Chapter 10

The interrelation between development, management, and management issues in Plitvice Lakes National Park

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Abstract

The implementation of the first management system for Plitvice Lakes coincided with the founding of the Park and its associated management body in 1949. Since then, the area of the Park has been managed by various public institutions, founded for the purpose of preserving its natural and cultural value. The area's development as a tourism destination has resulted in many developmental missteps, as well as management issues and other challenges. The problems associated with managing protected areas can be seen by analysing the goals that have been achieved by past management bodies, as well as by observing how the current management body is working toward its stated goals (which is not done enough). In terms of development, it is important to emphasise how development policy has largely encouraged hotels and hospitality businesses, while other sorts of businesses lag behind. This has significantly reduced the potential positive effects on the greater community as well as the return of important services of the ecosystem and geosystem to the environment itself. Concordantly, management goals are insufficiently oriented toward the fundamental role of national parks, conservation, and evaluation of natural components in the area.

Key words: national park, management of protected areas, environment, tourism, geography, Plitvice Lakes National Park, Croatia

Introduction

In Croatia, typical planning and management practices (especially in tourism) often only promote concepts of integral management and sustainable development in principle, whereby dangers for the environment and human health become marginalised. Due to this, one of the goals of this chapter is to determine all possible negative influences for a given area at the start of the planning process, which is especially important for protected areas (Harding, 2006). Additionally, it is important to establish possible solutions that can be achieved with respect to the specific conditions of a given area, and which are in keeping with sustainable management.

This chapter focuses on Plitvice Lakes National Park, primarily due to the fact that national parks represent generators of development for individual areas (Petrić, 2008; Radeljak and Pejnović, 2008), and are the protected areas that are most visited by tourists. National parks are also typically large in area and are natural areas that are used intensively for tourism. It is also important to mention how protection of national parks is regarded as a fundamental part of protection of biodiversity around the world (Gaston et al., 2006; Mora and Sale, 2011) and, as such, these areas are among the most valuable parts of national territory (Lausche et al., 2013) and number among the most attractive tourism destinations. Therefore, the aforementioned areas must be planned and managed carefully using active measures that are in keeping with sustainable development. This approach requires a detailed analysis of each area's status, from which solutions to potential associated problems can be generated.

Therefore, the basic goal of this chapter is to give a unified view of the developmental phases of Plitvice Lakes National Park in relation to management phases and problems. A recommendation for a conceptual model of integral and sustainable development for the Park is also put forward in this chapter.

Methodological framework

The method of triangulation, using interviews with management experts, analysis of literature and secondary sources, and a critical assessment of

existing management plans was used for the purposes of this chapter. Push and pull factors were established, analysed, and compared to existing methods of managing protected areas, creating the basis for the integral management model presented later in the chapter.

The chapter analyses data from the area of Plitvice Lakes National Park, accumulated from statistical, professional, and scientific publications, as well as numerous cartographical and graphical elements. The key sources of data for the research in this chapter, related to the Park, were: Population Censuses of 1991, 2001, and 2011 (Croatian Bureau of Statistics, 1994; 2003; 2013); number of overnight stays; arrivals (visits); and other tourism statistical data from the internal database of the Park and the *eVisitor* system (2019). Material from the aforementioned phases also represents data on the status of the environment in the area of the Park, stemming from a long line of previously-published research. Finally, two management plans for the Park (from 2007 and 2018 respectively) served as important parts of the base data for the analysis.

In the scope of the research, deep interviews with groups of experts from the domain of management of national parks were carried out. The fundamental theme in the interviews was establishing the efficiency of park management via analysis of 14 specific goals from the management plans of 2007 and 2018 and 18 management sub-plans of 2018. Eight experts from different scientific fields (geology, geography, biology, economy, chemical engineering, forestry, sociology, and architecture) were interviewed.

Fundamental characteristics of Plitvice Lakes National Park

Plitvice Lakes National Park lies in the mountainous part of the Republic of Croatia (Fig. 1) and encompasses an area of 297 km². The park contains an exceptionally-sensitive natural phenomenon based on the process of tufa formation¹, for which it was named a UNESCO World Heritage site in 1979.

- 1 Tufa is a result of development of strictly determined interactions between physical-chemical and biological characteristics of a unique karst water basin, in climate conditions of the current interglacial and conditions of undisturbed natural balance (Stilinović and Božičević, 1998).

Fig. 1 Location of Plitvice Lakes National Park in Croatia
Source: State Geodetic Administration of the Republic of Croatia (SGA), 2019

The area of the Park, however, is increasingly threatened due to an explosion in the number of visitors over the last 20 years (Sremac et al., 2011). Due to this, it is crucial to consider possibilities for managing all elements of the Park with the goal of sustainable development on all levels. The underlying phenomenon that created the park (tufa formation) is a result of a process of strictly-determined interactions of physio-chemical and biological factors of the unique karst aquifer, climatic conditions of the current interglacial period, and the generally-undisturbed natural balance (Stilinović and Božičević, 1998). The formation of tufa is an extremely sensitive process, which can be halted by changes in the environment and environmental conditions, as well as by natural and anthropogenic influences.

For the aforementioned reasons, the need to protect this particular phenomenon became apparent very early (Pevalek, 1924; 1935; 1938; Petrik, 1958; Stilinović and Božičević, 1998). The area of the Park encompasses Plitvice Lakes and the surrounding landscape. Over the last two centuries, the landscape of the park itself has been significantly altered to accommodate modern leisure activities (tourism, recreation, transport) and other anthropogenic activities. Indicators of long-term settlement are the numerous deforested areas, which took shape in the period from the 17th century to the end of the Second World War (Marković, 2015). In keeping with contemporary trends of rural depopulation, protected areas (which are often in zones of rural periphery settlements) are becoming predominantly tourist settlements as tourism strengthens (Lukić, 2012), which is out of synch with the status of the periphery. This has happened in the area of Plitvice Lakes, where intense tourism development has contributed to the stagnating number of residents in the area around the Park itself.

The lifecycle of tourism in Plitvice Lakes National Park

Starting in the mid-20th century (with the exception of wartime discontinuity), the development of the Park, its wider area, and the corresponding socio-economic region took place under the dominant influence of tourism. An indicative fact linked to economic characteristics is how, in 2018, there were 768 full-time employees of the Park, while there were between 130 and 250 temporary employees (depending on seasonal needs) (Plitvice Lakes National Park, 2019), making the Park the largest employer in Lika-Senj County.

In keeping with the aforementioned, further development of the Park should be regarded in the context of development that has (with minor dis-

continuity) taken place over the last 150 years—more specifically, the formal development of the last 70 years. In regard to the processes of protection and connection that began with the founding of the “Society for the Maintenance and Beautification of Plitvice Lakes” in 1883, the area of Plitvice Lakes was “discovered” in a touristic sense around the same time, marking the start of a series of leaps in development that can be divided into six fundamental phases (Marković Vukadin and Franjković, 2019):

1. the research phase;
2. the phase of intense infrastructure development;
3. the phase of reorganisation and spatial expansion;
4. the phase of intense growth in the number of visitors;
5. the wartime phase, i.e. phase of decline—second developmental cycle; and
6. the phase of (re)expansion of visitors—second developmental cycle.

From the end of the 19th century to the end of the Second World War, the area of Plitvice Lakes was characterised by the gradual discovery of its touristic potential. This period represents the research phase in the lifecycle of the area as a destination, when the first tourism-related construction took place. The first hospitality object near Plitvice Lakes was built in Velika Poljana in 1862. It was called the “Tourist House” and would also later gain the role of forester’s lodge (Ivanuš, 2010). On the initiative of the Society for the Maintenance and Beautification of Plitvice Lakes in 1886, the first hotel near Plitvice Lakes was built—also in Velika Poljana. Hotel Plitvice was a generator of development for the area, and the opening of the Lika railway line made the area more accessible and spurred the refurbishing of hotels, summer houses, roads and paths, and bridges². Just before the Second World War, the tourism supply also spread to the area of Labudovac and Plitvički Ljeskovac (Petrić, 2008).

The next lifecycle phase of Plitvice Lakes as a destination was the period of intense development (1949–1969), which was characterised by concentration of the bulk of the tourism supply (especially in the area around Velika Poljana) in the early developmental phase of the Park. This also had an influence on the demographic livelihood in the area immediately sur-

- 2 Concrete was used for the construction of parts of the paths and bridges, however, due to the lack of knowledge at the time regarding the processes underlying the fundamental phenomenon of the Park, it is hard to determine how much damage this did to its biodynamic processes (Pevalek, 1938).

rounding the park (Pejnović, 1992), and resulted in discord between nature protection imperatives and intense (and poorly-controlled) development of tourism establishments. The largest hospitality objects were constructed during this era, e.g. Hotel Plitvice (1953), Hotel Bellevue (1963), and Hotel Jezero (1970) (Marković Vukadin and Franjković, 2019).

As a response to the prior period of growth, a phase of reorganisation followed (1970–1990), which was characterised by numerous qualitative changes based on scientifically well-founded research and solutions. Business and work within the Park itself was united under a single organisation, which allowed its development to be better coordinated. It is important to note how economic and infrastructural projects, for which the basic goal was the dispersion of the tourism supply throughout the wider Lika Region, emerged and played a major role in the preservation of the Park's fundamental phenomenon. This period was characterised by the redistribution of Park resources to the local community and the strengthening of traditional forms of economic activity, by which a balance between nature protection, tourism, and the needs of the local community was attained. This can be seen in the amount of new accommodation capacity that was built from 1975 to 1981, when the development of new accommodation in the Park, and in Lika as a whole, equalised.

It should also be mentioned how this period was still characterised by centralised development of tourism and other functions. In the second half of the 1970s, there was a huge surge in tourist accommodation capacity (Marković Vukadin and Franjković, 2019). Concurrently, there was also a huge surge in tourist visits, which peaked in 1985 (762,221 visitors). This represents the zenith of Plitvice Lakes as a tourist destination prior to the collapse of Yugoslavia and the Croatian War of Independence (1991–1995). After 1985, the Park would slowly slide into a phase of stagnation (Vidaković, 1997).

The next two periods (second developmental cycle) during and following the Croatian War of Independence—the phase of decline and the phase of (re)expansion of visitors—represent a new lifecycle for the Park as a destination, complete with new challenges, problems, and opportunities for tourism development. It should be stressed here that the Park was characterised (unsurprisingly) by a sharp decline in visitors during the War (nearly 100%) and the destruction of tourism objects. Therefore, the period of 1997 to the time of writing has been characterised by tourism development and a constant increase in the number of visitors, overnight stays, income,

and a corresponding increase in conflicts between nature protection and economic imperatives.

Passing the milestone of one million visitors was only the herald of further growth—the number of visitors was 1,188,798 in 2013 and would grow to 1,7 million in 2017 (Fig. 2) The pressure caused by the massive number of visitors is not overly alarming if regarded in terms of average visitors per day, which was 3,093 in 2013 and 4,657 in 2017. In terms of the number of entry passes sold (tracked daily), however, there were 18 days when the Park had over 10,000 visitors, and 62 days with over 8,000 in 2013, while in 2017 there were 56 days when the Park had over 10,000 visitors (Plitvice Lakes National Park, 2018)³.

Fig. 2 Yearly and daily fluctuation in the number of visitors to Plitvice Lakes National Park in 2017

Source: Plitvice Lakes National Park, 2018

- 3 The introduction of a new system of ticket reservations, starting on April 1st, 2019, set the daily entrance limit for the Park at 10,000, which should prevent further

It is important to emphasise how the aforementioned numbers exclusively regard visitors to the zone of the fundamental phenomenon of the Park, which is near the two main entrance points. Excess and (spatially and temporally) discordant development of tourism in the Park is an increasingly severe threat to the sustainable development of the area, whereby special attention should be given to the atrophied settlement structure, the corresponding weakening of traditional local identities and the multi-faceted, unique localities within the Park, as well as processes of anthropogenic eutrophication.

Contemporary tourism development—in the second developmental cycle—in terms of spatial transformation has been characterised by intense growth in the number of private accommodation objects, which has had a tendency to encroach on the most sensitive parts of the Park (e.g. Plitvica Selo along the Plitvica River—which is the source of the large waterfall). Thus, the amount of private accommodation has grown with the number of visitors over the last 20 years, especially in the immediate area of the Park. The aforementioned Plitvica Selo, which has recorded the highest level of growth in private accommodation, should not be allowed to undergo a new phase of tourism urbanisation that would be characterised by the construction of new objects as well as the renewal of existing ones.

Private accommodation has expressly seasonal characteristics, and its demands, particularly on the water supply during summer months, heavily burden the area's resource base. Furthermore, this burdens the drainage and sewer systems, as well as the area's waste management capacity (Opačić et al., 2005). The scope of the problem becomes clearer when it is regarded in terms of the spatial distribution of private accommodation within the Park, in which the immediate area of the National Park is especially pressured.

Finally, it should be pointed out that, in keeping with knowledge gained from the last few decades of overuse of the Park's resources, this phase of expansion could mature into a new phase of development that would be oriented toward improving the quality of the existing tourism supply and increasing awareness of the area's value via education (regarding the environment as well as the traditional significance of Plitvice Lakes and its surroundings). This would go hand in hand with renewing existing hospitality objects in the area of the Park, building more recreational paths,

eutrophication of the environment of the lakes. This is also in the interest of providing a better experience for visitors as crowding is reduced.

as well as forming a unified concept of the Park, as both a protected nature area with its own local tradition and history and as a world-renowned tourist destination.

Management and its contribution to sustainable development of Plitvice Lakes National Park

The main determining element for continued management on all levels of the Park is the fact that it is still centrally-managed, based on the decision made by the competent state institution, i.e. state governance. This type of management, however, has more to do with management policy than actual management methods—which will hereinafter be described.

The start of management and general social awareness regarding Plitvice Lakes coincided with the founding of the Society for the Maintenance and Beautification of Plitvice Lakes in 1883 (Vidaković, 1997), marking the beginning of organised action that can be understood as a forerunner to the contemporary management system. The first management system for the Park was implemented when the Park was officially formed in 1949. In this period (1949–1969), the Park was managed by several different management bodies.

In 1970, a single organisation—called National Park Plitvice, enterprise for nature protection, hospitality, tourism, and commerce—took over management of the Park. This organisation acted as the Park's management body and was very successful at achieving determined goals, despite the lack of management plans that have (in Croatia) come to be regarded as the most important pieces of documentation for the management of a given area. It continued to operate successfully up until Croatian independence, and managed the area primarily via spatial planning documents (Petrić, 2012):

- Plitvice—Regional Plan, 1950;
- Programme of the General Urban Plan, 1960;
- General Maintenance Plan, 1971;
- Recommendation for the Spatial Plan of Plitvice Lakes National Park, 1975;
- Spatial Plan for Plitvice Lakes National Park: spatial plan for an area of special purpose, 1986.

After wartime occupation and the return of the local populace and reinstatement of the Park's management structure, visitors also returned. At

this point, the main task of management was to restore damaged objects while managing existing tourism. The obligation to create management plans for protected areas was written into law for the first time with the *Law on Nature Protection* of 2003. Management plans determined management goals and activities, how to reach them, and indicators by which the efficiency of management would be measured. These plans are made for ten-year periods, with an option to update/replace them after five years, and are implemented via yearly programmes for protection, preservation, use, and promotion of protected areas.

The management plan for Plitvice Lakes National Park of 2007 is among the most important documents in Croatia on this particular strategic level. The plan consists of a summary of strategic documentation by which strategic orientation and management goals are to be determined, as well as individual parts of action plans that go deep into detail regarding management orientation and management methods to be used in the field. Based on the aforementioned, four fundamental phases of management of the area were identified (Fig. 3):

1. the phase of informal management (1883–1948);
2. the phase of management based on spatial plans (1949–1989);
3. the wartime phase—lack of a fundamental management and decision-making body (1990–2002); and
4. the phase of planned management documents (2003–time of writing).

In order to evaluate the Park's management, its fundamental goals should be listed (Plitvice Lakes National Park, 2007):

- *preserve the unique karst biological diversity by ensuring that natural processes remain undisturbed, and ensuring protection to the area by minimising human impacts;*
- *cooperation between the local community and the Park's management in terms of planning and implementation on the local level; and*
- *ensuring that visitors receive a genuine experience of the natural riches of the Park.*

The fundamental goals for long-term sustainable management of the Park have been laid out in the management plans, whereby the focus is on continual preservation of the landscape and its biodiversity, cultural herit-

Fig. 3 The lifecycle of Plitvice Lakes National Park as a tourism destination and its management phases

Source: according to Marković Vukadin and Franjković, 2019, adapted by author

age, promotion of awareness of the importance of nature and cultural heritage preservation, preserving the pristine nature and other attractions of the Park, and strengthening the local community. A number of specific developmental goals were determined based on these fundamental goals, from which the final action plan was determined. The specific goals for biodiversity preservation and the development of tourism are of particular interest:

1. the goal of managing the forests of Plitvice Lakes National Park is to ensure the natural state of the forest ecosystem, which are of crucial importance for biodiversity and the preservation of the fundamental phenomenon, and to ensure all generally-useful functions of the forest;
2. preservation of positive trends of the development of tufa formations of the river community and tufa conditions on tufa barriers, and ensuring the preservation of all plant and animal communities in the aquatic ecosystem (source, standing, and flowing waters) in order to preserve biodiversity and the ecological balance;
3. preservation of grasslands (dry pastures and meadows, wet pastures and meadows, and marshes) as areas of great biodiversity and value to the landscape;

4. systematic research, preservation, and presentation of cultural heritage and preservation of the entire rural area and traditional production methods (agriculture, herding, trades and crafts);
5. gathering of sufficient data regarding all elements of the protected area (biotopes and species as well as other elements that do not belong to the domain of natural sciences research but are important for the purposes of management, e.g. cultural heritage, etc.) in order to better and more easily manage the area of the National Park;
6. enabling visitors to have a quality visit, with a high level of organisation and a minimal possibility of damaging the ecological system of Plitvice Lakes;
7. understanding of the value of Plitvice Lakes as a natural phenomenon on the part of all employees, the local population, and visitors, while enabling a high level of enjoyment of the natural area and quality services;
8. improving the quality of accommodation and services in the area of Plitvice Lakes National Park, while respecting the highest ecological criteria along with maximising use of local and regional resources according to the relevant spatial plan;
9. improving the image of Plitvice Lakes National Park and the level of general knowledge regarding its natural and cultural value;
10. regulation of traffic in accordance with the fundamental purpose of Plitvice Lakes National Park and the needs of stakeholders;
11. development of infrastructure that has a minimal effect on the environment;
12. establishment of cooperation with the local population in order to achieve the vision of Plitvice Lakes National Park;
13. resolution of legal-property issues within Plitvice Lakes National Park with special attention given to co-ownership relations for the duration of the current plan; and
14. improvement of the legal framework for the effective management of Plitvice Lakes National Park.

With the expiration of the prior plan came the obligation to create a new management plan for the Park for the period of 2019 to 2028, however, this plan has yet to be accepted and is still in its final draft form (that is available for public discussion) at the time of writing. In terms of its contents, the new plan is in keeping with documentation from 2018 (Ministry

of Environment and Energy and the Republic of Croatia and Croatian Agency for the Environment and Nature, 2018) regarding orientation and planning for protected areas and/or areas of ecological networks, and the best practices of European management plans. The management of the Park is planned via five main themes, for which general goals and activities have been defined by evaluation and grouped into subthemes.

For each planned activity the following has been determined: implementation priorities; schedule of implementation; expected cooperation with partners and institutions in goal implementation; and an evaluation of expected implementation expenses (normal expenses for Park business, e.g. employee payroll, are not included in this evaluation). In total, 556 activities were determined and grouped into 18 subthemes within the five general themes. In comparison to the former plan, the determination of the aforementioned five themes with their respective subthemes (listed below) is a major change (Plitvice Lakes National Park, 2018).

- A. *Preserved species diversity, biotopes and karst forms, as well as the stable process of tufa formation ensure the preservation of the unique beauty of the natural landscape, and also the preservation of the unique, universal value of the Park for current and future generations.* Subthemes: preservation of aquatic ecosystems; preservation of forest ecosystems; preservation of grasslands; and preservation of karst.
- B. *Preserved cultural heritage has an important role in presenting the value of the Park and contributes to preservation of the traditions and cultural identity of the area.* Subthemes: tangible cultural heritage; intangible cultural heritage; and cultural landscapes.
- C. *A full and unhindered experience that does not damage the values of the Park must be enabled for all visitors, which will best present preserved world heritage, create the income needed for its upkeep, generate public support for nature preservation, and create opportunities for sustainable development of the local community.* Subthemes: visitation system; hospitality and commerce; interpretation and education; and marketing.
- D. *The local community is the main partner of the Public Institution in management of the Park and preservation of its values and the Park is recognised as a constituent part of the identity of the local community, and development of the local community based on sus-*

tainable usage is an opportunity that preservation of a world heritage site offers. Subthemes: revitalisation of agricultural production; development; and harmonisation of the ecotourism supply.

- E. *The competent Public Institution will apply all needed legal, organisational, human, and material capabilities, resources, and power in order to manage the Park and continually work toward its improvement in all segments of management and organisational culture, strengthening cooperation with stakeholders and the role of the Park's management in Croatian and international professional and scientific circles. Subthemes: ensuring the legal and planning framework needed for proper management; development of institutional and human potential and competence; and management of property and infrastructure.*

Effectiveness of the aforementioned goals and themes from both the former and proposed plans will be analysed in sections below, with respect to their focus on the basic problems faced by the Park and how to solve them.

Management problems that have been identified

In order to establish the state of the environment, area, and community, a wide selection of scientific literature from various scientific fields was analysed with the goal of establishing the key problems faced by the Park. A large number of problematic areas were identified via preliminary synthesis of secondary sources, however, only the themes listed below were selected due to the need for rapid reaction and resolution.

Functional overburdening

The number of visitors exceeds the number of local residents of the area. This can cause social pressures on the community that, with regard to its weak demographic potential, is not large enough to ensure a steady tourism supply without daily commuters and a constant flow of newcomers. In terms of employment, the number of workers who live in other regions and commute to work in the Park⁴ or in corresponding tourism objects is increasing. This creates a situation where the community is, apart from the large number of tourist visits and itinerant workers, suffering increasing

4 Of employees of the Public Institution of the Park in 2013, 7% commuted from other regions (Marković, 2015).

social pressure as older property and buildings are being sold off and adapted to the needs of tourism or temporary residents⁵. There are a number of other negative effects, ranging from overcrowding in the main pedestrian areas of the Park (and on the county road that goes through it), to problems for the local community that arise from nature protection imperatives and restrictions (Marković, 2015).

A good example of such an issue for the local community is that construction in the village Korana is restricted and access to certain roads and paths, traditionally used by the local community, has also been restricted. Functional overburdening is seasonal in the area of the Park, echoing tourism demand. The Park has experienced unequal development throughout and, as a consequence, the number of visitors puts immense pressure on the existing public infrastructure, which is insufficient for the relatively-modest needs of the local community alone (much less for tens of thousands of tourists). This has serious negative effects on the surrounding environment.

Threatened hydrological elements of the environment

According to the latest research, a certain amount of change has been noted in the fundamental physio-chemical process of tufa formation and catalysed biological processes in relation to prior research. According to Pribičević et al. (2011), areas where tufa formation has stalled or slowed have been identified. The research demonstrated how the increased amount of dissolved organic substances (pollution) in the water has halted or hindered the process of tufa formation in the fundamental phenomenon of Plitvice Lakes.

Additionally, there is the process of eutrophication or of aging lakes—this is a natural process that lasts for centuries, but humans can accelerate it greatly with their actions (agriculture, herding, tourism, traffic, waste water) (Stilinović and Božičević, 1998; Marković, 2015). Plitvice Lakes are currently overgrown with marsh vegetation and the lake bottoms are covered with aquatic grasses (Pribičević et al., 2011). Looking at the available biochemical data, it can be concluded that Plitvice Lakes are undergoing a process of anthropogenic eutrophication. Measurements of the flow on Kozjak since 1954 show a continual reduction over the last 60 years of

5 As a consequence, there is a certain kind of class difference between “newcomers” who have capital and the local community, which feels less of the positive effects resulting from the Park.

~0.03 m³ per year (Barešić, 2009; Bonacci, 2013). In other words, water is held in the lakes longer and the hydrological system of the lakes is becoming more closed.

Threatened biotopes and changes in land use

Biotope diversity of forest ecosystems—which humans have damaged by suppressing forests—has enabled the development of different types of grasses and other types of ecosystems. Today, however, a large part of the area (primarily grasslands) of the Park is becoming overgrown. From both a floral and vegetation diversity viewpoint, as well as from the perspective of an anthropogenic landscape, this is a negative process because it reduces biodiversity and the richness of the existing flora (Šegulja, 2005). Marsh biotopes and their vegetation are also threatened. There are years of built-up remains of decayed vegetation in some places, which is causing the ground to gradually rise and the biotopes to narrow.

All of the aforementioned shows the emergent need to protect grassland areas, as well as other swamp vegetation areas and marsh biotopes in the Park. Only in this way will the existing biodiversity within the Park be preserved. In order to reach these goals, anthropogenic influence must be restored to a portion of the grassland areas (Fuller et al., 2019), i.e. the grasslands in certain areas of the Park should be regularly mowed.

Negative demographic processes in the Park and its surroundings

The fundamental cause of depopulation in the area of the Park during the second half of the 20th century was emigration, which was in turn caused by the backwardness and stagnation (in terms of socio-economic development in Croatia) of the wider area. This is supported by the predominance of emigrational types of general population mobility from 1971 to 1991, from both the immediate and wider areas of the Park. The analysis of general population mobility shows a clear difference in the intensity of emigration from the immediate and wider areas of the Park during the last few decades, whereby the immediate area of the Park—thanks to its more developed work functions—has a lower rate of emigration than the wider area (Tab. 1).

Tab. 1 Types of general population mobility of the immediate and wider area of Plitvice Lakes National Park by intercensal period (1971–2011)

Period	Area	Emigration ⁶				Immigration ⁷			
		E1	E2	E3	E4	I1	I2	I3	I4
1971–1981	Immediate area	■							
	Wider area				■				
	Total area				■				
1981–1991	Immediate area	■							
	Wider area				■				
	Total area				■				
1991–2001	Immediate area			■					
	Wider area				■				
	Total area				■				
2001–2011 ⁸	Immediate area				■				
	Wider area								■
	Total area				■				

Sources: Croatian Bureau of Statistics, 1994; 2003; 2013

The analysis of general population mobility shows a clear difference in the intensity of emigration between the immediate and wider areas of the Park over the last few decades. This is a result of the War and consequent developmental difficulties, stemming from the beginning of the 1990s, causing depopulation to spread to the settlements in its immediate area. This is a fundamental feature of recent demographic development. Thus, thanks to more developed work functions, the immediate area of the Park has experienced a lower intensity of emigration than the wider area. The problem of “demographic extinction” is not a new occurrence in the

6 E1) emigration, E2) depopulation, E3) expressed depopulation, E4) extinction.

7 I1) expansion via immigration, I2) regeneration via immigration, I3) weak regeneration via immigration, I4) very weak regeneration via immigration.

8 In contrast to the previous 40-year period, the available statistical data for the last intercensal period (2001–2011) were not dependable indicators of general population mobility. Namely, the 2011 Census registered returnees (war refugees) as permanent residents, of whom a smaller proportion (mostly the elderly) actually returned, while the vast majority were not permanent residents.

Lika and Kordun regions, however, it is a theme that is outside of the scope of management concerns for the Park.

Relevance and efficiency of management documentation

Martinić (2010) pointed out the lack of a central agency tasked with protected areas/national parks, that would manage the implementation and oversight of existing management plans, as a key problem in Croatian management of protected areas. The problem with managing protected areas, however, is much deeper and can be seen via analysis of attained management goals. The basic tool for measuring efficiency of protection is a method known as “Management Effectiveness Tracking Tools” (METT). This method is widely accepted and often used for determining influences and for reporting regarding management efficiency and effectiveness (WWF, 2007).

The lack of methodology presents certain problems, such as the fact that some protected areas are very general (non-specialised), as well as problems connected to the recognition of specific influences, problems, and the level of success of certain management actions. This problem shows the lacking transparency of data and the possibility of subjective assessment (Canteiro et al., 2018), in regard to the fact that the forms for assessing the success of a given management body are (astoundingly) sometimes filled out by members of the very management body that is being assessed.

Due to the aforementioned problems with objectiveness in the assessment of management, scores were chosen based on interviews with scientists and experts (who have dealt with the problems faced by the Park for years) in order to assess the efficiency of the Park’s management. This allowed us to have an approach to assessment that was both multi-disciplinary and objective. The interviewed scientists were from the following fields of study: biology; architecture; social geography; chemical engineering; forestry; geology; and tourism.

The respondents analysed management goals from the 2007 management plan and the outline of the 2018 management plan with the main intent of determining the extent to which the goals were focused on real management problems and how successful they were at achieving their aims. The current management transition period and expansive growth in the number of visitors were taken into account in the experts’ assessments. General scores were given, grading how focused the management goals were on the most relevant problems for the Park, as well as scores grad-

ing how successful said goals were during the period that they were actively pursued (Tab. 2). Apart from scores, the respondents also shared their thoughts on individual goals and in regard to the advantages and disadvantages of the existing management model.

Accordingly, the respondents found that the majority of the goals were insufficiently-relevant and unfulfilled, which is exceptionally important in terms of efficiency of management. Of the 14 goals, six were deemed *irrelevant, unnecessary to have as a general goal, or as goals that the management body can and/or should direct resources to achieve*, four were deemed *partially-relevant*, and the remaining four were deemed *relevant* in relation to the management problems faced by the Park. Furthermore, in terms of the successful achievement of management goals, a high level of inefficiency in management was indicated, such that only one goal was completely achieved, while five were partially-achieved, and the remaining eight goals were not achieved, in the opinion of the respondents.

As the new management plan for the period of 2019 to 2028 has yet to be formally adopted at the time of writing, the respondents were not able to assess it as they had the previous plans, rather they examined the relevance of the new goals and themes and how they related to the goals of previous management plans (Tab. 3).

Tab. 2 Scores of relevance and successful achievement of management goals (R-relevance, P-level of successful achievement)⁹ in Management Plan for Plitvice Lakes National Park, 2007

Management goal	Respon- dent 1		Respon- dent 2		Respon- dent 3		Respon- dent 4		Respon- dent 5		Respon- dent 6		Respon- dent 7		Respon- dent 8	
	R	P	R	P	R	P	R	P	R	P	R	P	R	P	R	P
Forest ecosys- tems	3	3	3	-	1	3	3	3	3	3	2	3	3	3	3	2
Tufa barriers and formations	3	1	3	2	3	1	3	1	2	1	3	2	3	1	2	2
Grassland pres- ervation	2	2	3	-	2	-	3	3	2	3	2	2	3	-	3	-
Presentation of the rural area	3	1	3	2	2	1	2	2	3	-	3	1	3	1	3	2

9 Relevance: 1) the goal is irrelevant; 2) the goal is partially-relevant; 3) the goal is relevant; Level of successful achievement: 1) the goal was not achieved; 2) the goal was partially-achieved; 3) the goal was achieved.

Management goal	Respondent 1		Respondent 2		Respondent 3		Respondent 4		Respondent 5		Respondent 6		Respondent 7		Respondent 8	
	R	P	R	P	R	P	R	P	R	P	R	P	R	P	R	P
Inventory of data	2	1	2	2	3	1	3	1	2	1	3	2	3	1	2	2
Quality tourism experience	2	1	2	3	3	1	2	1	2	-	2	1	3	1	2	3
Understanding of the Park's values	1	1	2	2	3	1	2	1	1	1	1	1	2	2	2	2
Improvement in the quality of accommodation and services	1	1	2	-	2	1	1	1	1	2	1	1	2	1	2	-
Improvement in the Park's image	1	2	1	2	1	1	2	1	1	2	1	2	1	2	2	2
Creation of a quality transport network	1	1	1	1	2	1	3	1	2	2	1	1	1	1	1	1
Development of infrastructure with minimum negative impact	3	1	3	1	3	1	2	1	2	1	2	1	3	1	2	1
Cooperation with the local community	2	1	3	3	3	2	2	1	2	1	2	1	3	2	3	3
Resolution of legal-property relations	2	1	2	-	1	-	2	1	2	1	2	1	2	-	2	1
Advancement of the legal framework	1	1	1	-	1	3	1	1	1	1	1	1	1	-	1	1

Tab. 3 Scores of relevance and level of connection to goals of prior management plans for management goals in the proposed plan for the period of 2019 to 2028 (R-relevance, P-level of relation to prior goals)¹⁰ in Proposed Management Plan for Plitvice Lakes National Park, 2019–2028

Management goals	Respon- dent 1		Respon- dent 2		Respon- dent 3		Respon- dent 4		Respon- dent 5		Respon- dent 6		Respon- dent 7		Respon- dent 8	
	R	P	R	P	R	P	R	P	R	P	R	P	R	P	R	P
Preservation of aquatic ecosystems	3	1	3	-	3	1	3	1	3	1	-	1	2	1	2	2
Preservation of forest ecosystems	3	2	3	-	3	2	3	2	3	-	3	2	3	2	3	2
Preservation of grasslands	2	2	2	2	2	1	3	2	2	2	2	2	2	1	2	2
Preservation of karst	3	1	3	1	3	2	3	1	3	1	3	1	3	-	3	1
Tangible cultural heritage	3	1	3	1	1	2	3	1	3	1	3	1	2	-	3	1
Intangible cultural heritage	3	1	3	1	3	1	2	3	-	-	3	2	-	--	3	1
Cultural landscape	3	1	3	1	3	2	3	1	-	-	3	1	-	-	3	1
Visitation system	3	2	3	1	3	3	3	2	3	2	3	1	3	2	2	2
Hospitality and commerce	3	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1
Interpretation and education	2	2	3	3	2	2	2	3	3	1	1	3	2	2	2	1
Marketing	1	3	1	3	1	3	2	3	1	3	3	-	1	3	1	3
Revitalisation of agricultural production	2	2	3	2	1	2	2	2	2	1	2	2	2	3	2	2
Development and harmonisation of the ecotourism supply	3	1	3	1	3	2	3	1	3	1	2	1	3	2	3	1
Ensuring an adequate legal and planning framework needed for management	1	1	-	1	1	1	-	1	2	1	1	2	3	1	1	1

¹⁰ Relevance: 1) the goal is irrelevant; 2) the goal is partially-relevant; 3) the goal is relevant; Level of relation to previous goals: 1) the goal is not related; 2) the goal is partially-related; 3) the goal is related.

Management goals	Respon- dent 1		Respon- dent 2		Respon- dent 3		Respon- dent 4		Respon- dent 5		Respon- dent 6		Respon- dent 7		Respon- dent 8	
	R	P	R	P	R	P	R	P	R	P	R	P	R	P	R	P
Development of institutional & human capacity and competence	1	2	-	2	1	2	-	2	2	2	1	2	1	2	1	2
Management of property and infrastructure	3	2	-	2	3	2	-	2	3	2	3	2	1	2	1	2

In the case of the new management plan, ten goals were deemed to be relevant, three to be partially-relevant, and three to be irrelevant for the Park's management. The goals that were deemed to be irrelevant predominantly related to resource organisation. The respondents were nearly unanimous regarding the improvements, in terms of better-stated goals/sub-themes, in the new plan over the former plans, but they agreed that the new goals were rather weakly-linked to the goals of previous management periods—this is not necessarily a bad thing, as one respondent put it: *'the old plan(s) should be filed away and forgotten, only to be dusted off and displayed as an example of what not to do'*.

It is indicative that in the case of both plans, priority in terms of relevance was given to the goals aimed at protecting (preserving) the environment, then to protecting cultural heritage and landscapes, and then to goals aimed at strengthening the local community and ecotourism supply. Not even the respondents from economic sciences gave high priority to goals that were oriented towards tourism, hospitality, and marketing. The respondents stressed that the emphasis of such goals, in terms of sustainable management of the Park, was *'the wrong approach, and was not oriented toward the primary goals underlying the founding of the Park'*.

One respondent, however, highlighted one of the dangers of the new plan that could lead to poor and improper implementation: *'each measure has a series of activity indicators, however, it is worrisome that the majority of them require the engagement of external contractors, which would add cost and complication, as well as the all-important question of which external contractors should be selected and how'*. Moreover, one of the respondents stressed that individual goals and their indicators were determined for a period of ten years, i.e. for the intended duration of the plan, but the sequence in the formulation of the goals is not clearly-defined—only the du-

ration of lower-level activities is determined—nor is there a timeframe for their implementation. This opens the possibility for a given activity to be delayed or otherwise insufficiently pursued, which could result in its ultimately unsuccessful implementation.

In summation, the dominant attitude was that it is certainly better to have a plan than to not have one, but the fact that the proposed plan will be adopted late would, in and of itself, be a detriment for its quality implementation. Additionally, the new plan still largely treats the goals of environmental, social, economic, and political sustainability as equally-important in an area where this absolutely cannot be the case.

Opportunities for improving management policy

In regard to the identified management problems, it should be emphasised that contemporary models of management often highlight the need to include different “additional” aspects in the management of protected areas (Newsome et al., 2013). The most frequent integration method is to include the local community, and the integration of socio-cultural sustainability with environmental sustainability for protected areas in order to attain better results in both segments. The second form of integration is to include the surrounding area in the management of the protected area, where one model is used for the entire area and the surrounding area serves as a buffer zone, protecting the core of the protected area from negative influences, while the surrounding rural area benefits from the opportunities offered by protected area status in terms of tourism development and serves as a “service area” for the Park (Leusche et al., 2013).

Zoning based on protection characteristics is carried out in the scope of management plans, i.e. the acceptable level of protection and activities (tourism and residence) for a given area is precisely determined—this is particularly the case in Europe. There are usually pre-existing areas that are used for tourism or housing, regardless of this isolating zoning, which limit the developmental aspects of the space. At the same time, the surrounding region perceives the protected area as a limitation on development, without which it could have a totally different system of management or even development. Therefore, protection and development must be integrated, which is best done by managing the entire area, in which communication between protection and development stakeholders is ensured and cooperation is heartily encouraged. As with the dimension of environmental sustainability, which is monitored as a part of protection, dimen-

sions of economic and socio-cultural or demographic sustainability must be established.

The aforementioned related dimensions would also have their own specific sets of developmental goals and systems of oversight and assessment. Accordingly, via solutions for individual impact factors and specific impacts in a given protected area, an integrated management model can be created that summarises the best practices and specific management needs, i.e. management goals, activities, monitoring, and (re)evaluation.

Integration is also understood to include integral management of natural and cultural heritage, which defines evaluation, research, inventorying, monitoring, protection measures, interpretation and promotion, and communication and reporting. Whereby, it is vitally important to include all natural and cultural heritage elements (e.g. geological, geomorphological, climatical, hydrological, biological, ethnological, archaeological, and anthropological elements). Furthermore, as an additional element of integral management, the importance of connecting protected areas with neighbouring areas on the regional level (or the international level if the area in question lies along a state's border) should be highlighted. In this way, complete management of a given area is enabled, in terms of both protection and developmental measures.

Initiatives to establish indicators on the global, national, and local levels indicate that they are necessary preconditions for sustainable development, materialisation, measurement, and evaluation of components of the environment, so that the concept of sustainable development would not simply become a general definition. It should be stressed that environmental protection and tourism cannot successfully coexist in an integral management system that is not based on the following two principles: first, the principle of meritocracy of different professions and experts; and second, the principle of continuous improvement of management systems and their oversight. Therefore, further research of all spatial components as an integral line, in which the protected area is only one component, is needed.

Conclusion

Development of Plitvice Lakes National Park should be regarded in the context of development that has unfolded over the past 150 years (with several short periods of discontinuity), 70 of which have been directed by formal management of some kind. Development throughout the entire timeline has dominantly been dependent on tourism demand and four fundamen-

tal phases of management have been established, based on the research underlying the chapter:

1. the phase of informal management (1883–1948);
2. the phase of management based on spatial plans (1949–1989);
3. the wartime phase—lack of a fundamental management and decision-making body (1990–2002); and
4. the phase of planned management documents (2003–time of writing).

Despite the largely consistent management presence and actions, it should be stressed that fundamental management problems have been identified: functional overburdening; threats to hydro-geological biotopes; and negative demographic processes in and around the Park. It is discouraging that the recent management phase had no answers to these three fundamental problems, despite the emphasis that was placed on preserving hydro-geological environmental biotopes—which was totally ignored in the second and third phases.

With regard to the fact that management of protected areas is a cyclical process, within the framework of which pre-arranged activities are undertaken to achieve specific goals, it is extremely important to observe how this process unfolded in previous periods, as well as how it is unfolding in current developmental processes. This process and efficiency assessments, based on interviews with respondents, show that the majority of goals were insufficiently relevant and unsuccessfully carried out, which is extremely important in terms of efficient management. The respondents were largely of the opinion that while it is better to have a plan than to not have one, the current plan is flawed in that it treats environmental, social, economic, and political sustainability goals as equally-important in an area where this (by definition) cannot be the case.

Finally, integration of protection and development via management of an entire area would ensure better communication and cooperation among various stakeholders. Additionally, dimensions other than that of a sustainable environment should be taken into account, e.g. economic and socio-cultural/demographic sustainability, in order to properly manage the development of a given area. The aforementioned integral model, which would enable a certain amount of management autonomy for social issues, is necessary in terms of strengthening the integration of the environment and the community as two parts of a single ecosystem.

References

- Barešić, J., 2009: *Primjena izotopnih i geokemijskih metoda u praćenju globalnih i lokalnih promjena u ekološkom sustavu Plitvičkih jezera*, Doctoral Thesis, University of Zagreb, Faculty of Science, Zagreb.
- Bonnaci, O., 2013: Zabrinjavajući hidrološki trendovi na slivu Plitvičkih jezera - dodatak, *Hrvatske vode* 21 (84), 137-146.
- Canteiro, M., Córdova Tapia, F., Brazeiro, A., 2018: Tourism impact assessment: A tool to evaluate the environmental impacts of touristic activities in Natural Protected Areas, *Tourism Management Perspectives* 28, 220-227, DOI: 10.1016/j.tmp.2018.09.007.
- Fuller, C., Onde, S., Brook, W. B., Buettel, C. J., 2019: First, do no harm: A systematic review of deforestation spillovers from protected areas, *Global Ecology and Conservation* 18, DOI: 10.1016/j.gecco.2019.e00591.
- Gaston, K. J., Charman, K., Jackson, S. F., Armsworth, P. R., Bonn, A., 2006: The ecological effectiveness of protected areas: the United Kingdom, *Biological Conservation* 132 (1), 76-87, DOI: 10.1016/j.biocon.2006.03.013.
- Harding, R., 2006: Ecologically sustainable development: origins, implementation and challenges, *Desalination* 187 (1-3), 229-239, DOI: 10.1016/j.desal.2005.04.082.
- Ivanuš, M., 2010: Vrednovanje turističke izgradnje na području Plitvičkih jezera, *Prostor* 18 (1), 123-135.
- Lausche B., Farrier, D., Verschuuren, J., La Vina, A., Trouwborst, A., Born, C., Aug, L., 2013: *The Legal Aspects of Connectivity Conservation Law: A Concept Paper*, IUCN, Gland.
- Lukić, A., 2012: *Mozaik izvan grada - tipologija ruralnih i urbaniziranih naselja Hrvatske*, Meridijani, Samobor.
- Marković, I., 2015: *Problemi i mogućnosti održivoga upravljanja zaštićenim prirodnim područjima: primjer Nacionalnoga parka Plitvička jezera*, Doctoral Thesis, University of Zagreb, Faculty of Science, Zagreb.
- Marković Vukadin, I., Franjković, D., 2019: Turizam i ugostiteljstvo, razvojni izazovi i potencijali nacionalnog parka Plitvička jezera, in: *70 godina Nacionalnog parka Plitvička jezera* (ed. Kovačević, T.), Javna ustanova "Nacionalni park Plitvička jezera", Plitvička jezera.
- Martinić, I., 2010: *Upravljanje zaštićenim područjima prirode - planiranje, razvoj i održivost*, Šumarski fakultet, Sveučilište u Zagrebu, Zagreb.
- Ministry of Environment and Energy of the Republic of Croatia, Croatian Agency for the Environment and Nature, 2018: *Guidelines for the man-*

agement of protected areas and/or ecological network areas, Zagreb, http://www.haop.hr/sites/default/files/uploads/dokumenti/o4_zasticena/smjernice/Smjernice_za_planiranje_upravljanja_MZOE_HAOP_2018.pdf

- Mora, C., Sale, P. F., 2011: Ongoing global biodiversity loss and the need to move beyond protected areas: a review of the technical and practical shortcomings of protected areas on land and sea, *Marine Ecology Progress Series* 434, 251-266, DOI: 10.3354/meps09214.
- Newsome, D, Moore S. A., Dowling R. K., 2013: *Natural Area Tourism, Ecology, Impacts and Management*, Channel View Publications, Bristol – Buffalo – Toronto.
- Opačić, V. T., Lukić, A., Fuerst-Bjeliš, B., 2005: Sustainable development of recreation and tourism in the protected areas of Croatia: issues and indicators, *Problemi na geografijata* 3-4, 209-223.
- Pejnović, D., 1992: Razvoj naseljenosti i promjene narodosnog sastava u Plitvičkoj regiji, *Geografski glasnik* 54, 75-97.
- Petrić, K., 2012: *Pejsažna i prostorno-organizacijska obilježja tradicijskih naselja na području Nacionalnog parka Plitvička jezera*, Master Thesis, University of Zagreb, Faculty of Architecture, Zagreb.
- Petrić, L., 2008. Kako turizam razvijati na održiv način u zaštićenim obalnim prostorima? Primjer „Park prirode Biokovo”, *Acta Turistica Nova* 2, 5-24.
- Petrik, M., 1958: Prinosi hidrologiji Plitvica, in: Nacionalni park Plitvička jezera (ed. Šafar, J.), 49-173.
- Pevalek, I., 1924: La travertine phytogene des lacs de Plitvice, in: *Actes du I Congres des ethnographes et geographes a Prague*, 207-208.
- Pevalek, I., 1935: Der Travertin und die Plitvicer Seen, *Verh d. Internat. Vereinig. F. Limnol*, 165-181.
- Pevalek, I., 1938: Biodinamika Plitvičkih jezera i njena zaštita, *Zaštita prirode* 1, 40-61.
- Pribičević, B., Medak, D., Đapo, A., 2011: Geodetsko-hidrografska istraživanja na području NP Plitvička jezera. in: *Znanstveno-stručni skup Nacionalnog parka Plitvička jezera* (eds. Šutić, B, Dujmović, A.), Plitvička jezera: Javna ustanova „Nacionalni park Plitvička jezera”, 68-81.
- Radeljak, P., Pejnović, D., 2008: Utjecaj turizma na održivi razvoj funkcionalne regije nacionalnog parka Krka, *Godišnjak Titius* 1, 329-361.
- Sremac, J., Božičević, S., Marković, I., 2011: Plitvice Lakes National Park (central Croatia) - more than 50 years of continuous monitoring of natural and human influence, *European Geologist* 34 (1), 2-16.

- Stilinović, B., Božičević, S., 1998: The Plitvice Lakes. A natural phenomena in the middle of the Dinaridic Karst in Croatia, *European Water Management* 1 (1), 15-24.
- Šegulja, N., 2005: Vegetacija travnjaka, cretišta i močvarnih staništa Nacionalnog parka Plitvička jezera, *Natura Croatica* 14 (suppl. 2), 1-194.
- Vidaković, P., 1997: *Nacionalni parkovi u svijetu*, Fond za stipendirane mladih za zaštitu prirode i turizam, Zagreb.
- WWF, 2007: *Management Effectiveness Tracking Tool*, WWF, Gland.

Sources

- Croatian Bureau of Statistics (CBS), 1994: *Census of population, households and dwellings in 1991: Population by sex and age, by settlements*, www.dzs.hr (12. 09. 2020)
- Croatian Bureau of Statistics (CBS), 2003: *Census of population, households and dwellings in 2001: Population by sex and age, by settlements*, www.dzs.hr (12. 09. 2020)
- Croatian Bureau of Statistics (CBS), 2013: *Census of population, households and dwellings in 2011: Population by sex and age, by settlements*, www.dzs.hr (12. 09. 2020)
- eVisitor, 2019: *Number of overnights in settlements in Croatia*, <https://www.evisitor.hr/eVisitor/hr-HR/> (20. 06. 2019)
- Official Plitvice Lakes Tourist Board, 2014: *Internal data*.
- Plitvice Lakes National Park, 2007: *Management Plan*, Arcode, Zagreb.
- Plitvice Lakes National Park, 2019: *Internal data*.
- Plitvice Lakes National Park, 2019: *Proposed Management Plan 2019–2028*, <https://np-plitvicka-jezera.hr/wp-content/uploads/2018/12/Nacrt-Plan-upravljanja-NPPJ-2019-2018.pdf?x92898> (13. 07. 2019)
- State Geodetic Administration of the Republic of Croatia (SGA), 2019: *Central registry of spatial units in the Republic of Croatia (GIS shapefiles)*, Zagreb.