

Management of visitors in Plitvice Lakes National Park (Croatia) – present situation, nature conservation, challenges

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Plitvice Lakes National Park is one of the oldest and best known protected areas in Croatia established in 1949 as an area of the exceptional natural beauty.

The international significance of Plitvice Lakes National Park as a unique natural location at the global level was acknowledged in 1979, when United Nations entered it on UNESCO World Heritage List in 1979.

The Plitvice Lakes are a specific geological and hydrological karst phenomenon. Unique continuous process of tufa deposition, where certain plants (algae and mosses play a significant role) cause the barriers between the lakes to grow and form new waterfalls, curtains and cascades, thus maintaining the form and existence of the Plitvice Lakes.

Placed within the forest karst landscape, the sixteen larger named and smaller lakes are interconnected with foaming cascades and waterfalls. The landscape value of this protected area is formed by an entire complex of natural elements, including forests, waters and meadows.

Forests, which take the biggest part of Park and grassland ecosystems, are abundant in biodiversity. There are 1,448 plant taxa have been recorded and many of them endemic, 50 of them represent various orchid species. Fauna of the Park is also rich and diverse. The forests are habitat of more than 50 mammals including large European carnivores – bear, wolf and lynx. Water areas of the Park as basic phenomena zone where tufa (kind of rock) is in progressive creation are the most visited but they take less than 1 % of Parks total area of 29,685.15 km².

Developed infrastructure of current visitor system includes hiking trails, wooden bridges over lakes and tufa barriers which enclose water to the visitors. Electro boats on Kozjak Lake drive since 1978. The most of the hiking trails are constructed at the end of nineteenth and beginning of last century completed during the 1930s with some enlargements in 1960s, and some very new, established in 2010.

The area was affected with the war in period 1991–1995. After war ends the natural beauties of Plitvice Lakes attracted huge number of visitors with growing tendency. In 2011 the Park was visited with 1,083,451 visitors. The tourists of this area could be divided into group and individual visitors. The most of visitors come to Park during summer season (July, August; up to 10,000 people per day) from the costal part of Croatia while the number of tourist groups is largest in the pre- and post- tourist season during the spring and autumn. All of them visit to the lake's zone as a rule. Between 10:00 a.m. and noon is the most frequent arrival time in the Park. In 2007 the new Management Plan was finished and foresee Carrying capacity study. The Management Plan calls for the development of a Study to determine the burden and estimate the carrying capacity, with assessment of the daily and annual carrying capacity of this area.

Visitors are received in Plitvice Lakes NP at two official entrances: Entrances 1 and 2 and the auxiliary entrance "Flora". The all information about the Park area could be received here. Information points can also be found at Kozjačka Draga, Labudovac and dock P1 on Lake Kozjak. Visitors can also obtain additional information at the hotel reception desks, from the scenic tour-trains staff and information assistants at the parking lots.

According to the Physical Plan of 1986, a total annual number of 1,657,000 was foreseen. There are seven different sight-seeing programs formulated on the basis of time schedule criteria for the visit to different areas, depending on which entrance is the starting point of the tour. These programs also include the use of the scenic train and the electric boat on Lake Kozjak.

Park visitors can move around marked trails in the Park individually and in groups, either by hiking or by a combination of transport by tour-trains, tour-boats and row boats on Kozjak Lake.

The new Physical Plan suggests a relocation of the official entrances to peripheral areas.

Carrying capacity studies of more recent date do not exist.

Besides Entrances 1 and 2 and the auxiliary Entrance Flora, information points are on following locations: Kozjačka draga, Labudovac and Dock P1 on Lake Kozjak.

Visitors can also obtain information at the reception desks of the hotels and from staff members working on the scenic trains and electric tour-boats.

The number of people visiting this national park is continually increasing but it will be necessary to develop management based on the principles of sustainable growth and an acceptable eco-tourism concept.

As the one of the most visited tourist destinations in Croatia the popularity of Plitvice Lakes NP has long since exceeded Croatian borders which is reflected in the nationality structure of Park visitors in which are predominant foreign visitors. The Lakes are known and very popular among the visitors in surrounding countries and Middle Europe.

This protected area is so-called "must go" destination, meaning a location that must be visited, which was reflected in the number of visitors during the 1996–2011 period.

The Management Plan foresees the determination of a carrying capacity study for the lakes visitor system, the wider Park territory and determination and implementation of daily visitor limits. The zone of the lakes is open to visitors is a recreation and tourism infrastructure zone. It is the most attractive area in Plitvice Lakes National Park. The largest number of visitors is concentrated in this zone.

In the interest of preserving the ecological balance and



Figure 1. Veliki slap – The highest waterfall in Croatia, with Sastavci and the Lower Plitvice Lakes is one of the most visited locations in Plitvice Lakes National Park

avoiding possible negative consequences to the sensitive ecosystem of the lakes and the natural process of tufa formation, and to ensure quality tourist experiences in this part of Park for each visitor, it is necessary to compile a study on the carrying capacity of the lake system for visitors which will define the optimum number of visitors in this zone

These activities require the engagement of a multidisci-

plinary team of experts and use of all previous data on such research. The challenge is how to establish parameters for this and to be as more objective as it possible in nature conservation and impact of visitors. The spatial distribution of visitors exerts a great impact on the state of environment and on the quality of the manner in which tourists experience this area.

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