

Czynna ochrona siedlisk nietoperzy w Jaskini Szachownica

Protection of the habitat of bats in a Cave Szachownica

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Abstract

The study presents the description of active protection measures aimed at securing the bat habitat in Szachownica Cave. They were carried out under the project "Carrying out the necessary conservation work on a territory of Szachownica Cave designated within Natura 2000 / Implementation of nature conservation activities in the Special Area of Conservation of Habitats Natura 2000 Szachownica" LIFE12 NAT/PL/000012, co-financed by the European Union and the National Fund for Environmental Protection and Water Management. Szachownica Cave is one of the largest wintering and swarming places in the southern part of Poland. The work carried out within the framework of the project consisted of supporting the cave ceilings with reinforced concrete pillars, gluing of cracked rock mass and protecting the ceilings and side walls with a mining net and anchor and anchor-tensioning housing.

About Szachownica

Szachownica Cave is one of the longest cave systems in the Cracow-Wielun Upland. It is located in the municipality of Lipie. The underground system was created by blurring the limestone hill, located in the direction of the outflow of the melting Middle-Poland Glaciation. The age of the caves has been estimated to be around 150,000 years. People unveiled Szachownica Cave during the exploitation of limestone for the needs of the local population. Mining was continued until 1962.

Currently, the object consists of five separate caves, which are marked with numbers I to V. The largest of them is "Szachownica I", with the corridors length about 600 meters. "Szachownica II", located in the western part of the quarry, is 200 meters long. Others (III - V) are small fragments of the system, located in the southern part of the quarry.

Szachownica as a reserve

The entire cave system is located under a hill called Krzemienna Góra. Because of its geological value, it is protected by law. On October 11, 1978 on the area of 12.70 ha was established the nature reserve "Szachownica".

Szachownica as a Natura 2000 area

In the reserve, next to the typical forest fauna, the most

valuable group is bats, wintering in the cave. As a result of the limestone exploitation, this object has lost a lot of its natural character, as well as a static, relatively warm microclimate. The undergrounds are now one of the largest bat wintering sites in southern Poland. Because of the cool microclimate and temperatures falling in the winter below 0°C, wintering bats in the cave are mainly cryophilic bats such as Natterer's bat (*Myotis nattereri*), Greater mouse-eared bat (*Myotis myotis*), Barbastelle (*Barbastella barbastellus*) and Brown long-eared bat (*Plecotus auritus*).

Due to its natural values and the importance of the conservation status of the bat population, Szachownica Cave has been included in the Natura 2000 programme, as an area of Community importance Szachownica PLH240004. Under the designated of the preserve, the habitat listed in Annex I of the Habitats Directive: *caves not accessible to visitors* 8310 is also protected. The Natura 2000 area covers the whole of the nature reserve Szachownica.

Thanks to the variety of thermal conditions and unlimited number of convenient roosts, in the cave every year hibernate more than 2000 bats, representing eleven species. There are four species listed in Appendix II of the Habitats Directive, which are protected in this area: Barbastelle (*Barbastella barbastellus*) 1308, Bechstein's bat (*Myotis bechsteinii*) 1324, Pond bat (*Myotis dasycneme*) 1318, Greater mouse-eared bat (*Myotis myotis*) 1304.

A need of implementation

Although the origin of Szachownica Cave is related to natural processes, its present shape is the result of the exploitation of limestone until 1962. As a consequence of the mining activity and the processes of weathering, in the undergrounds were observed very intensive processes of rock mass disintegration, manifesting, among other things, the fall of rocks from the ceiling and walls and clear deflections of the slope. Due to the geological value Szachownica has been registered as a nature reserve in 1978. In turn, its importance for the conservation of bat species rare in Poland and Europe, in 2007 resulted in the inclusion of the cave in the Natura 2000. It is the responsibility of the EU Member State to ensure the proper conservation status of the species and habitats for

which the Natura 2000 site has been established. In case of Szachownica Cave it has been stated, that the condition of the maintaining the proper condition of bats conservation in the area is to stop the disintegration of the cave ceiling in "Szachownica I", artificially widened and the opening area of "Szachownica II" cave.

In order to confirm the need to undertake planned actions to protect the Szachownica Cave, a positive opinion was also received by the Association for the Conservation of Bats. Chiropterologists have confirmed that complete destruction of the cave would result in a reduction in the number and volume of area used by bats, micro-climate change in the rest of the cave, and the emergence of obstacles with a difficult to predict scale preventing bats from entering the corridors. Existing hibernaculum due to microclimatic changes would undoubtedly lose its properties. Particularly negative impact for the cave would be a possible collapse of the ceiling, which would significantly reduce the place of seasonal, mass bat swarming. In the prepared opinion there was pointed out that it is necessary and urgent to carry out conservation work if area of Natura 2000 "Szachownica" is to retain the value for which it was designated.

LIFE+ Financial Instrument

LIFE + financial instruments were the opportunity to carry out the works. In 2012, the Regional Directorate for Environmental Protection in Katowice has prepared an application for co-financing the task of strengthening the ceiling of Szachownica Cave. The application passed a positive review and was supported by the National Fund for Environmental Protection and Water Management, which is the second institution financing the project.

For the effectiveness of the actions proposed in the project, the European Commission was convinced by among others the results of the German project called Conservation of the bat habitat community in the former Mayener Grubenfeld Mine, which was implemented between 2007 and 2013. It included protection measure for the ceiling blocks and fallen rock fragments. The strengthening of rock fragments was done in the way, as in Szachownica Cave, in order to maintain a good state of the bat population.

In 2013, there was signed an agreement with the European Commission and the National Fund for Environmental Protection and Water Management to fund the LIFE + task. "Carrying out the necessary conservation work on a territory of Szachownica Cave designated within Natura 2000 / Wykonanie zabiegów ochrony przyrody na terenie Specjalnego Obszaru Ochrony Siedlisk Natura 2000 Szachownica" LIFE12 NAT/PL/000012.

Implementation, technical documentation

The first step, before starting the physical strengthening of the rock mass, was to perform a detailed technical specification for planned protections. The task was entrusted to the Department of Taps and Strata Mechanics of the Main Mining

Institute. The documentation outlined the places identified in the cave with risk of collapse, provided details of the work to be done, included information on materials and equipment and machinery requirements, as well as special requirements, description of control activities, research and acceptance of works and accompanying works.

Works in the cave

The next stage of the LIFE Szachownica/PL project was to select a contractor for the job in an open tender, who had to strengthen the ceiling. The most dangerous part of the project was made by NOVUM Servis Sp. z o.o. from Zabrze. The work of maintenance and strengthening of rock mass was carried out between 2015 and 2016. In the framework of the works there was applied a combination of injection, anchoring and physical support of the ceilings in the most sensitive areas. In addition, the gritty destruction of the nets was covered by a mesh and their structure was reinforced by injection bolts.

The whole work was supervised by the so-called Monitoring team, consisting of members of LIFE Szachownica/PL design team, technical supervision inspector, technical documentation authors and natural science experts.

Results

The main objective of the project was to maintain a significant place of bats colonies. It was achieved by stopping the disintegration of the ceiling of the cave, and in particular by:

- solid securing of fragments of ceilings and caverns of the cave,
- maintaining the number and volume of areas used by bats,
- keeping in place the bat's entry point into the cave,
- maintaining proper cave ventilation in the unchanged condition.

The rock mass reinforcements were made in the halls of cave "Szachownica I" with risk of collapse and the entrance chamber to the "Szachownica II" cave. Assumed aims have been achieved.

In order to strengthen the ecological effect of the task, there were also made efforts to organize the tourism movement in the immediate vicinity of the cave. From the rock blocks was made visual barrier around the entrance to the cave "Szachownica I". Fencing in front of the cave is to clearly inform about the inaccessibility of the cave to visit. In addition, it minimizes the threat of bats disturbing by tourists. The ceiling and walls of the cave were protected to allow bats to stay there. According to the assumption of the project, no work was done to make the site accessible to the public. Szachownica Cave is still dangerous for visitors. There are small fragments of rock fragments all the time, because the ceiling has not been fully glued and secured.

