# THE PLIVA LAKES - SUSTAINABLE MANAGEMENT AND TOURISM VALORIZATION

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*The Pliva lakes that include the Great and Small Lake formed by the transformation of the Pliva are the biggest natural reservoir in Bosnia and Herzegovina. This region is a unique area in Bosnia and Herzegovina in many aspects. The area of Pliva lakes has been a national monument of Bosnia and Herzegovina since 2007. The Commission for national monuments proclaimed this area as a National Monument under the name of "Cultural landscape – the Pliva lakes with the complex of mills on the Pliva near Jajce". According to the regional plan of the Central Bosnia Canton and Jajce municipality, the Pliva lakes should represent a protected area that is a clearly defined entity by natural factors, which is the backbone of the river Pliva. The protected area should cover the entire course of the river Pliva, which is located in the administrative units of municipalities Jajce, Jezero and Šipovo. The same plans suggest that this area should be a protected area of the fifth category or a protected landscape of the sixth category according to the IUCN categorization.*

*For more than a century, the area of the Pliva valley has contributed to the intensive economic development, primarily through the construction of the first hydroelectric power plant in the Balkans for the needs of "Elektrobosna" which was built in 1890, and then through the hydroelectric power plant "Jajce I" that uses most of the water from the Great Pliva lake. The development of transport and tourism disrupt the natural processes that permanently alter the landscape and biodiversity of the area. What also greatly affects the transformation of the area of Pliva lakes is the development of tourism, which was intensively developed after the 50s of the last century, and again intensified after the war. Without a doubt, this area suffers from significant anthropogenic impacts permanently damaging natural links and relations, and this is evidenced by the stagnation of growing tuff, the emergence of aquatic vegetation as an indicator of pouring municipal wastewater, water-logging, and inadequate draining of the lake. A significant example of the anthropogenization of this area is the construction work on the riverbed of the Pliva, particularly interventions at the mouth, which are implemented in order to protect but contributed to the complete modification of the natural space.*

*The correct legislative protection, which is reflected in the IUCN categorization of protected areas, and applying the correct environmental policy can lead to the proper sustainable management of space, which will provide long-term enjoyment of the natural environment of the Pliva lakes. The sustainable management of the area can provide*

*sustainable economic development, primarily through the development of selective forms of tourism. In addition to the existing tourism offer based on short stay and rich cultural, historical and natural heritage, the development of tourism through selective forms will enable the sustainable use of resources, increase of the number of visits, extension of the tourist season and increase of economic effects.*

**Keywords:** ***Pliva lakes, protected areas, tuff, sustainable development, tourism***

## INTRODUCTION

Tourism and protected areas are a challenge and an opportunity for all potential tourist destinations. It should be emphasized that, unlike other activities, tourism is interested in preserving the protected area because the protection of the natural environment is a precondition for sustainable development. With sustainable development, tourism in a protected area can provide controlled use of resources and lasting benefits for the population in the developing environment.

Tourism in a protected area should be analyzed in the context of nature (based tourism) as any form of travel motivated by observation and enjoyment in nature. Nature-based tourism is one of the fastest growing segments of tourist demand that can adequately guarantee the permanent protection of space and enrichment of tourist offer. One of the most popular forms of tourism development is the selective forms of tourism. Selective forms of tourism are suitable to those destinations that have the ability to remain in harmony with the environment, i.e. to remain competitive on the market despite the emergence of new and less visited destinations (Rabotić, B. 2013).

According to the IUCN (International Union for Conservation of Nature), a protected area defines: a clearly defined area that is recognized for the purpose of and is managed with the goal of the permanent preservation of the overall nature, the ecosystem services it provides, and the associated cultural values, in a legal or otherwise effective manner.

Previous research has shown that the Pliva lakes, with their surroundings, primarily the springs of the Pliva with Janj tributary, the waterfalls at Bukva and Sokolina, the Draganić and Olički lakes, the cliff in Janj and Janjske otoke, the cave at Pliva lake and the Jajce Mills, make a complex extraordinary natural entity. The Pliva River basin area is a unique natural, especially hydrological, area that has long attracted researchers and scientists. Significant researches in the area of the Pliva River and Pliva Lakes were done by: Mojsisovics E. et al. (1880), Pliar Đ. (1882), Katzer F. (1903, 1921 and 1926), and Milojević P. (1929). Kanaet T. (1959) also found important research results on hydrographic problems in the Pliva river basin. In addition to this, in his limnological research of natural lakes of Bosnia and Herzegovina, the Pliva Lakes were also analyzed by Spahić M. in 2001.

From the significant recent professional documents, the continuous works on the technical improvement of the Pliva river basin, especially its lower course, can be distinguished: the decision on the proclamation of the National Monument entitled "Cultural Landscape - Pliva lakes with a complex of mills on the Pliva near Jajce" and the textual part of the nomination of "Cultural Heritage - Historical City of Jajce, Bosnia and Herzegovina" on the World Heritage List.

## HYDROGEOGRAPHIC POSITION OF THE PLIVA LAKES

The Pliva Lakes (Great and Small) are located in the central part of Bosnia and Herzegovina and are a part of the municipalities of Jajce and Jezero. The Pliva lake basin is an extremely interesting area, dominated by fluvial karst and gravitational morphological forms. The karst morphoscopy is noticeable in the foothills of Jastrebnjak and Smiljevac where the sources and springs of the Pliva are located. The sources are cracks created in massive and pure limestone. Although somewhat longer than 31 km, the Pliva river has two hydrides, the name Pljeva is used in the upper stream, while in the lower part the name of the river is the Pliva. The Pliva Valley is monogenic, polymorphic and polyphase. Epigenetic mixing give it a special quality. Pliva's rtna epigenija is located in the area of Sokolac, opposite the mouth of Sokočnica, where the river cut the river bed and valleys in hard geological sediments. Similar to this is the domna epigenija in Čerzakovići where the Pliva is cut into quartz porphytes, although there are low resistant Wefen sediment nearby. Based on the general morphological-morphogenetic appearance, the Pliva is a tectonically predisposed river valley. It has a longitudinal profile and polyphase character, especially in the Jajce-Jezero sector (Spahić, M. 2001).

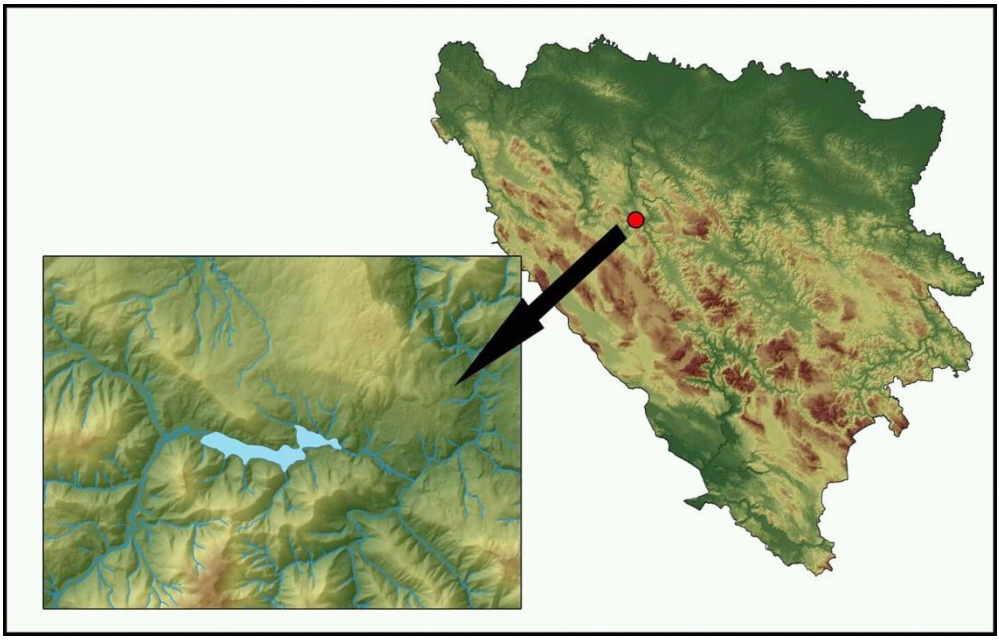

**Fig. 1. Topographic position of the Pliva lakes**

*Source: GIS data; edited by author, 2017.*

The Great Pliva Lake lies at an altitude of 424 m and was created at the site where the Pliva ends its flow, downstream from Jezero. Apart from the Great Lake, the Pliva creates the Round Lake there as well. The length of the Great Pliva Lake is 3.3 km and the surface area is 1.2 km². The Small Pliva Lake, which has a length of less than 940 m and an average

width of about 200 m, and the Great Pliva Lake make a unique hydro-accumulation of water in Bosnia and Herzegovina. (Spahić, M. 2001).

The characteristic flows on the river Pliva that were adopted based on the hydrological data of the hydro-electric power plant "Jajce I" are: maximum flow of 220 m³ / s / one-hundred-year water and maximum flow of 285 m³ / s / millennium water, which took place in 1996, while the average annual flow rate is 38.5 m³ / s (Barić, M. 2006).

Through the flow of the Pliva the basin of the Great and Small Lake make a mutual hydrographic connection (flow character). On the north there are Ravno brdo (902 m), Lice (862 m), Grič (890 m), Skala (883 m), and on the south there are Ćusine (840 m), Orahovica (984 m) and Otomalj 1052 m). As this part of the basin is constructed of water-bearing rocks, the so-defined orographic watershed is also a hydrogeological watershed (Spahić, M. 2001).

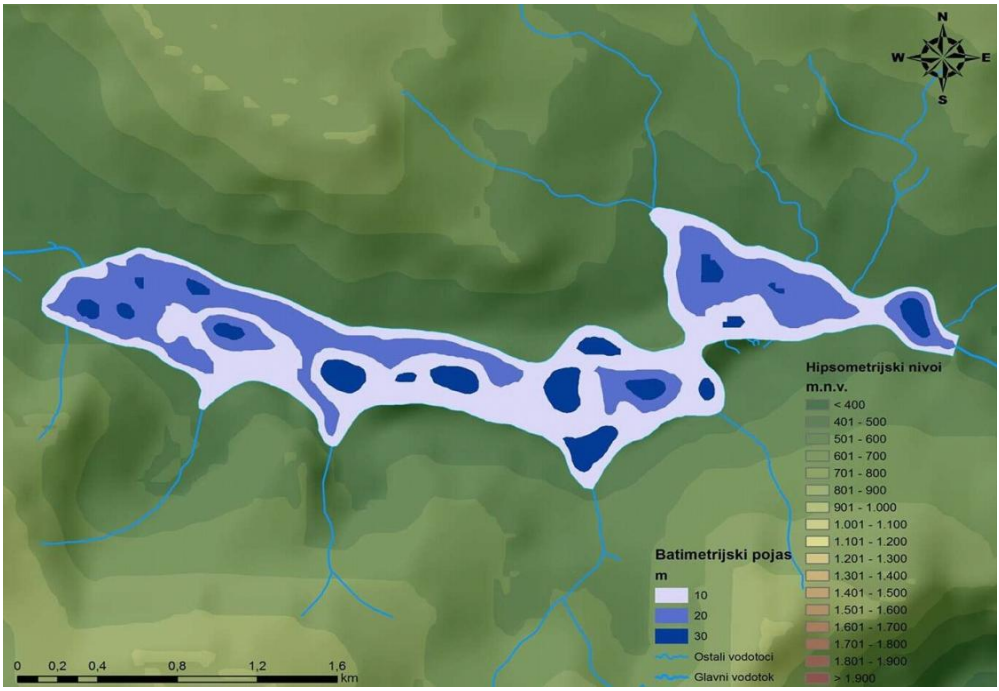


**Fig. 2. Bathymetry plan of the Pliva lakes**

*Source: GIS data; edited by author, 2017.*

The quotient of indentedness of the Great Pliva Lake is 1.3 along the coastline of 7.9 kilometers. The surface layer water temperature is about 17 ° C, while in the depth layer it is about 12 ° C. The average annual intake is 44 m³/s, of which 3 m³/s is drained under control as a biological minimum ("Jajce I" and "Jajce II", 2014). The quotient of indentedness of the Small Pliva Lake is 1.5, while the length of the coastline is 3.6 kilometers (Spahić, M. 2001).

The analysis of the results of the qualitative composition of the phytoplankton community of the Great and Small Pliva Lake indicates a relatively large biodiversity of

species, which is one of the indicators of primary lake production. This makes this lake a mesotrophic one. Quantitative phytoplankton analysis was performed on the basis of biomass estimate i.e. determination of chlorophyll concentration.

According to the OECD (Organisation for Economic Co-Operation and Development) limnological classification, the Small Pliva Lake, based on the average values of total phosphorus, chlorophyll and Secchi depth, is classified in the mezotrophic category. Based on the minimal Secchi depth and the maximum concentration of chlorophyll, it is characterized as oligotrophic. In the Great Pliva Lake, the values of chlorophyll are determined, which point to hypertrophic conditions, while the values of total phosphorus and Secchi depth point to mezo-eutrophic conditions. By analyzing the average values of total phosphorus, chlorophyll and Secchi depth, the Great Pliva lake is classified in the oligo-mesotrophic category (Hadžiahmetović, A. 2012).

## LEGISLATIVE REGULATIONS OF THE PROTECTED PLIVA LAKES AREA

The area of the Pliva Lakes is nowadays protected as the National Monument of Bosnia and Herzegovina. However, this area is not yet protected in accordance with IUCN standards, which would guarantee permanent protection and define forms and ways of using this space.

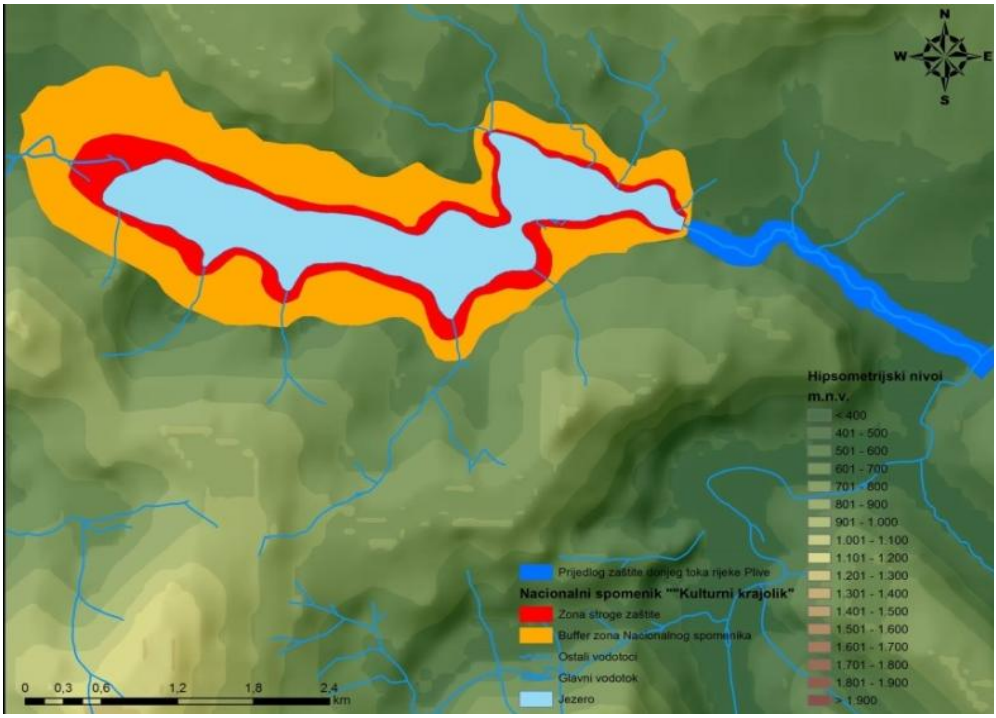


**Fig. 3. Coverage map of the protected area**

*Source: GIS data; edited by author, 2017.*

In 2007 the Commission for the Preservation of National Monuments lists the area around the watermills with a buffer zone around the banks of the Pliva Lakes (200 meters) as a national monument called "Cultural Landscape - Pliva lakes with a complex of mills on the Pliva near Jajce". The protection of the complex of the mills does not only imply the preservation of the wood mills, but through the protection of the mill complexes also contributes to the protection of the entire environment, which is one of Jajce's recognition factors, encourages the sustainable use of natural resources and helps to maintain the natural values of the landscape (Commission for Preservation of National Monuments, 2007).

In 1994, the International Union for Conservation of Nature (IUCN) developed a system of six categories of protected areas in accordance with their primary management objectives in order to improve understanding and awareness of the importance and purpose of protected areas (Federal Ministry of the Environment and Tourism, 2008).

The 2005 Spatial Plan of the Central Bosnia Canton and the Spatial Plan of the Municipality of Jajce (2008) provide for the protection of the Pliva Lakes in the area of 1,700.76 ha (Figure 3) which is reflected in the categories V (Protected Landscape) and VI (Protected Area) according to the IUCN classification which are defined as: Protected Landscape - area where over time human and nature interactions have created an expressive character area with significant aesthetic, ecological and cultural values and high biodiversity. Maintaining the integrity of these traditional interactions is of vital importance for the preservation, maintenance and evolution of such a zone. The protected area is intended for conservation of ecosystems and habitats, and in parallel with these also accompanying cultural values and traditional ways of managing natural resources. These areas are mostly large, most of them are in natural condition, while a part of them is used in a sustainable way. Extensive and non-industrialized use of natural resources is carried out in accordance with the nature conservation priority of the area (Dudley, N. 2008).

## ANTROPOGENIC IMPACT ON THE AREA AT THE MIDDLE AND LOWER PLIVA

A person can positively influence the natural space and "improve" it with the basic purpose of adapting it to himself/herself, considering that s/he can understand and evaluate all causal relationships and relations that govern in a given space. However, in most cases, the understanding merely implies the consequences of relationships and relations that natural processes cause, so any significant changes in these relationships and relations can cause permanent negative consequences. There is a significant number of such examples in the Pliva River area. The Pliva lakes, along with the Pliva river waterfall, have undergone significant changes of their natural state, such as the process of cessation of tuff formation in the lower course that is worrying.

The Pliva lakes along with the Pliva are characterized by the appearance of tuff. Tuff is a calcium-carbonate precipitated aquatic formation which is prevalent in the Una, the Trebižat and the Pliva river in Bosnia and Herzegovina.

By its chemical composition tuff is a calcium carbonate ($CaCO3$) which is excreted from water in karst rivers and from karst springs. The river basins of the tuff rivers are mostly of geological structures of limestone and dolomite, which dominate the Dinaric mountain system in Bosnia and Herzegovina. The basin water rich in carbon dioxide ($CO2$) chemically corrodes carbonate rocks from which a solution of calcium bicarbonate is formed: $CaCO3 + H2O + CO2 \rightarrow Ca(HCO3)$. This solution is carried by river water, which

under the influence of mechanical turbulence reversibly dissociates the calcium bicarbonate from which the tuff that accumulates in the river basin is formed: Ca (HCO3) 2 → CaCO3 ↓ + CO2 + H2O.

The process of tuff formation is accelerated by phytogenic processes in water, especially in algae and moss, which consume carbon dioxide from the water. Thus they help to release calcium carbonate which is deposited on algae, mosses, leaves and branches. For this reason, these plant communities are often called sedentary (Spahić, M. et all, 2014). Hydrological facilities such as the Pliva Lakes and the Pliva River Waterfall are the result of tuff formation in the Pliva.

Because of its uniform flow and concentration drop on a rather short move, in 1895, Austro-Hungarians built the first hydroelectric power plant in the Balkans, then the natural reservoir, i.e. the Great Pliva Lake, for the work of Elektrobosna that produced FeSi and Si metal (Barić, M. 2006). After the construction of the hydroelectric power plant "Elektrobosna", significant interventions on the aquatic complex of the Pliva Lakes occurred in the period from 1952 to 1957 (after the construction of hydroelectric power plant "Jajce I") when a concrete barrier was built on already existing tuff crossing with the aim of raising water levels of the Great Lake, and in addition to that a biologic minimum of 3m³ / s which is redirected to the Small Lake is determined. The hydroelectric power plant Jajce I, which was put into operation in 1957, uses significant amounts of water from the Great Lake, which 5.72 km long tunnels redirect water to turbines ("Jajce I" and "Jajce II", 2014).

In the aforementioned period, in order to prevent the acceleration of vertical erosion in the lower Pliva, 7 concrete slabs were built, and, from 1970 to 1972, subsequent 4 concrete slabs downstream of the Round Lake were constructed. With these activities, the Pliva river bed loses its natural character and the Great Pliva Lake becomes an artificial reservoir. With the appearance of large floods in 1996, a significant number of slabs were destroyed, which were supposed to protect the Pliva waterfall at the mouth, and there was also significant damage to the waterfall (Barić, M. 2005).

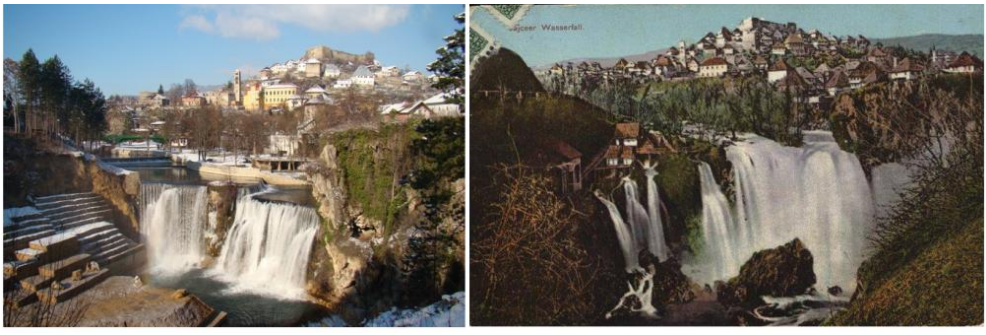

**Fig. 4. Changing the appearance of the waterfall today and 110 years ago**

*Source: www.agencija-jajce.ba,www.kolekcionar.eu*

Since 1996 repair works have been done to undo the harm of the consequences caused by the high water levels of the river Pliva. Solutions aimed at protecting the waterfall at the mouth of the river Pliva and the basin of the Small Pliva lake to the waterfall had significant consequences on the area, and today almost all this area is partially or completely anthropogenic.

The waterfall further loses its natural ambience by creating a pool under the waterfall at the very mouth of the river Pliva, which reduces its height by almost 4 meters. In addition, the waterfall loses its original role, which is to represent the mouth of the river Pliva into the Vrbas, which was unique in the wider environment. Although there are still pending works on the Pliva river basin and waterfall, the cost of these interventions is extremely high and exceeds 8.500.000 KM (Barić, M. 2006).

Although the interventions in this area partially preserved the waterfall, they permanently affected the landscape that was unique. It is important to emphasize that nobody has been expertly concerned with the issues of the negative consequences of complex natural processes and connections within the river basin and especially lakes as hydrological facilities, where a complex biological cycle takes place. The main role for the future of this aquatic complex and hydrological facilities will be in the activities of geographers, ecologists, biologists, geologists and hydrologists who will identify all inputs for the return of the Pliva and Pliva Lakes to their natural state.

From a group of negative tendencies, what is detrimental, especially on lake water, is the production of organic sludge and fecal matter. Organic sludge and other faeces that come into the lake water are deposited on the lake bottom, where colloidal particles rotten and rupture oxygen from the water, which has a beneficial effect on sapropelization and coastal eutrophication of the lake. Sapropelization and eutrophication are phytobenthos, which make coastal landscapes and fuse with the lake shore. (Spahić M. et al., 2015)

The disruption of the natural state of the middle and lower stream is also reflected in the cessation of the tuff formation, which is part of the natural, especially hydrologic, values of this region. Physical and chemical analyses of water above and below the waterfall have shown that the water is calcium carbonate saturated and that the physico-chemical conditions for tuff sediment in that area are met. However, the concentrations of some nutrient salts (nitrates and ammonia) have increased somewhat, as well as the concentration of dissolved organic carbon, which warns of certain organic contaminants. Though the concentrations are below the permissible concentrations for potable water and do not indicate any significant pollution, they may be inhibitory to the tuff sediment process itself, or to the development of microorganisms that play a significant role in the process of tuff formation (Horvatinčić, N. 2005) .

## MANAGEMENT OF THE PROTECTED PLIVA LAKES AREA

The area of the Pliva Lakes is located in the area of Jajce and Jezero municipalities and is divided by the entity of Bosnia and Herzegovina. Given the current territorial organization of the country, more complex projects and monitoring are more difficult to realize due to the competencies of different administrative units. An aggravating circumstance is the protection of space as a National Monument of Bosnia and Herzegovina that defines the relationship to protected areas by law. The Pliva and its hydrological facilities are managed by the Agency for the Sava River Basin, which regulates the ways of using water potential.

In 2007 the Commission for National Monuments proclaims the Pliva Lakes Region as a National Monument entitled "Cultural Landscape - Pliva lakes with a complex of mills on the Pliva near Jajce" in the area of 1,700.76 ha (Figure 3). In the same year, with the aim of implementing the Management Plan, the municipality of Jajce establishes the "Agency for

Cultural, Historical and Natural Heritage and the Development of Tourism Potentials of Jajce".

Given the natural features of the Pliva lakes, and especially the river bed in relation to anthropogenic factors (such as cultural, historical, economic, tourist, traffic), this aquatic complex has a specific feature and elements that are reflected through:

1. conservation of the stability of the entire ecosystem and human action therein;
2. protection of the narrow and broader area, i.e. protection from natural processes that can endanger natural processes in the protected area, such as: erosion, occurrence of very high water levels, changes in natural vegetation, etc.;
3. aesthetic values;
4. recreational significance in active, as well as passive recreation; walking, vacation, swimming, enjoying nature, games and other types and forms of recreation;
5. medical significance in rehabilitation activities;
6. an emphasized tourist function that needs to be permanently directed to develop with the preservation of natural values;
7. sanitary-hygienic task accomplished by the Pliva aquatic ecosystem (this function is particularly important with respect to the vicinity of the settlement);
8. ecological education from preschool, over school age to adult;
9. the function of the protection and maintenance of flora and fauna, especially ihtiofaunas, which are an integral part of the ecosystem in which they should be allowed to develop unhindered;
10. individual parts having a distinctly specific feature, such as watermills between the Great and Small Pliva Lake;
11. economic function, which is particularly important at the beginning and end of the Great Lake, where the development of the traditional economy should be supported.

The quality of conservation of the protected area depends primarily on the model of management of this protected area by clearly identifying its basic functions, which is precisely the central theme of this work.

Today, it is definitely a key issue in managing protected natural areas to define and select the most advantageous natural resource management strategy that will meet the economic and ecological criteria of development. Namely, practice has shown that different methods of estimation of natural resources give different results, and it is necessary, because of the quality management of protected areas, to evaluate the protected area on the basis of several methods prior to the adoption of strategic decisions (Črnjar, M. 2002).

One of the basic tasks of the "Agency" and the Agency for the Sava River Basin which have a legal obligation to take care of this area is initiating the protection of this area according to the IUCN categorization as provided for by the Spatial Plan of Jajce municipality and Central Bosnia Canton. The basic document for a sustainable management of a protected area that needs to be made is a Management Plan.

The management plan defines the development guidelines, the manner of performing the protection, use and management of the protected area, and specifies guidelines for the protection and preservation of the natural values of the protected area taking into account the needs of the local population. The management plan is made for a period of ten years, and persons performing activities in the protected area are obliged to adhere to the spatial plan and management plan (Martinić, I. 2002).

A similar Management Plan has been implemented by Jajce Municipality for the Natural Heritage Building of Jajce, for the purpose of naming this area for entry into the World Heritage List in 2006. This plan does not cover the Pliva Lakes area.

The Management Plan is designed to preserve the exceptional universal value of Jajce for future generations. Conservation in the context of this Plan does not only include physical protection from decay and other changes, but also the improvement of the visual character of the environment, mitigation and management of environmental factors, preservation of cultural values and their better interpretation and understanding by visitors, and a sustainable approach to tourism development (Commission for the preservation of national monuments and Municipality of Jajce, 2006). In this context, the Management Plan identifies the "Agency" which will be in charge of overseeing the implementation of the Management Plan on a local level.

The Agency carries out professional tasks related to the protection, reconstruction and presentation of cultural-historical and natural heritage and the development of tourism potentials of Jajce. Particularly important are tasks such as the preparation of analyses, information and other expert materials on the status of natural/cultural heritage for the needs of the authorities and for the purpose of carrying out the protection, preservation, restoration and rehabilitation process ("Agency for Cultural and Natural Heritage and Tourism Development Potential of Jajce ", 2007). This shows that the Municipality made the first step in the process of managing the natural and cultural heritage of the municipality of Jajce. Although the "Agency", for the purpose of nominating Jajce, focused on the activities of cultural heritage protection as well as the strategic development of tourism, there is no doubt that by strengthening the staffing and the adoption of the Protected Area Management Plan, the "Agency" can be the bearer of activities in this regard as well, in close cooperation with the Agency for the Sava River Basin.

Apart from the institutional establishment of the Public Institution for the Pliva Lakes area, there are several important decisions that affect the practical protection of this area:

- The Decree on the Proclamation of the National Monument has also issued a decree on the ban on new construction that disturbs the natural state of the area, in the buffer zone of the Pliva Lakes.
- The Agency for the Sava River Basin has adopted a regulation defining the use of internal combustion engines. Thus sailing is only possible with vessels with electric motors or paddles, with the aim of preserving water quality.
- It is worth noting that the exterior appearance of the mills at the Pliva Lakes has been restored and since 2016 works have been done to restore 20 mills for the purpose of grinding or presenting and selling souvenirs, which further enriches the existing tourist offer and gives a sustainable purpose to these facilities.
- A significant task is to determine the indicators for the formation of tuff at the middle and lower course of the river Pliva. If the indicators of all the factors affecting the creation of tuff are determined, the existing values can be controlled, and finally the future development can be predicted.

From the aspect of tourism and sustainable use of the Pliva Lakes, one of the tasks of protection and use is the zoning of space to be used for the development of facilities for sport and recreation (beaches, hiking trails, cycling trails, fishing rinks, etc.), housing and infrastructure that will be complementary to tourism activities (construction of tourist resorts, hotels, sewerage infrastructure, etc.), and small scale housing facilities for the needs

of the local population. By drafting the Regulatory Plan, the local self-government (Municipality) will clearly define the forms and scope of resource use of this area, as well as measures to ensure permanent protection and reduce the negative impact on the aquatic complex of the Pliva Lakes and its surroundings.

## TOURISM DEVELOPMENT AND THE TOURIST VALORIZATION OF THE PROTECTED PLIVA LAKE AREA

Tourism based on protected areas can be a key factor in supporting conservation of natural and cultural and historical heritage (Stojanović, N. 2010). Nevertheless, tourism in protected areas creates benefits as well as damages. These effects interact with each other in a variety of ways. The potential benefits of tourism in protected areas include: increased local employment, increased incomes, stimulating and diversifying local economy, promoting local production, contributing to the preservation of natural and cultural heritage, supporting research and development of good environmental habits, supporting ecological education of visitors and local residents, etc. Negative effects stem from tourist visits themselves, but many can be competently managed and thus reduced.

Tourism development emerged as a significant phenomenon since the middle of the last century until the war in the 1990s. After 2000, tourism infrastructure is being restored. These two phases had different developmental directions and the political systems in which they developed. The first phase until the 1990s was a period of intense interest for the tourism industry by the country that invested heavily in the reconstruction and development of tourism infrastructure.

By building the M-5 (Jajce-Bihać) regional road, the Pliva lakes gain traffic significance that greatly accelerates tourism development in this area. In addition, by the 1990s the tourist infrastructure provided for a 180-bed hotel, a car camp for 150 users and a restaurant for 200 visitors on the Pliva lakes. The tourist offer was based on a sports and recreational offer, the cultural and historical heritage of Jajce and tourist visits for a one day stay. The 1990 regulation plan provides for the upgrading of new accommodation facilities, the regulation of beach facilities, the construction of a hotel harbor for boats and the construction of sports grounds. Thus it is planned to provide an additional 2600 beds in five hotels, two tourist resorts and a motel and two car camps. From the total area of about 170 hectares, which is the subject of the drafting of the Regulatory Plan, the general urban plan envisages an area of approx. 1.5 ha for individual housing construction of a pansion type, about 2.2 ha for weekend development with individual housing (Urban Planning Institute of Bosnia and Herzegovina , 1990).

With the war the development of tourism stopped, even the then existing tourist infrastructure was completely destroyed partly due to the war conflicts and partly due to bad privatization. The remaining catering facilities offered basic accommodation and food services, and only after ten years after the end of the war, there was a significant increase in the number of visitors. At the moment, in the area of thePliva Lakes there is a smaller hotel with about 62 beds and a motel with 33 beds, a 48-seat car camp and bungalows with 68 beds. In addition, accommodation services are also offered by several private facilities that are not registered. Apart from accommodation and food, the facilities also offer numerous sports and recreation activities. One of the major problems in the tourist business of Jajce is the lack of high category hotels and larger accommodation capacities.

According to the "Agency", around 150,000 to 200,000 visitors and tourists visit the Pliva lakes area every year. Further development of this area in the context of tourism primarily depends on the manner of managing the protected area. It is undeniable that this area has a significant potential for the development of sporting and recreational forms of tourism, but the negative effects that tourism creates must be minimized. What is specific to tourism business in protected areas is the special conditions under which tourism can use natural resources here.

The International Biological Diversity Guidelines (CBD) on biodiversity and tourism development, for tourism development activities in vulnerable habitats such as the Pliva Lakes, which are of great importance for biodiversity and its guiding state:

- management of influence that is essential to avoid or minimize any disturbance to the protection of biodiversity and sustainable use that may be caused by the development of tourism or tourism activities;
- tourism should be planned and managed;
- monitoring of impacts can include, inter alia, measures for determining the sites of tourism development and tourism activities (Stojanović, N. 2010).

Apart from the changes in tourist infrastructure, the Pliva area is experiencing changes in the unification of the tourist offer in the destination and the forms of tourism that are being developed. The center of the tourist destination of the wider area of the Pliva is Jajce. The town of Jajce with its 29 National Monuments of Bosnia and Herzegovina is one of the most important cultural and historical towns. Before the end of the war, this area defines its tourist offer through rich history and preserved natural heritage, with a focus on monuments that are significant for the former Yugoslavia, and that resulted in the emergence of a specific form of tourism: the so called "AVNOJ Tourism". Although Jajce was in the socialist system, in the 80's it was at its national and international tourism development peak. This continental destination has defined an offer intended for domestic tourists (cultural and historical) and foreign tourists traveling to the Adriatic coast.

Today Jajce defines its offer through selective forms of tourism. The tourist destination is developing in the direction of the protection of natural and cultural heritage. For some time Jajce has been trying to protect certain monuments as part of the World Cultural Heritage (UNESCO). In addition to that, by protecting the river Pliva and parts of the Vrbas River according to the IUCN categorization, the natural heritage will also be adequately protected.

Selective forms of tourism in the Jajce area are not new, almost all professional documents indicate that this form of tourism development is recognized as a strategic goal of local community development. From the selective forms of tourism one can distinguish those which are to some extent represented in the tourist offer as well as those which have significant potential for development in the near future as complementary to the basic offer.

Cultural tourism can be distinguished as the basic form of tourist offer, within which the most important forms are: historical, religious, manifestational, conference and educational. In addition to cultural, sport plays an important role as well: fishing, water jumping, kayak on still waters and rafting. Present recreational forms of tourism in Jajce are: recreational fishing, rafting on the Pliva and the Vrbas, boat trips on the Pliva lakes, swimming in extremely hot and dry summers on the well-attended beaches of the Pliva and Pliva lakes, biking, hiking, hunting and skiing. Other forms of tourism may include camping and excursion tourism.

## CONCLUSION

The area of the Pliva Lakes is located in the area of Jajce and Jezero municipalities and is divided by the entity of Bosnia and Herzegovina. With a total area of 1.4 km² it is among the largest natural reservoirs of water in Bosnia and Herzegovina. The Pliva lakes consist of the Great and Small Lake, which are divided by a natural tuff transversal.

The use of water resources in the river Pliva comes from the arrival of permanent residents in these areas by the construction of temporary facilities such as ponds and watermills. A more intensive use happened with the construction of the hydroelectric power plants "Elektrobosna" and "Jajce I" which all resulted in the change of the Pliva Lakes area. The M-5 (Jajce-Bihać) and accompanying tourism development have also significantly influenced the change of the Pliva Lakes area.

Unfortunately, such development was not accompanied by adequate protection to ensure an unchanged natural environment with all the major natural processes that resulted in the emergence of a unique natural environment such as the ambience around the Pliva Lakes or the waterfall at the mouth of the river Pliva. The reduction of water flow from the Great to Small Lake further downstream of the Pliva and the discharge of municipal waste water into a further watercourse where no significant tributaries are present resulted in the cessation of tuff formation, the vertical blending of the Pliva into a basin mainly made of limestone and tuff. Subsequent landscaping of the riverbed of the Pliva with the aim of protecting the waterfall completely changed the natural space as anthropogenic.

Today, this area enjoys the protection as a Cultural Landscape that does not offer the appropriate measures to protect the biodiversity of an aquatic complex such as the Pliva Lakes. It is necessary to recognize this area as extremely valuable through the IUCN categorization, as provided by spatial planning documentation.

In addition to formal protection, this area has its potential in the sustainable use of hydrological resources and the development of selective forms of tourism. These forms of tourism can adequately achieve the desired development, enrich the existing tourist offer and use the natural and cultural attractions of the explored area.

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