# WORLD HERITAGE NOMINATION - IUCN SUMMARY

# CAVES OF THE AGGTELEK AND SLOVAK KARST (HUNGARY/SLOVAK REPUBLIC)

Summary prepared by IUCN/WCMC (March 1995) based on the original nomination supplied by the Governments of Hungary and Slovakia. This original and all documents in support of this nomination will be available for consultation at the meetings of the Bureau and the Committee.

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## 1. LOCATION

Situated on the southern foothills of the Carpathian mountains, on the southern Slovakian and northeastern Hungarian border.

## 2. JURIDICAL DATA

The Slovak Karst and Caves of Aggtelek were both designated protected landscape areas in 1973 and 1978, respectively. The latter was redesignated a national park in 1985. Both sites have been individually accepted as biosphere reserves, Slovak Karst in 1977 and Caves of Aggtelek in 1979.

## 3. IDENTIFICATION

The Caves of Aggtelek and Slovak Karst territory extends over a total area of 55,800ha and topographically comprises limestone plateaus dissected by deep river valleys. The territory is characterised by a fully developed karst landscape, of which dolines are the most typical surface landform. These have developed through solution and are, on average, 100m wide and 20m deep. Other surface phenomena include sink holes and karren fields. This is the most extensively explored karst area in Europe, and a total of 712 have so far been identified. Many of the younger caves which have formed at the plateau edges, such as Krásnohorská and Gombasecká, occur on several levels and contain dripstone decorations. The most notable of these is the Baradla-Domica cave system which is 21km long and connects Hungary with Slovakia. It has a cavern capable of holding 1,000 people, a 13m long stalactite and the autochthonous underground river Styx. These caves are also noted for having the world's highest stalagmite (32.7m), aragonite and sinter formations and an ice filled abyss, which considering the territory's height above sea-level, is a unique phenomena for central Europe. All these karst landforms are the result of long term geomorphological processes typical of this temperate climatic zone. Hydrological conditions are characterised by a lack of surface streams, except between mountain basins, and the complex circulation of underground water.

The flora is representative of both Pannonian and Carpathian elements, giving rise to a unique biotope arises where two floral sectors overlap, and consequently many rare endemics can be found throughout the territory. Approximately 70% of the territory consists of deciduous woodland The fauna is characteristic of steppe/forest-steppe habitats. The caves are noted for their diverse and abundant fauna.

## 4. STATE OF PRESERVATION/CONSERVATION

There is a serious pollution problem which is contaminating cave waters and threatening the park's ecosystem. This arises from the increased use of pesticides and fertilizers in the surrounding areas

and from tourist vehicles and nearby industry.

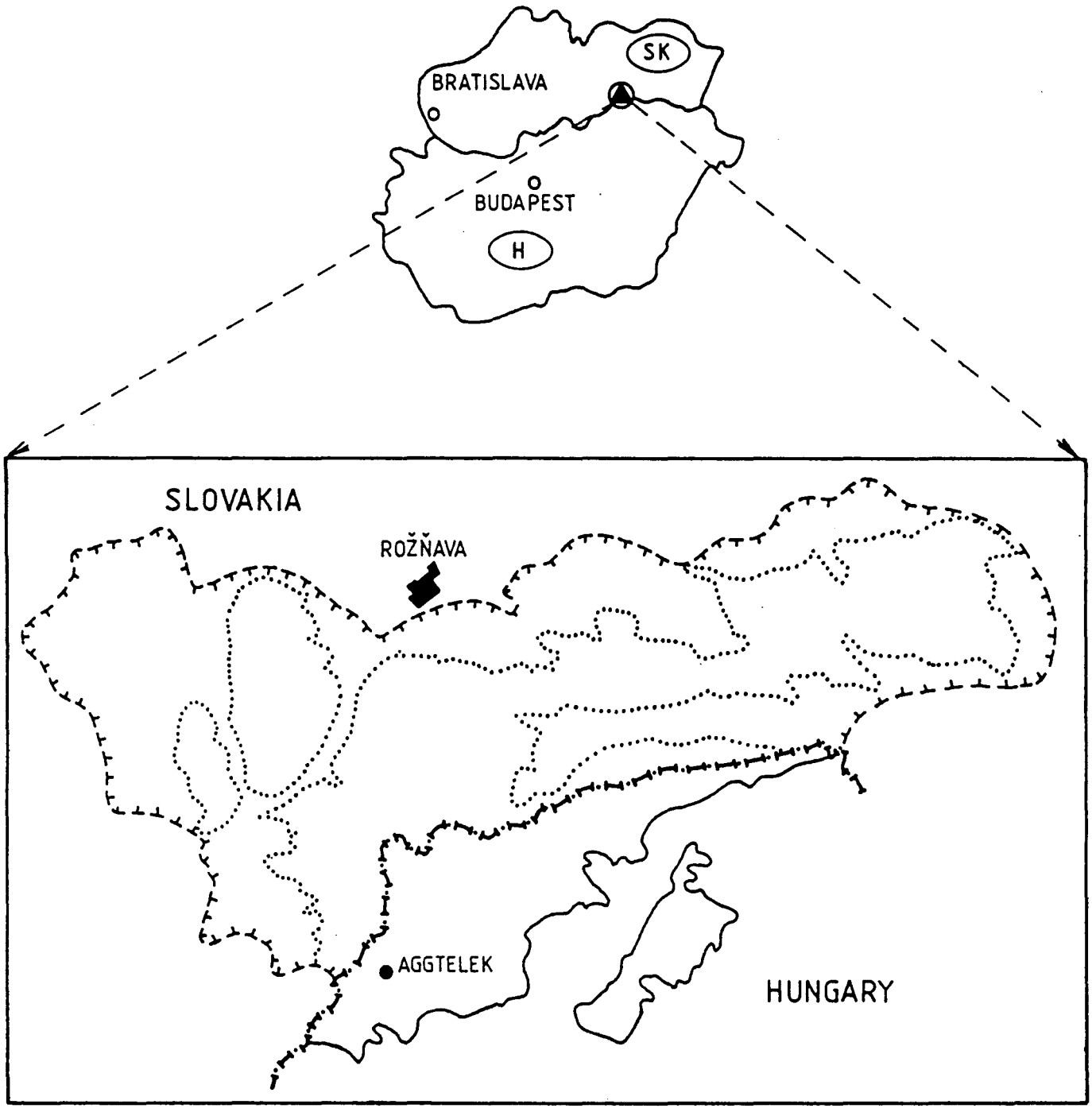
## 5. JUSTIFICATION FOR INCLUSION ON THE WORLD HERITAGE LIST

The Caves of Aggtelek and Slovak Karst nomination, as prepared by the Governments of Hungary and Slovakia, provides the following justification for designation as a World Heritage natural property:

(iii) **Contain superlative natural phenomena or natural beauty** The cave systems are noted for their aragonite formations which within Slovakia are unique. The caves are also known for having the world's highest stalagmite, an ice filled abyss, and various sinter formations such as plumes and shields. The Baradla-Dominca cave system is the second longest in Slovakia.

(iv) **Contain the most important areas of high biodiversity and significant natural habitats for threatened species** The cave systems are an important and significant habitat for the occurrence and survival of endangered species.

# PLAN OF THE LOCATION AND PROTECTION OF TERRITORY




National Park Aggtelek

Protected Landscape Area Slovak Karst

Protektive zone

Government border

# WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

# CAVES OF THE AGGTELEK AND SLOVAK KARST (HUNGARY/SLOVAK REPUBLIC)

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## 1. DOCUMENTATION

i) IUCN/WCMC Data Sheet (13 references)

ii) Additional Literature Consulted: Herak M. & Stringfield V.T. 1972. **Karst**; Courbon P. et. al. (ed.). 1989. **Atlas of the Great Caves of the World**. 369 pp; Middleton J. & Waltham T. 1986. **The Underground Atlas**. 239 pp; Jenik J. & Price M. Eds. **Biosphere Reserves on the Crossroads of Central Europe**. MAB; Hungarian Speleological Society. 1989. Karst and Cave. Special Issue. 112p. Bosák, P., I. Horácek, and V. Panos, 1989, Paleokarst of Czechoslovakia, *in* P. Bosák, ed., **Paleokarst**: Prague, Academia, p. 107-135. Bystricky, J., E. Mazúr, and J. Jakál, 1972, Karst of Czechoslovakia, *in* M. Herak and V.T. Stringfield (eds.), **Karst: Important Karst Regions of the Northern Hemisphere**: Amsterdam, Elsevier, p.297-325. Jakál, J., **Karst of the Silica Plateau** (in Slovakia): Osveta, Martin, 152 p.

iii) Consultations: Fourteen external reviewers, Slovak and Hungarian Government officials and University specialists.

iv) Field Visit: May, 1995. Jim Thorsell

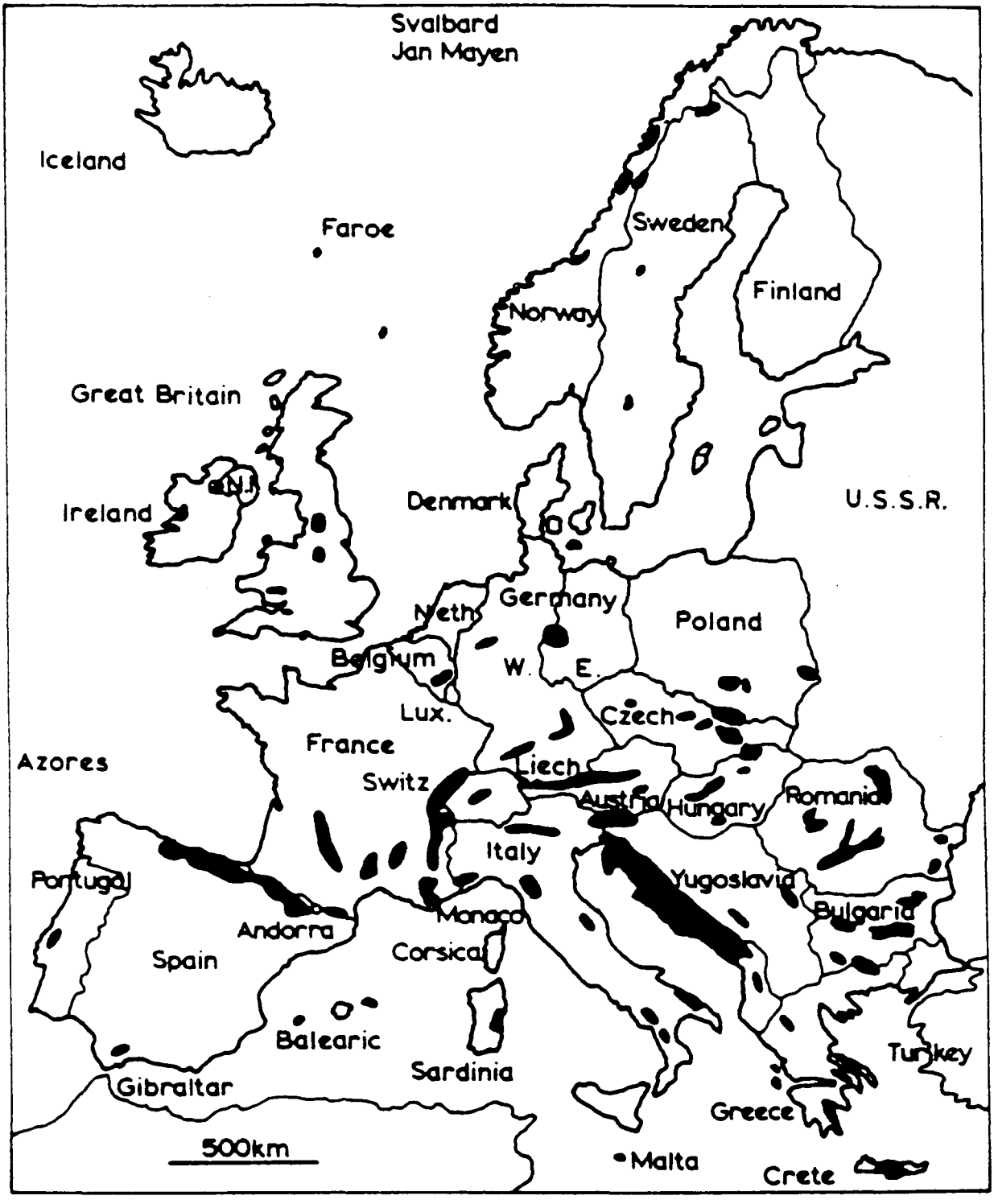
## 2. COMPARISON WITH OTHER AREAS

Karst cave systems are widespread natural features found in many parts of the world. The attached map indicates the location of some of the more significant cave regions in Europe where Karst landscapes are widespread. Two sites have been inscribed on the World Heritage List for their karst features alone: Mammoth Cave in Kentucky and Skocjan Cave in Slovenia. Other very significant caves are associated features of other natural World Heritage sites in the Canadian Rockies, Nahanni, Grand Canyon, Tasmanian Wilderness, and the Australian Mammal fossil site. Other world class caves exist in Sarawak at Gunung Mulu and in Australia at Nullabor. In addition, the Carlsbad Caverns National Park in the USA has also been nominated as a World Heritage site.

Reasonably complete inventories of the world's cave systems are available in the above cited references. These provide "Guinness lists" of the longest, deepest, and largest which are continually being revised as exploration continues. In assessing all cave nominations, IUCN has close liaison with the International Union of Speleology and carefully weighs their opinions in cave evaluations. In this specific case of the Caves of the Aggtelek and Slovak Karst (CASK), this Union as well as outside reviewers felt that the area had high natural values but had difficulty comparing them to others.

CASK is very different from the other two existing World Heritage caves. Mammoth Cave is notable for its enormous length, large level passages and jagged domepits. Skocjan is famous for its awesome river canyons and textbook portrayal of karst hydrogeology. CASK is distinguished by its great variety of cave types and speleothems and the array of typical temperate zone karst features. CASK also contains 712 known caves, a very high concentration, but none of these by itself rates on world lists of the deepest/largest or most decorated.

As supplemental information requested from the authorities during the field visit has noted:




KARST AREAS OF EUROPE

From: Middleton J. & Waltham T. (1986)

"... longer caves displaying rich decoration belong either to an absolutely different cave type (Lechuguilla Cave and Carlsbad Caverns), or are representatives of humid-tropical karstification (Gua Air Jernih, Mamo Kananda, Gran Caverna Santo Thomas, etc.). Other large systems of the world are either Kentucky-type multi-levelled mazes (Mammoth Cave Systems, Flint Ridge Cave, etc.); sub-horizontal active complexes (Ojo Guarena, Ease Gill Cave System, etc.); deep alpine caves (Hölloch, Siebenhengste-Höhlensystem, etc.); fault-controlled gypsum mazes (Optimisticheskaja, Ozernaja, etc.); or three-dimensional mazes of suspected hydrothermal origin (Jewel Cave and Wind Cave), in which speleothems are sparse or occur in relict upper levels only."

The CASK are also distinctive in terms of the variety of 500 species of troglodytes (cave dwelling animals). Its bat fauna (21 species) is of European importance and, though rich, is not as numerous as that, for instance, in Carlsbad. The caves contain substantial fossils but their significance has not been determined. The site, along with the Karst area of the Dinaric area of Slovenia, has been the center of much scientific research. Much has been contributed to the understanding of caves, particularly by the two national speleological societies.

In conclusion, CASK does not stand out on any particular natural feature. As one reviewer noted, other caves similar to those at Aggtelek exist elsewhere and, while the site is not considered unique, it is an excellent example. Although one of the better known cave areas in Europe it does not offer features in the "spectacular" category as are found in many other Karst areas. It does, however, stand out for the concentration of a wide variety of Karst features found in one area. These include 712 caves of many different types (eg. fluvial, shaft) with almost a full range of speleothems (17 out of 25 basic types including aragonite, calcite shields, helictite, moonmilk draperies, pearls, and soda-straw stalactites). It can be considered a "classic karst" area with most characteristic morphological elements present. These include dolines, uvalas, doline lakes, Karrenfields, gorges, Karst springs and travertine deposits. CASK thus draws its distinction from other cave areas not in terms of containing any dramatic natural feature but more for its variety of Karst features and their concentration in a relatively small area.

Finally, it is noted that CASK is in the Middle European Forest Biogeographic Province but as only the underground caves have been nominated and **not** the surficial features, the normal biogeographic comparisons do not apply.

## 3. INTEGRITY

The CASK nomination is a unique one in that it consists of underground caves and has no surface component. The caves, however, are all State-owned and the land above them has protected status (Category *v* by international standards). Management plans are available as are visitor centers and trained staff. Many of the 712 caves are closed to the public and there are many regulations in force (eg. to protect hibernating bats). The four "show-caves", however, have been substantially modified to allow human use which reaches 300,000 visitors annually. Only 10% of the caves have been affected by human use with the remainder still in an almost unmodified condition. This is in contrast to the similar Bihor mountain caves in Romania which have suffered major destruction. The caves, however, will need strict controls from surface activities as they can be adversely affected by agricultural pollution, deforestation and soil erosion.

## 4. ADDITIONAL COMMENTS

4.1 The extent of the surface area that protects the caves is 60,000 ha. As it is only the sub-surface caves that have been nominated, the actual size of the property is much smaller.

4.2 The CASK also preserve the remains of prehistoric cultures going back some 35,000 years. Tools and ceramics as well as artifacts from the Bronze, Copper and Iron ages have been recovered from some cave entrances. The significance of these cultural values has not been assessed.

4.3 Although both countries have other natural sites on their indicative lists, it is IUCN's opinion that this is the best and perhaps only prospect for a World Heritage site in Hungary and Slovakia.

## 5. EVALUATION

CASK is typical of many Karst localities in Europe. Its special distinctions are that it has a great number of caves (712) of different types found in a concentrated area. The caves themselves are of moderate extent and are not as long, deep or decorated as are other world caves. Research at the site by geologists, biospeleologists, mineralogists and paleontologists has been extensive (though little known outside the region) and demonstrates the importance of the site to science.

A significant aspect of CASK is that it has undergone a great deal of fossilization and later exhumation of landscape features and subsurface groundwater routes. In other words, many karst features, after having formed, were buried by later sediment and then later reactivated or exhumed by erosional removal of the sediment. The resulting karst features contain a great deal of evidence pertaining to the geologic history of the last several millions (or even tens of millions) of years. The present karst landscape has been developing intermittently since the late Cretaceous Period (about 100 million years ago). Pollen of Cretaceous age is present in the sediment fill in a cave near Gombasek, Slovakia. Relics of pre-Pleistocene karst (i.e., more than about 2 million years old) are very distinct in the Slovak Karst, and many of them show evidence for sub-tropical and tropical climates forms. These include rounded hills that are relics of tropical karst later modified by Pleistocene periglacial weathering. This is a very unusual combination of climatic effects that is probably better documented in the Slovak Karst than anywhere else in the world. Finally CASK's particular suite of paleokarst features is very unusual in showing a combination of both tropical and glacial climates.

The site thus meets criterion *i* for natural sites as an area which represents an outstanding example of on-going geological processes and is a significant geomorphic feature. The caves are well protected and the site meets the relevant conditions of integrity for this criterion.

## 6. RECOMMENDATIONS

The Caves of Aggtelek and Slovak Karst should be added to the World Heritage List on the basis of natural criterion (i). The Committee may wish to encourage the local authorities to ensure strict control over surface activities that may affect the underground caves.

**COUNTRY:** Hungarian Republic and Slovak Republic

**NAME:** Caves of Aggtelek and Slovak Karst

**IUCN MANAGEMENT CATEGORY:**
II (National Park)
V (Protected Landscape)
IX (Biosphere Reserve)

**BIOGEOGRAPHICAL LOCATION:** 2.11.05 (Middle European Forest)

**GEOGRAPHICAL LOCATION:** Straddles the international border between southern Slovakia and northeastern Hungary, on the southern foothills of the Carpathian mountains. Lies within Borsod-Abaúj-Zemplén county, Hungary and Roznava District and Kosice county District, Slovakia. 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 Jelsava town and Jasov village, respectively. 48 25' - 48 40'N, 20 15' - 21 00'E

**DATE AND HISTORY OF ESTABLISHMENT:** 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 desighated a national park by law-decree No.7/1984 (XII.29.) OKTH.
Slovak Karst (Slovak Repablic) was proclaimed a protected landscape area in 1973 by Decree of the Ministry of Culture No.110/1973 Zb. under the Act on the Protection of the Nature and Landscape No.287/1994 Z.z.

Both sites have been individually accepted under UNESCO's Man and Biosphere programme; Aggtelek National Park in 1979 and Slovak Karst Landscape Protected Area in 1977. They have been jointly nominated for inclusion on the World Heritage List in 1995.

**AREA:** Total area is 60 000 ha.

| | |
|---|---|
| Aggtelek National Park and Biosphere Reserve: | 19 861 ha |
| Slovak Karst Protected Landscape Area and Biosphere Reserve: | 36166 ha |
| Nonprotected Landscape Area: | 3973 ha |

**LAND TENURE:** State

**ALTITUDE:** Ranges from 150 m to 925 m at Matesova Rock in Slovakia

**PHYSICAL FEATURES:** Topographically dominated by a system of plateaus dissected by deep canyon like valleys of the rivers Bódva, Slaná, Stítnik, Zádielska and Hájska. The territory comprises two geomorphologically different sedimentary rock formations. The first, laid down during the lower Triassic Period, comprises impermeable and resistant clastic rocks, namely argillaceous slates, and variegated grit and sandstone. Overlaying this is the second formation, a two kilometre thick layer of weakly resistant limestone and dolomite deposited during the mid and upper Triassic Period. The territory is characterised by a fully developed karst landscape, of which dolines are the most typical surface landform. These have developed through solution and are, on average, 100 m wide and 20 m deep. Other surface phenomena include sink holes and karren. This is the most extensively explored karst area in Europe, and a total of 712

caves have been identified so far. Many caves with nice speleothem decorations are occuring in several levels at the plateau edges (e.g. Krasnahorská-, Gombasecká- and Kossuth-Cave) The most notable of these is along the underground Styx river formed, 25 km long Domica-Baradla cave system which includes a hall with more than 50 m in diameter and a 13 m long stalactite. These caves are also noted for having the highest stalagmite (32.7 m) of the territory, aragonite and sinter formations and an ice filled abyss, which considering the height above sea level, is a unique phenomena for Central-Europe.

All these karst landforms are the result of long term geomorphological processes typical of the temperate climatic zone. Hydrological conditions are characterised by lack of surface streams, except between mountain basins and the complex circulation of underground water.

**CLIMATE:** Under the influence of the Carpathian Mountains, the climate is humid continental with long summers. The average temperature in the lower regions is -3 C in January and 19 C in July. These values decrease with an increase in altitude to -7 C and 14 C respectively. Annual rainfall total is 620 m, but the last decade was very dry.

**VEGETATION**: The flora is representative of both Pannonian and Carpathian elements, giving rise to a unique biotope where the two overlap. The variation in microclimate restricts some north-Carpathian representatives to the higher plateaus and colder valleys, whilst some submediterranean plants are confined to south facing, dry hillsides. Thanks to this bordering situation a lot of plant species reach their southern whilst others the northern limit here. Deciduous woodland 70% of the territory and is dominated by hornbeam and oak forest (*Quercus petraeae-Carpinetum*), but many differences from this forest type can be observed for example extrazonal beech forest, calciphilous oak forest, shrub forest with pubescent oak, ravine and rock forest. Mosaik-like opening, rocky grasslands, stone exposing hillside provide life-space for our precious soft stemmed plants. Some places woodland is surrounded by patches of secondary communities of juniper and heather (*Calluna vulgaris*) on the covered karst. Association of alder, marsh and moor fields are confined to stream bank.
The important endemic species are as follows:Klastersky's whitlow grass (*Draba klastersky*), *Onosma tornense**, bladder milk-vetch ( *Astragalus vesicarius ssp. albidus*), thistle (*Colymbada badensis*), mustard treacle (*Erysimum pallidiflorum*), Pannonian festuce (*Festuca pannonica)*, Sadler's gianrt fennel (*Ferula sadleriana*), Hungarian iris (*Iris aphylla ssp. hungarica*), *Campanula xylocarpa** and it is also worth to mention the Austrian dragonhead (*Dracocephalum austriacum**), lady's slipper (*Cypripedium calceolus**) and Laxman's reedmace (*Typha laxmanii**). The species, signed with *, are included in the European Red Data Book. (See the enclosed list for further examples.)

**FAUNA:** The fauna has varied geographic affinities too, submediterranean, Carpathian and continental. Saw-legged Cricket (*Saga pedo*) must be emphasized from the extraordinarily rich insect world of this area, this species is a post-glacial relic of the steppe. *Abax schueppeli* is a carpathian element, *Fuxoa birivia* is a xeromontan species and Apamea rubrirena is a representative of Sibirian fauna. Mammals include wolf (*Canis lupus*), lynx (*Lynx lynx*), red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*), wild boar (*Sus crofa*), wild cat (*Felis catus*) and badger (*Meles meles*). Bird rarities nesting in the territory are as follows: rock bunting (*Emberiza cia*), black stork (*Ciconia nigra*), corncrace (*Crex crex*), imperial eagle (*Aquila heliaca*), dipper (*Cimclus cinclus*), Ural owl (*Strix uralensis*) saker falcon (*Falco cherrugh*), short-toed eagle (*Circaetus gallicus*), honey buzzard (*Pernis apivorus*). (See the enclosed list for further examples.)

Of particular scientific interest are the cave and subterranean water fauna. Beetles including *Duvalius bokori bokori* and *D. hungaricus brzotinensis*, and insects such as *Limonia nubeculosa, Tamania fenestralis* and *Eccoptomera obscura* are abundant. Cave worms including *Peloscolex velutinus* and *Rhyacodrilus falciformis* are often found in sand and clay deposits, whilst molluscs namely *Bythinella austriaca, Pisidium personatum* and *P. casertanum* are associated with underground streams. Crustaceans such as *Niphargus tatrensis* and *Gammarus fossarum* occur. The notable primitiva crab is the endemic species *Niphargus aggtelekiensys*. A total of 21 bat species have been identified in the Slovak Karst and include *Myotis myotis, M. Blythi* and *M. schreoberi.*

**CULTURAL HERITAGE:** Archeological findings suggest that the Domica-Baradla Cave system was inhabited and used as a sanctuary and burial place since Neolithic times. Pottery relics from the Bükk, Pilin and Halstatt cultures have been found within Silická l'adnica Ice Cave and a Hussite inscription dated to 1447 on the walls of Jasovská Cave. Documentary evidence about the caves of Aggtelek and the Slovak Karst first appeared in the 16th century. The first cave map from the region was completed in 1704 about the Silicka Ice Cave, while in 1794 a two kilometre section of Baradla Cave was mapped by József Sartory. Some caves, such as Béke and Gobasecka Caves have a long tradition in the treatment of illnesses such as asthma and lung diseases.

**LOCAL HUMAN POPULATION:** There are one sizeable settlement (Silica) and two hamlets within the Slovak protected area and two villages (Aggtelek and Jósvaf with approximately 1100 inhabitants) inside the Aggtelek National Park's boundaries.

**VISITOR AND VISITOR FACILITIES:** Tourists have been visiting the Hungarian caves since 1806, when the first stairs and fences were constructed. Currently, tourist access in both regions is restricted to four caves which are open throughout the year, namely Domica-Baradla-, Gombasecka-, Ochtinska Aragonite- and the Jasovska Caves. 280 000 - 300000 persons arte visiting the four showcaves yearly.

**SCIENTIFIC RESEARCH AND FACILITIES:** Research has been conducted on flora, fauna, speleology, geomorphology and geology of both territories. Educational institutes including schools and universities arrange field trips to the caves and there are study trails in both countries in order to help the visitors to get familiar with the natural values of the territory.
A komplex floristic and phytoecological survey was undertaken in 1970 on a selected part of the Slovak Karst namely the Silice Tableland by the Department of Geobotanics of the Natural Science Faculty, Comenius University. The flora of the site has been recorded in over 100 publications. For the period 1976 to 1980 and 1981-1990, approval was given for a complete survey of the entire slovak Karst within the state plan of research for Comenius University.
The Aggtelek Karst was one of the favourite site of the Hungarian scientists esspecially geologists and speleologists. Several researches were conducted such as cave exploration, cave mapping, karst genetical, research of karst hidrological connections, cave climatological, bacteriological, karst hidraulics and an underground measuring system was set up in the Vass Imre-cave. Complex ecological survey have been conducted since 1992 on the whole area of the Aggtelek National Park.

**CONSERVATION VALUE:** The Aggtelek and Slovak Karst are noted for the unique karstic landscape and underground phenomena which comprise physical and biological formations with great scientific, medical, educational, recreational and aesthetic value.

**CONSERVATION MANAGEMENT:** Under the auspices of the National Authority for Nature Conservation, Aggtelek Karst is administered by the Aggtelek National Park directorate in collaboration with the Speleological Institute and the Hungarian Speleological Society. Management objectives are based upon the findings of scientific investigations and include the protection of terrestrial habitats as well as the caves themselves, regulating scientific exploration and research within the caves and increasing services such as information, interpretation and education. Those caves which are not opened to the public, have been locked with safety doors, eliminating the unauthorised entry. The biosphere reserve at Aggtelek has been zoned as follows: two core areas (150ha and 80ha) a buffer zone (874ha) and a transition zone (17,604ha). In Hungary the protection of caves has been guaranteed since 1961 according to law-decree No.18/1961. Armed rangers patrol the park either on foot, horseback or vehicle depending on the field conditions.
Under the Innovated Statue issued by the Ministry for the Environment, Slovak Karst is managed by the Administration of the Slovak Caves in cooperation with other national agencies namely Slovak Agency for the Environment, Slovak Speleological Society and the maintaining the accessible caves, providing information and education services and coordinating further research.

**MANAGEMENT CONSTRAINS:** The major part of the region was used during centuries for forestry, grazing and traditional agriculture, some places karrenfelds had developed as the result of erosion after deforestation, but the erosion does not mean significant and serious danger in the nominated territory. Since in a small extent the local inhabitants cultivate the land in a traditional way they hardly use pesticides and fertilizers. Increasing air pollution derive from only tourist vehicles, although it has not been a serious threat yet. Other pollution sources are not significant because the industry in the neigbourhood was collapsed during last years.

**STAFF:**

Staff of the Slovak Karst Protected Landscape Area: 38 persons ( Management: 11, administration: 5, showcave, tourism and recreation: 16, on-site conservation staff: 2, maintenance: 4.)

Staff of the Aggtelek National Park Directorate: 71 persons ( Management: 9, administration: 6, showcave, tourism and recreation: 29, on-site conservation staff: 11, maintenance: 16.)

**BUDGET:** Major part of it is supported by the Slovak and Hungarian Goverment and the minor is from other sources.

Annual budget of the Slovak Karst PLA: 5,190 million Sk.

Annual Budget of the ANPI: 90 million HUF (1994) and a fund (100 million HUF) have been available for improving the facilities of Baradla showcave since 1989.

**LOCAL ADDRESSES:**

Slovak Environmental Agency - Administration of the Slovak Karst Protected Landscape and BR, 049 51 Brzotin, Slovakia
Administration of the Slovak Caves, Hodzova 11, 031 01 Liptovsky Mikulas
Ministry for the Environmental of the Slovak Republic, Hlboká 2 812 35, Bratislava, Slovakia
Aggtelek National Park Directorate, 3758 Jósvafő , Tengerszem oldal 1. Hungary
Ministry for Environment and Regional Policy, 1011 Budapest I., F utca 44-50. Hungary
National Authority for Nature Conservation, Speleological Institute, 1121 Budapest, Költő utca 21.

| Representatives of | | animal examples | plant examples |
|---|---|---|---|
| | | | |
| Carpathian | | Abax schueppeli<br>Dendrocopus leucotus<br>Eliomys quercinus | Prenanthes purpurea<br>Polygonatum verticillatum<br>Dianthus plumarius ssp. praecox |
| "Dacic" (east-carpathian - north-balkan) | | Pholidoptera transsylvanica | Sesleria heuffleriana<br>Pulsatilla grandis ssp pseudoslavica<br>Dentaria glandulosa<br>Ferula sadleriana |
| Dealpine, prealpine species<br>(Zadiel Gorge) | | | Arabis alpina<br>Biscutella austriaca ssp. hungarica<br>Campanula carpathica<br>Corthusa mathiolli<br>Primula auricula ssp. hungarica |
| Boreo-mountain | | Drufus trifidus<br>Canis lupus<br>Lynx lynx<br>Bielsia ceorulescens<br>Rosalia alpina<br>Sadleria pannonica | Polistychum lonchitis<br>Cetraria pinastri |
| Steppe and forest steppe | | Omocestus viridulus<br>Eumedonia eumedon<br>Arcyptera fusca<br>Euxoa recussa<br>Falco cherrugh<br>Aquila heliaca<br>Crex crex<br>Cytellus cytellus<br>Limenitis populi<br>Metrioptera brachyptera | Dracocephalum austriacum<br>Pulsatilla grandis<br>Echium russicum<br>Astragallus vesicarius ssp. albidus<br>Nonea pulla<br>Iris pumilla<br>Anacamptys pyramidalis<br>Adonis vernalis<br>Anemone sylvestris<br>Campanula sibirica<br>Phlomis tuberosa<br>Carex brevicollis |
| Baltic-sarmatian | | | Gentianella livonica<br>Pulsatilla patens<br>Lathyrus pisiformis |
| Illyr-carpathian | | | Erythronium dens-canis |
| Submediterranean ponto-mediterranean | | Peribatodes umbraria<br>Pierus mannii<br>Saga pedo<br>Hipparchia semele<br>Agrodiaetus admentus<br>Emberiza cia<br>Ablepharus kitaibelii | Riccia glauca<br>Ephemerum serratum<br>Lathyrus pannonicus<br>Ornithogallum pyramidale<br>Quercus virgiliana |
| Pannon-balkan | | | Onosma tornense |
| Representatives in antropogenic environment | | Ciconia ciconia<br>Tyto alba<br>Myotis emarginatus | |