

POLISH
NATIONAL REPORT
ON THE IMPLEMENTATION OF THE AGREEMENT ON THE
CONSERVATION OF THE POPULATIONS OF EUROPEAN BATS
(EUROBATS)
2001

A. GENERAL INFORMATION:

Name of Party: Poland
Date of Report: 20 March 2002
Period Covered: January 2001 - March 2002
Competent Authority: Ministry of the Environment
Appointed member of the Advisory Committee:
Professor Bronisław W. Wołoszyn
Chiropterological Information Centre
Institute of Animal Systematics and Evolution
Polish Academy of Sciences in Kraków, Poland

B. Bat legislation.

In Poland bats have been legally protected since 1952. Now all bat species are under the protection of the Decree of the Minister of the Environment concerning the species protection of animals, as signed on 26.09.2001. This implements provisions of the Nature Conservation Act passed on 16.10.1991, with subsequent amendments (main text and texts of amendments are available in the *Dziennik Ustaw* Official Journal of Laws – see: *Dz. U.* 1991 No 114 item 492, *Dz. U.* 2001 No 99 item 1079, *Dz. U.* 2001 No 100 item 1085, and *Dz. U.* 2001 No 145 item 1623). A consolidated current text of the Act is available on the Internet at address http://www.salamandra.org.pl/u_przyroda.html. The Decree text is in turn available at http://www.salamandra.org.pl/news/dokumenty/rozp_min_zwierzeta.html.

The Decree of the Minister of the Environment concerning the species protection of animals prohibits:

- 1) the intentional killing, injuring, catching, possessing or keeping of live bats, as well as the possession of dead bats or parts thereof;
- 2) the frightening, disturbing, photographing, filming and observing of bats from a distance where this causes disturbance during hibernation, breeding or the birth of offspring, without permission from the Governor of the Province (Voivod);
- 3) the intentional destruction of bat habitats;
- 4) the stuffing of dead bats (whole or parts) and the keeping of stuffed bats or their parts without permission from the Governor of the Province.
- 5) the moving of bats from the places they occur naturally to other places (as well the release to nature of bats that were born and brought up in the captivity).
- 6) the purchasing, offer for sale, exchange, giving as a present, import or export of bats, either alive or dead, including entire stuffed specimens, their parts or derivatives.

In accordance with the same Decree, the aforementioned prohibitions do not apply to:
the photographing or filming of bats in buildings and in places accessible to the public;
the catching of stray bats in housing areas by an authorised person or institution, and their

subsequent removal to places of regular occurrence;
the catching of injured or weak bats with a view to their being given veterinary help and or delivered to a rehabilitation centre;
actions taken within the confines of rational human management, especially that concerning agriculture, forestry and fisheries.

C. Bat species.

The occurrence of 22 species of bats has so far been confirmed in the territory of Poland. There are 2 horseshoe bat species, the greater and the lesser horseshoe bats (*Rhinolophus ferrumequinum* and *Rhinolophus hipposideros*), along with 20 species of vespertilionid bat. To date, breeding records of the greater horseshoe bat and noctule (*Nyctalus lasiopterus*) have not been obtained in Poland.

The presence of the soprano pipistrelle (*Pipistrellus pygmaeus*) was confirmed in 2001 by way of the analysis of echolocation calls (Gas, Postawa 2001, Rachwald, Szkudlarek 2001). The occurrence of two additional species, lesser mouse-eared bat (*Myotis blythii*) and Schreibers' bat (*Miniopterus schreibersii*), is possible in the southern part of Poland.

Of the 22 species, eight (*Rhinolophus ferrumequinum*, *Rh. hipposideros*, *Myotis bechsteinii*, *M. emerginatus*, *M. dasycneme*, *Vespertilio murinus*, *Eptesicus nilssonii* and *Nyctalus leisleri*) were listed in the new edition of the Polish Red Data Book of Animals (Vertebrates) (Wołoszyn, in: Głowaciński *et al.* 2001).

D. Publications:

D.1. Journals.

Three journals exclusively devoted to bat biology are published in Poland.

D.1.1. *Acta Chiropterologica* (International Journal of Chiropterology). ISSN 1508-1109

Editor-in-chief: Wiesław Bogdanowicz

Museum and Institute of Zoology, Polish Academy of Sciences, Warszawa

[In the period covered by the report there were two issues: vol. 3 (2001), nos. 1 and 2]

D.1.2. *Nietoperze* (The Bats). ISSN 1640-2677

Editor-in-chief: Rafał Szkudlarek

The Journal is published by the Agreement for Bat Conservation in Poland.

[In the period covered by the report there were two issues: vol. 2 (2001), nos. 1 and 2.]

D.1.3. *Studia Chiropterologica* (Annals of the Chiropterological Information Centre in Kraków). No ISSN, in 2001 – ISBN 83-85222-96-0

Editor-in-chief: Bronisław W. Wołoszyn

Institute of Animal Systematics and Evolution PAS, Kraków

[In the period covered by the report there was one issue, vol. 2 (2001)]

D.2. Publications in book form:

In the period covered by the report the following book publications were prepared:

D.2.1. Ciechanowski M., Sachanowicz K., Przesmycka A., Jarzembowski T., Iwicka B. (2001). *XV Ogólnopolska Konferencja Chiropterologiczna – materiały konferencyjne* (Materials of the XVth Polish Chiropterological Conference). AKCh PTOP "Salamandra", Gdańsk. 64 pp. [*in Polish with English abstracts*]. ISBN 83-905186-9-4

D.2.2. Hejduk J., Stopczyński M., Pawenta W. (2001). *Nietoperze okolic Łodzi* (Bats of Łódź and its neighbourhood). *Łódzka Grupa Chiropterologiczna*, Łódź, 40 pp. [*in Polish*]. ISBN 915291

D.2.3. Wołoszyn B.W. (2001). Bats of Poland. Distribution, habitat and conservation status. Publication of the Chiropterological Information Centre PAS in Poland. 87 pp. [in Polish and English]. ISBN 83-916540-0-1

D.2.4. Wołoszyn B.W. and Bashta A.T.V. (2001). Field key to the bats of the Carpathians. Publication of the Chiropterological Information Centre PAS in Poland, 168 pp. [in Polish and Ukrainian]. ISBN 83-85222-77-4

D.3. Selected publications (see Appendix 1).

The full list of papers published in 2001 by Polish chiropterologists or concerning the Polish bat fauna is accessible on the Internet at <<http://www/salamandra.org.pl/pon/literatura>>.

E. Research.

E.1. PhD projects recently undertaken:

E.1.1. Mateusz CIECHANOWSKI (Gdańsk University, Department of Ecology and Vertebrate Zoology): Spatial structure and activity of a bat community in the forest-agricultural landscape of northern Poland.

E.1.2. Joanna FURMANKIEWICZ (Wrocław University, Institute of Zoology): Mating behavior of the brown long-eared bat (*Plecotus auritus*).

E.1.3. Katarzyna KOZAKIEWICZ (Chiropterological Information Centre PAS, Kraków): Analysis of pollution of anthropogenic origin in the greater mouse-eared bat *Myotis myotis* (Borkhausen, 1797) in West Poland.

E.1.4. Leszek KOZIRÓG (University of Warmia and Mazury, Olsztyn): Differences in bat activity near streams and rivers in various kinds of landscape.

E.1.5. Dariusz ŁUPICKI (Agricultural University of Wrocław, Department of Zoology and Ecology): Biology and ecology of the ectoparasites of selected bat species.

E.1.6. Jakub NOWAK (Agriculture University, Kraków) Influence of some climate factors on the competition and structure of bat groups in caves of SE Poland.

E.1.7. Tomasz POSTAWA (Chiropterological Information Centre PAS, Kraków): Comparative analysis of the post-glacial and recent bat faunas of the Kraków-Częstochowa Upland (S Poland).

E.1.8. Grzegorz RADZICKI (Łódź University): Temporal and spatial differentiation of bat winter clusters in Szachownica Cave.

E.1.9. Ireneusz RUCZYŃSKI (Mammal Research Institute, PAS, Białowieża): Factors influencing roost selection and occupation by bats in Białowieża Primeval Forest.

E.1.10. Piotr SCHICK (Wrocław University, Institute of Zoology): Winter feeding of Daubenton's bats (*Myotis daubentonii*), greater mouse-eared bats (*Myotis myotis*) and barbastelles (*Barbastella barbastellus*) in the Międzyrzecz Fortified Front (W Poland).

E.1.11. Michał WOJCIECHOWSKI (N. Copernicus University, Department of Animal Physiology, Toruń): Characteristics of the adaptive strategies of the heterothermic bats (*Myotis myotis* and *Myotis daubentonii*) in relation to the organism's energetic reserves and thermal environment.

E.1.12. Grzegorz WOJTASZYN (Adam Mickiewicz University, Poznań): Bats of the Barycz Valley.

E.2. M.Sc. projects:

a) finished:

E.2.1. Piotr Zahorowicz (Academy of Podlasie, Białystok): Comparison of activity periods of the noctule bat (*Nyctalus noctula* Schleb., 1774) and Leisler's bat (*Nyctalus leisleri* Kuhl, 1817) in Białowieża Primeval Forest.

b) in progress:

- E.2.2. Katarzyna ANDRZEJEWSKA (Adam Mickiewicz University, Poznań): Voice analyses for selected bat species.
- E.2.3. Adriana DORENDA (N. Copernicus University, Toruń): Ecological factors influencing the occurrence of maternity colonies of bats in Wdecki and Zaborski Protected Landscape Areas in 1994 and 2000.
- E.2.4. Karolina DRABIŃSKA (Agricultural Academy of Szczecin): The importance of different kind of shelters for bats hibernating in the vicinity of Szczecin.
- E.2.5. Iwona Dudek (Wrocław University, Institute of Zoology): The activity of bats at the entrances of underground shelters out of the winter season.
- E.2.6. Anna GAS (Jagiellonian University, Kraków): The dynamics of a maternity colony of the mouse-eared bat (*Myotis myotis* (Borkhausen, 1797) in Studnisko Cave (Częstochowa Upland); the influence of micro-climatic conditions on development and body condition in juvenile bats. (in preparation).
- E.2.7. Joanna GÓRNIAK (Wrocław University, Institute of Zoology): Structure and dynamics of a multi-species bat colony in an old mine shaft in Skalki Stoleckie (Lower Silesia, W Poland) during the whole year.
- E.2.8. Agnieszka GUBAŃSKA (Wrocław University, Institute of Zoology): Fidelity of male Nathusius's pipistrelle bats (*Pipistrellus nathusii*) to mating territory in the Szczytnicki city park in Wrocław.
- E.2.9. Ewa HAFERKORN (Adam Mickiewicz University, Poznań): The bat fauna of Sierakowski Landscape Park.
- E.2.10. Anna HEINOWSKA (N. Copernicus University, Toruń): Food availability, the thermal environment and torpor in the mouse-eared bat (*Myotis myotis*)(Borkh., 1797) (in preparation).
- E.2.11. Emilia JUZWISZYN (N. Copernicus University, Toruń): Problems of the protection of bats hibernating in the city of Toruń – a plan of bat protection.
- E.2.12. Jarosław KNOP (Łódź University): Estimation of bat winter activity in Szachownica cave.
- E.2.13. Maciej ŁOCHYŃSKI (Adam Mickiewicz University, Poznań): Roost-site selection and roosting ecology of forest-dwelling bats in the middle part of Śerkowsko-Czeszewski Landscape Park.
- E.2.14. Anna OLCZAK (N. Copernicus University, Toruń): Brown adipose tissue thermogenesis in three mammalian species: laboratory mice (*Mus musculus*), Djungarian hamsters (*Phodopus sungorus*) and Daubenton's bats (*Myotis daubentonii*).
- E.2.15. Małgorzata MACIEJEWSKA (Agricultural Academy of Szczecin): The influence of weather and microclimatic conditions on bat hibernation.
- E.2.16. Wojciech PAWENTA (Łódź University): Bats of Wzniesienia Łódzkie Landscape Park..
- E.2.17. Wojciech SMOLARCZYK (N. Copernicus University, Toruń): Bats in bat boxes in Zamrzenica Forest.
- E.2.18. Anna ŚWIĄTKOWSKA (University of Warmia and Mazury, Olsztyn): The use rate of bat and bird boxes by bats in Iława Lake District Landscape Park.
- E.2.19. Karolina WODECKA (Warsaw University): Occurrence of bats as an indicator of forest condition.
- E.2.20. Tomasz ZAJĄC (Gdańsk University, Department of Ecology and Vertebrate Zoology): Activity of bats in selected habitats of the Reda river valley.

E.3. Examples of other projects recently carried out (in alphabetical order):

- E.3.1. "ABC - project" - Atlas of Bats of the Carpathians.
This international project is co-ordinated by the Chiropterological Information Centre PAS, Kraków. Chiropterologists from the Czech Republic, Hungary, Romania, Slovakia, Poland and Ukraine participate in it.
- E.3.2. Activity of bats at the entrance of underground shelters out of the winter season.
The project is co-ordinated by R. Szkudlarek (PTPP „pro Natura”)
- E.3.3. Bats migrations to the "Nietoperek" Bat Reserve.
The project is being undertaken in co-operation with German chiropterologists. On the Polish side it is co-ordinated by Tomasz Kokurewicz PhD (Department of Zoology and Ecology, Agricultural University of Wrocław).
- E.3.4. The foraging strategy of the serotine bat *Eptesicus serotinus*.
Project co-ordinated by Elzbieta Fuszara, M.Sc.(Institute of Ecology PAS).
- E.3.5. Habitat use, distribution and diversity of bats in northern Poland.
The project is being undertaken by Mateusz Ciechanowski, M.Sc. (Gdańsk University, Department of Ecology and Vertebrate Zoology).
- E.3.6. The influence of anthropogenic factors on bats in a forest environment.
The project is being implemented by Alek Rachwald PhD (Forest Research Institute, Ecology and Nature Protection Department, Warszawa).
- E.3.7. Monitoring of the natural environment of Poland.
The project started in 2000. An integral part of it is the monitoring of bat populations. Every year since 1988, in the first half of February, Winter bat censuses in caves and cave-like shelters have been organised every year since 1988, in the first half of February. The action termed the "Winter Bat Census" (DSN) was carried out in 2001 (14th DSN) and in 2002 (15th DSN). This was developed by the Chiropterological Information Centre (Wołoszyn, B.W. (in press): Chiropterological Information Centre 1987 - 2001. Fifteen years of activity for bat protection. Publication of the Chiropterological Information Centre PAS in Poland [*in Polish and English*].
In 2001 and 2002, the monitoring was organised by the Chiropterological Information Centre PAS and by regional centres, mainly by non-governmental organisations and Universities.
- E.3.8. Monitoring of populations number and long term population trends of *M. daubentonii*, *M. myotis*, *M. nattereri*, *Barbastella barbastellus*, *Plecotus auritus* in "Nietoperek" bat reserve. The project is being carried out in co-operation with non-governmental organisations and is co-ordinated by Tomasz Kokurewicz PhD (Department of Zoology and Ecology Agricultural University of Wrocław).
- E.3.9. Monitoring of bat population sizes and long-term population trends on the Śnieżnik Massif (Sudety Mountains).
This Czech-Polish project is being carried out in co-operation with non-governmental organisations, the "Wrocław Chiropterological Group", Czech Speleological Society, section „Barbastellus” and Speleological Section in Stronie Śląskie. The project is co-ordinated by Joanna Furmankiewicz M.Sc. (Institute of Zoology, University of Wrocław) and Tomasz Kokurewicz PhD (Department of Zoology and Ecology, Agricultural University of Wrocław).
- E.3.10. Natural and anthropogenic factors affecting bat mortality.
The project is being implemented by M. Kowalski and G. Lesiński (MTOF, OTON)
- E.3.11. Social vocalisation in Nathusius's pipistrelle bat (*Pipistrellus nathusii*)
The project is being realised by R. Szkudlarek (PTPP „pro Natura”)
- E.3.12. Summer activity of bats in the area surrounding the "Nietoperek" bat reserve.
The project is carried out in co-operation with non-governmental organisations, namely the Polish Society for Nature Protection "Salamandra" and "Wrocław Chiropterological Group". The project is co-ordinated by Alek Rachwald PhD (Forest

Research Institute, Ecology and Nature Protection Department, Warszawa) and Tomasz Kokurewicz PhD (Department of Zoology and Ecology Agricultural University of Wrocław).

- E.3.13. The bacterial flora of the alimentary tract of vespertilionid bats.
The project has now been completed and a paper summarising the results is in preparation. The project was realised by Tomasz Jarzembowski PhD at the Department of Microbiology, Gdańsk Medical University.
- E.3.14. The bat fauna of the Landscape Parks located in the Ziemia Lubuska and Wielkopolska regions.
The project is being realised by the Polish Society for Nature Protection „Salamandra” and local students’ groups (from the Agricultural University of Poznań, and Adam Mickiewicz University)
- E.3.15. The importance of small cellars for bat hibernation in Poland.
The project is being realised by The Polish Society for Bat Protection, Mazovian Society for Fauna Protection, and the Polish Society for Nature Protection „Salamandra” (as co-ordinated by G. Lesiński PhD)
- E.3.16. The migration and genetic structure of a population of Nathusius’ pipistrelle *Pipistrellus nathusii* on the southern Baltic Coast.
The project is being conducted by Tomasz Jarzembowski PhD, at the Department of Ecology and Zoology of Vertebrates (University of Gdańsk).
- E.3.17. The relationship between sex, age and body reserves and thermal preferences in Daubenton’s bats (*Myotis daubentonii*) during natural hibernation.
The project is finished and a paper summarising the results is in preparation. The project was realised by Tomasz Kokurewicz PhD (Department of Zoology and Ecology, Agricultural University of Wrocław) and Michał Wojciechowski, M.Sc. (N. Copernicus University, Department of Animal Physiology, Toruń).
- E.3.18. The vertical differentiation of bat groupings in Tatra Mountain Caves.
The project is being implemented by K. Piksa (Pedagogical University of Kraków)

F. Areas becoming protected in the period covered by the report.

F.1.1. "Mopkowy Most" [Barbastelle Bridge].

The only winter shelter for barbastelles (*Barbastella barbastellus*) in Pomorze (Pomerania) Province, situated in a bridge over the Vistula river near Tczew, came under protection in 2001. The protection proposal was prepared by the Academic Chiropterological Circle of the Polish Society for Nature Protection "Salamandra", at Gdańsk University. Contact person: Mateusz Ciechanowski M.Sc. (Gdańsk University, Department of Ecology and Vertebrate Zoology).

F.1.2. "Oliwskie Nocki" [Bats in Oliwa near Gdańsk]

A winter shelter for bats (*Myotis myotis*, *Myotis nattereri*, *Myotis daubentonii*, *Plecotus auritus* – above 80 individuals) situated in an old bunker in Gdańsk was brought under protection in 2001. The protection proposal was prepared by the Academic Chiropterological Circle of the Polish Society for Nature Protection "Salamandra", at Gdańsk University. Contact person: Mateusz Ciechanowski M.Sc. (Gdańsk University, Department of Ecology and Vertebrate Zoology).

G. Winter shelters identified as important for the conservation of bats.

In Poland there are only four known winter shelters where more than a thousand hibernating bats have been observed. There are another 19 localities where the number of wintering bats ranges from 201 to 1000 individuals, 33 where numbers of bats range from 101

to 200 and 63 with numbers between 50 and 100 hibernating animals (Appendix 2). There are also some other winter shelters with smaller number of animals, but identified as important to the conservation of bats in Poland – for instance on account of the presence of rare species.

The identification and proper protection of summer bat shelters needs greater efforts at national level. Some new projects in this field have already been initiated in Poland (mostly by local groups), but they need some legislative and financial support.

The most important bat hibernacula plus some bat summer roosts are now being put forward as object for protection within the Polish part of the NATURA 2000 network. A proposal for this network is now under construction.

H. Areas of particular importance to the maintenance of the current state of bat populations in Poland.

The "Nietoperek" and "Nietoperek II" bat reserves.

These underground fortifications of the Międzyrzecz Fortified Front (MFF) form the largest bat hibernaculum in Poland. The maximal number of hibernating bats, 29 493 individuals, was observed in February 1991 (Urbańczyk, in Wołoszyn 1994). 12 bat species (*Myotis bechsteinii*, *M. brandtii*, *M. dasycneme*, *M. daubentonii*, *M. myotis*, *M. mystacinus*, *M. nattereri*, *Pipistrellus pipistrellus*, *Eptesicus serotinus*, *Barbastella barbastellus*, *Plecotus auritus* and *P. austriacus*) have found hibernating there, and a further one, the northern bat (*Eptesicus nilssonii*), has been observed in the area of MFF, but not yet in the main underground system. In 1980, approximately one-third of the surface area of corridors was embraced by protection as the "Nietoperek" Bat Reserve. On account of increased tourist traffic in this area in the early 1990s, as well as the small area covered by the Reserve, the protection afforded to bats began to look insufficient. Thus September 1997 saw an area of 5 117.72 ha surrounding the underground fortifications become constituted as a "Natural-Landscape Complex" to protect the bat's maternity colonies, feeding grounds and migratory routes. In October 1998, the National Foundation for Environmental Protection from Warsaw started work on the preparation of a "Nietoperek Management Plan". As a consequence, the December of the same year saw the remaining 67% of the underground corridors embraced by protection as the "Nietoperek II" Bat Reserve. The Plan was finally accepted into local law in June 2000, and will remain in force until 2019. In line with the Plan, the local nature conservancy authorities are obliged to undertake several protection activities, e.g. to keep the whole system gated in winter, to increase the number of microhabitats available for hibernating bats and, in co-operation with local forestry managers, to commence with changes in forest structure that could be favourable to bats. The Plan also provides that tourist movement is to be forbidden in both bat reserves from 1st November to 31st March, while an increase in the summer months, except places occupied by summer colonies of bats, is recommended.

The main threats to the winter colony of bats in MFF are the tourist industry, changes in micro-climatic conditions (esp. water level) and the building of the A3 motorway.

Other areas of a particular importance are caves of the Kraków-Częstochowa Upland, the Polish Carpathians, and the Polish Sudety Mountains, as well as variously-located old fortifications and summer roosts in churches and the attics of private houses.

I. Activities pursued to promote awareness of the importance of bat conservation (organised in connection with the celebration of the International Year of the Bat – in alphabetical order):

I.1. 7th International Bat Night

It was organised by Chiropterological Information Centre on 21 September 2001 at the HQ of the Board of the Carpathian Landscape Parks (Zarząd Karpackich Parków Krajobrazowych) in Krosno. During the event the old mine in the village of Czarnorzeki near Krosno was grilled to protect the bat hibernaculum situated there.

- I.2. Bat Education Centre in Poznań
The Polish Society for Nature Protection "Salamandra" organised the Education Centre located at Fort Ila in Poznań. The educational programme of the Centre is oriented mainly towards bats and their conservation.
- I.3. Bat Hospital in Poznań
The hospital was created by the Polish Society for Nature Protection "Salamandra". In 2001 ca. 150 injured or weakened bats were hospitalised there. Most of them were released after some veterinary care and feeding.
- I.4. Bat Night in Wrocław
Bat Night for the inhabitants of the city was organised by the Wrocław Chiropterological Group on 23/24 of June of 2001 in Wrocław.
- I.5. Bat Observatory "Batmanówka"
The observatory is located in the loft of the school in the village of Kopanki near Poznań. Due to the installation of a transparent cupola and red light, the maternity colony of greater mouse-eared bats (*Myotis myotis*) situated in the loft can be observed without disturbance. The observatory was made by the Polish Society for Nature Protection "Salamandra". 2001 was the first year in which it was open to the public. During this time it was visited by over a thousand schoolchildren, students and tourists.
- I.6. Calendar "International Year of the Bat 2001"
This has been edited by the Chiropterological Information Centre PAS, Kraków. (Text and concept: Bronisław W. Wołoszyn, Photographs by Krzysztof Skrok, Design by Sławomir Onyszko).
- I.7. Competitions for the best poster popularising bat protection.
The Nature of Upper Silesia Heritage Center (organiser) addressed this to around 1600 schools in Śląsk (Silesia) Province. Answers came back from 65 schools and works were presented at a special exhibition.
- I.8. Education in the mass-media.
Hundreds of articles in newspapers, programmes on regional and national TV, and broadcasts on many radio stations were prepared by all the organisations and institutions working with bat protection. They also included information about bat biology and protection, as well as about the International Year of the Bat.
- I.9. Education of foresters
The Chiropterological Information Centre PAS joined the General Directorate of the State Forests in developing a programme of education for foresters in bat biology and conservation.
- I.10. Educational lectures
Over 108 lectures for school groups or open to the public were organised only by organisations and groups belonging to the Agreement for Bat Protection (PON). The educational programme carried on by PON is applied to all education levels. It includes also for example field trips with bat detectors.
- I.11. Exhibition "Face to face with bats"
This was prepared by the Chiropterological Information Centre (Krzysztof Skrok – photographs and Bronisław W. Wołoszyn – text) and presented in autumn 2001 in: Drawieński National Park, Bory Tucholskie National Park, Roztoczański National Park, Górznańsko-Lidzbarski Landscape Park, Budzyński Landscape Park, Gostynińsko-Włocławskiego Landscape Park, Mazowiecki Landscape Park, Chojnowski Landscape Park, in the Ministry of the Environment from December 2001 to January 2002) and at the Silesian University in Katowice (January – February 2002).
- I.12. Film about the "Nietoperek" Bat Reserve

In March 2001 a film about bat protection and research at the Nietoperek Bat Reserve was produced by Cicada Films (London, UK) in co-operation with Tomasz Kokurewicz PhD (Dept. of Zoology and Ecology, Agricultural Univ. of Wrocław). The film was shown in October 2001 on the Discovery Animal Planet television channel. The Polish version of the film appeared in January 2002.

- I.13. Information materials concerning the protection and significance of bats in ecosystems
Posters, postcards, printing, fly-sheets, leaflets and brochures and folders were published by the Chiropterological Information Centre and by the Agreement for Bat Conservation in Poland.
- I.14. Interactive CD: "Hanging with Bats"
Minnie Cruz, the Peace Corps volunteer working at the Chiropterological Information Centre from 1999 to 2001, prepared an interactive CD: "Hanging with Bats", in Polish and English versions. In 2001, the Chiropterological Information Centre received financial support from the Ministry of the Environment and published 3 000 copies of the CD. The copies are being distributed to National and Landscape Parks, scientific institutions and schools across the country.
- I.15. Monographic lectures "Natural History of Bats"
These are delivered for students of biology and earth sciences at the Jagiellonian University in Kraków by Prof. Bronisław W. Wołoszyn. The course takes place during the winter semester and finishes with a test exam.
- I.16. The first International Chiropterological Summer Camp in Nietoperek
The camp was organised 23rd July - 5th August 2001 by the Dept. of Zoology and Ecology, Agricultural Univ. of Wrocław, the Polish Society for Nature Protection "Salamandra" and Wrocław Chiropterological Group. The aims of the camp were: to find and protect summer colonies; to estimate the numbers of bats using tunnels in that period; to identify the main feeding grounds; to increase local interest in bat protection by giving talks about the importance of the "Nietoperek" and "Nietoperek II" Bat Reserves for bat protection in Poland and Germany.
- I.17. XV Polish National Bat Conference (Gdańsk - Sobieszewo, 9-11 November 2001).
The conference was organised by the Academic Chiropterological Circle of the Polish Society for Nature Protection "Salamandra". Taking part in the Conference were ca. 100 chiropterologists from Poland, The Netherlands and Lithuania.

J. Non-Governmental Organisations involved in bat conservation.

The more important Polish non-governmental organisations (NGOs) concerned with the monitoring and conservation of bats, and education with regard to this group of animals are as follows:

1. *Centrum Dziedzictwa Przyrody Górnego Śląska [The Center for the Natural Heritage of Upper Silesia] (Katowice)
2. *Fundacja Ekologiczna Ziemi Legnickiej "Zielona Akcja" [Ecological Foundation "Green Action"] (Legnica)
3. *Mazowieckie Towarzystwo Ochrony Fauny (MTOF) [Mazovian Society for the Protection of Fauna] (Siedlce)
4. *Ogólnopolskie Towarzystwo Ochrony Nietoperzy (OTON) [The Polish Society for Bat Protection] (Warsaw)
5. *Polskie Towarzystwo Ochrony Przyrody „Salamandra” [The Polish Society for Nature Protection "Salamandra"] (Poznań, Gdańsk, Łódź, Olsztyn, Szczecin)
6. *Polskie Towarzystwo Przyjaciół Przyrody "pro Natura" (PTOP "pro Natura") [The Polish Society of Wildlife Friends "pro Natura"] (Wrocław)

7. Radomsko-Kieleckie Towarzystwo Przyrodnicze [The Nature Society of Radom and Kielce Region]
8. *Stowarzyszenie dla Natury "Wilk" [The Association for Nature "WOLF"] (Godziszka)
9. Sekcja Chiropterologiczna Towarzystwa Przyrodników im. M. Kopernika [The Chiropterological Section of the N. Copernicus Naturalists Society] (Kraków)
10. Wrocławska Grupa Chiropterologiczna [Wrocław Chiropterological Group] (Wrocław)

The asterisk * means organisation belonging to Porozumienie dla Ochrony Nietoperzy *The Agreement for Bat Conservation* (PON) – the union of organisations and institutions which commenced with its activity in the years 2000/2001

K. Additional, more important activities connected with bat protection (in alphabetical order)

K.1. Bats in forests.

Organisations belonging to The Agreement for Bat Conservation (PON) prepared 4 new kinds of bat boxes (realised by R. Szkudlarek of PTPP „pro Natura”). Over 1500 boxes was put out in forests. A publication about the protection of bats in forest was prepared and the project is continuing.

K.2. Chiropterological Licenses for bat researchers.

In 2001 a system of Chiropterological Licences was introduced in Poland. Licences certify that persons which posses them have sufficient knowledge and experience to carry out research on bats, connected with disturbing these animals. There are three levels of Licence, certifying ability to three kinds of activity: (1) monitoring of summer and winter roost, (2) netting and (3) ringing of bats. The licence is given after theoretical and practical exams (in bat biology, species identification, skills in the proper research techniques, etc.) have been passed. The possessing of a Licence does not exempt those with them from the duty to receive the proper permission (form the nature protection authorities) for particular research programs.

The System of Chiropterological Licences was developed by The Agreement for Bats Protection (PON), but it is open to all Polish chiropterologists. Up to the end of March 2002, 50 bat workers had obtained such a Licence.

K.3. The Chiropterological Faunistic Commission.

In the year 2001, the Chiropterological Faunistic Commission was organised by The Agreement for Bats Protection (PON). The Commission is verifying field records, especially concerning rare species and species difficult to determine to the species level. The Commission exists at national level and its activity is not limited solely to the members of the PON.

K.4. The first International Chiropterological Summer Camp in Nietoperek

The camp was organised on 23rd July - 5th August 2001 by the Dept. of Zoology and Ecology, Agricultural Univ. of Wrocław, the Polish Society for Nature Protection "Salamandra" and "Wrocław Chiropterological Group". The aims of the camp were: to find and protect summer colonies; to estimate the number of bats using tunnels in that period; to identify the main feeding grounds; and to increase local interest in bat protection by giving talks about the importance of the "Nietoperek" and " Nietoperek II" Bat Reserves in the protection of bats in both Poland and Germany.

K.5. „Protection of bats in Poland – part I”

This is the first common project of non-governmental organisations united under The Agreement for Bat Conservation. It included different aspects of bat protection. Its budget in 2001 was about 200.000 EURO (Main sponsor – UNDP GEF/SGP).

K.6. Protection of bats in NW Poland.

The project has been underway for some years now thanks to the Polish Society for Nature Protection „Salamandra” (in Poznań, Szczecin, Gdańsk, Olsztyn, Łódź). It takes in most aspects of bat protection.

K.7. Remedial timber treatment safe for bats.

This project is being implemented by Alek Rachwald PhD (Forest Research Institute, Ecology and Nature Protection Department, Warszawa).

K.8. "Strzaliny" reserve

This is a project for the creation of a fourth Polish bat reserve in the underground fortification system at "Strzaliny". The multi-species colony in this underground fortification is the fifth largest bat hibernaculum in Poland (see Appendix 2). In 2001, the Polish Society for Nature Protection "Salamandra" grilled all entrances to the fortifications and commenced efforts to have this object protected as a reserve. Reserve status will probably be granted in 2002.

L. Problems connected with bat protection occurring in the reporting period

L.1. Rabies and bats

In the year 2001, several rabid bats were found in different Polish cities. This caused a panic reaction in the media in some cases. To mitigate the fear a special information project (including a campaign in the media, meetings with citizens, special information for veterinary and human health authorities, educational brochures, Internet sites etc.) was undertaken by the Chiropterological Information Centre, the Agreement for Bats Protection (PON) and other organisations.

L.2. Notification of the EUROBATS Amendment

Up to now Poland has not notified the Amendment of the Agreement (Resolution 3.7 of the 3rd Session of the Meeting of Parties)

M. Responsible bodies nominated to provide advice on bat conservation and management.

Chiropterological Information Centre (C.I.C.)
Institute of Animal Systematics and Evolution
Polish Academy of Sciences
Address: 31-016 Kraków, ul. Sławkowska 17, Poland
Phone: +48 12/ 422-64-10, 422-10-01 (Secretariat)
Fax: + 48 12/ 422-42-94,
e-mail: woloszbr@isez.pan.krakow.pl
cic@isez.pan.krakow.pl

Report elaborated by:

Prof. Bronisław W. Wołoszyn
Head of the Chiropterological Information Centre
Institute of Animal Systematics and Evolution
Polish Academy of Sciences in Kraków

The Report also took advantage of additional information sent in by:

- The Agricultural University of Szczecin
- Mateusz Ciechanowski (Department of Ecology and Zoology of Vertebrates University of Gdańsk)
- Joanna Furmankiewicz, Marek Furmankiewicz, Sławomir Telatyński (Wrocław Chiropterological Group)
- Witold Grzywiński (Agricultural University of Poznań)

- Krzysztof Kasprzyk, Marek Kowalski, Grzegorz Lesiński (The Polish Society for Bat Protection - OTON)
- Andrzej Kepel, Radosław Dzieciołowski, Krystyna Laskowska, Magdalena Dziegielewska, Michał Stopczyński, Radosław Jaros, (The Polish Society for Nature Protection "Salamandra")
- Tomasz Kokurewicz (Department of Zoology and Ecology, Agricultural University of Wrocław)
- Jakub Nowak (Agriculture University, Kraków)
- Krzysztof Piksa (Pedagogical University of Kraków)
- Michał Piskorski (Maria Curie-Skłodowska University, Lublin)
- Rafał Szkudlarek (The Polish Society of Wildlife Friends "pro Natura")
- Agnieszka Wower (Center for the Natural Heritage of Upper Silesia)

APPENDIX 1.

Selected original publications.

- D.3.1. BUŘIČ Z., FURMANKIEWICZ J., FURMANKIEWICZ M., KLODEK R., KOKUREWICZ T., TELATYŃSKI S. *Zimowe stanowiska nietoperzy na Ziemi Kłodzkiej* [Winter localities of bats in the Kłodzko region (SW Poland)]. *Szczeliniec* 5: 149-168.
- D.3.2. IGNACZAK M., RADZICKI G., DOMAŃSKI J. *Nietoperze Parku Krajobrazowego Międzyrzecza Warty i Widawki* [Bats of the Interriver Warta and Widawka Landscape Park]. *Nietoperze* 2 (1): 125-134.
- D.3.3. JEFIMOW M., WOJCIECHOWSKI M., TĘGOWSKA E. (2001): Non-shivering thermogenesis in *Myotis daubentonii* at different ambient temperatures. *Bat Research News*, 43 (3): 103.
- D.3.4. JURCZYSZYN M., BAJACZYK R. Departure dynamics of *Myotis daubentonii* (Kuhl, 1817) (*Mammalia, Chiroptera*) from their hibernaculum. *Mammalia* 65 (2): 121-130.
- D.3.5. KASPRZYK K., RUCZYŃSKI I. The structure of bat communities roosting in bird nest boxes in two pine monocultures in Poland. *Folia Zoologica* 50 (2): 107-116.
- D.3.6. KLIŚ T., FURMANKIEWICZ J., KOKUREWICZ T. (2001): *Zmiany liczebności i składu gatunkowego zimowych kolonii nietoperzy w jaskiniach góry Połom (Góry Kaczawskie, Sudety Zachodnie) w latach 1964 - 2001*. [Changes in number and species composition of bats hibernating in natural caves of Połom (Kaczawskie Mts., W Sudetes) in the years 1964 – 2001]. *Studia Chiropterologica*, 2: 47-66.
- D.3.7. KOTEJA P., JURCZYSZYN M., WOŁOSZYN B.W. Energy balance of hibernating mouse-eared *Myotis myotis*: a study with the TOBEC instrument. *Acta Theriologica* 46 (1):1-12.
- D.3.8. KOWALSKI M., OSTRACH-KOWALSKA A., KRASNODĘBSKI I., SACHANOWICZ K., IGNACZAK M., RUSIN A. *Nietoperze Parków Krajobrazowych: Górzniensko-Lidzbarskiego i Welskiego* [Bats of the Górzniensko-Lidzbarski and Welski Landscape Parks]. *Nietoperze* 2 (1): 117-124.
- D.3.9. LESIŃSKI G. *Nietoperze Chiroptera Kotliny Biebrzańskiej i terenów przyległych* [Bats *Chiroptera* of the Biebrza Basin and surrounding areas]. *Parki Narodowe i Rezerваты Przyrody* 20 (2): 51-64.
- D.3.10. LESIŃSKI G., FUSZARA E., KOWALSKI M. *Charakterystyka miejskiego zgrupowania nietoperzy Warszawy* [Characteristics of the urban bat community of Warsaw]. *Nietoperze* 2 (1): 3-17.
- D.3.11. LESIŃSKI G., KOWALSKI M. *Znaczenie małych piwnic dla hibernacji nietoperzy w środkowej i północno-wschodniej Polsce* [The importance of small cellars to the hibernation of bats in central and north-eastern Poland]. *Nietoperze* 2 (1): 43-52.
- D.3.12. LESIŃSKI G. (2001): *Nietoperze (Chiroptera) Kotliny Biebrzańskiej i terenów przyległych*. [Bats (*Chiroptera*) of the Biebrza Basin and adjoining terrains.] *Parki Narodowe i rezerваты Przyrody*, 20: 51-64.
- D.3.13. ŁUPICKI D., SZKUDLAREK R., SCHICK P., DUDEK I. *Wykorzystywanie obiektów podziemnych przez nietoperze w rezerwacie „Nietoperek” w okresie jesiennym* [The utilisation of underground objects by bats in the "Nietoperek" Reserve in autumn]. *Nietoperze* 2 (1): 93-101.
- D.3.14. PIKSA K., WOŁOSZYN B.W. (2001): The postglacial bat remains of the Polish Tatra caves. *Lynx*, 32: 234-255.
- D.3.15. RACHWALD A., BORATYŃSKI P., NOWAKOWSKI W. K. Species composition and activity of bats flying over rivers in the Białowieża Primeval Forest. *Acta Theriologica* 46: 235-242.
- D.3.16. RACHWALD A., SZKUDLAREK R. *Stwierdzenie występowania typów echolokacyjnych „45 kHz” i „55 kHz” karlika małego Pipistrellus pipistrellus („gatunki ukryte” P. pipistrellus i P. pygmaeus) na terenie Polski* [The record of phonic types "45 kHz" and "55 kHz" in the pipistrelle *Pipistrellus pipistrellus* ("cryptic species" *P. pipistrellus* and *P. pygmaeus*) in Poland]. *Nietoperze* 2 (1): 19-22.
- D.3.17. RZEBIK-KOWALSKA B., KOWALSKI K. The northernmost fossil locality of fruit bats (Megachiroptera,

- Mammalia) in the Miocene of Bełchatów (Poland). *Acta Zoologica Cracoviensia*, 44: 59-63.
- D.3.18. SACHANOWICZ K., MARZEC M., CIECHANOWSKI M., RACHWALD A. *Nietoperze Puszczy Romnickiej* [Bats of the Romincka Forest]. *Nietoperze* 2 (1): 109-115.
- D.3.19. SACHANOWICZ K., RUCZYŃSKI I. Summer roost sites of *Myotis brandtii* (Eversmann, 1845) (Chiroptera, Vespertilionidae) in eastern Poland. *Mammalia* 65 (4): 531-535.
- D.3.20. SZKUDLAREK R., PASZKIEWICZ R. *Przypadek nietypowej echolokacji karlika malutkiego Pipistrellus pipistrellus* [A case of non-typical echolocation of the pipistrelle bat *Pipistrellus pipistrellus*] (Schreber, 1774). *Nietoperze* 2 (1): 144-146.
- D.3.21. SZKUDLAREK R., PASZKIEWICZ R., BLOHM T., NOWAK E., ŁUPICKI D. *Bunkry Ziemi Lubuskiej jako schronienia nietoperzy* [Bunkers of the Ziemia Lubuska region as bat shelters]. *Nietoperze* 2 (1): 85-92.
- D.3.22. SZKUDLAREK R., PASZKIEWICZ R., GOTTFRIED T. *Stanowiska podkowca małego Rhinolophus hipposideros (Bechstein, 1800) w południowo-zachodniej Polsce* [Sites for the lesser horseshoe bat *Rhinolophus hipposideros* (Bechstein, 1800) in south-western Poland]. *Nietoperze* 2 (1): 53-62.
- D.3.23. WĘGIEL A., GRZYWIŃSKI W., ADAMUS P., SADOWY R., WIECZOREK M. *Nietoperze (Chiroptera) zimujące w jaskiniach Wyżyny Krakowskiej* [Bats (Chiroptera) hibernating in the caves of the Kraków Upland]. *Nietoperze* 2 (1): 23-42.
- D.3.24. WĘGIEL A., PASZKIEWICZ R., SZKUDLAREK R. *Nietoperze Beskidu Wyspowego, Beskidu sądeckiego, Beskidu Niskiego i Pogórza Karpackiego – letnie schronienia nietoperzy w budynkach* [Bats of Beskid Wyspowy, Beskid Sądecki, Beskid Niski and Pogórze Karpackie – summer roosts in buildings]. *Nietoperze* 2 (1): 75-84.
- D.3.25. WOJCIECHOWSKI M., TĘGOWSKA E., JEFIMOW M. (2001): Body mass and thermal environment affect torpor in heterothermic bats. *Bat Research News*, 43 (3): 129.
- D.3.26. WOJCIWICZ B., DUSZCZYK M. *Największe zimowisko karlika malutkiego Pipistrellus pipistrellus w Polsce* [The biggest winter colony of the pipistrelle bat *Pipistrellus pipistrellus* in Poland]. *Nietoperze* 2 (1): 142-143.
- D.3.27. WOŁOSZYN B. W. (2001): Greater horseshoe bat (*Rhinolophus ferrumequinum*). Pp. 44-46, in: *Polska czerwona księga zwierząt, kręgowce* [Polish Red Data Book of Animals (Vertebrates)] (Z. Głowaciński, ed.). Państwowe Wydawnictwo Rolnicze i Leśne, Warszawa.
- D.3.28. WOŁOSZYN B. W. (2001): Lesser horseshoe bat (*Rhinolophus hipposideros*). Pp. 46-48, in: *Polska czerwona księga zwierząt, kręgowce* [Polish Red Data Book of Animals (Vertebrates)] (Z. Głowaciński, ed.). Państwowe Wydawnictwo Rolnicze i Leśne, Warszawa.
- D.3.29. WOŁOSZYN B. W. (2001): Bechstein's bat (*Myotis bechsteini*). Pp. 49-51, in: *Polska czerwona księga zwierząt, kręgowce* [Polish Red Data Book of Animals (Vertebrates)] (Z. Głowaciński, ed.). Państwowe Wydawnictwo Rolnicze i Leśne, Warszawa.
- D.3.30. WOŁOSZYN B. W. (2001): Pond bat (*Myotis dasycneme*). Pp. 51-52, in: *Polska czerwona księga zwierząt, kręgowce* [Polish Red Data Book of Animals (Vertebrates)] (Z. Głowaciński, ed.). Państwowe Wydawnictwo Rolnicze i Leśne, Warszawa.
- D.3.31. WOŁOSZYN B. W. (2001): Geoffroy's bat (*Myotis emarginatus*). Pp. 53-54, in: *Polska czerwona księga zwierząt, kręgowce* [Polish Red Data Book of Animals (Vertebrates)] (Z. Głowaciński, ed.). Państwowe Wydawnictwo Rolnicze i Leśne, Warszawa.
- D.3.32. WOŁOSZYN B. W. (2001): Parti-coloured bat (*Vespertilio murinus*). Pp. 55-56, in: *Polska czerwona księga zwierząt, kręgowce* [Polish Red Data Book of Animals (Vertebrates)] (Z. Głowaciński, ed.). Państwowe Wydawnictwo Rolnicze i Leśne, Warszawa.
- D.3.33. WOŁOSZYN B. W. (2001): Northern bat (*Eptesicus nilssoni*). Pp. 56-58, in: *Polska czerwona księga zwierząt, kręgowce* [Polish Red Data Book of Animals (Vertebrates)] (Z. Głowaciński, ed.). Państwowe Wydawnictwo Rolnicze i Leśne, Warszawa.
- D.3.34. WOŁOSZYN B. W. (2001): Leisler's bat (*Nyctalus leisleri*). Pp. 58-59, in: *Polska czerwona księga zwierząt, kręgowce* [Polish Red Data Book of Animals (Vertebrates)] (Z. Głowaciński, ed.). Państwowe Wydawnictwo Rolnicze i Leśne, Warszawa.

APPENDIX 2.

Table 1a. Winter shelters identified as important to the conservation of bats in Poland, in that at least 50 hibernating bats have been observed. Explanation of abbreviations: FO- fort, BU – bunker, CV-cave, CE- cellar, MI- mine. Data from the years 1988-2002.

No.	Name of the locality	Type of locality	Max. number of bats	Year of observation	References
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1.	"Nietoperek" Bat Reserve	FO	29 493	1991	Urbańczyk with group, in Wołoszyn, 1994
2.	Szachownica	CV	1 485	2002	Róg, Pawenta, Knop, unpubl.
3.	Grudziądz, Citadel	FO	1 328	2002	Leszczyński, Kasprzyk, unpubl.
4.	Poznań, Fort I	FO	1 051	2001	Jurczyszyn, database of PTOP „Salamandra”
5.	Strzaliny, Wisielcza Góra	FO	895	2000	Bernard, database of PTOP „Salamandra”
6.	Bochotnica, group of stone-pits I	MI	531	2001	Kowalski, Urban, Potakiewicz, Piskorski, unpubl.
7.	Strubiny I	FO	378	1996	Fuszara, Fuszara, database of OTON
8.	Bunker 10 in Mamerki	BU	355	1997	Fuszara, Fuszara, database of OTON
9.	Osowiec	FO	344	1993	Fuszara <i>et al.</i> , 1996
10.	Kostrzyn on the Odra River – „Król” Bastion	FO	340	2001	Laskowska, Jaros, Dzieciołowski, database of PTOP „Salamandra”
11.	Konewka, train shelter	BU	297	1993	Fuszara <i>et al.</i> , 1996
12.	Beneath Sokola Góra	CV	265	1994	Labocha, Postawa, 1994
13.	Tatra Mountains, Czarna Cave	CV	265	1997	Piksa, Nowak, 2000
14.	Cooler in Cieszków	CE	263	1997	database of PTPP „pro Natura”
15.	Świecie on the Vistula	FO	263	1992	Postawa <i>et al.</i> , 1994
16.	Studnisko	CV	255	1995	Zygmunt, 2000
17.	Kletno, Niedźwiedzia Cave	CV	251	2002	"Wrocław Chiropterological Group", unpublished
18.	Stolec	MI	242	1999	database of PTPP „pro Natura”
19.	Koronowo	CE	234	1996	Kasprzyk <i>et al.</i> , 2002
20.	Tarnowskie Góry	MI	233	1994	Kłys, 1994
21.	Jaworznicka Cave (with old Chelosiowa)	CV	224	1995	Gwardjan, Kasza, Jachimkowska, Gubała, database of OTON
22.	Poznań, Fort II	FO	211	1997	Dzieciołowski, database of PTOP „Salamandra”
23.	Toruń, Fort XV	FO	205	1997	Kasprzyk <i>et al.</i> , 2002
24.	Szczelina Wojcieszowska	CV	194	2001	Kliś <i>et l.</i> , 2001
25.	Malbork, Castle	FO	191	2001	Ciechanowski & Stec unpubl.
26.	Kostrzyn on the Odra River – „Filip” Bastion	FO	175	2001	Laskowska, Jaros, Dzieciołowski, database of PTOP „Salamandra”
27.	Warszawa, Fosa Street	CE	173	1994	Fuszara, 1995
28.	Poznań, Fort Via	FO	170	2002	Grzywiński, database of PTOP „Salamandra”
29.	Poznań, Fort III	FO	164	1996	Gawlak, data base of PTOP „Salamandra”
30.	Siedliska, Fort I "Salis Soglio"	FO	160	1996	Mleczek, in print
31.	Drozdowo, brewer's cellar	CE	157	1992	Fuszara <i>et al.</i> , 1996
32.	Kołobrzeg, stadium, complex of bunkers	BU	154	2001	Wojtaszyn <i>et al.</i> , 2001
33.	Forts in Nysa	FO	153	2001	database of PTPP „pro Natura”
34.	Goławice I	FO	151	2000	Fuszara, Fuszara, Kowalski, Lesinski, database of OTON
35.	„Tapadła”	MI	145	1999	database of PTPP „pro Natura”
36.	Wiercica	CV	142	1991	Postawa <i>et al.</i> , 1994
37.	Sztolnia in Młoty	MI	141	2002	database of PTPP „pro Natura”
38.	Toruń, Fort V	FO	140	1999	Kasprzyk <i>et al.</i> , unpubl.
39.	Modlin Stronghold, Fort Dębina	FO	135	2000	Fuszara, Fuszara, Cygan, Sergiej; database of OTON
40.	Mine in Podlesie	MI	132	2001	database of PTPP „pro Natura”
41.	Szczecin, Światowida	BU	132	2001	Dziegielewska <i>et al.</i> , 2001
42.	Miedzianka – group of tunnels on Miedzianka mount	MI	127	2000	Gwardjan, Kasza, Jachimkowska, database of OTON

43.	Monastery in Lubiąż	CE	124	1998	database of PTPP „pro Natura”
44.	Poznań, Fort VIIIA	FO	123	1999	Dzięciołowski, database of PTOP „Salamandra”
45.	Bukowiec, Diabla Dziura	CV	121	1993	Mleczek, in print
46.	Szczecin – Zdroje, cemetery	BU	121	1997	Dzięgielewska <i>et al.</i> , 1997
47.	Complex „Włodarz”	MI	120	2002	database of PTPP „pro Natura”
48.	Mamerki Bunker 11	BU	119	1996	Fuszara, Fuszara, database of OTON
49.	Sokolec, Gontowa	MI	118	2000	database of PTPP „pro Natura”
50.	Gdańsk, Wisłoujście Fortress	FO	115	2001	Ciechanowski, unpubl.

Table 1b. Winter shelters identified as important to the conservation of bats in Poland, in that at least 50 hibernating bats have been observed. Explanation of abbreviations: FO- fort, BU – bunker, CV-cave, CE- cellar, MI- mine. Data from the years 1988-2002.

No.	Name of the locality	Type of locality	Max. number of bats	Year of observation	References
51.	Psia Cave	CV	115	1997	Piksa, Nowak, 2000
52.	Błogosławie	FO	114	1994	Fuszara, 1995
53.	Giżycko, fortress	FO	105	2001	Fuszara, Fuszara, database of OTON
54.	Gierłoż 13	BU	104	1996	Fuszara, Fuszara, Gjerde, database of OTON
55.	Mine in Wojcieszów Dolny	MI	101	2002	database of PTPP „pro Natura”
56.	Mines in Złoty Jar and Złoty Stok	MI	101	2002	database of PTPP „pro Natura”
57.	Tatra Mountains, Zimna	CV	100	1999	Piksa, Nowak, 2000
58.	Toruń, Armoured Battery	FO	100	1996	Ruczyńska, Kasprzyk, unpubl.
59.	Kopalnia „Kopaliny” in Kletno	MI	100	2001	Buřič <i>et al.</i> , 2001
60.	Poznań, Fort VI	FO	95	1999	Dzięciołowski, database of PTOP „Salamandra”
61.	Toruń, Fort IV	FO	95	1998	Kasprzyk <i>et al.</i> , unpubl.
62.	Kłodzko, fortress	FO	93	1995	Buřič <i>et al.</i> , 2001
63.	Bochotnica, group of stone-pits II	MI	91	2002	Kowalski, Urban, Potakiewicz, Piskorski, unpubl.
64.	Grubno, ice-cellar	CE	91	2002	Tomaszewski <i>et al.</i> , unpubl.
65.	Grodziec, palace	CE	88	2002	Dzięciołowski, database of PTOP „Salamandra”
66.	Na Świniuszcze Cave	CV	88	1990	Postawa, 1994
67.	Szczecin – Gocław shelter I	BU	86	1998	Dzięgielewska <i>et al.</i> , 1998
68.	Frombork, kanonia	CE	85	2001	Ciechanowski <i>et al.</i> , 2001
69.	Kostrzyn on the Odra River, Fort Sarbinowo	FO	84	2002	Jaros, Dzięciołowski, Wojciechowski, database of PTOP „Salamandra”
70.	Miedzianka	MI	84	1989	Wołoszyn, 1994 a
71.	Poznań, Fort IIIa	FO	84	1996	Adamus, database of PTOP „Salamandra”
72.	Poznań, Fort IV	FO	84	2002	Szubert, database of PTOP „Salamandra”
73.	Poznań, Fort VIII	FO	84	1999	Gawlak, database of PTOP „Salamandra”
74.	Gdańsk – Oliwa	BU	83	2000	Ciechanowski, unpubl.
75.	Nietoperzowa	CV	81	1999	Węgiel <i>et al.</i> , 2001
76.	Samsonów, Zygmunt Ironworks	CE	81	1999	Gwardjan, Jachimkowska, database of OTON
77.	Raj	CV	80	1994	Wąsikowski, Snoch, database of OTON
78.	Mine near Biały Flins, Mine near Rozdroże Izerskie	MI	78	2002	database of PTPP „pro Natura”
79.	Koralowa	CV	77	1988	Wołoszyn, 1994 b
80.	Mine above tunnel Szklarska Poręba Dolna	MI	77	2001	data base of PTPP „pro Natura”
81.	Poznań, Cytadela	FO	77	2002	Jaros, Dzięciołowski, database of PTOP „Salamandra”
82.	Pustelnia	MI	77	1994	Mleczek, in print
83.	Complex of mines near Baworowo Factory in Leśna	MI	75	2002	database of PTPP „pro Natura”
84.	Wojcieszów, Jaskinia Północna	CV	75	2000	Kliś <i>et al.</i> , 2001

Table 1c. Winter shelters identified as important to the conservation of bats in Poland, in that at least 50 hibernating bats have been observed. Explanation of abbreviations: FO- fort, BU – bunker, CV-cave, CE- cellar, MI- mine. Data from the years 1988-2002.

No.	Name of the locality	Type of locality	Max. number of bats	Year of observation	References
85.	Wojcieszów, Nowa Cave	CV	75	2002	"Wrocław Chiropterological Group", unpublished
86.	Tatra Mountains, Bańdzioch Kominiarski	CV	73	1999	Piksa, Nowak, 2000
87.	"Osówka" Complex	MI	71	2002	data base of PTPP „pro Natura”
88.	Szczecin, Gocław – bunker II	BU	71	2001	Dzięgielewska <i>et al.</i> , 2001
89.	Mine in Kolorowe Jeziora near Wieściszowice	MI	69	2002	data base of PTPP „pro Natura”
90.	Staropole, PzW 708	BU	69	2001	Szkudlarek <i>et al.</i> , 2001
91.	Szczecin, Bogumińska I	BU	69	2000	Dzięgielewska <i>et al.</i> , 2000
92.	Za Kratą Cave	CV	69	1991	Kowalski, Lesiński, 1994
93.	Mine in Kletno	MI	68	2002	data base of PTPP „pro Natura”
94.	Chobienia – palace cellars	CE	67	1997	data base of PTPP „pro Natura”
95.	Skotniki, palace	CE	67	2001	Hejduk, Pawenta, Róg, unpubl.
96.	Brody	FO	65	2001	Fuszara, Adamiak, data base of OTON
97.	Radochowska	CV	65	1991	Buřič <i>et al.</i> , 2001
98.	Zalesie, well	MI	65	1995	Kowalski, Rusin, Witkowski, Mikołajski, Ostrach-Kowalska data base of OTON
99.	Puławy, palace cellars	CE	64	2002	Urban, Potakiewicz, Piskorski, unpubl.
100.	Staropole, PzW 712	BU	64	2001	Szkudlarek <i>et al.</i> , 2001
101.	Pieski, PzW 741	BU	63	2001	Szkudlarek <i>et al.</i> , 2001
102.	Węglówka, Jasna Mine	MI	62	2000	Mleczek, 2001
103.	Szczecin – Gocław, bunker IV	BU	61	1994	Bernard, 1995
104.	Ojcowski National Park, Ciemna Cave	CV	60	2000	Węgiel <i>et al.</i> , 2001
105.	Complex ”Soboń”	MI	59	1999	data base of PTPP „pro Natura”
106.	Toruń, Fort XIII	FO	58	1995	Ruczyńska, Kasprzyk, unpubl.
107.	Gilów	MI	55	2002	Furmankiewicz, Urban, unpubl.
108.	Kołobrzeg, Solna street	BU	55	1999	Wojtaszyn <i>et al.</i> , 2001
109.	Poznań, Wojska Polskiego street	BU	55	1997	Dzięciołowski, data base of PTOP „Salamandra”
110.	Mine Helena in Ciechanowice	MI	54	1999	data base of PTPP „pro Natura”
111.	Uznam island (Świnoujście)	FO	54	1994	Bernard, 1995
112.	Cellar of castle in Śmigród	CE	53	2000	data base of PTPP „pro Natura”
113.	Tatry, Śpiących Rycerzy Niżnia Cave	CV	53	1999	Piksa, Nowak, 2000
114.	Gdańsk, Reduta Napoleońska	FO	52	1997	Jarzebowski <i>et al.</i> , 2000
115.	Twierdza Modlin, Fort Janówek III	FO	52	1998	Lesiński, data base of OTON
116.	Wolin (Świnoujście)	FO	52	1994	Bernard, 1995
117.	Poznań, Fort Va	FO	51	1998	Gawlak, data base of PTOP „Salamandra”
118.	Mine of Radon Inhalatorium in Kowary	MI	50	1999	Szkudlarek, data base of PTPP „pro Natura”
119.	Poznań, Fort IVa	FO	50	1992	Bernard, Jurczyszyn, 1994