

# Caves of Aggtelek Karst and Slovak Karst

## 2020 Conservation Outlook Assessment

### SITE INFORMATION

**Country:** Hungary, Slovakia

**Inscribed in:** 1995

**Criteria:** (viii)



The variety of formations and the fact that they are concentrated in a restricted area means that the 712 caves currently identified make up a typical temperate-zone karstic system. Because they display an extremely rare combination of tropical and glacial climatic effects, they make it possible to study geological history over tens of millions of years. © UNESCO

### SUMMARY

#### 2020 Conservation Outlook

Finalised on 02 Dec 2020

**GOOD**

The conservation outlook for the karst features of the site is positive overall. Only about 1% of the caves are open for visitation and careful monitoring programmes are in place. Protection and management of the karst areas is relatively effective both in Hungary and Slovakia and on transboundary level. However, there are some concerns regarding the lack of resources, particularly in Slovakia where the current staff numbers and funding are insufficient and significantly lower than in the Aggtelek National Park in Hungary. Certain areas will require improvement, including better cooperation between different institutions and better engagement of local communities. Potential threats, such as pollution or infrastructure projects in the broader region, will require monitoring and careful planning, ensuring that the necessary environmental impact assessments have been undertaken, as well as development of an integrated management of the entire water catchment, and this will need to be supported by adequate funding in the long term.

## FULL ASSESSMENT

### Description of values

#### Values

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##### Other important biodiversity values

► **Important cave biodiversity**

Cave and subterranean water fauna are of particular scientific interest (IUCN, 1995). Beetles and other insects are abundant. Cave worms are often found in sand and clay deposits whereas molluscs are associated with underground streams, and crustaceans occur including an endemic species of primitive crab. A total of 21 bat species were recorded at the time of inscription (IUCN, 1995) and 28 are known at present (IUCN Consultation, 2020a). In total, about 500 animal species have been identified in the caves, many of them endemic (IUCN Consultation, 2020a).

► **Above-ground biodiversity**

A unique biotope arises where two floral sectors (Carpathian and Pannonian) overlap, and consequently many rare endemics can be found throughout the territory. Approximately 70% of the territory consists of deciduous woodland dominated by hornbeam and oak. The fauna includes wolf, lynx, red deer, roe deer, wild boar, wild cat and badger. Nesting bird species include: rock bunting, black stork, corncrake, imperial eagle, dipper, Ural owl, saker falcon, short-toed eagle, honey buzzard (IUCN, 1995).

### Assessment information

#### Threats

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##### Current Threats

Low Threat

Despite the strict conservation activities, the fact that the caves are visited by such a large number of visitors might eventually lead to some damage and pilferage. This threat is managed by keeping the number of visitors within the carrying capacity and offering guided tours only. Effects of new threats, such as climate change, are hard to predict. However, the level of threat remains low.

► **Solid Waste**

*(Illegal garbage disposal)*

Very Low Threat

Inside site, localised (<5%)

Outside site

Elimination of illegal garbage disposal and building debris in caves (Gaál & Gruber, 2015) and in the surrounding settlements is necessary to prevent pollution of the water in the caves system (World Heritage Committee, 2013). In the Hungarian part of the site, there is selective waste collection in the villages and illegal garbage disposal is rare (IUCN Consultation, 2020b).

► **Water Pollution**

*(Pollution from human activities)*

Low Threat

Inside site, scattered (5-15%)

Outside site

There was a pollution problem which contaminated cave waters and threatened the park's ecosystem. This arose from use of pesticides and fertilizers in the surrounding areas and from tourist's vehicles and nearby industry (IUCN, 2000). Now a substantial part of agricultural land consists of permanent grasslands with preference of ecological agriculture (IUCN Consultation, 2020). The protected water management area of the Slovak Karst (natural water accumulation) has also been declared on the territory, and the missing sewers and wastewater treatment plants have been built in several municipalities (e.g. Silica).

A project was prepared for improvement and wise use of the precipitation water including the increase of retention and water regime potential, both of surface and underground territories, however, it is still waiting for proper grant scheme to be submitted (planned to use the EEA grants scheme) (IUCN Consultation, 2020c).

► **Tourism/ visitors/ recreation**

**Very Low Threat**

*(Large number of visitors in the caves)*

Inside site, localised(<5%)

More than 99% of the Caves of Aggtelek Karst and Slovak Karst is preserved in its original natural condition and is well protected. The other 1% has been substantially modified as “show-caves” to allow human use, which includes 300,000 visitors annually (World Heritage Committee, 2013). Despite the strict conservation activities, the fact that the caves are visited by such a large number of visitors might eventually lead to some damage and pilferage.

Due to the global situation related to COVID-19 pandemic in 2020, all caves have been closed to visitors for several months (IUCN Consultation, 2020).

► **Temperature extremes, Storms/Flooding**

**High Threat**

*(Effects of rising temperature and extremes in precipitation)*

Inside site, throughout(>50%)

Outside site

Climate change manifests through its effects on flora and fauna, as well as decreased ice in the ice caves Silica (Šupinský et al., 2019) and Dobšinská or disappearance of cave decoration, erosion of soil and deposition of sediments in caves and associated possible changes in hydrological regime. Water scarcity above the ground and droughts can also affect the hydrological regime of the caves (States Parties of Hungary and Slovakia, 2014; IUCN Consultation, 2020).

**Potential Threats**

**Low Threat**

There is a potential risk of pollution of the cave system from mining, agricultural and forestry activities on the land in the area. Protection of the unique geological features of the site requires integrated management of the entire water catchment.

► **Other**

**Low Threat**

*(Surface activities)*

Inside site, widespread(15-50%)

Outside site

The cave system is exceptionally sensitive to environmental changes, including mining (mining in quarries Včeláre or Gombasek is in operation and located outside protected areas), agricultural and forestry activities (inappropriate management in commercial forests). Maintenance of the integrity of active geological and hydrological processes (karst formation and the development or evolution of stalagmites and stalactites) requires integrated management of the entire water catchment area (World Heritage Committee, 2013). Expansion and modernization of transport infrastructure can affect e.g. Hrušovská cave (new planned R2 motorway tunnel Soroška - Zahorec et al., 2019).

► **Oil/ Gas exploration/development**

**High Threat**

*(Risk of oil leakage from the pipeline crossing the Slovak component of the property)*

Inside site, scattered(5-15%)

Energy distribution network - oil and gas pipeline crosses the Slovak Karst national park with approximately 25 kilometres of the pipeline running through the national park territory. While the necessary monitoring and prevention measures are in place (Gaál & Gruber, 2015), a potential oil leakage would cause serious impacts on the property.

## Protection and management

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### Assessing Protection and Management

► **Management system**

**Some Concern**

In Slovakia, management of the caves system is implemented by the Slovak Caves Administration in Liptovský Mikuláš as part of State Nature Conservancy of Slovak Republic. Management of terrestrial ecosystems is implemented by the Authority of the Slovak Karst National Park in Brzotín (with the exception of the surface part of the Dobšinská ice cave, which is under administration of the Slovak Paradise National Park). Aggtelek Karst is administered by the Aggtelek National Park Directorate. The administrative bodies in two countries carry out joint projects including research, protection and monitoring (World Heritage Committee, 2013). An Integrated Management Plan has been prepared for the transboundary site. However, it has not been approved. Coordination between different administrative bodies and levels could be improved (States Parties of Hungary and Slovakia, 2014). The countries have several cross-border projects realized, currently finishing the Interreg project “Medical/wellness tourism development in the World Heritage caves of the Aggtelek and Slovak Karst” with a total budget of 1.6 mil EUR realized fully within the World Heritage territory (IUCN Consultation, 2020c).

► **Effectiveness of management system**

**Some Concern**

Protection of the caves appears effective. However, there is some room for improvement (management activities related to surface areas and the cave environment must be well connected). Sharing of economic benefits derived from tourism with local people in area and their involvement could also be improved. Results of management evaluation (Tomaškinová & Tomaškin, 2013) showed a need for more effective management and protection in the Slovak Karst national park area, including in such topics as zoning, cooperation, marketing and PR, communication and involvement of relevant stakeholders and regional development.

► **Boundaries**

**Mostly Effective**

The site's northern and southern boundaries are defined by the geological borderline between karstic and nonkarstic rocks, whilst the western and northeasternmost points comprise Jelšava town and Jasov village, respectively (IUCN, 2000). Boundaries are adequate to maintain the property's values. However, they are not well known by local residents, communities and landowners (States Parties of Hungary and Slovakia, 2014).

► **Integration into regional and national planning systems**

**Mostly Effective**

Both national parks are well integrated into the regional systems of protected areas and are also Multi-Internationally Designated Areas (Natura 2000, Ramsar site, Biosphere Reserve). In Slovakia the caves are located almost exclusively within the territory of the Slovak Karst National Park and the Slovak Paradise National Park (Dobsina Ice Cave within Stratena cave system).

► **Relationships with local people**

**Some Concern**

There is one sizeable settlement (Silica) and two hamlets within the Slovak protected area and two villages (Aggtelek and Jósvalfó with approximately 1,100 inhabitants) inside the Aggtelek National Park's boundaries (World Heritage Committee, 2013). Some challenges remain related to ensuring better involvement of key stakeholders in site management, communications and benefits sharing. Socio-economic situation of the Aggtelek Karst microregion is relatively better than that of the neighbouring regions, and this relative welfare is due to the existence of the national park and Baradla Cave (Telbisz et al., 2020).

► **Legal framework**

**Mostly Effective**

All of the caves are State-owned and their protection is guaranteed by the Act no. LIII. 1996 on nature protection in Hungary and by the Slovak Constitution no. 90/2001, and the Act of Nature Protection and Landscape no. 543/2002 in Slovakia, irrespective of ownership or protection status of the surface areas (World Heritage Committee, 2013). The Aggtelek Karst (Hungary) was first declared a protected landscape area in 1978 under decision No.8/1978 of the President of the National Authority for Environment and Nature Conservation (OKTH), and in 1985 was designated a national park by law-decree No.7/1984 (XII.29.) OKTH (IUCN, 2000). The Slovak Karst Landscape Protected Area was established in 1973 and in 2002 the Slovak Karst National Park was designated (Act No. 543/2002). The

protection arrangements were considered highly effective in Hungary and sufficiently effective in Slovakia (States Parties of Hungary and Slovakia, 2006). The latest Periodic Report (States Parties of Hungary and Slovakia, 2014) stated that legal framework provided an adequate basis for effective management and protection but that some deficiencies remained. Protection of caves is, if necessary, also ensured by declaring protection zones on the surface (e.g. Milada Cave). The whole process is lengthy and demanding, includes participation of landowners and, as everything, has to be approved by the government regulation. The amendment to the Nature and Landscape Protection Act specifies the conditions for renting caves for a certain period (IUCN Consultation, 2020).

► **Law enforcement**

**Some Concern**

Permanent monitoring and control of caves' condition used to be carried out by Speleological Guardian Service, which due to lack of financial sources stopped this activity in 2010 (Gaál et al., 2015). Closing (gating) of some caves for public, camera systems, technical equipment and protective zones of caves have improved the situation.

► **Implementation of Committee decisions and recommendations**

**Data Deficient**

No recent Committee decisions.

► **Sustainable use**

**Mostly Effective**

The current levels of visitation appear sustainable, however, careful monitoring is required to ensure conservation of the site's values (IUCN Consultation, 2020).

► **Sustainable finance**

**Some Concern**

In both countries the national parks receive budget from the state which appears adequate, particularly in Hungary. Yearly budget of Aggtelek NP is approx. 12,3 mil. Euro. On Slovak side, data on Protected Areas expenses is currently not comparable. State Nature Conservancy of the Slovak Republic does not record expenditures in a way that would allow to compare unit expenditure by national parks or protected landscape areas. However, just for comparison, the whole budget of the State Nature Conservancy of the Slovak Republic (9 National Parks, 14 Protected Landscape Areas including Slovak Cave Administration) in 2019 year was only 5,2 mil. Euro, excluding funding received from the EU (IUCN Consultation, 2020). Existing sources of funding coming from few sources are not secure in the long-term and could be improved to meet management needs (States Parties of Hungary and Slovakia, 2014). Additional financial resource are needed to support control and monitoring activities, as well as risk preparedness and contingency planning for potential accidents.

Both parties use various grant schemes to improve the budget they have for financing the World Heritage site. The EU structural funds are used on a long term basis, with by now a used sum exceeding 2.5 million EUR on the Slovak side (IUCN Consultation, 2020c).

► **Staff capacity, training, and development**

**Mostly Effective**

In Slovakia, there are 11 administrative staff members of national park administration and 6 caves open for public have administrator and few guides as staff members of Slovak cave administration (14 people). Due to lack of financial resources, the current staff numbers are insufficient, especially the number of cave guards. In Hungary, the Aggtelek National Park Directorate is comprised of 145 staff members, 16 of them are responsible for caves (IUCN Consultation, 2020a); however, there has been some decrease in the number of staff since 2018 (IUCN Consultation, 2020b). Speleological staff in both countries receive occasionally training.

► **Education and interpretation programs**

**Mostly Effective**

Both countries have good education and interpretation programmes in place (States Parties of Hungary and Slovakia, 2006). Interpretative trail (e.g. reconstruction of Domica trail supported by Interreg), exhibition, promotion materials including film and lectures have been developed for visitors (Gaál et al., 2015). However education and awareness building activities could be still improved (States Parties of Hungary and Slovakia, 2014). Two journals (Aragonit and Slovenský kras) are published regularly in

print. In Hungary, there are special programs for local elementary school pupils (IUCN Consultation, 2020b).

► **Tourism and visitation management**

**Highly Effective**

Interpretation of cave protection, cave values and cave benefit for local people is effective. There are materials available in both countries. Visitor rules for caves exist and are being applied. A tourism management plan is available in both countries (States Parties of Hungary and Slovakia, 2006). Visitation is relatively stable, however due to precautionary measures to prevent the spread of the coronavirus (COVID-19), the caves were closed for public in early 2020 (IUCN Consultation, 2020). A project was submitted for Interreg V-A program in 2019 under the name “Development of nature based attractions in the world heritage sites of Aggtelek and the Slovak Karst”. Among other things, it comprised a unique concept of a Speleopark near the Gombasek Cave, aiming at presentation of both natural and educational and artistic expression of caves. However, the project was not selected for financing (IUCN Consultation, 2020c).

► **Monitoring**

**Mostly Effective**

Regular monitoring of the caves’ state and development is carried out by the Aggtelek National Park Directorate in Hungary and the Slovak Caves Administration (States Parties of Hungary and Slovakia, 2006). Because the site belongs to important underground sites for bats in Europe (Eurobats) there is a regular winter census of bats in cooperation with the Slovak Bat Conservation Society. Mapping of underground spaces by members of the Slovak Speleological Society continued. Monitoring is also focused on study of the environmental and hydrological processes in caves (Czuppon et al., 2018) and karst area (Gessert et al., 2019). The Slovak World Heritage show caves have installations of a permanent climatic and hydrological monitoring connected to the headquarters of the Slovak Caves Administration (IUCN Consultation, 2020c).

► **Research**

**Mostly Effective**

In Slovakia, different home and foreign institutions (e.g. Slovak and Czech Academy of Sciences, and Slovak, Czech and Polish universities) are involved in the research activities, mainly geological, geomorphological, hydrogeological, speleoclimatic, biospeleologic studies (Gaál et al., 2015). Research in Hungarian caves is undertaken by the Hungarian Academy of Science in collaboration with the Aggtelek National Park Directorate (Gruber, 2015). The scientific research is increasing, e.g. biological, archaeological and hydrogeological research of the caves (Gruber & Gaál, 2014). The following examples of recent work can be mentioned: study of endemic and relict cave fauna species (Derbák et al., 2018; Červená et al., 2019), biomass production and carbon stocks of above-and below-ground biomass in grassland (Kizeková et al., 2019), lower plants diversity in karstic streams (Czerwik-Marcinkowska et al., 2018), bacterial diversity in soils (Knáb et al., 2018) and geomorphology studies (Hofierka et al., 2018; Bella et al., 2019). Scientific papers with participation of the Slovak Caves Administration were published on karst morphological features of Aggtelek Karst and Jósua River valley (Bella et al., 2016) and on geomorphology of the Moldava Cave (Bella et al., 2018). The 12th Scientific Conference on research, utilization and protection of caves at the occasion of the 25th anniversary of the inscription of the Caves of Aggtelek Karst and Slovak Karst on the World Heritage List was held in Slovakia in September, 2020, within limited participants due to the COVID-19 pandemic (IUCN Consultation, 2020c).

## **Overall assessment of protection and management**

► **Assessment of the effectiveness of protection and management in addressing threats outside the site**

**Some Concern**

Management programs are mainly focused on the internal threats. The few threats from outside the site, such as water flow from arable agriculture lands, have not been addressed sufficiently (e.g. polders capturing flood waters) (IUCN Consultation, 2020). A project was prepared for improvement and wise use of the precipitation water including the increase of retention and water regime potential, both of surface and underground territories, however, this has still not been funded (IUCN

Consultation, 2020c).

## State and trend of values

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### Summary of the Values

► **Assessment of the current state and trend of World Heritage values**

**Trend: Stable**

► **Assessment of the current state and trend of other important biodiversity values**

**Low Concern  
Trend: Stable**

The state of the site's above-ground biodiversity is regularly assessed through a comprehensive information and monitoring system within the monitoring of habitats and species of European importance in the Slovak Republic. The conservation status is different for individual species and habitats depending on the impacts and threats (Černecký et al., 2020).

## Additional information

### Benefits

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#### Understanding Benefits

► **Outdoor recreation and tourism**

Tourism generates considerable economic benefits. About 300,000 tourists visit the caves annually (World Heritage Committee, 2013).

Factors negatively affecting provision of this benefit :

- Climate change Impact level - Moderate, Trend - Increasing
- Overexploitation Impact level - Moderate, Trend - Continuing

► **Importance for research, Contribution to education**

Unique natural phenomena (e.g. rareness of ice-filled caves) including archaeological findings and historical monuments served as exemplary study objects for science and education.

Factors negatively affecting provision of this benefit :

- Climate change Impact level - Moderate, Trend - Increasing
- Pollution Impact level - Low, Trend - Decreasing
- Overexploitation Impact level - Moderate, Trend - Continuing
- Habitat change Impact level - Low, Trend - Continuing

► **Outdoor recreation and tourism**

The therapeutic effect of the air in the cave Béke near Jósvalfő was recognised very early in history and in 1969 it was officially declared the first therapeutic cave in Hungary. Researchers have recognised the special climate of the cave, which - due to the aspects of hygiene and microbiology - has a therapeutic effect. However, the potential use of caves for therapeutical purposes is currently being further researched, the introductory results are very positive (<http://www.skhu.eu/funded-projects/medical-wellness-tourism-development-in-the-world-heritage-caves-of-the-aggtelek-and-slovak-karst>).

### Summary of benefits

The site contributes to the national economies through tourism and is also important for science and education. Caves are attractive as ecotourism destinations (Béki et al., 2017) and provide unique opportunities to educate the public about biodiversity values and ecosystem services (water availability or human health).

## Projects

### Compilation of active conservation projects

№	Organization	Brief description of Active Projects	Website
1	State Nature Conservancy of Slovak Republic	Birds without borders - SKHU/1601/1.1/065. The main outcome of the project is to broaden the services of the ornithological camps for both professionals and the public, by improving accessibility, providing better equipment for catching and observing birds, providing full-time professional and lecturer service for the visitors during the migration season, creating adventurous nature trails directly at the ornithological camps, creating observation towers at other venues and introduction of eco-education activities for the visitors all year, even beyond the main bird migration season.	<a href="http://www.skhu.eu/funded-projects/birds-without-borders">http://www.skhu.eu/funded-projects/birds-without-borders</a>
2	Aggtelek National Park Directorate	Medical/wellness tourism development in the world heritage caves of the Aggtelek and Slovak karst - SKHU/1601/1.1/035. The aim of the project is to perform the obligatory surveys required for the certification of the caves of the cross-border cave system of the Aggtelek and Slovak Karst as therapeutic caves. Further aim is the creation of the infrastructure necessary for the operation of the therapeutic caves, the performance of the necessary internal and external construction works and the procurement of the assets required for the performance of speleotherapy. The first results are promising.	<a href="http://www.skhu.eu/funded-projects/medical-wellness-tourism-development-in-the-world-heritage-caves-of-the-aggtelek-and-slovak-karst">http://www.skhu.eu/funded-projects/medical-wellness-tourism-development-in-the-world-heritage-caves-of-the-aggtelek-and-slovak-karst</a>
3	Bratislavské regionálne ochrannárske združenie BROZ	Conservation of subpannonic dry grassland habitats and species - LIFE17 NAT/SK/000589. Project LIFE SUB-PANNONIC focuses on restoration of rare dry grassland ecosystems which are currently threatened by succession and invasive plant species due to the abandonment of traditional grazing and management. The restoration of the rare habitats is done with sustainable management through grazing animals by local farmers. On several project sites also in Slovak Karst the project improves the status of rare habitats and the protection status of population of floral species of European Importance.	<a href="https://broz.sk/en/projekty/life-sub-pannonic/">https://broz.sk/en/projekty/life-sub-pannonic/</a>



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