

World Heritage Sites

Protected Areas and World Heritage



CAVES OF AGGTELEK KARST AND SLOVAK KARST HUNGARY & SLOVAKIA

The variety and concentration of their formations make these cave systems of 712 caves excellent representatives of a temperate-zone karstic network. They also display an extremely rare combination of tropical and glacial climatic effects, making it possible to study geological history over tens of millions of years.

COUNTRY

Hungary and Slovakia

NAME

Caves of Aggtelek Karst and Slovak Karst

NATURAL WORLD HERITAGE TRANSBOUNDARY SERIAL SITE

1995: The cave systems of the two protected areas jointly inscribed on the World Heritage List under Natural Criterion viii.

2000: Extended to include Dobšinská cave in Slovakia (660 ha). 2008: Extended by 87.8 ha.

STATEMENT OF OUTSTANDING UNIVERSAL VALUE [pending]

INTERNATIONAL DESIGNATIONS

1977: *Slovensky Kras* Protected Landscape Area designated a Biosphere Reserve under the UNESCO Man & Biosphere Programme (36,166 ha).

1979: Aggtelek National Park designated a Biosphere Reserve under the UNESCO Man & Biosphere Programme (19,247 ha);

2001: Baradla Cave System & Related Wetlands, Hungary (2,075 ha) and Domica Wetland in the *Slovensky Kras*, Slovak Republic (627 ha) both in Aggtelek National Park, designated a transboundary Wetland of International Importance under the Ramsar Convention.

IUCN MANAGEMENT CATEGORY

II National Parks

BIOGEOGRAPHICAL PROVINCE

Middle European Forest (2.11.5)

GEOGRAPHICAL LOCATION

Straddles the Slovensky Kras foothills of the Carpathian mountains on the border of southern Slovakia and northern Hungary 152 km northeast of Budapest and 55 km southwest of Kosice. The caves lie between 48°25' to 48°40'N and 20°15' to 21°00'E.

DATES AND HISTORY OF ESTABLISHMENT

1973: The Slovensky Kras (Slovak Karst) proclaimed a protected landscape area by Ministry of Culture Decree 110/1973 under the Protection of the Nature Act No.1/1955:

- 1978: The Budai protected landscape area in the Hungarian Aggtelek Karst proclaimed under decision No.8/1978 of the President of the National Authority for Environment and Nature Conservation;
- 1985 The Aggtelek Karst redesignated a National Park (19,708 ha) by Decree 7/1984 (19,861 ha);
- 2002: The Slovensky Kras redesignated a National Park (36,166 ha).
- 2008: Extended by 87.8 ha; a buffer zone of 28,000 ha proposed.

LAND TENURE

Hungarian and Slovakian states; in Borsod-Abaúj-Aemplén county in Hungary and the Rožnava District of Kosice county in Slovakia. Managed by the Aggtelek National Park Directorate (OKTH) under the National Authority for Nature Conservation. Slovensky Kras National Park is managed by the local Administration of Protected Landscapes and Biosphere Reserves under the Slovak Agency for the Environment.

AREA

56,650.6 ha is the area of the land surface above the caves protected within the Aggtelek, Slovensky Kras and Slovensky Raj (containing Dobšinská) National Parks. The designated World Heritage underground area is much smaller; eg: the area above Dobšinská cave is only 660 ha). There is a buffer area of 86,797.3 ha.

ALTITUDE

970m (Dobšinská Cave entrance) to - 235m deep (Vecsembükk pothole).

PHYSICAL FEATURES

Beneath a low series of plateaus dissected by deep valleys, sink-holes, eroded karrenfields, dolinas and dolina pools the Jósvalfö-Aggtelek-Domitsa system of 712 caves in 14 cave systems is the most extensively explored area of karst in Europe and the third largest such system in the world. 273 caves are known on the Hungarian side of the border. The lower Triassic bedrock is comprised of impermeable, resistant, argillaceous and marly slates, variegated grit and sandstone. Above this lie layers over a kilometre thick of predominantly 230-year old middle Triassic and upper Triassic, weakly resistant limestones with some dolomite originating from Triassic calcareous shallow sea sediments. The present karst landscape has been developing intermittently since the late Cretaceous Period about 100 million years ago. Much of it has undergone fossilization, burial and later exhumation by erosion. The resulting features contain much evidence of the geologic history of the last tens of millions of years. Relics of pre-Pleistocene karst over 2 million years old are very distinct in the Slovak Karst, many showing evidence of sub-tropical and tropical climatic forms, including relict tropical karst hills later modified by Pleistocene periglacial weathering. This very unusual combination is probably better documented there than anywhere else in the world. Beginning some two million years ago, extensive and complex surface and underground erosion developed in this rock into classic forms of temperate climate karst. The resulting cave types, both fluvial and shaft, with 17 out of the 25 basic types of speleothems, and temperate zone karst features are not unusually spectacular but they are beautiful, exceptionally varied in form and concentrated in area.

The most notable of these is the Baradla-Domica cave system which is 25 km long, including branches, 19.4 km being in Hungary. It runs north-south, connecting Hungary with Slovakia underground. This has a cavern 50m in diameter capable of holding 1,000 people, the world's highest stalagmite at 32.7m, a 13m long stalactite, and an underground river, the Styx, which originates within the Slovakian caves. The caves are noted for their aragonite and sinter formations. The 10-km long Béke cave (closed) has a stream dammed by travertine into numerous pools and air so pure that it is used medically. The Rákóczi cave, opened up by mining, has coralloid formations. Open caves include the Gombasecká, Ochtinska and Jasovska caves. Speleotherms include calcite crystal masses and shields, aragonite, helictites, moonmilk, draperies, pearls, and soda-straw stalactites. Many of the younger caves formed at the plateau edges such as Krásnohorská and Gombasecká, occur on several levels and contain decorative dripstones and calcite crystal forms. The Slovakian section includes an outlier 21km north in the Dobšinská ice-cave in the Stratenska cave network under Slovensky Raj National Park. This cave, which is filled with ice formations (*glaciére*) at only 969m above sea-level, is unique in central Europe and one of the largest and best examples of its kind. On the surface there are intermittent pools though

few streams, but the circulation of water in the subterranean wetlands is complex (OKTH, 1994; IUCN, 1995, 2000).

CLIMATE

Influenced by the Carpathian mountains, the climate is humid cool continental with long summers. The average low elevation temperature is -3°C in January and 19°C in July, decreasing with altitude to -7°C and 14°C, respectively. The annual rainfall totals 620mm in the lowest and 1000mm in the highest part of the tablelands, falling more in the spring. Depending on elevation, snow cover persists between 60 and 139 days. The temperature in the caves remains at a constant 12°C, with a relative humidity of 95-98%. The temperature in Dobšinská ice cave remains around -6°C.

VEGETATION

The designated site is underground. Above ground the original Oak-Hornbeam *Quercus-Carpinus* forest is now largely forest-steppe vegetation which has wide geographic affinities: Pannonian, Carpathian and continental with some sub-Mediterranean elements. The limestone bedrock and moderate climate, provide habitats for over 900 species of vascular plants, making the area one of the botanically richest in Central Europe with many rare endemics. It has karst pools, cliffs, chasms, deep crevasses and ravines in which the inversion of vegetation zones is very well developed.

FAUNA

Above the caves the surface fauna is representative of the area, with wolf *Canis lupus*, badger *Meles meles*, Eurasian lynx *Lynx lynx*, wildcat *Felis silvestris*, wild boar *Sus scrofa*, red deer *Cervus elephus* and roe deer *Capreolus capreolus*; and the nesting bird species: black stork *Ciconia nigra*, eastern imperial eagle *Aquila heliaca* (VU), short-toed snake-eagle *Circaetus gallicus*, saker falcon *Falco cherrug* (VU), honey buzzard *Pernis apivorus*, corncrake *Crex crex*, Ural owl *Strix uralensis* and white-throated dipper *Cinclus cinclus*. The area round Domica cave also has the 30cm-long parthenogenetic and predatory bush cricket *Sago pedo* (VU). The forest-steppe surface fauna which use cave entrances retains some montane elements in damp and cool valleys, and has wide affinities.

The caves are noted for their diverse and abundant fauna, and are haunted by innumerable colonies of bats of 21 species. Slovakia's largest colony of Mediterranean horseshoe bats *Rhinolophus euryale* is based in Domica cave. The troglobitic fauna of more than 500 species, many blind and colorless, and the aquatic fauna, are of great scientific interest. Karst forms of beetles and insects are particularly abundant. Relict endemics include the Aggtelek cave shrimp *Niphargus aggtelekiensis*, the snail *Bythinella pannonica*, (VU), the carabid beetles *Duvalius hungaricus* *brzotinensis* and *Trechus quadristriatus*, the isopod *Mesoniscus graniger* and arachnid *Eukoenenia austriaca vagvoelgyii*. The beetles *Duvalius bokori bokori* and the insects *Limonia nubeculosa*, *Tarnania fenestralis* and *Eccoptomera obscura* are common. Cave worms such as *Peloscoclex velutinus* and *Rhyacodrilus falciformis* are often found in sand and clay. Molluscs such as *Bythinella austriaca*, *Pisidium personatum* and *P. casertanum*, and crustaceans such as *Niphargus tatrensis* and *Gammarus fossarum* occur in the underground streams (OKTH, 1994). The common fire salamander *Salamandra salamandra* occurs in karst springs.

CONSERVATION VALUE

The caves of Aggtelek and Slovak Karst are noted for their unique subterranean karst landscape of physical and biological formations of great aesthetic, scientific and educational value. They are sited in a WWF Global 200 Ecoregion. On each side of the border they include Ramsar sites and are included within UNESCO Biosphere Reserves.

CULTURAL HERITAGE

Relict tools, hearths and pottery from the Neolithic, Bronze and Iron ages show that the Baradla-Dominca Cave system and Jasovská cave were inhabited before 7.000 years ago and used as a sanctuary and burial place. Pottery from the Bükk, Pilin and Hallstatt cultures have been found in Silická l'adnica Ice Cave. Documentary evidence of the caves of Aggtelek first appeared in 1549 though a Hussite inscription dated to 1447 was found on the walls of Jasovská Cave; the Slovak caves were first mentioned in the mid 16th century. The first record of Baradla Cave was made in 1742 and a scientific description of it made in 1794. In 1825 I. Vass reached the far end of the cave and the first map was printed in 1831. Exploration has continued intermittently ever since.

LOCAL HUMAN POPULATION

Within the Hungarian protected area there are two villages, Aggtelek and Jósvalfő, with about 1,500 inhabitants, small farming communities now becoming more dependent on income from tourism. The Béke cave is connected to an asthma sanatorium (Aggtelek National Park Directorate, 1994). In Slovakia, Silická village is within the protected area.

VISITORS AND VISITOR FACILITIES

Tourists have been visiting the Hungarian caves since 1806, when the first stairs and fences were built. Tourism focuses on the villages of Aggtelek, Jósvalfő and, in Slovakia, Silická. Currently, tourist access in Aggtelek Park is restricted to three caves which are open throughout the year: Baradla-Domica. The first is the most popular, receiving between 150,000 and 200,000 visitors per year and may be visited on guided tours lasting 1, 2, 5 or 7 hours starting from Aggtelek and Jósvalfő. Boat tours on the Styx are also given from both ends of the complex. The Slovakian caves receive fewer visitors where only 1.6 out of 5.6 km in the Domica system were open to the public until early 2007, though visitors can now get through to the Hungarian side. There is a visitors' centre at the entrance to Domica cave. Permits to visit closed caves must be requested from the Hungarian Park directorate at Aggtelek or the Slovak Protected Regions management at Brzotin. The Dobšinská ice-cave has been a tourist attraction since its discovery in 1870 and draws 90,000 visitors a year. Béke cave is used for speleotherapy, the treatment of allergies, asthma and respiratory diseases. A nature trail on the surface links the Slovak Karst with Aggtelek National Park, and there is a 7-km study trail between the entrances of the Baradla cave at Aggtelek and Jósvalfő. There is a visitor centre with an exhibition on the Park in Aggtelek village. Tourism mainly consists of one-day visits but there are hotels nearby. Classical and other music concerts are held in the beautiful Concert Hall of the Baradla Cave which has wonderful acoustics.

SCIENTIFIC RESEARCH AND FACILITIES

The caves have a long history of research. In 1794, the world's first cave map, based on a two kilometre section of Baradla cave, was produced by J. Sartory and by 1825, over 8 km of passage had been mapped. In 1934 the syphons of the Styx were crossed, and the link to the Domica Cave in Slovakia discovered. Research at the site by geologists, biospeleologists, mineralogists and paleontologists has been extensive, into the site's speleology, geology, geomorphology and karst dynamics. Aggtelek, being compact and the most completely explored karst area in Europe, is a model area for demonstrating the interactive relations between geological and hydrogeographical phenomena. The Park hosts organized field courses and camps for professionals and students. Cave surveying, mapping, and hydrogeological investigations have been undertaken by the water authority of north Hungary, based on its Karst Research Station at Jósvalfő. Researches have also covered the flora and fauna and phytogeological and zoogeographical conditions. Two floristic surveys, in 1970 and in 1976-80, were made of a part of the Slovak Karst, the Silice Tableland, by the Department of Geobotanics of the Natural Science Faculty, Comenius University in Bratislava as the basis for a map of the climax vegetation and to determine and evaluate vegetation types. Ecological surveys have also mapped the major habitats and their characteristics. The flora of the site has been recorded in over 100 publications. Educational institutions arrange field trips to the caves and there are study trails in both countries.

MANAGEMENT

Under the auspices of the National Authority for Nature Conservation, Aggtelek is administered by the Aggtelek National Park Directorate in collaboration with the Speleological Institute and the Hungarian Speleological Society. Aggtelek Park has a management plan and its objectives are based on the findings of scientific investigations. They include protecting terrestrial habitats as well as the caves themselves, regulating scientific explorations and research within the caves and increasing services such as information, interpretation and education. Those caves not open to the public, are shut off by safety doors. Specific regulations are enforced, such as for example, to protect hibernating bats. Under the Ministry for the Environment the Slovak Karst National Park is managed by the Administration of the Slovak Caves in cooperation with the Slovak Speleological Society and the Slovak Museum for Nature Protection and Caving. A management plan was developed for the Slovak part of the World Heritage site in 1996. Its objectives include maintaining the accessible caves, providing information and education services and coordinating further research (OKTH, 1994).

MANAGEMENT CONSTRAINTS

The area was originally forested but has been eroded as a result of timber extraction, grazing and farming, now being succeeded by large-scale cereal production. The accompanying increased use of fertilizers and pesticides have introduced considerable quantities of polluting chemicals into the underground cave waters. Acid rain has affected the area and pollution also comes from tourist vehicles and nearby industry. (IUCN, 1995). A threat of limestone mining within what was then the Slovensky Kras Protected Landscape Area in 2001 was averted in 2002 by its designation as a National Park in which mining is prohibited.

STAFF

Aggtelek National Park had 71 full-time and 9 part-time staff in 1995: Management, 9; administration, 6; cave tourism and recreation, 29; on-site conservation staff, 11; maintenance, 16.

Slovensky Kras National Park had 38 persons in 1995: Management, 11; administration, 5; cave tourism and recreation, 16; on-site conservation staff, 2; maintenance, 4.

BUDGET

The major part of the Parks is funded by the governments with some funds from other sources. The annual Budget of Aggtelek National Park was 90 million HUF in 1994 (US\$680,000), and a fund of 100 million HUF (US\$755,000) was available for improving the facilities of Baradla Cave since 1989. The annual budget of the Slovak Karst was 5.19 million Sk (US\$207,070) in 1995.

LOCAL ADDRESSES

The Director, Aggtelek National Park Directorate, 3758 J6svaf6, Tengersizem oldal 1, Hungary

The Director, Slovensky Kras National Park, Biely Kastiel 188, 049 51 Brzotin, Slovakia.

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National Authority for Nature Conservation, 1121 Budapest, K6lto utca 21, Hungary

Ministry for the Environment of the Slovak Republic, Hlbok6 2 812 35, Bratislava, Slovakia

National Authority for Nature Conservation, Speleological Institute, 1121 Budapest, Hungary.

REFERENCES

The principal sources for the above information were the original nomination for World Heritage status and the IUCN Nomination summary.

Aggtelek National Park Directorate (OKTH) (1994). *Caves of Aggtelek and Slovak Karst World Heritage Nomination*. Aggtelek National Park Directorate. 63 pp. [Contains a full bibliography]

Anon (1985). Acid rain devastates eastern Europe. *WWF News*. 23 Jan/Feb.

Berczik, A. (1983). Adaptability of monitoring systems in the management of biosphere reserves - experiences in Hungary. In *Conservation, Science and Society*. First International Biosphere Reserve Congress, Minsk, Byelorussia / USSR. UNESCO-UNEP. pp. 384-388.

Bosak, P., Horacek, I. & Panos, V. (1989). Paleokarst of Czechoslovakia, in P. Bosak, (ed.) *Paleokarst*: Prague, Academia, pp. 107-135.

Bystricky, J., Mazur, E. & Jakal, J. (1972). Karst of Czechoslovakia, in Herak, M. & Stringfield V. (eds) *Karst: Important Karst Regions of the Northern Hemisphere*: Amsterdam, Elsevier. pp. 297-325.

Carter, F. (1984). Pollution problems in post-war Czechoslovakia. *Transactions of the Institute of British Geographers New Series* 10:17-44.

Dudich, E. (1932). *Biologie der Aggteleker Tropfsteinh6hle "Baradla" in Ungarn*. Vienna.

Haberova, I. (1975). Vegetation associations of the alluvia of the Silice Plateau. *Proceedings of the 2nd SBS Congress in Presov*.

Herak M. & Stringfield V. (1972). Karst. In Courbon, P. *et al.* (eds.) (1989). *Atlas of the Great Caves of the World*. 369 pp.

Hungarian Speleological Society (1989). *Karst and Cave*. Special Issue, 112.

IUCN (2000). *Evaluation of Nominations of Natural & Mixed Properties to the World Heritage List*. IUCN Gland, Switzerland.

----- (1995). World Heritage Nomination - Caves of the Aggtelek And Slovak Karst (Hungary/ Slovak Republic). *IUCN, Gland, Switzerland*

Jakal, J. (1975). *Karst of the Silica Plateau (in Slovakia)*. Osveta, Martin. 152 p.

Jenik J. & Price M. (eds) (1989). *Biosphere Reserves on the Crossroads of Central Europe*. MAB, UNESCO, Paris.

Kordos, L. (1984). *Caves of Hungary*. Gondolat, Hungary.

Middleton, J. & Waltham T. 1986. *The Underground Atlas*. 239 pp.

Povolny, F. & Voloscuk, I. (1986). *Management of Biosphere Reserves in Czechoslovak Protected Areas Network*. Paper presented at All European MAB Conference, March 1986.

Slovenská agentú životného prostredia. (1994). *Caves of the Aggtelek and Slovak Karst World Heritage Nomination*. Slovenská agentú životného prostredia. 74 pp. [Contains a full bibliography]

Udvardy, M. (1985). New national park in Hungary. *Parks* 10 (2): 22.

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