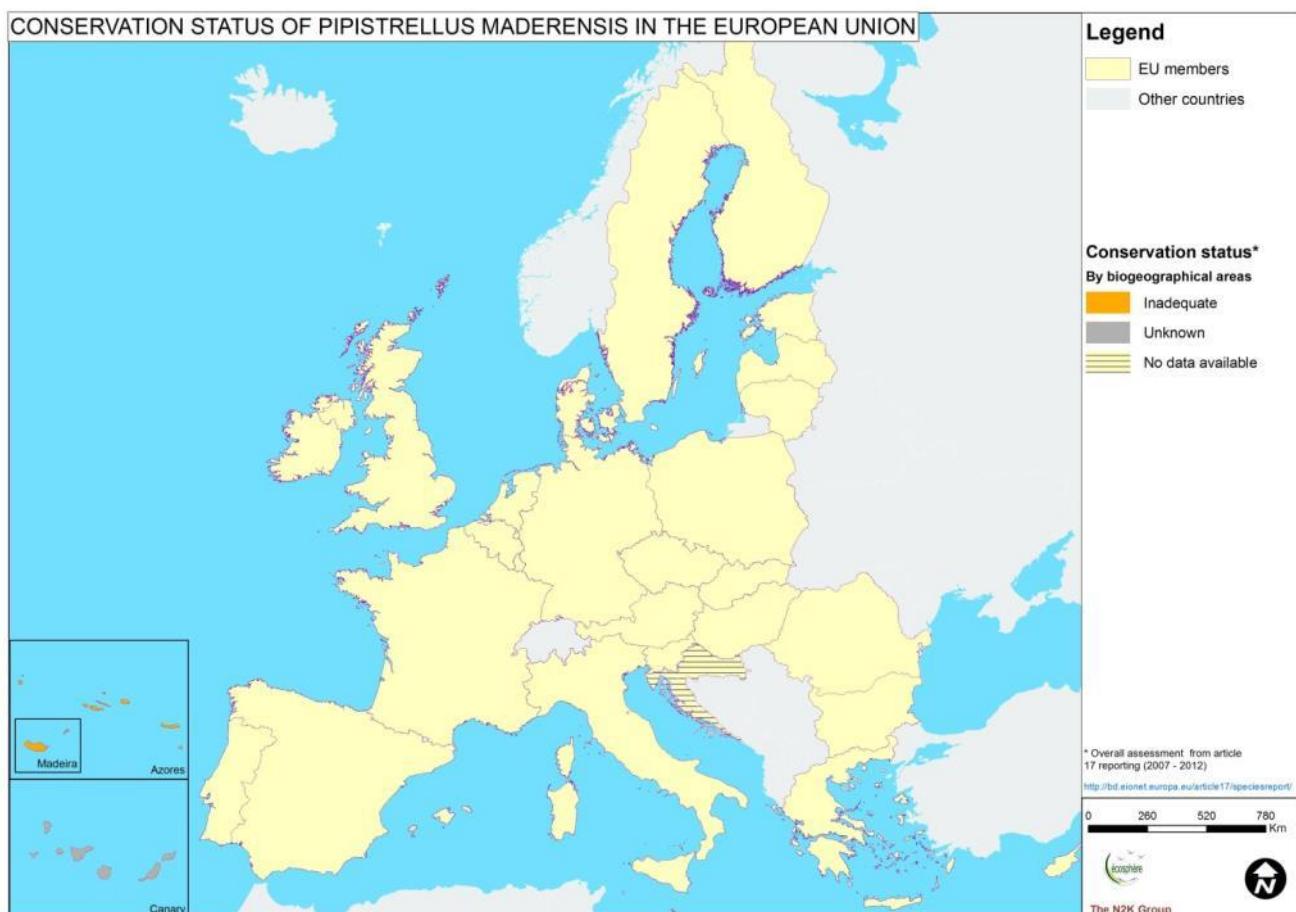
Family: Vespertilionidae; Genus: *Pipistrellus*; Species: *maderensis* (Dobson, 1878)

#### A-2 Threats

The Madeira pipistrelle may be threatened by the loss of natural habitat, the important use of pesticides and the disturbance to roosts in buildings (54).

IUCN Red List Category		
2013 (World): EN	2007 (Europe): EN	2007 (EU 25): EN

#### A-3 Species conservation status



The population trend is for a decrease. The global population is naturally fragmented. This species is very rare on Porto Santo. However, it is common on Madeira and the Canary Islands. The population is probably decreasing due to the loss and degradation of habitat, pesticide use, and disturbance and destruction of roosts. On the Azores, *Pipistrellus* genus is rare or very rare on all the islands where it occurs (10; 54).

### 3.29 - *Pipistrellus nathusii* - Natusius's pipistrelle

#### A-1 Taxonomy

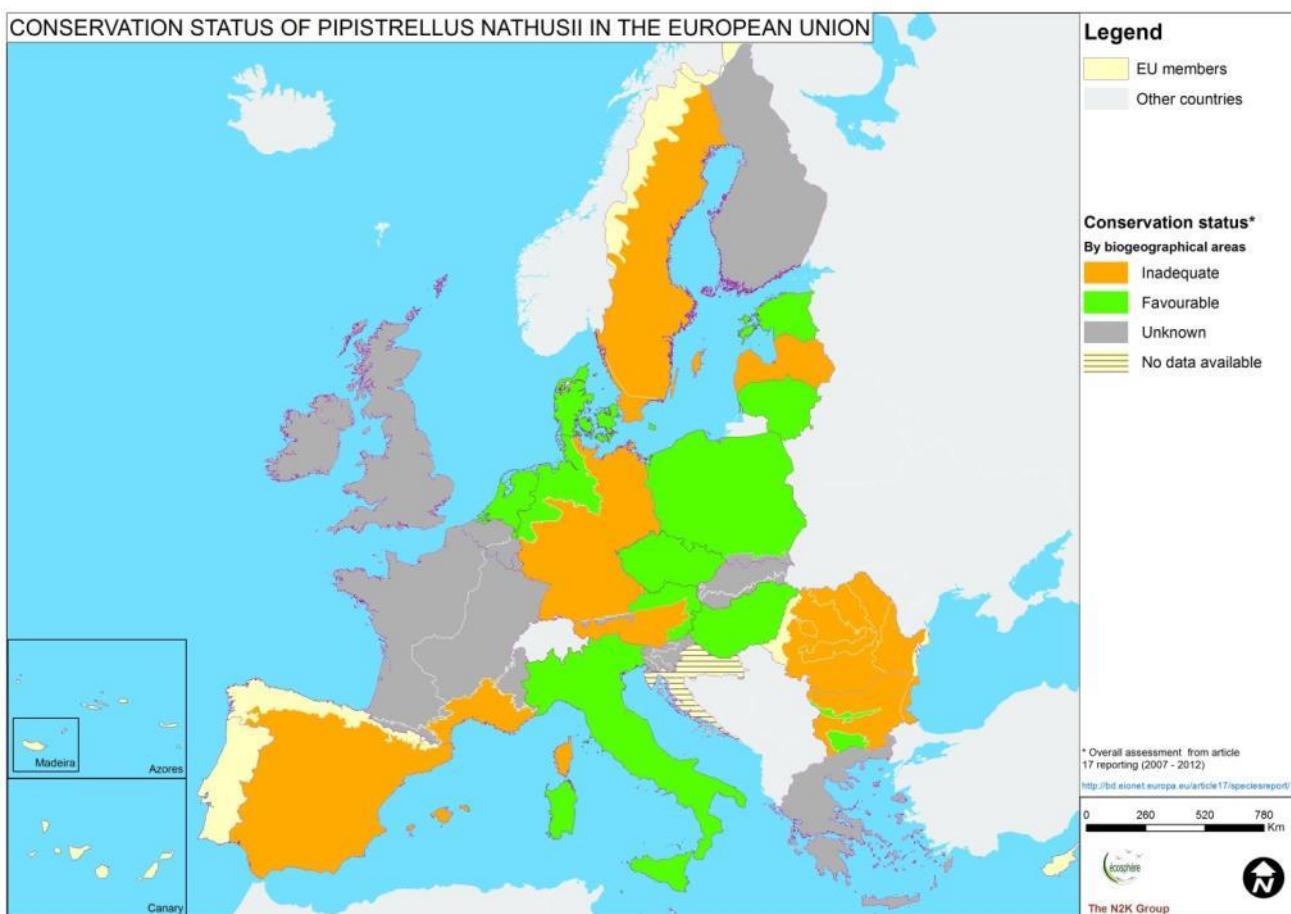
Family: Vespertilionidae; Genus: *Pipistrellus*; Species: *nathusii* (Keyserling et Blasius, 1839)

#### A-2 Threats

*P. nathusii* does not face any major threat. However, it might be affected by habitat fragmentation on flyways, the loss of and disturbance to roosts in buildings, the loss of mature trees and water quality changes affecting food supply (55). The important use of pesticides and wind farms on migration roads can be problems as well (10).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

#### A-3 Species conservation status



Natusius's pipistrelle is abundant in northern parts of its range. It is less common in the south and west, but is increasingly recorded there (55). The general population trend is unknown, but it seems to be increasing in Central and Western Europe and to extend to the south and west (11). For example, population in northern Germany is increasing and extends south-westwards (10).

### 3.30 - *Pipistrellus pipistrellus* - Common pipistrelle

#### A-1 Taxonomy

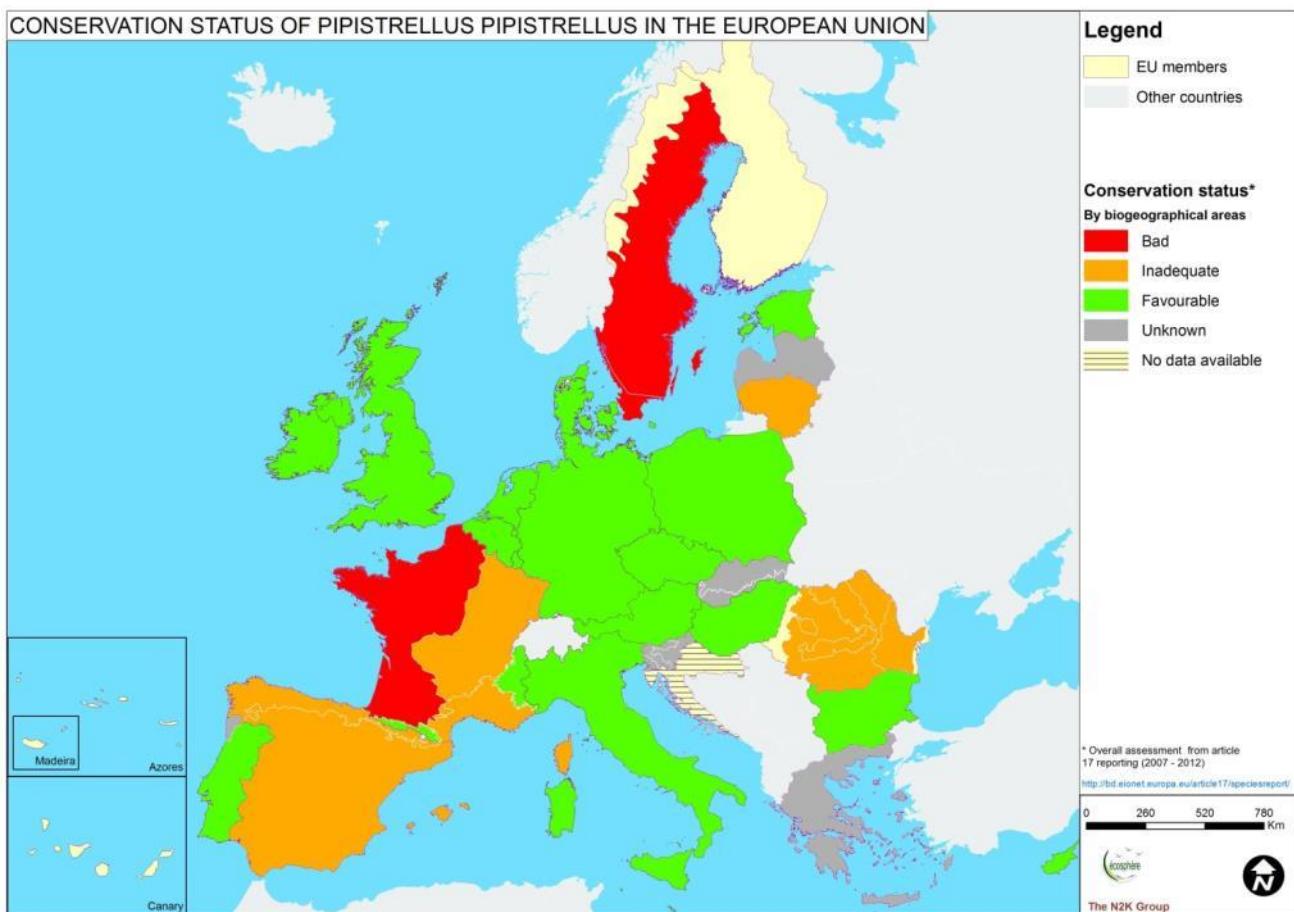
Family: Vespertilionidae; Genus: *Pipistrellus*; Species: *pipistrellus* (Schreber, 1774)

#### A-2 Threats

Building colonies have to face human persecution. The Common pipistrelle is probably very vulnerable to anthropogenic factors, such as disturbance, timber treatment and building renovation (56). Threats also include roost destruction, the important use of pesticides and disturbance due to cave tourism (10).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

#### A-3 Species conservation status



Common Pipistrelle populations are generally stable. This species is one of the most common bat in many parts of its range, although it has been severely declining in some countries such as in Great-Britain but has now recovered (56).

### 3.1 - *Pipistrellus pygmaeus* - Pygmy or Soprano pipistrelle

#### A-1 Taxonomy

Family: Vespertilionidae; Genus: *Pipistrellus*; Species: *pygmaeus* (Leach, 1825)

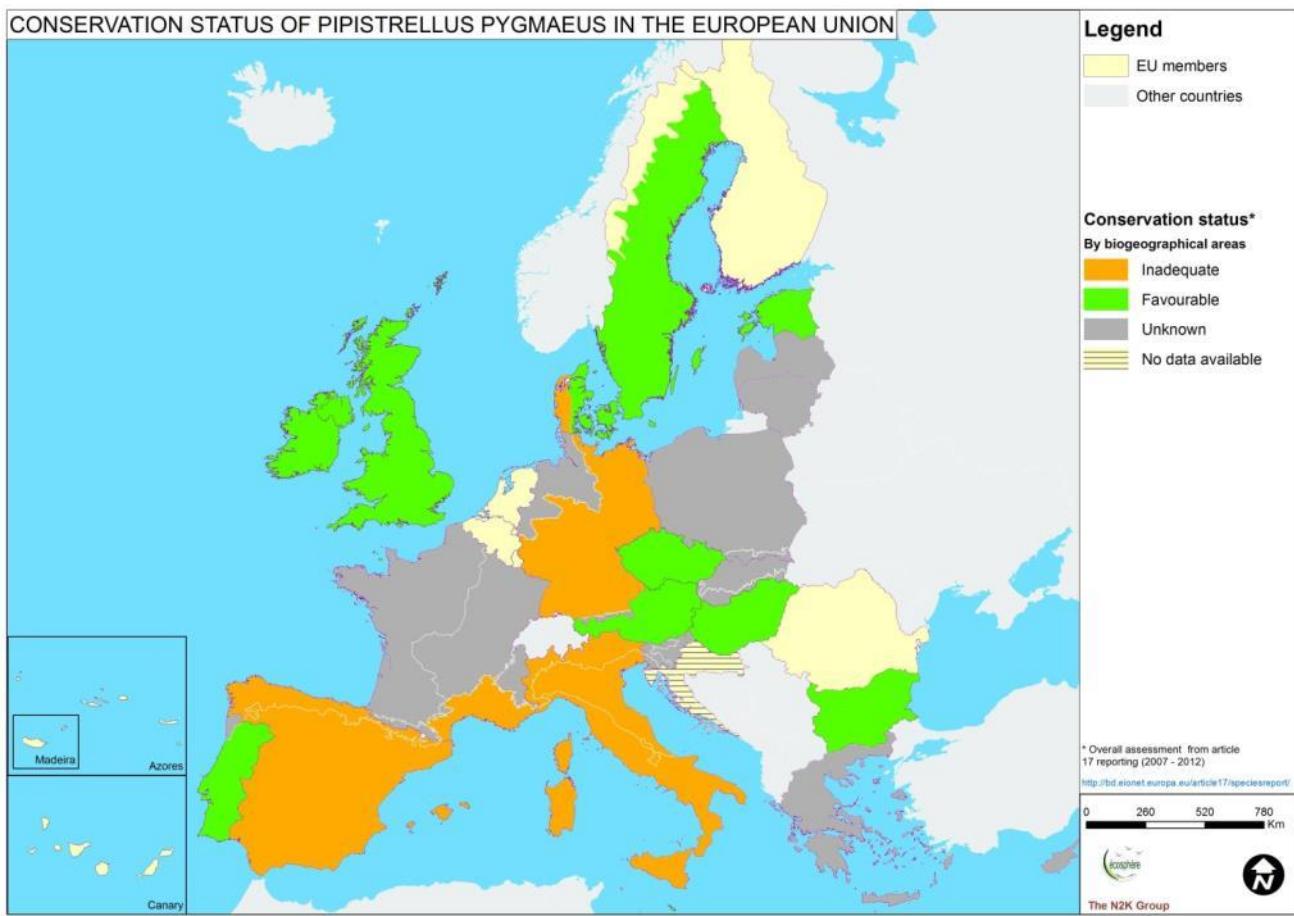
The Pygmy pipistrelle was only recently differentiated from the Common pipistrelle (57).

#### A-2 Threats

Threats include human disturbance, as maternitys are often found in buildings. The Pygmy pipistrelle may be negatively impacted by timber treatment and building renovation. Damage to forests can also be an issue (12; 10; 58).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

#### A-3 Species conservation status



The Pygmy pipistrelle is a widespread and abundant species, although it is usually less abundant than the Common pipistrelle. Its distribution is patchy and heterogeneous. In Greece however, *P. pygmaeus* is more common than *P. pipistrellus*, as well as in Norway, Scotland and on the coastal area of southern France. It is rare in the rest of France, and rarely seen in Belgium (11; 10).

## 3.2 - *Plecotus auritus* - Brown long-eared bat

### A-1 Taxonomy

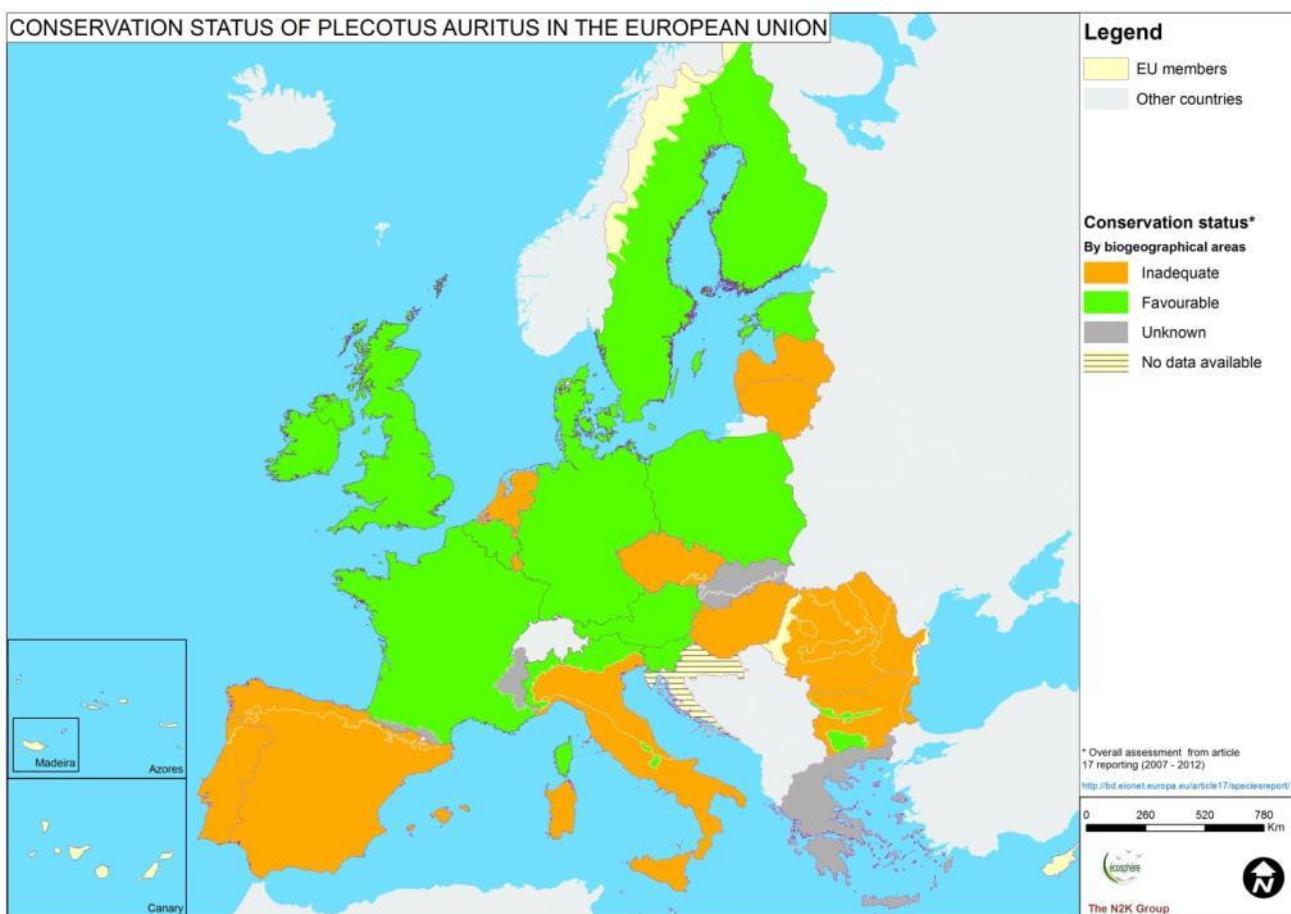
Family: *Vespertilionidae*; Genus: *Plecotus*; Species: *auritus* (Linnaeus, 1758)

### A-2 Threats

Threats include the loss of deciduous forests and mature trees in some Mediterranean countries. *P. auritus* may be locally threatened by timber treatment and the loss of roost sites (59; 60). Attic renovation and road kills are also issues (10).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

### A-3 Species conservation status



The Brown long-eared bat is common in central and northern Europe. However, it is rare in the southern part of its range (60; 11; 10).

### 3.3 - *Plecotus austriacus* - Grey long-eared bat

#### A-1 Taxonomy

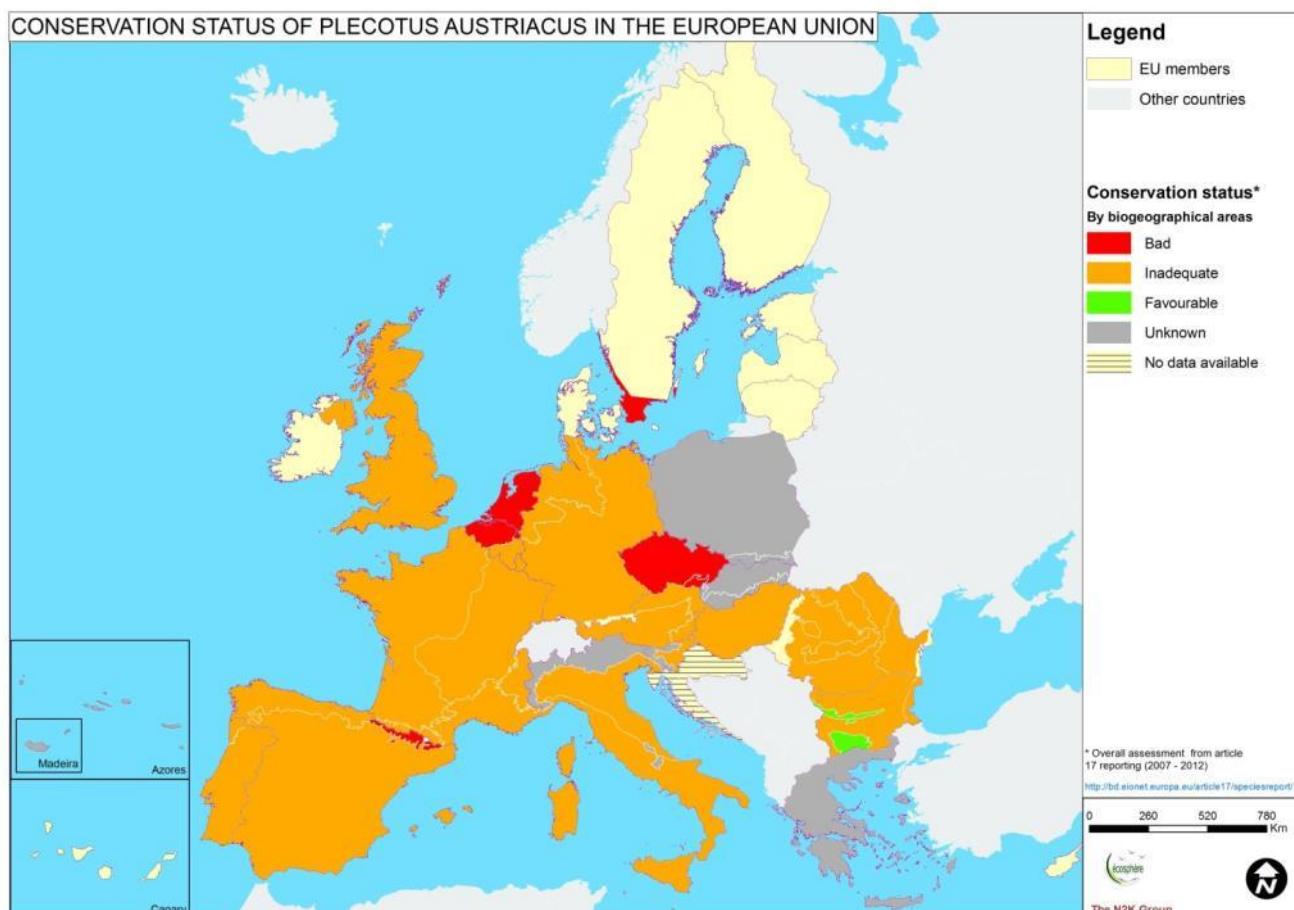
Family: Vespertilionidae; Genus: *Plecotus*; Species: *austriacus* (Fischer, 1829)

#### A-2 Threats

Threats include renovations, remedial timber treatment, intensification of agriculture, loss of roost sites and the use of pesticides (12; 10; 59; 11).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

#### A-3 Species conservation status



*P. austriacus* is quite common in the Mediterranean Basin. However, population has been declining in parts of central Europe (61). In Austria, it is considered as Vulnerable and in Croatia as Endangered. It is relatively rare in the European part of Turkey (33).

## 3.4 - *Plecotus kolombatovici* - Kolombatovic's Long-eared bat

### A-1 Taxonomy

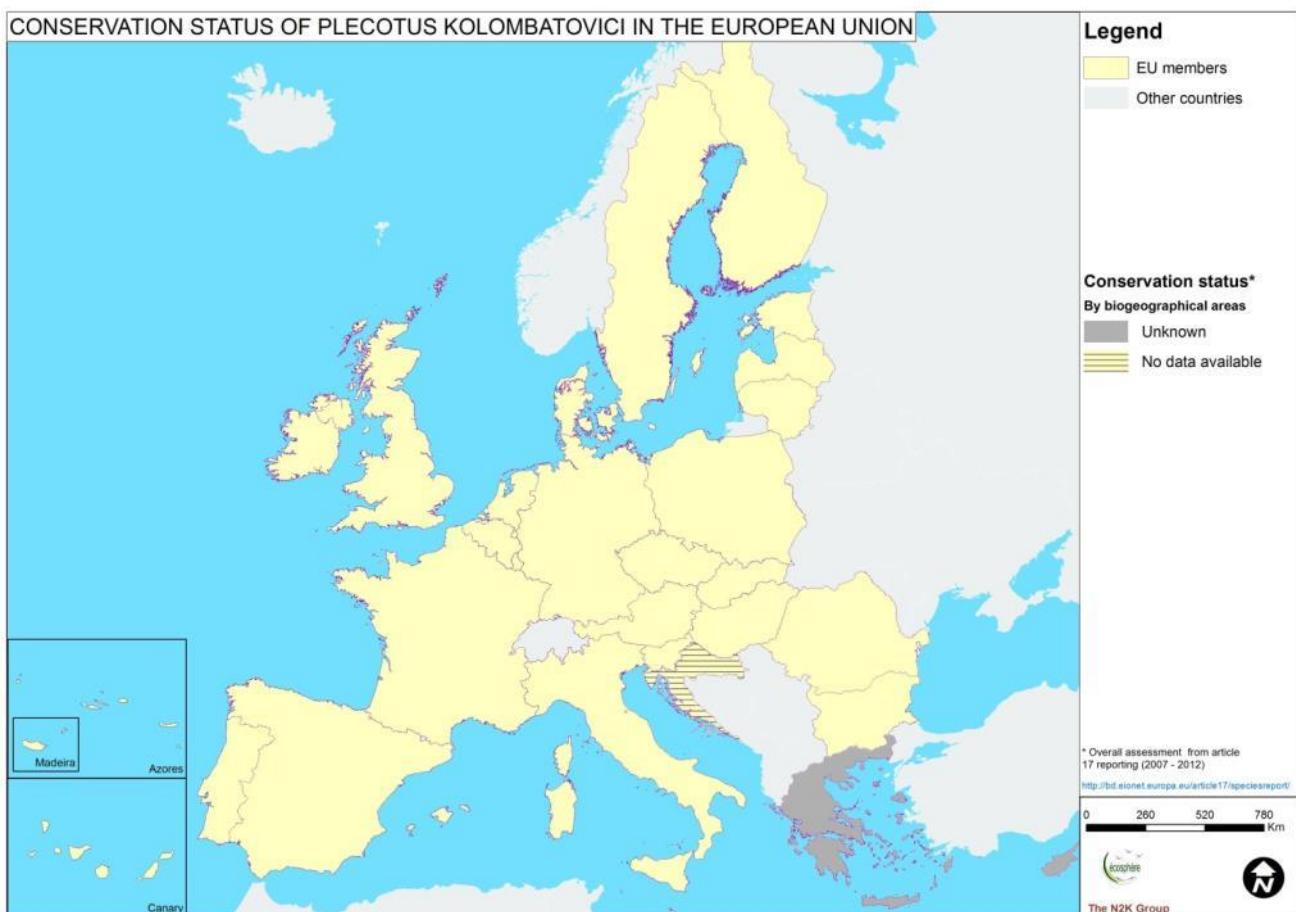
Family: Vespertilionidae; Genus: *Plecotus*; Species: *kolombatovici* (Đulić, 1980)

### A-2 Threats

Tourism may disturb roost sites on coastal areas. Pesticides might also be a problem (62; 12).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): NT	2007 (EU 25): NT

### A-3 Species conservation status



Kolombatovic's long-eared bat populations are suspected to be generally decreasing. The total population is estimated at less than 10,000 mature individuals in Europe (63).

### 3.5 - *Plecotus macrobullaris* - Mountain long-eared bat

#### A-1 Taxonomy

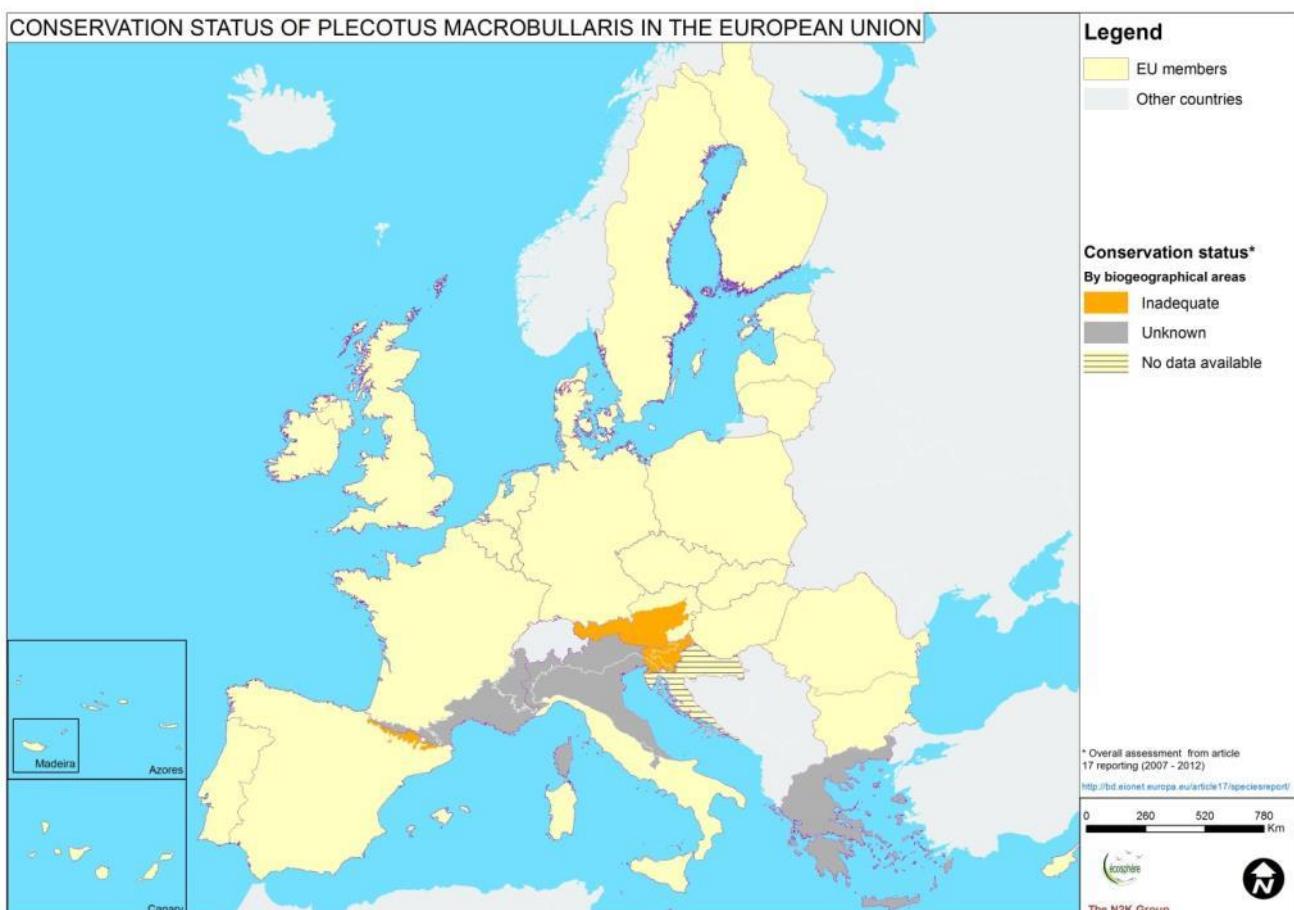
Family: *Vespertilionidae*; Genus: *Plecotus*; Species: *macrobullaris* (Kuzjakin, 1965)

#### A-2 Threats

The Mountain long-eared bat may be threatened by building renovation (10) and habitat loss due to the development of tourism infrastructures (64).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): NT	2007 (EU 25): VU

#### A-3 Species conservation status



Little is known about *P. macrobullaris*. Its population is globally decreasing. This species seems globally uncommon and its distribution is fragmented (64).

### 3.6 - *Plecotus sardus* - Sardinian long-eared bat

#### A-1 Taxonomy

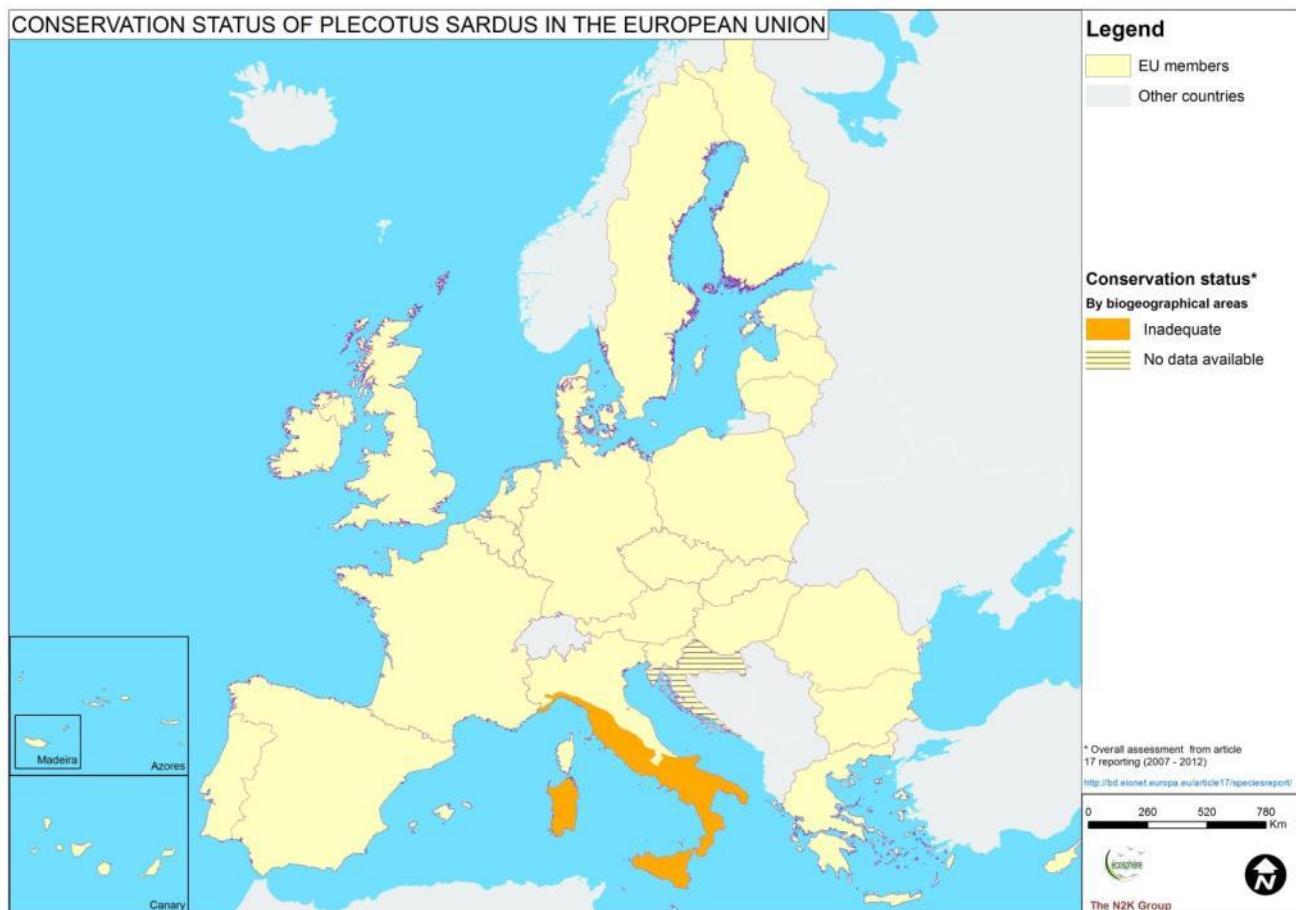
Family: *Vespertilionidae*; Genus: *Plecotus*; Species: *sardus*  
(Mucedda, Kiefer, Pidinchedda, & Veith, 2002) (65)

#### A-2 Threats

This species may be threatened by roost disturbance due to tourism and habitat loss caused by forestry management (66). It is probably quite vulnerable because of its rareness (10).

IUCN Red List Category		
2013 (World): VU	2007 (Europe): VU	2007 (EU 25): VU

#### A-3 Species conservation status



Little is known about this species. It is considered to be rare (10; 66).

## 3.7 - *Plecotus teneriffae* - Tenerife long-eared bat

### A-1 Taxonomy

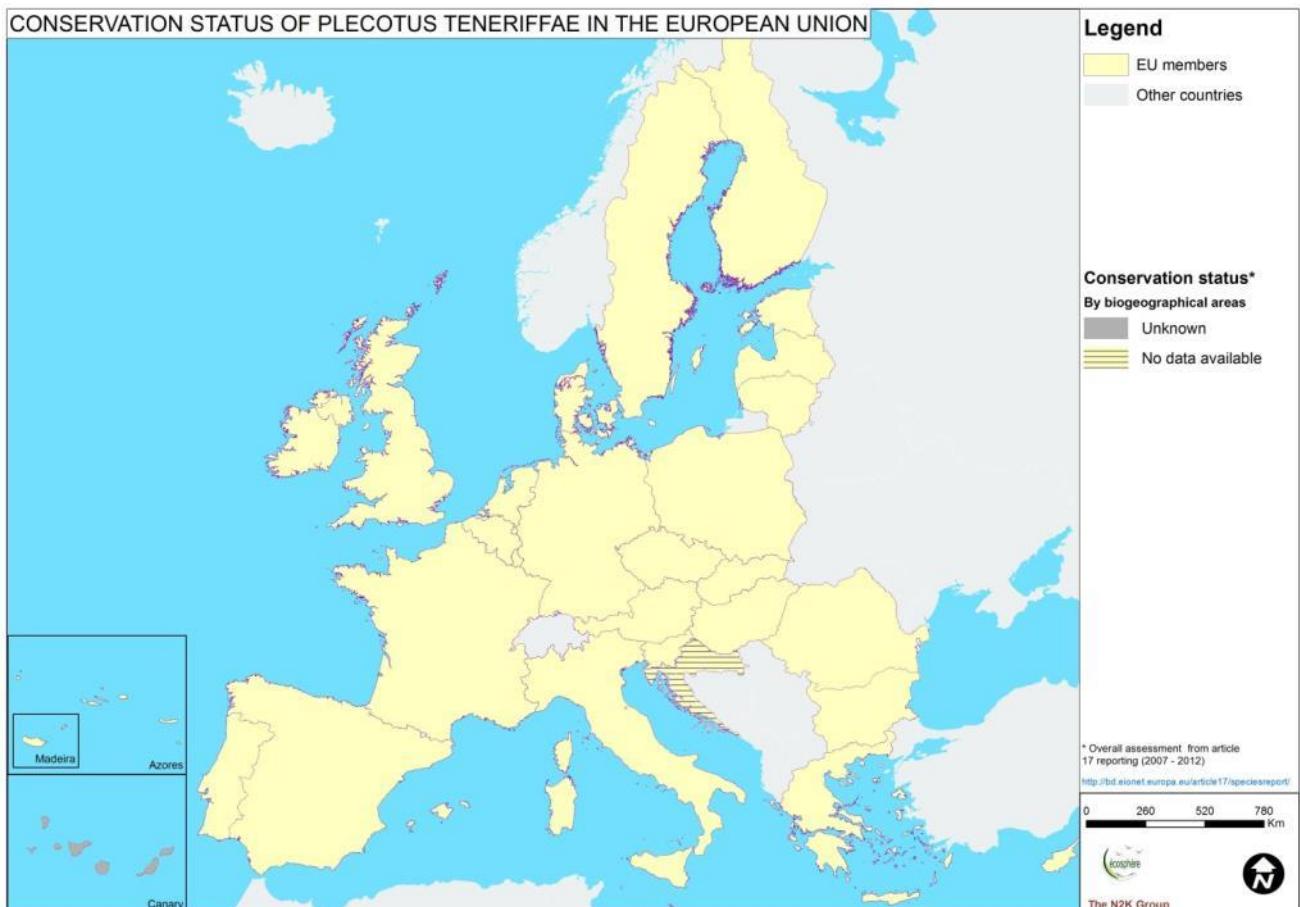
Family: *Vespertilionidae*; Genus: *Plecotus*; Species: *teneriffae* (Barret-Hamilton, 1907)

### A-2 Threats

The Tenerife long-eared bat is threatened by habitat loss and disturbance to roosts (10). For example, the La Palma maternity colony decline is probably due to disturbance. Threats also include the important use of pesticides, the loss of woodland, the restoration of buildings and the destruction of roost sites. Shafts into in the mountains are being fenced, which is also an issue (67).

IUCN Red List Category		
2013 (World): EN	2007 (Europe): EN	2007 (EU 25): EN

### A-3 Species conservation status



The Tenerife long-eared bat population is decreasing. There are only two known maternity colonies (on La Palma and Tenerife), and the population is estimated to 500 - 2,000 individuals. The largest maternity colony has been strongly declining recently (67).

### 3.8 - *Rhinolophus blasii* - Blasius' Horseshoe Bat

#### A-1 Taxonomy

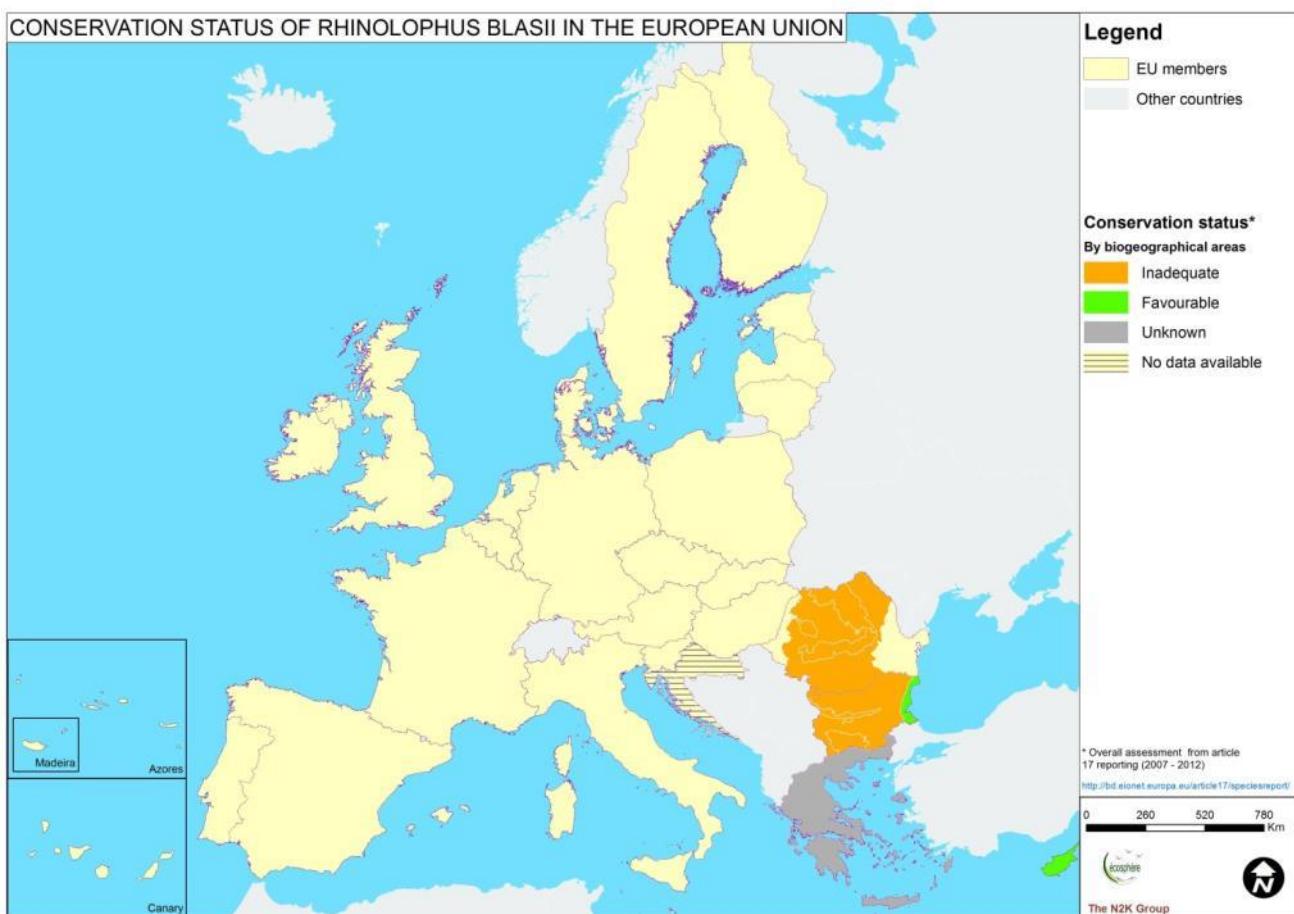
Family: *Rhinolophidae*; Genus: *Rhinolophus*; Species: *blasii* (Peters, 1866)

#### A-2 Threats

The Blasius' Horseshoe bat's threats include the loss of Mediterranean woodland and habitat, and roost sites disturbance or destruction which can be due to cave tourism or the use of caves as shelter for livestock (68).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): VU	2007 (EU 25): DD

#### A-3 Species conservation status



A rare or infrequent species, it is probably the rarest horseshoe bat in Europe. Its population trend is globally decreasing (68). The Blasius' Horseshoe bat has probably gone extinct in the northern edge of its range, e.g. in northern parts of Bulgaria and Romania (10). It hasn't been recorded in Slovenia in the last 50 years either and has gone extinct in north-eastern Italy (68).

### 3.9 - *Rhinolophus euryale* - Mediterranean Horseshoe Bat

#### A-1 Taxonomy

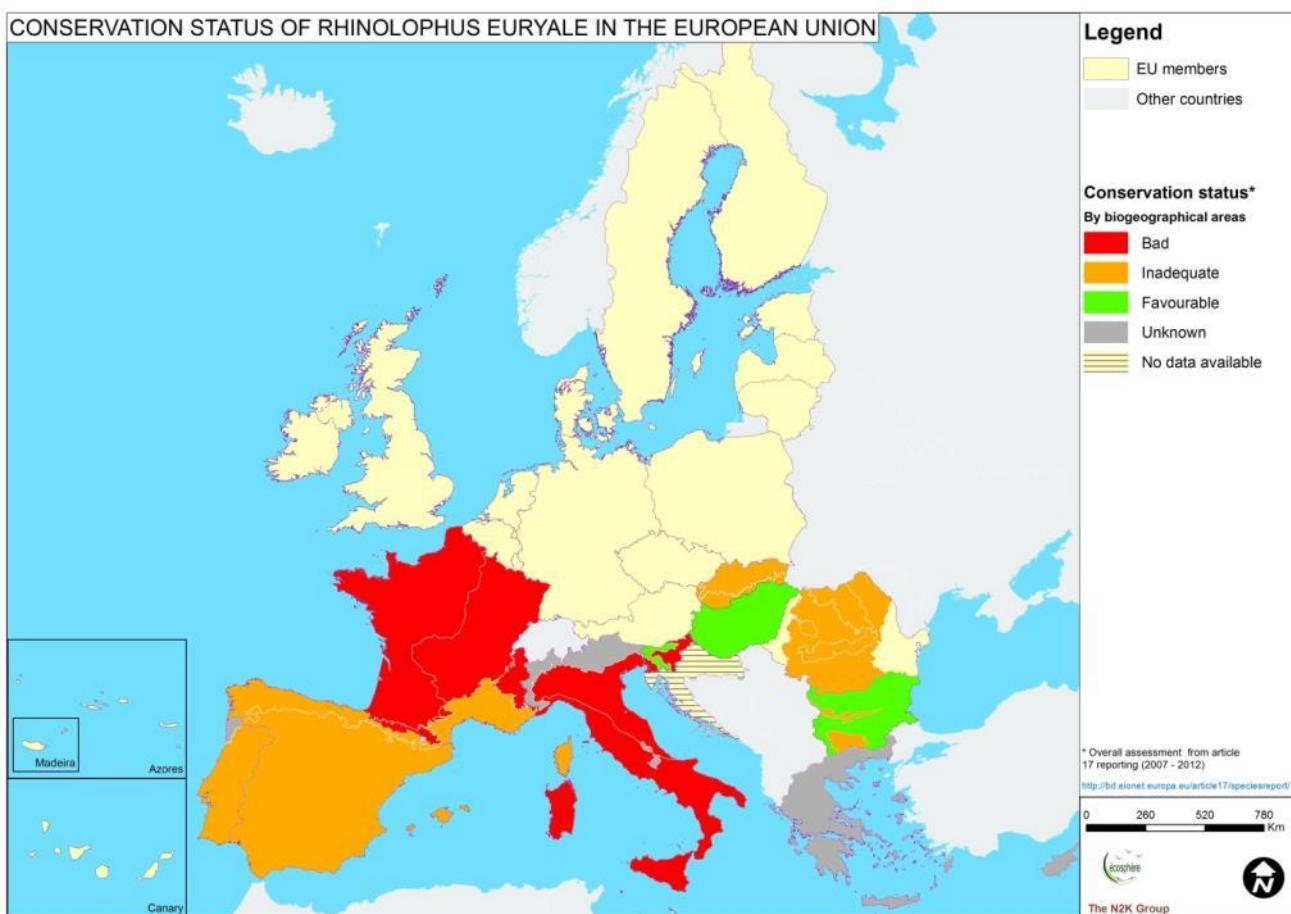
Family: *Rhinolophidae*; Genus: *Rhinolophus*; Species: *euryale* (Blasius, 1853)

#### A-2 Threats

The Mediterranean Horseshoe bat's most important threat is underground sites disturbance (partly due to cave tourism), this species being particularly sensitive to cave disturbance. The use of pesticides (organochlorine pesticides in France for example) and habitat loss can also be an issue (11; 69; 10).

IUCN Red List Category		
2013 (World): NT	2007 (Europe): VU	2007 (EU 25): VU

#### A-3 Species conservation status



The Mediterranean Horseshoe bat population is generally decreasing. This species is considered threatened in many range states and some populations are declining (69). The species has gone extinct in Switzerland (11). In France, there was a 70 % decline in population figures between 1940 and 1980. Since then, it is getting stable. Population trend is unknown in Portugal. This species is common and stable in the central and eastern Balkans (69).

### 3.10 - *Rhinolophus ferrumequinum* - Greater Horseshoe bat

#### A-1 Taxonomy

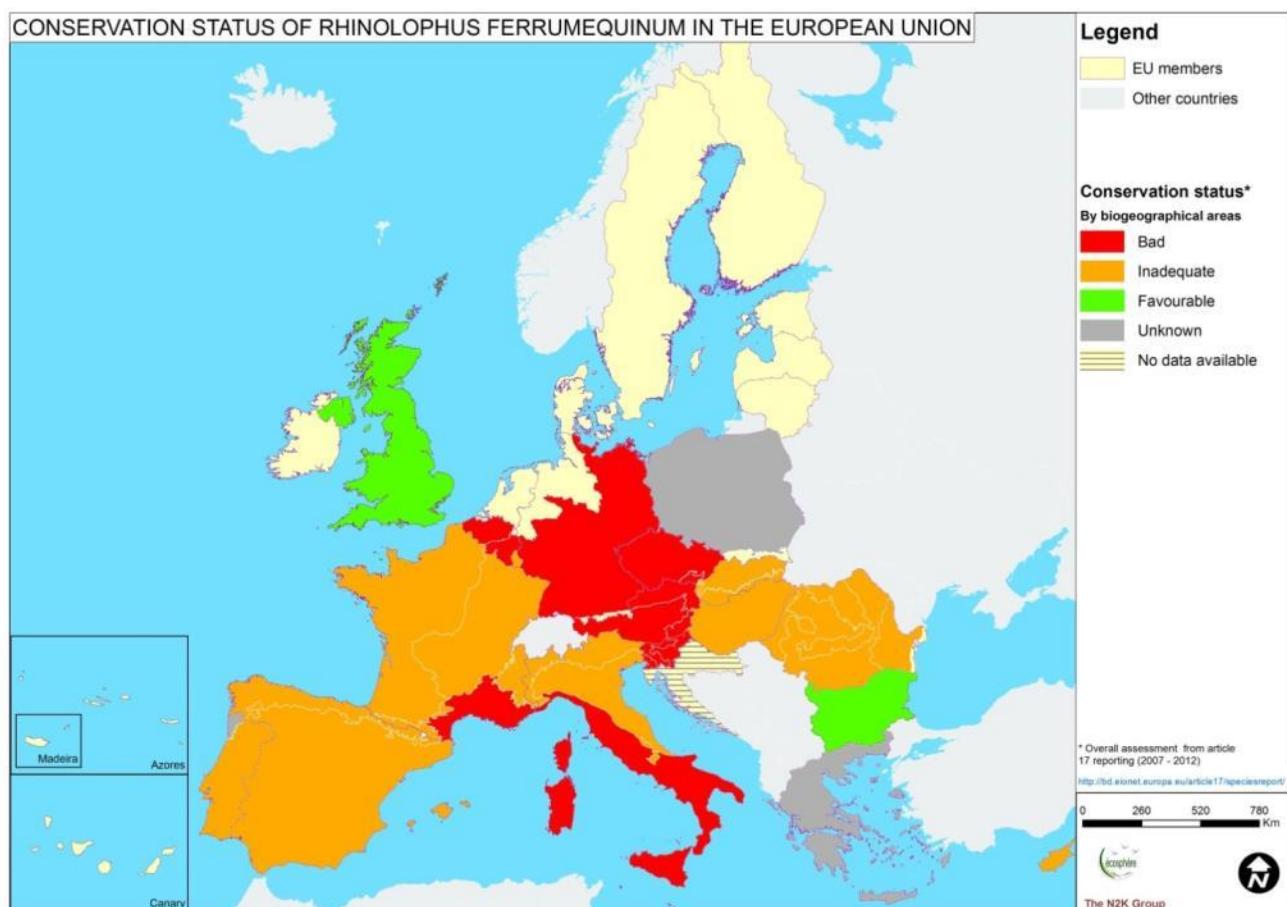
Family: *Rhinolophidae*; Genus: *Rhinolophus*; Species: *ferrumequinum* (Schreber, 1774)

#### A-2 Threats

*R. ferrumequinum* has shown marked decline in northwest Europe, and become almost extinct in Germany. Reasons for the decline are the use of highly toxic pesticides in agriculture and forestry and timber preservative in roosts. Other threats include habitat loss and fragmentation, reduction of food availability, and roost disturbance (12).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): NT	2007 (EU 25): NT

#### A-3 Species conservation status



*R. ferrumequinum* has shown declines in northwest Europe within the last 100 years and has gone extinct in some countries (Belgium and Netherlands). However, there are signs of stabilisation and/or recovery. For example, in the UK the species declined massively in the past but it is now stable at a low population level (around 5,000 individuals). However, in Austria declines continue, with population reductions of 70 % in the last 10 years. In other parts of Europe, trends vary and are generally less well known: in Malta the species has gone extinct, in Spain the trend is not known, in Croatia and Portugal the population is thought to be stable, and in Romania the population has been slowly increasing since 1989 due to reduced use of pesticides and a return to traditional agriculture with colonies of up to 800 individuals (70).

### 3.11 - *Rhinolophus mehelyi* - Mehely's Horseshoe bat

#### A-1 Taxonomy

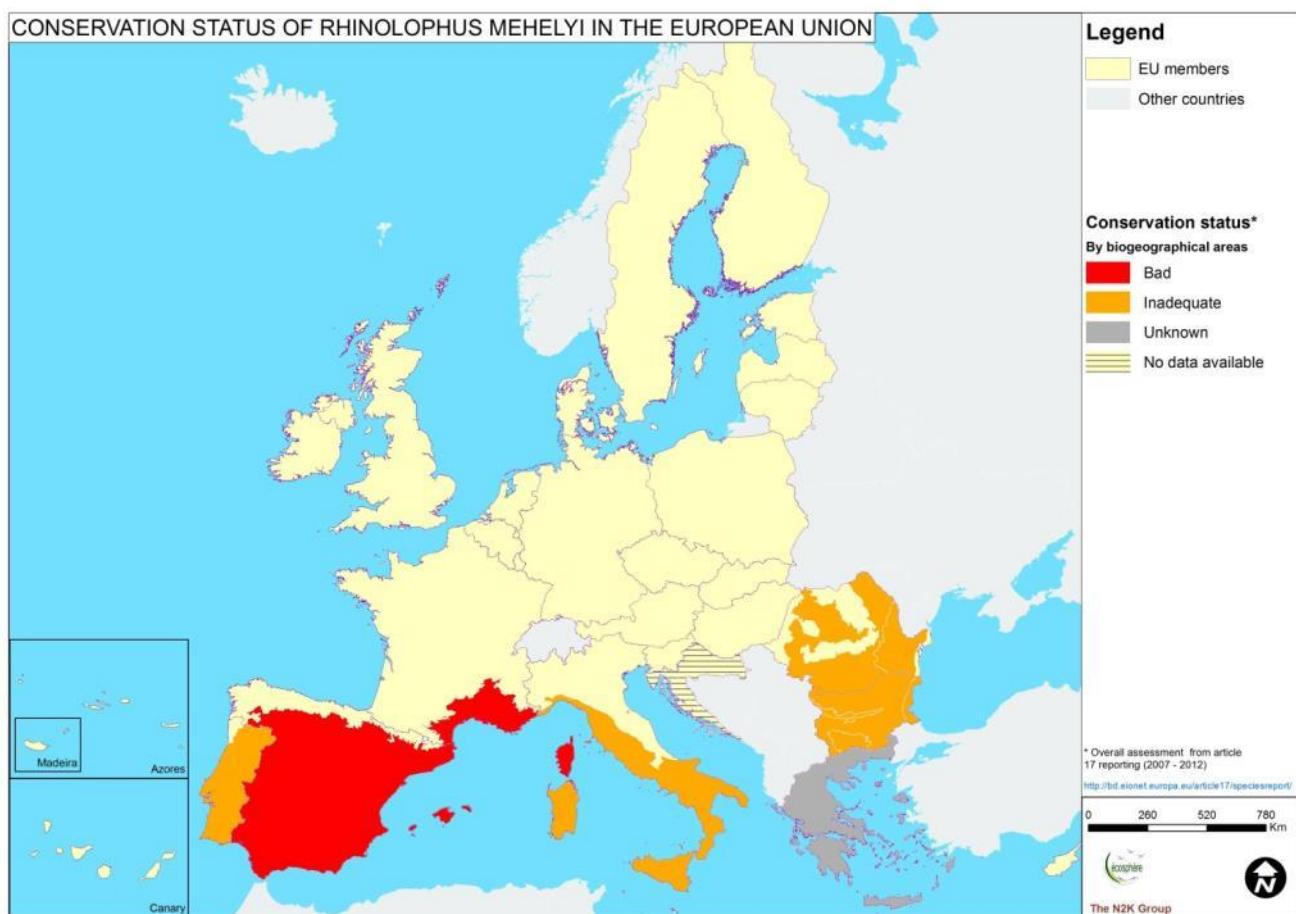
Family: *Rhinolophidae*; Genus: *Rhinolophus*; Species: *mehelyi* (Matschie, 1901)

#### A-2 Threats

*Rhinolophus mehelyi* is the most threatened *Rhinolophus* species (10). It faces roost disturbance, habitat loss (partly due to cave tourism), habitat fragmentation and the massive use of pesticides in forests (12). Mortality due to collisions with cars is a problem in some areas (71).

IUCN Red List Category		
2013 (World): VU	2007 (Europe): VU	2007 (EU 25): VU

#### A-3 Species conservation status



The Mehely's Horseshoe bat population is globally decreasing and this species is threatened everywhere. The total European population is estimated at 50, 000 individuals. In Andalucía (Spain), a 10 % decline has been estimated over the last ten years. The species has nearly gone extinct in France, Romania and north-eastern Spain. It is also declining in southern Spain (10; 71).

### 3.12 - *Rhinolophus hipposideros* - Lesser Horseshoe Bat

#### A-1 Taxonomy

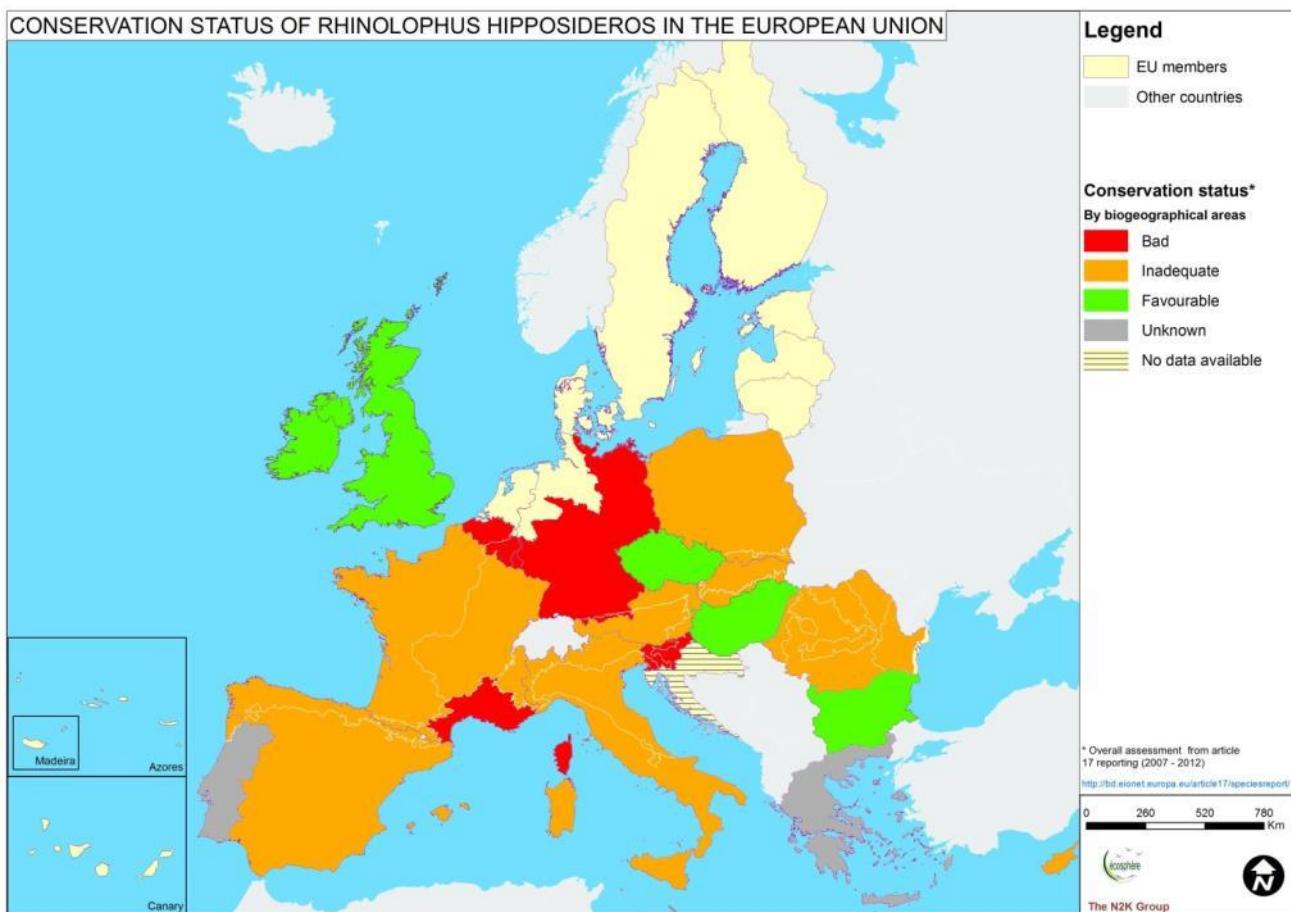
Family: *Rhinolophidae*; Genus: *Rhinolophus*; Species: *hipposideros* (Bechstein, 1800)

#### A-2 Threats

The Lesser Horseshoe bat has to face roost disturbance or loss, both underground and in buildings. It may as well be threatened by agricultural intensification with the important use of pesticides and habitat fragmentation (12). The extinction of that species in Germany was probably due to the use of highly toxic pesticides such as DDT (10).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): NT	2007 (EU 25): NT

#### A-3 Species conservation status



The trend is overall for a decrease in this species population. In the 1950s, the Lesser Horseshoe bat started to move from north to southern Europe (72). In the 1960s, it started to decline abruptly and went extinct in a large part of Germany, Poland and Switzerland, in northern France and all over the Netherlands and Luxembourg (10). In Poland, 87 % of the hibernating colonies were lost between 1950 and 1990. In Switzerland, however, the population has been slowly recovering over the last 10 years. Populations seem to be stable in southern France (72). The species is common in Slovenia, Slovakia, Hungary, Romania, Bulgaria, in the Balkans (11).

### 3.13 - *Rousettus aegyptiacus* - Egyptian fruit bat

#### A-1 Taxonomy

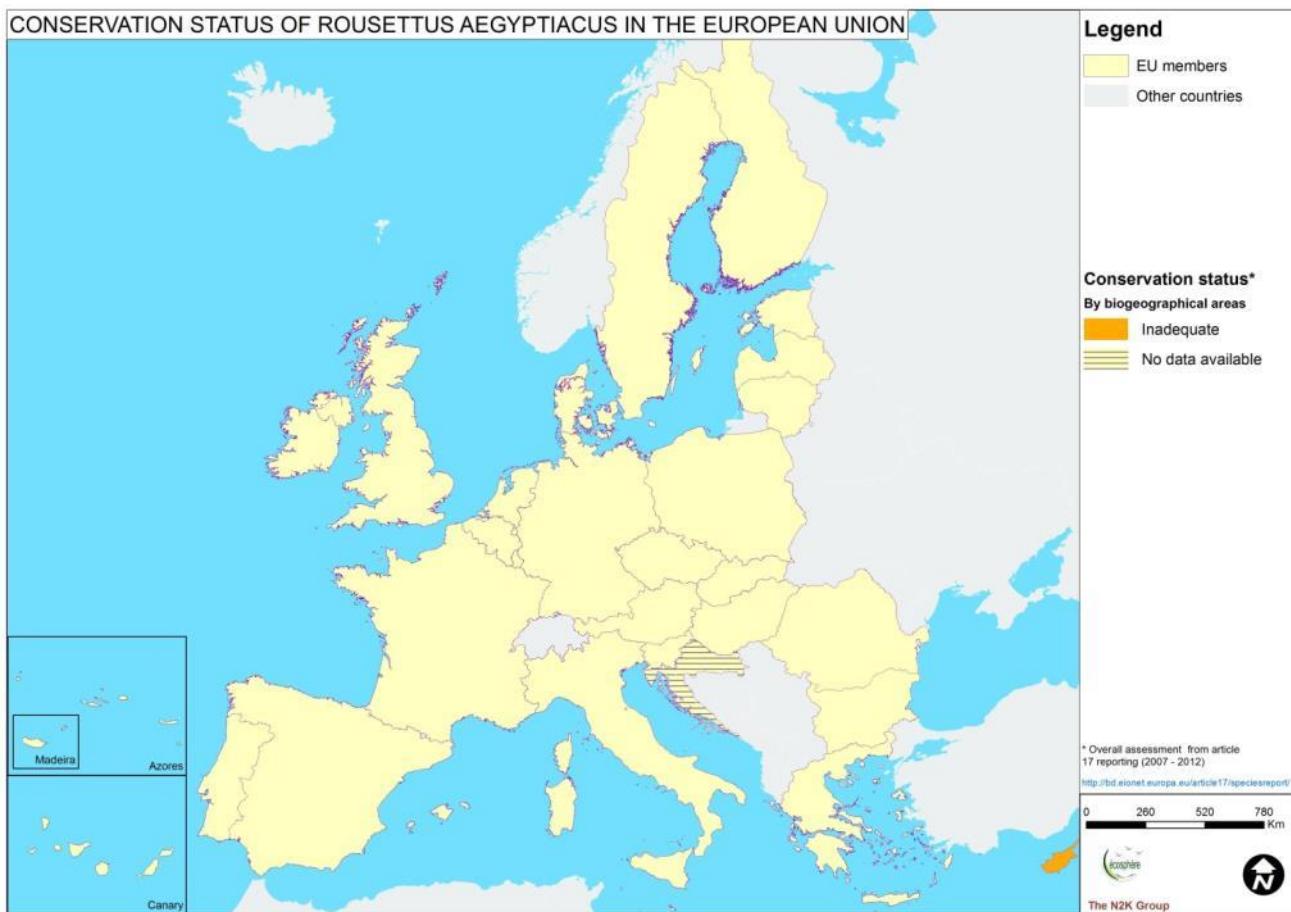
Family: *Pteropodidae*; Genus: *Rousettus*; Species: *aegyptiacus* (E. Geoffroy, 1810)

#### A-2 Threats

There are no major threats on this species. However, it is locally hunted for food in Africa and is considered as a pest by fruit farmers. It can also be disturbed in caves and persecuted, for example, in Israel, Turkey and Cyprus, where caves have been destroyed and fumigated (62).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): N/A (EN?)	2007 (EU 25): N/A (EN?)

#### A-3 Species conservation status



*R. aegyptiacus* seems to recover quite quickly from colony destructions. Its population is generally stable (62). Colonies have been massively destroyed in Cyprus until the 1970s, but the population is now recovering.

### 3.14 - *Tadarida teniotis* - European free-tailed bat

#### A-1 Taxonomy

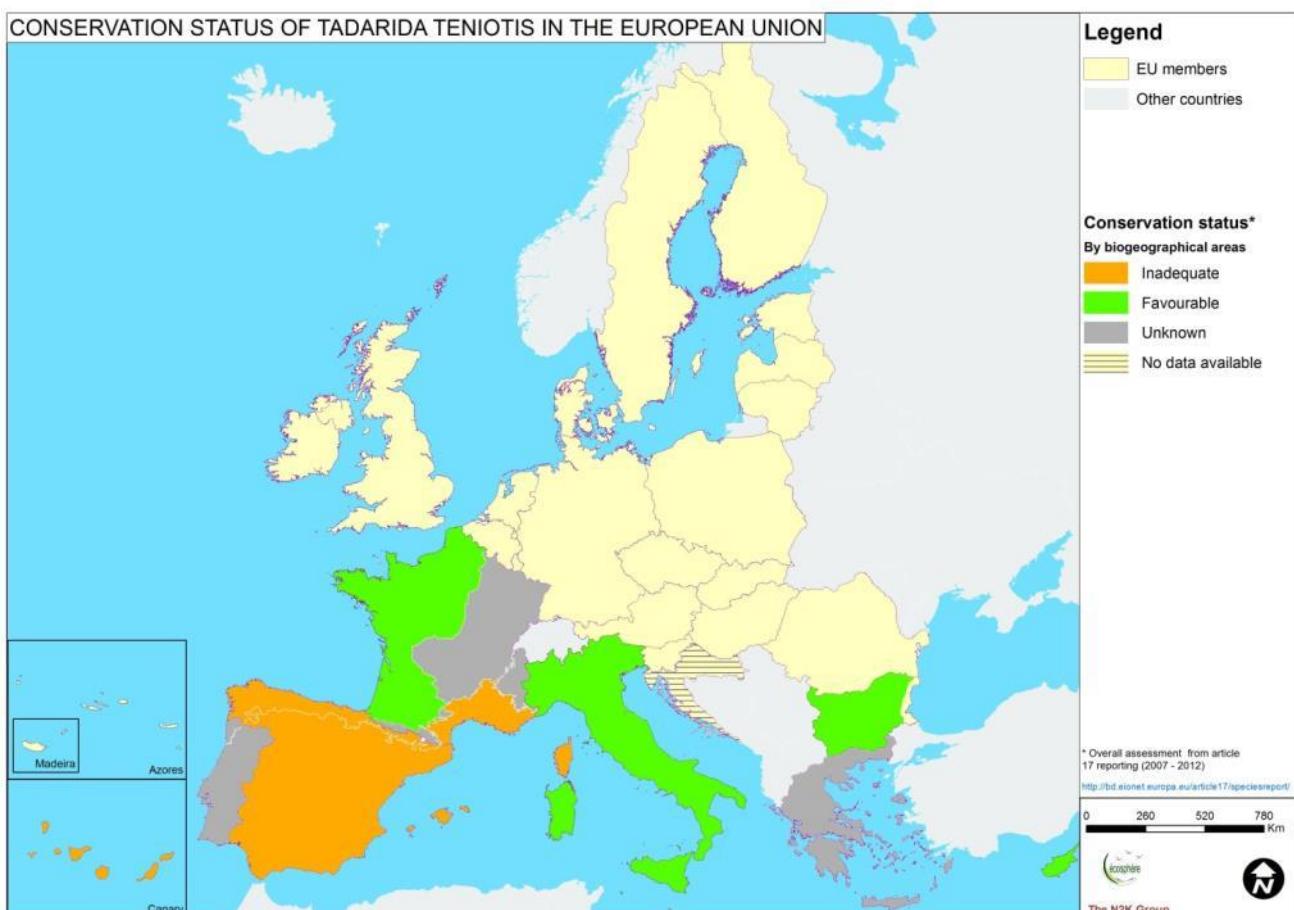
Family: Molossidae; Genus: *Tadarida*; Species: *teniotis* (Rafinesque, 1814)

#### A-2 Threats

*T. teniotis* doesn't have to face major threats. However, it may be affected by disturbance and loss of roosts in buildings, the use of pesticides, and more locally deforestation (73; 11).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

#### A-3 Species conservation status



This species is locally abundant in many Mediterranean countries (10; 73).

### 3.15 - *Vespertilio murinus* - Parti-coloured bat

#### A-1 Taxonomy

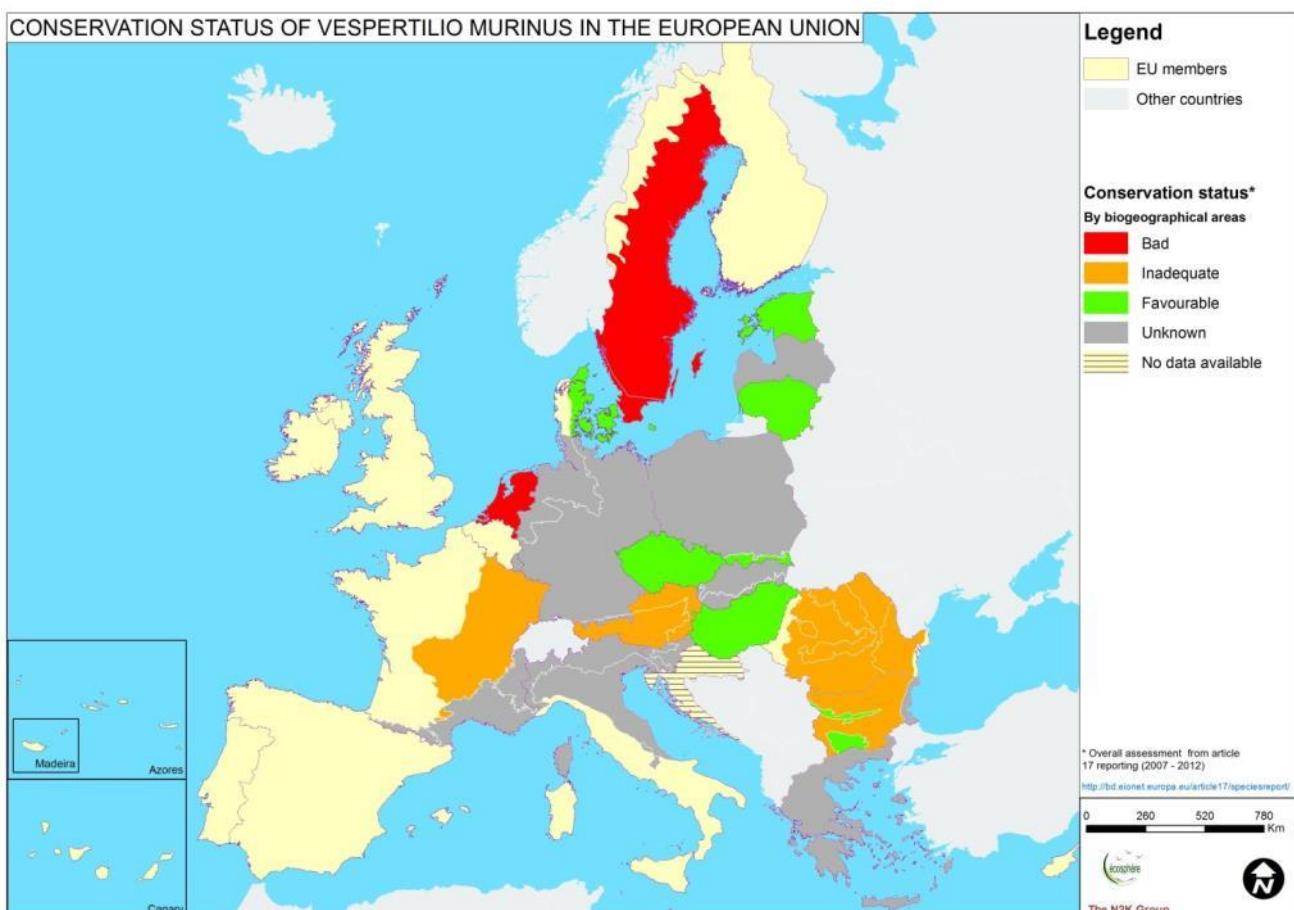
Family: Vespertilionidae; Genus: *Vespertilio*; Species: *murinus* (Linnaeus, 1758)

#### A-2 Threats

There are no major threats to this species. However, it may be negatively affected by the loss of or disturbance to roosts in buildings and by wind farms on migration roads (10; 74; 11).

IUCN Red List Category		
2013 (World): LC	2007 (Europe): LC	2007 (EU 25): LC

#### A-3 Species conservation status



The Parti-coloured bat population is globally stable. Its European distribution is quite heterogeneous (10). It doesn't seem to be very abundant in most of central and western Europe, but can be locally abundant, for example in Russia, southern Sweden and Denmark (11). It is abundant in northern parts of its range and populations are expanding in some areas (e.g. Denmark and the Netherlands) (74).

## 4 - BIBLIOGRAPHY

1. Schatz J, Fooks AR, McElhinney L, Horton D, Echevarria J, Vázquez-Moron S, Kooi EA, Rasmussen TB, Müller T, Freuling CM. Bat rabies surveillance in Europe. *Zoonoses Public Health*. 2013, Vol. 60(1), 22-34.
2. Serra-Cobo, J., Bourhy, H., López-Roig, M., Sánchez, L.P., Abellán, C., Borràs, M. and Amengual, B. Rabia en quirópteros: Circulación de EBLV-1 (Lyssavirus de murciélagos europeos tipo 1) en murciélagos de España. *Boletín Epidemiológico Semanal*. 2008b, Vol. 16(15), 169–180 (in Spanish).
3. Serra-Cobo J., López-Roig M., Seguí M., Pilar Sánchez L., Nadal J., Borrás M, Lavenir R. & Bourhy H. Ecological Factors Associated with European Bat Lyssavirus Seroprevalence in Spanish Bats. *PLoS ONE*. 2013, 8(5). doi:10.1371/journal.pone.0064467.
4. Ministère de la Santé du Luxembourg. Découverte d'une chauve-souris atteinte de rage. *Santé Public.Lu*. [Online] Division de l'Inspection Sanitaire, 15th May 2013. [Cited: 25th July 2014.] <http://www.sante.public.lu/fr/actualites/2013/05/rage-chauve-souris/index.html>.
5. AFP. Une chauve-souris porteuse de la rage découverte en Savoie. *LeMonde.fr*. [Online] 9 August 2013. [Cited: 19 August 2013.] [http://www.lemonde.fr/planete/article/2013/08/08/une-chauve-souris-porteuse-de-la-rage-decouverte-en-savoie\\_3459321\\_3244.html](http://www.lemonde.fr/planete/article/2013/08/08/une-chauve-souris-porteuse-de-la-rage-decouverte-en-savoie_3459321_3244.html).
6. Aréchiga N. et al. Novel Lyssavirus in bat, Spain. *Emerging Infectious Diseases*. 2013, Vol. 19, 5. doi: <http://dx.doi.org/10.3201/eid1905.121071>.
7. Wellenberg GJ, Audry L, Ronsholt L, van der Poel WH, Bruschke CJ, Bourhy H. Presence of European bat lyssavirus RNAs in apparently healthy Rousettus aegyptiacus bats. *Archives of Virology*. 2002, Vol. 147, 2, pp. 349-61.
8. Moutou, François. Des chauves-souris et des hommes. *14e journées nationales d'infectiologie* 12-14 juin 2013. Clermont-Ferrand : JNI/Anses, 2013.
9. Amman BR, Carroll SA, Reed ZD, Sealy TK, Balinandi S, et al. Seasonal Pulses of Marburg Virus Circulation in Juvenile Rousettus aegyptiacus bat coincide with periods of increased risk of human infection. 2012. *PLoS Pathog*, Vol. 8, 10. doi:10.1371/journal.ppat.1002877.
10. Dietz C., Nill D. & Von Helversen O. *Bats of Britain, Europe and Northwest Africa*. [ed.] A & C Black Publishers Ltd (15 Sep 2009). 2009. p. 400. ISBN-13: 978-1408105313..
11. Arthur L. & Lemaire M. *Les chauves-souris de France, Belgique, Luxembourg et Suisse*. Paris : Biotope, Mèze (Collection Parthénope) ; Muséum national d'Histoire Naturelle, 2009. 978-2-914817-35-6.
12. EUROBATS. Protected Bat Species. UNEP/EUROBATS. [Online] [Cited: 07 04, 2013.] [http://www.eurobats.org/about\\_eurobats/protected\\_bat\\_species](http://www.eurobats.org/about_eurobats/protected_bat_species).
13. Hutson, A.M., Aulagnier, S. & Spitzenberger, F. *Barbastella barbastellus*. *IUCN Red List of Threatened Species*. [Online] 2008. [Cited: 19th July 2013.] <http://www.iucnredlist.org/details/2553/0>. Version 2013.1.
14. Flemish Agency for Nature and Forests ANB; Service public de Wallonie (SPW) Direction générale de l'Agriculture, des Ressources naturelles et de l'Environnement (DGARNE); Brussels Institute for Environment IBGE-BIM, Brussels Capital region. *National report on the implementation of the Agreement on the conservation of bats in Europe (EUROBATS)*. 2007-2009. 2010.
15. Ministry of Agriculture, Nature and Food Quality (ANF). *National report of the Kingdom of the Netherlands on the implementation of the Agreement on the Conservation of Population of European Bats: 2006-2009*. 2010.
16. Ján Kadlecík, State Nature Conservancy of the Slovak Republic ; Martin Celuch, Slovak Bat Conservation Society (SON). *Report on the implementation of the Agreement in the Slovak Republic*. 2006-2010. 2010.
17. Ibanez, Carlos. Atlas y Libro Rojo de los Mamíferos Terrestres de España. MAGRAMA. [Online] Ministerio de Medio Ambiente. [Cited: 18th July 2013.] [http://www.magrama.gob.es/es/biodiversidad/temas/inventarios-nacionales/40\\_rhino\\_tcm7-22015.pdf](http://www.magrama.gob.es/es/biodiversidad/temas/inventarios-nacionales/40_rhino_tcm7-22015.pdf).

18. Development, Ministry of Rural. *REPORT ON THE IMPLEMENTATION OF 'EUROBATS' IN HUNGARY*. 2010.
19. **Stubbe, M., Ariunbold, J., Buuveibaatar, V., Dorjderem, S., Monkhzul, Ts., Otgonbaatar, M., Tsogbadrakh, M., Hutson, A.M., Spitsenberger, F., Aulagnier, S. & Coriou, I.** *Eptesicus nilssonii*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 19th July 2013.] <http://www.iucnredlist.org/details/7910/0>. Version 2013.1.
20. **Hutson, A.M., Spitsenberger, F., Aulagnier, S., Alcalde, J.T., Csorba, G., Bumrungsri, S., Francis, C., Bates, P., Gumal, M., Kingston, T. & Benda, P.** *Eptesicus serotinus*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 17th July 2013.] <http://www.iucnredlist.org/details/7911/0>. Version 2013.1.
21. **Hutson, A.M., Spitsenberger, F., Juste, J., Aulagnier, S., Palmeirim, J., Paunovic, M. & Karataş, A.** *Pipistrellus savii*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 20th July 2013.] <http://www.iucnredlist.org/details/44856/0>. Version 2013.1.
22. **Helversen O. von, Keller K.-G., Mayer F., Nemeth A., Volleth M., Gombötkö P.** Cryptic mammalian species: a new species of whiskered bat (*Myotis alcathoe* n. sp.) in Europe. *Naturwissenschaften*. May 2001, Vol. 88, 5, pp. 217-223.
23. **Hutson, A.M., Aulagnier, S., Nagy, Z., Karataş, A., Palmeirim, J. & Paunović, M.** *Myotis alcathoe*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 17th July 2013.] <http://www.iucnredlist.org/details/136680/0>. Version 2013.1..
24. **Benda, P. & Tsytsulina, K. A.** Taxonomic revision of *Myotis mystacinus* group . *Acta Societatis zoologicae bohe-* . 2000, Vol. 64, pp. 331-398.
25. **Benda, P., Aulagnier, S., Hutson, A.M., Tsytsulina, K., Karataş, A., Palmeirim, J. & Paunović, M.** *Myotis aurascens*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 19th July 2013.] <http://www.iucnredlist.org/details/136553/0>. Version 2013.1.
26. **Hutson, A.M., Spitsenberger, F., Tsytsulina, K., Aulagnier, S., Juste, J., Karataş, A., Palmeirim, J. & Paunović, M.** *Myotis bechsteinii*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 17th July 2017.] <http://www.iucnredlist.org/details/14123/0>. Version 2013.1.
27. **Simmons, N.B.** *Order Chiroptera. Pp. 312-529, in: Mammal species of the World: a taxonomic and geographic reference, Third Edition, Vol. 1.* [ed.] D.E. Wilson and D.M Reeder. s.l. : Johns Hopkins University Press, 2005.
28. **Hutson, A.M., Spitsenberger, F., Aulagnier, S., Juste, J., Karataş, A., Palmeirim, J. & Paunović, M.** *Myotis blythii*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 19th July 2013.] <http://www.iucnredlist.org/details/14124/0>. Version 2013.1.
29. **Hutson, A.M., Spitsenberger, F., Coriou, I., Aulagnier, S., Juste, J., Karataş, A., Palmeirim, J. & Paunović, M.** *Myotis brandtii*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 17th July 2017.] <http://www.iucnredlist.org/details/14125/0>. Version 2013.1..
30. **Hutson, A.M., Spitsenberger, F., Aulagnier, S., Juste, J., Karataş, A., Palmeirim, J. & Paunović, M.** *Myotis capaccinii*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 19th July 2013.] <http://www.iucnredlist.org/details/14126/0>. Version 2013.1.
31. **Hutson, A.M., Aulagnier, S. & Nagy, Z.** *Myotis dasycneme*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 20th July 2013.] <http://www.iucnredlist.org/details/14127/0>. Version 2013.1.
32. **Stubbe, M., Ariunbold, J., Buuveibaatar, V., Dorjderem, S., Monkhzul, Ts., Otgonbaatar, M., Tsogbadrakh, M., Hutson, A.M., Spitsenberger, F., Aulagnier, S., Juste, J., Coriou, I., Paunovic, M. & Karataş, A.** *Myotis daubentonii*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 17th July 2017.] <http://www.iucnredlist.org/details/14128/0>. Version 2013.1.
33. **IUCN 2013.** *The IUCN Red List of Threatened Species. Version 2013.1*. [Online] 2013. [Cited: 9th July 2013.] <http://www.iucnredlist.org/>.
34. **Hutson, A.M., Spitsenberger, F., Aulagnier, S. & Nagy, Z.** *Myotis emarginatus*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 17th July 2013.] <http://www.iucnredlist.org/details/14129/0>. Version 2013.1.

35. **BBC News.** Geoffroy's bat discovered in UK for first time. [Online] BBC News Sussex, 14th September 2012. [Cited: 17th July 2013.] <http://www.bbc.co.uk/news/uk-england-sussex-19596320>.
36. **Ibáñez, C., García-Mudarra, J.L., Ruedi, M., Stadelmann, B. and Juste, J.** The Iberian contribution to cryptic diversity in European bats. *Acta Chiropterologica*. 2006, Vol. 8(2), 277-297.
37. **García-Mudarra, J.L., Ibáñez, C. and Juste, J.** The Straits of Gibraltar: barrier or bridge to Ibero-Moroccan bat diversity? *Biological Journal of the Linnean Society*. 2009, Vol. 96(2), 434–450.
38. **Serra-Cobo, J., Roig, L., Bayer, X., Amengual, B. and Guasch, C.** Ratpenats. *Ciència i mite*. Barcelona : Edicions Universitat Barcelona (in Catalan), 2008a. 978-84-475-3344-2.
39. **Hutson, A.M., Spitzenberger, F., Aulagnier, S., Coroiu, I., Karataş, A., Juste, J., Paunovic, M., Palmeirim, J. & Benda, P.** Myotis myotis. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 18th July 2017.] <http://www.iucnredlist.org/details/14133/0>. Version 2013.1.
40. **Kirby, Alex.** 'Extinct' UK bat bounces back. *BBC News*. [Online] BBC, 14 December 2002. [Cited: 19th July 2013.] <http://news.bbc.co.uk/2/hi/science/nature/2587445.stm>.
41. **Hutson, A.M., Spitzenberger, F., Aulagnier, S. & Coroiu, I.** Myotis mystacinus. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 20th July 2013.] <http://www.iucnredlist.org/details/14134/0>. Version 2013.1.
42. **Hutson, A.M., Aulagnier, S. & Spitzenberger, F.** Myotis nattereri. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 19th July 2013.] <http://www.iucnredlist.org/details/14135/0>. Version 2013.1.
43. **Aulagnier, S., Juste, J., Karataş, A., Palmeirim, J. & Paunović, M.** Myotis punicus. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 19th July 2013.] <http://www.iucnredlist.org/details/44864/0>. Version 2013.1.
44. **Hutson, A.M., Aulagnier, S., Benda, P., Karataş, A., Palmeirim, J. & Paunović, M.** Miniopterus schreibersii. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 23th July 2013.] <http://www.iucnredlist.org/details/13561/0>. Version 2013.1.
45. **Hutson, A.M., Aulagnier, S., Rainho, A. & Palmeirim, J.** Nyctalus azoreum. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 17th July 2013.] <http://www.iucnredlist.org/details/14922/0>. Version 2013.1..
46. **Hutson, A.M., Alcaldé, J.T., Juste, J., Karataş, A., Palmeirim, J. & Paunović, M.** Nyctalus lasiopterus. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 18th July 2013.] <http://www.iucnredlist.org/details/14918/0>. Version 2013.1.
47. **Hutson, A.M., Spitzenberger, F., Aulagnier, S., Juste, J., Karataş, A., Palmeirim, J. & Paunović, M.** Nyctalus leisler. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 17th July 2013.] Version 2013.1.
48. **Csorba, G., Bates, P., Stubbe, M., Hutson, A.M., Aulagnier, S. & Spitzenberger, F.** Nyctalus noctula. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 17th July 2013.] <http://www.iucnredlist.org/details/14920/0>. Version 2013.1.
49. **Water, Ministry of Environment and.** REPORT ON THE IMPLEMENTATION OF THE AGREEMENT IN BULGARIA. September 2003- December 2009. 2010.
50. **Aulagnier, S. & Palmeirim, J.** Pipistrellus hanaki (Hanaki's Dwarf Bat). *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 21 August 2013.] <http://www.iucnredlist.org/details/136209/0>. <http://www.iucnredlist.org/details/136209/0>.
51. **Hulva P., Benda P., Hanak V., Evin A. & Horacek I.** New mitochondrial lineages within the Pipistrellus pipistrellus complex from Mediterranean Europe. *Folia Zoologica*. 2007, 56, pp. 378–388.
52. **Benda Ptr., Georgiakakis P. , Dietz C., Hanak V., Galanaki K., Markantonatou V., Chudarkova A., Hulva P. & Horacek I.** Bats (Mammalia: Chiroptera) of the Eastern Mediterranean and MiddleEast. Part 7. The bat fauna of Crete, Greece. *Acta Soc. Zool. Bohem.* 2008, 72, pp. 105-190.
53. **Aulagnier, S., Juste, J., Karataş, A., Palmeirim, J. & Paunović, M.** Pipistrellus kuhlii. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 17th July 2013.] <http://www.iucnredlist.org/details/17314/0>. Version 2013.1.

54. **Juste, J., Palmeirim, J. & Alcaldé, J.T.** *Pipistrellus maderensis*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 19th July 2013.] <http://www.iucnredlist.org/details/17315/0>. Version 2013.1.
55. **Hutson, A.M., Spitzenberger, F., Juste, J., Aulagnier, S., Palmeirim, J., Karataş, A. & Paunović, M.** *Pipistrellus nathusii*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 19th July 2013.] <http://www.iucnredlist.org/details/17316/0>. Version 2013.1.
56. **Hutson, A.M., Spitzenberger, F., Aulagnier, S., Coriou, I., Karataş, A., Juste, J., Paunovic, M., Palmeirim, J. & Benda, P.** *Pipistrellus pipistrellus*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 20th July 2013.] <http://www.iucnredlist.org/details/17317/0>. Version 2013.1.
57. **Barratt EM, Deaville R, Burland TM, Bruford MW, Jones G, Racey PA, Wayne RK.** DNA answers the call of pipistrelle bat species. *Nature*. 8 May 1997, Vol. 387, 6629, pp. 138-9.
58. **Hutson, A.M., Spitzenberger, F., Aulagnier, S., Coriou, I., Karataş, A., Juste, J., Paunovic, M., Palmeirim, J. & Benda, P.** *Pipistrellus pygmaeus*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 23th July 2013.] <http://www.iucnredlist.org/details/136649/0>. Version 2013.1.
59. **Stebbing, R.E.** *Conservation of European Bats*. s.l. : Christopher Helm Ltd, 1988. ISBN 0-7470-3013-8.
60. **Hutson, A.M., Spitzenberger, F., Aulagnier, S., Coriou, I., Karataş, A., Juste, J., Paunovic, M., Palmeirim, J. & Benda, P.** *Plecotus auritus*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 20th July 2013.] <http://www.iucnredlist.org/details/17596/0>. Version 2013.1.
61. **Juste, J., Karataş, A., Palmeirim, J., Paunović, M., Spitzenberger, F. & Hutson, A.M.** *Plecotus austriacus*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 19th July 2013.] <http://www.iucnredlist.org/details/17597/0>. Version 2013.1.
62. **IUCN 2013. . The IUCN Red List of Threatened Species. Version 2013.1.** [Online] 2013. [Cited: 09 07 2013.] <http://www.iucnredlist.org/>.
63. **Hutson, A.M., Aulagnier, S., Juste, J., Karataş, A., Palmeirim, J. & Paunović, M.** *Plecotus kolombatovici*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 19th July 2013.] <http://www.iucnredlist.org/details/136473/0>. Version 2013.1.
64. **Hutson, A.M., Aulagnier, S., Juste, J., Karataş, A., Palmeirim, J. & Paunović, M.** *Plecotus macrobullaris*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 19th July 2013.] <http://www.iucnredlist.org/details/136229/0>. Version 2013.1.
65. **Mucedda M., Kiefer A., Pidinchedda E. et Veith M.** A new species of long-eared bat (Chiroptera, Vespertilionidae) from Sardinia (Italy). *Acta Chiropt.* 2002, 4, pp. 121-135.
66. **Hutson, A.M., Aulagnier, S., Juste, J., Karataş, A., Palmeirim, J. & Paunović, M.** *Plecotus sardus*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 23th July 2013.] <http://www.iucnredlist.org/details/136503/0>. Version 2013.1.
67. **Aulagnier, S., Juste, J., Palmeirim, J. & Alcaldé, J.T.** *Plecotus teneriffae*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 23th July 2013.] <http://www.iucnredlist.org/details/17602/0>. Version 2013.1.
68. **Jacobs, D., Cotterill, F.P.D., Taylor, P.J., Aulagnier, S., Nagy, Z. & Karataş, A.** *Rhinolophus blasii*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 17th July 2013.] <http://www.iucnredlist.org/details/19515/0>. Version 2013.1.
69. **Hutson, A.M., Spitzenberger, F., Juste, J., Aulagnier, S., Alcaldé, J.T., Palmeirim, J., Paunovic, M. & Karataş, A.** *Rhinolophus euryale*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 19th July 2013.] <http://www.iucnredlist.org/details/19516/0>. Version 2013.1.
70. **Aulagnier, S., Hutson, A.M., Spitzenberger, F., Juste, J., Karataş, A., Palmeirim, J. & Paunovic, M.** *Rhinolophus ferrumequinum*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2013. [Cited: 17th July 2013.] <http://www.iucnredlist.org/details/19517/0>. Version 2013.1.
71. **Hutson, A.M., Spitzenberger, F., Juste, J., Aulagnier, S., Alcaldé, J.T., Palmeirim, J., Paunovic, M., Benda, P. & Karataş, A.** *Rhinolophus mehelyi*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 19th July 2013.] <http://www.iucnredlist.org/details/19519/0>. Version 2013.1.

72. **Jacobs, D., Cotterill, F.P.D., Taylor, P.J., Aulagnier, S., Juste, J., Spitzenberger, F. & Hutson, A.M. 2008.** *Rhinolophus hipposideros*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 19th July 2013.] <http://www.iucnredlist.org/details/19518/0>. Version 2013.1.
73. **Aulagnier, S., Paunovic, M., Karataş, A., Palmeirim, J., Hutson, A.M., Spitzenberger, F., Juste, J. & Benda, P. 2008.** *Tadarida teniotis* Version 2013.1. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: 20th July 2013.] <http://www.iucnredlist.org/details/21311/0>. Version 2013.1.
74. **Hutson, A.M., Spitzenberger, F., Aulagnier, S., Coroiu, I., Stubbe, M., Ariunbold, J., Buuveibaatar, V., Dorjderem, S., Monkzhul, Ts., Otgonbaatar, M. & Tsogbadrakh, M.** *Vespertilio murinus*. *IUCN Red List of Threatened Species*. [Online] IUCN, 2008. [Cited: July 23th 2013.] <http://www.iucnredlist.org/details/22947/0>. Version 2013.1..