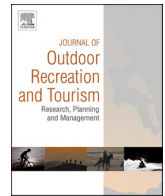




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Research Article

Protected area management effectiveness and COVID-19: The case of Plitvice Lakes National Park, Croatia

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ABSTRACT

The decline in economic activities and tourism during the COVID-19 pandemic has reduced the pressure on the environment and protected area (PA) systems to some extent. However, the financial losses within nature-based tourism due to travel restrictions and park closures will negatively impact tourism income-dependent PAs' management effectiveness. This exploratory study incorporates a risk-assessment framework to investigate and provide first insights into the pandemic's influence on the delivery of management outputs in Plitvice Lakes National Park, Croatia.

Although in 2020, this PA faced a 75% decline in overall revenue compared to the year before, analysis suggests that, in the short term, conservation-related outputs are least affected. Visitor management and PA efforts to support the local community's sustainable development are the most severely impacted first-order outputs. Third-order nature-based tourism-related outputs face average to high risks.

This study's risk-assessment framework provides a starting point for a post-pandemic reassessment of the delivery of PA management outputs and decision-making about output prioritisation and resource allocation. Results suggest several new avenues for research.

Management implications: Post-pandemic recovery of PA requires prioritisation risk framework to identify specific objectives that should be addressed first and which require additional effort or funding. Facing a crisis PA will allocate financial resources in a way that sustains primary functions such as conservation until negative trends change, or at least until financial resources become available. PAs require a paradigm shift, which includes tailoring of financial mechanisms to practical and policy purposes, effective allocation of financial resources, and responsible tourism recovery plans that capture the value and efforts of conservation through tourism and investments in nature-based solutions for sustainable tourism within PA.

1. Introduction

Changes occurring around the world owing to the COVID-19 pandemic suggest that protected areas (PA) are also being impacted. The pandemic resulted in the global decline of tourism and closure or massive decrease of international tourism demand for PA activities, for example, in Brazil, Costa Rica, Namibia, Ecuador, Indonesia, Canada, and the USA (Spenceley et al., 2021). The gradual lifting of the restrictions in European countries, for example, United Kingdom, Italy, and Spain, significantly increased visitor numbers during the summer of 2020 (McGinlay et al., 2020). Simultaneously, some remote German and Swedish sites within the regions where the movement was not significantly restricted continuously experienced increasing visitation during the pandemic, mainly due to domestic visitors (McGinlay et al., 2020). This has demonstrated the importance of PA for people to deal with

stress and maintain and/or restore physical and mental health amid the pandemic (COVID-19 International Park Managers Expert Panel, 2020). The pandemic has undoubtedly reduced the pressure on wild species given the decline in visitor numbers caused by travel restrictions and park closures, especially in popular nature-based destinations (Corlett et al., 2020). There have also been media reports on animals in urban areas and significant air quality improvements in many countries and regions (BBC News, 2020). Simultaneously, some PA in Africa experienced increased poaching as the number of conservancy management employees and park guards reduced (Spenceley et al., 2021). All of these short-term changes underline the pervasiveness and severity of anthropogenic impacts worldwide (Corlett et al., 2020, p. 2).

The pandemic has led to a revisit of the debate on the relationship between nature-based tourism and PA. Sustainable travel and tourism agenda groups (Does wildlife management need tourism? 2020)

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question if tourism should even be part of wildlife management, suggesting that this symbiotic relationship introduced by Dharmaratne, Yee Sang, and Walling (2000) and discussed by, among others, Whitelaw, King, and Tolkach (2014) must be redefined. Tourism revenue dependency is not new, given the growing global importance of wildlife tourism and nature-based destinations in national tourism development plans concurrent with cuts in public financing for PA (Eagles, 2014; Ante; Mandić, 2020; Whitelaw et al., 2014). According to the IUCN (International Union for Conservation of Nature) BIOPAMA (Biodiversity and Protected Areas Management) program report (IUCN ESARO, 2020), nature-based tourism accounts for 81% of PA revenues in the Eastern and Southern Africa (ESA) region, making it the primary source of PA income. Spenceley (2020) recently launched a global study on COVID-19 and PA tourism for the EU commission under the 'Wildlife economy: sustainable tourism in protected areas' program. Currently available preliminary analysis results for Africa suggest a massive decline in visitors due to the pandemic. Unfortunately, this decline has reduced wages and is responsible for job losses, demonstrating that the symbiosis between tourism and PA in developing countries is fragile but vital due to, among others, their support for local community development.

After the pandemic, all existing challenges will rebound; however, PA funding will have to compete for financial resources with several new priorities (COVID-19 pandemic is not a break for nature, 2020). This concern was discussed in a recently published editorial essay on COVID-19 and PA (Hockings et al., 2020). The essay emphasised the negative impacts on PA management's effectiveness, resulting primarily from the economic effects of nature-based tourism losses. The essay's authors also claim that in many PA worldwide, management activities are operating at a lower intensity because of newly imposed expenditure constraints and cuts in staff numbers. In places where tourism revenue contributes directly to salaries and operations, field operations have been cut, resulting in the abandonment or postponement of monitoring and management tasks. However, the current understanding of these connections, causes, and effects is limited and lacks empirical evidence; the problems merit further investigation.

Nature-based tourism is the most extensive use of PA, inducing a growing number of positive and negative impacts. This growth requires good and responsible management, i.e., PA managers' commitment to deliver long-term and short-term goals and policies to reconcile conservation and recreation activities and priorities (Dudley & Stolton, 2018). Measuring whether PA management improves over time and understanding what external factors affect observed changes in management are crucial benchmarks for Aichi Target 11 and the overall delivery of the Convention on Biological Diversity (CBD) plan (Geldmann et al., 2015, p. 693). From a risk-assessment framework perspective (Kingsford & Biggs, 2012, p. 32), this study provides a first insight into the influence of the ongoing novel COVID-19 virus pandemic on the management effectiveness of the Plitvice Lakes National Park, Croatia. This PA is a Croatian leading nature-based destination, highly dependent on tourism revenues and severely threatened by excessive tourism development. The focus is restricted to the pandemic's influence on implementing management programs and actions (from now on referred to as management outputs) defined within the Plitvice Lakes National Park management plan. We follow the hierarchy approach adapted within the management plan to structure the outputs as first, second, and third-order objectives (Table 2). Particular attention was paid to nature-based tourism-focused outputs, including *improving the visitor management system, hospitality and trade, interpretation and education, marketing, and development of ecotourism products and offerings*. The evaluation of management outputs is an integrated part of the Rapid

Assessment and Prioritisation of Protected Area Management (RAP-PAM) methodology. Based on the IUCN-World Commission on Protected Areas (WCPA) framework, RAPPAM was developed by the WWF to broaden the understanding of management strengths and weaknesses within PA systems (Stoll-Kleemann, 2010, p.379).¹

Following the introduction, the study is divided into four main sections. It begins by examining the concept of PA management effectiveness. This is followed by introducing the study site, i.e. Plitvice Lakes National Park, Croatia and the risk assessment framework as an analysis approach. The results section outlines the risk scores assigned to the outputs underlined within Plitvice Lakes National Park's management plan. The conclusion section frames the lessons learned from this PA within a broader context of responsible nature-based tourism development and responsible recovery agenda and outlines the study's limitations and suggestions for future research.

2. Literature review

2.1. Protected area management effectiveness

Management effectiveness evaluation refers to assessing how well PA are managed, i.e., management's ability to protect values and deliver objectives (Hockings, Stolton, & Leverington, 2010). The evaluation of management effectiveness is considered a crucial component of flexible, proactive PA management (Bushell & Bricker, 2017; Leung, Spenceley, Hvenegaard, Buckley, & Groves, 2018). Stoll-Kleemann's (2010) study identifies RAPPAM (WWF, 2003), the *Management Effectiveness Tracking Tool (METT)* (Stolton & Dudley, 2016), and UNESCO's *Enhancing our Heritage (EoH) Toolkit* (Hockings et al., 2008) as the most frequent methodologies of PA management effectiveness evaluations. The list should be augmented to include IUCN's guidelines for *Evaluating Effectiveness: A Framework for Assessing Management Effectiveness of Protected Areas*, revised in 2006 (Hockings, Stolton, Leverington, Dudley, & Courrau, 2006). This framework is the foundation for most of the PA management effectiveness (PAME) evaluation systems developed and applied in diverse PA and for a range of evaluation purposes. Coad et al. (2015, p.2) point out that a sustained increase in PAME assessments during the last four decades resulted in 95 assessment methodologies currently recorded in the Global Database for Protected Area Management Effectiveness (GD-PAME), which contains the data of almost 18,000 assessments. The variety of approaches is evident in supplementary materials from the latest global assessment of PAME (Leverington, Costa, Courrau, et al., 2010), indicating that different strategies are working toward the same goal in almost every European country. These different approaches often yield different assessment results and limit the comparability of results of management effectiveness studies, suggesting that this problem deserves further consideration. A recently published review of impact evaluation methods¹ estimating the effectiveness of PA (Ribas, Pressey, Loyola, & Bini, 2020) concluded that estimates from traditional methods of impact evaluation were commonly more substantial than those obtained by counterfactual methods². Furthermore, the study of Cook, Carter, and Hockings (2014) on the accuracy of management effectiveness evaluations of PA demonstrated the interrelation between the wording of evaluation questions, framing effects and their influence on management effectiveness evaluations.

Well-governed, well-designed, and well-managed PA are the most effective tools for conserving nature and providing various ecosystem services, including recreation (IUCN & WCPA, 2017, p.5). Evaluating the effectiveness of management measures requires proactive monitoring and assessment of the goals set by the PA. Inadequate

¹ Impact evaluation methods aim to estimate the impact of interventions by comparing conditions in the presence of interventions with those in the absence of interventions.

management, followed by substandard monitoring of outcomes, will lead to what are called 'paper parks' (Hummel et al., 2019, p. 2434). Management is particularly challenging in PA that act as nature-based destinations, where visitation and conservation-related outcomes interfere with management goals. A global analysis of score changes in PAME that used a globally expanded database of PAME and focused on multiple METT assessments between 2006 and 2015 for 722 PA in 74 countries suggests that performance metrics related to planning and context, as well as monitoring and enforcement systems, increased in 69.5% of sites (Geldmann et al., 2015). At the same time, PA outcomes demonstrated the least improvement, suggesting that PAME evaluation is neither a unanimous nor an ultimate solution for advancing or gaining insight into PA results delivery. These outcomes also suggest that the problem of monitoring the delivery of PA outcomes is complex and worth exploring further. Coad et al. (2015) support these conclusions, pointing out the lack of empirical evidence of a correlation between PAME scores and biodiversity outcomes. Stoll-Kleemann (2010, p.380) concluded that the outcomes of major studies of overall effectiveness and success and failure factors for PA management are partially contradictory. Although they are not substantial, the findings of Hummel et al. (2019) suggest an improvement of PA effectiveness, in contrast to a global analysis of PAME by Leverington, Costa, Pavese, Lisle, and Hockings (2010) that revealed that 40% of PA in the sample showed significant deficiencies across many management effectiveness indicators, which significantly constrained their operational efficiency.

In a recent study, Hockings, Leverington, and Cook (2015, p. 892) suggest that four complementary effectiveness evaluation approaches could be followed in considering PA and PA systems' impact. They are the assessment of the extent and the location of the PA; the assessment of the effectiveness of the PA on larger scales; the assessment of overall PA management effectiveness (PAME); and the outcomes of individual PA in conserving biodiversity values. Due to the scope of the approaches mentioned above and its central aim, this study focuses more on assessing overall PA management effectiveness. Therefore, PAME and RAPPAM are discussed below in detail.

2.2. PAME and RAPPAM

PAME should be viewed as a management tool and an essential part of adaptive management, enabling effective resource allocation, promoting accountability and transparency, and fostering community involvement (Hockings et al., 2010). The PAME framework is a foundation for the development of other assessment systems, providing guidance about what must be assessed as well as criteria for assessment while also allowing for different methodological approaches and for different scales of analysis. The IUCN WCPA PAME process involves six steps (Fig. 1), all of which should be addressed if the management effectiveness is to be understood. The steps are: context, planning, inputs, processes, outputs, and outcomes (Hockings, Stolton, Leverington, Dudley, & Courrau, 2006, p. 901).

The RAPPAM methodology is based on the PAME approach. Like the WCPA framework, it includes six primary assessment elements. Although the methodology is designed for comprehensive benchmarking of large PA systems, it also allows for assessment of a single PA as well as in-depth field assessment if more detailed questionnaires are used (Ervin & Fund, 2003). The RAPPAM approach may be used not only for prioritisation and resource allocation but also to improve overall PA management at the system level.

The current study was designed to gain first insights into the influence of COVID-19 on the delivery of Plitvice Lakes management outputs, with particular attention paid to those related to nature-based tourism. Table 1 below presents the treatment of contexts (specific threats and external influences) in recent studies and national RAPPAM assessments.

The CBD (n.d.) advises that effective mechanisms for identifying and preventing the negative impacts of various threats to PA ensure risk

control as well as successful rehabilitation and restoration of ecological integrity. Threats to PA include global, regional, and local scale challenges. Recognising the sources of risks and understanding the root causes of and the impacts induced by threats are essential for a comprehensive understanding of the PA system context and successful PAME assessment. For a more detailed examination of threats in IUCN publications, see Hockings et al. (2006), IUCN WCPA (1984), Osipova et al. (2017) and Osipova et al. (2020).

Most assessment methodologies underline the importance of describing and addressing existing and potential threats and external influences. Efficient management seeks proactivity in prevailing degradation before it becomes severe and recognises that significant threats arise outside of PA that affects the achievement of management objectives (Hockings et al., 2006). However, only a limited number of risks of those kinds have been considered in current studies and national assessments (Table 1). For example, Failler et al. (2020), Mazaris et al. (2019), and Wade et al. (2011) are among recent researchers who discuss climate change or pollution. The majority of national assessments presented address localised problems (e.g. poaching, logging, hunting, fishing) and regional scale challenges (e.g. habitat fragmentation, energy transmission lines). Of the contexts of the studies in Table 1, Russia is the only country where assessment encompassed analysis of natural catastrophes, in this case, fires. These examples illustrate that site-specific data about threats is often used to understand conservation conflicts and local biodiversity threats. At the same time, current knowledge about the impact of external influences, such as the pandemic, on management actions remains limited.

National assessments such as those in Table 1 have demonstrated that tourism and recreation are often discussed as stressors, emphasising the importance of the delivery of nature-based tourism management actions and plans within PA. The latest IUCN *Tourism and visitor management in protected natural areas* guidelines (Leung et al., 2018) agree, stating that excessive tourism in PA relates to adverse environmental/ecological, socio-cultural, and economic impacts. The IUCN 2nd *World Heritage Outlook* (Osipova et al., 2017) emphasised excessive tourism as a third major threat for world heritage sites. More precisely, excessive tourism development threatens PA's sustainability, requiring PA managers to inaugurate timely planned policies and measures to minimise and prevent development's adverse impacts. Closure of national borders and parks due to the pandemic has reduced these pressures temporarily, but closures also reduce financial resources. Considering that PA management significantly depends on tourism-generated revenues (Dudley & Stolton, 2018; Emerton et al., 2006; Whitelaw et al., 2014), the pandemic's influence on PA management effectiveness (Hockings et al., 2020) is a logical consequence.

This study was designed to provide empirical evidence of influences like these, emphasising nature-based tourism outputs. The conclusions are drawn based on a single case study site, employing a risk assessment framework; both introduced below. The critical question we aim to address is, "To what extent has the pandemic jeopardised the delivery of objectives outlined in the management plan of this PA?". The analysis's conclusions are framed in the context of a vibrant Mediterranean PA, which is highly dependent on international tourism revenues, and recently introduced a new visitor management plan.

3. Method and analysis approach

3.1. Study site

This exploratory study focused on Plitvice Lakes National Park (IUCN Category II), a UNESCO World Heritage site and a renowned Croatian nature-based destination (Fig. 2). This is the first proclaimed (1949),

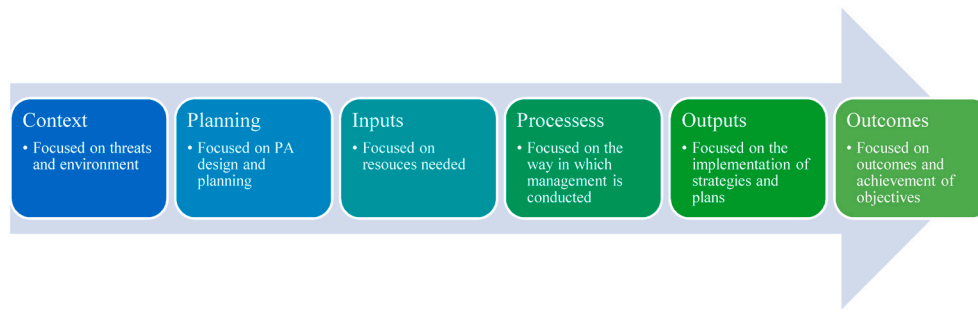


Fig. 1. The IUCN WCPA PAME framework (Adjusted from: Hockings et al., 2006, p. 901).

and largest national park (296 km²) in Croatia inscribed onto the UNESCO World Heritage List in 1979 (<https://np-plitvicka-jezera.hr/en/>). Located in the mountainous regions of Croatia, administratively, the park falls within Lika-Senj and Karlovac counties. The Park area is easily accessible. The state road, which is connecting continental and coastal Croatia, passes through the park and is connected to the Croatian highway passing northwest from the park's territory. The most attractive and visited part of the park covering under 1% of its total area, is the lake system comprising 16 named and several smaller cascading lakes. The park has highly developed recreational facilities, including four hotels, two camps, fifteen restaurants and cafes, and more than 20 km of hiking trails, and operates all year. Visitors are usually advised to take one of seven sightseeing programs. The most popular are circular tours that include visiting the entire lake zone, "Upper Lakes", "Lower Lakes", and lake boat rides (Plitvice Lakes National Park management plan, 2019).

In 2018, the Park recorded 1,796,670 visitors (Tourism in numbers, 2013; 2018), a 51.1% increase compared to 2013. These numbers refer mainly to international tourism, as domestic visitors' share was only 5% (Plitvice Lakes National Park management plan, 2019). The seasonality is particularly pronounced, with peaks in July and August (more than 60% of visitors). The recent analysis by McCool et al. (2021) suggests that peak hourly and daily visitation during the two months of the summer season challenges the existing visitation system's physical capabilities to provide outstanding visitor experiences, resulting in overcrowding, increased risks and potential degradation of some visitors experience. Although this massive volume of visitors severely threatens conservation efforts at the Park (Mandić & Petrić, 2020), tourism and tourism-generated revenue are crucial if PA management plan outputs are to be delivered. Croatian PA are supported by state and local administrative unit budgets, the Environmental Protection and Energy Efficiency Fund budget, and other revenue sources (Environmental Protection Act, s 204), mainly referring to tourism development. The financial reports for 2019 suggest that visitors entry fees ranging from 26,5€ (groups) to 40€ (individual) for adult visitors in the peak season accounted for 56.2% (€29,539,948) of overall revenue while other hospitality-related revenue (souvenir shops, hotels, restaurants, parking) accounted for 42.7% (€21,845,274) of the overall revenue of this PA (Plitvice lakes National Park official financial report, 2019). The financial report for 2020 (Plitvice lakes National Park official financial report, 2020) demonstrated a massive decline in overall revenue (-75.1%) due to the decline of international tourism arrivals. This tourism revenue dependency was emphasised in the latest Plitvice Lakes PA and visitor management plan published in 2019 and discussed extensively in a recently published study by Mandić and Petrić (2020) on the economic effects of this PA.

The UNESCO Report of a mission to Plitvice Lakes National Park (UNESCO, 2018) and the latest IUCN World Heritage Outlook (Osipova

et al., 2017) revealed a growing number of significant tourism-development-related concerns. In both cases, establishing reactive monitoring and the timely delivery of management outputs, specifically nature-based tourism-related outputs, were described as vital. Preparing a new management plan (2019) began in 2017 and lasted until December 2018 and was aligned with Guidelines on management planning for protected areas and Ecological network areas (Leung et al., 2018). Within the visitor management section, particular attention was paid to limits of acceptable change and recreation opportunity spectrum classes to develop a spectrum of recreational opportunities. UNESCO also supervised the development process led by a working group involving, among other two renowned international experts.

3.2. Analysis approach

The study involved three stages. The first stage was an exploratory research design that included a review of the literature and content analysis of the current PA management and visitor management plan (Plitvice Lakes National Park management plan, 2019). This examination facilitated the identification of a set of PA management outputs, i.e. objectives. The analysis yielded five first-order outputs, 21 s-order outputs, and 25 third-order outputs (Table 2). This hierarchy approach to structure PA outputs was adapted from the management plan. The first order outputs referred to (1) *preservation of natural* and (2) *cultural heritage*, (3) *visitor management*, (4) *support of sustainable development of the local community*, and (5) *capacity development and management of public institutions*. Each of these five groups encompassed several second-order objectives, and finally, several third-order objectives. Considering the number of overall objectives and the focus of this analysis, the third-order objectives considered in this analysis were related exclusively to *visitor management* and *the local community's sustainable development* (Table 2). In the second stage of the study, the system of objectives was entered into an MS Office Excel file and sent to the PA's management team in June 2020, following a phone interview and their agreement to participate in the study. The analysis assumes that PA managers and administrators have adequate knowledge to provide sufficient and reliable data and thus the first insights into the pandemic influence on PA outputs delivery. The management team was asked to consider and rate on a 7-point Likert scale (1 – low, 7 – high) each of the objectives according to two criteria: (1) the influence of COVID-19 on the objective's delivery, and (2) the objective's relative importance for the PA. These ratings were used in the third stage of the analysis to calculate raw scores, i.e. the relative risk for each goal, and interpret the results. The risk scores were calculated as a product of the perception of impact and the importance rate (e.g. the perception of impact = 7, the importance of accomplishing goal = 2; the risk score = 14).

The study's assessment sought to determine which outputs were the most severely impacted by the pandemic. Failure of each objective was articulated as a risk with a discussion of consequences. The output-assessment framework for estimating a single site's list of objectives used in this study to assess each goal's progress was based on an adjusted risk-assessment framework proposed by Kingsford and Biggs (2012,

² Counterfactual methods seek to improve impact evaluation by identification and careful selection of comparable control areas in assessment process.

Table 1
Threats identified in research using RAPPAM assessments.

Reference	Study context	Identified threats and external influences
Failler, Touron-Gardic, Drakeford, Sadio, and Traoré (2020)	Perception of threats and related management measures in the 32 marine protected areas in West Africa	<i>Anthropogenic threats:</i> Unmanaged fishing; Overexploitation of terrestrial natural resources; Pollution; Industry; Agriculture; Hunting; Loss of Habitats; Infrastructure; Demography; Tourism ; Transport <i>Natural threats:</i> Erosion; Climate change; Invasive species; Salinization; Silting; Habitat modification; Marine intrusion; Bush fires
Mazaris et al. (2019)	The analysis of threats related to marine PA in EU	Outdoor sports, leisure, and recreation activities; Fishing and aquatic harvesting resources; Human-induced changes in hydraulic conditions; Urbanised areas - human habitation; Other human intrusions and disturbances; Pollution of surface waters; Shipping lanes, ports, marine constructions; Invasive non-native species; Discharges; Marine water pollution, biocenotic evolution; Mining and quarrying; Abiotic natural processes; Utility and service lines; interspecific fauna relations; Excess energy; Other ecosystem modifications; Marine and freshwater aquaculture; Changes in abiotic conditions; Illegal taking/ removal of marine fauna; Military use and civil unrest; Renewable abiotic energy use; Exploration and extraction of oil or gas; Other hunting, fishing, or collecting activities; Changes in biotic conditions
Wade, Theobald, and Laituri (2011)	The analysis of local and surrounding threats – United States PA	Residential and commercial development; Agriculture and aquaculture; Energy production and mining (oil and gas drilling, mining and quarrying); Transportation and service corridors (roads and railroads, utility and service lines); Biological resource use (hunting and collecting terrestrial animals); Human intrusions and disturbance (recreational activities, work activities); Natural system modifications (fire suppression, ecosystem modifications); Invasive and other problematic species and genes (invasive non-native species, introduced genetic material); Pollution (urban, industrial, and agricultural effluents, airborne pollutants); Geological events

Table 1 (continued)

Reference	Study context	Identified threats and external influences
Stanciu and Steindlegger, (2006)	RAPPAM assessments Romania	(volcanoes, avalanches); Climate change and severe weather (habitat shifts, droughts, flooding) Poaching; Conversion; Waste management; Legal and illegal logging; Uncontrolled tourism ; Legal and illegal construction works; Grazing; Infrastructure development; Hunting, Pollution; Dams; Tradition loss; Quarry/ mining; Skiing infrastructure; Trade fishing
Nemekhjargal and Belokurov, (2005)	RAPPAM assessments Mongolia	Logging; Conversion of land use; Mining; Grazing; Dam building; Hunting; NTFP collection; Tourism and recreation ; Waste disposal; Semi-natural processes, Cross-boundary influences; Invasive alien species
Diqiang et al., (2003)	RAPPAM assessments China	Logging; Animal poaching; NTFP; Grazing; Tourism ; Agriculture; Mining
Goodman, (2003)	RAPPAM assessments South Africa	Alien animals; Alien plant invasion; Arson/ uncontrolled fires; Bush encroachment; Dam building; Destruction of archaeological assets; Disease - exotic; Disease - indigenous; Erosion; Land invasion; Land-use change; Management solid waste; Mining; PA isolation; Poaching; Pollution; Purposeful species eradication; Resource utilisation; Siltation; Tourism
Lopes Simoes and Numa de Oliveira, (2003)	RAPPAM assessments Brazil	<i>Biota:</i> Hunting; Illegal NTFP; Intrusion of exotic species; Fire; Deforestation; Animal and vegetation traffic; Mining; Fishing; Logging <i>Conflicts:</i> Urban pressure; Irregular settlement; Agriculture; Pollution; Grazing; Use conflicts; Surrounding activities impact; Agricultural defensiveness use; Land property regulation <i>Infrastructure:</i> Roads; Energy transmission lines; Water impoundment; Construction of reservoirs; Communication towers; Construction of ducts <i>Public use:</i> Disorganised tourism ; Track openings; Public visitation; Patrimony detriment
Tyrlshkin et al., (2003)	RAPPAM assessments Russia	Tourism ; Hunting; Logging; NTFP; Agriculture; Settlements; Pollution; Water use; Mining; Natural catastrophes
Zazanashvili, Dzeladze, and Belokurov (2003)	RAPPAM assessments Georgia	Logging; Conversion of land use; Mining; Grazing; Dams; Hunting; Collection of non-timber forest products (NTFP); Tourism and

(continued on next page)

Table 1 (continued)

Reference	Study context	Identified threats and external influences
		recreation; Waste disposal; Semi-natural processes; Cross-boundary influences; Invasive alien species; Construction and operation of infrastructure sites; Transportation

p.32).

The study’s mixed-method design involving collecting narrative and numerical data and conducting content and qualitative analysis facilitated answering the research question. The pragmatism as a philosophical foundation of research design was followed as it prioritises the use of methods ‘that work’, utilises similarities between qualitative and quantitative approaches, and does not require research design to be positioned directly in the centre between qualitative and quantitative approaches (Iaquinto, 2018). Additionally, mixed-method research from the perspective of pragmatism can purposefully promote positive societal change (Molina-Azorín and Font, 2015), which reflects the intention behind much sustainable tourism research, as this one is.

Table 2
Output-assessment framework.

1 st -order objectives	2 nd -order objectives	3 rd -order objectives	The influence of COVID-19 on delivery of objective (average)	The relative importance of objective (average)	Raw (Risk) score
To preserve natural heritage			2	7	● 14.0
<i>General objective</i>	Preserve diversity of species, habitats, karst forms, tufa, and the unique beauty of the natural landscape and the exceptional universal value of the Park for present and future generations		2	7	● 14.0
<i>Specific objectives</i>	Conservation of the aquatic ecosystem		2	7	● 14.0
	Conservation of forest ecosystem		2	7	● 14.0
	Conservation of grasslands		2	7	● 14.0
	Conservation of karst		2	7	● 14.0
To preserve cultural heritage			2	6	● 12.0
<i>General objective</i>	Preserve cultural heritage within the PA, which contributes to the preservation of tradition and strengthening of the cultural identity of the area		2	6	● 12.0
<i>Specific objectives</i>	Conservation of tangible cultural assets		2	6	● 12.0
	Conservation of intangible cultural assets		2	6	● 12.0
	Conservation of cultural landscapes		2	6	● 12.0
Visitor management					● 23.3
<i>General objective</i>	To ensure that visitation does not impair the values of the Park and deteriorate visitors’ experiences		7	7	● 49.0
<i>Specific objectives</i>	Improvement of the visitor-management system		3.5	7	● 24.5
		<i>Provide information for visitors</i>	5	7	● 35.0
		<i>Monitoring and control of visitor behaviour within PA</i>	4	7	● 28.0
		<i>Development of visitor programs and tours</i>	2	7	● 14.0
		<i>Visitor safety</i>	5	7	● 35.0
		<i>Maintenance and development of tourism and recreation facilities</i>	3	7	● 21.0
		<i>Visitor transport within the Park</i>	5	7	● 35.0
		<i>Monitoring</i>	3	7	● 21.0
		<i>Research on visitor management</i>	2	7	● 14.0
	Improvement of hospitality and trade		3.7	6.6	● 25.4
		<i>Development of strategic and business plans for hospitality</i>	4	7	● 28.0
		<i>Monitoring of visitor satisfaction</i>	3	7	● 21.0
		<i>Maintenance of existing and development of new hospitality facilities</i>	5	7	● 35.0
		<i>Development and management of souvenir shops and similar stores</i>	2	6	● 12.0
		<i>Maintenance and improvement of the existing hospitality facilities</i>	5	6	● 30.0
		<i>Setting up new facilities</i>	4	6	● 24.0
		<i>Improvement of the quality and overall hospitality offerings</i>	3	7	● 21.0
	Improvement of interpretation and education		3	6.3	● 19.3
		<i>Improvement of education and interpretation</i>	4	7	● 28.0
		<i>Printing of brochures, development of a new website and mobile app</i>	4	7	● 28.0
		<i>Improvement and development of educational trails</i>	2	6	● 12.0
		<i>Design and promotion of interpretative content in PA</i>	2	6	● 12.0
		<i>Educational programs</i>	3	6	● 18.0
		<i>Improvement of presentation centres and exhibition</i>	3	6	● 18.0
	Improvement of marketing		5	6	● 30.0
Support sustainable development of the local community			5.7	6.3	● 36.0
<i>General objective</i>	Foster cooperation with the local community as the leading partner of the public institution in the management of the Park and preservation of its values		6	7	● 42.0
<i>Specific objectives</i>	Foster the development of agricultural production		6	6	● 36.0
	Foster the development of networks and ecotourism products and ecotourism offerings		5	6	● 30.0
		<i>Establishment of cooperation with main stakeholders</i>	5	7	● 35.0
		<i>Development of integrated tourism offerings</i>	4	6	● 24.0
		<i>Promotion of integrated tourism offerings of the destination</i>	5	6	● 30.0
		<i>Fostering of the development of ecotourism offerings in the PA</i>	4	7	● 28.0
Capacity development and management of public institution			2.5	6.8	● 16.8
<i>General objective</i>	Ensure that the public institution has all the necessary legal, organisational, human, and material capacities and resources to manage the Park and use them to continuously improve all segments of management and corporate culture, building cooperation with all relevant national and international stakeholders		3	7	● 21.0
<i>Specific objectives</i>	Establishment of a legal and strategic framework for successful PA management		2	7	● 14.0
	Development of institutional capacity, human resources, and competencies		3	6	● 18.0
	Asset management		2	7	● 14.0
Influence & Importance (1-7; low-high), Weight (1-49; low-high)					Low
					High

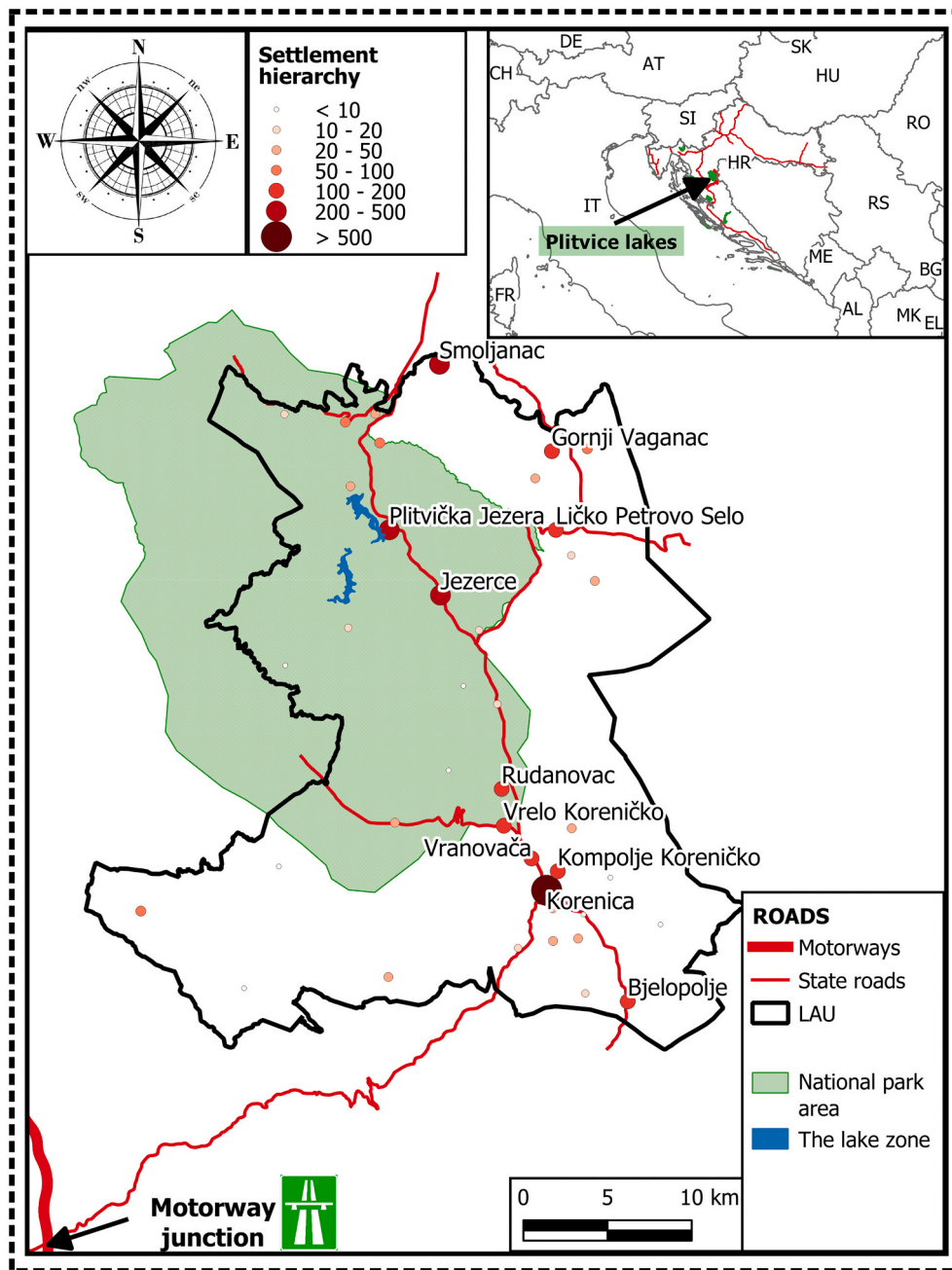


Fig. 2. Plitvice Lakes National Park, Croatia, ArcGIS location. Source: Mandić and Petrić (2020).

4. Results

The results of the analysis, with the raw score assigned to each of the proposed objectives, are summarised in the output assessment framework (Table 2). Along with risk assessment, we briefly reflect on the relevance of each of the affected outputs. The data presented below, addressing different outputs and challenges within the current PA system, are drawn from the latest Plitvice Lakes National Park management and visitor management plan, unless specified otherwise (Plitvice Lakes National Park management plan, 2019).

4.1. 1st-order objectives

PA are complex socio-ecological systems requiring a balance between biodiversity conservation and community livelihoods. Wei et al. (2018) and Jones-Walters and Čivić (2013) reference Aichi Targets and

emphasise that PA are expected to contribute social benefits and to make an economic contribution to the local community by generating revenue bolstering the economy through tourism, and by providing ecosystem services. Our study illustrates how COVID-19 severely constrains the delivery of these vital goals. The highest risk score of 36 was recorded for the Support *sustainable development of the local community* objective. This output focuses on the development of domestic agricultural production (small and micro enterprises) as well as on nurturing the development of networks and ecotourism products and ecotourism offerings, for which the Plitvice Lakes National Park authority has designated €3.284.000 for the period 2019–2028. The output presumes that current low-volume traditional agricultural production could become an essential part of a branded high-quality ecotourism offering distributed in hospitality facilities within the PA and providing the incentive for local community development. The recent study on PA tourism amid the COVID-19 pandemic (Spenceley et al., 2021) demonstrated how

economic recovery from the effect of the pandemic is not straightforward, suggesting that there is a need to find short term as well as long term solutions to support tourist-dependent communities. One solution could be to develop alternative revenue streams by fostering networks and cooperation between individuals and businesses supported by fiscal stimulus from the government.

The second highest-scoring first-order objective (risk score 23.3) was *Visitor management*. Weaver and Lawton (2017) argued that current approaches to visits to PA focus on the management and monitoring of visitors and associated impacts. They proposed that visitor monitoring and management should evolve into a ‘third-generation’ model in which visitors will not be positioned as an inherent threat, but an opportunity, and visitor management and monitoring will be advanced according to visitor motivation and growing need to spend time in nature. This proposal is in line with Wolf, Wohlfart, Brown, and BartoloméLasa (2015, p. 112), who stated that PA managers must understand the potentially conflicting demands of different visitor groups to create a diverse and high-quality range of experiences. In the case of Plitvice Lakes National Park, a continuously growing number of international visitors to the Park relates to increased revenue and increasing pressures on protected features. Additional challenges at that site are a lack of data on visitor satisfaction and motivation and pronounced seasonality, with more than 90% of visits between late April and early October and approximately 60% of all visits during the peak season (July and August). In 2017, this Park recorded 16,125 visitors in one day (the Park’s highest registered daily visitor number to date), leading to the conclusion that current infrastructural capacities cannot meet visitor-induced pressures in the peak summer season. To address these challenges, that are often related to declines in visitor satisfaction, rule infractions (such as wandering off marked trails), and insufficient information and services provided to visitors, the PA has designated funds in the amount of €16,451,333 for the period 2019–2028. The new management plan paid particular attention to determining hourly capacities and introduced monitoring of determined indicators for ROS classes. Out of the total amount above, the PA has designated €400,000 for establishing a system of e-ticket sales with hourly limitations and registering entry and exit of visitors. The pandemic has significantly influenced the design and the delivery of visitor experiences, and consequently, visitor management. Along with these inherent challenges, the PA now has to consider how to ensure visitor safety and social distancing (reduce crowding to prevent spreading of the disease), how to develop new ways of environmental interpretation (e.g. self-guides; personalised interpretative services, static displays, mobile-driven applications), and how to address problematic behaviour and conflicts which could be the consequence of the fear of virus transmission.

4.2. 2nd-order objectives

The highest risk scores were recorded for three outputs: *To ensure that visitation does not impair the values of the Park and deteriorate visitors’ experience* (raw score of 49); *Foster cooperation with the local community as the leading partner of the Public Institution in the management of the Park and preservation of its values* (raw score of 42); and *Foster the development of agricultural production* (raw score of 36).

Understanding visitors and the quality of their experiences within a PA has become a more relevant and vital focus in recent years (Pearce & Dowling, 2019, p. 87). PA aim to protect natural resources and cultural heritage and fulfil residents’ and visitors’ expectations in term of recreation (Fennell, 2007; Pearce & Dowling, 2019). To provide facilities aligned with visitors’ expectations, PA managers must understand the complexity of visitor satisfaction. Moore, Rodger, and Taplin (2015) discussed the need to move beyond the measure of visitor satisfaction to loyalty, as increased levels of satisfaction are associated with a willingness to pay to visit and enjoy such areas. However, building loyalty is both a complicated and time- and resource-consuming challenge for PA managers. Recently, Moyle et al. (2017) suggested how to measure

visitor preferences for different experiences to alleviate pressures on a PA’s specific sites. They concluded that PA managers should consider creating a multi-experience site or multiple sites catering to different needs.

The planning and management system established for the period 2007–2017 substantially deviated from the outline of an ideal planning and management cycle, thus failing to deliver vital objectives, among others related to research on visitor satisfaction or crowding issues. This significantly limited the PA’s ability to develop multiple ecotourism experiences and address the diversity of visitor needs. To address these inherent weaknesses, the management plan introduced in 2019 emphasised, among other cooperation with the tourism industry and understanding of benefits for visitors and the community as a priority. In 2020 the PA planned to initiate a cooperative arrangement with travel agencies and tour operators to develop programs for organised groups visiting the Park. Additionally, several customised activities were planned with marketing-focused outputs. In the COVID-19 environment, these activities will, at least in the short term (one year), likely be postponed. Simultaneously, these stakeholders could play an essential role in sustainable recovery from the effect of the pandemic, particularly considering their role in facilitating visitor experiences.

Cooperation with the local community is the essence of contemporary PA management; this topic is often advocated for and researched. The community is an essential partner in the planning and implementation of management actions and policies that aim both to preserve space for wildlife beyond protected area boundaries (Treves, Wallace, Naughton-Treves, & Morales, 2006) and to make PA socially acceptable and efficient (Ayivor, Gordon, Tobin, & Ntiamao-Baidu, 2020; Faizi, 2006). In a recent analysis of arguments for and against IUCN PA management category VI, Shafer (2020) reflected extensively on community and state governance as two fundamental governance types and, briefly, on co-management as an alternative to this dichotomy. The analysis depicted the community as both a governance leader and a constructive partner. As partners, locals have an essential role in nature-based tourism planning and development. This conclusion is supported by, among others, a study of an Indian Himalayan PA (Badola et al., 2018, p. 1) that demonstrated that a three-tier set-up involving crucial stakeholders is the most effective tool to incorporate socio-economic progress of local communities and environmental concerns in a tourism management framework. The EUROPARC charter for sustainable tourism (European Charter for Sustainable Tourism, 2020) also places people into the heart of this sustainable nature-based tourism initiative. Islam, Ruhanen, and Ritchie (2018) discussed the community’s vital role in a study addressing adaptive co-management (ACM) as an approach for improving nature-based tourism governance. That study, among the few discussing ACM and adaptive management (AM) in the tourism-planning context (see also Dai, Xu, & Chen, 2019; Larson & Poudyal, 2012; Scott & Becken, 2010), suggests that ACM could make a significant contribution to improved governance by providing new opportunities for stakeholder engagement in iterative learning, which is particularly essential for the sustainability of a PA where stakeholder attitudes and behaviour evolve and change over time.

Responsible recovery from the effect of the pandemic will require building resilience, which in the context of this PA means safeguarding the health of visitors and placing greater attention on the well-being of the local community. Nature-based tourism is a vital stimulus for the local community’s economic and social development in the case-study area. The wider Park area is facing extremely negative long-term demographic trends, in addition to the war during the 1990s, causing demographic shocks and population drops. The latest management plan aims to stimulate cooperation with the community living in the counties around the PA territory by influencing traditional agricultural production and creating a feasible environment for the local community’s inclusion in ecotourism development. Several management policies and actions were planned to be introduced in 2020 to achieve both of these outputs (direct financial subsidies to the local community; buying-in of

local products; market research and education); however, they could not be realised due to the pandemic. The increasing nature-based tourism development spurred the development of private tourism facilities in the area surrounding the Park and agricultural productions, as the Park has (re)initiated to involve local agricultural producers in the supply chain of its gastronomy offer. One of the critical characteristics of recent developments is the growing share of foreign investors who build accommodation facilities. To some extents, this could be contrary to the interests of the local community living on the territory adjoining PA and the interests of conservation of natural and cultural heritage as construction is often taking place in attractive locations with inadequately developed municipal infrastructure. Additionally, considering a growing number of entrepreneurs, who have invested money in developing tourism-related businesses, policies focused on limiting the visitor numbers could be perceived negatively and thus trigger resentment. Such diverging interests in the relatively successful story about nature-based tourism development in this PA can lead to an imbalance of power between internal and external stakeholders, ultimately affecting decision-making processes.

4.3. 3rd-order objectives

The results of our study's analysis clearly demonstrate that most of the objectives that are considered nature-based tourism-related face average to high risk scores, suggesting the potentially devastating influence of the pandemic on PA tourism and recreation planning and development. The highest risk scores were recorded for five third-order outputs: *Provision of information to visitors (risk score 35)*; *Visitor safety (risk score 35)*; *Visitor transport within the park (risk score 35)*; *Maintenance of existing and development of new hospitality facilities (risk score 35)*; and *Establishment of cooperation with main stakeholders (risk score 35)*.

Information for visitors, visitor safety, and facilities development are operational management considerations within visitor management's broader concept (Sandwith, MacKinnon, & Enkerlin Hoefflich, 2016). Visitor information provided pre-arrival, during a visit, and after visitors leave the area is essential and should be planned and developed wisely; thus, PA managers are expected to adopt a communication strategy to promote sustainable tourism. Leung et al. (2018) considered communication to be one of ten principles of visitor and tourism management and a key to increasing knowledge of and support for sustainability. A recent study by *Croy, Moyle, and Moyle (2020)* established a relationship between information provision and perception of park tourism benefits and benefit-sharing; however, this type of communication (PA-community) is not addressed in our study. In the Plitvice Lake case, the communication output relates to activities such as updating information for visitors on the official website and app, setting up a newsletter and printing out tickets and brochures, setting up real-time crisis communication, and coordinating employees in the information office using designated funds of approximately €320,000 for the period 2019–2028. According to the current management plan (Plitvice Lakes National Park management plan, 2019, pg. 175), given the increasing number of visitors, the existing number of information points does not satisfy the needs and does not enable the quality provision of information to visitors. Additionally, the existing number of information panels is insufficient for high-quality routing of visitors. Along with planned activities, the pandemic additionally emphasised the importance of ICTs adaptation to provide information to visitors (e.g. is the park open or closed for visiting? whether there are any special requirements to access PA) and design experiences (e.g. development of video tours and live video streams). For example, in October 2020, the Park has launched a live video stream with cameras overlooking the Great waterfall as its leading site (<https://np-plitvicka-jezera.hr/en/entrance-1-video-stream/>).

Visitor safety is essential in PA, and they are expected to complete risk-management assessments and ensure that staff members are adequately trained to deal with crisis and safety incidents (Sandwith

et al., 2016). A recent study by *Gstaettner, Lee, Weiler, and Rodger (2019)* demonstrated that complex responsibility-sharing relationships characterise the management of visitor safety in PA. At the Plitvice Lakes National Park, the responsibility for visitors' security is shared between the public authority that runs the Park, police, emergency service, and Croatian mountain-rescue service. These organisations are expected to collaborate, deliver initial risk assessments, and monitor risks continuously. In 2020, the Plitvice Lakes National Park allocated financial resources to provide an annual risk assessment of the safety of recreational infrastructure, roads, and mountain paths for visitors. Particular attention will be paid to erosion, tree conditions, and landslides. As safety is a precondition for tourism and recreation within any PA, timely funding to deliver these outputs is essential. Due to the pandemic PA also must pay particular attention to the visitor health and hygiene. This requires new approaches to onsite management of visitor behaviour and experience design, to prevent crowding. This will be particularly challenging for Plitvice Lakes due to the seasonality of tourism demand and often present crowds near main sites and in shuttle boats and trains.

In many PA, a range of recreation opportunities is provided along with associated facilities. However, as more infrastructure is built in some PAs in response to increased visitor traffic, growing concerns have been expressed about visitors' negative environmental and social impacts and the facilities required to serve them (Leung et al., 2018, p.10). For a PA to earn revenue from a growing number of visitors, the visitors must be concentrated at access points and enjoy access to information and services (*Wall, 2019*). Leung et al. (2018, p.30) suggested that the impact of commercial tourism infrastructure on a PA depends significantly on where and how facilities are sited. The critical challenge is to ensure that the facilities are sustainable and consistent with local ecosystems and traditions. Planned activities within this output in the Plitvice Lakes National Park include eco-certification of hospitality facilities and preparation of project documentation and permits for reconstructing and improving hotels, restaurants, campgrounds and tennis courts. Aside from funding, the primary challenge associated with this output will be the timely delivery of permits, as state administration offices were closed or working only limited hours during the pandemic. As Europe, including Croatia (ECDC, 2021), faces an increasing number of COVID-19 positive cases since November 2020, travel and operating restrictions have returned and will undoubtedly impact delays associated with delivering all outputs.

While sustainable transport measures have increasingly been invoked, conceived, and adopted in many urban contexts over the last 40 years, only recently has a similar commitment favouring more sustainable forms of mobility been made for natural settings (*Orsi, 2016*). For nature-based destinations, this transition toward new sustainable methods of mobility, such as electric boats or trains, is vital, as it helps reconcile tourist activities with the preservation of PA (*Bigerna, Micheli, & Polinori, 2019*). In the Plitvice Lakes National Park, beginning in 2020, a substantial amount of funds (€1,333,330) has been designated for the procurement of new means of transport, required due to the increasing number of visitors to the Park. These vehicles will be used for organised visits of ROS (Recreation Opportunity Spectrum) class IV programmes, a new sightseeing programme that the Park has developed in cooperation with the local community living within the Plitvice Lakes zone, and to improve connections between the Park entrance and end-points of the trails. The challenges associated with visitor transportation and traffic issues recently gain more attention, as *McGinlay et al. (2020)* identified them as critical issues in managing the European PA amid pandemic. The authors mainly referred to incidents of irresponsible parking and increased traffic as people were not willing to use public transport or organised shuttle buses due to fear of virus transmission. The challenge for this PA in this context is twofold: the pandemic prevents them from buying new means of transportation, while simultaneously they need to find a way to reduce the number of travellers per vehicle, otherwise, the visitors will be reluctant to use shuttle transportation due to fear of virus transmission.

When most of the visitors arrive in two peak months, the seasonality of tourism demand creates pressure on PA ecosystems (Mandić & Petrić, 2020); thus, communication, and active cooperation between the PA administration and tourism industry professionals is essential. This challenge, extensively discussed in the *Forging links between protected areas and the tourism sector* report (UNEP, 2005), is due to the nature of tourism development and tourism demand, currently at the heart of the research agenda. Reflecting on the 2014 IUCN World Parks Congress, Spenceley (2017) suggested that there is a need to engage in partnerships with the tourism industry, requesting that they contribute financially and technically to the establishment, operation, and maintenance of the PA. In his reflection on research priorities, Eagles (2014) presented specific professional competencies for tourism management and park tourism governance. Together, these opinions and efforts suggest that timely delivery of this communication output is of great importance to the PA.

The pandemic will undoubtedly influence communication and cooperation between the PA and local tourism professionals, as now the collaboration agenda should be advanced with some emerging themes. The experience of the COVID-19 pandemic requires us to see how tourism can promote the local community's well-being, conservation of heritage and innovative, meaningful and transformative visitor experiences (Spenceley et al., 2021). Plitvice Lakes National Park planned to initiate regular meetings with local and regional tourism board offices, establish a partnership for ecotourism development, and launch regional tourism management and marketing plans. Delivery of this output is urgent, as it works toward fundamental conservation and local community well-being goals, thus benefitting all stakeholders in the Park's system. The PA is currently predominantly an excursion site, with less than 30% of visitors (Plitvice Lakes National Park management plan, 2019, pg. 224) spending at least one night within administrative units adjoining the PA. The development of attractive complementary tourism offer could ensure that visitors stay longer within the destination, and thus tourism businesses earn more and the Park records less daily visitors. However, this can be achieved only by introducing joint vision of economic and tourism development of wider Park area, in which public institution can and should take a lead. This requires entire community to think about some critical questions. For example, which are the development priorities for the local community? What is the role of the Park in the process of socio-economic development and post-pandemic recovery? How to improve the cooperation between the community and the Park to achieve mutual benefits? How to co-design solutions to strengthen the resilience of the entire ecosystem and the stakeholders within?

5. Conclusions

The COVID-19 pandemic is likely to have short- and long-term effects on PA. As uncertainty due to the fear of a global economic depression continues, governments are likely to invest in stimulus packages to revive economies (Conserving Nature in a time of crisis, 2020). These government decisions may result in a reduction of funds allocated for conservation. This funding challenge will be accompanied by the challenges associated with reopening parks for visitors. Reduced tourism revenue will impact the delivery of management plans and postpone monitoring. The current understanding of the pandemic and its impacts is still limited and lacks empirical evidence. However, in these circumstances, any attempt to detail and explain the complexity of causes and consequences of the pandemic within PA systems may provide valuable insights and enable the delivery of timely responses.

This study investigated the effects of the COVID-19 pandemic on PA management effectiveness by examining the pandemic's influence on the delivery of PA management outputs in the Plitvice Lakes National Park, Croatia. The analysis is framed in the context of a vibrant Mediterranean destination where tourism accounts for 98% of revenues, international visitors for 95% of overall visits, and which, until the

pandemic, faced increasing visitor numbers and seasonality. Several tentative conclusions can be drawn from the analysis.

This study's findings extend previous work on management effectiveness by demonstrating PA system's vulnerability to external shocks. Recent editorials and viewpoints (Corlett et al., 2020; Hockings et al., 2020; Newsome, 2020), as well as relevant media and international organisation reports (e.g. National Geographic, Conservation International, IUCN), have asserted that the pandemic is likely to jeopardise PA worldwide, undermining decades of conservation efforts. The general premise of these claims is that a reduction in funding and revenue due to the loss of nature-based tourism will initiate a chain of adverse events. For example, a decrease in tourism revenue leads to job losses, which leads to increased poaching and illegal deforestation. However, this study offers an alternative view. Our results suggest that, contrary to initial expectations, in the short-term, conservation-related outputs, specifically the conservation of natural resources and cultural heritage, are among the least affected outputs. We surmise that the initial, general claims such as those cited above may reflect the scenario in the long term in less-developed and underdeveloped countries if the pandemic and restrictions continue. However, in the context of developed countries, this study provides convincing evidence that in the short-term and facing a crisis, PA will allocate financial resources in a way that sustains primary functions such as conservation until negative trends change, or at least until financial resources become available. In the EU, for example, some countries are actively working to increase protection for natural and protected areas amid the pandemic (COVID-19 jeopardizing world's protected areas, 2020), part of the EU's plan to protect at least 30% of EU land and seas by 2030 (EU Biodiversity Strategy for 2030, 2019). However, long-lasting conservation efforts will only be achieved if the EU addresses biodiversity beyond its borders, supporting global efforts with appropriate financial mechanisms.

This study has deepened the understanding of the role of adaptive management and system approach in nature-based tourism development in a time of uncertainty. Results suggest that the highest risk scores during uncertain times are related to nature-based tourism's and PA's support to local community development outputs. One interpretation of these results would be that the PA has faced revenue decreases and postponed all "non-conservation" activities in the absence of visitors. While this might be a feasible short-term solution for PA, we suggest that the adverse impact of such an approach on local communities' well-being living within the park or in the adjacent territory could be potentially devastating. In many cases, including the one discussed above, PA are central to the local economy. The case above illustrates that tourism development within the Park stimulates, among others, local agricultural production and tourism investments. This local economy depends on PA's tourism development, and decline of economic activities, financial losses for tourism businesses and potential deterioration of local well-being due to the pandemic are expected. The scale of the impact will undoubtedly depend on travel restrictions and the Park's closure for visitors, which emphasises the importance of creating a favourable environment for sustainable recovery of tourism and tourists' return. After this pandemic, capitalising on lessons learned will be critical to efficiently implement recovery plans and enhance management effectiveness and PA's overall resilience. Our results lend strong support to the conclusions discussed in the recently published *One planet vision for responsible recovery of the tourism sector* (Programme, 2020) report; that improving collaboration between key stakeholders along the nature-based tourism value chain as well as prioritising participatory approaches is crucial to ensure efficient implementation of recovery plans. The risk-assessment framework utilised in this analysis should provide a starting point for responsible nature-based tourism recovery, post-pandemic reassessment of objectives within the management plans of PA, and decision-making about output prioritisation and resource allocation within PA, especially if the decline of tourism revenues continues.

The study's analysis has demonstrated that the devastating impacts

of a crisis like the COVID-19 pandemic, together with the significant dependence of PA on tourism-generated revenue, may undermine decades of conservation efforts and work by PA managers striving to improve management effectiveness. Along with providing conclusive evidence to reconsider complete reliance on tourism revenue, the study has extended the explanation of why the symbiosis between tourism and PA should not be broken easily. The pandemic has emphasised that environmental conservation and nature-based tourism development are cross-cutting and interrelated goals. The costs of biodiversity conservation are high and wide-ranging. Simultaneously, a recent report has shown that the benefits arising from the conservation of nature outweigh the costs by a ratio of at least 5-to-1 (Waldron et al., 2020). Within Europe, EU member states (including Croatia) have costs of a total of €7 billion annually to maintain both the network of Natura 2000 sites and national PA. Approximately €2.8 billion of additional spending on species conservation and €4.4 billion of spending on high natural-value farming must be considered as well (Kettunen et al., 2017). Therefore, it is not surprising that PA finds it challenging to secure sufficient financial resources to cover biodiversity conservation costs and ensure ecosystem services. As financing often fails to keep pace with PA's growing needs, they lack resources to implement management decisions, actions, and plans (Dudley & Stolton, 2018; Mandić, 2020). The case of Plitvice Lakes National Park demonstrates that tourism-related revenue (entry fees and other hospitality-related revenues) accounts for approximately 98% of overall revenue, leading to the conclusion that this PA cannot deliver its management actions and plans in the absence of visitors. This vicious circle, characterised by continuously increasing numbers of visitors that lead to increased revenue and the need for more resources to support the PA system, can only be broken with a paradigm shift. The shift requires tailoring financial mechanisms to practical and policy purposes, creating a diversity of financial sources for PA and communities, effective allocation of financial resources, and responsible tourism recovery plans that capture the value and efforts of conservation through tourism and investments in nature-based solutions. The need for a paradigm shift is powerful in Mediterranean PA such as Plitvice Lakes, where, along with insufficient funds and growing visitor totals, a lack of quality proposals and administrative capacities necessary for preparing and implementing projects is evident (Lazić & Emerton, 2020; Mandić and Marković Vukadin, 2021). Finally, this reduced volume of international tourism in the context of Plitvice Lakes also provides an opportunity to introduce restrictive policies related to peak load limits discussed with a recently adapted management plan, as it will be more challenging to do it once tourism as we knew it rebounds (McCool et al., 2021).

The results of this study suggest a number of new avenues for research on nature-based tourism development and PA management in the post-pandemic era, including the adaptation of PA to ensure resilience during pandemics and future crises; governmental actions introduced to mitigate the influence of park closures on PA systems; the consequences of park closure on stakeholders in the nature-based tourism value chain; assessment of the economic, sociological, and health effects of park closures with attention to the connection between people (visitors and residents) and parks; and the feasibility and reality of alternative sources of funding.

The most significant limitation of the study is that it reports on a single case, which limits the generalisation and interpretation of the results. However, the Plitvice Lakes National Park is an exceptional showcase of a vibrant southern Mediterranean nature-based destination. The single-case approach is, to a large extent, conditioned with a research design. Within its management plan, each PA defines its own strategic outputs and priorities. Consequently, it would be more than challenging to determine second- or third-order outputs that would be common to multiple PA. However, these variances also offer opportunities for additional research in the context of international or intraregional comparisons.

CRediT authorship contribution statement

Ante Mandić: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft, Project administration.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jort.2021.100397>.

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