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PLITVICE LAKES NATIONAL PARK CROATIA

The waters of three local rivers, flowing across limestone and chalk over thousands of years in a continuing biogeological process, have deposited natural dams of travertine, creating a series of beautiful lakes, cascades and caves. Its forests are a refuge for bears, wolves and many species of birds.

Threats to the site: Eutrophication by sewage, and tourist pressure on the lake waters.

COUNTRY

Croatia

NAME

Plitvice Lakes National Park

NATURAL WORLD HERITAGE SITE

1979: Inscribed on the World Heritage List under Natural Criteria vii and ix;

2000: Expanded over its underground catchment basin under the same criterion.

1993-96: Placed on the List of World Heritage in Danger because of civil conflict.

STATEMENT OF OUTSTANDING UNIVERSAL VALUE [pending]

IUCN MANAGEMENT CATEGORY

II National Park

BIOGEOGRAPHICAL PROVINCE

Balkan Highlands (2.33.12)

GEOGRAPHICAL LOCATION

Close to the Bosnia-Herzegovina border in the Dinaric mountains, 20 km northwest of Bihac in Bosnia and 110km south of Zagreb on the main road south to the Adriatic. Its approximate coordinates are 44° 44' N to 44° 57'N and 15° 27' to 15° 36' E.

DATES AND HISTORY OF ESTABLISHMENT

1928: The lakes originally accorded National Park status, but not developed;

1949: Plitvice Lakes declared public property by law;

1989: Designated a National Park in Official Gazette 29; the area's boundaries finalised (19,462 ha);

1993-6: Site listed as endangered because of civil conflict;

2000: The Croatian Parliament at the suggestion of the Lakes Public Establishment and the State Agency for the Protection of Nature and the Environment, expanded the Park by 10,020 ha to include most of the underground catchment basin supplying lakes and streams of the Park.

LAND TENURE

State; in Lika province, Lika-Senj county. Some 3,500 ha of village agricultural plots, representing 12% of the Park, are privately owned. Administered by the Plitvice Lakes Public Establishment.

AREA

19,200 ha (Nomination document gave 19,462 ha).

ALTITUDE

417m to 1,280m

PHYSICAL FEATURES

Plitvice plateau lies at 650-700m between the Licka Pljesevica (1,640m) and Mala Kapela (1,280m) mountains and is intersected by the headwaters of the Korana River, the Black and White rivers. The upper end of the Korana Valley overlying the dolomite stratum is a wide basin holding the upper lakes while the lower lakes occupy a narrow limestone canyon. The Plitvice Lakes basin is a formation of biological origin, a karst river basin of limestone and dolomite, with some sixteen lakes, behind dams created during the last 4000 years by the deposition of calcium carbonate in solution by encrustation on mosses (*Bryum*, *Cratoneuron*), algae and aquatic bacteria. This results in the building, at about 1-3cm/year, of barriers of phytogenetic travertine (calcareous tufa) which have created the lakes of various sizes linked by cascades and waterfalls, some up to 25m in height. These have characteristic strange shapes and contain travertine-roofed and vaulted caves.

The carbonates date from the Upper Triassic, Jurassic and Cretaceous ages and are up to 4,000m thick. Soil types include humus on limestone, rendzinas and brown soils on limestone, eliminated and brown eliminated soils on limestone and humus, brown soils and the eliminated soils of sinkholes. In order to maintain and preserve the natural characteristics of the lakes from pollution, the whole of the surface and most of the subterranean drainage system has been included within the borders of the Park. The new areas comprise layers of karstified limestone with dolomites of Jurassic age.

CLIMATE

The National Park lies on the boundary between a moderately warm lower level rainy forest climate and a higher altitude snowy forest climate, with an annual precipitation of 1,000-1,200mm. The height of 700m above sea-level or the mean temperature of -3° C in the coldest month has been taken as the boundary line between the two climates.

VEGETATION

There are 22,308 ha of forest, which cover 75% of the Park, 6,957 ha of meadow and 217 ha of lakes. The forest comprises pure stands of beech *Fagus sylvatica* at lower altitudes and mixed stands of beech and fir *Abies alba* higher up. The percentages of species are: 72.8% beech, 22.1% fir, 4.7% spruce *Picea excelsa* and 0.4% pine *Pinus sylvestris*. One area of 84 ha has never been cut and contains trees up to 700 years old. The forest can also be classified in terms of its underlying dolomite and limestone strata. The dolomite communities comprise tertiary pine, hornbeam *Ostrya carpinifolia*, spruce and beech-fir forests. The limestone communities have a smaller number of forest types, but cover a larger area with communities of spruce and fern, spruce in beech, coppiced hornbeam with sumac *Rhus cotinus*, Italian maple *Acer obtusatum* and heather *Erica* spp. Hydrophytic communities of black alder *Alnus glutinosa*, willow *Salix* spp., grey ivy, reeds and bulrush communities. Alpine beech groves grade into fir and beech forests, with juniper *Juniperus* sp., and in the valleys and on lower slopes patches of sub-Mediterranean vegetation. There is a large mosaic of meadow communities, depending on altitude, geology soils and other factors, in three classes: *Festuco-Brometea*, *Nardo-Calunatea*, *Molinio-Arrhenatheretea* and *Scheuchzerio-caricetea fuscae*. Threatened and endemic plants protected include *Cardamine chelido*, *Cypripedium calceolus*, *Daphne blagayana*, *Lilium bulbiferum*, *L. carnolicum*, *Primula kitaibeliana*, *P. wulfeniana*, *Ruscus hypoglossum* and *Paeonia mascula*.

FAUNA

The area is faunistically rich, including European polecat *Mustela putorius*, European brown bear *Ursus arctos*, wolf *Canis lupus*, European otter *Lutra lutra*, wild cat *Felis silvestris*, Two bats, the western barbastelle *Barbastella barbastellus* and the longfingered bat *Myotis capaccinii* (VU) are rare. There are records of 126 species of birds, of which 70 breed in the area including golden eagle *Aquila chrysaetos*, Eurasian eagle owl *Bubo bubo*, capercaillie *Tetrao urogallus* and white-throated dipper *Cinclus cinclus*; also of the European pond turtle *Emys orbiculatus*.

CONSERVATION VALUE

The area of Plitvice Lakes is noted for its karst landscape of lakes, caves and waterfalls formed from deposits of travertine. The forests of the Park are a refuge for bears, wolves and many species of birds. The Park lies within a WWF Global 200 Eco-region.

CULTURAL HERITAGE

The area was the cradle of the prehistoric Illarian tribe of Yopuds dating from 1,000 BC. The Yopudic culture was followed by Roman influence and from the 8th century AD was occupied by Slavs. Archaeological remains include a prehistoric settlement on the site of the current Plitvice village, fortifications, Bronze Age tools and ceramics (Frankic, 1990).

LOCAL HUMAN POPULATION

The area had 1,100 inhabitants in 1949 and about 2,200 in 1990 in 18 rural communities but the war was fought throughout the area and there are now only two small settlements of elderly households.

VISITORS AND VISITOR FACILITIES

Tourism at the lakes started in the 19th century. By the mid-1980s they were a major tourist attraction and tourists numbered 800,000 of whom two-thirds were foreign, largely German, with peak visitation in July and August. The revenue obtained from visitor fees (US\$9.00 a head) and general income from tourism amounted to some US\$2.5 million in 1986. With the outbreak of war in 1991 and subsequent occupation of the Park, tourism stopped completely and many buildings were damaged. In 1996, a tourism revitalization programme began, including the removal of all landmines. Existing tourist facilities located within the Park include hotels, post office, restaurants, and sports and information centres (Ivandić & Klaric 1996; Dezelic, 1996). There are now two entry points for visitors, with car parks and information offices. Visitors move around the park on arranged and marked paths and gangways with a qualified guide and according to a set program. Within the Park, hotel accommodation is available at Plitvice and Bellevue. During 1996, there were 260,000 visitors, in 1998 350,000 and in 2000, 490,000. The visitor reception service has developed various educational sight-seeing programmes. The visitor reception service also has information offices where visitors can obtain all the necessary information. The Plitvice Lakes Public Establishment collaborates with local and foreign media to promote the Park.

SCIENTIFIC RESEARCH AND FACILITIES

There has been extensive research on travertine formation, age and structure, and forest structure. Park staff work in collaboration with a number of national universities, and a permanent research station has been established together with extensive meteorological and climatological measuring points. Hydrometeorological data have been collected for 20 years, chemical analysis of rainfall for 10 years and air pollution monitoring data since 1982. Hydrology, soil and phenology are monitored within the Park. Specific areas of research include the biochemical analysis of travertine formations, water quality (for human consumption), limnology and palaeolimnology, microbiology and soil erosion, ecology of the brown bear and plant community structures. There are five meteorological and hydrometeorological monitoring stations. With the outbreak of war in 1991, many staff were forced to leave the Park, and some facilities were damaged.

MANAGEMENT

Plitvice Lakes National Park is protected pursuant to the Croatian Constitution and the Nature Protection Law. Economic and any other kind of activity is possible only in line with the regulations concerning the Internal Order in the area. Management is done at a national level. The Council of Management, which consists of seven members, is appointed by the Government. The first General Development Plan of the Park was adopted by the Assembly of the local commune in 1970. From 1972 the Park was run as a commercial company which owned the tourist facilities and was supplied by local farmers. A Zoning Plan dating from 1986 is still valid, but environmental protection measures are not considered to be stringent enough to solve the problems which the Park now faces.

In 1996, the Ministry of Tourism and the Park management drew up the Tourism Revitalization Program for the Plitvice Lakes National Park, with the aim of drawing visitors back to the Park, without threatening the site's natural values. This programme was part of a broader project called the Programme Basis of the Functioning and Development of the Plitvice Lakes National Park. The strategy aimed to increase tourist facilities at the two main entrances, reducing the number of through-visitors to the Velika Poljana hotel zone, to keep freight traffic out of the Park, and ultimately exclude all motor vehicles from the Park, and to reduce visitor pressure on the central and most sensitive zone around the waterfalls and lakes. The management was to be restructured into a Park Management Sector and a

subordinate Hotels and Restaurants Sector. The aim in the short-term was to rehabilitate the protective and research functions in the Park, and to improve the visitor management system (Cetinski, 1996, Ivandic & Klaric, 1996). A State of Conservation report on the Park was submitted to the World Heritage Committee in 1997 (UNESCO, 1997). But even after 1997 the Park suffered from inadequate management which postponed improvement (Vidokovic, 2000). However, in 2002 a Karst Ecosystem Conservation Project for four Croatian karst landscape parks was launched with funds from the GEF to be used in Plitvice on a creating a Management Plan and research laboratory (World Bank, 2002).

MANAGEMENT CONSTRAINTS

Between 1991 and 1995, the civil war was fought mainly in the region and the Park was abandoned by the staff. The lack of supervision resulted in the destruction of forest and Park facilities, the hunting of bears and fishing with dynamite. Several villages in and around the northern boundary were also destroyed (B. von Droste, *in litt.*, 1991). Consequently, the site was placed on the World Heritage in Danger List in 1992, from which it was withdrawn in 1997. Some of the key threats facing the Park before 1991 have not been adequately solved. Eutrophication of the lakes is becoming a threat, due to sewerage treatment by hotels which contaminates the lakes. The water supply for the Park and surrounding area is currently taken from Lake Kozjak, which interferes with the water flow and the travertine formation process.

Preparations for a new effluent disposal system are under way, damage to the Park's infrastructure is being repaired and there is ongoing monitoring. The main road link between Zagreb and Dalmatia with some 7,000 vehicles a day ran beside the lakes but by 1998 had been detoured round the Park (UNESCO, 1998). The high number and concentration of tourists visiting the most sensitive areas of the Park, the lakes and waterfalls, also poses a threat (Ivandic & Klaric, 1996). The site still lacks a management plan, research and information about biodiversity, and a visitors' centre, requirements which are being provided under the GEF-funded Karst Ecosystem Conservation Project (Vidaeus, 2001).

STAFF

In 1990 there were 146 staff in park management, 66 in the Department of Nature, 80 in tourism and 100 in maintenance (D. Krga, pers. comm., 1990). By 2000 there were 120 employees (Vidaeus, 2001).

BUDGET

The Park is 97% self-supporting with a gross income of US\$2.5 million per year. In addition the State provides US\$150,000 for research (MEPPP, 2001). During 2001-2 USAID funded staff training projects and the World Bank small grants program funded promotional and educational materials. In 2002, US\$450,000 for Park improvements was granted under the Karst Ecosystem Conservation Project from GEF, the Croatian government and other sources (Vidaeus, 2001).

LOCAL ADDRESSES

The Director, Institute for Nature Conservation, Ilica 44/11, 4100, Zagreb, Croatia.

The Director, Nacionalni Park Plitvice, 48231 Plitvicka Jezera, Croatia.

The Director, The Plitvice Lakes Public Establishment, 53231 Plitvicka Jezera, Croatia.

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