

# **PLITVICE LAKES NATIONAL PARK MANAGEMENT PLAN 2019 - 2028**





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**PLITVIČKA  
JEZERA** Nacionalni park  
National Park



United Nations  
Educational, Scientific and  
Cultural Organization



**Plitvice Lakes National Park**  
• inscribed on the World  
• Heritage List in 1979

# **Plitvice Lakes National Park Management Plan 2019 - 2028**

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**PLITVICE LAKES  
NATIONAL PARK  
MANAGEMENT  
PLAN 2019 – 2028  
PREPARATION TEAM**



# Plitvice Lakes National Park Public Institution

## Core Working Group

**Tomislav Kovačević**, Director

**Kazimir Miculinić**, Head of Service for National Park Protection, Maintenance, Conservation, Promotion and Use

**Krešimir Čulinović**, Head of Presentation Section

**Andrijana Brozinčević**, Head of Water Ecology Section

**Ivanka Špoljarić**, Head of Flora and Fauna Ecology Section

**Nikola Magdić**, Head of Forest Ecosystem Protection Department

**Jurica Cindrić**, Head of Cultural Heritage Conservation Section

**Ivica Vuković**, Head of National Park Supervision, Protection and Conservation Department

**Maja Vurnek**, Expert Associate – Biologist/Ecologist

**Nikola Markić**, Expert Associate - Hydrogeologist

**Marija Kulić**, Presentation Expert for unique natural characteristics of the National Park

**Jelena Marković**, Presentation Expert for unique natural characteristics of the National Park

**Željko Rendulić**, Ranger

**Marija Turkalj**, Head of Marketing and Sales Service

**Natalija Božičević**, Head of Service for Reception, Guided Tours, Information, Visitor Transport and Internal Transport

**Roža Poznanović**, Head of Service for Economic and Financial Affairs

**Silvija Rubčić Kovačić**, Head of Planning and Analysis Department

**Nataša Maričić Brkljačić**, Head of Department for Legal, HR and General Affairs

**Sanda Sertić**, Head of Procurement and Storage Department

**Dragan Sekulić**, Head of Fire Safety Section

**Dragana Franjković**, Head of HORECA Branch

**Zoran Luketić**, Head of Retail Outlets Branch

## Other associates from the Plitvice Lakes National Park Public Institution (PLNPPI)

**Anđelko Novosel**, PLNPPI Director until November 2017

**Bogdan Radaković**, Head of Maintenance and Utilities Branch

**Marko Šimić**, Head of Technical Management Department

**Katarina Marković**, Senior Advisor

**Tomislav Štrbac**, Head of Infrastructural Maintenance and Horticulture Department

**Sanja Žalac**, Expert Associate – Biologist/Ecologist

**Tea Frketić**, Expert Associate – Biologist/Ecologist

**Stipe Špoljarić**, Expert Associate for Forest Protection

**Antonija Dujmović**, Expert Associate – Landscape Architect

## Team of consultants

**Ognjen Škunca**, Granulum Salis d.o.o. – Coordinator and Integrator

**Vesna Vukadin**, Park bureau d.o.o. – Key Management Plan Expert

**Vladimir Lay**, Sociologist - Researcher

**Steven McCool**, International Protected Area Visitor Management Expert – Advisor for Visitor Management Action Plan

**Paul Eagles**, International Protected Area Visitor Management Expert – Advisor for Visitor Management Action Plan

## Croatian Agency for Environment and Nature / Ministry of Environment and Energy

**Karla Fabrio Čubrić**, Head of Section

**Maša Ljuština**, Head of Section

**Gordana Zwicker Kompar**, Senior Expert Advisor

**Ivana Ilijaš**, Senior Expert Advisor

**Tamara Čuković**, External Associate

**Boria Vitas**, Senior Expert Advisor

**Daniel Springer**, Head of Protected Area Service

# FOREWORD



Plitvice Lakes National Park Management Plan is a strategic document bringing together all the relevant information on the area and characteristics of the Park, as well as policies defined with the aim of effective management of this unique world heritage jewel, in order to conserve its natural values and to preserve it for future generations.

Plitvice Lakes National Park is the oldest and largest national park in the Republic of Croatia. In 1979, due to its outstanding universal value recognized in the tufa formation process, it gained the status of a UNESCO World Heritage Site, gaining extraordinary popularity and recognizability in global terms.

The priceless value of the National Park area and its extraordinary beauty made it imperative to find a long-term and sustainable mode of managing this protected area. Thanks to synergy effects stemming from the activities of staff of the National Park, Ministry of Environment and Energy and other relevant stakeholders active in the area of nature protection, as well as representatives of the local community, a strategic long-term planning document has been created, and its implementation is compulsory for all entities active in the protected area.

The Management Plan sets out fundamental objectives for achieving the vision of the National Park, according to which appropriate management of the protected area and cooperation with the local community represent the foundation of sustainable development. In achieving these objectives, particular attention must be paid to conservation of outstanding universal value of the Park, conservation of tradition and cultural identity of the area, sustainable development of the local community and building of partnership relations, where the local community recognizes the Park as part of its identity.

In accordance with that, it is important to work on revival of agricultural production of high-quality local products, as well as on development and networking of ecotourism offer, in order to extend the average duration of stay in the Park, but also in order to prolong the tourist season in the Park and in the destination of the Lika region as a whole. This was the essential background and motivation that has resulted in the establishment of cooperation with the Lika Destination Cluster in tourism, by implementing a project aimed at branding Lika as a protected area destination and gastronomic destination, founded upon sustainable development model.

Managing the National Park is a demanding and wide-ranging task, and the role of this document is to create a framework for a plan-led approach to management, founded upon strategic clarity, long-term objectives and defined policies, thus contributing to the conservation of unique characteristics and values of the Park.

**Tomislav Kovačević,**  
Director

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# **LIST OF ACRONYMS AND ABBREVIATIONS**



<b>B2B</b>	business to business
<b>B2C</b>	business to consumer
<b>BC</b>	before Christ
<b>CAEN</b>	Croatian Agency for Environment and Nature
<b>CAFAS</b>	Croatian Agricultural and Forestry Advisory Service
<b>CMRS</b>	Croatian Mountain Rescue Service
<b>CR</b>	Critically Endangered species
<b>CRM</b>	Customer Relationship Management
<b>DD</b>	Data Deficient
<b>DEM</b>	digital elevation model
<b>DMO</b>	destination management organisation
<b>E1</b>	Entrance 1
<b>E2</b>	Entrance 2
<b>EIP</b>	Education and Interpretation Program
<b>EN</b>	Endangered
<b>ES</b>	Emergency services
<b>etc.</b>	et cetera
<b>FAM Trip</b>	Familiarization Trip
<b>FCD</b>	Flora Croatica Database
<b>FE</b>	Folk ensemble
<b>FF</b>	family farms
<b>GIS</b>	Geographic information system
<b>GSM</b>	Global System for Mobile Communications
<b>h</b>	hour
<b>ha</b>	hectare
<b>HEP</b>	Hrvatska elektroprivreda
<b>HORECA</b>	Hotel/Restaurant/Café

<b>IBA</b>	Important Bird Area
<b>IPA</b>	Important Plant Area
<b>IPTSP</b>	Interested private tourism service providers
<b>IT</b>	Information Technology
<b>IUCN</b>	International Union for the Conservation of Nature
<b>Izas</b>	saturation index
<b>KEC Project</b>	Karst Ecosystems Conservation Project
<b>kn</b>	kuna
<b>LAC</b>	Limits of Acceptable Change
<b>LAG</b>	Local Action Group
<b>LIDAR</b>	Light Detection and Ranging
<b>LMWL</b>	Local Meteoric Water Line
<b>m.a.s.l</b>	Meters Above Sea Level
<b>MEE</b>	Ministry of Environment and Energy
<b>MoI</b>	Ministry of Interior
<b>NCA</b>	Nature Conservation Act
<b>NHC</b>	National Habitat Classification
<b>NL</b>	newsletter
<b>NP</b>	National Park
<b>OUV</b>	Outstanding Universal Value
<b>P1, P2, P3</b>	Boat docks 1, 2, 3
<b>PAAFRD</b>	Paying Agency for Agriculture, Fisheries and Rural Development
<b>PAOT</b>	People at One Time
<b>PPASF</b>	Physical Plan for Areas with Specific Features
<b>PLNPPI</b>	Plitvice Lakes National Park Public Institution
<b>SAC</b>	Special Area of Conservation
<b>SPF</b>	small Park facilities

<b>ROS</b>	Recreation Opportunity Spectrum
<b>s</b>	second
<b>SGA</b>	State Geodetic Administration
<b>ST1, ST2, ST3</b>	station 1, 2, 3
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>VIM</b>	Visitor Impact Management
<b>VU</b>	Vulnerable

# 1. | INTRODUCTION AND CONTEXT

## 1.1 Brief description of the Management Plan

The document presented here is the second Management Plan of Plitvice Lakes National Park - a World Heritage Site of the United Nations Educational, Scientific and Cultural Organization (UNESCO). The Plan covers the period of implementation from 2019 until 2028. In addition to Park management (and management of the World Heritage Site), this Plan also encompasses all management obligations in connection with Natura 2000 ecological network areas (see chapter 1.4.1), and use of the concepts „Park“ and „area“ throughout the document also encompasses ecological network areas.

Management Plan for protected area and/or ecological network area is a strategic document of a Public Institution determining the status of that protected area and/or ecological network area, and determining management objectives and activities aimed at the fulfillment of objectives, as well as indicators of Plan implementation.

The aim of the Management Plan (the Plan) is to clearly and succinctly display key information about the area in one place, as well as policies and strategies determined through a participatory process (through objectives and activities) that focus Park management and resources of the Public Institution. The Management Plan primarily assists the Public Institution and institutions in the nature conservation sector (Ministry of Environment and Energy - MEE) to manage the protected area in an effective long-term manner. However, the Management Plan is also a public document available to all, enabling all stakeholders and the interested

public to monitor the activities of the Public Institution and to get involved in Park management with own engagement where possible, thus contributing to the conservation of its values.

The Plan is structured in three key sections – introduction, description of the area and management section. The management section contains the vision, management objectives, status evaluations and activities per theme, as well as management zonation.

In addition to these three main sections, the Plan also contains Annexes with consolidated additional information concerning individual themes, important for a more comprehensive understanding of the text. Among the annexes, there are two relation tables with conservation measures and management activities – for species in habitats and for birds (annexes 5.13 and 5.14). These tables are made for purpose of joining activities from the Plan with the conservation measures elaborated in Ordinance on the conservation objectives and conservation measures for birds in the SPAs and Ordinance on the conservation objectives and conservation measures for other species and habitats in the SPAs. As a foundation for the development of the Visitation Management Action Plan (prescribed through Theme C. Visitation Management), a separate document entitled Visitation Management Study has been prepared, as well as the Marketing Strategy.

Park management is planned through five main themes that include prepared status evaluations of key characteristics, as well as defined general objectives and activities grouped around sub-themes. Each planned activity includes the following: priority of implementation;<sup>1</sup> planned period of implementation; expected cooperation with external collaborators and institutions in the process of implementation; finally, estimated indicative costs of implementation (that do not include costs of regular business operations of the Public Institution). In

<sup>1</sup> Division into 3 priority levels was used for the implementation of activities, in accordance with the Guidelines on Management Planning for Protected Areas and/or Ecological Network Areas.

total, there are 561 activities,<sup>2</sup> grouped in 5 themes, i.e., 17 sub-themes, and the foreseen costs of all activities within the ten-year Plan implementation period amount to 1,630,846.000 HRK.

The vision and general objectives of the Plan have been defined for a period longer than the Plan implementation period itself, i.e., for a period of 20 or more years, under the assumption that no extraordinary circumstances that are currently impossible to foresee will arise in the Park, causing

substantial changes to the management context or characteristics of the area. Specific objectives and their indicators have been defined for the 10-year period as foreseen implementation period of the Plan, so the duration aspect is not specifically emphasized in the manner in which the objectives are formulated. Period of implementation of activities is determined by the timetable stated for each activity, and this aspect is also not specifically emphasized in the manner in which the activities are formulated.

## 1.2 How is the Plan implemented?

Management Plan has been prepared for the period of 10 years, with the possibility of general revision after 5 years. It is developed in more detail, and implemented as well, through Annual Programs of National Park Protection, Conservation, Promotion and Use (hereinafter: Annual Programs). Both of these documents are reached by the Governing Board of the Public Institution, with the consent of the Ministry of Environment and Energy (MEE).

Long-term vision and general objectives of the Plan, as well as specific objectives and their indicators defined for the implementation period of the Plan, define basic policies of managing the Park. Everything that is taking place in the Park should be consistent with these elements. Plans prepared for a 10-year period cannot ensure the final level of detail and precision needed for the implementation of activities without periodic verification and adjustment, nor can they ensure a substantial and sufficient level of adaptability to new findings or changes that are arising. Therefore, they serve as a framework that ensures planning approach to management and implementation of needed activities over a longer period of time, while decreasing the possibility of reaching unfounded or *ad hoc* decisions or changes of management direction. Developed action plans also enable monitoring of the degree of implementation of planned activities and their effectiveness in the achievement of objectives, which is the foundation of adaptable management.

The adaptation of management itself is ensured through Annual Programs that can amend parts of action plans with required detail or new activities; planned activities can be adapted or even eliminated all together, but always in a manner that continues to contribute to the achievement of objectives defined by the Management Plan, and with appropriately elaborated and founded reasons for such changes.

In a described manner, by combining these two fundamental management documents of the Public Institution, key requirements of adaptable protected area management – seemingly conflicting – are ensured: the Management Plan ensures the continuity of management and the possibility of monitoring its successfulness and effectiveness, while Annual Programs ensure regular periodic adaptation of management, founded upon the needs established by monitoring.

With the adoption of the Management Plan, it becomes an official document that must be adhered to by all natural persons and legal entities undertaking activities in the protected area, pursuant to Article 138 of the Nature Conservation Act. This does not mean that this Plan is defining the activities of all institutions and persons active in the Park area; instead, their activities must not be inconsistent with management objectives stated in this document.

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<sup>2</sup> By comparison, the previous Management Plan for the Plitvice Lakes National Park (2008 – 2017) had 9 themes with 79 measures, and only 2 themes were developed through action plans, with 96 defined activities in total.

## 1.3 Planning process and stakeholder involvement

The process of preparation of the Management Plan began in January 2017, and it lasted, with varying intensity, until December 2018. The method of work was founded upon best-practice experiences in management planning in Croatia gained so far, and the implementation process is almost fully aligned with the recommended mode of work described in the Guidelines on Management Planning for Protected Areas and/or Ecological Network Areas (MEE and CAEN) that were published in March 2018. Additionally, in developing the Visitation Management Action Plan (integrated through theme C), the so-called LAC (*Limits of Acceptable Change*) methodological planning framework was used, as well as ROS (*Recreation Opportunity Spectrum*) classes describing the spectrum of experience opportunities offered by the Park. Experience opportunity spectrum with the description of ROS classes and allocation of various classes within the Plitvice Lakes National Park is provided in Annex 5.15.

Through a separate process, but in parallel with the preparation of the Management Plan, the Marketing strategy of the Plitvice Lakes National Park Public Institution (PLNPPI) was prepared as well. In order to ensure the harmonization of these two documents, information and insights obtained through both processes were used and integrated into both documents.

Members of the Core Working Group for the preparation of the Management Plan played the main role in the collection and processing of existing knowledge and data, and in preparation of the written document. In the work of this Group, participants throughout the process included 22 employees of the Public Institution, six employees of the CAEN, and two external consultants. Other staff members of the Public Institution and additional external experts were also joining the work of the Group on occasion, based on core expertise of their work. In total, 24 workshops of the Core Working Group were held (20 in plenary session and 4 for individual themes), lasting one to three days, as well as a range of individual meetings and consultations.

Two renowned international experts for visitation management in protected areas also participated as advisors to the project, in particular in the segment pertaining to the development of the Visitation Management Action Plan. Their engagement was co-financed by the Embassies of their countries to the Republic of Croatia: the Embassy of the United States of America, and the Embassy of Canada. Under their leadership, two educational events for staff members of other Public Institutions in nature conservation sector were also held: a five-day intensive training on use of the LAC framework for visitation management planning in protected areas, and a two-day seminar on relevant topics in the sphere of visitation management.

MEE accompanied and supported the process throughout the project duration. Since the beginning of the project, UNESCO was informed of the Plan preparation process. In April 2018, UNESCO comments concerning the first draft of the Management Plan were received, and this final draft aimed to take these comments into account.

External collaborators of the Public Institution and Park stakeholders also provided substantial contribution to the preparation of this Plan. Already in the preparatory phase of Plan drafting, especially during open interviews with 16 representatives of key collaborating and stakeholder institutions,<sup>3</sup> the long-lasting problem of poor communication of the Public Institution with its stakeholders, especially the local population, was pointed out. One experience frequently stressed by respondents was that the Public Institution is closed to the external world and disinterested in cooperation, and that no one has asked them anything in years. Therefore, this process aimed to include people to the maximum extent possible, to acknowledge their perspectives in the Management Plan, and to initiate a change in the mode of operation of the Public Institution, opening up room for development of future cooperation. These efforts of the Public Institution have mostly been accepted in a very positive and benevolent manner.

<sup>3</sup> Four local self-government units in the territory of which the Park is located; local and county-level tourist boards; County Development Agency of Ličko-senjska County; local tourism entrepreneurs; local associations; key Ministries and state investment structures (MEE, Ministry of Construction, Croatian Institute for Spatial Development, Ministry of Tourism)

In addition to these interviews, two one-day workshops and one two-day workshop were held with key institutional stakeholders, each time with approximately 70 participants from approximately 70 institutions in the public, private and civil sector, ranging from local to national level, as well as from the academia. In addition, surveys of attitudes of the local population encompassed 60 respondents from 18 settlements in the Park area. In total, 346 Park staff survey results were collected as well. For the purposes of development of the Visitation Management Action Plan, 134 visitors were polled, and 608 reviews on Park visitation experience from the TripAdvisor website were analyzed. Finally, the preliminary draft of the management section of the Plan was sent via e-mail to more than 150 addresses, from more than 80 institutions in the public and civil sector, and in the academia, which resulted in received written responses of 19 additional persons from 14 institutions who did not participate in the workshops.

The list of involved institutions and methods of their inclusion into the Plan preparation process are provided in annex 1.1.

Some comments, proposals, information and

attitudes collected from stakeholders have been included in the relevant sections of the Plan, thus becoming its constituent part. For example, key values of the area that most people have recognized as fundamental are reflected in management themes, sub-themes and objectives. Suggestions of experts and scientists on how to improve knowledge on natural and cultural values, or implementation of active measures of their conservation, have been integrated into activities in themes A and B. Expectations of the local community and stakeholders connected with tourism, as well as those of visitors, have been taken into account primarily by aiming to fulfill them through the development of activities in themes C and D. Proposals of Public Institution staff on how to improve organization and working conditions have found their place in theme E. The aim of the entire Plan has been to achieve mutual support and harmonization of the need for conservation of outstanding universal value of the Park, as core interest of all those involved, with other needs and interests of the local community and other stakeholders connected with the Park through their activities. Detailed reports on individual activities of stakeholder involvement<sup>4</sup> are available as project results in the Public Institution archive.

## 1.4 Evaluation of the Management Plan (2007-2017)

Continuous systematic monitoring and periodic evaluation of Plan implementation are key aspects of a continuous planning and management cycle, providing feedback to the process concerning its effectiveness and efficiency in fulfilling the planned activities and in achieving the defined objectives. In the context of fully established planning and management system, with a plan that includes precisely defined objectives, activities and indicators of their success, as well as activities aimed at the monitoring of Plan implementation, evaluation is a periodic activity that:

1. determines the current status of fulfillment of planned activities and objectives;

2. provides analysis of reasons behind deviations in case the current status shows that defined activities are not implemented and/or objectives are not achieved in the manner and in the timing determined by the Plan;
3. articulates gained experiences and provides recommendations for the next planning period, in order to increase effectiveness and efficiency.

The planning and management system established and initiated by the Plitvice Lakes National Park Management Plan (2007-2017) substantially deviates from this outline of an ideal planning and

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<sup>4</sup> Study of socioeconomic context, potential and desirable role of the Plitvice Lakes National Park Public Institution as stakeholder in sustainable development of a wider surrounding area – preliminary findings; Reports with conclusions of three stakeholder workshops; Report with results of the population survey; Report with results of the survey of attitudes and perspectives of employees; Report with results of the survey of visitors; Report with results of the analysis of visitor comments on TripAdvisor.



management cycle. To be specific, the Plan:

- does not contain status evaluations per management theme;
- does not contain sufficiently specific objectives, with defined indicators and their target values;
- is not complete in a large spectrum of themes, i.e., clear activities and indicators of successfulness of their implementation are not defined, and only potential measures are listed instead;
- the content of processed themes is not clearly defined, and content is frequently mixed as a result, which substantially decreases the transparency of overview and renders the monitoring of content and Plan implementation more difficult;
- some themes important for Park management are left out of the Plan in their totality, despite the fact that, as it had originally been foreseen, the Plan should have been completed by preparation of at least seven, and possibly more, action plans, but that was not done.

The usability of such Management Plan was very limited in operational planning and management in the previous ten-year period, which was performed through the preparation and implementation of annual programs. As a consequence, evaluation of undertaken work was not possible in the described standard manner, as evaluation of execution of the Plan and of the level of fulfillment of objectives defined by it. However, in the final year of implementation of the Management Plan, as part of preparation for the drafting of the new Plan, the Public Institution undertook an evaluation of its implementation, with several key conclusions arising from it.

Lack of continuity of management has been

recognized as one of the key obstacles to more effective Park management.

In the course of the bulk of its implementation period, Plitvice Lakes National Park Management Plan (2007-2017) was perceived as a relatively insignificant and non-binding document, relevant for only one segment of the Public Institution dealing with nature protection. Insufficiently clearly defined management objectives and activities, as well as the fact that some themes were not covered in the Management Plan at all, largely contributed to such an understanding of its role in Park management.

Such a state of affairs resulted in constant changes in direction as regards activities and priorities, as well as in lack of realization of a large chunk of initiated activities, despite invested efforts and staff enthusiasm, as well as spent resources.

Expert and HR capacities of the Public Institution are not sufficient for quality implementation of all the required management activities, and the existing internal structure, with insufficiently clearly defined Public Institution job descriptions, assignments and competences, does not ensure an optimal framework for quality Park management. Permanently unresolved issues – i.e., decreasing efficiency and effectiveness of management – are to a large extent caused by lack of communication and cooperation among teams, coupled with lack of coordination of their activities, needed in order to contribute to the same management objectives more effectively.

Effective Park management is not possible without the inclusion of stakeholders and without continuous cooperation with the local community, which requires a systematic approach, patience and permanent investment of effort, coupled with regular activities and initiatives, which has proven to be lacking as regards both the preparation and implementation of the first Management Plan.

## 1.5 Park management context

### 1.5.1 National and international area conservation

Plitvice Lakes are the oldest and the largest National Park of the Republic of Croatia. With its extraordinary natural beauty, this area has always attracted nature enthusiasts, and, as early as 8 April 1949, it was pronounced the first National Park in Croatia.<sup>5</sup> In 1997, the area of the National Park expanded to the current surface of 29,630 ha (296 km<sup>2</sup>), due to the inclusion of the catchment area.

The fact that values of this Park exceed national boundaries was confirmed in 1979, when Plitvice Lakes National Park became listed as UNESCO World Heritage Site, under the then-applicable natural criteria (ii) and (iii), with the total surface of 19,462 ha (i.e. the surface of the National Park at that point in time). At the time of entry into the list, the criterion (ii) was identifying outstanding examples of ongoing ecological, biological and geological processes. Ongoing process of tufa formation, resulting in tufa barriers that create the lakes of Plitvice, was stated as an outstanding example of such processes. Criterion (iii) speaks of superlative natural phenomena or areas of exceptional natural beauty, and the Plitvice Lakes area was also seen as meeting this criterion. Due to changes introduced into the criteria of the World Heritage Committee, the criteria according to which the Park became listed as World Heritage Site currently correspond to criteria (vii), (viii) and (ix) that define

the Outstanding Universal Value (OUV) of the Park. Interaction of water, air, geological foundation and organisms, coupled with specific physico-chemical and biological conditions, enables the formation of tufa that has created a series of lakes, barriers, cascades and waterfalls by dividing the lakes. OUV ultimately stems from the totality of these processes and their unique ecology, in combination with the extraordinary beauty of the area.<sup>6</sup>

In 2000, the World Heritage Committee also approved the expansion of the World Heritage Site area by additional 10,020 ha, after which the total surface of the Site stood at 29,482 ha (which corresponded to the calculation of Park surface at the time),<sup>7</sup> and the UNESCO area corresponds to the Park area.

International importance of the Park for conservation of biodiversity was reconfirmed in 2013. Back then, with the Regulation on the Ecological Network, which transposed two EU Directives into the Croatian legislation,<sup>8</sup> the Park was declared an Important Bird Area (IBA) (HR1000020) and Special Area of Conservation (SAC) important for species and habitat types (HR5000020), as a Natura 2000 area significant at the level of the European Union. List of Natura 2000 habitat types for the Park is provided in table 1 (chapter 2.2.5), and lists of wild flora and fauna species in annexes 5.2. and 5.3. while Natura 2000 habitat types zones are provided on the map in Annex 5.10.

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<sup>5</sup> Act Proclaiming Plitvice Lakes a National Park.

<sup>6</sup> Criterion (vii) describes areas containing superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance; criterion (viii) describes areas that represent outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features; criterion (ix) describes areas that are outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals.

<sup>7</sup> In its technical assessment of expansion, the International Union for Conservation of Nature (IUCN) concluded that the expansion will strengthen the existing position of the area, preventing harmful development in the surrounding catchment area, and that the expansion of catchment protection crucial for water quality, coupled with the inclusion of unmanaged forest areas, will result in improved integrity of the area. It was also pointed out that these regulations ensure that tourist facilities, which might result in deterioration of water quality, cannot be built in the immediate catchment area, and that prohibition of heavy transport along the state road passing through the Park will decrease the threats of disturbance and pollution from this particular source.

<sup>8</sup> Directive on the conservation of wild birds (Council Directive 79/409/EEC; 2009/147/EC), colloquially the Birds Directive, and the Directive on conservation of habitats and of wild fauna and flora (Council Directive 92/43/EEC), colloquially the Habitats Directive.

## **Nature Conservation Act**

### **Article 113.**

(1) A national park is a large, predominantly unmodified mainland and/or marine area of outstanding and multiple natural values. It includes one or more conserved or slightly modified ecosystems and is primarily intended for the conservation of autochthonous natural values.

(2) A national park has a scientific, cultural, educational and recreational purpose.

(3) In a national park only those actions and activities are permitted that do not pose any threat to the authenticity of nature.

(4) In a national park all economic use of natural resources is prohibited.

(5) By way of derogation from paragraph 4 of this Article, it may be permitted to perform catering, tourist and recreational activities in connection with the requirements of visitation and to perform other activities in accordance with the Ordinance referred to in Article 142.

In accordance with the international classification of protected areas (IUCN), Plitvice Lakes National Park corresponds to Category II National Park. Category II represents large natural or near natural areas set aside to protect comprehensive ecosystems, processes ongoing in them and species they support, in a way that they simultaneously provide foundation for environmentally and culturally compatible, spiritual, scientific, educational, recreational, and visitor opportunities.

In addition to the above, old-growth forest Čorkova uvala located in the northwestern part of the Park (see chapter 2.2.5) was declared a protected area in 1965, in the category of special reserve of forest vegetation, defined in the Nature Conservation Act as an area of special importance due to its unique, rare or representative natural values, or an endangered habitat, or habitat of an endangered wild species, with the primary aim of ensuring conservation of these values.

In addition, three caves in the Park area are also protected in the category of geomorphological monument of nature, defined in the Act as an individual unmodified segment of nature with ecological, scientific, aesthetic and educational value. These caves are Golubnjača, Šupljara and Crna pećina (Špilja Vile Jezerkinje) – annex 5.11.

### **1.5.2 Regulations and plans relevant for Management Plan implementation**

Legal and planning context of National Park management is very wide, given the multidisciplinary character of management. However, the following regulations are particularly prominent in this context, given their importance for the development and implementation of the Management Plan: Ordinance on Goals and Basic Measures of Bird Conservation in the Area of the Ecological Network; Ordinance on Conservation Goals and Measures for Other Species and Habitat Types for Each Ecological Network Area (under development); Physical Plan for Areas with Specific Features of the Plitvice Lakes National Park; Rules on Internal Order in the Plitvice Lakes National Park.

Ordinances on conservation goals and measures in ecological network areas prescribe conservation goals and measures that the Public Institution is obliged to achieve and implement. Ordinance on Objectives and Basic Measures of Bird Conservation in the Area of the Ecological Network was used in the preparation of this Plan, as well as working

versions of conservation goals and measures for other species and habitat types for the Park.

According to the Nature Conservation Act, organization of space and methods of use, preparation and conservation of space in a national park are determined by the Physical Plan for Areas with Specific Features (PPASP) for national parks. The current Physical Plan for Areas with Specific Features of the Plitvice Lakes National Park was reached in 2014; however, due to a range of determined shortcomings, as well as due to UNESCO requirements, MEE initiated the procedure of changes and amendments at the Ministry of Construction and Physical Planning at the beginning of 2018. In the process of Management Plan preparation, the need to change and amend the Physical Plan for Areas with Specific Features was identified as well, since this was necessary to successfully achieve management objectives defined by the Plan.

When it comes to national parks, in accordance with Article 42 of the Nature Conservation Act, the Minister, at the proposal of the Governing Board of the Public Institution, reaches the Ordinance on Protection and Conservation, which prescribes measures of protection, conservation, improvement and use in greater detail, as well as management zones of the protected area. Ordinance on Protection and Conservation for the Plitvice Lakes National Park is expected in 2019, and the Rules on Internal Order in the Plitvice Lakes National Park are applied until the adoption of the Ordinance. Incorporation of policies determined by this Management Plan into the Ordinance on Protection and Conservation will ensure the regulatory framework needed for their implementation.

Other regulations, plans and internal regulations of the Public Institution important for Park management have been analyzed in status evaluation for theme EA: Legal and planning framework required for management.

### **1.5.3 Organization, authority, financing and areas of activity of the Public Institution**

One year after the establishment of the Park, in 1950, the hotel and catering company Plitvice was established. In 1954, Management Service of the Plitvice Lakes National Park was established as well. In 1970, these two institutions merged into a single organization: Plitvice National Park, company for nature conservation, hotels, tourism and commerce. In 1992, Public Company Plitvice Lakes

National Park Management Service was established, eventually inherited by the current Plitvice Lakes National Park Public Institution – PLNPPi (the Public Institution; Croatian acronym: JU).

The Public Institution manages the National Park and areas of the Natura 2000 ecological network, as well as other protected areas in the area of the National Park.

The founder of the Public Institution is the Republic of Croatia, and the rights and duties of the founder are exercised on behalf of the Republic of Croatia by the central body of state administration in charge of nature conservation, i.e., the MEE.

In accordance with the Nature Conservation Act, the Public Institution shall perform activities pertaining to conservation, maintenance and promotion of a protected area with the aim of protecting and maintaining the authenticity of nature and of ensuring the undisturbed progress of natural processes and the sustainable use of natural resources, and shall exercise control of the implementation of nature conservation conditions and measures in the area of its management; the Public Institution also participates in data collection with the aim of nature conservation status monitoring. In addition to these tasks, the Plitvice Lakes National Park Public Institution also performs other activities determined by its Charter, such as: reception, provision of information, guidance and transport of visitors using own means of transport; HORECA (Hotel/Restaurant/Café) and tourism activities; wholesaling and retailing within its area of activity; promotion of production of autochthonous cultural products (ethnological treasure); promotion of development of traditional HORECA offer (rural tourism); management of facilities; promotional activities (advertising and publicity) and market research; professional fire brigade activity within economic activities; etc.

The Public Institution is managed by the Governing Board, which consists of five members appointed and dismissed by the Minister. One member of the Governing Board is chosen by workers from their ranks, in accordance with provisions of a special regulation determining labor relations. The Governing Board adopts the Charter of the Public Institution, Management Plan, Annual Programs, annual financial plans and accounts, Rules on Internal Structure, Ordinance on Salaries; Staff Regulations and other acts of general application defined by the instrument of incorporation and the Charter; it appoints and dismisses the Conservation Manager, Head of Ranger Service, rangers and Heads

of internal organizational units. The Board reaches decisions on disposition of immovable property of the Public Institution with the consent of the Government of the Republic of Croatia; as regards disposition of movable property of the Public Institution or execution of another transaction the individual value of which does not exceed the amount of HRK 10 million, the Board reaches its decisions independently, while transactions exceeding this amount require consent of the Government of the Republic of Croatia. The Governing Board is deciding on leasing of facilities and premises of the Public Institution or changes to their use and on other issues determined by the Nature Conservation Act, instrument of incorporation and the Charter, as well as on other issues pertaining to management of the Public Institution where the competence of the Director is not prescribed.

Work and operations of the Public Institution are managed and organized by the Director, who is appointed and dismissed by the competent Minister. Expert work of the Public Institution within the activities of Park protection, conservation, promotion and use are managed and supervised by the Conservation Manager. Tasks of other organizational units are managed and supervised by their Heads. Immediate surveillance in the Park is performed by rangers, organized within a special organizational unit managed by the Head of Ranger Service, and their authority and work are prescribed by the Nature Conservation Act.

The Public Institution obtains the means for its operations and activities from revenue from fees (primarily entry tickets and parking fees); sale of products and goods (retail shops and souvenir shops); provision of HORECA and tourism services (hotels, camping sites, restaurants, small-scale Park facilities); revenue from use of protected segments of nature; donations of legal entities and natural persons; etc. Plitvice Lakes National Park Public Institution currently obtains almost all of its revenue from the first three listed items, while other sources are negligible in the revenue structure. As an example, in 2017, total revenue amounted to approx. HRK 325 million, out of which over 51% from fees, approx. 39% from the provision of HORECA and tourism services, and approx. 10% from sale of products and goods.

For a number of years, the Public Institution has been achieving significant profit, managing to accumulate funds that enable it to engage in substantial investments with the aim of improving management. As an example, in 2017, profit stood at approx. HRK 65 million or 20% of total revenue,

while cash balance at the end of the reporting period amounted to approx. HRK 226 million.

In accordance with Article 204.b of the Nature Conservation Act, the Public Institution must pay 3% of revenue achieved from sale of each entry ticket into the State Budget; if it achieves a surplus of revenue, the Institution must pay part of that surplus without predefined use from the previous budgetary year into the State Budget, in the amount not exceeding 10%.

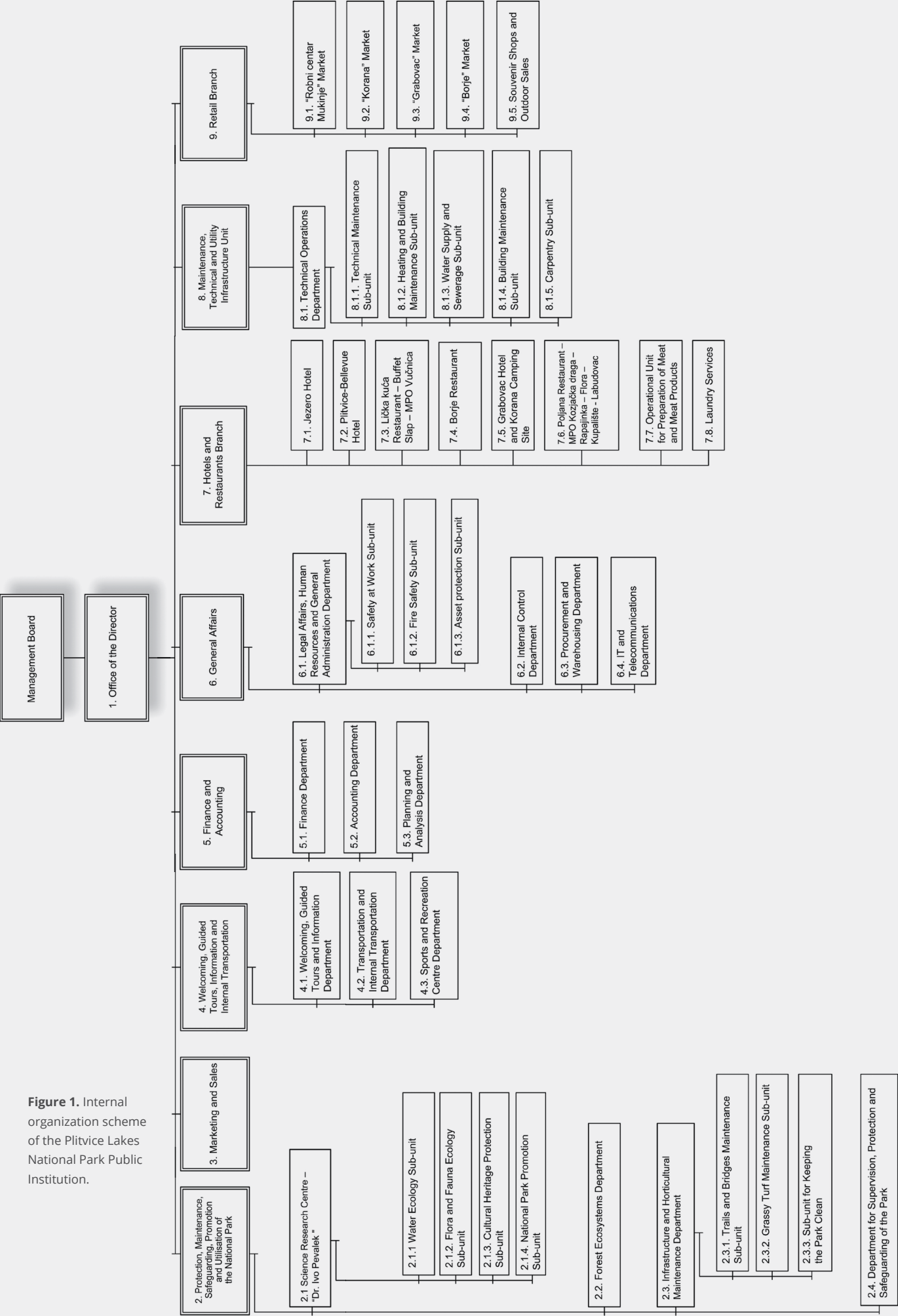
Pursuant to the Regional Development Act, and to the Decision on the Level of Compensation, Method of Payment and Eligible Costs for Use of Protected Area Fee (Official Gazette NN 102/15), the Public Institution must pay part of entry ticket sale revenue (up to 6.5% of net turnover) to local self-government units in the territory of which it is located, in the form of a fee due for the conservation of natural areas. Local self-government units must use this fee solely for project implementation

costs concerning environmental and nature conservation, development of social infrastructure, as well as economic growth and sustainable development. In 2017, on this basis, the Public Institution paid approx. HRK 8.5 million to four local self-government units in the territory of which it is located.

In 2018, the Public Institution employed approximately 1100 employees in total, out of whom approx. 60% are in permanent employment, and approx. 40% are fixed-term (seasonal) workers. HORECA Branch had the highest number of employees (53%), followed by the Service for Reception, Guided Tours, Information, Visitor Transport and Internal Transport (16%), Service for National Park Protection, Maintenance, Conservation, Promotion and Use (8%), and Joint Operations Service (8%).

Structure of the Public Institution is shown in figure 1.

Figure 1. Internal organization scheme of the Plitvice Lakes National Park Public Institution.



## 2. | DESCRIPTION OF THE AREA



## 2.1 Spatial and administrative position of the Park and population

### 2.1.1 Spatial and administrative position of the Park and traffic connections

Plitvice Lakes National Park is located in highland Croatia, on the boundary of Lika, Kordun plateau and Ogulin-Plaški valley, between the massif of Mala Kapela in the northwest and Lička Plješivica in the southeast, at an average elevation of 600 m.a.s.l. (figure 2).<sup>9</sup> Administratively, most of the Park (91%) is located in the territory of municipalities Plitvice Lakes and Vrhovine, within Ličko-senjska County, and a small share of Park surface (9%) is located in the territory of municipalities Rakovica

and Saborsko, within Karlovačka County, in the border area of the Republic of Croatia along its border with Bosnia and Herzegovina. Out of 20 settlements within the Park, 16 of them are located within the Plitvice Lakes Municipality, two are in Vrhovine Municipality, one in Rakovica Municipality, and one in Saborsko Municipality.

Park surface amounts to 29,630 ha (296 km<sup>2</sup>), and it encompasses the entire area of the Plitvice Lakes catchment area. Aquatic area of the Park represents approximately 1% of the total surface. The remainder of the Park predominantly consists of forest areas (81%), followed by grassland areas

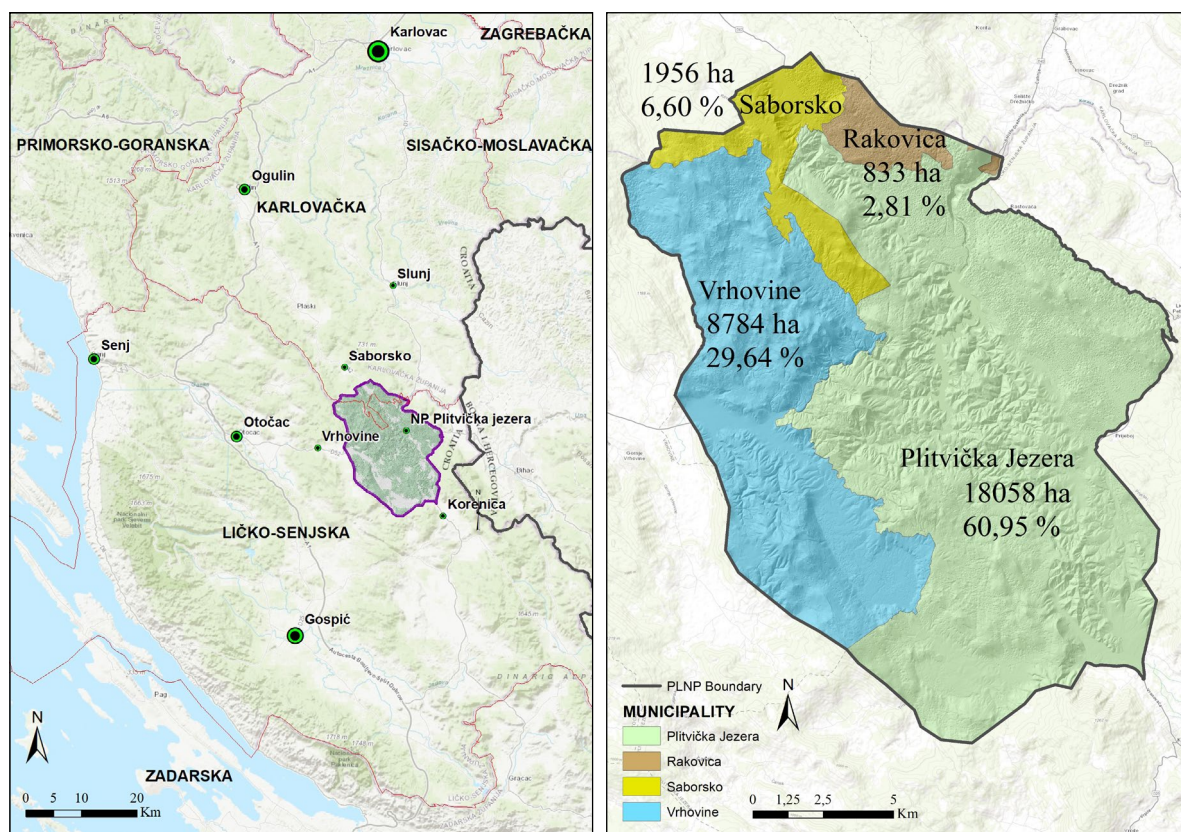


Figure 2. Spatial and administrative position of the Plitvice Lakes National Park.

<sup>9</sup> The highest peak of Mala Kapela is situated in the Park area itself – Seliški vrh at 1279 m.a.s.l. In the part of the massif of Lička Plješivica immediately along the Park, the highest peak is Gola Plješivica at 1646 m.a.s.l.

(approx. 15%) and approximately 3% of areas substantially changed due to anthropogenic impact.

Wider area surrounding the Park, accessible within approx. 1 to 1.5 hours of driving (figure 2) and including the entire area of Lika, Kordun and Ogulin-Plaški valley, is an attractive, extraordinarily diverse and relatively sparsely populated natural and rural landscape. In the entire area, there are only several small urban centers (according to the 2011 Census, relatively large settlements in the area include: Korenica with 1,766 inhabitants; Slunj with 1,674; Otočac with 4,240 and Gospić with 6,575 inhabitants). As for other settlements, even the largest do not surpass the level of several hundred inhabitants (e.g., according to the 2011 Census: Rakovica with 310 inhabitants; Saborsko with 462 and Vrhovine with 465 inhabitants). Two more National Parks are located in the wider surrounding area (Northern Velebit National Park and Paklenica National Park), as well as one Nature Park and UNESCO Man and Biosphere area (Velebit Nature Park); there is also a range of other protected nature areas in other categories (including the significant landscape Baraćeve špilje, cave park Pećinski park Grabovača, geomorphological nature monument Cerovačke pećine, beech forests in the area of Paklenica National Park and Northern Velebit National Park listed as UNESCO World Heritage), and most of the wider area is included in the Natura 2000 ecological network. The area has a rich history, tradition and cultural heritage, and the traditional way of life and activities is still present.

The main state road linking continental Croatia and Dalmatia passes through the Park (D429/D1), as well as less busy state roads D42 linking the area towards the north and the region of Gorski kotar, and D52 that represents the main access route from the direction of the northern Adriatic (Senj, Otočac, Korenica); both roads are also main connections to the A1 motorway passing northwest of the Park. Due to its position and good traffic links, the Park is easily accessible from the direction of Zagreb (138 km along the D1 road) and from a large part of the coastal area ranging from the region of Kvarner to Dalmatia, which is also 2 to 3 hours of driving away from the Park (Senj 105 km; Rijeka 171 km; Rovinj 260 km; Zadar 133 km; Šibenik 187 km; Split 256 km). The Park is 2 to 2.5 hours of driving away – along excellent roads, through a diverse and attractive landscape – from four international airports near Zagreb, Rijeka, Zadar and

Split. The route of the so-called Lika Railroad passes along the northwestern boundary of the Park, as the only railway link between continental Croatia and the region of Dalmatia.

### 2.1.2 Settlements in the Park area and demographic characteristics

According to the Census of 2011, there were 1,411 inhabitants living in 20 settlements in the Park area (Figure 3). Out of them, 87% lived in two relatively large and six medium-sized settlements, while the remainder lived in 12 small settlements, including some settlements facing disappearance.

Additional 1,636 inhabitants lived in settlements the administrative area of which covers the Park up to an extent, but residential areas themselves are located outside of the Park.

In total, in four municipalities in the territory of which the Park is located (Plitvice Lakes, Rakovica, Vrhovine and Saborsko), there were 8,773 inhabitants.

Even though the number of inhabitants remained relatively stable in the period between the two most recent official censuses (2001 – 2011), demographic trends are unfavorable, with aging population (figure 4),<sup>10</sup> negative natural increase, emigration of young population and an increasing number of single-person households and households with few members.

This situation is also reflected in data concerning the use of housing units in the Park area. According to the 2011 Census, out of the total of 1018 registered housing units in the Park area, only 480 of them are permanently inhabited, while 336 units are inhabited only occasionally; 66 units are used as vacation properties, and 136 units are abandoned.

Unfavorable demographic status is also reflected in the educational structure of the population (figure 4).

This is not a short-term or recent trend. In all four municipalities in the territory of which the Park is located, the current population level is at one quarter or less of the maximum number of inhabitants in these areas less than 100 years ago (figure 5).

<sup>10</sup> According to the 2011 Census, share of population above 65 years of age in the Park territory stood at 23%, and population younger than 15 had the share of 15%. According to the 1991 Census, these shares were 14% and 18% respectively.



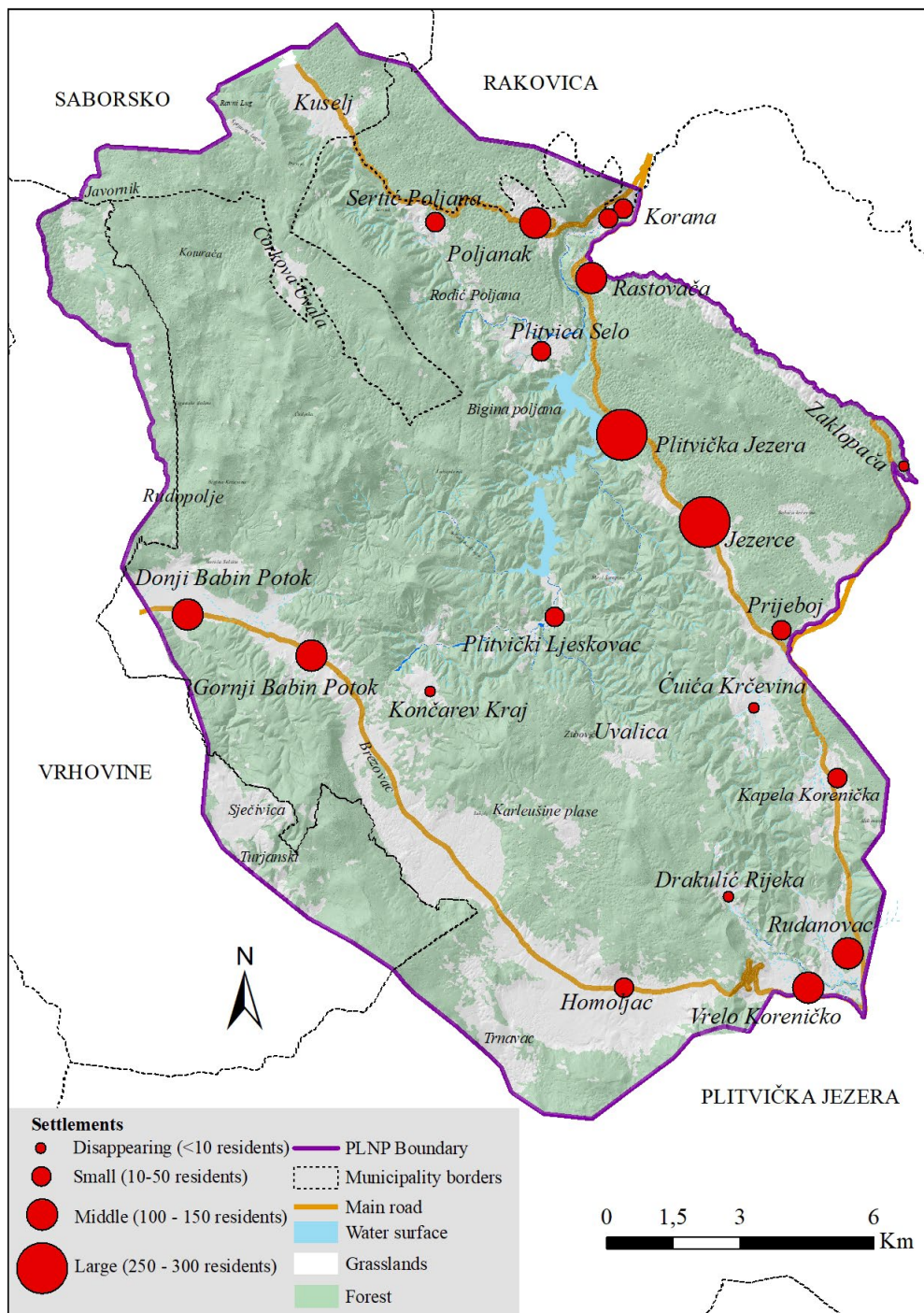
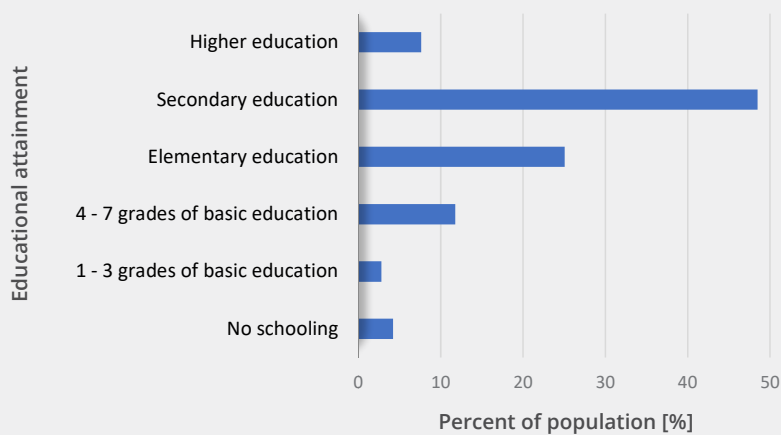
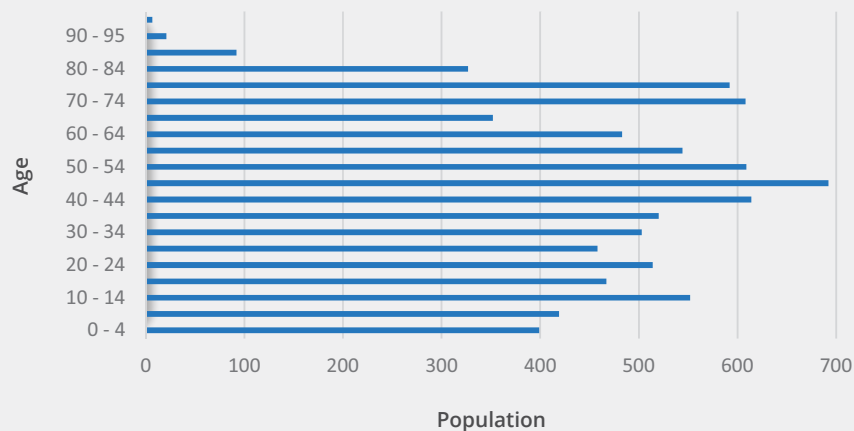
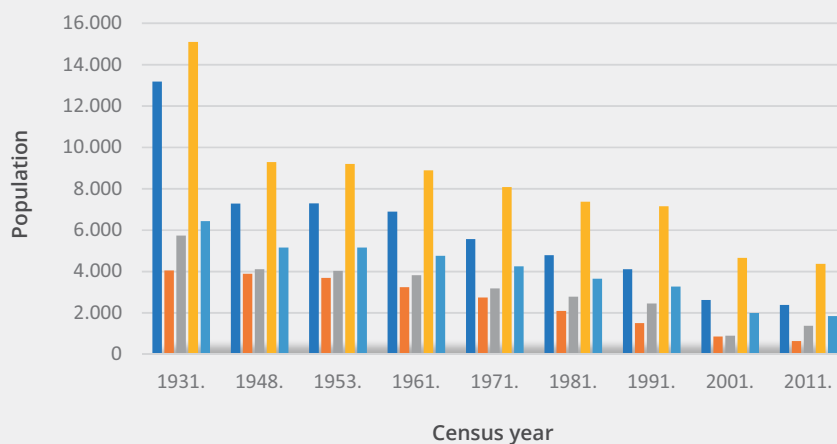


Figure 3. Settlements in the territory of Plitvice Lakes National Park according to the 2011 Census.



**Figure 4.** Population of four local self-government units in the territory of which the Park is located, per age (up; share of the population older than 15 according to the level of completed education (according to the 2011 Census).



**Figure 5.** Change in population numbers in four municipalities in the territory of which the Park is located, and in settlements in the Park.

Wider Park area is facing extremely negative long-term demographic trends. In addition to the most recent two wars causing demographic shocks (each time with losses exceeding one third of the population), the inter-war period also resulted in a population drop exceeding 10% between two censuses. Similar trends are true for the entire region of Lika, which had approx. 200,000 inhabitants around the year 1900, and has approx. 50,000 today. Roughly the same percentage of population decrease is also true cumulatively for settlements within the Park.

### 2.1.3 Land ownership and rights of use

Exact data on the share of private property as regards land plots within the Park is not available. However, since it is known, based on long-term management practice, that forest areas are in state ownership almost in their totality,<sup>11</sup> and that

grassland areas are mostly in private ownership (at the level of approx. 90%), as well as areas of settlements and adjacent agricultural land, a broad assessment can be made that slightly under 20% of the Park surface is in private ownership.

In the period from 2015 until 2018, the Public Institution was purchasing property within Park boundaries from private owners. In total, HRK 16 million was spent for this activity in four years, and purchased land included construction land, agricultural land (meadows, arable land, grasslands) and forests. The bulk of purchased land was agricultural land, a small part consisted of forests, and the share of construction land was the lowest. Agricultural land and forests were purchased for the purposes of active management of protected habitats, while construction land was purchased in order to decrease the intensity of construction in the Park.

## 2.2 Natural characteristics

### 2.2.1 Climate and climate variations

The prevailing climate in the Park is moderately warm humid climate with warm summers (according to Köppen classification, climate subtype Cfb); only areas above 1200 m.a.s.l. have humid snow forest climate (according to the Köppen classification, climate subtype Df).

Spring periods begin relatively late, and are cold and rainy, with temperatures typically below 8 °C. Summers are warm, with fresh mornings. Autumn is relatively short, with average air temperature at approx. 13 °C. Winters begin early, in November, and January is the coldest month on average. Monthly mean air temperatures point to rather uniform seasonal distribution, with cold winters (-0.5 °C in December) and warm summers (+18.6 °C in July). Mean annual air temperature is 9.4 °C.

Seasonal distribution of mean monthly precipitation is not as clear. Monthly precipitation is typically not higher than 300 L m<sup>-2</sup>; on average, it stands at approx. 130 L m<sup>-2</sup>. Measured annual levels of precipitation range between 1148 and 2113 mm, and

value of mean annual precipitation is 1592 ± 371 mm, which points to a high degree of precipitation variation. In winter, precipitation typically occurs in the form of snow.

The continental impact on air mass circulation, prevailing in the Park, results in northeasterly winds blowing approx. 27% of the time, primarily in winter and spring, while occasional Mediterranean impact reflects itself in southwesterly winds, predominantly in summer. Windless periods are rare (at 3.17%).

Differences in air humidity are very low on a yearly basis. Distribution of values of mean relative air humidity for a longer period of time points to lower values in the period from spring to summer (65% - 67%), and high values in wintertime (86%). Mean annual relative air humidity stands at 77.5%.

There was no systematic air temperature monitoring in the Park area prior to 1980, which is a relative short period to reach specific conclusions concerning the global warming impact on Plitvice Lakes ecosystems. However, in the period from

<sup>11</sup> Approx. 200 hectares of forests are in private ownership, which constitutes less than 1% of the forest area of the Park.

1986 until 2014, trend of air temperature increase of approximately 0.06 °C per year has been noted, which is in line with global trends; accompanying trend of average surface water temperature increase of 0.04 °C – 0.06 °C per year has been noted for water sources as well, coupled with increase of 0.1 °C – 0.25 °C for the lake system.

## 2.2.2 Geology and geomorphology

### Geological and hydrogeological characteristics

The territory of Plitvice Lakes National Park is part of the Dinaric karst area, and it is one of the most striking karst complexes in the world, characterized by highly specific geological, geomorphological and hydrological features.

Geological base of the Park is mostly made of Mesozoic limestones with layers of dolomite, but also of dolomites itself. Relation between low porous dolomites on the one hand and karstified porous

Jurassic and Cretaceous limestone layers on the other has conditioned the current appearance of the entire area. Specific hydrogeological characteristics of rocks have enabled the surface water accumulation on Triassic dolomites (Upper Lakes), but also canyon incisions in Cretaceous limestone layers (Lower Lakes and Korana canyon).

The Upper Lakes consist of 12 lakes dominant in space and volume, formed on dolomites, with wider, more indented shores compared to the Lower Lakes. The Upper Lakes include two largest lakes in the lake system: Kozjak and Prošćansko Lake. The remaining four lakes create the Lower Lakes, situated in limestone canyon with steep shores.

Tufa barriers provided lake formation (figure 6). Favorable conditions for tufa formation and growth, and for the resulting lake retention, most recently occurred at the beginning of the Holocene period, which means that the current lakes represent a very young complex.

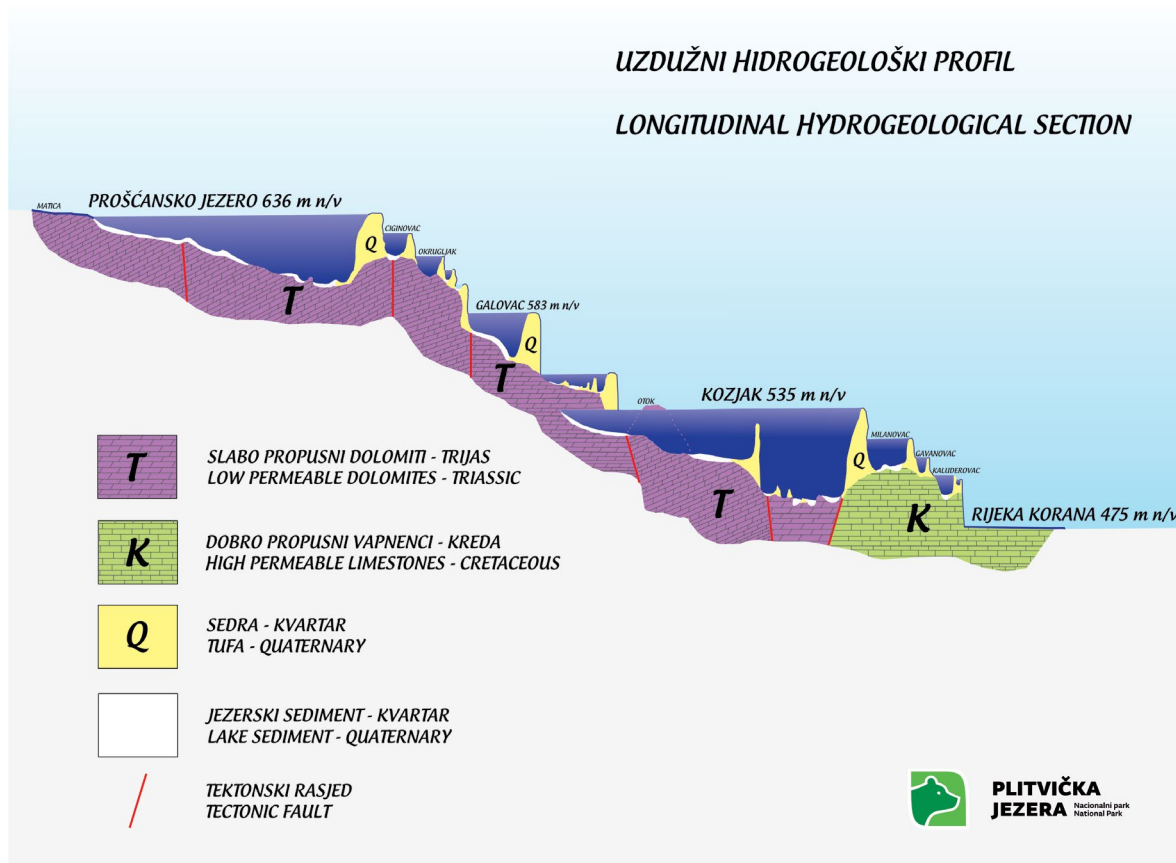


Figure 6. Longitudinal hydrogeological section. Prepared by PLNPI (based on the original: Božičević, 1994).



### ***Surface and subterranean karst forms***

The karst relief is primarily associated with carbonate rocks (limestone and dolomite), given their strong susceptibility to chemical and mechanical wear, as well as with tectonic impact (faulting, folding, cracking, etc.). Specific geological structure of the terrain, dominated by carbonate rocks, predominantly karstified limestone and less karstified dolomite, was decisive for the formation of specific karst morphology of the area. Water rich in carbon dioxide penetrates through cracks in the carbonate bedrock, thereby dissolving it and creating various surface features (karst fields, sinkholes, peaks, towers, columns, karrens, pavements) and subterranean features (pits, caves, caverns) in the karst terrain.

The most represented surface karst forms in the Park area are sinkholes, with approximately 8000 of them recorded. They are typical and representative geomorphological phenomena for the karst, since their existence points to karstification processes, dissolution of rocks and position of fault zones, which ultimately means possible links with active karst channels, and it also points to the zone of increased infiltration into the subterranean area.

There are no karst fields in the Park area, but there are several karstic plateaus (Brezovac and Homoljačko polje) that are significant for interpretation of hydrogeological relations in the Plitvice Lakes catchment area.

There are 114 speleological sites recorded in the Park and its boundary areas (up to 500 meters outside of Park boundaries). The predominant forms are pits (72%), and the remainder (28%) consists of cave sites, i.e. prevaillingly horizontal sites. Most speleological sites (80%) are fairly small in dimension (shallower and shorter than 50 meters); however, medium-sized speleological sites are also represented (at 20%, with depth or length between 50 meters and 500 meters). Very large speleological sites with depth or length exceeding 500 meters have not been discovered so far. The total length of explored sites is 1664 meters, and depth 2251 meters.

In morphological terms, the most significant sites are pits Čudinka (-203 m), Golubnjača (Homoljačko polje, -170 m) and pit at Vršić (-154 m, length 110 m). Site Čudinka is also interesting due to the fact that the entire site consists of only one vertical channel, and this pit was one of the deepest known pits in Croatia for a long time. In addition to these pits, prominent sites in terms of dimensions include caves in the lake area: Mračna špilja (160 m), Golubnjača (Korana canyon, 145 m) and cave Špilja vile Jezerkinje (104 m). Caves Špilja vile Jezerkinje, Šupljara and Golubnjača (Korana canyon) are additionally protected as geomorphological nature monuments, since 1964. It is also worth pointing out that the sites of Ledenica in Čudina uvala, Rodića špilja, Šupljara špilja, Baričeve špilje, Vila jezerkinja, Mračnjača and Modra špilja constitute part of the Natura 2000 habitat 8310 (Caves and pits closed to the public).



**Figure 7.** Cave Garden, Labudovac barrier. Archive of the PLNPII.

As a result of dynamics of tufa barrier growth, caves may appear in individual tufa barriers. The best-known example are numerous tufa cavities, semi-caves and caves between 300 and 1600 years old that can be found within the Labudovac tufa barrier 100 meters wide, and that are referred to as the Cave Garden ("Špiljski vrt"). Below the cascade of Labudovac itself, there is the cave Janečekova pećina, more than 50 meters long.

Cave bear bones have been discovered in caves Rodića pećina at Sertić Poljana, Mračna špilja near the Lower Lakes and in Baričeve špilje, so these localities are also paleontologically significant.

The most recent systematic research conducted in speleological sites in the Park area took place in the 1960s, and it is believed that the number of known sites will rise substantially with further research.

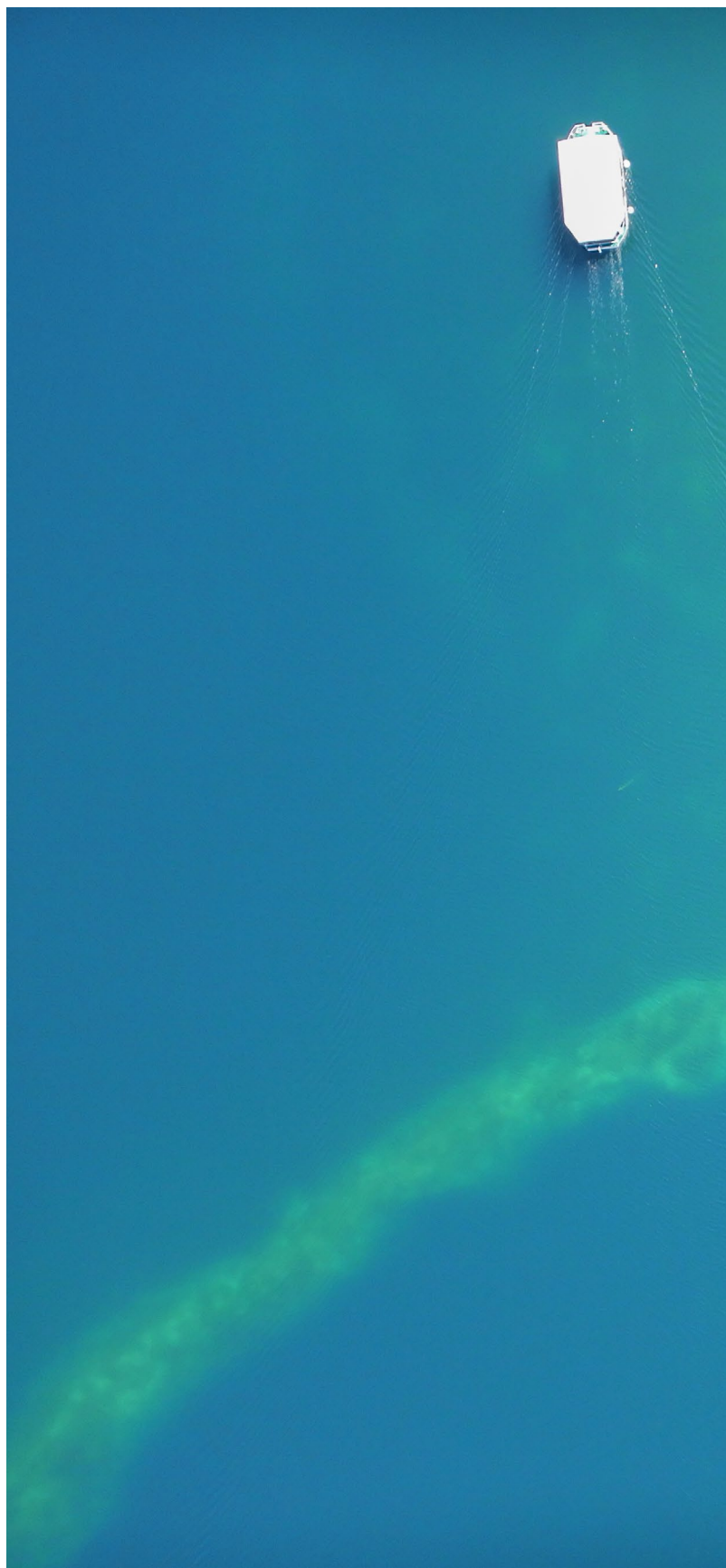
### ***Tufa barriers and cave sediment***

The process of tufa formation in the Plitvice Lakes area ranges back to the distant geological past. Tufa is formed only in conditions of warm and humid climate similar to the current climate (even today, tufa is deposited more quickly in summer than in winter). According to assessments, age of active tufa barriers in present-day watercourses ranges between 6,000 and 7,000 years, and these barriers were created after the most recent ice age. However, along the sides of present-day watercourses, especially in the source area of the lakes, paleo barriers have been found at higher elevations, and their age is assessed at between 90,000 and 130,000 years, and in some cases between 250,000 and 300,000 years.

Each barrier has its own dynamics, with some barriers growing more quickly, and some more slowly. More recent analyses based on hydrological methods have resulted in calculations showing that annual growth speed of the exit barrier of Lake Kozjak is approx. 5.6 mm, while growth speed at Prošćansko Lake is approximately three times higher.

Downstream barriers sometimes grow higher than upstream ones, and the latter end up submerged, with two lakes merging into one lake. The best example of such dynamics can be seen in Lake Kozjak, where a submerged tufa barrier is situated approx. 6 meters below water level, once dividing this lake into two separate lakes. The submerged tufa barrier, approx. 300 meters wide and approx. 40 meters high, grew slower than the exit tufa barrier of Lake Kozjak, which resulted in a gradual increase of water level in the downstream lake, and ultimately, approx. 400 years ago, in the submerging of the upstream barrier and formation of a single lake (figure 8).

Age analyses of active barriers, as well as analyses of lake sediment, have shown that average annual sedimentation speed for lake sediment is up to 17 times lower than tufa barrier growth speed, which also results in the rising water level of lakes.







**Figure 8.** Submerged tufa barrier in Lake Kozjak. Archive of the PLNPII.



### 2.2.3 Tufa formation process

”

*Due to the tufa formation process, Plitvice Lakes are an extraordinary biodynamic system, and it is only upon the progressive status of this biodynamic system that the future of Plitvice Lakes we all want depends.*

”

(Ivo Pevalek)

Biodynamic and uninterrupted tufa formation process that results in origination and growth of tufa barriers is responsible for the formation of lakes and the cascading lake system. It is precisely due to this ecological process, conditioning the formation of lakes, cascades and extraordinary beauty

of landscapes, that the area of Plitvice Lakes became first a National Park, and then an internationally recognized and protected phenomenon due to its status of a UNESCO World Heritage Site.

Tufa formation process is extraordinarily complex, and still not fully clarified. However, what is certain is that Plitvice Lakes waters are oversaturated by dissolved calcium carbonate (in the form of calcium bicarbonate), and that such mineralized water, in rapids, and especially on tufa barriers, enables excretion of calcium carbonate (calcite) in the form of small sedimenting crystals.

Basic tufa formation chemical formula:

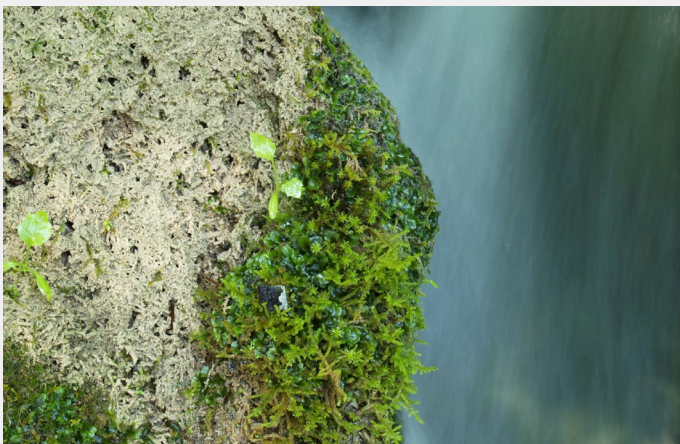
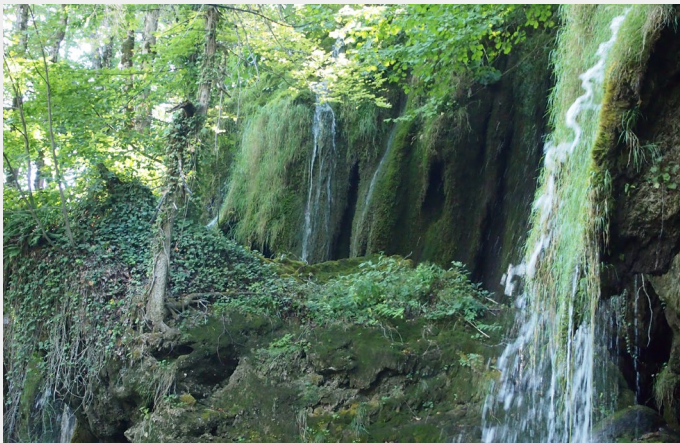


Figure 9. Tufa barrier detail. Archive of the PLNPI.

Tufa is a porous rock created by sedimentation of calcium carbonate dissolved in water, with the help of bacteria, algae and mosses (figure 9).

Numerous scientific researches in Plitvice Lakes have proven that the tufa sedimentation process is a result of interaction of physical, chemical and biogenic processes in water; i.e., that the processes of sedimentation of lake sediment and tufa on barriers are both inorganic and biologically induced.

Three main chemical conditions that must be satisfied are the following:

1. Oversaturation of water with calcium carbonate, i.e., saturation index (Izas)  $> 3$  (in places where tufa formation is very intensive: Izas = 5 to 7);
2. pH value of water must exceed 8.0 (in watercourses with intensive tufa formation, pH value ranges from 8.2 to 8.4; on the other hand, in springs, where pH value is approx. 7.5, there is no tufa formation process);
3. Concentration of dissolved organic matter in water must be lower than  $10 \text{ mg L}^{-1}$  of carbon (already very small quantity of dissolved organic matter present in water substantially inhibits the process of calcite crystal nucleation, thus preventing its sedimentation).

Biogenic element of tufa formation process is ensured by the so-called tufa-forming mosses growing on barriers, and by cyanobacteria and diatoms and other microorganisms developing on them. These microorganisms excrete adhesive substances that promote the process of creation of initial small calcite crystals. Calcium carbonate and shells and skeletons of microorganisms then continue to sediment around these crystals, which eventually results in the creation of tufa macro structure. This is why incrustations of mosses, algae, bacteria and

As early as in 1938, academician Ivo Pevalek wrote about morphological shapes of tufa, such as curtains, grooves, tubes, etc. He wrote about two fundamental biological forms of tufa: Cratoneuron tufa (based on moss species *Cratoneuron commutatum*) and Bryum tufa (based on moss species *Bryum pseudotriquetrum*).

other organic matter frequently appear in tufa and lake sediments.

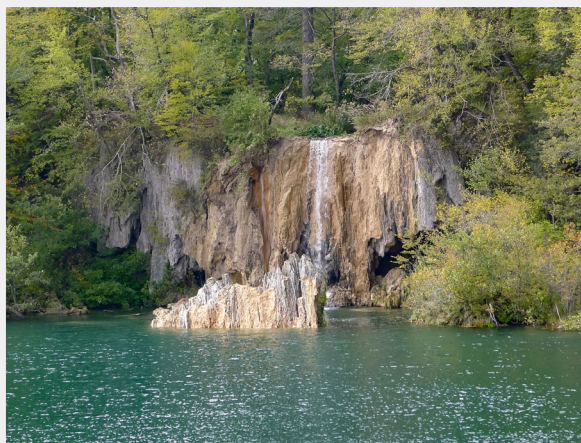
The shape of tufa is primarily impacted by tufa-forming mosses, but also by other microphytes and macrophytes, larvae of insects and other invertebrates on barriers. The most frequent moss species, covering steep and vertical tufa barriers, and participating in the formation of "Cratoneuron-type" of tufa, is *Palustriella commutata*. It "petrifies" quickly, and the shape of moss remains well conserved in tufa. In more horizontal localities, with more pronounced horizontal flow of water, tufa-forming moss species *Ptychostomum pseudotriquetrum* creates "Bryum-type" tufa. This type of tufa "petrifies" more slowly than Cratoneuron type, and the morphology of mosses themselves remains less conserved. Even though lower parts of mosses transform into tufa, they continue to grow, enabling continuous process of tufa formation and barrier growth.

One aspect worth emphasizing when it comes to tufa growth and barriers forming lakes is the fact that each tufa barrier turns water behind it into a lake, clearing it from debris that can enter the lake from many direct inflows from the lake catchment area. This natural filtering and purification of water enables the conditions for growth and development of downstream tufa barriers. Debris remains in the highest lakes that may ultimately end up partially clogged with it. Over time, a river is divided and turns into a cascade lake system.

This living lake system is subject to constant change, in history and present time, largely thanks to the dynamics of growth and erosion of tufa barriers. In hydrological conditions of high waters with strong discharges, it is not rare for smaller, or

The most significant tufa-forming mosses of Plitvice Lakes:

- *Palustriella commutata* (*Cratoneuron commutatum*),
- *Ptychostomum pseudotriquetrum* (*Bryum pseudotriquetrum*),
- *Eucladium verticillatum*
- *Hymenostylium recurvirostrum*



**Figure 10.** Cracked tufa barrier next to Milino Lake (left); in Lake Okrugljak (right). Archive of the PLNPII.

even larger, parts of fragile tufa barriers to crack and detach from the main barrier, which may result in changes of watercourses and morphology of the lakes and tufa barriers (Figure 10).

#### 2.2.4 Hydrology

Plitvice Lakes belong to the Danube catchment area, i.e., to the Black Sea basin, and they are situated in the boundary area towards the Adriatic Sea basin, with the watershed crossing the Park in the area of Babin potok. According to current findings, the entire Plitvice Lakes catchment area is within the boundaries of the Park, with the exception of small surfaces in the mountain area of Mala Kapela and area between Kuselj and Saborско. Approximately one third of the Park belongs to other catchment areas, including the catchment area of Koreničko polje (approx. 12% of the Park), catchment area of the Gacka River (approx. 9%), catchment area of Lička Jasenica (approx. 9%), catchment area of the subterranean river zone in Prijeboj (approx. 4%), and direct catchment area of the Korana River (figure 11).

Surface water represents approximately 1% of Park surface, with the total volume of 22.95 million m<sup>3</sup> of water. The most pronounced surface water phenomena in the Plitvice Lakes National Park are cascades of lakes of various sizes, formed due to the biodynamic process of growth of tufa barriers that have divided the original river valley and enabled the creation of lakes. Tufa barrier growth results in rising water levels and changing volume of water in the lakes. The system consists of 16 large named lakes and a number of smaller unnamed ones, divided by tufa barriers and connected into a single water system with a range of cascades between the lakes (figure 12).

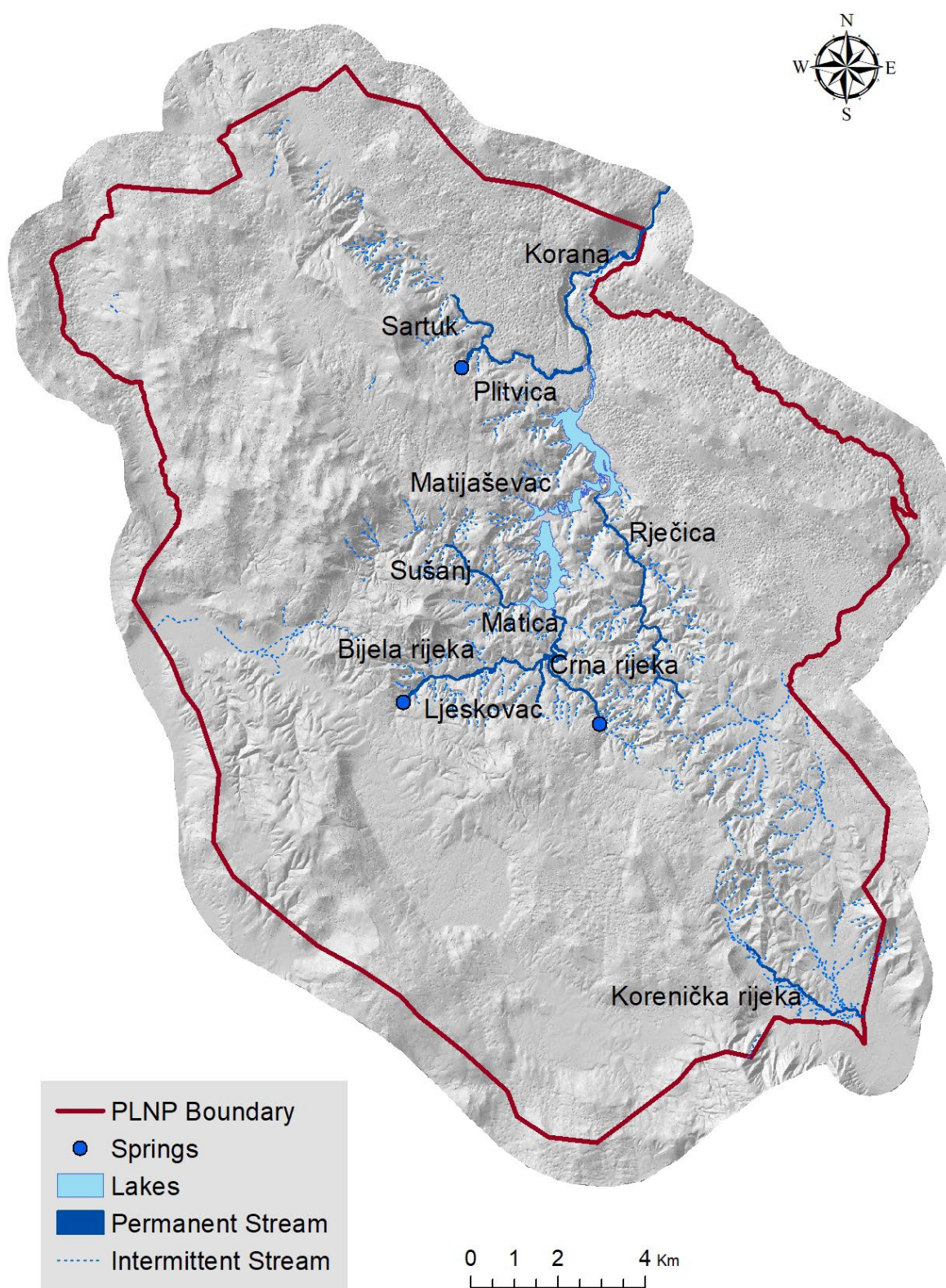
The lake system is divided into the Upper Lakes (box 1) and the Lower Lakes (box 2). The Upper Lakes include two largest lakes – Kozjak and Prošćansko Lake – together carrying as much as 89% of the total water volume in the Park.

Hydrological water yield in the Plitvice Lakes system comes from direct precipitation, watercourses and other inflows from the direct catchment area; losses are caused by evaporation, outflow of the Korana River and water extraction for water supply purposes. Water flows through the lakes with a relatively brief retention. Even the average time of water retention in subterranean layers is relatively brief (1.5 – 2.3 years), and speeds of groundwater flows are relatively high (2.1 – 10.7 cm s<sup>-1</sup> between Brezovačko polje and Homoljačko polje on the one hand, and spring of Crna rijeka on the other), which is an indicator of small capacity of water retention in subterranean karst, as well as high natural vulnerability of a large part of the basin.

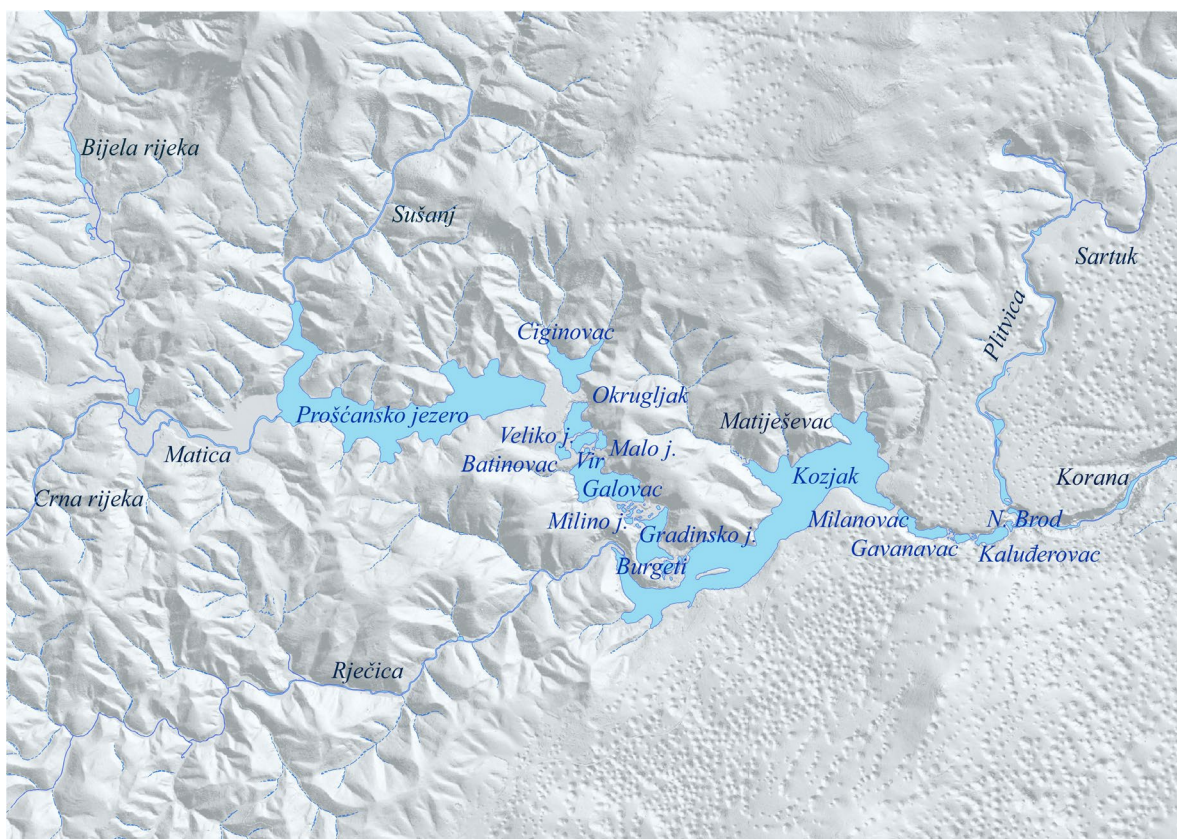
The most important permanent (perennial) karst springs forming surface watercourses in the area of the National Park are the spring of Crna rijeka, spring of Bijela rijeka, and spring of the Plitvica stream. Watercourses Rječica and Sušanj enter the lakes as permanent (perennial) streams, but they do not originate from abundant karst sources; instead, they depend on drainage of less permeable layers of the terrain. In addition to these watercourses, there are also many permanent or intermittent streams that bring water to the lakes and the Korana River either directly or indirectly (Figure 11 and figure 12).

For the Upper and Lower Lakes, main water sources are the rivers of Crna rijeka and Bijela rijeka (500 - 600 L s<sup>-1</sup> of water in dry periods, and over 10,000





**Figure 11.** Hydrological map of the area of Plitvice Lakes National Park. Prepared by the PLNPPI.



**Figure 12.** Sixteen lakes of Plitvice with main tributaries. Prepared by the PLNPII.

L s<sup>-1</sup> in rainy periods). The source of Crna rijeka is situated at the base of hill Kik north of the settlement of Uvalica, and it represents the largest water source in the area of Plitvice Lakes. Crna rijeka never runs dry, and it provides the bulk of water entering the lake system during dry periods. The spring of Bijela rijeka is situated in the area of Končarev Kraj (Čudin klanac), where water originates at the edge of the valley on several locations, in a rather disperse manner and without much strength; in extremely dry conditions, part of the watercourse runs dry (as in 2011/2012). Waters of Crna rijeka and Bijela rijeka merge in the settlement of Plitvički Ljeskovac, forming the watercourse of Matica, which flows into Prošćansko Lake after passing along its course approximately 1.5 kilometers long.

Prošćansko Lake is the second-largest lake in the lake system. A small watercourse Sušanj enters the lake in the area of Liman draga. With temperature increase in the warm part of the year, thermocline and lake stratification occur, i.e., separation of water layers per depth due to different temperatures and densities. In such a state, there is no mixing of water per depth, and only the upper surface layer of water above the thermocline is in motion.

Isothermy in the form of equalization of temperature per depth occurs in late autumn and early spring, resulting in comprehensive mixing of lake water, which makes the lake dimictic.

From Prošćansko Lake, water flows across Labudovac barrier into the Upper Lakes system, all the way to the Burgeći cascades, after which it flows into Lake Kozjak.

Lake Kozjak is the largest and deepest lake in the Plitvice Lakes system, receiving water not only from the Upper Lakes system, but also from direct inflow of waters from the Rječica watercourse and from several smaller intermittent streams. Just as in the case of Prošćansko Lake, thermal stratification and dual isothermy characterize Lake Kozjak as well. Kozjak is the only lake in the lake series where traffic of electric boats is permitted within the visitation system, and water from the lake is also used for water supply.

Flowing over the exit barrier of Kozjački mostovi, water then enters the Lower Lakes all the way to the final lake Novakovića brod. First small-scale water losses due to the sinking of water into



<b>Kozjak</b> 82 ha  47 m	<b>Prošćansko Lake</b> 68 ha  38 m	<b>Galovac</b> 12 ha  24 m
<b>Gradinsko Lake</b> 8 ha  10 m	<b>Ciginovac</b> 7 ha  11 m	<b>Okrugljak</b> 4 ha  13 m
<b>Veliko jezero</b> 2 ha  7 m	<b>Malo jezero</b> 1 ha  9,5 m	<b>Batinovac</b> 1 ha  5 m
<b>Burgeti</b> 1 ha  5 m	<b>Vir</b> 0,6 ha  4 m	<b>Milino Lake</b> 0,1 ha  1 m

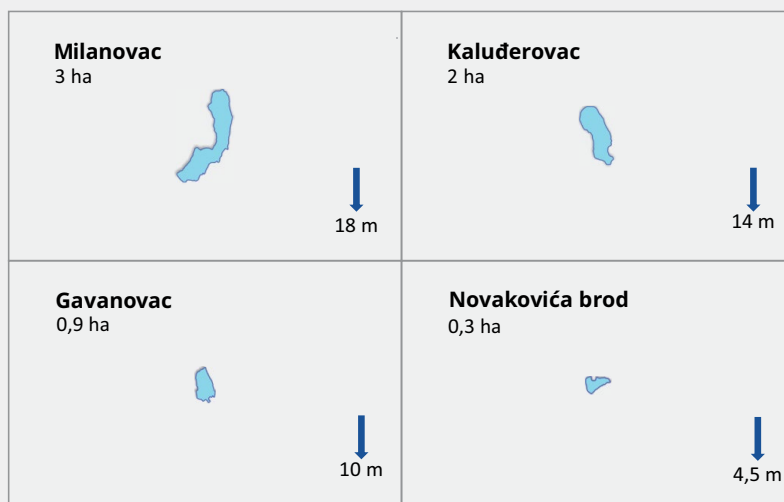
**Box 1.** Upper Lakes.

subterranean karst have been recorded at the exit from Lake Kozjak.

Watercourse Plitvica flows into the lake system across the waterfall Veliki slap (Big Waterfall) 78 meters high, as one of the most attractive sites in the Park. Spring of the Plitvica stream is located near the hamlet Rodić Poljana, and it never runs dry (discharge ranges from  $0.3 \text{ m}^3 \text{ s}^{-1}$  in dry summer periods up to  $6 \text{ m}^3 \text{ s}^{-1}$  in rainy periods). After a brief section of its course, it also receives water from Sartuk stream (figure 11). Due to pronounced sinking of water into subterranean karst in the section of the Plitvica stream downstream from the locality of Hajdukovića mlin, only 35 % of the flow from the spring of Plitvica and from Sartuk watercourse reaches Veliki slap.

At the base of the exit barrier of Novakovića Brod (Sastavci), water from the lake system merges with water from the Plitvica stream, creating the Korana River that belongs to the Black Sea basin and enters the Kupa River at the city of Karlovac after 134 kilometers of its course. Downstream from Sastavci, water sinking into subterranean karst becomes much more pronounced, and River Korana remains without water already in the Park area during dry summer periods.

Hydrological analysis of Plitvice Lakes has determined a general trend of decreasing quantity of water flowing through the Plitvice Lakes system in the period 1952 - 1991. The recorded trend of decreasing mean annual discharge is also a general characteristic of water resources in the entire area of Croatian karst, but the trend of decreasing



**Box 2.** Lower Lakes.

discharges in the area of Plitvice Lakes is the highest. This phenomenon is caused by general present trends of increasing mean annual air temperatures and decreasing precipitation. On the other hand, growth in water levels of lakes Kozjak and Prošćansko has been recorded in this period, due to continuous growth of tufa barriers.

Analyses of the recent period, from 2000 until 2011, have shown that the trend of decreasing water discharge in Lake Kozjak and tributaries of Prošćansko Lake is continuing; as regards mean annual water level trends, there are conflicting conclusions, and results need to be additionally analyzed.

## 2.2.5 Flora and habitats

Extraordinary diversity of flora and habitats of the Park, coupled with the presence of endangered and protected taxa, endemic species and species protected pursuant to international conventions, make the Park a valuable area in terms of its flora, not only at the national, but also at the international level. Such abundance of species and habitats is a consequence of mutual interaction of various factors, such as geographic location and position of the Park, its geological, geomorphological, hydrological and climatic characteristics, as well as ecological processes and human impact.

Plitvice Lakes National Park is part of the Important

Plant Area (IPA), as an area containing remarkable botanical treasure and an extraordinary mix of rare, endangered and endemic taxa, as well as vegetation of major botanical importance. IPA area is somewhat larger than the National Park itself, and it also encompasses the northwestern part of Lička Plješivica and area from Vrelo Koreničko to Bjelopolje in the southeast.

In the continuation of this document, the concept of significant species pertains to target species, priority species, strictly protected species and indicator species.

## Flora

There are over 1400 vascular plant species and subspecies recorded in the Park area, which represents as much as 30% of all plant species recorded in Croatia. In a relatively small area, one can encounter species with diverse distribution and floral elements (such as Mediterranean, Mediterranean-Atlantic, Illyrian, Balkan, Carpathian, Eurasian, circumpolar, boreal, etc.).

Share of endemic species in the Park flora is not high (approx. 1.7%), but it cannot be considered negligible either, given the representation of a range of interesting species, such as squill *Chouardia litardierei*, Croatian carnation *Dianthus giganteus* D'Urv ssp. *croaticus*, hellebore species





Figure 13. Squill *Chouardia litardierei* (left); orchid *Ophrys* sp. Archive of the PLNPPi.

*Helleborus multifidus*, plant species *Cardamine che-  
lidonia*, etc.

Share of strictly protected species and subspecies in Park flora is high (approx. 5%), and the presence of a large number of orchids is also significant (over 60 taxa), given the fact that this group is rare and endangered at the global level.

The Park area is also interesting due to major diversity of moss species, with 207 recorded species found in inland habitats.

The area of the Park as part of the ecological network is significant due to 7 wild species: four vascular plants (creeping marshwort *Apium repens*, lady's slipper orchid *Cypripedium calceolus*, squill *Chouardia litardierei*, Siberian rayflower *Ligularia sibirica*) and three moss species: *Drepanocladus (Hematocaulis) vernicosus*, *Buxbaumia viridis* and *Dicranum viride* (see annex 5.3).

One should also mention *Sphagnum* spp. moss genus that can be found in peat habitats and that is

endangered due to potential habitat loss caused by overgrowth and changes to the water regime.

### Habitats

The bulk of the Park surface is covered by forests; grasslands also cover substantial areas, while aquatic habitats, even though extremely important for biodiversity conservation, are the smallest in terms of surface. The entire Park is situated in karst relief with numerous surface and subterranean karst forms, which is why the subterranean area, even though poorly researched, is bound to be very rich in biodiversity; one could say that there is one entire unknown Park hidden below the Park that we can see. Almost the entire Park surface is still covered in natural or semi-natural habitats, and only about 3% of its area is built and cultivated.

In accordance with the National Habitat Classification (NHC), there are 40 NHC level III habitat types recorded in the Park area, distributed in 8 main

**Table 1.** Natura 2000 natural habitat types and habitats (\* priority).

Natura 2000 code	Target habitat type
3140	Hard oligo-mesotrophic waters with benthic vegetation of chara formations (Characeae)
3260	Watercourses of plain to montane levels with the <i>Ranunculum fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation
32A0	Tufa cascades of karstic rivers of the Dinaric Alps
8210	Calcareous rocky slopes with chasmophytic vegetation
4030	European dry heaths
6210*	Semi-natural dry grasslands and scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> ) (* important orchid sites)
6230*	Species-rich <i>Nardus</i> grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)
6410	<i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils ( <i>Molinion caeruleae</i> )
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
7140	Transition mires and quaking bogs
7230	Alkaline fens
5130	<i>Juniperus communis</i> formations on heaths or calcareous grasslands
9180	<i>Tilio-Acerion</i> forests of slopes, screes and ravines
91E0*	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> )
91K0	Illyrian <i>Fagus sylvatica</i> forests ( <i>Aremonio-Fagion</i> )
91L0	Illyrian oak-hornbeam forests ( <i>Erythronio-Carpinion</i> )
91R0	Dinaric dolomite Scots pine forests ( <i>Genisto januensis-Pinetum</i> )
9410	<i>Acidophilous Picea</i> forests of the montane to alpine levels ( <i>Vaccinio-Piceetea</i> )
91MO*	Pannonian-Balkan turkey oak-sessile oak forests
8310	Caves and pits closed to the public

groups within NHC level I, out of which two groups pertain to built and cultivated areas (annex 5.4). The remaining 6 habitat groups are represented through 20 natural habitat types of the Park within Natura 2000 ecological network (\*priority) (table 1).

### Forests

Forests are the most prominent ecosystem in the Park area in terms of surface, and one can say that most of the originally fully forested landscape is still conserved in various stages, from underbrush to old-growth forest.

The most frequent species of the forests of Plitvice is beech *Fagus sylvatica*, and the second in terms of frequency is European silver fir *Abies alba*. In

addition to typical representatives of forest communities, forests also include many endangered plant species. The most significant such species are Natura 2000 species for the Park: lady's slipper orchid *Cypripedium calceolus* (figure 14), and moss species *Buxbaumia viridis* and *Dicranum viride*. At the moment, mosses *Buxbaumia viridis* and *Dicranum viride* have been recorded only in the forests of Medvedak in the Park area.

Natura 2000 habitat types in the Park include 7 forest habitat types and *Juniperus communis* formations on heaths or calcareous grasslands (table 1). Significant localities for the conservation of forest biodiversity also include forest clearings and edges along forest paths, where many rare and endangered species are using these areas. The list of forest communities present in the Park area is provided in annex 1.5.

Illyrian *Fagus sylvatica* forests (91K0) growing on almost 95% of the total forest surface (21,748 ha) are the most prominent forests in the Park, and they are present in the form of four communities:

Beech forests with giant dead nettle; Dinaric beech-fir forests with *Omphalodes*; Beech forests with Christmas rose; Beech forests with hop hornbeam.




Lady's slipper orchid is one of the rarest, most endangered and most beautiful European orchids.

It is rare in the forest habitats of the Park, but there are several stable populations that are also the most numerous populations of this species in Croatia.

**Figure 14.** Lady's slipper orchid *Cypripedium calceolus*. Archive of the PLNPII.





Old-growth forest Čorkova uvala is one of the best-conserved beech-fir forests in the area of the Dinaric Alps. On the surface of 84 hectares, ranging from 860 to 1028 meters above sea level, one comes across all old-growth forest development stages, with pronounced aging and decomposition stages. Individual old beech, spruce and fir trees reach impressive dimensions. In its structure and specific elements, Čorkova uvala is a secondary virgin forest, with only occasional human impact, but not present to the extent that would make the old-growth forest lose its original characteristics. As such, this forest was declared a special forest vegetation reserve in 1965. As a natural forest that has developed without human impact, it represents a lesson of sorts in natural perfection, with a fully stable forest ecosystem.

Figure 15. Beech-fir forest in the locality of old-growth forest Čorkova uvala. Archive of the PLNPPi.



The remaining 7 Natura 2000 forest habitat types jointly occupy approximately 5% of the Park surface. The most pronounced among them is type 9410: Acidophilous *Picea* forests of the montane to alpine levels (on 839 hectares or approx. 3.6% of forest area of the Park), represented by the community of Spruce forest with Christmas rose on dolomite (*Helleboro nigri-Piceetum*). The largest range of this community is located in the southwestern part of the Park, but its fragments are also situated elsewhere, such as e.g. in Čorkova uvala, Sartuk, etc. Given the fact that spruce forests grow in the zone of beech-fir forests, fir and beech frequently occur next to spruce, as well as Scots pine in drier and shallower soil.

Dinaric dolomite Scots pine forests (91R0), present on approx. 1% of the total forest surface in the Park (274 hectares), are represented by the community of Scots pine forest with Christmas rose (*Helleboro nigri-Pinetum sylvestris*), Ht. 1958. Their natural growth takes place mostly in the southwestern part of the Park, in shallow rendzic soil on dolomite. Since they appear in beech and fir forest zone, there are frequent field examples of beech and fir growing in more favorable habitats (valleys, depressions) instead of pine, while pine reappears on abandoned agricultural land. Pine forests have developed along the edges of agricultural plots in sunny expositions, where Scots pine is exposed to fire threat as a species with abundant combustible material (resin, needles, cones).

Alluvial forests (91E0\*), present on only 67 hectares, which is less than 0.5% of the total forest surface, are represented with two communities: Grey willow underbrush (*Salicetum cinereae*) and Black alder formations (*Alnetum glutinosae*). Both communities directly depend on the quantity of water in their habitats, and they mostly appear along watercourses, in valleys and on fields where water is retained for a longer period of time following snow melt or heavy rains. Black alder formations decisively depend on water level in the lakes, especially in areas where streams enter the lakes, where stands of these communities are fully or partially submerged in early spring and autumn periods.

Illyrian oak-hornbeam forests (91L0) are present on a small surface of merely 6 hectares (less than 0.1% of the total forest surface of the Park), and represented by the community of Oak-hornbeam

forest with barrenwort and *Carex pilosa* (As. *Epimedio-Carpinetum betuli caricetosum pilosae* (Horvat 1938, Borhidi 1963). These are mostly degraded hornbeam formations without durmast oak. The area of this community has degraded due to human impact (logging, etc.), and it is situated along the edges of neglected agricultural land.

*Tilio-Acerion* forests of slopes, screes and ravines (9180\*) are present in the Park in point localities with very small surfaces (exact surface is not known); they are represented by the community of Sycamore maple and common ash forest (*Aceri-Fraxinetum* s.l.). These forests appear on rocky peaks and ridges, typically in areas where forest fires destroyed previous beech and fir forests. Since this habitat is situated within the beech-fir forest zone, on very small surfaces, there is a realistic danger that this community might disappear due to natural processes, and its conservation requires active management measures and continuous status monitoring.

Pannonian-Balkan turkey oak-sessile oak forests (*Lathyro nigri-Quercetum petraeae*; 91M0\*) is present in the National Park on southern steep slopes of Lisina hill, with the surface of 14 hectares and average slope exceeding 25 degrees. Microclimatic habitat conditions providing strong impetus to thermophilous vegetation are particularly pronounced. The floral composition of this community is very similar to the explored durmast oak and hornbeam forests, but it differs from them due to the presence of xero-thermophilous species from the sub-Mediterranean area of Croatia.

*Juniperus communis* formations on heaths or calcareous grasslands (5130) in the Park have developed on calcareous grasslands where grazing stopped. Since these grasslands are situated in various zones and constitute various communities, ranging from sub-Mediterranean to mountainous continental, these habitats are connected only by the species *Juniperus communis*. They represent a succession stage on heaths and gradually overgrowing abandoned grasslands. Surface of this habitat type in the Park amounts to 98 hectares. Given the fact that this is a transition stage prior to the establishment of a permanent forest community, the surface of this habitat type has not been added to the total forest surface in the Park.



Figure 16. *Juniperus communis* formations. Archive of the PLNPPi.

### Aquatic habitats

Aquatic habitats in the Park can generally be divided into three basic types: lakes, watercourses and tufa barriers, and they all represent Natura 2000 habitat types of the Park (table 1). In addition to these habitats as such, their boundary areas are also extraordinarily important for biodiversity conservation, as well as semi-natural habitats abundant in water, such as wetland localities,<sup>12</sup> ponds and wells.

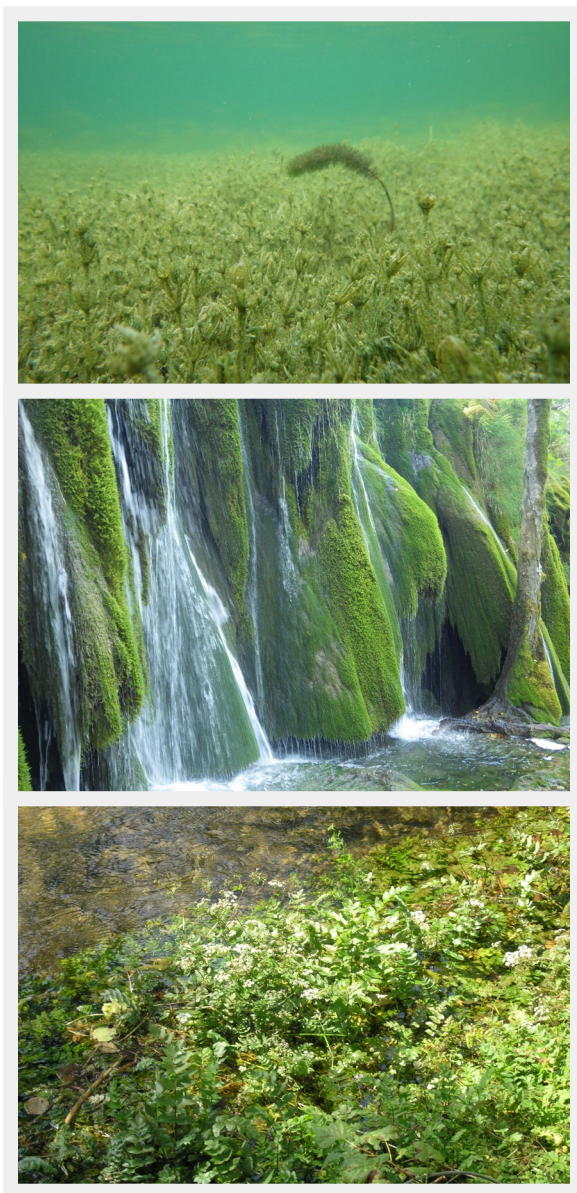
As is clear from the name of the habitat type 3140, lake bottom of the lakes of Plitvice is covered by benthic vegetation of chara formations (figure 17), which are indicators of low concentration of nutrients. Phytoplankton content of Lake Kozjak is dominated by diatoms, while their share in Prošćansko Lake is lower, with golden algae dominating there for the most part. It is interesting to note that the only site of golden alga *Hydrurus foetidus* in Croatia so far has been discovered in Bijela rijeka. When it

comes to the area of cascades and waterfalls, 104 taxa of diatoms and 72 taxa of other, non-*Diatomeae* alga groups have been discovered. Algae are also important from the point of view of monitoring of the tufa cascade formation process (habitat type 32A0), where some algae are actively involved, such as cyanobacteria of the species *Phormidium incrustatum*, green algae of the species *Oocardium stratum*, and yellow-green algae *Vaucheria geminata*.

Until the early 1960s, there were 34 moss species recorded in the area of lakes and cascades. More recent research, initiated in 2016, has confirmed characteristic species of tufa-forming mosses in one segment of tufa barriers of the Upper Lakes. Watercourses with vegetation of *Ranunculus fluitantis* and *Callitriche-Batrachion* (type 3260) frequently include creeping marshwort *Apium repens* as Natura 2000 species growing in wet and aquatic habitats such as wet meadows, ditches, shallow ponds and river channels (figure 17).

<sup>12</sup> E.g. shore of Liman draga; branches of Prošćansko Lake; branches of Bijela rijeka; reservoirs of Bijela rijeka; localities along the Matica; etc.





**Figure 17.** Chara formations (upper photograph, by Igor Stanković); tufa barriers with *Palustriella commutata* mosses (middle photograph, by Antun Alegro); creeping marshwort *Apium repens* (down). Archive of the PLNPPi.

### **Unvegetated and sparsely vegetated inland surfaces**

These areas are either unvegetated or sparsely vegetated with vascular vegetation, outside of the zone of permanent water impact (with dry phase or permanently dry), and conditioned by the structure and wear of the geological base, fires or surface erosion. This category does not include unvegetated surfaces under the influence of water level oscillations and erosion impact of standing and running waters. The only Natura 2000 habitat of

this type in the Park area is type 8210 Calcareous rocky slopes with chasmophytic vegetation. Vegetation of cracks in carbonate rocks of the Mediterranean and continental area from lowlands to mountains belongs to orders *Potentilletalia caulescentis* and *Centaureo-Campanuletales* (= *Asplenietalia glandulosi* p.p.). Such a wide definition of rock habitat brings together all hasmophytic communities in Croatia. NHC community B.1.3.2.2. Mossy sandwort and white fumewort association (As. *Moehringio-Corydaletum ochroleucae* Ht. 1962) has been recorded in the Park area.

It can be found on rocks within beech forests surrounding the Lower Lakes, and within other communities present in this locality; in the area of Medvedak, as well as in a wider Park area. This is the only scree association recorded in the Park area so far.

### **Grasslands, fens and bogs and tall herb communities**

Grasslands are semi-natural habitats. Due to the need for space that would enable livestock grazing and cultivation of food, communities in this area have been intervening in their natural surroundings for a long time, creating new habitats and conditions for better biodiversity. As a result of mowing, grazing and treading of livestock, overgrowth of grasslands due to woody species was prevented.

Grasslands (meadows and pastures) have a particularly high importance for Park biodiversity, primarily as regards plant taxa (as many as 70% of them), including some endemic species such as squill *Chouardia litardierei* and many animal species (see chapter 2.2.7.). With more and more pronounced decrease of population and traditional land use in settlements, the survival of grassland areas is increasingly questionable, which endangers Park biodiversity.

Diverse types of grasslands have developed in the Park area, ranging from permanently wet to dry grasslands. Natura 2000 habitats in the Park include 7 habitat types connected with grasslands, fens, bogs and tall herbs (table 1).

DRY GRASSLANDS predominantly consist of perennial herbaceous plants, where core biomass is created by grasses (Poaceae) and, to a lesser extent, sedges (*Carex*), with a range of dicotyledonous plants with some subshrubs. As a rule, communities fully cover the soil (grasslands) or develop on rocky soil, so plants only partially cover the entire

surface (rocky areas). Natura 2000 habitats in the Park include three habitat types of dry grasslands (figure 18).

6210\* Dry continental grasslands (*Festuco-Brometalia*) (important orchid sites) are dry to semi-dry calcareous grasslands strongly exposed to overgrowth. In the Park area, this habitat type is represented mostly by the community Meadows of brome grass and hoary plantain (*As. Bromo-Plantaginietum mediae* Ht.1931). This community reaches its eastern boundary at Mala Kapela, and it is distributed along the edges of fields and on forest clearings, in combination with other grassland types. Kalnik moor grass association (*As. Seslerietum kalnikensis* Ht. 1942) has partially developed on dolomite slopes along the lakes, mostly on small surfaces on the edges of forest formations, or within forests where the structure of forest vegetation is not complete. Rare and endangered species garland flower *Daphne cneorum* can be found within these grasslands, and it is sporadically present on only two localities in the Park area.

4030 European dry heaths (*As. Genisto sagittalis-Callunetum* Ht. 1931) (association *Calluno-Festucion capillatae* Ht. 1959.) are present on substantial surfaces in the Park, on relatively dry and acidic soil, mostly in Brezovačko polje and partially in Homoljačko polje, as well as on small surfaces in the area of Karleušine plase. They appear together with 6230\* Species-rich *Nardus* grasslands. The most important species building dry heaths is common heather *Calluna vulgaris* ("vrišt" in Croatian, resulting in heaths' folk name "vrištine"). Common heather is a Western-European (Atlantic) species, and its final eastern distribution boundary in Croatia is the region of Lika.

6230\* Species-rich *Nardus* grasslands are closed dry to mesophilous grasslands with *Nardus stricta* and other perennial acidophilous plants growing on acidic soils. Only species-rich *Nardus* grasslands have been included into the Natura 2000 habitat type. In the Park, this habitat type is present in the form of community of Purple moor grass and hawksbeard grassland (*As. Crepidi conyzae-foliae-Molinietum altissimae* Šegulja 1992), which has been recorded in Homoljačko polje and Brezovačko polje in recent times. It appears together with 4030 European dry heaths.

WET AND MODERATELY WET GRASSLANDS depend on substantial level of groundwater and quantity of nutrients. Given the level of groundwater, such grasslands are between wetland high sedge communities on the one hand, and mountain grasslands



Figure 18. *As. Bromo-Plantaginietum mediae* Ht.1931 (up), *As. Genisto sagittalis-Callunetum* Ht. 1931 (center) and *As. Crepidi conyzae-foliae-Molinietum altissimae* Šegulja 1992 (down). Archive of the PLNPPI.

on the other. Plant communities are very rich in terms of their flora composition, and they include more than 500 species in total. As spontaneously developed permanent anthropogenic stages, wet and moderately wet grasslands are maintained by regular mowing. In the Park, they are present within the Natura 2000 habitat type 6410 Purple moor grass fields (*Molinion caeruleae*). This habitat type is represented by the community Purple moor grass and Pannonian sweet pea (*As. Molinio-Lathyretum pannonici* H-ić. 1963), which appears together with



moderately wet meadows and lowland hay meadows, and with peat and wetland vegetation along watercourses. Its floral composition is very rich as a result of diversity of habitat conditions, such as varying humidity in the course of the year.

TALL HERB communities frequently represent a transition area (ecotone) between grassland and forest vegetation in direct contact, and they appear

independently on larger areas as a succession stage during the overgrowth of grasslands into forests. In the Park area, these communities appear in the form of habitat type 6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (*Convolvulion sepium*, *Filipendulion*, *Senecion fluviatilis*).

This habitat encompasses wet and nitrophilous



Within grasslands of purple moor grass, in the southeastern part of the Park, next to streams between scrub of willow, alder and poplar, one encounters Siberian rayflower *Ligularia sibirica* (figure 19): the Park is its only site in Croatia, but also in the territory of southeastern Europe, and its southernmost range. Siberian rayflower is critically endangered species at the global level, and it is a Natura 2000 species of the Park.

**Figure 19.** Siberian rayflower *Ligularia sibirica*. Archive of the PLNPPI.





**Figure 20.** Hay meadows of purple moor grass and Pannonian sweet pea (As. *Molinio-Lathyretum pannonic*). Archive of the PLNPI.



**Figure 21.** Tall herbs with meadowsweet *Filipendula ulmaria*. Archive of the PLNPI.

communities that develop along river courses and forest edges. In the Park area, one encounters the community of Tall herbs with meadowsweet *Filipendula ulmaria* and Shady butterbur communities (association *Petasition officinalis*), dominated

by three butterbur species *Petasites hybridus*, *Petasites kablikianus* and *P. albus*, with occasional presence of great horsetail *Equisetum telmateia*, cabbage thistle *Cirsium oleraceum*, etc.



FEN AND BOG HABITATS AND THEIR VEGETATION in the area of Croatia and in the Park are a result (relic) of the glacial period. Croatia is the southern boundary of distribution of this habitat type characteristic for central and northern areas of Europe. These habitats are present on small surfaces, typically smaller than one hectare, and they strongly depend on microclimatic conditions. Highly specialized plant species, rare and endangered today, depend on this habitat type, such as peat mosses of the genus *Sphagnum*; carnivorous plants round-leave sundew *Drosera rotundifolia*, common butterwort *Pinguicula vulgaris* (CR) and lesser bladderwort *Utricularia minor*; other interesting plant species: *Tofieldia calyculata* (CR), marsh arrow-grass *Triglochin palustris* (CR), sedge species *Carex bohemica* (CR), star sedge *Carex echinata* (EN), etc.

Alkaline fens (7230) are wet habitats predominantly covered by low sedge, and frequently by tufa-forming brown mosses. Habitat soil is saturated with water, predominantly seeping from surrounding terrain, typically above impermeable dolomite layer. Calciphilous small sedge or other species from the family of *Cyperaceae* prevail in the habitat, and the community belongs to the association *Caricion davallianae*.

This type of habitat is represented in the Park area with several communities that have developed on small surfaces in depressions and furrows together with wet grasslands *Molinio-Lathyretum pannonicum* and wetland vegetation, directly along streams.

- As. *Caricetum davallianae* association
- Dinaric alkaline peat fen with cotton grass (*Eriophoro-Caricetum paniceae*)
- Alkaline fens with purple bromegrass and tawny sedge (*Molinio caeruleae* – *Caricetum hostianae*)

Within this habitat, there are locally developed stands of buckbean (*Menyanthes trifoliata*) and spikesedge *Eleocharis quinqueflora*, as well as stands of the species *Pinguicula vulgaris*-*Tofieldia calyculata* and slender sedge associations (*Caricetum lasiocarpae*).

Transition mires and quaking bogs (7140) develop on acidic soil (acidophilous bogs); just like in case of basophilous fens, water is present either on the surface or near it. Peat-forming communities develop in water ranging from oligotrophic to mesotrophic, and they include several communities of medium-sized to small sedges in association with



**Figure 22.** Transition bog with: **a)** common cottongrass *Eriophorum angustifolium* and **b)** round-leave sundew *Drosera rotundifolia* (up and center); *Pinguicula vulgaris* (down). Archive of the PLNPII.

various peat mosses (*Sphagnum*) or brown mosses. Rare community of star sedge and round-leave sundew (*Drosera* – *Caricetum stellulatae*) has developed in thick peat layer and layer of mosses of the genus *Sphagnum*, on three very small plots ranging from 50 to 150 m<sup>2</sup>.



### Subterranean habitats

Various surface and subterranean karst forms also represent important habitats (see chapter 2.2.2.), and caves and pits are particularly pronounced among them, as a target habitat type of the Park (8310). Biodiversity of these habitats is primarily reflected in the presence of many endangered, rare and endemic fauna species (chapter 2.2.7).

### 2.2.6 Fungi and lichens

In addition to plant and animal species, the area of the Park also abounds in fungus species. Research conducted so far has encompassed fungi of the divisions *Basidiomycota* and *Ascomycota*. More than 800 species have been recorded, which is only a small part of the total fungus biodiversity that requires further research. Lichen biodiversity has not been explored in the Park so far, but one can assume that it is substantial.

According to all indicators stemming from research, old-growth forest Čorkova uvala is the most valuable locality for fungus biodiversity conservation

There are more than 800 fungus species recorded in the Park area so far, and they represent merely a small part of the total fungus biodiversity that requires further research.

out of six explored localities in the Park area. Out of the total number of recorded endangered species (77), there are 37 species recorded only in the old-growth forest, out of which 11 critically endangered species (CR), 18 endangered species (EN), seven vulnerable species (VU), and one species in data-deficient (DD) status.

The true reason underlying the value of present fungus species is a combination of trees that constitute the present forest formation: beech, fir and spruce. All three plant species are excellent partners to many mycorrhizal fungi, and a superb substrate for life of numerous saprotrophic fungi. Another reason behind the extraordinary value of this habitat, and a particularly important one,

is the old-growth forest type of forest formation that has developed in this locality due to strict conservation and absence of human activity (with the exception of research activity) over a long period of time.

Forest formations of the Park are the only Croatian finding site of many endangered fungus species (more than 60 species).



Figure 23. Critically endangered species *Pachyella pseudosuccosa* (Photo: Armin Mešić)





**Figure 24.** Brown bear *Ursus arctos* (up left); wolf *Canis lupus* (up right); lynx *Lynx lynx* (down left). Archive of the PLNPI. Otter *Lutra lutra* in Gradinsko Lake (down right; Photo: Biom Association).

### 2.2.7 Fauna

Animal life in the Park is extraordinarily diverse and abundant, with many very rare and endangered species in all fauna groups, which points to a major importance of the Park for biodiversity conservation.

In the continuation of this document, the concept of significant species pertains to target species, priority species, strictly protected species and indicator species.

As regards fauna research, many gaps still exist. Vertebrates are relatively well researched with over 250 recorded species, with the exception of small mammals (one exception in this context are the bats). Invertebrate fauna is poorly researched, even though much more numerous, and most

available data pertains to groups of high (decapod) crustaceans, aquatic insects, butterflies, moths and beetles, while there is almost no research concerning other groups.

#### **Mammals**

In the Park area, research conducted so far has resulted in more than 50 recorded mammal species, out of which 11 wild species. The list of wild and strictly protected mammal species is provided in annex 5.6. Three large carnivores live in forests: bear (*Ursus arctos*), wolf (*Canis lupus*) and lynx (*Lynx lynx*). Watercourses, lakes and shores are ideal habitats for the largest Mustelidae species in the order of carnivores: otter *Lutra lutra* (figure 24).

The list of Natura 2000 mammal species also



includes seven bat species (Barbastelle bat *Barbastella barbastellus*, large bent-wing bat *Miniopterus schreibersi*, long-fingered bat *Myotis capaccinii*, greater mouse-eared bat *Myotis myotis*, Mediterranean horseshoe bat *Rhinolophus euryale*, greater horseshoe bat *Rhinolophus ferrumequinum* and Bechstein's bat *Myotis bechsteinii*), out of the total of 22 bat species recorded in the Park (annex 5.6). All these species prefer conserved, calm and hidden habitats that ensure sufficient availability of prey, shelter for daily and winter rest, and – in particular – shelter for nursing, which they can clearly find in the Park area.

## Birds

Ornithofauna of the Park is extraordinarily rich and diverse, with 168 species recorded so far, including 21 wild bird species of the Park (annex 5.2).

Similarly as in the case of mammals, forest habitats play a major role in bird conservation. Particularly prominent groups of birds predominantly connected with forests include woodpeckers, owls, birds of prey and tits, also serving as indicators of the level of conservation and quality of forest habitats. Out of 9 owl species recorded in the Park area, 8 species are nesting in the area. Populations of the following Natura 2000 wild birds are particularly significant: Ural owl *Strix uralensis*, Eurasian pygmy owl *Glaucidium passerinum* and boreal owl *Aegolius funereus*. Ural owl population in the Park area constitutes 10% of the total population of this species in Croatia; population of Eurasian pygmy owl approx. 8%; population of boreal owl approx. 5%. Ural owl is the most numerous owl species in the Park, with the population estimated at 70 to 80 pairs. Eurasian pygmy owl is the nesting tenant of the Park, in relatively small numbers, and its population is assessed at 8 to 12 pairs. This population is primarily associated with spruce stands and mixed forests with higher share of spruce. Eurasian pygmy owls prefer parts of forests with forest glades, meadows and similar open habitats where they enjoy hunting. Boreal owl inhabits only the area of beech-fir forests, and its population in the Park is estimated at 20 to 30 pairs.

Density of Ural owl population (5.4 pairs/10 km<sup>2</sup>) in beech and fir forests in the northwestern area of the Park is the highest recorded density of this species in Croatia, and among the highest in Europe, which points to extraordinary level of conservation and quality of forest habitats.

Piciformes species in the Park are represented with 9 species, including four wild species of the Park: white-backed woodpecker (*Dendrocopos leucotos*), three-toed woodpecker (*Picoides tridactylus*), black woodpecker (*Dryocopus martius*) and grey-headed woodpecker (*Picus canus*). Specific characteristic of white-backed woodpecker habitat is large share of dried and old trees, and many felled trees. Three-toed woodpecker is present in the area of beech-fir and spruce forests in the Park. This species is an indicator of conserved old forest stands. It feeds on bark beetles, and its numbers can fluctuate substantially, depending on seasonal variations of conditions in the environment, such as bark beetle infestations. Woodpecker monitoring has been ongoing continuously since 2015.

Wild bird of prey species European honey buzzard (*Pernis apivorus*) is nesting in the Park, in very low numbers (1 to 2 pairs). The entire Park area is a potentially significant area for this rare and endangered species. It prefers forest areas with tall trees and open areas near them, where it can hunt up to 10 kilometers away from its nest.

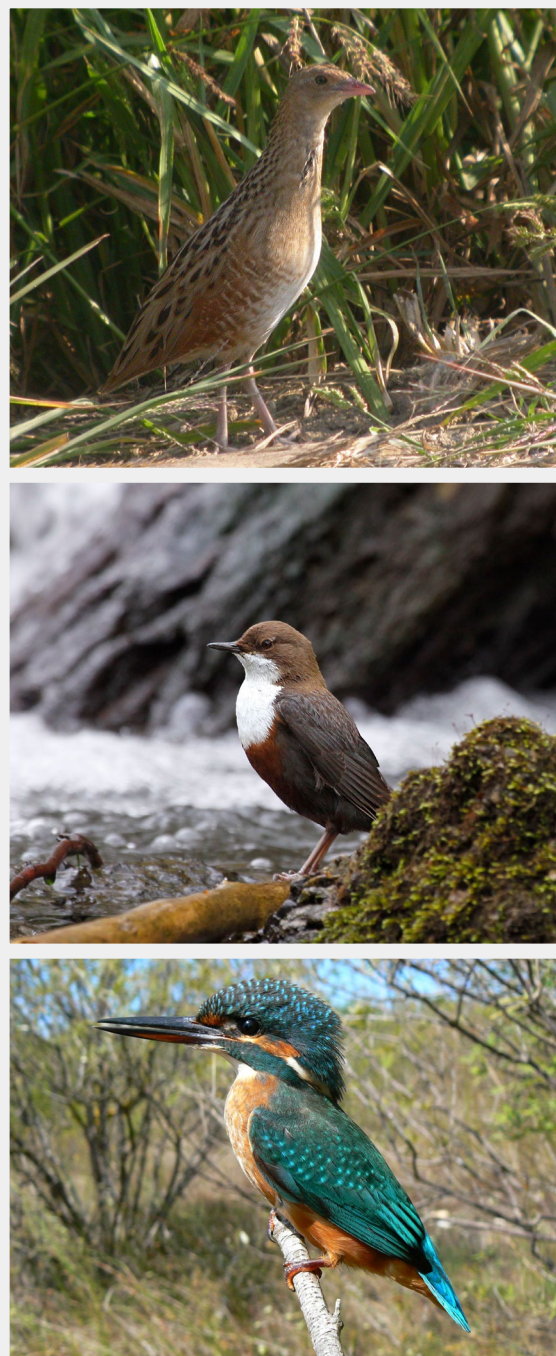
Forest glades and shrub-like forest edges are important habitats for the wild species hazel grouse *Bonasa bonasia*.

Natura 2000 songbird species in the Park are collared flycatcher *Ficedula albicollis* and red-breasted flycatcher *Ficedula parva*. Collared flycatcher returns from Africa at the time when most other cavity-nesting birds are already nesting and occupying available cavities. As a result, it is very attached to old forest stands with a sufficient number of old and mature trees with holes where it can prepare its nest, typically high above ground. In the Park, it is frequently present in the beech forest zone. Red-breasted flycatcher is rare in the Park, and it lives in the beech forest zone. It prefers open areas of the forest and the vicinity of water.

White-throated dipper *Cinclus cinclus* is particularly interesting as indicator species for water purity and for the quality of aquatic habitats. It can be frequently noticed or heard along lakes and streams. There are no available assessments as



**Figure 25.** Ural owl *Strix uralensis* (up; Photo: Dario Štefančič); black woodpecker *Dryocopus martius* (center; Photo: Boris Ende); white-backed woodpecker *Dendrocopos leucotos* (down; Photo: Davor Krnjeta)



**Figure 26.** Corn crane *Crex crex* (up; Photo: Davor Krnjeta); white-throated dipper *Cinclus cinclus* (center; Photo: Davor Krnjeta); common kingfisher *Alcedo atthis* (down; Photo: Ivica Lolić)



to the size of its population. Grey wagtail *Motacilla cinerea* is also connected with the high quality of water. Common kingfisher *Alcedo atthis* is a Natura 2000 species associated with aquatic habitats. It is rare in the Park area.

Rocky habitats of the Lower Lakes and the Korana canyon are habitats and nesting areas of wild species peregrine falcon *Falco peregrinus* and Eurasian eagle-owl *Bubo bubo*. These habitats are also home to a common raven *Corvus corax*.

Park grasslands are important for three wild species of nesting birds: Montagu's harrier *Circus pygargus*, short-eared owl *Asio flammeus* and corn crane *Crex crex*. Corn crane population in the Park has been estimated at 40 to 60 singing males. Particularly significant habitats for this species are situated in the southern part of the Park (Homoljačko polje and Brezovačko polje). These areas are also home to a sizeable population of nesting bird species Eurasian skylark (*Alauda arvensis*). Agricultural habitats, especially in Brezovačko polje and Homoljačko polje, have been well conserved so far. Even though the current habitat status is favorable, beginnings of succession have been recorded, especially in pastures, as a result of abandonment of agriculture and traditional livestock farming.

Progressive succession of grasslands and agricultural areas constitutes a major threat for species exclusively associated with these habitats. As regards woodlark *Lullula arborea* and barred warbler *Sylvia nisoria* as wild bird species, the current succession stage is favorable since these species prefer mosaic areas where they can encounter open habitats and overgrowth, but it is not favorable for other species. Wild species lesser grey shrike *Lanius minor* uses open habitats with scattered trees and bushes, typically meadows and uncultivated land, but also cultivated land. The numbers of lesser grey shrike in the Park are low. Red-backed shrike *Lanius collurio*, also a Natura 2000 species of the Park, uses habitats such as forest edges, bushes, hedges and open areas with scattered tall bushes. Habitat diversity is important for this species, especially in cultivated areas where it requires uncultivated plots, as well as bushes and hedges. It is relatively frequent in the Park.

### **Amphibians and reptiles**

Grasslands and adjacent transition areas (especially humid and wet) are habitats of many amphibian and reptile species living in the Park area. Some recorded species predominantly use aquatic habitats of these areas during the reproduction period,



**Figure 27.** Horned viper *Vipera ammodytes*. Archive of the PLNPI.

Out of 13 reptile species present in the Park, as many as 10 species are strictly protected.

Dry habitats in the Park (rocky slopes, meadows with bushes, rocky terrain) are also inhabited by two out of three venomous snakes of Croatia: horned viper and common European adder.

while other species inhabit them permanently.

Research on amphibians and reptiles in the Park area has resulted in 14 recorded amphibian species and 13 reptile species. List of strictly protected amphibian species is provided in annex 5.7, and list of reptile species in annex 5.8.

The Park is habitat of Italian crested newt *Triturus carnifex*, a strictly protected and rare native species. Unfortunately, presence of allochthonous amphibian species, frog *Pelophylax kurtmulleri*, originating from Albania and Greece and hybrid *Pelophylax kurtmulleri* x *Pelophylax ridibundus* has also been recorded in the Park

As for lizards, it is worth mentioning the presence of strictly protected and rare viviparous lizard species *Zootoca vivipara*. Snakes are present with six species. Along shallow sections of streams, rivers

and lakes, and along shores and banks covered in vegetation, one frequently encounters dice snake *Natrix tessellata*. Dry habitats (rocky slopes, meadows with bushes, rocky terrain) are also inhabited by two out of three venomous snakes of Croatia: horned viper *Vipera ammodytes* and common European adder *Vipera berus*.

## Fish

Waters of Plitvice Lakes belong to trout water type.

Research conducted so far has determined 9 fish species, four of them autochthonous: brown trout *Salmo trutta*, common minnow *Phoxinus phoxinus* and two Natura 2000 species determined by recent research – Italian loach *Sabanejewia larvata* and *Cobitis bilienata*.

As for allochthonous species, the following species have been recorded: rainbow trout *Oncorhynchus mykiss*, brook trout *Salvelinus fontinalis*, chub *Squalius cephalus*, common rudd *Scardinius erythrophthalmus* and northern pike *Esox lucius*. Some allochthonous species have been introduced as a result of fish stocking (rainbow trout in 1935 and brook trout in 1963), or as live bait (chub and common rudd). Fishing was permitted in the lakes of Plitvice until the 1990s. Domination of chub and common rudd has been noted over the past 20 to 30 years. In recent times, pike has been noted in the waters of Plitvice (in 2005), and it has spread to all lakes.



Figure 28. Brown trout *Salmo trutta*. Photo: Aljoša Duplić.





Figure 29. Stone crayfish *Austropotamobius torrentium*. Archive of the PLNPII.

### **Molluscs – snails, bivalves**

Molluscs in the Park have not been inventoried nor systematically researched. Systematic research concerning snails and bivalves is yet to be performed, in order to determine the numbers and diversity of species.

### **Crustaceans**

Aquatic habitats in the Park are an important habitat for two vulnerable (VU) and strictly protected species of ten-footed crustaceans (decapods): stone crayfish *Austropotamobius torrentium* and noble crayfish *Astacus astacus*. Stone crayfish is also a Natura 2000 and priority species of the Park.

### **Insects**

Among insects, the group of butterflies and moths (Lepidoptera) deserves particular attention. Research performed in the Park area so far has determined approximately 90 species of butterflies,

but the realistic numbers are certainly higher due to the fact that meadows and boundary forest habitats have not been sufficiently explored, and butterflies dominate in such habitats. In addition, approximately 350 species of moths have been recorded, which doesn't represent the final number of moth fauna.

Out of recorded butterflies, 3 interesting endangered and strictly protected taxa from the family of Lycaenidae stand out in particular: alcon large blue *Phengaris alcon alcon*, large blue *Phengaris arion* and mountain alcon blue *Phengaris alcon rebeli*.

Alcon large blue is a critically endangered (CR) butterfly species, and its population in the Park, in the area of Rudanovac (Rudanovačke bare), is the densest population of this species in Croatia; this area is among rare and best-conserved Croatian areas.

Marsh fritillary *Euphydryas aurinia* and Jersey tiger *Euplagia quadripunctaria* are Natura 2000 species of the Park (annex 5.3). Značajna je zastupljenost strogo zaštićenih vrsta, such as Old World



**Figure 30.** Alcon large blue *Phengaris alcon alcon*. Archive of the PLNPI.

swallowtail *Papilio machaon*, southern festoon *Zerynthia polyxena* and clouded Apollo *Parnassius mnemosyne* (annex 5.9).

Dragonflies and damselflies (Odonata) are insects associated with aquatic habitats, but also good bioindicators of aquatic ecosystems (figure 31). They also include one Natura 2000 species of the Park: ornate bluet *Coenagrion ornatum*, inhabiting small, shallow streams exposed to sunlight, as well as channels with slow water flow. It is assumed that around 30 species of dragonflies and damselflies appear in the Park area, i.e., one half of such species recorded in Croatia in total. Out of species recorded so far, three endangered species are particularly prominent: brown hawker *Aeshna grandis* (EN), yellow-winged darter *Sympetrum flavolum* (VU) and small emerald spreadwing *Lestes virens* (VU). Brown hawker can most frequently be seen along watercourses in forest areas, and it reproduces in calm waters with abundant shore vegetation (lakes, ponds, separated branches, etc.). Small spreadwing reproduces in bushes or tall grass along the edges of ponds and lakes, while yellow-winged darter prefers shallow ponds that

warm up quickly and abound in vegetation, for example in occasionally flooded meadows of wetland valleys.

In addition to Odonata, aquatic habitats are also home to caddisflies (Trichoptera), with 90 species recorded so far, including one endemic species *Drusus croaticus* and one endemic subspecies *Rhyacophila dorsalis plitvicensis* that was first recorded precisely in the area of the Park.

As regards the group of stoneflies (Plecoptera), there are 42 species recorded in the Park, and almost all of them are listed in the Red List, while *Brachyptera monilicornis* and *Perla pallida* belong to the category of endangered species (EN).

Fauna of Ephemeroidea of Croatia (62 species) is very poorly researched. There are 20 taxa recorded in the Park area so far, including four new taxa for the fauna of Croatia: *Ecdyonurus submontanus*, *Leptophlebia vespertina*, *Paraleptophlebia werneri*, *Caenis horaria*.

Due to their ecological characteristics, ground





Figure 31. Darter *Sympetrum* sp. (left) and Rosalia longicorn *Rosalia alpina* (right). Archive of the PLNPPi.

beetles (Carabidae) also represent an interesting insect group. Given their ecological properties, ground beetles can serve as indicators of habitat quality, but also in determining the consequences of succession processes for biodiversity of a given area. Research performed so far and accidental sightings have resulted in 29 species recorded in the Park area.

Out of seven saproxylic beetle species listed in Annexes II and IV to the EU Habitats Directive and found in Croatia, six species are present in the Park area, and three of them are Natura 2000 species of the Park: hermit beetle *Osmoderma eremita*\* (\*priority species), *Morimus funereus* and Rosalia longicorn *Rosalia alpina* (figure 31). Development cycle of saproxylic beetles depends on dead wood, either as food or as living area. Conserved old-growth forests that grow in the Park area are ideal habitats of these species.

Hymenoptera (ants, bees, wasps and bumblebees) in the Park area have not been sufficiently explored, and further research concerning these species is needed. In general terms, the most recent entomofauna research of a wider spectrum, looking at species and habitats, was performed in 2006, when major abundance and diversity of entomofauna was determined, as well as presence of five new species for fauna of Croatia (Tenthredinidae of suborder Symphyta: *Pontania bella*, *Phyllocolpa leucaspis*, *Ph. Leucosticta*, *Scharliophora nigella* and *Pristiphora laticis*).

### Spiders

Along with many other insect groups, spiders constitute a substantial part of grassland biomass, and

they represent significant predators in grasslands, as well as in other habitat types. Research concerning this group has not been performed for grasslands. However, several interesting spider species have been noted as a result of accidental sightings by the Service for National Park Protection, Maintenance, Conservation, Promotion and Use (crab spider *Misumema vatia*, wasp spider *Argiope bruennichi*, *Araneus quadratus*).

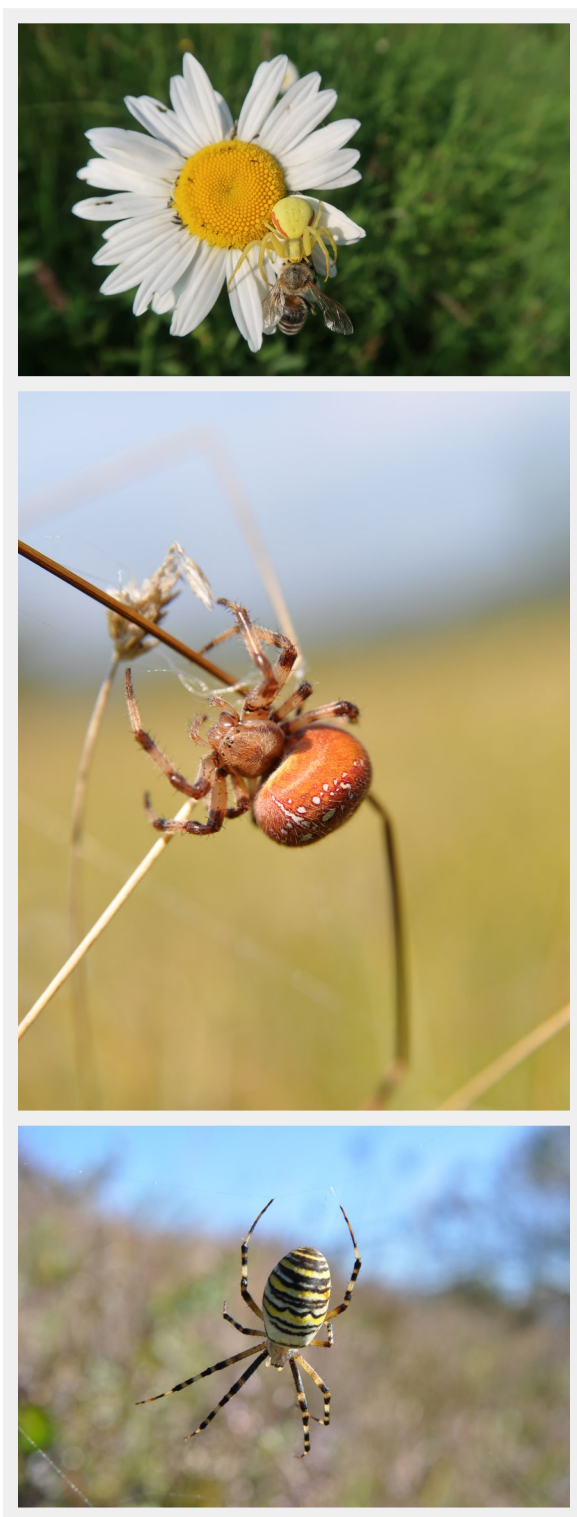
### Cave fauna

Cave fauna of Croatia is an extraordinarily valuable segment of European, but also global cave fauna. Pronounced biodiversity is present, with extremely high number of endemic and relic taxa.

There are many caves and pits in the Park, but they have not been systematically researched so far, resulting in insufficient knowledge concerning cave fauna. Biospeleological data, mostly from literature and partially from collections, exists for 30 sites. More recent biospeleological research was conducted in 2005.

There are 32 subterranean taxa recorded so far. Subterranean fauna is dominated by insects, with beetles as the most numerous group with 11 recorded taxa. They are followed by arachnids, with prominent presence of pseudoscorpions and spiders. However, crustaceans, snails, millipedes and other animal groups are present as well.

Snails include two recorded terrestrial representatives of the genus *Zospeum*: *Z. isselianum* and *Z. amoneum*. Chilopods are represented with several troglophile taxa of the genus *Lithobius* and *Polybothrus*, but there are also several trogliont



**Figure 32.** Crab spider *Misumema vatia* (up); *Araneus quadratus* (center); wasp spider *Agriope bruennichi* (down). Archive of the PLNPII.

species belonging to the genera *Atemsia*, *Haasia*, *Brachydesmus*, etc. Pseudoscorpion individuals (of the genus *Chthonius*) that have been discovered in several localities quite likely represent a new taxon. Troglobiont species of the genera *Roncus* and *Neobisium* have also been recorded, such as, e.g., *N. stygium*. One novelty for the Park are finds of troglobiont spider (Araneae) of the genus *Troglohyphantes*, harvesters (Opiliones) of the genus *Cyphophthalmus* and troglobiont two-pronged bristletails (Diplura) of the genus *Plusiocampa* (*Stygocampa*).

The Park includes type localities for five taxa. Given the fact that the taxa in question have been found only on these localities so far, they can be considered endemic for the Park. Described taxa include small troglobiont beetle *Machaerites udrzali* from the cave Rodića špilje, pseudoscorpion *Neobisium speluncarium* from the cave Šupljara, and a Gammaridae taxon *Niphargus rucneri* from the site Glibovita draga. Beetle *Astagobius angustatus drioli* and millipede *Attemsia likana* from the site Ledenice in Čudina uvala have been described as well.

### 2.2.8 Beauty of natural landscape

Plitvice Lakes were proclaimed the first National Park in Croatia as an “area of exceptional natural beauty.” At the time when the Park was listed as UNESCO World Heritage Site among the first such sites in the world, one of the criteria of outstanding universal value that resulted in its selection referred to the “superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance”.<sup>13</sup>

The most impressive element of this outstanding natural beauty and aesthetic importance, unique in global terms, are natural landscapes of 16 cascading lakes with their unique blue and green color, connected with cascades and waterfalls of various shapes that flow over tufa barriers covered in mosses; all of that within a dense forest complex and a dynamic mountain relief (figure 33).

A more detailed landscape analysis points to the difference between the Upper Lakes and the Lower Lakes. The Upper Lakes are more spacious and more indented, with less steep shores compared to the Lower Lakes that are cut into a narrow canyon with steep slopes and cliffs. The analysis can extend further, to the level of individual lake or cascade. For example, wetland habitat and bog

<sup>13</sup> UNESCO Outstanding Universal Value criterion (vii): “to contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance”.



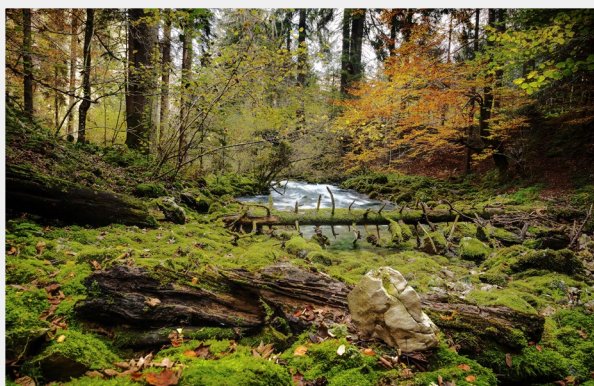


**Figure 33.** Veliki slap (Big Waterfall), Sastavci and the beginning of the Korana River. Photo: Lucija and Rade Jug.









**Figure 34.** Spring of Crna rijeka (left) and hay meadows on deforested land within forest areas (right). Photo: Lucija and Rade Jug.

along the southern shore of Prošćansko Lake is quite different in landscape terms from other lakes in the Upper Lakes series. On the other hand, in the Korana canyon, the most recent process of lake formation in the Park has been creating a number of small and shallow lakes within the river bed, and the canyon itself is narrower and more intensely cut into the terrain compared to the Lower Lakes canyon.

Outside of the lake area as well, the Park abounds in diverse natural landscapes (figure 34). Small rivers and streams that bring water into the lakes flow through forests around the lakes, themselves creating tufa barriers and cascades. As for forest areas, thanks to their diverse geological base, local

geomorphology, geographic position and elevation ranging from 450 m.a.s.l. to 1280 m.a.s.l., they are hiding immense diversity of forest communities that produce diverse land cover and ambiance changing with the seasons. Vivid surface karst forms – monoliths, blocks and pillars, such as those found in the area of Karlovci – also contribute to the diversity of forest landscapes.

Deforested land, as a semi-natural habitat of grasslands resulting from the aim of creating arable land, meadows and grasslands, represents an additional landscape enrichment of the Park, just like spacious grassland areas of karst fields of Homoljačko polje and Brezovačko polje.

## 2.3 Cultural and historical characteristics

### 2.3.1 History of settlement in the area

Abundance of natural resources (water, forest, meadows with fauna and flora connected with them, caves as natural shelters), as well as relief characteristics making the wider area of the Park the simplest traffic connection between the regions of Lika, Kordun plateau and the area of the Una River, are reasons why the Park area has been inhabited since prehistoric times.

Relatively high spatial concentration of prehistoric hillfort localities on elevations around karst fields in the southwestern part of the Park confirms that members of the Illyrian tribe of Iapods recognized the favorable character of this area for livestock farming, as well as its strategic location, as early

as in the 10th century BC, and for over 1000 years that followed. After that, the Romans ruled the area since the 1st century BC, and the Slavs began inhabiting the area in the 7th century.

Many medieval forts, frequently built on sites of ancient Iapodian hillforts, testify to the settlement and significance of the area in medieval times. During the period of the Croatian rulers, the Park area was part of the Krbava county, and the first center of Krbava bishopric established in the 12th century was in Mursinograd, situated on a hill above the nearby town of Korenica. Hillfort Krčingrad, dated to the 13th century, was built on a peninsula between Gradinsko Lake and Lake Kozjak (figure 35).



**Figure 35.** Remains of defense tower and fragment with six-petal flower ornament found during the recent exploration of the Krčingrad site. Archive of the PLNPII.

This period of history ended with the incursion of the Ottoman Empire and the defeat of the Croatian feudal army in the Battle of Krbava (on the nearby Krbava Field) in 1493, following which the population largely took refuge and emigrated, and most settlements and facilities ended up destroyed or temporarily abandoned. Following the retreat of the Ottoman rule from the regions of Lika and Krbava 200 years later, with the Peace of Karlowitz of 1699, a new border was established, partly passing right through the Park area, along the Korana canyon and eastern shore of Lake Kozjak, further on towards Prijeboj, with military roads, guard posts and watchtowers. In 1712, the entire area became part of the established Military Frontier (within the regiments of Otočac and Ogulin),

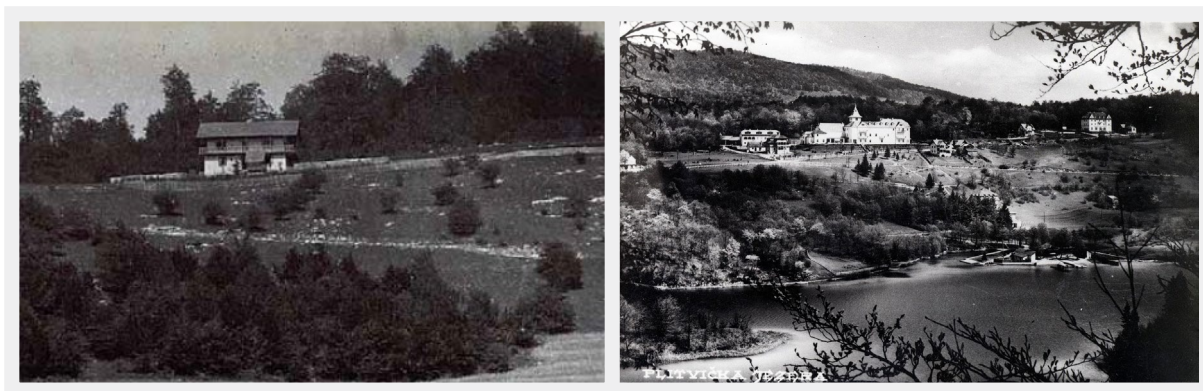
where it remained for more than 150 years, until the demilitarization of the Frontier. On maps from this earliest period, the entire Park area, including the area of Lička Plješivica, was marked as the "Devil's Garden" (*Hortus Diabolus*), which speaks volumes of the reality and perception of the area during these centuries.

More recent population increase and the establishment of current settlements in the Park area took place approximately one hundred years later, after the border moved slightly east, passing across Plješivica to the edge of the Bihać basin, as a result of the Peace of Sistova in 1791. The oldest settlements were built on sites of present-day Plitvica Selo and Končarev Kraj, and other sites of present-day settlements became inhabited as well in the decades that followed.<sup>14</sup> The settlers began clearing forests in the area they inhabited, turning forest areas into meadows and arable land, thus creating the currently dominant cultural landscape in the surroundings of settlements. One reason of settlement in the area was to use the power of water, so water mills, stamper mills for cloth and water-powered sawmills were soon built along main watercourses (along Bijela rijeka, Crna rijeka, Korana; e.g., there was a sawmill at Burget as early as in the beginning of the 19th century, and it is known that sawmills in Plitvički Ljeskovac and Devčićevac were also built at a later stage). Settlers neither knew nor cared about the consequences of their interventions on nature, so forest logging performed during that period caused erosion, and eroded soil became deposited in a number of smaller lakes upstream of Prošćansko Lake, for example, and even in Prošćansko Lake itself in the area where the Matica enters the lake, where a long alluvial sediment was formed. Traffic links in the area began developing more intensely during that time. In the period from 1840 until 1852, a road was built leading from Plitvički Ljeskovac via Mirić Štropina to Prijeboj, followed by the construction of a branch of this road leading to Jezerce and to Velika Poljana, i.e., Lake Kozjak. Towards the end of the 19th century, road from the direction of Drežnik Grad was built, and Plitvice Lakes became connected with Karlovac. Demilitarization of the Military Frontier in 1873 resulted in substantial changes when it comes to the mode of life and new freedom for private initiative.

Starting in 1862, with the construction of a travel

<sup>14</sup> According to the Topography of the Karlovac Military Frontier of 1835, there were approximately 13,350 inhabitants living in the wider area of Plitvice in 1830, with Prijeboj as the most important settlement – a border locality next to the historical communication route towards Bosnia, a place known for blacksmithing craft, and a site of fairs and trade with the Ottoman Empire.





**Figure 36.** Travel lodge Turistička kuća (left) and the first Plitvice hotel (right) at Velika Poljana. Archive of the PLNPPi.

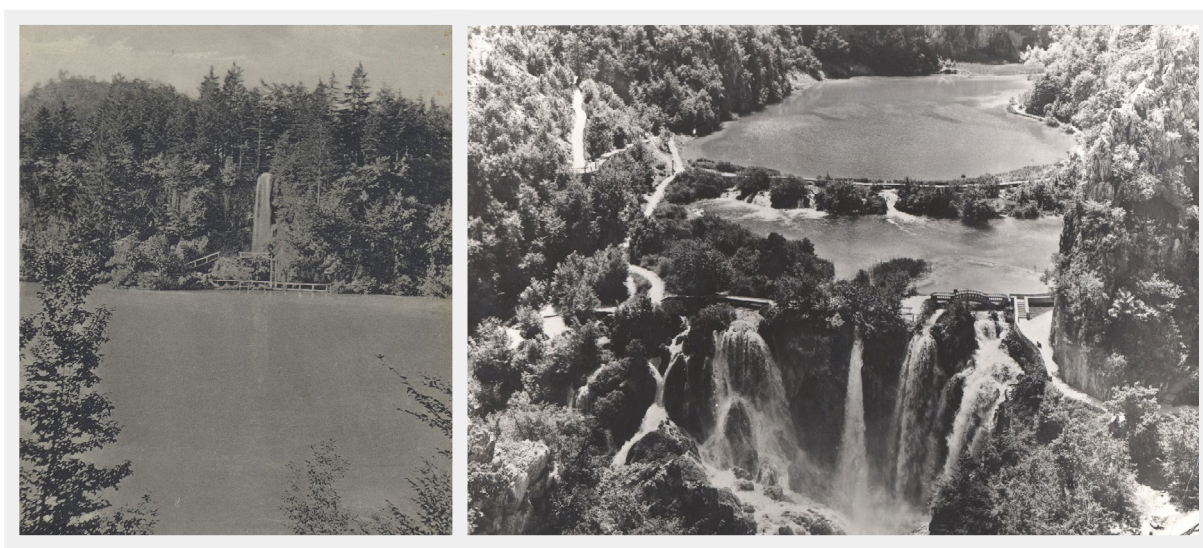
lodge (known as “Carska kuća” or “Turistička kuća”) at Velika Poljana, tourism development in the area began, with construction motivated by the provision of tourism services. Establishment of the *Society for the Beautification of Plitvice Lakes and their Environs* in 1893 gave a genuine impetus to development, since the Society brought together many reputable people in the Croatian public, and stood at the forefront of development processes around the lakes until it disbanded on the eve of World War II. As early as in 1896, three years after its establishment, the Society built the first genuine hotel with 28 rooms at Plitvice Lakes, on the site of Velika Poljana (figure 36); after that, a series of villas and boarding houses were built on this site.

The first trails around Kozjak were prepared in 1888, and trails and boardwalks taking visitors through the lake zone, as well as through the surrounding area towards Medveđak, were built until the beginning of the 20th century, more or less

along the same routes that are currently in use (figure 37).

Additional utility infrastructure was built for the purposes of tourism development. The first water supply system, bringing water from the spring of the Plitvice stream to Plitvice hotel, was built in 1909. A small hydropower plant at Burget, which supplied the hotel with electricity, was built in 1936. Impetus to tourist visitation and development in the Park area, by improving its accessibility, was also provided by the completion of the Lika Railroad in 1924 and the introduction of bus line linking the lakes with the Vrhovine railway station.

In World War II, the Park area again became a site of conflict, with most settlements and facilities destroyed. It was precisely in the area of the Park that part of the first session of the State Anti-fascist Council for the National Liberation of Croatia was held in June 1943, and it was in the Park that



**Figure 37.** Boardwalks at site Labudovac in 1920 (left) and at site Sastavci in 1940 (right). Archive of the PLNPPi.

the "Plitvice Declaration" was adopted.

After the war, the settlements underwent reconstruction. In 1949, the area was officially declared a National Park, and new planned development of HORECA services began in parallel. In the period from the 1950s until the 1970s, present-day hotels Plitvice, Bellevue and Jezero were built at the site of Velika Poljana, as well as the settlement of Plitvice Lakes (Mukinje) as the central accommodation facility for employees. In addition, since the 1970s onwards, the local population became increasingly involved in the provision of tourism services, primarily rental of accommodation<sup>15</sup>. The problem of transit traffic was mitigated after traffic along the road passing over the Kozjak barrier and along the very lake shore to Plitvički Ljeskovac was rerouted to the current D429 and D52 roads in the mid-1970s. The need for utility infrastructure was also resolved, albeit partially and temporarily,<sup>16</sup> in the 1970s, with the construction of water supply with water intake structure at Lake Kozjak, and with the construction of sewage system with discharge in Rastovača.

The Homeland War period, which started with the tragic death of the first victim of this war precisely in Plitvice Lakes in March 1991, and ended with liberation operations in August 1995, was a time of suffering, refugees and destruction, including in the Park area.

After the war, a period of reconstruction followed. In the first ten years or so following the war, the number of visitors returned to pre-war levels and then continued to grow. This growth also represented an impetus for further construction in settlements, almost exclusively for the provision of accommodation services. Continuous growth has intensified substantially since 2014,<sup>17</sup> with increasing share of investments that do not originate from the local community.

### 2.3.2 Tangible cultural heritage

In the Park area and along its boundary areas,<sup>18</sup> there are approximately twenty archaeological sites, primarily prehistoric and medieval hillfort settlements on elevations, as well as caves and fortification architecture with several castles (burgs). With its position in the core lake zone, Krčingrad hillfort is particularly worthy of note, situated on the peninsula between Gradinsko Lake and Lake Kozjak (figure 35). This extraordinarily interesting locality has not been sufficiently explored yet, but it is already an archaeological site with proven value. Only the defense tower has been researched so far, with its rare shape of equilateral triangle (external side length amounts to 16 meters); it is assumed that the tower is merely one part of an old town that was situated on site, with its external defense walls approximately 285 meters in length. According to assumptions, the tower – which remained preserved only at ground floor level – originally had at least four levels, i.e., the height that would allow for observation of the surrounding lakes and paths. It probably stems from the 13th century, and it belonged to the noble family of Babonić. However, there was also a hypothesis in expert circles that this site once housed a monastery of the Paulists.<sup>19</sup> Again according to assumptions, the medieval hillfort might be merely the final "layer of history" in the continuity of settlement on this site – continuity that probably ranges back to prehistoric times given the exquisite location of the site.

Within Park boundaries, there are also several valuable sites of modern architecture. The following modern facilities are worth mentioning, both of them at the site of Velika Poljana: Kozjak Restaurant, built in 1949 and considered an architectural masterpiece, and Plitvice Hotel, built in 1958 as the first top-category hotel built in Croatia after World War II, based on the design of a renowned

<sup>15</sup> In the period from 1975 until 1981, accommodation capacity in the Park grew from 2850 to 5282 beds, which constitutes growth of 85 % in six years.

<sup>16</sup> However, even almost 50 years later, these temporary and partial solutions for road bypasses and municipal infrastructure have not been replaced by solutions that would ensure that settlements in the Park area do not endanger the outstanding universal value of the World Heritage Site by extracting and polluting lake system waters.

<sup>17</sup> In the past couple of years, the volume of bed capacity built for tourism purposes and registered for tourism activity each year in the four local self-government units in the territory of which the Park is located, but also partially within the Park itself, broadly corresponds to the total capacity of three hotels managed by the Public Institution.

<sup>18</sup> Areas of Donji Babin Potok and Gornji Babin Potok, Homoljac, Plitvica Selo and Rastovača.

<sup>19</sup> Given the Plitvice legend about the Black Queen, and the fact that the Paulists traditionally venerate the Black Madonna, it is easily possible that some historical truth may have been recorded in both folk traditions and the mythology of the area. A renowned Croatian historian, professor Vjekoslav Klaić, wrote the following in his *Natural Geography of Croatia* from 1878: "The people of Croatia tell tales about how the famous 'Black Queen' once had her court in Plitvice Lakes, with her main residence on Lake Kozjak."





**Figure 38.** Forestry house in Čorkova uvala, built in 1954 based on the design by Ivan Vitić, a renowned Croatian architect. Archive of the PLNPI.

Croatian architect Marijan Haberle. Architectural value is also clear in case of three forestry houses based on the designs of Ivan Vitić, another renowned Croatian architect, and built in 1954 in Čorkova uvala (figure 38), Prijeboj and Poljanak;<sup>20</sup> the first two forestry houses are also officially protected cultural assets. One other protected cultural asset is Villa Izvor, built as residential facility in 1953.

Finally, other facilities listed in the Register of Cultural Assets of the Republic of Croatia are the building of the former workers' restaurant; building of a former municipal postal office; four residential buildings in Mukinje, with four apartments per building, designed by architect Lavoslav Horvat and built in 1954 (figure 39).

Facilities used in the traditional economy are also

an important part of cultural heritage of the Park. Some of the most attractive examples include the following: water-powered mill and sawmill in the village of Korana (figure 40); mill Radekin mlin at Veliki slap; mill Stipanov mlin in Plitvički Ljeskovac; traditional house with croft in Končarev Kraj.

Register of Cultural Assets of the Republic of Croatia also includes a small hydropower plant at Lake Burget, built in 1936, as a valuable example of industrial architecture of the first half of the 20th century. Remains of a small hydropower plant can also be found in Plitvički Ljeskovac.

It is worth pointing out that valuable cultural heritage also includes a range of other elements of traditional architecture, such as walled public wellsprings and draw-wells, sections of historical roads with small bridges and stone buffers, etc.



**Figure 39.** Building of a former municipal postal office (left) and former workers' restaurant (right), designed by architect Lavoslav Horvat and built in Mukinje. Archive of the PLNPI.

<sup>20</sup> Poljanak forestry house burned down in the Homeland War, but the possibility of its reconstruction is under consideration.





**Figure 40.** Water-powered sawmill in the village of Korana prior to renovation (left) and after renovation (right). Archive of the PLNPII.

### 2.3.3 Intangible cultural heritage

The area of Plitvice, as well as the entire region of Lika, abound in rich intangible cultural heritage. It is expressed through various traditional activities, folk costumes, customs (feather-plucking, custom of social gathering called “ličko prelo”), songs and dances (e.g. polyphonic folk singing “lička ojkalica”, playing long-necked lutes “tamburica samica”, form of dance in a circle called “ličko kolo”), food, tales and legends.

As regards traditional activities, traditional agriculture is particularly prominent, but agriculture also serves as foundation for further processing and production, such as brandy distillation (most often of “šljivovica” plum brandy) and cheese production (cooked hard cheese, “škripavac”, “basa”). Wood

processing and production of wooden products also constitute significant traditions of this forested area (including production of roof shingles, furniture, “tamburica” musical instruments, etc.). In addition, there is a range of other traditional activities aimed at the production of useful goods, including the processing of wool of autochthonous Pramenka sheep of Lika (washing, combing, spinning, weaving and coloring of wool); knitting of footwear (famous “ličke coklje”); knitting of clothes (vests, gloves, hats, neck scarves); weaving of various items made of wool, hemp or linen on “krosna” weaving looms.<sup>21</sup> (figure 42).

The Plitvice cycle of fairytales and legends is unique and highly valuable, with its central tale of the Black Queen in oral tradition, eventually recorded by a renowned Croatian historian,



**Figure 41.** “Ličko kolo” dance presentation for Park visitors (left); folk costumes (right). Archive of the PLNPII.

<sup>21</sup> Hemp was used to make covers and wheat bags, for example; linen was used in order to produce fine cloth for shirts and underwear, while wool was predominantly used for the making of cloth and unique blankets (*biljci* and *šarenice* of the region of Lika).





**Figure 42.** Roof shingles and tools used to make them (up); shingle roof (center); modern variations of "lička cokolja" footwear (down). Archive of the PLNPPi.

professor Vjekoslav Klaić, towards the end of the 19th century. According to interpretation by the author Čedo Prica, who researched, discovered and retold these tales in a more recent period,<sup>22</sup> the Legend of the Black Queen is a story of creation of the lakes, but also a story that uses a unique language of oral literature of the area that faced many conflicts throughout history in order to tell a universal tale of the birth of beauty and life after overcoming destruction and division through catharsis.

### 2.3.4 Cultural landscape

Several recognizable types of cultural landscape are present within the Park, including three cultural landscape types shaped by traditional activities and methods of use of the area. They are all characterized by the same traditional architecture, with traditional single-story houses built on basement made of stone, with crofts that include farm facilities, yards, hedges, fences, gardens, orchards and arable land. They differ in characteristics of the natural environment in which they originate, and in specific aspects of human activity in them.

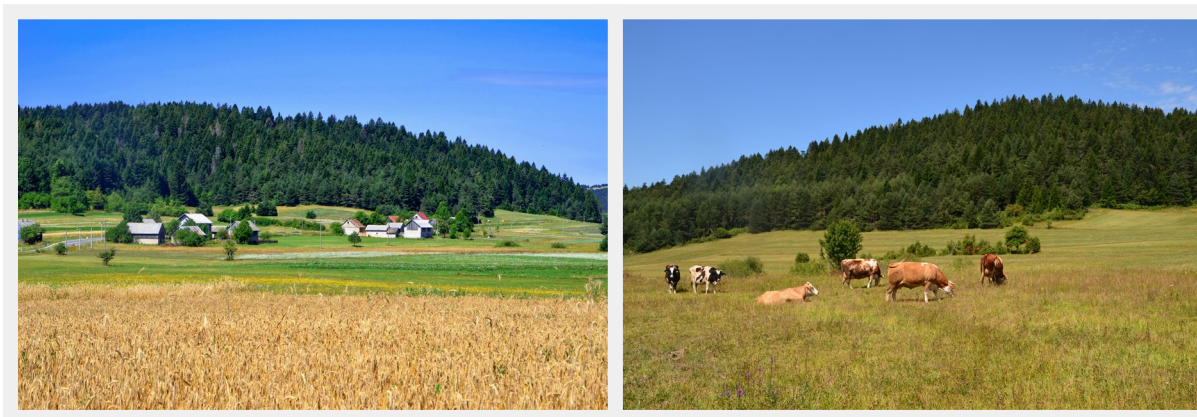
The first type of cultural landscapes are wide grassland areas, meadows, pastures, arable land of karst fields and their traditional settlements with open structure and relatively orderly croft forms. The best-conserved examples of this landscape type in the Park are areas around the settlements of Homoljac, Gornji Babin Potok and Donji Babin Potok (figure 43); i.e., a section along the D52 road leading from Borje to Donji Babin Potok.

Another cultural landscape type includes deforested land, meadows within forest areas and settlements in them characterized by a wide spread of houses and by irregular shapes of crofts, with hamlets consisting of several crofts, characteristic for the area of Plitvice. Areas with best-conserved landscape of this particular type are Drakulić Rijeka, Končarev Kraj, Uvalica, Kapela Korenička, Rodić Poljana.

The third cultural landscape type are settlements along watercourses, associated with traditional activities in connection with the use of watercourses (flour mills, stamper mills for cloth, sawmills), such as the settlements of Korana, Plitvički Ljeskovac, Vrelo and Rudanovac.

<sup>22</sup> Čedo Prica is the author of the book "Crna kraljica – Bajke i legende o Plitvičkim jezerima" (Black Queen: Fairytales and Legends of Plitvice Lakes) published in 1964.





**Figure 43.** Gornji Babin Potok: settlement in a cultural landscape (left); cattle grazing maintaining the cultural landscape (right). Archive of the PLNPII.

Other settlements in the Park have gradually lost the characteristics of traditional landscapes to a higher or lesser extent, due to social and economic changes and the disappearance of the traditional way of life; with the replacement of traditional facilities and crofts by facilities adapted to the provision of accommodation for tourists, they are increasingly transforming into a touristified

landscape inappropriate for conservation of Park values. The most dramatic examples of such changes are present in those settlements where permanent population is either completely or almost completely absent (e.g. Plitvica Selo), and entire hamlets are transformed into modern tourist *resorts* with an emphasis on luxury instead of conservation of original Park values.

## 2.4 Characteristics of Park visitation

### 2.4.1 Visitor infrastructure and programs

The current visitation system includes the following elements: segments for reception of visitors; visitation system within the lake zone (which constitutes the main visitor attraction and outstanding universal value of the Park in the narrow sense of the word, but comprises less than 1 % of Park surface); visitation system outside of the lake zone.

Reception of visitors takes place within two main entrances and one auxiliary entrance (figure 44), which ensure all of the standard services, including ticket sales, information points, toilets, souvenir shops and catering facilities. There are also two parking lots at the entrances, with approximately 1,200 parking places at Entrance 1 (U1) and 1,300 parking places at Entrance 2 (U2), as well as

parking areas for more than 60 buses in total. At the moment, the existing system does not include established management systems and procedures that would enable it to control visitor inflow, and to limit it as needed.<sup>23</sup>

Visitation system in the lake zone includes over 20 kilometers of trails and boardwalks; three docks (P1, P2, P3) with 8 boats operating on two boat shuttle lines (P1-P2 and P3-P2 or P3-P1) and capable of transferring approximately 600 visitors per hour, in both directions; three panoramic vehicle stations (ST1, ST2, ST3) for 6 panoramic vehicles, with the capacity of transferring approx. 600 visitors per hour along the transfer line ST1 - ST2 - ST3, in both directions (annex 5.12.).

Visitors are suggested to tour the lake zone using one of seven loop tour programs on offer, with

<sup>23</sup> For example, the system that enables booking and purchase of entry tickets for an exact hour and day, with limited number of tickets in sale per each hour, or established procedure to limit the entry of visitor vehicles into parking lots when it is determined that the inflow of visitors into the lake zone exceeds the acceptable level, i.e., when the system begins displaying symptoms of congestion at critical localities.



**Figure 44.** Visitor reception system of the Plitvice Lakes National Park with two main entrances, parking lots and other standard services. Archive of the PLNPPi.

**Table 2.** Visitation programs for Plitvice Lakes National Park lake zone

Program	Start	Duration (hrs)	Tour		Transport use	
			Upper Lakes	Lower Lakes	Panoramic vehicle	Electric boat
A	Entrance 1	2-3	-	x	-	-
B	Entrance 1	3-4	-	x	x	x
C	Entrance 1	5-6	x	x	x	x
E	Entrance 2	2-3	x	-	x	x
F	Entrance 2	3-4	-	x	x	x
H	Entrance 2	5-6	x	x	x	x
K	Entrances 1 and 2	6-8	x	x	-	x

the tours taking between 2 hours and 8 hours. The most popular programs are tour programs covering the entire lake zone, including both the Upper Lakes and the Lower Lakes, with included boat transfer along the long boat transfer line across Lake Kozjak and panoramic vehicle ride along its entire route (table 2).

All of these programs use boardwalks and trails in the Lower Lakes canyon, as well as transverse trails across the barriers of the Upper Lakes. The only exception are brief programs that do not use both mentioned parts of the system, but only one part (annex 5.12). A single entry ticket for tour of the lake zone is valid for all of these tour programs. The Park is also offering guided tour services.





**Figure 45.** View of the Velike kaskade and a boardwalk from the top of the Lower Lakes canyon. Archive of the PLNPI.

The described system was established towards the late 1970s, under the leadership of engineer Josip Movčan and with consent of academician Ivo Pevalek PhD, as a response to the first sudden postwar rise in the number of visitors and pressure on ecosystems. There are several key characteristics of the system ensuring that visitation does not threaten the outstanding universal value of the area, while enabling safe and extraordinary experience of these values for visitors. In order to ensure safety of visitors and to limit their impact on the surrounding ecosystem and landscape, the movement of visitors is limited exclusively to a network of trails and boardwalks, their width limited to 1.6 meters.<sup>24</sup> The location of trails and boardwalks in space, coupled with their design and materials they are made from (wood), ensure their maximum integration into the natural landscape, while at the same time enabling visitors to come closer to water and to directly experience the extraordinary natural beauty as part of outstanding universal values (figure 45). Finally, clearance of boardwalks from the surface (tufa barriers, lake shores, water) ensures undisturbed flow of natural processes in the ecosystem (enabling undisturbed growth of barriers and preventing their erosion

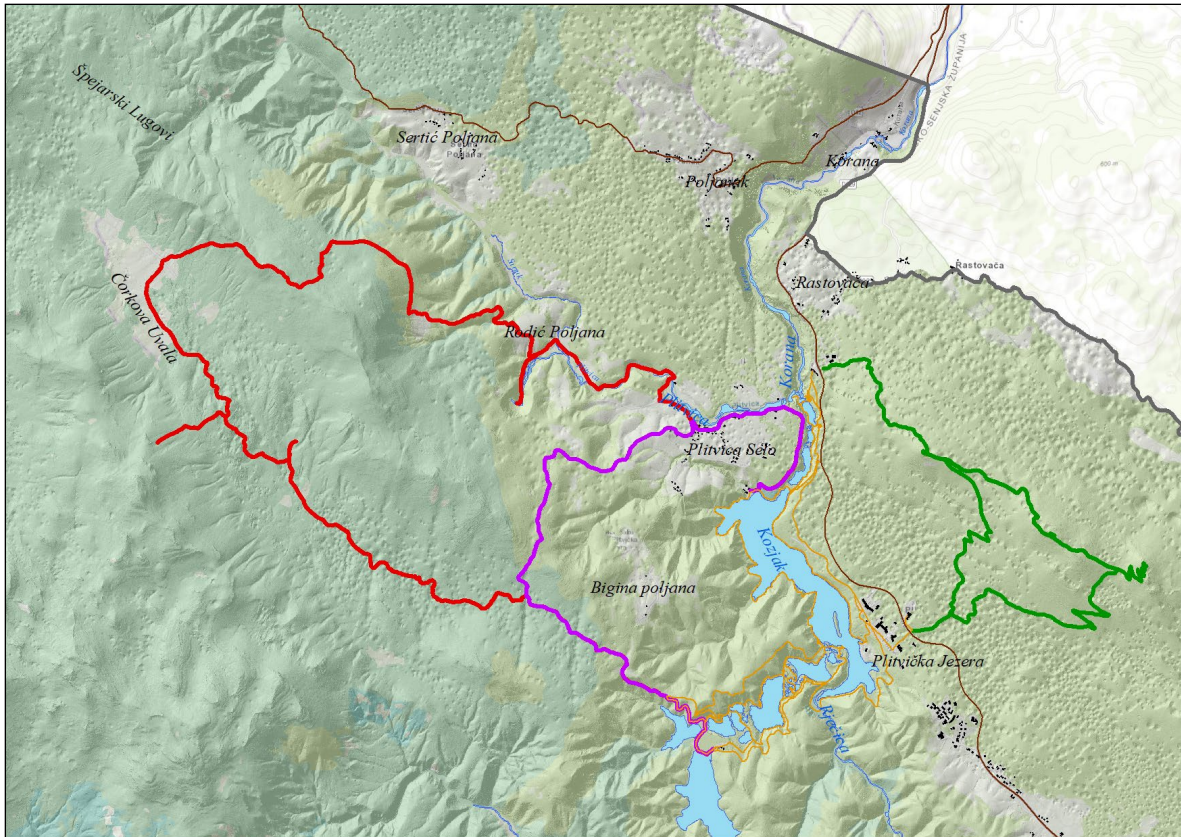
that would occur in case of walking on them; ensuring unbroken contact zone between terrestrial and aquatic ecosystem; avoiding interference with the natural flow of water, etc.) .

Visitation system outside of the lake zone currently includes three hiking trails / educational and recreational trails taking visitors through the forest area around the lakes (figure 46): Medveđak trail (8 kilometers), Plitvica trail (9 kilometers) and trail Čorkova uvala (21 kilometers). Prohibition of leaving the trails during the tour applies in this area as well, ensuring safety of visitors, but also minimizing their impact on the surrounding ecosystems. Currently, only approximately 1% of Park visitors use trails on offer outside of the lake zone.

*In-situ* interpretation and education content within the system includes a relatively low number of educational panels along hiking trails. In the lake zone, information panels provide only the basic information about the name and size of a given lake. *In-situ* information content for visitors includes maps with a clear overview of the area and basic signalization with directions and warnings about the rules of conduct.

<sup>24</sup> Initially, the standard width was 1.4 meters. The Physical Plan of 1986 defined 1.5-meter width as standard. In recent times, the standard width – enabling better safety of visitors, while still being acceptable in landscape terms – has been defined at 1.6 meters.





**Figure 46.** Hiking trails/educational and recreational trails Medveđak, Plitvica and Čorkova uvala

### 2.4.2 Situation and trends in Park visitation

With more than 1.7 million visitors in 2017, the Park is the most visited national park in the Republic of Croatia, and among the most visited such parks in the world.<sup>25</sup> In recent times, the recorded number of visitors is rising fast (figure 47), having roughly doubled over the past 10 years.

The Park is a global destination, with visitors coming from throughout the world. Visitors from Croatia constitute slightly more than 5% of the total number of visitors. The bulk of visitors come from European countries (predominantly from Germany, France, Poland, Italy); however, the share of visitors from markets in the Far East is rising fast in recent times.

There is pronounced seasonality in Park visitation, with peak intensity of visitation in July and August; more than 80% of visitors visit the Park in the period from May to September, and merely 7%

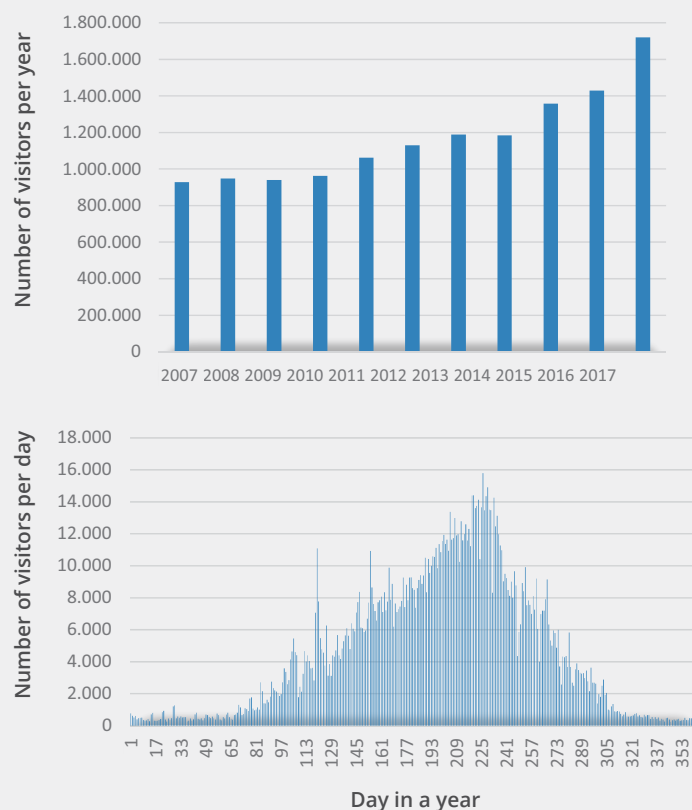
visit the Park from November until March (figure 47 right). In recent times, the number of visitors is growing in all months, in absolute terms more quickly in months with higher visitation intensity; however, in relative terms, growth rates are actually higher in months outside of the peak season.

Approximately two thirds of visitors are individual visitors, and one third group visitors. As for group visitors, they dominate outside of the four months of peak season (reaching up to two thirds in share in winter months); on the other hand, individual visitors dominate during the peak season (approx. 60% in June and September, and approx. 80% in July and August).

The Park is predominantly a transit and excursion destination, meaning that less than 30% of visitors spend the night in the area, and even taking into account those who do, the average number of overnight stays is approximately 1.5. More than 70% of visitors spend half a day or less in the Park, either in transit or as part of a one-day excursion

<sup>25</sup> For example, Plitvice Lakes National Park would enter the top-15 most visited national parks in the United States in terms of the number of visitors.

**Figure 47.** Annual number of Plitvice Lakes National Park visitors in the last ten years (up); Number of Plitvice Lakes National Park visitors per day in the course of 2017 (down).



from another destination (in the coastal area of Croatia or Zagreb). Such a structure of visitors is in line with the current Park offer, which essentially boils down to various ways of touring the lake zone for two to eight hours, without a developed offer or recommendations for multi-day stay.

The situation that the Park is increasingly facing is the number of visitors exceeding the designed capacity of the existing visitation system in the lake zone that represents the main attraction, outstanding universal value of world natural heritage and the main reason of visit for all Park visitors.<sup>26</sup> Indicative number of visitors that the current system can accept – without congestion on the trails, i.e.,

with mean minimal distance between visitors not lower than 3 meters, and without waiting for panoramic vehicles and boats at stations and docks – is approximately 650 visitors per hour, at each of the two entrances; in other words, 1,300 visitors per hour in total, distributed evenly at two main entrances.<sup>27</sup> Inevitable consequences of letting more visitors enter the Park per hour include crowding, waiting and, in general terms, decreasing quality of visitor experience and quality of presentation of Park values (figure 48). The determined symptoms worsen with each consecutive hour during which the system is overloaded with the number of visitors that exceeds the designed capacity. Since visitors even start leaving the designated trails in such

<sup>26</sup> According to monitoring results, merely 1% of the total number of visitors use offered hiking trails outside of the lake zone. However, even these visitors are visitors who primarily come to see the part of the Park that is unique in global terms – i.e., the lake zone – and then decide to prolong their stay and widen their experience by exploring the surrounding area as well.

<sup>27</sup> Analysis prepared in the 1960s and 1970s, when the current system was designed, recognized that the rule on exclusive use of the trail and boardwalk system as the only permissible touring method in the Park also determines the carrying capacity of the visitation system defined in this manner. Boardwalks and trails were designed as visitor infrastructure that enables the presentation of outstanding universal value of the Park, as well as exceptional experience of visitors, without diminishing this value, but protecting it from negative impact of visitors instead. At the same time, "permeability" of the system – which can be assessed for defined visitation density conditions – also determines the carrying capacity. On the basis of the measured average speed of visitors, defined visitor density along the trail of no more than one visitor per 3 meters of trail, and the fact that tour programs from two entrances partly use the same trail sections, the resulting maximum permeability of the system amounts to approx. 650 visitors per hour per entrance. It is important to bear in mind one key insight: it is not possible to increase the permeability of infrastructure in the area – e.g. by its widening, which would allow for "multi-track" movement, or by a denser network of trails – since such changes would jeopardize both the outstanding universal value of the natural landscape and the possibility of visitor experiences.

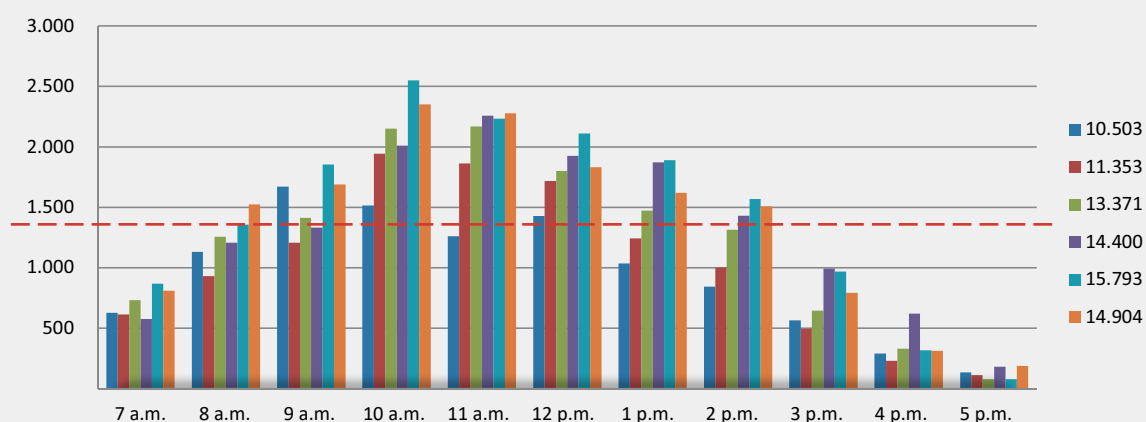


**Figure 48.** Congestion and negative impact on ecosystems as a consequence of the trend of rising peak visitor numbers in the lake zone. Photo: Ognjen Škunca.

conditions, one consequence of this is undesirable impact on the ecosystem, primarily on tufa barriers. Luckily, this impact is currently not such that it would substantially endanger the outstanding universal value of the Park. However, people leaving the trails and crowding along trails diminish visitor safety as well.

Results of monitoring of the number of visitors entering the Park in days with typical time distribution of visitors in the course of one day (figure 49) show that the probability of exceeded capacity is very high, and capacity is exceeded in the course of peak hours (from 10 until 13 hours) even in days with approximately 10,500 visitors per day.

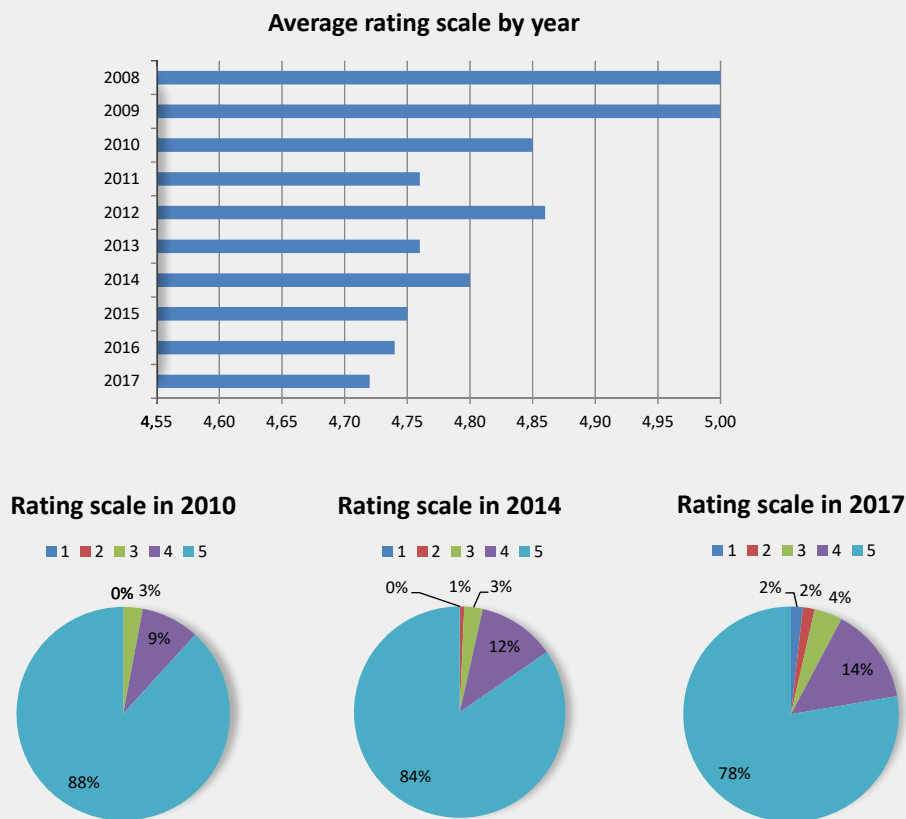
It is worth pointing out that days with increased number of visitors are no longer an exception; rather, they are increasingly becoming a standard scenario in the course of peak season. For example, the number of visitors in July and August 2017 was approximately 335,000 and 385,000 respectively, which gives daily averages of 10,800 and 12,400 visitors respectively. The record was set on a day in August 2017 when the number of visitors exceeded 16,000. Table 3 also illustrates the worsening trend as regards this problem over the years. It was ten years ago that the number of visitors in one day exceeded 10,500 visitors. In 2017, the maximum recorded number of visitors in one day exceeded 16,000 visitors.<sup>28</sup>



**Figure 49.** Number of visitors entering the visitation system in the lake zone of the Park per hour during the summer days in July and August 2017, in days with varying total number of visitors (ranging from 10,503 visitors per day to 15,793 visitors per day), in the form of summary data for both entrances. The red line denotes the determined maximum number of visitors that the system can accept per hour without congestion (1,300 visitors).

<sup>28</sup> There is no doubt that the actual number of visitors is even higher, since crowding results in an increasing number of visitors who use suggestions shared in *online* forums and enter the Park without a ticket (so they are not registered in official statistics), and effective control is de facto impossible in crowded conditions.





**Figure 50.** Satisfaction of visitors as expressed in total rating of their experience of visit in comments on the *TripAdvisor* platform (visit experience rating scale: 1 – Terrible; 2 – Poor; 3 – Average; 4 – Very good; 5 – Excellent).

**Table 3.** Growth of maximum number of visitors per day during July and August, per year

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
July	8322	8622	8760	9947	9758	9830	10917	9137	11479	11112	13371
August	10718	10737	11474	11936	11978	12817	13757	12289	13313	14113	16125

The described trend is also reflected in the expressed pleasure of visitors with Park visit. Figure 50 shows a trend of decreasing visitor satisfaction, as expressed in comments of visitors on the *TripAdvisor* platform. Not only is the “total average rating” dropping, but the share of the number of visitors who express serious reasons for dissatisfaction is substantially rising. A more detailed analysis of comments confirms the expected: all visitors, including those whose total rating is lower, praise the extraordinary beauty of nature. They refer to the Park as the “most beautiful place they have been to”, or a “must-see place”, but they – as well as visitors who provide the highest satisfaction ratings – criticize issues such as crowding, waiting in line, or even the condition of trails and boardwalks.

Given the fact that the structure of Park visitors includes all emissive markets in the world, and given the fact that World Tourism Organisation forecasts on the doubling of the volume of international travel in the period 2010-2030 have been fully confirmed or even exceeded so far, one can assume, with a fairly high degree of probability, that the trend of growing interest and demand for Park visits will continue. As a result, there is a need to upgrade the existing system by introducing management instruments needed for the conservation and presentation of outstanding universal values of the Park, and for ensuring high quality of experience and visitor satisfaction.



**Figure 51.** View of Lake Kozjak from the window of Plitvice Hotel; bungalows at Korana camping site; open fireplace in national restaurant Lička kuća, photo: Vlado Butina. Bistro Kozjačka draga at Lake Kozjak. Archive of the PLNPPi.

#### 2.4.3 HORECA activities of the Public Institution



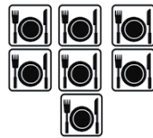

The Public Institution manages four hotels, two camping sites, seven restaurants and eight so-called small Park facilities– bistros, buffets and cafés – situated within the Park and in its immediate surroundings. Hotels Plitvice, Bellevue and Jezero are located in the very center of the Park, at Velika Poljana above Lake Kozjak, while Hotel Grabovac is located outside of the Park, approximately 3 kilometers away from its northern border, near the planned future main entrance to the Park. Both camping sites are located outside of the Park, but in its immediate vicinity: Borje camping site is at its southern side, and Korana camping site at its northern side. Restaurants are predominantly situated within hotels and camping sites, with the exception of two standalone restaurants – Poljana and Lička kuća – both in the central zone of the Park. Small Park facilities are distributed at existing entrances and within the visitation system in the core lake zone (with the exception of Vučnica bistro in Mukinje).

The oldest and architecturally the most valuable

hotel is Hotel Plitvice, built in 1958 (chapter 2.3.2), today classified as a two-star hotel, with 52 accommodation units in total (51 rooms and one presidential suite). It has an à la carte restaurant (160 seats), lobby-bar with outdoor terrace and a TV room that can also be used as a meeting hall (for 45 persons). Hotel Bellevue is in its immediate vicinity, also a two-star hotel, with 69 accommodation units in total, and it operates as a garni hotel (providing only overnight stays with breakfast), so its board guests eat their meals in Hotel Plitvice.

The largest and best-equipped hotel is Hotel Jezero, a three-star hotel with 229 accommodation units in total. It has a restaurant with summer terrace (400 seats in total), lobby-bar and café, congress hall (for 250 persons) and four meeting halls (with 80, 25 and two times 15 seats). In addition, this hotel has a small indoor whirlpool for up to 15 persons, two Finnish saunas, Turkish bath and gym, and there are sport and recreation facilities within the hotel establishment as well: one tennis court, tennis wall, two table tennis tables and bowling alley.

The smallest hotel of the Public Institution is Hotel Grabovac, a three-star hotel with 31

<b>4 HOTELS</b> 	<b>2 CAMPING SITES</b> 	<b>7 RESTAURANTS</b> 	<b>8 SMALL PARK FACILITIES</b> 
<b>TOTAL:</b> <b>380</b> accommodation units <b>820</b> beds	<b>TOTAL:</b> <b>2850</b> campers	<b>TOTAL:</b> <b>approx. 1500</b> seats	<b>TOTAL:</b> <b>approx. 1200</b> <b>outdoor</b> and <b>170 indoor</b> seated or standing guests

**Box 3.** Overview of HORECA services of the Public Institution

accommodation units, restaurant, café and a summer terrace.

Camping sites, both of them three-star facilities, belong to the best camping sites of continental Croatia in terms of their location and services. Korana camping site with its surface of 35 hectares can receive approximately 2500 campers, and it also has 47 bungalows, a restaurant with a summer terrace (250 seats), café and shop. The entire camping site area is well-forested and pleasantly horticulturally designed, with the Korana River in its immediate vicinity.

Borje camping site with its surface of 6.5 hectares is a much smaller facility that can receive approximately 350 campers. Restaurant Borje of the Public Institution is located in the immediate vicinity of this camping site, as well as a café and shop.

Restaurants of the Public Institution have approximately 1500 seats in total. Three restaurants are located within hotels, two are in camping sites, and two are standalone restaurants: national restaurant Lička kuća and restaurant Poljana. Restaurant Lička kuća was built in 1972 opposite to Entrance 1, and it was fully restored in 2015 as a unique area with the ambiance of a traditional house of Lika, on two levels (as lapodian house on ground level and traditional Lika house on the upper level). It has 280 seats (120 per level and 40 on the terrace). In the middle of the restaurant, there is an open fireplace with fire, where culinary specialties of Lika are prepared, and the entire interior is used for presentation of the traditional way of life of families of Lika.

Restaurant Poljana is located at Velika Poljana, near the hotels Bellevue and Plitvice, along the trail

taking visitors from Entrance 2 towards the lakes. Within this facility, there is a self-service restaurant (120 seats), national restaurant with open fireplace (100 seats) and café (48 seats); all these amenities are linked by a spacious terrace with 160 seats offering a magnificent view of the Upper Lakes area.

Small Park facilities include 3 bistros (Hladovina, Kozjačka draga and Vučnica), 3 buffets (Slap, Labudovac and Kupalište) and 2 cafés (Flora and Rapa-jinka). All these facilities serve drinks and simple cold or hot meals (cakes, sandwiches, grill, etc.).

Offer in HORECA facilities is based on food staples that are procured through public procurement in 95% of cases, while a small share is procured on the basis of green procurement principles, or on the basis of certificates proving local geographical origin.

Opening season of facilities is adjusted to the market and to the needs of Park visitors. Hotel Jezero with its restaurant, as well as restaurants Lička kuća and Poljana, together with small Park facilities at entrances, are open throughout the year, while hotels Plitvice and Grabovac, as well as other restaurants and small Park facilities, are closed during the three winter months; Hotel Bellevue and camping sites close one month earlier and open one month later.

In 2018, HORECA sector of the Public Institution employed more than 300 permanent employees and 300 seasonal workers, which was more than half of the total number of Public Institution employees. With approximately 250,000 overnight stays per year, out of which approx. 55 % in hotels and 45 % in camping sites, HORECA sector of the Public Institution has the share of approximately



one third of total tourism turnover in the four local self-government units in the territory of which the Park is located.<sup>29</sup>

Since hotel guests are predominantly agency guests from the markets of East Asia, average length of stay in hotels is even shorter than the average length of stay in the entire destination consisting of four local self-government units in the territory of which the Park is located, and it amounts to 1.2 days. Average length of stay in camping sites is slightly above the average of the destination, and amounts to 1.7 days.

#### 2.4.4 Retail shops and souvenir shops of the Public Institution

The Public Institution also manages five retail shops with approximately 700 m<sup>2</sup> of sales area, five souvenir shops with approximately 250 m<sup>2</sup> of sales area and six outdoor ice cream stands.<sup>30</sup> Facility Robni centar in Mukinje, Market Grabovac and souvenir shop in Hotel Jezero<sup>31</sup> operate throughout the year, and they play an important role in the supply of the local population as well.

Retail shops are predominantly selling consumer goods; however, most retail shops include sections with souvenir sales, while two souvenir shops at main entrances offer visitors basic consumer goods as well. The existing offer includes all standard types of souvenirs, including guidebooks, videos, handicrafts, clothes with Park motifs, equipment (raincoats, umbrellas, warm sweaters), traditional local food products, educational toys and books for children, etc. The Public Institution ensures the current offer on the basis of contracts with slightly less than 100 providers, and the share of locally produced products is currently below 5% due to undeveloped local production.

In 2017, the Branch in charge had 33 permanently employed staff members and 20 additional seasonal workers. In 2017, total annual revenue amounted to approx. HRK 38 million, out of which 48% in souvenir shops, 40% in retail shops, and 12% in outdoor points of sale. Looking at average consumption per visitor, each of the 1.72 million visitors of the Plitvice Lakes National Park in 2017 spent approximately 11 HRK on souvenirs on average.<sup>32</sup>



**Figure 52.** Souvenir shop „Slap” at Entrance 1 (left), photo: Vlado Butina. Local souvenir (right). Archive of the PLNPPi.

<sup>29</sup> With fast growth of accommodation capacity among private operators and other investors, the share achieved by the Public Institution in total tourism turnover is gradually falling (it stood at 38% in 2016, and at approx. 34% in 2017).

<sup>30</sup> Five retail shops are: Market Grabovac at Grabovac Hotel; facility Robni centar Mukinje; Trgovina Jezerce; Market Korana and Market Borje at camping sites Korana and Borje respectively. Five souvenir shops are: souvenir shop Slap at entrance U1; souvenir shop Hladovina at entrance U2; souvenir shops in hotels Jezero and Plitvice; souvenir shop Kozjačka draga. Six ice cream stands are situated at the localities: Labudovac, Kupalište, Flora, Rapajinka, Slap and Kozjačka draga.

<sup>31</sup> After renovation, retail shop Jezerce will be put into service as well.

<sup>32</sup> By comparison, a study from 2014 estimated the souvenir consumption in US National Parks at 13 USD per visitor per day. Note: retail shops are also used by the local population throughout the year, so it is not possible to determine the share of visitors versus the share of the local population. As regards souvenirs, one may assume that the share of the local population in purchase of souvenirs is negligible.

## 2.5 Social and economic characteristics

### 2.5.1 Role of the Park in the development and economic life of the local community

The Park plays a crucial role in economic life, perspectives and development of the local community, both directly and indirectly. Direct role pertains to more than 650 permanent employees and approximately 450 seasonal employees. The Public Institution of the Plitvice Lakes National Park is the largest employer in the wider region (part of Ličko-senjska County and Karlovačka County).

Looking at the total number of permanent and temporary employees in the territory of four local self-government units, the Public Institution employs more than 30% of permanent employees and almost 90% of temporary employees. In addition, approximately 1100 jobs also generate substantial additional jobs in various services, so impact of the

Institution is at least twice bigger than the stated percentages. The significance of this can best be seen in data on population in the four local units according to source of income, as shown in figure 53, making it clear that jobs are in short supply.

The Public Institution also contributes to the local community indirectly, by supporting the municipal and county budgets that are partly financed from a defined portion<sup>33</sup> of income tax on income earned in their territory; pursuant to the Regional Development Act, they also receive a defined portion<sup>34</sup> of revenues from Park entry ticket sales.

In the period prior to the 1990s, the Park had a highly developed network for purchase of all agricultural products from the surrounding area, and it played a crucial role in the survival of agricultural production in the area through guaranteed market. It is only in the most recent period that

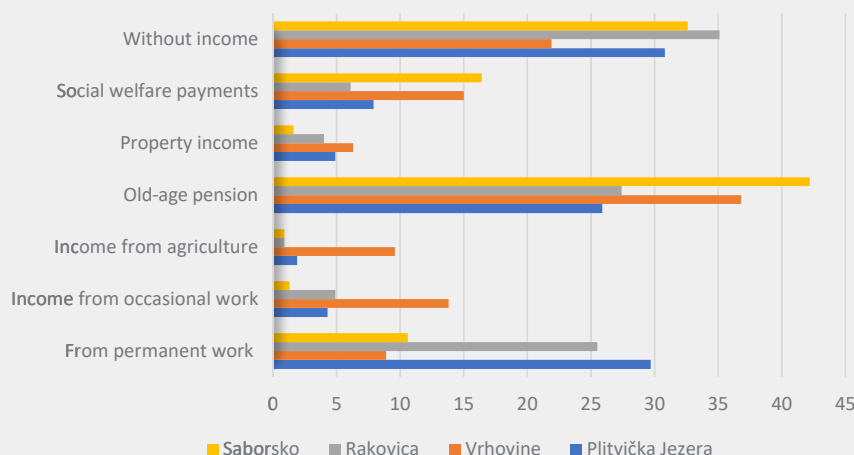


Figure 53. Population of four local self-government units of the region of Plitvice according to source of income [%] (2011 Census).

<sup>33</sup> The share of local self-government units amounts to between 60% and 88%, depending on unit status (according to the development status; status of mountain area; etc.). The share of counties stands at 16.5%.

<sup>34</sup> Up to no more than 6.5% of net turnover. In 2017, for example, four local self-government units in the territory of which the Park is located received approx. HRK 8.5 million based on this provision.

the Park has revived such purchases, this time in the context of the market economy, by purchasing branded products. Their quantity and value are minimal at the moment; however, the potential of the Park as regards placement of these products is immense, including through the HORECA sector, souvenir shops and retail shops of the Public Institution, but also through the offer of other tourism service providers in the area.

A less direct, but nevertheless fundamental way in which the Park contributes to the sustainability and development of the local community stems from the fact that it is a main tourist attraction as a UNESCO World Heritage Site with its outstanding universal value, and the surrounding area is therefore witnessing accelerated development of the private sector of tourism service providers; in addition opportunities are opening up for other activities as well, such as those involving products and services the placement of which can be ensured in the tourism market developed around the Park.<sup>35</sup> Currently, these are predominantly simple HORECA services (primarily accommodation offered in suites and rooms), and several local travel agencies are providing typical agency services within the destination; however, these developments nevertheless ensure substantial additional revenue for the local economy.<sup>36</sup>

### 2.5.2 Other main economic activities and land use

Main economic activity in the Park area and the surrounding area is, beyond dispute, the provision of HORECA, tourism and recreation services (figure 54).

Traditional activities of agriculture and forestry still exist, but with much lower importance, especially given the fact that economic use of forests in the National Park area is not permitted (forestry activities are possible only in Park surroundings). Other activities substantially represented in the statistics

are standard activities indispensable in modern life (public administration, trade, construction, education, health care).

In spatial terms, provision of HORECA, tourism and recreation services has above-average share in the municipalities of Plitvice Lakes and Rakovica (36% and 51% respectively), while agriculture has above-average share in Vrhovine and Saborsko (17% and 13% respectively).

The main trend in recent local development is quick growth of accommodation capacity, which continues at breakneck speed despite the fact that the level broadly satisfying the needs of visitor numbers in peak days of the season has already been reached.<sup>37</sup> To illustrate the trend present in all four local self-government units: over the past three years in the territory of the Municipality of Plitvice Lakes (Figure 55), the number of beds in private accommodation has approximately doubled, as well as the number of households engaged in accommodation rental.

By comparison, new 1615 beds are approximately twice the size of the accommodation capacity in hotels managed by the Public Institution. In other words, in merely three years of development of private accommodation, the equivalent of eight new hotels has been built – only in the Municipality of Plitvice Lakes. Slightly more than two thirds of registered private accommodation in the Municipality of Plitvice Lakes is situated within Park boundaries, most of it in the settlements of Jezerce (675 beds), Plitvica Selo (319 beds), Plitvice Lakes – Mukinje (238), Rastovača (204) and Poljanak (180).

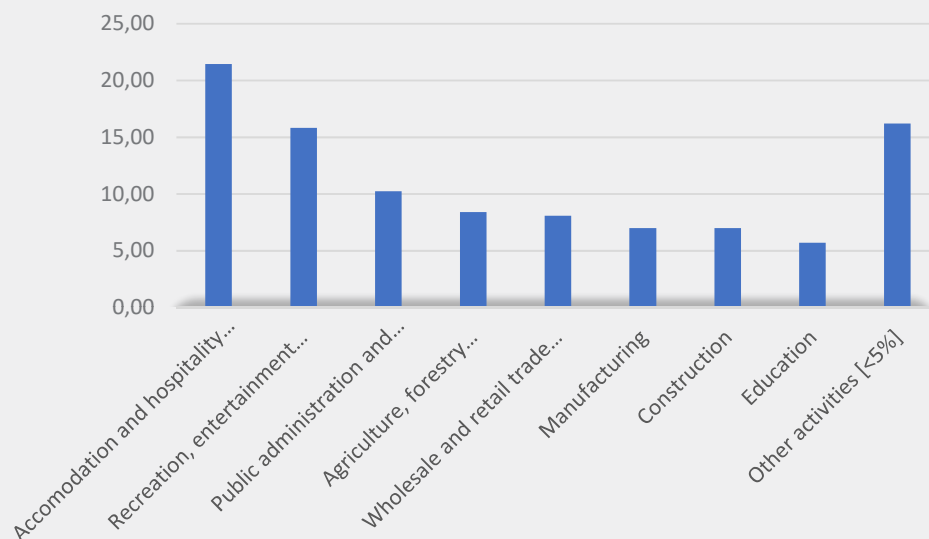
One important characteristic of recent growth is the growing share of investors that do not come from the local community. When taking into account the fact that further growth of accommodation capacity creates conditions in which supply outstrips demand, and the fact that facilities recently built by investors outside of the local community tend to be better in quality and more competitive in the

<sup>35</sup> For example, revived production of high-quality branded agricultural and other products "with a story to tell" that can be offered as part of the tourist experience.

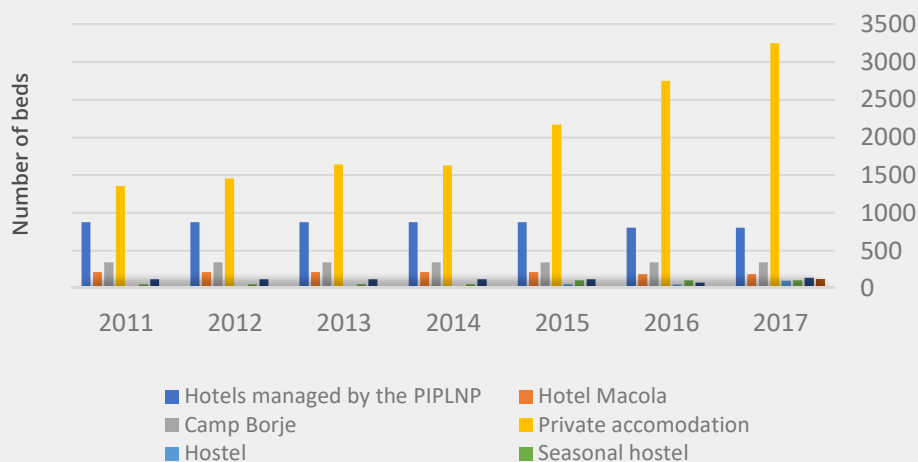
<sup>36</sup> In 2016, there were approx. 600,000 overnight stays in the territory of four local self-government units (out of which approx. 225,000 overnight stays in Public Institution hotels and camping sites). In 2017, there were approx. 750,000 overnight stays (out of which approx. 250,000 in Public Institution facilities). If one excludes revenue of the Public Institution, the resulting 500,000 overnight stays in facilities of other accommodation providers, with the assumed average price of 200 HRK per overnight stay, represent the revenue of the local economy of four local self-government units in the amount of approx. HRK 100 million, i.e., slightly over HRK 10,000 per inhabitant.

<sup>37</sup> Taking into account the assumed daily number of 12,000 visitors (which is the upper acceptable limit of the designed visitation system), the current share of visitors in overnight stay (less than 30%) and the average number of overnight stays (1.5), the required number of beds amounts to 5,400 ( $= 12,000 \times 0.3 \times 1.5$ ). Currently, there are over 6,500 registered beds in the territory of municipalities of Plitvice Lakes and Rakovica, not counting the camping sites.





**Figure 54.** Employed persons in four local self-government units in the territory of which the Park is located: share [%] of various activities for 2,312 employees in total (2011 Census).



**Figure 55.** Quick growth of accommodation capacity in the Municipality of Plitvice Lakes<sup>38</sup> per type of facility.

market, one can conclude that the continuation of existing trends is contrary to the interests of the local community. Bearing in mind further touris- tification of settlements, it is also contrary to the interests of conservation of natural values and

conservation of cultural and natural landscapes, given the fact that construction is taking place in conditions characterized by unsatisfactory munic- ipal infrastructure.

<sup>38</sup> Municipality of Plitvice Lakes has approximately twice more fixed accommodation capacity than the Municipality of Rakovica, and a comparable development dynamics as regards new investments. Municipalities of Vrhovine and Saborsko have slightly over 100 beds per municipality; however they too already have development projections for a multiple increase in capacity.

# 3. | MANAGEMENT

## VISION

**Plitvice Lakes National Park is a UNESCO World Natural Heritage Site, a place to experience and learn about the outstanding universal value and other natural and cultural values. It is an example of good protected area management in cooperation with the local community, where conserved nature is the foundation of sustainable development.**

## GENERAL MANAGEMENT PLAN OBJECTIVES

- A.** Conserved diversity of species, habitats and karst forms, as well as stable tufa formation process, ensure unique beauty of the natural landscape, and thus conservation of Park outstanding universal value, for current and future generations.
- B.** Conserved cultural heritage plays an important part in the presentation of Park values, contributing to the conservation of tradition and cultural identity of the area.
- C.** Visitation does not undermine Park values, offering visitors unhindered and comprehensive experience, thus presenting conserved world heritage in the best manner possible, while ensuring revenue required for its conservation, building public support for nature conservation and opening possibilities for sustainable local community development.
- D.** Local community is the main Public Institution partner in Park management and conservation of its values, recognizing the Park as an important part of its identity, grounding its development in sustainable use of opportunities offered by conservation of a World Heritage Site.
- E.** Public Institution has all the required legal, organizational, human and material resources to manage the Park, and it is using them to continuously improve all segments of management and organizational culture, while building cooperation with stakeholders and its role in Croatian and international expert circles.



## 3.1 Theme A. Conservation of natural values

### GENERAL OBJECTIVE

**A.** Conserved diversity of species, habitats and karst forms, as well as stable tufa formation process, ensure unique beauty of the natural landscape, and thus conservation of Park outstanding universal value, for current and future generations.

### SPECIFIC OBJECTIVES

#### **Sub-theme AA.** CONSERVATION OF AQUATIC ECOSYSTEMS

**AA.** Ensured optimal hydrological conditions and water quality in the catchment area that enable stability of the tufa formation processes, existing diversity of habitats in favorable conservation status, with present stable populations of significant species.

##### Indicators

- Very good to good ecological status of waters in the entire catchment area
- Tufa formation process is active and stable in the entire lake system
- Existing aquatic habitats<sup>39</sup> are in favorable conservation status
- Populations of significant species<sup>40</sup> are stable

#### **Sub-theme AB.** CONSERVATION OF FOREST ECOSYSTEMS

**AB.** Diversity of forest communities in stable natural condition with represented stable populations of significant species is conserved throughout the Park area.

##### Indicators

- All currently present forest communities are represented in the Park area<sup>41</sup>
- Forest habitats<sup>42</sup> are in favorable state of conservation
- Populations of significant species<sup>43</sup> are stable

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<sup>39</sup> Aquatic habitats are listed in the description of the area.

<sup>40</sup> Significant species of aquatic habitats are listed in the description of the area and in the annexes.

<sup>41</sup> List of forest communities in the Park is provided in annex 5.5.

<sup>42</sup> Priority forest habitats are listed in the description of the area.

<sup>43</sup> Significant species of forest habitats are listed in the description of the area and in the annexes.

**Sub-theme AC.**  
**CONSERVATION OF GRASSLANDS**

**AC.** Ensured favorable water regime and established active maintenance and use that allow for conservation of grasslands, bogs and tall herbs in favorable conservation status throughout the Park area, with present stable populations of significant species.

**Indicators**

- Growing share of grassland, bog and tall herb surfaces where active use and maintenance is established
- Growing share of grassland, bog and tall herb surfaces in favorable conservation status, per habitat types<sup>44</sup>
- Populations of significant species<sup>45</sup> are stable

**Sub-theme AD.**  
**CONSERVATION OF KARST**

**AD.** Diversity of karst geomorphological forms and sites of fossil flora and fauna are conserved throughout the Park area; favorable conditions are ensured in subterranean and surface habitats, enabling maintenance of stable populations of cave fauna.

**Indicators**

- Growing share of conserved determined and recorded karst geomorphological forms in the Park
- Growing share of conserved determined sites of fossil flora and fauna
- Populations of significant species<sup>46</sup> are stable

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<sup>44</sup> Priority grassland habitats are listed in the description of the area.

<sup>45</sup> Significant species of grassland habitats are listed in the description of the area and in the annexes.

<sup>46</sup> Significant species of cave fauna are listed in the description of the area and in the annexes.

### 3.1.1 AA. Conservation of aquatic ecosystems

Good ecological status of surface waters and tufa formation process in the Park area are still conserved. Tufa barriers in current watercourses are still active, changing the appearance of lakes and cascades through their biodynamics. In general terms, water quality is in good condition, while large numbers of plant and animal species, coupled with diversity of habitats, testify to the quality of aquatic ecosystems.<sup>47</sup>

However, pressures exerted on aquatic ecosystems are numerous. The most significant pressures include pollution due to wastewater from settlements; pollution due to roads in the catchment area; water losses in the lake system; water extraction impacting the decrease in water discharge and water quantity; spread of allochthonous species; naturally conditioned changes to the entire water system due to climate change. In the summer period, seasonal visitor overload arises as well, exerting additional pressure on lake ecosystems.

Research activity has a long history in the Park, contributing to knowledge on water ecosystems. Even though research was frequently neither systematic nor undertaken on the basis of identified management needs, and even though it was not providing a clear assessment of conservation status of individual characteristics with management recommendations, it nevertheless pointed out individual issues and ensured conservation guidelines. Continuous water quality monitoring implemented by Park staff has thus been established as a result of scientific research. Monthly analyses monitor basic physico-chemical and microbiological indicators in connection with tufa formation process, eutrophication and sanitary quality of water. Good equipment level of the laboratory, coupled with the possibility of investing in new equipment and additional improvement of knowledge of expert personnel, ensure immediate

implementation of monitoring, as well as extension of its scope. Initiated and planned research should provide new data necessary for adaptable management, enabling the extension of monitoring of the Plitvice Lakes water system.

Complex biodynamic tufa formation process has not been fully researched so far; however, it has been determined that it is sensitive to disturbance of physico-chemical and biological aquatic conditions that growth and development of tufa barriers depend on.<sup>48</sup> Seasonal microbiological pollution has been recorded in individual localities, such as Bijela rijeka, Plitvica stream, Kozjački mostovi, most likely caused by wastewater. Unresolved sewage system in the wider Park area represents a major pollution threat. Particular risk in this context is posed by leaking septic tanks of existing facilities, lack of control of their permeability and regular discharge, as well as neglected status of infrastructure and permeability of the existing wastewater collection (sewage) network. Under such conditions, intensive construction of new tourist facilities in the catchment area is particularly problematic, nowhere more so than in areas facing high pollution risk.

Potential danger for the quality of groundwater and surface water is also posed by unsatisfactorily resolved drainage of wastewater (effluent) from farms (slurries, septic tanks, etc.) in the catchment area, where more intensive monitoring of agricultural activities is needed. A very intensively used state road D52 is passing through the catchment area of characteristic karst water sources of Crna rijeka and Bijela rijeka, and it is still used for transport of hazardous and heavy cargo. Additional pollution risk is also posed by D1 (D429) and D42 roads. Activities covering these issues are defined in sub-theme ED of the Management Plan.

Over the past approx. 15 years, hypoxia and

<sup>47</sup> Good ecological status of surface waters is determined on the basis of biological and basic physical and chemical elements of quality, stemming from the Regulation on Water Quality Standard for localities included in supervisory monitoring of Hrvatske vode (Croatian Waters). The Regulation does not cover nor assess all indicators important for the tufa formation process, eutrophication, trophic level and sanitary integrity of waters that are relevant for conservation of favorable habitat conditions, so the general assessment of water quality pertains to these listed indicators.

<sup>48</sup> One such disturbance is increased inflow of organic matter of natural origin (due to wash-out of surrounding terrain) or anthropogenic origin (mineral fertilizers from agricultural areas, livestock farming, sewage system). Process that enriches aquatic ecosystem with mineral matter (eutrophication) causes changes in water quality and impacts upon the tufa creation process. Arising organic matter that disintegrates into simpler compounds in the aquatic ecosystem due to the activity of microorganisms represents a foundation for increasing development of planktonic algae and higher aquatic plants, which results in overgrowth of the shore zone and contributes to decreasing lake depth.



anoxia have been recorded in Prošćansko Lake during the summer period, when there is no mixing of layers in the water column due to lake stratification, which points to changes in the lake ecosystem. New data also points to a high percentage of individuals from the family of Cyprinidae (chub and common rudd) in the total sample, which is worsening the assessment of ecological status of the lake. This lake represents a lake system filter of sorts, and it is the most exposed element of the system when it comes to potential incoming pollution from the catchment area. Results of research projects and monitoring, pointing to a trend of annual air temperature increase by  $0.05\text{ }^{\circ}\text{C g}^{-1}$  and water temperature increase in the lake system by approx.  $1.5\text{ }^{\circ}\text{C}$  over the past approx. 30-year period, additionally point to present accelerated changes, also connected with global climate variations. Lack of systematic and continuous meteorological and climatological measurements renders the actual status assessment and forecasting of future trends more difficult. In addition, there is also no recent data that would point to dynamics of lake changes, such as data concerning depth, surface, elevation and lake bed structure. Scientific research<sup>49</sup> should provide a better insight into the dynamics and flow direction of surface water and groundwater, suspended solids and pollutants, as well as the possibility of forecasting changes in water hydrodynamics and climate indicators.

In addition to changes in water quality, the trend of reduction of average annual water discharges in lakes and tributaries has been noted as well. Water losses have been determined in the aquatic system, very pronounced in certain watercourses. For example, water loss along the Plitvica stream bed from its source to Veliki slap (Big Waterfall) is as high as 65% during the dry summer periods. Smaller losses in the lake system have already been recorded in the Donja jezera (Lower Lakes) canyon, and there are substantial losses in the Korana riverbed, where the riverbed ends up dry in a 14.5-kilometer long section downstream from the village of Korana during the dry summer periods. In this context, additional risk, especially in the dry summer periods, is posed by water extraction from Lake Kozjak for the needs of water supply of facilities and settlements in the area of the Park and the Municipality of Rakovica, as well as by uncontrolled water extraction from the source of the Plitvica spring for the needs of the settlements

Plitvica Selo and Poljanak. Water supply installations also exist in Čujić Krčevina and Vrelo Koreničko, and there are also cases of illegal water extraction from other, smaller watercourses.

In recent times, cooperation with stakeholders has intensified in terms of resolving water supply and sewage problems, which could lead to relocation of water supply and high-quality method of wastewater collection and treatment for settlements and facilities in the Park territory. Since these are projects that the Public Institution cannot implement by itself, it is necessary to ensure good will and readiness of other key stakeholders on these issues. This is why the strategic project of Construction of Municipal Water Infrastructure of the Plitvice Lakes Agglomeration is expected to yield both practical and quick solutions.

Tufa structure is very sensitive, so major seasonal visitor load during the summer period can also pose risk for conservation of tufa barriers, since part of the visitor infrastructure is located on the barriers themselves. Additional threat to tufa barrier stability is also posed by traffic along roads in high-risk zones (particularly pronounced along the road leading from Plitvica Selo to Veliki slap). Impact of visitor infrastructure and roads in the immediate vicinity on tufa barrier stability has not been researched so far, nor the impact of woody species growing on tufa barriers. Opinions of scientists concerning the need to eliminate macrovegetation from the barriers are divided, and the Public Institution does not have clear management recommendations. Rupturing of tufa barriers in hydrological conditions of high waters with strong discharges, arising due to sudden and abundant snow melt, are not an unusual occurrence. In recent period, these events have not had a substantial impact on hydrology and morphology of the lake system; however, a major rupture of tufa barrier on Milino Lake in March and April 2018 has caused substantial changes in the downstream system. The biggest problem for the conservation of tufa barriers, both in the past and today, has been posed by direct human impact, such as the devastation of tufa barriers that took place in 2011 in the Korana canyon, which significantly disturbed and permanently changed the hydrological system of the canyon.

Natura 2000 habitat types (3140, 3260, 32A0)

<sup>49</sup> Interdisciplinary scientific research on the creation of hydrodynamic mathematical model for Park groundwater and surface waters was initiated in 2017. Within it, a range of required comprehensive measurements and research of the aquatic system of Plitvice Lakes will be performed, as well as creation of a detailed climatological mathematical model.

represented in aquatic ecosystems (see table 1 and chapter 2.2.5) are in excellent condition, on the basis of assessments in the Natura 2000 Standard Data Form (SDF); however, detailed and high-quality data on their actual distribution zones are not available. In addition to lakes, watercourses and tufa barriers, important aquatic habitats for biodiversity conservation are also ponds and wetland localities. However, their biodiversity and conservation status have not been systematically researched so far, and a reliable assessment of their conservation status and endangerment is therefore not possible at the moment.

Detailed data concerning the conservation status of Natura 2000 species are mostly not available. Systematic monitoring of conservation status of Natura 2000 habitat types and species related to aquatic ecosystems has not been fully established so far; however, presence of Natura 2000 species otter and stone crayfish is regularly monitored. Monitoring results point to a frequent presence of otter in lakes and watercourses in the Park. Results of stone crayfish *Austropotamobius torrentium* monitoring in the Park area have determined dense populations in the streams of Sartuk, Prijeboj and Rječica. Mixed populations with the species European crayfish *Astacus astacus* have been determined in the downstream section of the Sartuk stream and in the area of Burget. Significant risk for the conservation of stone crayfish is posed by uncontrolled introduction and spreading of invasive species signal crayfish *Pacifastacus leniusculus* and pathogen *Aphanomyces astaci* connected with it (crayfish plague agent) through natural upstream spreading along the Korana river. Brown trout *Salmo trutta* is suppressed by populations of allochthonous species (see chapter 2.2.7. Fauna, section Fish), while Natura 2000 species Italian loach, *Sabanejewia larvata* and *Cobitis bilineata*, apart from having been recorded in several research endeavors, have never been explored in greater detail, and there is no data concerning the distribution and viability of populations. The structure of ichthyofauna has changed as a result of fish stocking in the past, unintentional introduction,

changes of trophic level or other factors (climate change, etc.). Fish research in the past was primarily practically oriented, with the purpose of fishing, which is why a range of factors necessary for the reconstruction of present and past fish communities is missing. In addition to the quality of habitats and the presence of allochthonous species, illegal fishing present in the Park area also exerts a substantial negative impact on the conservation of individual species (such as brown trout, stone crayfish and otter) in aquatic ecosystems. Individual sections of watercourses were changed substantially in hydromorphological terms in the past, which has resulted in hampered brown trout migration. Research that will result in collection of required data and preparation of detailed recommendations for the implementation of active conservation measures for brown trout of Plitvice is currently ongoing.<sup>50</sup>

Certain groups of entomofauna, such as dragonflies, caddisflies, Diptera, Ephemeroidea, aquatic Coleoptera and stoneflies have still not been systematically researched, nor fully inventoried. As a result, there is no assessment of conservation status of ornate bluet *Coenagrion ornatum*; however, it is known that the conservation of this species necessitates conservation of quality of small and shallow streams exposed to sunlight, as well as slow-flowing channels. Kingfisher *Alcedo atthis* has not been systematically researched so far; this species is rare in the Park area according to the existing data. Species creeping marshwort *Apium repens*, according to the existing data, is represented in the Park area along the water sources and watercourses in the area of Drakulić Rijeka, Vrelo Koreničko and Rudanovac, Bijela rijeka and Crna rijeka, Rječica.

There was no systematic research of amphibians and reptiles in the Park area in the past.<sup>51</sup> Data from ongoing research<sup>52</sup> unfortunately confirms the presence of allochthonous frog species *Pelophylax kurtmulleri*, hybrid *Pelophylax ridibundus*, at the mouth of the stream Sušanjski potok at Proščansko Lake, which can potentially have a

<sup>50</sup> Research will determine the condition of the fish community, quality of fish habitats and taxonomic distribution and genetic structure of trout in the wider area of Plitvice Lakes; identify autochthonous strains and their distribution; create DNA databases for brown trout of Plitvice; create a detailed action plan on the conservation of Plitvice brown trout with the proposal of measures concerning population regeneration and increasing the probability of their survival.

<sup>51</sup> Sporadic data on the fauna of this area ranges back to the distant past. In 2007, preliminary list of species for the Park was prepared within the KEC Project; however, a detailed inventory was not prepared.

<sup>52</sup> Three-year research of amphibians and reptiles began in 2015, and it will determine the list of species present in various habitats within the Park, their exact spatial and elevation distributions, and assessment of their numbers and population stability.

negative impact on autochthonous species. Data on locations of most frequent amphibian roadkills (black spots), required in order to protect migration paths, is also missing. Mollusks in the Park are also poorly researched.

In recent years, beaver has been recorded in the Park as an allochthonous species in the area; however, detailed research has not yet been undertaken. Given the fact that this is a strictly protected species, its presence in the Park area should be determined and monitoring program should be prepared, including monitoring of the influence of the species on tufa barriers.

Quality status of aquatic habitats can also be monitored through the presence and conservation of indicator species such as white-throated dipper *Cinclus cinclus*, a bird species connected with clean (oligotrophic) waters, or stoneflies (Plecoptera) as insects that represent important macrozoobenthos indicator organisms in biological methods of assessing the level of pollution of natural waters.



AA. CONSERVATION OF AQUATIC ECOSYSTEMS															
SUB-THEME															
OBJECTIVE	AA. Ensured optimal hydrological conditions and water quality in the catchment area that enable stability of the tufa formation processes, existing diversity of habitats in favorable conservation status, with present stable populations of specific species.														
INDICATORS	Very good to good water status in the entire catchment area; Tufa formation process is active and stable in the entire lake system; Existing aquatic habitats are in favorable conservation status; Populations of specific species are stable.														
CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
RESEARCH															
AA1	Implement additional hydrogeological and hydrological research in the Park area, with the Plitvice stream as priority, in order to define catchments, directions of flows of surface water and groundwater and their balance equations, with identification of locations of water losses.	Research report; Detailed hydrogeological map in GIS; Calculation of water balance; Determined locations of losses and directions of groundwater flow	1	External collaborators											800.000,00
	Undertake detailed mathematical modeling of lake system hydrodynamics (origin of water, time of retention of water underground, spatial monitoring of outflow, movement of water and soluble / suspended solids in water, analysis of multi-annual changes in trends of hydrological conditions - water levels and discharges) in the Park area;	Annual reports on undertaken research; Pilot hydrodynamic model of Prošćansko Lake; Hydrodynamic model of the entire lake system	1	Faculty of Science; Faculty of Geotechnical Engineering Varaždin; Faculty of Civil Engineering in Rijeka											1.500.000,00
AA2															

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AA3	Renovate and expand the network of weather stations in the Park area, with two automatic weather stations as a priority (for the collection of data required for the precise design of a detailed meteorological and climatological mathematical model as a foundation for hydrodynamic modeling), and establish regular monitoring.	Number of newly established weather stations; Established operation of 2 automatic weather stations; Updated database of climatological and meteorological data in GIS; Measurement results on a daily basis; Annual monitoring reports	2	Croatian Meteorological and Hydrological Service (CMHS); External collaborators											160.000,00
AA4	Undertake research of isotopic composition of monthly precipitation in a wider area around the Park for the purposes of determining the recharge areas (locations of meteorological, climatological and rain gauge CMHS stations), isotopic composition of waters and dissolved inorganic carbon at water sources, surface water, vertical profiles and sediment, for the purposes of dating, climatological and hydrological research	Research report; Database of measured parameters; Determined mean time of water retention for sources, water mixing, losses; Determined recharge area and climatological impacts; Determined baseline a 14C carbonate status for the purposes of precise 14C dating of tufa and sediments	3	External collaborators											450.000,00
AA5	Undertake initial bathymetric measurements for all lakes.	Research report; Digital elevation model (DEM) of lake bottom; Correlated DEM of lake bottom with Park DEM	1	External collaborators											60.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AA6	Research parameters responsible for the tufa formation process in Plitvice Lakes (with emphasis on specific conditions of the process), and issue management and recommendations on the basis of research results.	Research report with management recommendations; Determined indicators responsible for the tufa formation process in Plitvice Lakes	1	External collaborators											540.000,00
AA7	Research and assess the origin and composition of organic load in Plitvice Lakes ecosystem.	Research report; Determined origin and composition of organic matter; Determined localities with elevated organic load (GIS database); Protocol for continuation of organic load monitoring; Management recommendations	1	External collaborators											300.000,00
AA8	Undertake chemical and molecular analyses of collected samples for the needs of microbial observatory (environmental DNA).	Number of implemented analyses; Database of obtained results; Report on obtained results with status assessment	2	External collaborators											400.000,00
AA9	Research the impact of woody species and macrovegetation on tufa barriers on the tufa formation process and tufa barrier statics and biodiversity	Research report; Specific management recommendations	1	External collaborators											280.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AA10	Determine ecologically acceptable flow on sites where water intake structures are located, priorities being Lake Kozjak, Rijeka Korenička (Vrelo Koreničko) and Plitvica stream.	Research reports; Determined values of ecologically acceptable flow for Kozjak; Rijeka Korenička (Vrelo Koreničko); Plitvica stream; and for other sites with water intake structures	1	External collaborators											200.000,00
AA11	Complete research of morphological changes in the Korana riverbed caused by digging through tufa barriers in 2011	Research report; Model of morphological changes of the Korana riverbed; Recommendations for monitoring morphological changes	1	Faculty of Civil Engineering in Rijeka											60.000,00
AA12	Map macrovegetation, record the status of overgrowth on lakes and watercourses, and map in detail Natura 2000 target aquatic habitats 32A0, 3140 and 3260 in the Park area.	Data for GIS and detailed maps of spatial distribution for: 1) macrovegetation and status of overgrowth on lakes and watercourses; 2) habitats 32A0, 3140, 3260 in the Park area (at a minimum, 3rd NHC level)	1	External collaborators											950.000,00
AA13	Map and determine the state of conservation of ponds, wetland localities and furnished water sources in the Park area, and produce recommendations for their restoration and maintenance.	Research report with data for GIS; Updated spatial databases for ponds, wetland localities and wells, with data on their state of conservation Recommendations for restoration and/or maintenance per locality	2	External collaborators											10.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AA14	Complete inventory and research of amphibians and reptiles in the Park, with a targeted focus on small and less well researched areas.	Research report with data for GIS; List of species per locality; Distribution of species in the Park area; List of impacts per locality; Management recommendations	2	External collaborators											160.000,00
	Create project proposal of habitat restoration with the implementation plan for restoration intervention in selected watercourses, with the aim of restoring the degraded habitat as a precondition for better brown trout migration.	Prepared project proposal with a list of locations and required restoration measures; Implementation plan for restoration interventions	1	External collaborators											
AA15	Determine the distribution, size and structure of loach population (Cobitidae) in the Park area, and provide management recommendations.	Research report with data for GIS; Distribution in the Park area; Monitoring program; Monitoring reports; Management recommendations.	1	External collaborators											120.000,00
	Analyze existing data, prepare inventory of aquatic entomofauna in unexplored parts of the Park (with an emphasis on rare, endemic and endangered species and the Natura 2000 species <i>Coenagrion ornatum</i> ), determine the factors that impact the groups, and provide management recommendations.	Research report for each individual group with data for GIS; List of species per locality; Distribution of species in the Park area; List of impacts per locality; Management recommendations	1	External collaborators											
AA16															480.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AA18	Prepare inventory of fauna of snails and freshwater bivalves in the Park area, determine impact factors for the group and provide management recommendations.	Research report with data for GIS; List of species per locality; Distribution of species in the Park area; List of impacts per locality; Management recommendations	2	External collaborators											180.000,00
AA19	Research the distribution of kingfisher <i>Alcedo atthis</i> and white-throated dipper <i>Cinclus cinclus</i> in the Park area, determine impact factors and provide management recommendations.	Research report with data for GIS; Distribution in the Park area; List of impacts per locality; Management recommendations	1	External collaborators											90.000,00
AA20	Undertake research on beaver <i>Castor fiber</i> presence in the Park area and prepare program of monitoring the presence of this species and its impact on tufa barriers.	Research report with data for GIS; Distribution of beaver in the Park area; Beaver monitoring program; Monitoring reports; Management recommendations	1	External collaborators											200.000,00
AA21	Determine the distribution, size and structure of otter <i>Lutra lutra</i> population in the Park area, and provide management recommendations.	Report on performed research; Otter distribution map in the Park area; Management recommendations	1	External collaborators											200.000,00
AA22	Complete initiated research on flora and vegetation of mosses and vascular plants of tufa barriers in the lake system.	Research report with data for GIS; Management recommendations	1	Croatian Botanical Society											60.000,00



[illegible]

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AA27	Regularly collect monitoring results for water quality elements of Prošćansko Lake, Lake Kozjak, Crna Rijeka and Korana, and incorporate them in the appropriate databases.	Database on monthly monitoring and assessment of ecological status	1	Hrvatske vode (Croatian Waters)											0,00
AA28	Continue with continuous measurement of the discharge (at least once per year), with the aim of determining losses on permanent profiles.	Annual monitoring report; Data from the report entered into internal databases of the Public Institution	1	CMHS											450.000,00
AA29	Continue with continuous monitoring of hydrological parameters (water level, discharge, temperature) at hydrological stations (limnigraph network) in the Park area, and establish and regularly implement monitoring of water discharge at the Prošće station.	Annual monitoring report (with data in digital form); Data from the report entered into internal databases of the Public Institution	1	CMHS											1.960.000,00
AA30	Establish continuous monitoring of water temperature at hydrological measuring stations;	Measurement results on a daily basis; Annual monitoring reports	1	CMHS											60.000,00
AA31	Establish automation of existing hydrological stations along Pečina and Kavga watercourses.	Automated operation of existing hydrological stations	2	CMHS											30.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AA32	Regularly analyze all available data to determine the trends of hydrological parameters (water level, discharge, temperature) throughout the Park area, as well as phenomena and causes of changes.	Established and updated internal database of hydrological parameters; Reports on undertaken trend analyses (every 5 years)	2												0,00
AA33	Undertake monitoring of isotopic composition of monthly precipitation in the Park area for the purposes of climatological and hydrological analyses and monitoring.	Annual reports with analyses; determined LMWL	3	External collaborators											250.000,00
AA34	Undertake hydromorphological monitoring of surface waters pursuant to the Regulation on Water Quality Standard.	Protocols for further monitoring; Baseline status results; Monitoring results and assessment of hydromorphological status of surface waters	3	External collaborators											60.000,00
AA35	Develop monitoring protocol and regularly monitor the intensity of agricultural activities in the catchment area.	Monitoring protocol; Status monitoring reports; Recommendations for management adjustment	3												6.000,00
AA36	Establish regular monitoring of the status of ponds and wetland localities in the Park area; use monitoring results for management adjustment.	Monitoring protocol at Park level; Status monitoring reports; Recommendations for management adjustment	2	External collaborators											0,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AA37	Establish regular status monitoring of Natura 2000 habitat type 3140 in the Park area, and use monitoring results for management adjustment.	Monitoring protocol at Park level; Status monitoring reports with data for GIS, containing at a minimum: surface covered with habitat type, structure and function of habitat, future prospects, recommendations for management adjustment.	1												5.000,00
AA38	Establish regular status monitoring of Natura 2000 habitat type 3260 in the Park area, and use monitoring results for management adjustment.	Monitoring protocol at Park level; Status monitoring reports with data for GIS, containing at a minimum: surface covered with habitat type, structure and function of habitat, future prospects, recommendations for management adjustment.	1												5.000,00
AA39	Establish regular status monitoring of Natura 2000 habitat type 32A0 in the Park area, and use monitoring results for management adjustment.	Monitoring protocol at Park level; Status monitoring reports with data for GIS, containing at a minimum: surface covered with habitat type, structure and function of habitat, future prospects, recommendations for management adjustment.	1												5.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AA40	Continue with regular monitoring of otter <i>Lutra lutra</i> status in the Park area, and use results for management adjustment.	Monitoring protocol at Park level; Status monitoring reports with data for GIS, containing at a minimum: number of individuals (in the Park area), distribution, quality and size of habitat for the species, future prospects, recommendations for management adjustment.	1	External collaborators											10.000,00
AA41	Establish regular monitoring of the status of kingfisher <i>Alcedo atthis</i> and white-throated dipper <i>Cinclus cinclus</i> in the Park area; use monitoring results for management adjustment.	Monitoring protocol at Park level; Status monitoring reports with data for GIS, containing at a minimum: number of individuals (per locality), distribution, quality and size of habitat for the species, future prospects, recommendations for management adjustment.	1	External collaborators											140.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AA42	Establish regular monitoring of the status of creeping marshwort <i>Apium repens</i> in the Park area, and use monitoring results for management adjustment.	Monitoring protocol at Park level; Status monitoring reports with data for GIS, containing at a minimum: number of individuals (per locality), distribution, quality and size of habitat for the species, future prospects, recommendations for management adjustment.	1	External collaborators											60.000,00
AA43	Establish long-term monitoring of phenology of aquatic insects.	Monitoring reports with data for GIS, containing at a minimum: number of individuals (per locality), distribution, quality and size of habitat for the species, future prospects, recommendations for management adjustment.	2	External collaborators											450.000,00
AA44	Establish regular monitoring of the status of ornate bluets <i>Coenagrion ornatum ornatum</i> in the Park area, and use monitoring results for management adjustment.	Monitoring protocol at Park level; Status monitoring reports with data for GIS, containing at a minimum: number of individuals (per locality), distribution, quality and size of habitat for the species, future prospects, recommendations for management adjustment.	1	External collaborators											40.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AA45	Establish monitoring of population dynamics for brown trout <i>Salmo trutta</i> and changes in habitats according to the protocol, as well as status monitoring for allochthonous species.	Monitoring protocol at Park level; Status monitoring reports with data for GIS, containing at a minimum: number of individuals (in the Park area), distribution, quality and size of habitat for the species, future prospects, recommendations for management adjustment.	1	External collaborators											120.000,00
AA46	Establish regular monitoring of the status of loach population (Italian loach <i>Sabanejewia larvata</i> and <i>Cobitis bilineata</i> ) in the Park area, and use monitoring results for management adjustment.	Monitoring protocol at Park level; Status monitoring reports with data for GIS, containing at a minimum: number of individuals (per locality) distribution quality and size of habitat for the species future prospects recommendations for management adjustment	1	External collaborators											60.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AA47	Establish regular monitoring of the status of stone crayfish <i>Austropotamobius torrentium</i> and European crayfish <i>Astacus astacus</i> in the Park area; use monitoring results for management adjustment.	Monitoring protocol at Park level; Status monitoring reports with data for GIS, containing at a minimum: number of individuals (in the Park area), distribution, quality and size of habitat for the species, future prospects, recommendations for management adjustment.	1	External collaborators											120.000,00
AA48	Prevent the expansion of signal crayfish <i>Pacifastacus leniusculus</i> in the Park area by conducting population control in the areas in the immediate vicinity of the Park.	Monitoring protocol; Monitoring reports; Updated spatial data on the expansion area of signal crayfish in Public Institution's database; Absence of signal crayfish in the National Park	1	External collaborators											200.000,00
AA49	Monitor and record any illegal water wells in the Park area, and urge competent authorities to remedy any irregularities.	Monitoring protocol; Monitoring results; Number of reports concerning illegal water wells submitted to competent authorities	2	Ministry of Environment and Energy (MEE); Nature Conservation Inspection; Water Inspection; Hrvatske vode (Croatian Waters)											0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AA50	Monitor the status of amphibian and reptile populations determined by research	Monitoring protocol at Park level; Status monitoring reports with data for GIS, containing at a minimum: number of individuals (in the Park area) distribution quality and size of habitat for the species future prospects recommendations for management adjustment	2	External collaborators											80.000,00
AA51	Continuously measure and monitor data at the climatological and automated meteorological station Plitvice Lakes, and at newly established meteorological stations.	Established network of meteorological stations. Measurement results on a daily basis. Annual monitoring reports. Updated database of climatological and meteorological data in Excel and GIS	1	External collaborators											250.000,00
AA52	Upon completion of initial bathymetric measurements, continue with monitoring of lake bathymetry every 4 years.	Comparative analytic reports on bathymetry changes	1												30.000,00
AA53	Monitor the incidence and level of groundwater in existing and newly established well bores	Report with results of performed measurements	1												0,00
AA54	Collect status monitoring results for hydrological characteristics and status of vegetation at the springs of Koreničko vrelo, Stipanovac and Kameniti vrelac.	Status monitoring reports	1	Hrvatske vode (Croatian Waters)											0,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>ACTIVE CONSERVATION</b>															
<b>AA55</b>	In accordance with determined priorities and recommendations arising from research results, undertake active measures of restoration and maintenance of ponds, wetland localities and furnished springs in the Park area.	List of localities where restoration and maintenance measures are implemented; Description of implemented conservation measures	<b>1</b>												190.000,00
	On the basis of results of project proposal for habitat restoration, undertake restoration interventions at selected watercourses with the aim of restoring the degraded habitat.	Performed restoration works in degraded habitats; Prevented further habitat fragmentation; Report on performed restoration interventions with data in GIS; Established trout migration	<b>1</b>	External collaborators											360.000,00
<b>AA57</b>	Implement elimination or decrease of invasive fish species populations in streams and in lakes.	Elimination Plan prepared; Annual reports on the implementation of elimination, with data on locations of elimination and quantity of eliminated fish; Significant decrease in population of rainbow trout; Decrease in population of other invasive fish species	<b>1</b>	External collaborators											250.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AA58	On the basis of results and recommendations stemming from scientific research, prepare Implementation Plan for Restoration of Populations, and implement measures for restoration of brown trout <i>Salmo trutta</i> populations.	Prepared Implementation Plan for Restoration of Populations; Undertaken population restoration measures; Restored populations	1	External collaborators											500.000,00
AA59	In case of expansion of signal crayfish <i>Pacifastacus leniusculus</i> to areas in the immediate vicinity of the Park, implement measures to prevent its expansion in cooperation with relevant institutions.	List of stations for signal crayfish expansion control; Number of captured individuals	1	External collaborators											200.000,00
AA60	Establish and implement disinfection of equipment for research and monitoring and for the purposes of other projects, in order to prevent the spread of crayfish plague	Procured equipment and preparations for disinfection; Protocol for implementation of disinfection; Database on performed disinfection procedures	1	External collaborators											60.000,00
AA61	In accordance with research recommendation, monitor other invasive species in lakes and streams, and eliminate such species based on need.	List of localities where invasive species elimination measures are implemented Number and structure of captured (eliminated) individuals.	1	External collaborators											100.000,00
AA62	Combat illegal fishing in the Park area through increased surveillance and enforcement of penal provisions.	Number of records on performed surveillance Decreasing share of recorded cases of illegal fishing in the records on performed surveillance	1												0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AA63	Establish cooperation with competent institutions in recording and control of permeability of septic tanks and their regular maintenance, most urgently in areas facing high pollution risk.	Agreed cooperation in data exchange; Septic tank control results available to the Public Institution; Septic tanks in the Park meet the requirement of water quality conservation	1	Sanitary inspection; Water inspection; Municipal utility companies; Hrvatske vode (Croatian Waters); Nature Conservation Inspection											0,00
AA64	Undertake periodic waste cleaning in lakes and watercourses (surface cleaning and cleaning by diving) at least 2 times per year (in spring and autumn).	Cleaning plan with spatial data on localities; Annual cleaning report with data on quantity and type of collected waste per locality	1	External collaborators											185.000,00
AA65	Protect migration paths (especially for amphibians) during the reproduction cycle	List of localities where warning signs on potential presence of a large number of amphibians should be placed along roads during the migration periods of these species to and from their reproduction areas. Installed warning signs.	1												0,00
TOTAL:															14.446.000,00



### 3.1.2 AB. Conservation of forest ecosystems

General condition of forests in the Park can be assessed as good, and some important indicators point to a further positive trend. Lack of forest management for over 20 years and natural development of forests contribute to the stability of forests (optimal natural composition of plant communities and species; trees of diverse age, height and thickness; self-renewal; disease resistance), and to increase of biodiversity.

Preparation of the Forest Protection, Care and Restoration Program is foreseen for forests through the Nature Conservation Act. For the purposes of preparation of this program, the Public Institution is implementing the project "LIDAR Technology Application in Forestry Research". The aim of the program is to use LIDAR images in order to improve traditional methods of forest inventory, and to obtain more reliable and more punctual results with a substantially lower investments of funds and effort. The project will result in a methodological proposal and method of inventory for forest ecosystems in protected natural sites.

Global changes such as climate change or incidence of diseases might represent a potential threat to good status of forests in the future. Increased bark beetle presence in beech and fir forests in the southwestern part of the Park has already been noted. Causes partly lie in changes to the mode of use (increased share of spruce in the composition of communities as a consequence of the logging of beech and planting of spruce in the past, coupled with overgrowth of grassland surfaces due to abandonment of use), but also in changes in climate conditions. From the ecological point of view, bark beetle presence represents part of the natural process leading to the establishment of climax community of beech and fir, and measures aimed at bark beetle suppression are not needed in this regard. According to monitoring conducted so far, climax community of beech and fir forests is being established in surfaces covered in pure spruce formations characterized by total drying, given the fact that the zone in question is the zone of beech and fir forests. In terms of forest diseases, no significant disturbances have been recorded so far.

In addition to global phenomena, one potential threat to general condition of all forests in karst terrain in the future can also be posed by water regime changes, or changes in groundwater level that may arise due to excessive water extraction,

i.e., due to the establishment of new water pumping sites or construction in sensitive areas (especially pronounced along watercourses in the area of Rudanovac and Vrelo Koreničko). Alluvial forests are particularly sensitive to this threat.

Fire hazard is not high; however, it is rising due to the increasing human presence, as well as the need to implement fire protection measures. Some localities, e.g. those where pine and spruce cultures were planted, or zones along the railway, are more exposed to fires. Fire hazard can also be increased due to certain modes of use, such as e.g. uncontrolled burning of weed in springtime, in dry years when fires spread more easily.

With regular surveillance of the Park area by the Ranger Service, bearing in mind changes to the population structure (predominantly senior population) and the disappearance of villages, illegal logging does occur, but it is very rare.

Old-growth forest Čorkova uvala represents a particularly valuable example of forests in the Park. It includes all development stages of pristine beech and fir forest, providing important insights into the ecosystem life cycle, ranging from origin to decay and self-renewal. Given its extraordinary conservation level (composition of communities; quantity of dry and dead trees and tree crown openings; tree thickness and height; surface; biodiversity), old-growth forest Čorkova uvala serves as a reference point for the advancement of forest management in Croatia as a whole.

With the reaching of the Act Proclaiming Plitvice Lakes a National Park, the Park surface has been enlarged by additional 10,000 hectares; however, pedological map has not been prepared for the entire area of the Plitvice Lakes National Park.

Forest glades (Čudinka, Delička and other), as well as forest edges along forest paths, can generally be assessed as being in poor condition due to overgrowth as a result of succession. Data on their precise locations, degree of conservation and appropriate conservation measures are lacking for the purposes of a high-quality assessment of their status.

Natura 2000 habitats of forest ecosystems in the Park (table 1 in chapter 2.2.5) are largely mapped in sufficient detail, with the exception of NHC E.4.6.1. Illyrian *Fagus sylvatica* forests (91KO); NHC

E.4.4.2 Tilio-Acerion forests of slopes, screes and ravines (9180); NHC E.3.1.5. Illyrian oak-hornbeam forests (Erythronio-carpinion) (91LO); NHC E.3.4.1. Thermophilous durmast oak and hornbeam forest (91M0\*). Monitoring of conservation status for Natura 2000 habitat types is still not established, and its establishment represents a priority.

Natura 2000 habitat type 5130 *Juniperus communis* formations on heaths or calcareous grasslands requires active conservation measures as a transitional vegetation stage prior to the establishment of association climax, since most of the surfaces creating this habitat type are currently in a phase where other species, such as, e.g., common spruce, are taking over the key role, which results in the disappearance of *Juniperus communis*, i.e., this habitat type.

Main threats to large carnivores in the Park are posed by roads, waste and poaching. State roads and local (county and municipal) roads fragment the habitat, introduce disturbance and represent direct danger for animals crossing them due to major traffic density, in particular in summer months. Two cases of bear roadkills and two cases of wolf roadkills have been recorded along roads in the Park in the last 20 years. In 2018 itself, one lynx was killed as well, and this case, which took place on the D1 state road in the area of Prijeboj, is the first recorded case of lynx roadkill in the area of the Plitvice Lakes National Park. In addition to direct roadkills, roads also cause disturbance of animals due to noise and higher level of human presence in their habitats. Forest roads in the Park area serve solely for the purposes of the Public Institution, such as, e.g., for status monitoring of species and habitat types, research, patrols of the Ranger Service, patrols of information service in times of elevated forest fire danger, as well as for free access for firefighters and firefighting vehicles in case of fire. Some forest roads are regularly maintained, and some forest roads that are impassable due to lack of maintenance should be put into service. Telemetry monitoring of wolves has established that wolves retreat to calmer areas of their territory during the summer months, when there are more people staying in the Park. Unfenced waste disposal sites and discarded food from households or catering facilities attract bears in particular, and some of them regularly frequent such disposal sites, due to which some are killed. Even though hunting is prohibited in the Park, isolated cases of large carnivore (bear and wolf) poaching have been recorded, and cooperation with hunting ground lessees in the surroundings of the Park for the purposes of large carnivore

conservation should be strengthened in this regard. In case of some species that are known to exist in the Park area (wildcat, rabbit, wild boar, deer, roe deer, chamois), no research has been performed so far, and there is no data on the status of their populations (numbers, distribution, etc.). In 2018, invasive alien species raccoon dog *Nyctereutes procyonoides* was recorded in the Park area for the first time, with the help of photo traps.

Small mammal fauna has not been inventoried nor systematically researched so far. Diverse and conserved habitats at various elevations point to major diversity of this particular segment of the fauna, and it therefore needs to be researched in detail.

Conserved Park forests are significant for resident and migratory forest bat species. In the area of the National Park, stable resident population of endangered forest bat species Western Barbastelle *Barbastella barbastellus* has been found. Additional research is needed in order to determine the area of colony shelters, movement and hunting areas for Natura 2000 species Western Barbastelle *Barbastella barbastellus* and Bechstein's bat *Myotis bechsteinii*, as well as for other species that use the forest for their living needs (food and shelter). In addition to resident and migratory forest species, forests are also significant hunting grounds for species that use caves as summer or winter shelters (*Rhinolophus ferrumequinum*, *Rhinolophus euryale*, *Myotis blythii* and *Miniopterus schreibersii*), and for species connected with human settlements (*Rhinolophus hipposideros*, *Plecotus austriacus*, *Pipistrellus pipistrellus*, etc.). For the time being, bat monitoring includes only cave localities important for populations of target bat species (Vila jezerkinja, Modra pećina, Baričeve špilje and cave Mračnjača), as well as surface site Vila Izvor.

Ornithofauna of forest habitats is very rich in species, and particularly prominent species are woodpeckers, owls, birds of prey and songbird species of forest habitats.

Diversity of species and their stable populations, with population densities for some owl species (Ural owl *Strix uralensis*) among the highest in Europe, are indicators of the fact that the status of forests is favorable and that forests as such are ideal habitats for these species. Owl monitoring has been implemented since 2008.

Satisfactory status of forests is also confirmed by a large number of Piciformes species. Their monitoring has been in place continuously since

2015. Results of status monitoring performed so far clearly point to a conclusion that these species prefer virgin forest type of forest habitat.

Monitoring results support the provision in the Management Plan that forests in the Park area should not be managed, and it is furthermore recommended not to undertake remediation activities in certain extraordinary situations such as windthrows, fires or bark beetle infestations. Such “catastrophic events” are part of the natural forest cycle (such as, e.g., fires), after which natural restoration takes place.

Such management approach also contributes to the conservation of Natura 2000 species of forest songbirds: collared flycatcher *Ficedula albicollis* and red-breasted flycatcher *Ficedula parva*.

European honey buzzard, *Pernis apivorus*, has only a modest presence as a nesting species in the Park (with 1 to 2 pairs). Establishment of monitoring will point to the trends for these Natura 2000 species and the need to undertake conservation measures.

According to recommendations stemming from the project “Grouse of Plitvice Lakes National Park – Distribution and Impact of Tourism Activities”, status monitoring establishment is foreseen for hazel grouse *Bonasa bonasia*.

Research projects on beetles in the Park, including 3 Natura 2000 species for the Park (see annex 5.3), have been performed within the beech and fir habitat, beech forest, and areas along watercourses with willowed areas, black alder, etc. The habitats are very favorable for beetles, and their presence is an indicator of favorable management method and good conservation status of forest habitats.

Fauna of snails and slugs in forest ecosystems has not been researched.

Lady's slipper orchid *Cypripedium calceolus* as a target orchid species is rare in the Park area, with several stable populations, and the most numerous population has approximately 50 individuals. Status monitoring for lady's slipper orchid has been in place since 2008, and no significant deviations in numbers have been recorded. Given the fact that lady's slipper orchid is one of the slowest-growing plants in the world, key threat to its conservation is posed by illegal plant collectors. This threat is particularly pronounced in the flowering period from mid-May until mid-June.

Thermophilous habitats along forest roads, forest edges, forest clearings, heaths and overgrown grassland surfaces are ideal habitats for butterfly Jersey tiger *Euplagia quadripuncaria*. Succession of boundary forest areas and other habitats that this species prefers, even though present, does not pose a serious threat.

Diverse and conserved forest communities with beech serve to promote mosses *Buxbaumia viridis* and *Dicranum viride* as moss populations listed in the Red Book of European Bryophytes.

*Dicranum viride* is a sub-continental species living as epiphyte on bark of old trees. Historically, it was recorded on the foothills of Papuk, in Maksimir park forest in Zagreb and in Bunjevačka draga on Velebit. It has not been confirmed by new research in the first two localities.

Medveđak in the Plitvice Lakes National Park is the only finding site of this species in Croatia in beech-fir forest *Omphalodo-Fagetum*, living on beech bark in several small clusters.

*B. viridis* was discovered in beech-fir old-growth forest in Čorkova uvala in the Plitvice Lakes National park, where it inhabits tens of decaying trees.

Old-growth forest-type stands, developed as a result of strict conservation and lack of human activity, are an ideal habitat of many endangered fungus species (more than 60 of them). Approximately 800 species recorded so far are only a small segment of total fungus biodiversity that requires research.

Lichen biodiversity has not been explored so far, but one can assume it is substantial.



AB. CONSERVATION OF FOREST ECOSYSTEMS															
SUB-THEME		AB. Diversity of forest communities in stable natural condition with represented stable populations of significant species is conserved throughout the Park area.													
SPECIFIC OBJECTIVE															
INDICATORS		All currently present forest communities are represented in the Park area; Forest habitats are in favorable state of conservation; Populations of significant species are stable.													
CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
RESEARCH															
AB1	Detailed mapping of the following Natura 2000 forest habitat types: 9180 (NHC E.4.4.2.); 91KO (NHC E.4.6.1.) and 91LO (NHC E.3.1.5.); 91M0* (NHC E.3.4.1.).	Data for GIS and detailed habitat distribution map (at a minimum, 4th NHC level)	1	External collaborators											200.000,00
AB2	Complete research on use of LIDAR technology in the preparation of inventory of forest ecosystems in the Park area.	Established permanent experimental plots (130 - 180) with measured biometric data and subsequently calculated biometric values; Research reports; Working documents for the preparation of a manual for forest ecosystem monitoring	1	Faculty of Forestry in Zagreb											370.000,00
AB3	Complete research on number, use of space and behavior of bears <i>Ursus arctos</i> in the Park area, and establish connected Public Institution database of spatial data.	Research reports with data for GIS; Assessment of bear numbers; Assessment of bear conservation status; Impact factors for the species; Updated database of spatial data on bear movement and behavior; Management recommendations	1	Faculty of Veterinary Medicine											105.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AB4	Complete research on movement, use of space and activity of wolves <i>Canis lupus</i> in the Park area, and establish connected Public Institution database of spatial data.	Research reports with data for GIS; Assessment of wolf numbers; Assessment of species conservation status; Impact factors for the species; Updated database of spatial data on wolf movement and behavior; Management recommendations	1	Faculty of Veterinary Medicine											355.000,00
AB5	Complete research on movement, use of space, activity and number of lynxes <i>Lynx lynx</i> in the Park area, and establish connected Public Institution database of spatial data.	Research reports with data for GIS; Assessment of lynx numbers; Assessment of species conservation status; Impact factors for the species; Updated database of spatial data on lynx movement and behavior; Management recommendations	1	Faculty of Veterinary Medicine											340.000,00
AB6	Determine the distribution and number of wildcats <i>Felis silvestris</i> in the Park area.	Research report with data for GIS; Number of individuals in the Park area; Species distribution in the Park area; Management recommendations	2	External collaborators											120.000,00
AB7	Explore the distribution of bat species in forests, determine factors that impact the group and important areas for their conservation in view of the method of use of the area, and establish connected Public Institution database of spatial data.	Research report with data for GIS; Impact factors for the group of present species at researched localities; Updated database of spatial data on the distribution of bats and methods of use of the area; Management recommendations	1	External collaborators											190.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AB8	Prepare inventory of rodent species (squirrels, dormice, voles, Eurasian harvest mice), determine the distribution of species and impact factors per individual group.	Research report with data for GIS; List of species per locality; Distribution of species in the Park area; Assessment of conservation status; Interpretation recommendations	3	External collaborators											190.000,00
AB9	Prepare inventory of fauna and determine the distribution of shrews, hedgehogs and moles in the Park area.	Research report with data for GIS; List of species per locality; Distribution of species in the Park area; Interpretation recommendations	3	External collaborators											190.000,00
AB10	Determine the distribution and number of hares <i>Lepus europaeus</i> in the Park area.	Research report with data for GIS; Species distribution in the Park area; Number of individuals in the Park area;	3	External collaborators											120.000,00
AB11	Prepare inventory and determine the distribution of snails in the Park area.	Research report with data for GIS; List of species per locality;	3	External collaborators											210.000,00
AB12	Continue preparation of inventory and research on moths, with an emphasis on Natura 2000 species <i>Euplagia quadripunctaria</i> .	Report on performed research with data for GIS; List of species per locality Species distribution map; Assessment of habitat conservation status; Impact factors for the species; Management recommendations	1	External collaborators											210.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AB13	Perform detailed mapping of forest glades (C.5.2.) up to level V of the NHC.	Research report with data for GIS; List of species per locality; Impact factors for groups present at localities; Interpretation recommendations Management recommendations	2	External collaborators											210.000,00
AB14	Perform detailed mapping of flora of rare, endangered and strictly protected species of forest ecosystems.	Research report with data for GIS; Interpretation recommendations Updated internal database of spatial data on species distribution in the Park; Updated <i>Flora Croatica Database</i> (FCD)	2	External collaborators											380.000,00
AB15	Continue research and preparation of inventory of fungi in forest habitats, and implement status monitoring and conservation measures based on research results.	Research report with data for GIS; List of species per locality; Distribution of species per habitat type; Assessment of importance of researched habitats and localities for fungus conservation; Management recommendations;	3	External collaborators											210.000,00
AB16	Prepare inventory of lichens in the Park area.	Research report with data for GIS; List of species per locality; Assessment of importance of researched habitats and localities for lichen conservation;	3	External collaborators											140.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>AB17</b>	Continue research and preparation of inventory of mosses in forest habitats in the Park area, with an emphasis on Natura 2000 species <i>Buxbaumia viridis</i> and <i>Dicranum viridae</i> .	Research report with data for GIS; List of species per locality; Distribution of species in the Park area; Assessment of status per locality (for Natura 2000 species)	<b>2</b>	External collaborators											150.000,00
<b>AB18</b>	Undertake research of fauna of bark beetles and other xylophagous beetles in the Park area, including status monitoring for dominant species.	Research report with data for GIS; List of species per locality; Distribution of species in the Park area; Assessment of status per locality (for Natura 2000 species); Management recommendations	<b>2</b>	External collaborators											265.000,00
<b>AB19</b>	Undertake research of saproxylic Natura 2000 beetles in unexplored Park areas.	Research report with data for GIS; List of species per locality; Distribution of species in the Park area; Assessment of status per locality (for Natura 2000 species); Management recommendations	<b>2</b>	External collaborators											200.000,00
<b>AB20</b>	Create detailed pedological map for the Park area.	Research report with data for GIS; Detailed pedological map (1 : 25000)	<b>2</b>	External collaborators											300.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>AB21</b>	Explore (current and potential) impact of climate change on the status of forest ecosystems in the Park and the role of forest ecosystems in mitigation of climate change impacts.	Research report with data for GIS; Management recommendations	<b>2</b>	External collaborators											300.000,00
<b>AB22</b>	Determine the numbers and distribution of wild boar <i>Sus scrofa</i> , chamois <i>Rupicapra rupicapra</i> , deer <i>Cervus elaphus</i> and roe deer <i>Capreolus capreolus</i> (cloven-hoofed or even-toed ungulates).	Monitoring protocol at Park level; Research report with data for GIS, containing at a minimum: - number of individuals in the Park area - distribution - quality and size of habitat for the species - recommendations for management adjustment	<b>3</b>	External collaborators											300.000,00
<b>AB23</b>	Map invasive alien species raccoon dog <i>Nyctereutes procyonoides</i> .	Research report with data for GIS, containing at a minimum: - number of individuals in the Park area - distribution	<b>1</b>	External collaborators											50.000,00
<b>AB24</b>	Biodiversity of subterranean fungi in Plitvice Lakes National Park	Research report with data for GIS; List of species per locality; Distribution of species per habitat type; Assessment of significance of explored habitats and localities for conservation of fungi; Management recommendations	<b>1</b>	External collaborators											240.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>MONITORING</b>															
<b>AB25</b>	Upon establishment of long-term scientific monitoring of natural forest ecosystems in the Republic of Croatia, the regularly monitor the status at selected plots in the Park area.	Monitoring protocols; Status monitoring reports with data for GIS	<b>1</b>	External collaborators											200.000,00
<b>AB26</b>	Upon completion of current research, establish regular bear <i>Ursus arctos</i> status monitoring in the Park area, and use the results for management adjustment.	Monitoring protocol at Park level; Status monitoring reports with data for GIS, containing at a minimum: - number of individuals in the Park area - distribution - quality and size of habitat for the species - recommendations for management adjustment	<b>1</b>	External collaborators											20.000,00
<b>AB27</b>	Upon completion of current research, establish regular wolf <i>Canis lupus</i> status monitoring in the Park area, and use the results for management adjustment.	Monitoring protocol at Park level; Status monitoring reports with data for GIS, containing at a minimum: - number of individuals in the Park area - distribution - quality and size of habitat for the species - recommendations for management adjustment	<b>1</b>	External collaborators											10.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AB28	Upon completion of current research, establish regular lynx <i>Lynx lynx</i> status monitoring in the Park area, and use the results for management adjustment.	Monitoring protocol at Park level; Status monitoring reports with data for GIS, containing at a minimum: - number of individuals in the Park area - distribution - quality and size of habitat for the species - recommendations for management adjustment	1	External collaborators											10.000,00
	Establish regular status monitoring for Natura 2000 bat species in forests (Western Barbastelle <i>Barbastella barbastellus</i> , Bechstein's bat <i>Myotis bechsteinii</i> , greater mouse-eared bat <i>Myotis myotis</i> , <i>Myotis bechsteinii</i> and other species determined by research) in the area of the Plitvice Lakes National Park ecological network, and use the results for management adjustment.	Monitoring protocols at Park level; Status monitoring reports with data for GIS, containing at a minimum: - number of individuals in the Park area - distribution - quality and size of habitat for the species - recommendations for management adjustment	1	External collaborators											200.000,00
AB30	Regularly monitor the conservation status of Natura 2000 forest habitat types in the Park area (91K0, 91R0, 91L0, 91B0, 91M0*, 91M0*, 5130), in accordance with status monitoring protocols.	Monitoring protocol at Park level; Monitoring reports with data for GIS, containing at a minimum: - quality and size of habitat - distribution - recommendations for management adjustment	1	External collaborator, MEE											150.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AB31	Continue established status monitoring for target forest owl species in the Park area (boreal owl <i>Aegolus funereus</i> , Eurasian pygmy owl <i>Glaucidium passerinum</i> , Ural owl <i>Strix uralensis</i> , Eurasian eagle-owl <i>Bubo bubo</i> , short-eared owl <i>Asio flammeus</i> ) and other owl species in the Park area.	Monitoring protocols at Park level; Status monitoring reports with data for GIS, containing at a minimum: - number of individuals in the Park area - distribution - quality and size of habitat for the species - recommendations for management adjustment	1	External collaborators											180.000,00
AB32	Continue monitoring the status of target forest Piciformes species in the Park area (white-backed woodpecker <i>Dendrocopos leucotos</i> , black woodpecker <i>Dryocopus martius</i> , three-toed woodpecker <i>Pycoides tridactylus</i> , grey-headed woodpecker <i>Picus canus</i> ) and other woodpecker species.	Monitoring protocols at Park level; Status monitoring reports with data for GIS, containing at a minimum: - number of individuals in the Park area - distribution - quality and size of habitat for the species - recommendations for management adjustment	1	External collaborators											180.000,00
AB33	Continue monitoring the status of collared flycatcher <i>Ficedula albicollis</i> , red-breasted flycatcher <i>Ficedula parva</i> and other forest songbird species.	Monitoring protocols at Park level; Status monitoring reports with data for GIS, containing at a minimum: - number of individuals in the Park area - distribution - quality and size of habitat for the species - recommendations for management adjustment	1	External collaborators											130.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>AB34</b>	Continue monitoring the status of peregrine falcon <i>Falco peregrinus</i> .	Monitoring protocols at Park level; Status monitoring reports with data for GIS, containing at a minimum: - number of individuals in the Park area - distribution - quality and size of habitat for the species - recommendations for management adjustment	<b>1</b>												0,00
<b>AB35</b>	Establish status monitoring for European honey buzzard <i>Pernis apivorus</i> .	Monitoring protocols at Park level; Status monitoring reports with data for GIS, containing at a minimum: - number of individuals in the Park area - distribution - quality and size of habitat for the species - recommendations for management adjustment	<b>1</b>	External collaborators											60.000,00
<b>AB36</b>	Continue monitoring the status of black stork <i>Ciconia nigra</i> .	Monitoring protocols at Park level; Status monitoring reports with data for GIS, containing at a minimum: - number of individuals in the Park area - distribution - quality and size of habitat for the species - recommendations for management adjustment	<b>1</b>												0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AB37	Establish status monitoring for hazel <i>Bonasa bonasia</i> grouse in the Park area.	Monitoring protocols at Park level; Status monitoring reports with data for GIS, containing at a minimum: - number of individuals in the Park area - distribution - quality and size of habitat for the species - recommendations for management adjustment	1	External collaborators											90000,00
AB38	Continue monitoring the status of Natura 2000 beetle species ( <i>Morimus asper</i> <i>funereus</i> <i>Morimus funereus</i> , hermit beetle <i>Osmoderma eremita</i> , Rosalia longicorn <i>Rosalia alpina</i> ) and stag beetle in the Park area, and use monitoring results for management adjustment.	Monitoring protocols at Park level; Status monitoring reports with data for GIS, containing at a minimum: - recommendations for management adjustment - number of individuals in the Park area - distribution - quality and size of habitat for the species - future prospects	1	External collaborators											100.000,00
AB39	Establish regular status monitoring of Natura 2000 moth species Jersey tiger ( <i>Euplagia quadripunctaria</i> ), and use the results for management adjustment.	Monitoring protocol at Park level; Monitoring reports with data for GIS (number of individuals (per locality), distribution, quality and size of habitat for the species, future prospects, recommendations for management adjustment)	1	External collaborators											10.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AB40	Continue established status monitoring for Natura 2000 species lady's slipper orchid <i>Cypripedium calceolus</i> in the Park area, and use monitoring results for management adjustment.	Monitoring protocol at Park level; Status monitoring reports with data for GIS, containing at a minimum: - number of individuals in the Park area - distribution - quality and size of habitat for the species - future prospects - recommendations for management adjustment	1												10.000,00
AB41	Establish status monitoring for Natura 2000 moss species ( <i>Buxbaumia viridis</i> and <i>Dicranum viridae</i> ) in the Park area.	Monitoring protocol at Park level; Status monitoring reports with data for GIS, containing at a minimum: - number of individuals (per locality) - distribution - quality and size of habitat for the species - future prospects - recommendations for management adjustment	1	External collaborators											60.000,00
AB42	Continue established status and development monitoring for old-growth forest (Čorkova uvala) through survey on existing permanent plots.	Status monitoring reports with data for GIS; Assessment of old-growth forest status	1	External collaborators											60.000,00
AB43	Continue monitoring the dynamics of incidence of bark beetle in established monitoring points (localities).	Status monitoring reports; Recommendations for management adjustment	2	External collaborators											50.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AB44	Establish monitoring program for incidence of other diseases or allochthonous species in forest ecosystem.	Status monitoring reports; Recommendations for management adjustment	2	External collaborators											50.000,00
AB45	Continue implementation of damage assessment monitoring for forests on bioindicator plots (air pollution, biotic and abiotic factors).	Status monitoring reports; Recommendations for management adjustment	2	Croatian Forest Research Institute Jastrebarsko											50.000,00
AB46	Establish status monitoring for numbers and distribution of wild boar <i>Sus scrofa</i> , chamois <i>Rupicapra rupicapra</i> , deer <i>Cervus elaphus</i> and roe deer <i>Capreolus capreolus</i> (cloven-hoofed or even-toed ungulates).	Monitoring protocol at Park level; Monitoring reports with data for GIS; Recommendations for management adjustment	3	External collaborators											50.000,00
AB47	Establish and continue monitoring phenological changes during the vegetation season.	Monitoring results on a weekly basis Annual monitoring reports	3	External collaborators											200.000,00
AB48	Continue and expand status monitoring on permanent plots established within the project "Growth and development of special-use forests in the Park area (1998)".	Annual status monitoring reports with data for GIS Status monitoring analysis for the period 1998-2018 Report on monitoring of air pollution impact	1	Croatian Forest Research Institute Jastrebarsko											300.000,00
AB49	Monitor the status (succession) of surfaces affected by the drying of spruce <i>Piceas abies</i> in the Park area.	Status monitoring reports with data for GIS	1	External collaborators											0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AB50	Monitor the status of Natura 2000 habitat type 91EO ( <i>Alno padium, Alnion incanae</i> )	Status monitoring reports with data for GIS	1	External collaborators											80.000,00
AB51	Monitoring of climate change impact on the status of forest ecosystems in the Park	Status monitoring reports with data for GIS	1	External collaborators											100.000,00
<b>ACTIVE CONSERVATION</b>															
AB52	Maintain forest glades (clearings) within forests and along trails, as well as shrub-like edges, as important habitats for biodiversity conservation.	Database of spatial data for forest glades and shrub-like edge surfaces; List and surfaces of localities where maintenance is performed; Description of implemented conservation measures	2												0,00
AB53	Record private forest land surfaces (forests and glades – meadows, grasslands – within forest complexes), determine purchase criteria and priorities (for the purposes of biodiversity conservation and management), and incorporate them into Public Institution Guidelines for Property Purchase – Zone IA and IB.	Database of spatial data for forest land; List of criteria and priority plots for purchase, incorporated into the Guidelines List of purchased plots	2												0,00
AB54	Apply increased surveillance and enforcement of misdemeanor provisions to prevent illegal logging.	Number of records on performed surveillance; Share of recorded cases of illegal logging	1												0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AB55	Apply increased surveillance and enforcement of misdemeanor and penal provisions to prevent poaching.	Number of records on performed surveillance; Share of recorded cases of poaching; Number of submitted misdemeanor and crime reports	1												0,00
	Develop cooperation with hunting clubs in the area around the Park in activities of research, monitoring and conservation of large carnivores.	Number and descriptions of initiated cooperation initiatives; Initiated joint projects	1												0,00
AB57	Clear impassable forest roads and maintain all forest roads in passable condition for the purposes of surveillance, status monitoring and fire control.	Updated database of spatial data in GIS with all connected data Report on cleared impassable forest roads. Report on regular annual maintenance - sand laying; maintenance of transverse drains and outlets; mulching of road edges; cutting of branches from live trees and vegetation along road edges disabling free passage for vehicles; removal of broken trees and windthrows as well as other material from road routes after the winter period	1												1.600.000,00
AB58	Continue implementation of patrol and monitoring activities in accordance with annual forest fire protection plans and the Operational National Park Fire Protection Plan.	Patrol records	1												0,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AB59	Implement active conservation measures for Natura 2000 habitat type 5130 <i>Juniperus communis</i> formations.	Database of spatial data in GIS with surfaces where conservation measures for habitat type are implemented; Descriptions of implemented measures.	1	External collaborators											150.000,00
AB60	Install and maintain video surveillance of the Park for the purposes of fire protection, in accordance with the Fire Threat Assessment and the Fire Protection Plan.	Installed and functional video surveillance	1												1.000.000,00
TOTAL:															10.445.000,00

### 3.1.3 AC. Conservation of grasslands

Systematic research on grassland, bog and wetland habitat vegetation in the Park area was undertaken from 1984 until 1990, and there has been no continuity of research or monitoring since. Research was performed at the last moment, and it represents the baseline for these vegetation types, with overgrowth process quite pronounced even at the time of research. The Park area includes Natura 2000 habitat types of grasslands 4030, 6210\*, 6230\* and 6410, as well as bogs 7140, 7230 and tall herb fringe communities 6430 (Table 1, Chapter 2.2.5).

Largest grassland surfaces in the Park are covered by dry continental grasslands as important orchid sites (6210\*), present mosaic along the edges of Homoljačko polje and Brezovačko polje, around carbonate shoots within heaths, and within forest complexes (with strong overgrowth) in the areas of Čorkova uvala, Mirić Štropina, Sertić Poljana, etc. Largest surfaces of this grassland type were present at Karleušine plase, but there has been no mowing or grazing there for already approximately 30 years, so revitalization of these areas is necessary in order to achieve favorable status and sufficient surfaces of this habitat type. Despite such major exposure to overgrowth, these grasslands in the Park area are still nevertheless conserved, in particular in the areas of Brezovačko polje and Homoljačko polje. Brezovačko polje encompasses solely karst pastures; as for Homoljačko polje, its western section is characterized by karst pastures, while its smaller eastern section encompasses hay meadows and arable land. Grassland vegetation has a very pronounced mosaic distribution on these surfaces, reflecting the configuration of the terrain and its pedological and geological features.

European dry heaths (4030) also cover significant surfaces in the Park area, mosaically represented together with *Nardus* grasslands (6230\*) in relatively dry habitats in the area of Homoljačko polje and Brezovačko polje. Their current general status can be assessed as satisfactory; however, there are threats stemming from progressive succession (overgrowth due to scrub species and forest) and lack of grazing, or due to regressive succession on account of uncontrolled burning (domination of species *Molinia arundinacea* and other grass species). On the other hand, some localities are already facing too intensive cow and sheep grazing. Excessive sheep and cow grazing is partly present in the area of Homoljačko polje and

Kapela Korenička (sheep); however, it is not worrying at the moment, given the changes in grazing intensity during the vegetation season in recent years. In case grazing begins to negatively reflect upon the composition of plant communities, monitoring and implementation of measures would certainly be required.

In addition to succession due to changes in the manner of use, threats to these grasslands are also posed by potential pollution from the D52 road passing along the middle of Homoljačko polje and Brezovačko polje, which still includes transport truck and tank truck traffic with heavy and dangerous cargo. Activities that should bring to solving these problems are elaborated in the sub-theme ED. When it comes to invasive plant species, the following species have been recorded in the Park area in various volume and coverage so far: ragweed *Ambrosia artemisiifolia*, *Erigeron annuus* and invasive moss species *Campylopus introflexus*. These species do not represent a major threat to autochthonous flora at the moment, but they require monitoring and implementation of measures aimed at their elimination and prevention of spread. An additional challenge in managing these grasslands is posed by high interest in recent times in using meadows and heaths in the Park for grazing/foraging and bees, which has not been covered by clearly defined criteria and rules, nor conservation measures and supervision, so far. Certain activities in the sub-theme EA of the Plan will deal with that.

Highest-quality wet grassland formations (6410) in the Park have developed in the area of Drakulić Rijeka, Vreljske bare, Rudanovačke bare and Prijeboj, as well as Vrelina in the western part of the Park, in the area of Babin Potok. Siberian rayflower (*Ligularia sibirica*) grows in this habitat, in the area of Rudanovačke bare and Vreljske bare, along the creek, as a Natura 2000 species that can be found nowhere else in Croatia but in the Park.

Threats are posed by grassland succession due to the absence of mowing, extraction of water from creeks and pollution due to the expansion of settlements in the immediate vicinity. Wet meadows and alkaline fens are habitats of Natura 2000 species *Chouardia litardierei*. These habitats are still in good condition, and the biggest threat is posed by abandonment of traditional agriculture, which has resulted in succession present in some plots

where monitoring is performed. Potentially negative impact can also be exerted by mowing and grazing in the phase of flowering, or prior to the ripening of *Chouardia litardierei* fruits. At several plots, it has been noticed that wild animals (primarily wild boar) dug out bulbs, which is a result of a natural process that will not harm the squill population. However, given the fact that wild boar is a potentially invasive species, negative impact cannot be excluded, and activity of determining wild boar population numbers has therefore been foreseen through activity AB22.

Examples of excessive and inappropriate wet grassland grazing have not been frequent so far, but they do exist (for example, in the area of Babin potok (Vrelina), Korenička Kapela, Drakulić Rijeka and Rudanovac). Appropriate grazing, in the season when most plants manage to shed their seeds (in early spring and autumn period), exerts a positive impact on the conservation status of grasslands. However, due to potential negative impact of excessive or inappropriate grazing (due to timing or type of livestock), grazing conditions should be clearly defined prior to the implementation of active maintenance measures, which are planned in the sub-theme DA.

Alkaline fens (7230) in the Park are present in wet areas: Ljeskovačka bara, Drakulić Rijeka, Rudanovačke bare and Vreljske bare, in a small section of Čujića Krčevina and Kapela Korenička where they appear together with wet grasslands and wetland vegetation, right along the creeks. Even though their condition is still satisfactory, they are threatened by already present substantial pressures, primarily connected with the potential establishment of new water pumping sites in the area of Vrelo Koreničko, which is elaborated in the sub-theme AA. Additional threat is posed by pollution from defective septic tanks. These problems are exacerbated by excessive construction taking place in the area of Vrelo Koreničko and Rudanovac. Due to major importance of alkaline fens for biodiversity conservation, satisfactory solutions should be defined as a priority, and appropriate measures should be implemented in order to ensure favorable water regime and permanent (purposeful) hydration of these fens. In order to succeed in this effort, the Public Institution must receive support of other relevant institutions.

Transitional bogs are among the rarest and most endangered habitats in Croatia. They are small in surface, but extraordinarily important in terms of botany and fauna. Star sedge *Carex echinata* and round-leave sundew *Drosera rotundifolia* fen in the

valley of Matica (Ljeskovačke bare) is one of the few such habitats in Croatia. The Matica valley is largely overgrown by black alder, partially by spruce and purple moor grass, which shade the habitat, extract water, and raise and desiccate the terrain. It once covered the surface of 0.6 ha. Given the fact that these habitats are no longer mowed, they began gradually decreasing in size, and, in case such trends continue, they could even disappear soon. Star sedge and round-leave sundew community is developed only in the northwestern part of Ljeskovačke bare, where it is limited to three small surfaces ranging from 50 m<sup>2</sup> to 150 m<sup>2</sup>. The surface is covered by a thick layer of *Sphagnum* mosses. This peat surface is being maintained, i.e. it is regularly mowed and the mown plants are removed. Currently mown surface is small and it must be increased as urgently as possible, in order to stop succession and to maintain the community. The plan is to increase the surface to 1 hectare.

Bog of Ljeskovačka bara is home to a vital population of *Drepanocladus (Hematocaulis) vernicosus*, which is the only such known population in Croatia. Monitoring needs to be established.

Due to grassland succession and disappearance of the traditional way of life, many grassland orchids are under threat.

Habitat type 6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (*Convolvulion sepium*, *Filipendulion*, *Senecion fluviatilis*) is conserved along lake shores, along other watercourses and along forest edges. The biggest threat to this habitat type is posed by changes to the water regime, most pronounced at the moment in the area of Vrelo Koreničko and Rudanovac, due to potential new water extraction sites. A smaller threat, but still prominent, is vegetation succession. Invasive species have not been recorded in these habitats so far, and they do not pose danger.

Monitoring of grassland vegetation on permanent plots 81, 82, 83 and 84 within the project of 100 permanent plots of the Republic of Croatia, initiated in 1988 (with continuation of monitoring in 2002, 2005, 2008 and 2018), points to a trend of decreasing diversity index, with prominent overgrowth into scrub, and then into forest vegetation types.

In addition to being abundant in plant species and representing a source of richness of Park flora, grasslands abound in animal species as well, primarily many insect species, where large blue

species of genus *Phengaris* are particularly prominent, including some of the most endangered European butterfly species: alcon large blue *Phengaris alcon alcon* (CR), mountain alcon blue *Phengaris alcon rebeli* (VU) and *Phengaris arion* (VU).

Alcon large blue *Phengaris alcon alcon*, with the densest population in the area of Vrelo Koreničko and Rudanovac (Rudanovačke bare), is one of rare and best-conserved areas in Croatia and Europe. Wet meadows with feeding plant *Gentiana pneumonanthe* and ants of the genus *Myrmica* in the area of Rudanovac (Rudanovačke bare) and Vrelo koreničko (Vreljske bare) are still relatively well conserved. Succession poses a serious threat, as well as potential change to the water regime with the establishment of new water extraction sites in the area, and cases of untimely mowing have also been recorded on both sites.

Cooperation with grassland owners has been established, but it is still not sufficient. In order to conserve grassland biodiversity, better cooperation needs to be established with landowners, but also with the Paying Agency for Agriculture, Fisheries and Rural Development and with Advisory Service.

The Public Institution is undertaking active conservation measures aimed at target habitat types (6210 and 6410), at the surface of approximately 60 hectares at the moment; continuation of this effort and increase in surface are planned.

Distribution of marsh fritillary *Euphydryas aurinia*, another Natura 2000 species for the Park, has not been researched in the Park area, and conservation measures have not been determined. Therefore, such data should be collected as a priority, and implementation of identified conservation measures should commence.

Butterfly species large copper *Lycena dispar*, a potential Natura 2000 species in the Park, has recently been recorded. Data on it should also be collected as a priority, and one should begin with the implementation of identified conservation measures.

Other insect groups and spiders are poorly researched or not researched at all, and more detailed research is needed concerning these species as important constituents of grassland biodiversity.

Wet meadows, primarily mowed meadows, are important for the maintenance of the nesting

population of corn crane *Crex crex*. The most numerous population of this species inhabits Brezovačko polje and Homoljačko polje. Corn crane monitoring has been in place continuously since 2006. So far, the population has been stable, and it fluctuates between 21 and 41 singing males. Grassland succession and mowing times can negatively impact upon corn crane numbers.

Conserved open mosaic habitats (grasslands, heaths, bushes, hedges and forest edges) in the area of Homoljačko polje and Brezovačko polje are important for the conservation of nesting populations of Natura 2000 wild birds: Montagu's harrier, lesser grey shrike, red-backed shrike, woodlark and barred warbler. Based on the results of monitoring in place since 2015, one can conclude that the current status is favorable, but initial stages of succession have been recorded as a result of abandonment of traditional agriculture. When it comes to woodlark and garden warbler, the current succession stage is favorable, since such species prefer mosaic areas where open habitats meet overgrowth areas. However, in case of other species, such as lesser grey shrike, that are in need of larger areas of open habitats and larger territory, it is important to maintain as wide open surfaces as possible.

In the grasslands of Homoljačko polje and Brezovačko polje, one of the more prominent species in terms of numbers is Eurasian skylark *Alauda arvensis*. Grassland succession and mowing during nesting times can exert a negative impact on numbers of species. The size of the population should be determined, and monitoring should continue.

Swallows and common house martins are connected with rural settlements and closeness of domestic animals (traditional way of life). Their status is favorable at the current point in time; however, the trend of disappearance of traditional way of life might also negatively reflect on these species.

Mushroom species of grasslands and bogs are very poorly researched.



AC. CONSERVATION OF GRASSLANDS															
SUB-THEME	AC. Ensured favorable water regime and established active maintenance and use that allow for conservation of grasslands, bogs and tall herbs in favorable conservation status throughout the Park area, with present stable populations of significant species.														
SPECIFIC OBJECTIVE	Growing share of grassland, bog and tall herb surfaces where active use and maintenance is established; Growing share of grassland, bog and tall herb surfaces in favorable conservation status, per habitat types; Populations of significant species are stable.														
INDICATORS	Growing share of grassland, bog and tall herb surfaces where active use and maintenance is established; Growing share of grassland, bog and tall herb surfaces in favorable conservation status, per habitat types; Populations of significant species are stable.														
CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
RESEARCH															
AC1	Perform detailed mapping of grasslands, heaths and bogs, with an emphasis on Natura 2000 habitat types (6210, 6230, 6410, 4030, 7140, 7230), and determine the degree of succession and possibilities of revitalization.	Data for GIS and detailed habitat distribution map (at a minimum, 3rd NHC level) Detailed lists of flora; Phytocenological maps and habitat maps; Management recommendations	1	External collaborators											380.000,00
AC2	Perform detailed mapping of flora of rare and strictly protected species of grasslands.	Research report with data for GIS; Updated internal database of spatial data on species distribution in the Park; Updated <i>Flora Croatica Database</i> (FCD).	1	External collaborators											380.000,00
AC3	Continue research and preparation of inventory of orchids in the Park area.	Report on performed research with data for GIS; List of species per locality; Species distribution map; Assessment of habitat conservation status; Impact factors for the species; Management recommendations; Updated spatial database for orchids	1	External collaborators											120.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AC4	Continue preparation of inventory and research on butterflies, with an emphasis on Natura 2000 species <i>Euphydryas aurinia</i> and potential Natura 2000 species <i>Lycaena dispar</i> and Lycaenidae butterflies <i>Phengaris alcon alcon</i> and <i>P. arion</i> .	Report on performed research with data for GIS; List of species per locality; Species distribution map; Assessment of habitat conservation status; Impact factors for the species; Management recommendations Updated spatial database for butterflies	1	External collaborators											210.000,00
AC5	Prepare inventory of ants, bees and wasps of grassland ecosystems, determine the distribution of species and impact factors per individual group.	Research report with data for GIS; List of species per locality; Impact factors for groups present at localities; Interpretation recommendations	2	External collaborators											210.000,00
AC6	Prepare inventory of hemipteroids (Heteroptera and Cicadidae), determine the distribution of species and impact factors per individual group.	Research report with data for GIS; List of species per locality; Impact factors for groups present at localities; Interpretation recommendations	2	External collaborators											210.000,00
AC7	Prepare inventory of orthopteroids (crickets, Gryllotalpidae, grasshoppers), determine the distribution of species and impact factors per individual group.	Research report with data for GIS; List of species per locality; Impact factors for groups present at localities; Interpretation recommendations	2	External collaborators											210.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AC8	Determine the diversity and biological characteristics of arthropods (Coleoptera, Acari, Diptera, Hymenoptera) and the importance of traditional livestock farming as a foundation for conservation of accompanying biodiversity, using arthropod fauna as an example.	Report on performed research (list of arthropod fauna in grassland and bog habitats and heaths, with an emphasis on rare, endangered species; List of species per locality; Arthropod habitats evaluated and researched in view of biodiversity of groups that they support; Impact factors for groups present at localities; Interpretation recommendations	2	External collaborators											180.000,00
AC9	Research the fauna of beetles (Coleoptera) and spiders (Araneae) in grasslands, heaths and bogs in the Park.	Report on performed research (list of beetle fauna in grassland and bog habitats and heaths, with an emphasis on rare, endangered, endemic and Natura 2000 species); List of species per locality; Beetle and spider habitats evaluated and researched in view of biodiversity of groups that they support; Impact factors for groups present at localities; Interpretation recommendations	2	External collaborators											180.000,00
AC10	Explore and prepare inventory of fungi in grasslands and bogs based on research results.	Research report with data for GIS; List of species per locality; Distribution of species per habitat type; Assessment of importance of researched habitats and localities for fungus conservation; Management recommendations	2	External collaborators											210.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AC11	Identify and map locations in the Park overgrown with invasive allochthonous species (e.g. <i>Ambrosia artemisiifolia</i> , <i>Erigeron annuus</i> ), and determine the owners and users of agricultural land and persons with management rights.	List of localities overgrown with invasive allochthonous species; Database of spatial data with localities overgrown with invasive allochthonous species; List of owners and users of agricultural land and persons with management rights	1												0,00
		MONITORING													
AC12	Regularly undertake status monitoring for Natura 2000 habitat type 6210 - Dry continental grasslands, and use the results for management adjustment.	Monitoring protocol at Park level; Monitoring reports with data for GIS, containing at a minimum: surface covered with habitat type, structure and function of habitat, future prospects. Recommendations for management adjustment	1	External collaborators											120.000,00
AC13	Regularly undertake status monitoring for Natura 2000 habitat type 4030 - European dry heaths, and use the results for management adjustment.	Monitoring protocol at Park level; Monitoring reports with data for GIS, containing at a minimum: surface covered with habitat type, structure and function of habitat, future prospects. Recommendations for management adjustment	1	External collaborators											120.000,00
AC14	Regularly undertake status monitoring for Natura 2000 habitat type 6230 - Matgrass fields, and use the results for management adjustment.	Monitoring protocol at Park level; Monitoring reports with data for GIS, containing at a minimum: surface covered with habitat type, structure and function of habitat, future prospects. Recommendations for management adjustment.	1	External collaborators											120.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AC15	Regularly undertake status monitoring for Natura 2000 habitat type 6410 - Purple moor grass fields, and use the results for management adjustment.	Monitoring protocol at Park level; Monitoring reports with data for GIS, containing at a minimum: surface covered with habitat type, structure and function of habitat, future prospects. Recommendations for management adjustment.	1	External collaborators											120.000,00
AC16	Regularly undertake status monitoring for Natura 2000 habitat type 6430 - Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels, and use the results for management adjustment.	Monitoring protocol at Park level; Monitoring reports with data for GIS, containing at a minimum: surface covered with habitat type, structure and function of habitat, future prospects. Recommendations for management adjustment.	1	External collaborators											120.000,00
AC17	Regularly undertake status monitoring for Natura 2000 habitat type 7140 - Transition mires and quaking bogs, and use the results for management adjustment.	Monitoring protocol at Park level; Monitoring reports with data for GIS, containing at a minimum: surface covered with habitat type, structure and function of habitat, future prospects. Recommendations for management adjustment.	1	External collaborators											120.000,00
AC18	Regularly undertake status monitoring for Natura 2000 habitat type 7230 - Alkaline fens, and use the results for management adjustment.	Monitoring protocol at Park level; Monitoring reports with data for GIS, containing at a minimum: surface covered with habitat type, structure and function of habitat, future prospects. Recommendations for management adjustment.	1	External collaborators											120.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AC19	Continue monitoring the changes in grassland vegetation on established permanent plots 81, 82, 83, 84.	Monitoring protocol; Monitoring reports with data for GIS, containing at a minimum: diversity index trend, soil analyses, methods of use/maintenance, degree of succession. Recommendations for management adjustment	1	External collaborators											160.000,00
AC20	Regularly undertake status monitoring of rare, endangered and strictly protected grassland plant species.	Monitoring protocol at Park level; Report on undertaken monitoring, number of individuals, population status, threat and assessment of habitat quality, with recommendations for further monitoring and implementation of conservation measures. Recommendations for management adjustment	1												10.000,00
AC21	Continue implementing annual status monitoring of nesting <i>Crex crex</i> bird populations at Homoljačko polje and Brezovačko polje.	Monitoring reports (number of individuals, assessment of the number of nesting pairs, assessment of habitat conservation, reasons of endangerment) with proposals of conservation measures and guidelines for sustainable habitat management.	1	External collaborators											10.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AC22	Continue monitoring of the status of nesting populations of Natura 2000 wild birds connected with grassland habitats and open mosaic and agricultural habitats (barred warbler <i>Sylvia nisoria</i> , woodlark <i>Lullula arborea</i> , lesser grey shrike <i>Lanius minor</i> , red-backed shrike <i>Lanius collurio</i> and Montagu's harrier <i>Circus pygargus</i> ).	Monitoring reports (number of individuals, assessment of the number of nesting pairs, assessment of habitat conservation, reasons of endangerment) with proposals of conservation measures and guidelines for sustainable habitat management.	1	External collaborators											200.000,00
AC23	Establish regular monitoring of the status of Eurasian skylark <i>Alauda arvensis</i> at Homoljsko polje and Brezovačko polje.	Monitoring reports (according to the Monitoring Programme for Frequent Bird Species of Agricultural Habitats in Croatia)	3	External collaborators											50.000,00
AC24	Continue with status monitoring of Natura 2000 species <i>Chouardia litardierei</i> , and use the results for proposals of conservation measures and management adjustment.	Monitoring reports (according to the National Programme for Conservation Status Monitoring of the Species Chouardia litardierei); Recommendations for management adjustment	1												10.000,00
AC25	Continue implementing status monitoring of the species Siberian rayflower <i>Ligularia sibirica</i> on determined plots, and use the results for proposals of conservation measures and management adjustment.	Monitoring reports (number of individuals, endangerment, habitat quality assessments, with recommendations for further monitoring and implementation of conservation measures).	1												10.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AC26	Continue monitoring of alcon large blue <i>Phengaris alcon</i> in the area of Rudanovac (Rudanovačke bare) and Vrelo Koreničko (Vrejske bare).	Monitoring protocol at Park level; Monitoring reports with data for GIS (number of individuals (per locality), distribution, quality and size of habitat for the species, future prospects, recommendations for management adjustment)	1	External collaborators											300.000,00
AC27	Establish regular monitoring of the status of other Lycaenidae species: <i>Phengaris rebeli</i> and <i>Phengaris arion</i> .	Monitoring protocol at Park level; Monitoring reports with data for GIS (number of individuals (per locality), distribution, quality and size of habitat for the species, future prospects, recommendations for management adjustment)	1	External collaborators											300.000,00
AC28	Establish regular status monitoring of Natura 2000 butterfly species marsh fritillary <i>Euphydryas aurinia</i> , and use the results for management adjustment.	Monitoring protocol at Park level; Monitoring reports with data for GIS (number of individuals (per locality), distribution, quality and size of habitat for the species, future prospects, recommendations for management adjustment)	1	External collaborators											200.000,00
AC29	Establish regular status monitoring for moss species <i>Hematomaculis vernicosus</i> in the Park area.	Monitoring protocol at Park level; Monitoring reports with data for GIS (number of individuals (per locality), distribution, quality and size of habitat for the species, future prospects, recommendations for management adjustment)	1	External collaborators											60.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AC30	Establish monitoring of potential Natura 2000 species large copper <i>Lycaena dispar</i> .	Monitoring protocol at Park level; Monitoring reports with data for GIS (number of individuals (per locality), distribution, quality and size of habitat for the species, future prospects, recommendations for management adjustment)	1	External collaborators											40,000,00
AC31	Continue monitoring the status of barn swallow <i>Hirundo rustica</i> and common house martin <i>Delichon urbicum</i> .	Monitoring protocol at Park level; Monitoring reports with data for GIS (number of individuals (per locality), distribution, quality and size of habitat for the species, future prospects, recommendations for management adjustment)	1												0,00
ACTIVE CONSERVATION															
AC32	Record ownership of land with habitat types 4030, 6210*, 6230*, 6410, 7140, 7230 and determine purchase priorities (for the purposes of biodiversity conservation and management).	Database of spatial data for grassland surfaces; List of purchase priorities;	1	Local population, cadastre											0,00
AC33	Establish cooperation with owners of selected priority grasslands (negotiate on the mode of land use, sign cooperation contracts, or agree purchase of land).	List of contacted owners; Number of agreed cases of cooperation/signed contracts	1	Owners of land; owners of agricultural holdings (family farms)											0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>AC34</b>	Determine priorities for revitalization and maintenance of grasslands, heaths and bogs in the Park area, and implement conservation measures in accordance with that.	List of revitalization priorities; Description of implemented conservation measures per locality.	<b>1</b>	External collaborators											120.000,00
<b>AC35</b>	Continue active management of acid bogs, with increase of surface compared to the current surface, and regularly monitor status changes (species, surface).	Reports on undertaken conservation measures and noted status changes; Purchased surface or signed management contract with landowners; Increased surface of acid bogs.	<b>1</b>	Owners of land; owners of agricultural holdings (family farms)											10.000,00
<b>AC36</b>	Implement conservation measures for alcon large blue <i>Phengaris alcon alcon</i> .	Reports on undertaken conservation measures and noted status changes; Mowing performed after 15 September every second year; Woody species removed from surfaces	<b>1</b>	Owners of land; owners of agricultural holdings (family farms)											10.000,00
<b>AC37</b>	Eliminate and prevent spread of invasive allochthonous species (common ragweed <i>Ambrosia artemisiifolia</i> , <i>Erigeron annuus</i> etc.).	Description of implemented elimination measures per locality; Updated spatial database; Surfaces from which invasive species have been removed	<b>1</b>	Entities in charge of management and maintenance of watercourses, channels and surfaces along watercourses and channels; entities in charge of management and maintenance of surfaces along public road; landowners; owners of agricultural holdings (family farms)											10.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AC38	Enable the provision of grassland mowing and mulching services and offer such services to the local population for the purposes of maintaining high natural value of grasslands.	Number of notifications; Surface of mulched and mown grassland surfaces (and days invested)	1	Owners of agricultural land; family farms											0,00
	Establish cooperation with the Paying Agency for Agriculture, Fisheries and Rural Development - Gospić, Advisory Service and owners of agricultural land, in utilizing subsidies for the maintenance of grasslands with high natural value.	Number of sent memos; Implemented measures; Newly obtained subsidies	2	External collaborators - Paying Agency for Agriculture, Fisheries and Rural Development; owners of agricultural land											0,00
AC40	Design and implement educational activities and campaigns on the importance of traditional methods of use of grasslands for the conservation of biodiversity.	Number of implemented activities and campaigns; Number of participants per activity	3												0,00
AC41	Establish active management of alkaline fens (7230), with increase in surface compared to the current surface, and regularly monitor status changes (species, surface, water regime).	Reports on undertaken conservation measures and noted status changes; Purchased land surface or signed management contract with landowners; Increased surface of alkaline fens.	1												0,00
	Continue with active management of dry continental grasslands (6210*) with increase in surface compared to the current surface, and regularly monitor status changes (species, surface).	Reports on undertaken conservation measures and noted status changes; Purchased land surface or signed management contract with landowners; Increased surface of dry continental grasslands.	1												0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AC43	Establish active management of European dry heaths (4030) and species-rich <i>Nardus</i> grasslands (6230*) with increase in surface compared to the current surface, and regularly monitor status changes (species, surface).	Reports on undertaken conservation measures and noted status changes; Purchased land surface or signed management contract with landowners; Increased surface of heaths and <i>Nardus</i> grasslands.	1												0,00
AC44	Continue with active management of Purple moor grass <i>Molinia caerulea</i> fields (6410) with increase in surface compared to the current surface, and regularly monitor status changes (species, surface).	Reports on undertaken conservation measures and noted status changes; Purchased land surface or signed management contract with landowners; Increased surface of <i>Molinia caerulea</i> purple moor grass fields.	1												0,00
TOTAL:															4.630.000,00



### 3.1.4 AD. Conservation of karst

Due to the lack of recognition of the importance of geology and geomorphology in the origination of lakes, other karst forms and the relief itself, there was also no research for a long period of time. Geological and geomorphological research performed so far has resulted in an insufficient database that should be amended by more detailed research; however, new research, with the implementation of new state-of-the-art methods, will result in more detailed knowledge about the geological history and development of karst and fluviokarst relief, and ultimately about the lake system as such. In addition, there are few available findings concerning the distribution of caves and pits, their ecological conditions and life in them. Research results will be used as foundation for understanding other processes, origination of various habitats, their effective research and sustainable management, as well as for other multidisciplinary research. In addition, these results will also be used for interpretation and education about the origination of current relief. Recently performed LIDAR imaging of the Park enables detailed geomorphological and geoecological analyses of relief, as well as visualization and interpretation of relief characteristics, in particular structural elements (faults, fracture systems, etc.), sinkholes, swallow-hole and blind valleys, entrances into speleological sites, etc. All research is significant from the point of view of identification and establishment of database on geodiversity, and from the point of view of determining the geoheritage of the Park.

The biggest challenge in management of karst terrain in the Park lies in its substantial permeability due to the fact that prevailing layers consist of soluble and tectonically fragmented carbonate rocks and possibility of surface/subterranean draining, which results in leakage and losses of surface water into subterranean layers. As a result, karst areas are highly sensitive to human impact, since water transport through subterranean karst is very quick, and it can reach speeds of several kilometers per day; furthermore, due to the fact that water flows through fractures and channels, with brief subterranean retention, there is no possibility of purification. Lack of data on routes of inflow and on characteristics of subterranean karst hydrography makes it impossible to gain insight in the movement of potential pollution through subterranean areas.

A large part of the Park surface is neither

inhabited nor directly endangered by construction and wastewater from settlements. Major threat for the conservation of subterranean areas is posed by water pollution due to intensive construction without appropriate infrastructure in zones of high pollution risk, which is a particularly pronounced issue in Plitvica Selo. The biggest danger exists in settlements in sensitive areas within the Park, where sudden increase in the construction of facilities has been pronounced over the past couple of years.

Direct release of untreated wastewater from the area of Plitvice Lakes into the sinkhole in Ras-tovača was posing a major problem until recently, but it was resolved by the installation of a mobile wastewater treatment facility. Road traffic in the catchment area (especially through Brezovačko polje and Homoljačko polje) represents potential danger due to trucks with heavy cargo and tank trucks that can overturn and thus permanently pollute groundwater and subterranean habitats. Catchment of surface runoff water that includes pollution caused by vehicle traffic (oils, fuel) impacts upon the quality of groundwater. These issues are covered in activities in sub-themes AA and ED.

In addition to dissolution of carbonate rocks and high degree of permeability, fractures rocks result in danger of landslides and unstable slopes, which can threaten human security and endanger property and infrastructure, especially within the visitation system. Natural and human impacts can have a negative influence on tufa barriers in terms of cracking and separation of barriers due to their drying and freezing; in terms of construction of concrete bridges and wooden boardwalks (such as the bridge above Veliki slap), as well as roads (e.g. road remains at Milanovački slapovi); in terms of the fracturing of barriers, digging through them, or treading upon them. This also threatens the caves originating in tufa. As a consequence of extraction of dolomite stone for the construction of houses and road laying, there are abandoned and unremediated quarries in the area of Prijeboj and Rudanovačke bare, as well as a number of borrow areas along the road leading towards Pogledalo and in Čorkova uvala, many of which have turned into illegal dumping sites. Numerous sinkholes and some caves and pits are also frequently used as illegal dumping sites.

Caves Golubnjača, Vila jezerkinja and Mračnjača,

situated in the Korana canyon, were part of the visitation system in the past. As a result, they were adapted by installation of lighting, construction of concrete steps and boardwalks, as well as excavation of paths, which affected the natural character of these sites. Cave ornaments were damaged due to visitors entering the caves. Entrances to caves Golubnjača and Vila jezerkinja were eventually closed by railing doors, adapted in case of Golubnjača in order to enable bats to enter and leave the cave.

Natura 2000 habitat types connected with karst ecosystems (8210 and 8310) are very poorly researched, and quality data on the distribution area and conservation status are missing. It is known that there are paleontological remains in two caves, but systematic research has not been performed, and water-submerged subterranean area is fully unexplored.

The area of the Park is poorly researched in biospeleological terms, and it is not possible to provide a reasoned assessment of the state of conservation of cave fauna. However, even the sporadically performed research can point to an assessment that the potential of findings of new species for the Park, but also endemic species, is high. Caves and pits, but also cracks in rocks, have been recognized as extraordinarily important summer and winter shelters of many bat species, such as *Rhinolophus ferrumequinum*, *Rhinolophus euryale*, *Miniopterus schreibersi*, *Myotis capaccinii*, *Myotis myotis* - all of them Natura 2000 bat species for the Park.

AD. CONSERVATION OF KARST															
SUB-THEME															
SPECIFIC OBJECTIVE		AD. Diversity of karst geomorphological forms and sites of fossil flora and fauna are conserved throughout the Park area; favorable conditions are ensured in subterranean and surface habitats, enabling maintenance of stable populations of cave fauna.													
INDICATORS		Growing number of recorded karst geomorphological forms in the Park and share of conserved forms; Increased share of conserved sites of fossil flora and fauna; Populations of significant cave fauna species are stable													
CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
RESEARCH															
AD1	Perform geomorphological research in the Park area.	Analysis (interpretation) of LIDAR data; Research report that includes determined morphogenetic types of relief, accompanying forms and processes, and prepared quantitative morphometric relief indicators; Digital geospatial data in vector form	1	External collaborators											120.000,00
	Perform analysis of LIDAR data as assistance in finding speleological sites.	Analysis (interpretation) of LIDAR data; Research report with potential locations of speleological sites; Digital geospatial data in vector form	1	External collaborators											40.000,00
AD3	Continue research on stratigraphy, sedimentology, structural, geological and paleontological characteristics of the Park, and select potential geolocalities for interpretation.	Research reports: Map of relative relief; 3D model of selected outcrops for presentation; Interpretation of microscopic thin sections; 3D structural model of the Park area	1	External collaborators											295.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>AD4</b>	Perform speleological research.	Report on analysis of existing data and references; Research reports (completed speleological records and site sketches); Surveyed area of the Park; Established and regularly updated internal database of speleological sites with spatial data (GIS)	<b>1</b>	External collaborators											650.000,00
<b>AD5</b>	Undertake geospeleological research and evaluation of speleological sites (with an emphasis on facilities with horizontal channels).	Report on undertaken research; Geospeleological evaluation map; Detailed geospeleological evaluation of one to two selected speleological sites	<b>2</b>	External collaborators											120.000,00
<b>AD6</b>	Perform archaeological and paleontological excavations in speleological sites.	Explored at least 2 speleological sites with potential archaeological and paleontological findings Established and interpreted archaeological and paleontological content	<b>1</b>	External collaborators											600.000,00
<b>AD7</b>	Perform speleodiving research in springs and submerged speleological sites.	List of potential localities suitable for speleodiving exploration; Report on undertaken speleodiving research	<b>1</b>	External collaborators											150.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AD8	Perform research on geodiversity and geoheritage in the Park area.	Analysis of existing data and references; Report on the preparation of inventory of geodiversity with analysis and evaluation of geoheritage; Selected localities based on defined criteria (status, endangerment, etc.); Established and regularly updated internal database of geodiversity with spatial data (GIS)	1												80,000,00
AD9	Perform biospeleological research and systematic preparation of inventory of subterranean fauna in speleological sites and springs in the Park area.	Research reports containing at a minimum: list of invertebrate subterranean fauna species per speleological site and spring; list of habitat types per site, values of physical and chemical parameters in habitat/site/spring	1	External collaborators											750,000,00
AD10	Prepare inventory and explore the distribution of bat species in speleological sites; rock cracks and anthropogenic sites; determine important areas for their conservation in view of methods of use of space, and provide management recommendations.	Reports on performed research; Database of spatial data on distribution and methods of use of the Plitvice Lakes National Park ecological network area; Management recommendations	1	External collaborators											190,000,00
AD11	Undertake research of flora in entry sections of speleological sites.	Report on performed research containing, at a minimum, the list of taxa with exact list of locations, photographs and conclusions on the importance for the National Park	2	External collaborators											110,000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AD12	Research the impact of visitor infrastructure and roads on the stability (statics) of tufa barriers.	Report on geomechanical research of different types of tufa in static and dynamic conditions; Determined impact of infrastructure and roads; Defined most endangered localities; Management recommendations	2	External collaborators											450.000,00
	Perform detailed mapping of (active and paleo) tufa barriers, undertake Quaternary geological research, explore morphology and determine the age of tufa samples and other connected and unconnected sediments. On the basis of obtained data, determine the genesis of the lake system (tufa barriers, lake sediment, paleo flows).	Detailed map of tufa barriers (separate paleo barriers and active barriers); Research report with morphological characteristics of tufa barriers (layout, profile, 3D depiction); Determined age of tufa and sediment samples; Model of lake system genesis;													
AD13			1	External collaborators											1.100.000,00
AD14	Perform geoecological research of the Park.	Status analysis of space founded upon biological, geological and anthropogenic indicators; Performed geographic regionalization of the Park and wider impact area on the basis of landscape units and habitats; Analysis of landscape status in view of the pressures and threats (natural, anthropogenic and transitional).	2	External collaborators											50.000,00
AD15	Perform limnogeological research of lake sediments.	Analyzed and interpreted sediments from the cores; Obtained 3D model of lake sediments	1	External collaborators											300.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AD16	Create basic geological map of the Park.	Prepared sheet of Basic Geological Map of the Plitvice Lakes National Park at a scale of 1:50,000; Map interpretation	1	External collaborators											950.000,00
	Detailed mapping of carbonate rocks with hasmophytic vegetation (Natura 2000 habitat type 8210).	Data for GIS and detailed habitat distribution map; Monitoring protocol at Park level; Management recommendations	1	External collaborators											150.000,00
MONITORING															
AD18	Establish and implement status monitoring of Natura 2000 target habitat type 8210 in the Park area, and use monitoring results for management adjustment.	Monitoring protocol at Park level; Status monitoring reports containing at a minimum: surface covered with habitat type, structure and function of habitat, future prospects. Recommendations for management adjustment	1	External collaborators											90.000,00
	Establish and implement status monitoring of Natura 2000 target habitat type 8310 in the area of the Plitvice Lakes National Park ecological network, and use monitoring results for management adjustment.	Monitoring protocol at Park level; Status monitoring reports containing at a minimum: surface covered with habitat type, structure and function of habitat, future prospects. Recommendations for management adjustment	1	External collaborators											150.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AD20	Establish and implement monitoring of physical and chemical parameters of water and microclimatic parameters in speleological sites.	Monitoring protocol at Park level; Annual status monitoring reports with measurement results; Updated internal database in GIS	1	External collaborators											120.000,00
AD21	Establish and implement regular monitoring of cave habitats and subterranean invertebrate fauna in speleological sites and springs.	Monitoring protocol at Park level; Reports on the status of habitats and subterranean fauna in speleological sites and springs	1	External collaborators											100.000,00
AD22	Continue implementing status monitoring of bat species according to protocol in speleological sites and surface sites and in potential or determined shelters in the area of the Plitvice Lakes National Park ecological network, with an emphasis on Natura 2000 species.	Monitoring reports with data for GIS, containing at a minimum: the number of individuals, distribution, description of quality and size of habitat for the species, analysis of future prospects, recommendations for management adjustment.	1	External collaborators											240.000,00
AD23	Within regular supervision and field patrols, record localities with illegal dumping sites.	Supervision records; Field diaries and reports of ranger service; Established and regularly updated database on illegal dumping sites (including data on cleaning campaigns)	1												0,00
AD24	Monitor morphological changes of tufa barriers.	Report on morphological changes	2	External collaborators											90.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
AD25	Establish monitoring of seismic activity of a wider area of the Plitvice Lakes National Park.	Processed data from the Plitvice Lakes seismological station	1	External collaborators											350.000,00
<b>ACTIVE CONSERVATION</b>															
AD26	In cooperation with interested stakeholders, regularly organize cleaning campaigns on localities polluted by waste, and undertake measures aimed at preventing their repeated pollution.	Number of organized cleaning campaigns; Number of cleaning campaign participants; Number of cleaned localities; Number and type of implemented measures aimed at prevention of repeated pollution; Number of repeated waste disposal cases	1	Associations; volunteers; municipal utility companies											500.000,00
AD27	Undertake cleaning of speleological sites that require knowledge of speleological techniques and specific methods of collection and removal of waste, as well as potential mine clearance and collection of human remains.	Number of cleaned speleological sites; Number and type of implemented measures aimed at prevention of repeated pollution	1	Speleological associations, "Clean Underground" initiative; external collaborators											300.000,00
AD28	Prepare the required project documentation and remediate (remove) the remains of old asphalt road, old concrete blocks and walls at Milanovački slapovi.	Prepared project documentation; Obtained required permits and conditions; Remediated locality	3	External collaborators											300.000,00
AD29	Prepare the required project documentation and remediate abandoned quarries in the Park area.	Prepared project documentation; Obtained required permits and conditions; Localities remediated	3	External collaborators											500.000,00
<b>TOTAL:</b>															8.845.000,00

## 3.2 Theme B. Conservation of cultural heritage

### GENERAL OBJECTIVE

**B.** Conserved cultural heritage plays an important part in the presentation of Park values, contributing to the conservation of tradition and the creation of cultural identity of the area.

### SPECIFIC OBJECTIVES

#### **Sub-theme BA.** TANGIBLE CULTURAL HERITAGE

**BA.** Tangible cultural heritage is mostly researched, restored, maintained, presented and used for the purposes of Park management.

##### **Indicators**

- Increasing share of known potentially valuable archaeological localities that are explored, conserved and presented
- Increasing number of renovated tangible cultural heritage sites that are used for the purposes of Park management, including for the purposes of the visitation system
- Increasing share of renovated cultural heritage sites in private ownership

#### **Sub-theme BB.** INTANGIBLE CULTURAL HERITAGE

**BB.** Through cooperation with the local population and associations nurturing intangible cultural heritage, tradition and identity of the area are conserved and presented, including songs, dances, customs, gastronomy, stories, legends, traditional crafts and activities, as well as other elements of the “Lika way of life”.

##### **Indicators**

- Increasing number of activities presenting intangible cultural heritage
- Increasing volume of researched and recorded intangible cultural heritage
- Increasing share of the local population involved in activities connected with the conservation, presentation and use of intangible cultural heritage in a modern context

## **Sub-theme BC.**

### **CULTURAL LANDSCAPE**

**BC.** Through cooperation with the local population, direct support and inclusion of settlements with conserved traditional cultural landscape into the Park visitation system, the trend of disappearance of this landscape is stopped, and favorable environment is created for its revitalization throughout the Park area.

#### **Indicators**

- Increasing number of started initiatives, established programs and implemented projects for the promotion of conservation and revitalization of traditional landscape elements
- Increasing number of settlements in the Park area where the local community is actively working on landscape conservation in cooperation with the Park
- Increasing number of households and facilities in private ownership with landscape value renovated in a manner that conserves their traditional features

### 3.2.1 BA. Tangible cultural heritage

Tangible cultural heritage in the Park area was not recognized as particularly important for the mandate of the Public Institution in the previous period; there was no vision, strategy or management plan for this type of heritage, nor were the needed Public Institution capacities developed for that purpose. Cultural heritage sites are in poor condition, with a tendency of further decay. Therefore, priorities need to be determined in order to conserve individual facilities and to put them into service. Existing tangible cultural heritage should be researched, evaluated and put into service. Some cultural heritage facilities can be integrated into the visitation system, and the remainder would serve the needs of the Public Institution. A comprehensive approach is always needed in this regard, looking at tangible cultural heritage sites under renovation in their wider context, as spaces that achieve their full cultural significance and sustainability only in synthesis with revitalized intangible heritage connected with them. The Public Institution has sufficient funds to undertake all these activities, and all the envisaged ideas can also be implemented, in cooperation with other competent institutions. One objective obstacle to quicker procedures lies in unresolved ownership of individual facilities and land plots.

A more detailed evaluation looking at individual elements of tangible cultural heritage points to the following conclusions.

Approximately twenty identified archaeological sites have not been researched, so detailed information about these sites is not available. Krčin-grad hillfort is a partial exception; research on this site was performed for several years, but then eventually stopped. Research of this interesting location at the very heart of the lake zone should continue as a priority, and the location should be interpreted and presented as a valuable archaeological site.

Valuable examples of modern architecture should also be renovated, put into service, and interpreted as valuable cultural heritage. Restaurant Kozjak, which was cleared after it had collapsed due to decay and lack of care, should be fully reconstructed in accordance with professional recommendations, and put into service. Renovation and adaptation of Plitvice Hotel that took place in 1997 was not performed in the northern wing of the hotel, nor did it include the attractive terrace, which is why these hotel facilities are neglected

and decaying today. The plan is to fully renovate the entire facility, in accordance with conservation guidelines, and to transform it into a top-category facility. Among forestry houses, the best conserved is the forestry house Čorkova uvala. Currently, it is undergoing renovation and preparation for a new purpose; it will include a research and surveillance station, and it will serve for implementation of specialized educational programs. Forestry house Prijeboj has partially collapsed and it is in a state of disrepair, so it should also be renovated. The third forestry house - Poljanak - which burned down during the Homeland War was also valuable in architectural terms, and its reconstruction is also under consideration. The latter two forestry houses will not be part of the visitation system, and they will be used for the needs of the Public Institution in accordance with the purpose that will be determined in the course of preparation of the terms of reference.

Four residential buildings in Mukinje, with four apartments per building, designed by architect Lavoslav Horvat and registered as cultural goods of national importance, are also in decay, since some apartments are privately owned by owners who are unable to invest in the required renovation, and there was no legal framework that would enable the Public Institution to independently initiate and co-finance the renovation of facilities that are not in its sole ownership. A positive example is the building of the former workers' restaurant that is renovated and used as office space of the Public Institution.

Villa Izvor is a protected cultural asset owned by the Republic of Croatia. It is currently completely devastated and left to disrepair, without satisfactory infrastructure (water supply, sewage, access road, electricity and telecommunications). The facility is located in an ecologically highly sensitive location, above the spring of the Plitvice stream, and its renovation and subsequent use must be adapted accordingly. Therefore, the intended function of this facility is to serve as a scientific and educational center with limited and controlled number of visitors.

Small hydropower plant at Lake Burget, a valuable example of industrial architecture of the first half of the 20th century, is yet another in a series of facilities in disrepair, and it is in need of urgent renovation.



When it comes to traditional economic facilities, renovation performed in 2002 and 2004 included a water mill and a water-powered sawmill in the village of Korana, which stopped their disrepair. However, the idea to organize visits and to present these facilities as part of cultural heritage, including intangible heritage aspects connected with them - traditional activities of flour milling and wood processing - has not been implemented since. Water mill Radekin mlin at Veliki slap (Big Waterfall) as one of the most visited attractions in the Park, is neglected and in disrepair. It is in need of urgent restoration, followed by interpretation and inclusion into the presentation of cultural heritage. A traditional house with croft (baking stove, barn, woodshed, threshing floor) in Končarev Kraj, which was assessed as the most successful *in situ* museum presentation of historical and rural values in continental Croatia by the expert public following its renovation in 1985, has not been renovated since 1995, and it is not used. Possibilities of its renovation and reintroduction into the cultural and visitation offer of the Park should be examined through communication with private owners. In these cases as well, sustainable conservation and tourist valuation projects require the conservation of life connected with the facility: life through which the facility itself continues to live.

In addition to mentioned assets, the Park area also includes a range of other architectural heritage sites (e.g. walled public wellsprings and draw-wells, sections of historical roads with small bridges and stone buffers, etc.) that require a more systematic and active care with the aim of conservation, followed by interpretation and presentation.

BA. CONSERVATION OF TANGIBLE CULTURAL HERITAGE															
Sub-theme	BA. Tangible cultural heritage is researched, restored, maintained, presented and used for the purposes of Park management.														
Specific Objective	Increasing share of known potentially valuable archaeological localities that are explored, conserved and presented; Increasing number of renovated tangible cultural heritage sites that are used for the purposes of Park management, including for the purposes of the visitation system; Increasing share of renovated cultural heritage sites in private ownership.														
Indicators															
Code	Activities	Indicators	Priority	Collaborators	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Implementation Cost
Renovation and Regular Maintenance of Cultural Heritage Facilities (with the exception of HORECA facilities)															
BA1	Resolve property ownership status of cultural heritage facilities managed by the Plitvice Lakes National Park, including the former post office building in Mukinje, forestry house Prijeboj, four buildings by architect Horvat at Mukinje, and transfer the ownership from the State to the Public Institution if possible (e.g. mill in the settlement of Korana; mill Radekin Mlin).	Number of cultural heritage facilities with resolved property ownership status	2	Ministry of State Property; external expert											60.000,00
	Complete the renovation of forestry house Čorkova uvala.	Funds spent; Renovated forestry house used for new purpose	2	External collaborators											6.500.000,00
BA3	Define new catering and sales function of restaurant Kozjak, prepare project documentation, obtain permits, renovate the facility in accordance with conservation conditions, and use it for new purpose.	Feasibility analysis of alternative purposes; Prepared documentation; Renovated facility	2	External experts and contractors; Ministry of Culture											7.000.000,00
	In accordance with the defined new purpose, prepare projects, obtain permits and renovate forestry house Prijeboj as protected cultural heritage site.	Funds spent; Renovated forestry house used for new purpose	3	External experts; Ministry of Culture											2.800.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
BA5	In accordance with the defined new purpose, prepare projects, obtain permits and renovate forestry house Poljanak.	Funds spent; Renovated forestry house used for new purpose	2	External experts											2.300.000,00
BA6	Renovate mill facility Radekin mlin at Veliki slap, consider the possibility to incorporate it into the visitation system, and use it for relevant purposes in accordance with conclusions.	Prepared documentation for renovation; Completed conservation works; Field interpretation	3	External experts; Ministry of Culture											400.000,00
BA7	Renovate the facility of the former hydropower plant at Burget, and present it as valuable cultural heritage of the Park.	Prepared conservation survey and documentation for renovation; Completed renovation works; Field interpretation	2	External experts; Ministry of Culture											900.000,00
BA8	Prepare project documentation and renovate Villa Izvor.	Facility renovated and used for relevant (scientific and educational) purposes	2	External experts; Ministry of Culture; MEE											50.000.000,00
BA9	Allow the State to manage apartments owned by the Public Institution in protected cultural heritage facilities in Mukinje settlement, in order to allow for resolution of issues concerning tenancy rights of the current and previous tenants.	State has taken over the resolution of tenancy rights issues	3	Ministry of State Property											0.00
BA10	Through the development of joint projects or in some other manner, stimulate the renovation of most valuable privately-owned cultural heritage facilities in the Park area (see activities within sub-theme BC as well)	Identified most significant facilities; Number of renovated facilities	3	Property owners; External experts											2.000.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
BA11	Identify, map, renovate, mark in space and interpret draw-wells in the Park area	Identified and mapped draw-wells in the Park area; Selected facilities interpreted	2	External experts											500.000,00
BA12	Status monitoring and regular maintenance of tangible cultural heritage facilities	Annual report on implemented works	2	External experts; external contractors											5.000.000,00
RESEARCH															
BA13	Perform analysis of the existing status of recorded, preventively protected and permanently protected cultural heritage facilities in the Park area, and determine the priorities for renovation and purchase (according to the criteria of cultural value, renovation urgency, attractiveness for visitors, and other valuable uses for the Public Institution).	Performed analysis List of criteria and priority facilities for purchase is incorporated into the Public Institution Guidelines for Property Purchase (E6)	2	External experts; Ministry of Culture											100.000,00
BA14	Continue, intensify and complete the initiated archaeological research and conservation of Krčingrad site.	Research and conservation plan for Krčingrad site Annual reports on research and conservation activities	2	External experts; Ministry of Culture											5.300.000,00
BA15	Research at least 3 archaeological sites with the highest archaeological potential in the Park area.	Analysis of archaeological potential of 3 sites; Annual reports on research and conservation activities	2	External experts; Ministry of Culture											4.000.000,00
TOTAL:															86.860.000,00



### 3.2.2 BB. Intangible cultural heritage

Thanks to the still partly present traditional way of live, and thanks to the activities of folk ensembles, associations and institutions as active guardians and carriers of heritage, many elements of intangible cultural heritage are still conserved. However, it is important to be aware of the fact that this is a very sensitive and endangered element of cultural heritage that can literally disappear in one generation, with the disappearance of those persons who are the carriers of customs and the way of life in which this heritage is woven. Current demographic processes in the Park area and the wider region (i.e., emigration, population aging and depopulation), as well as abandonment of the traditional way of life and of traditional activities, lead to a quick disappearance of elements of intangible cultural heritage in everyday life.

Quality records on cultural heritage within Park boundaries do not exist, and need to be prepared. List from the Physical Plan for Areas with Specific Features of the Plitvice Lakes National Park can serve as foundation for this, together with the conservation documentation prepared for the Physical Plan.

In the previous period, the Public Institution did not engage in systematic and active work on conservation and revitalization of intangible cultural heritage, nor was it developing the capacities for it within the Public Institution. The most prominent way in which the Public Institution was active in that regard was to hire (and in that way financially support) folk ensembles for presentation of traditional songs and dances to visitors during summer season. Organized through the HORECA Branch, cooperation is ongoing with approximately ten folk ensembles from the area of Slunj, Rakovica, Korenica and Otočac.

Established cooperation and expressed interest of folk ensembles provide an excellent foundation for intensifying this cooperation and expanding it onto other joint activities that would contribute to the conservation and presentation of intangible cultural heritage. A precondition for such strengthening is capacity development within the Public Institution, i.e. ensuring that there is a person who would be in charge of continuous planning, development and implementation of cooperation with folk ensembles. By developing such capacities, the Public Institution could play a bigger role, as a coordinator of cooperation between folk ensembles, researchers, competent state authorities, local

population and visitors, which is a precondition for effective and sustainable activity.

The Public Institution could also provide a substantial contribution by establishing a presentation center where this type of cultural heritage could be presented and displayed, and some traditional crafts could also be presented live. Presentation and placement of local tradition, i.e. of various intangible heritage aspects, could also be ensured in HORECA facilities and souvenir shops to a lot higher extent than has been the case so far. Protected traditional heritage sites that the Public Institution has renovated, or plans to renovate, are also ideal venues for the presentation of intangible cultural heritage in its authentic environment. Collection, purchase and archiving of works and items are important prerequisites for equipping these sites and for ensuring exhibition material. Support to intangible heritage research is yet another aspect not covered by the Public Institution at the moment, despite the fact that it has the capacity to do so. Establishment of cooperation with the local population in connection with the presentation of the traditional way of life to Park visitors is yet another manner in which the Public Institution can provide a significant contribution to better valuation, conservation and even revitalization of tradition among the local population. Finally, by raising awareness concerning the value and potential of conserved cultural heritage among its staff members, who are also local inhabitants, the Public Institution directly contributes to the conservation of tradition in its area.

BB. CONSERVATION OF INTANGIBLE CULTURAL HERITAGE																
SUB-THEME	BB. Through cooperation with the local population and associations nurturing intangible cultural heritage, tradition and identity of the area are conserved and presented, including songs, dances, customs, gastronomy, stories, legends, traditional crafts and activities, as well as other elements of the "Lika way of life".															
SPECIFIC OBJECTIVE																
INDICATORS	Increasing number of activities presenting intangible cultural heritage; Increasing volume of researched and recorded intangible cultural heritage; Increasing share of the local population involved in activities connected with the conservation, presentation and use of intangible cultural heritage in a modern context.															
CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST	
DIRECT SUPPORT TO CONSERVATION																
BB1	Establish a Collection of traditional artefacts, tools, records, and regularly collect and purchase these artefacts from the local population.	Established Collection in one site or several sites; Number of purchased artefacts	3	Ministry of Culture; Folk ensembles; Local community; Museums in the region; External experts											450.000,00	
BB2	Establish an Archive of audio and video recordings of memories, speech, customs of the local population.	Archive established within the Library of the Plitvice Lakes National Park Public Institution; Number of hours of archive materials;	3	Ministry of Culture; Folk ensembles; Local community; Museums in the region External experts											450.000,00	
BB3	Establish an Archive of old photographs and postcards, and examine the possibility of purchasing certain private collections.	Archive established within the Library of the Plitvice Lakes National Park Public Institution; Number of collected photographs;	3	Owners of private collections interested in acknowledged donation or sale											270.000,00	
BB4	List/record intangible cultural heritage in a systematic manner.	List of cultural heritage of the Plitvice Lakes National Park	3	Ministry of Culture; Folk ensembles; Local community; Museums in the region External experts											200.000,00	
INDIRECT SUPPORT TO CONSERVATION THROUGH COLLABORATION, EDUCATION, ETC.																
BB5	Provide logistic support to events, gatherings and festivals of folk ensembles from the wider region (Lika, Kordun).	Number of events	3	Folk ensembles; Local community											590.000,00	

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
BB6	Support activities of local school folk ensembles, cooperatives and associations.	Number of achieved cases of cooperation;	3	Local school folk ensembles; cooperatives; associations											590.000,00
BB7	Promote, develop and implement educational programs on topics such as traditional crafts, skills, techniques of crafting traditional products/souvenirs, etc.	Number of implemented programs; Number of participants per implemented program	3												320.000,00
BB8	Continue existing cooperation with folk ensembles and associations on presentation of intangible cultural heritage through Park offer and in facilities of the Public Institution.	Number of involved folk ensembles; Annual number of held programs	3												4.000.000,00
BB9	In cooperation with the local population, develop one-day and multi-day Park visitation programs based on presentation of conserved traditional activities, and integrate them into the Park visitation system.	Number of programs included in the Park offer	3	Interested local population, Folk ensembles; Craftspeople; Family farms; Producers											610.000,00
BB10	In cooperation with the local population, folk ensembles, craftspeople, support design and development of souvenirs inspired by intangible cultural heritage.	Number of designed souvenirs included in the Park offer	3	External experts, Folk ensembles, Cooperatives; Associations; School cooperatives, Local craftspeople/ entrepreneurs											200.000,00
BB11	Organize presentation and sales events for traditional crafts and products, including cheese, honey, brandy, wooden and woolen products, etc.	Number of presentation and sales events; Number of presenters	3	Interested local family farms, Craftspeople, Producers											90.000,00
BB12	On the Park website (and through all other established communication channels, including social networks and newsletters), publish and regularly communicate information on cultural heritage, societies and associations that work on its conservation, as well as relevant announcements related to events and manifestations (with a calendar of events).	Annual number of publications	3	All partners within the sub-theme, including folk ensembles, cooperatives, associations, school cooperatives, local craftspeople/ entrepreneurs, etc.; External marketing experts											100.000,00
TOTAL:															7.870.000,00

### 3.2.3 BC. Cultural landscape

Traditional cultural landscape has been conserved only in a small share of settlements in the Park area. Conserved original matrix of spatially scattered settlements of the region of Lika, with hamlets consisting of only a couple of houses, with traditional single-story houses built on basements made of stone, farm facilities, yards, hedges, fences, gardens, orchards, arable land, deforested land, meadows and pastures with livestock and hives, can still be seen in some parts of the villages Donji Babin Potok, Gornji Babin Potok, Končarev Kraj, Plitvički Ljeskovac, Homoljac, Vrelo Koreničko, Drakulić Rijeka and Korana.

“Modernization” of houses in the 1970s and 1980s, when cultural landscape was not recognized as being of value; war destruction and displacement of people in the 1990s; post-war reconstruction, when respect for original traditional forms was not a priority; recent demographic and economic processes of rural extinction; disappearance of traditional agriculture coupled with intensive tourist construction – all of these factors resulted in various forms of devastation of cultural landscape. Typical outcomes of these processes are the following: some areas are dominated by newly-built, oversized tourist construction, without traditional barns, haylofts, yards, gardens, orchards, but with some additions (such as swimming pools, playgrounds for children, gazebos) that additionally strengthen the impression of touristification (e.g., Jezerce, Plitvica Selo, Rastovača). Alternatively, there are settlements in which this newest modernization process has not yet happened, but they are nevertheless disfigured due to “modernization” examples from the 1980s or due to post-war reconstruction (e.g., Čujića Krčevina, Kuselj, Kapela Korenička, Rudanovac). Finally, some remote villages have managed to conserve their originality, but they no longer have permanent inhabitants, so cultivated landscape is conquered by natural succession, and the abandoned houses are collapsing (e.g., Sertić Poljana, Čorkova uvala, Uvalica). Such current situation and trends require urgent and systematic activities, in order to preserve the traditional landscape on sites where it is still relatively conserved, and, to the extent possible, in order to restore such landscape everywhere else in the Park area.

In the previous period, the Public Institution did not systematically implement activities with the aim of conservation and revitalization of the traditional cultural landscape, partly because the wider

legislative and institutional context was preventing such activities more than stimulating them, but also because the Public Institution itself did not recognize its role in the conservation of traditional cultural landscape to the sufficient degree.

Physical plan is a significant leverage for conservation of cultural landscape. In the previous period, the Public Institution did not have any significant opportunities to impact physical plan provisions, and thus direct the spatial processes in favor of conservation and revitalization of cultural landscape as one of the Park’s values for which the Park is responsible. Initiated changes and amendments to the Physical Plan for Areas with Specific Features of the Plitvice Lakes National Park are an opportunity to incorporate provisions that would stop the processes of further devastation of cultural landscape, while supporting those processes that would conserve and revitalize cultural landscape. In order to assess the situation in space, opportunities and needs, preparation of landscape documentation was needed, providing not only the assessment of the current situation, but also guidelines for the conservation of cultural landscape, and this documentation can serve as good foundation for the creation of the physical plan.

However, the Physical Plan itself is not sufficient to stimulate developments in the desired direction. In order to achieve that, a range of stimulating measures are needed, as well as cooperation of all key stakeholders (“critical mass” of the local population, property owners, conservators, the Public Institution, counties and local self-government, Ministries); the Public Institution as manager of the National Park can and should play the role of initiator and coordinator in this endeavor. A great opportunity for sustainable conservation and revitalization is the presentation of the conserved traditional landscape and its integration into the Park’s visitation system. Promotion of traditional architecture and agriculture is the best path towards the revival of neglected villages and agricultural land, and this would inevitably create traditional landscape.

Different existing situations necessitate different objectives and measures. In cases where there already exist biophysical preconditions (conserved cultural landscape) and social preconditions (living tradition and local population interested in developing tourism offer in their area) for visitor experience described as ROS class IV of the future



offer for Park's visitors (see Annex 3), managerial preconditions (visiting conditions, planning and organizing offer for visitors) have to be ensured in cooperation with the local population and included in the Park's offer to visitors. Success of that endeavor in areas with the best current conditions to do that will also be important for other areas as well, because it will serve as a role model for others to follow more easily. In touristified areas, the Park should promote introduction of elements of authentic living, rather than just market "comfort" without any originality, or kitschy imitation of authentic content. In areas where continuity of traditional life and activity is preserved, but where visual experiences have deteriorated due to inappropriate modernization, it is possible to improve the situation by promoting incentives for interventions in interior and exterior of houses. Finally, in areas where landscape is conserved, but continuity of living population is lost, the Park should stimulate people's return through incentives for agritourism that can become the new economic basis for living in the area.

Through such activities, the Public Institution contributes to the achievement of several of its fundamental aims at the same time: to ensure conservation of cultural landscapes as a value that it is obliged to conserve; to ensure added quality and offer for the Park's visitors; to contribute to the quality of life of the local population. It should also be recognized that conservation of traditional landscapes is achieved by many contributing activities from other sub-themes of this Plan, primarily activities from themes B and D.

BC. CONSERVATION OF CULTURAL LANDSCAPE															
SUB-THEME	BC. Through cooperation with the local population, direct support and inclusion of settlements with conserved traditional cultural landscape into the Park visitation system, the trend of disappearance of this landscape is stopped, and favorable environment is created for its revitalization throughout the Park area.														
SPECIFIC OBJECTIVE															
INDICATORS	Increasing number of started initiatives, established programs and implemented projects for the promotion of conservation and revitalization of traditional landscape elements; Increasing number of settlements in the Park area where the local community is actively working on landscape conservation in cooperation with the Park; Increasing number of households and facilities in private ownership with landscape value renovated in a manner that conserves their traditional features.														
CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
ANALYSES AND LEGAL PREREQUISITES															
BC1	In cooperation with the local population and property owners, update the assessment of status, needs and opportunities for conservation and restoration of cultural landscape for individual villages in the Park area.	Study of the status, needs and opportunities for conservation and restoration of cultural landscape	3	External experts; Local community; Property owners; Ministry of Culture											200.000,00
	Among villages with relatively well-conserved and still alive cultural landscape, determine those villages with the greatest potential for the visitation system, while respecting the criterion of local population's interest for this vision and cooperation.	Analysis of opportunities for conservation and revitalization with proposed priority areas	3	External experts; Local community; Property owners; Ministry of Culture											100.000,00
BC3	In cooperation with conservators and experts, develop detailed specification of building conditions in the Park territory, protection of viewpoints and other measures for the protection of landscape values and originality of the area, and propose and advocate these measures through active cooperation in the procedure of changes and amendments to the Physical Plan for Areas with Specific Features.	Conclusions of joint work with conservators and experts; Public Institution's proposal for changes and amendments to the Physical Plan for Areas with Specific Features	3	Ministry of Culture; Croatian Institute for Spatial Development; MEE; Local communities in settlements and property owners; external experts											100.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>BC4</b>	Create landscape character assessment for the entire Park area.	Landscape character assessment	<b>3</b>	External experts											300.000,00
<b>PROMOTION OF RESTORATION AND TOURIST VALUATION</b>															
<b>BC5</b>	Establish cooperation and develop partnerships with local population and property owners on the positive vision for revitalization and tourist valuation of the conserved traditional landscape.	Number of settlements where the findings and suggestions from the Study produced under BC1 were presented and discussed	<b>3</b>	External experts; Ministry of Culture; Local communities in settlements and property owners											400.000,00
<b>BC6</b>	Develop landscaping project designs for villages in the Park territory and jointly facilitate issuance of necessary permits (priority for settlements determined under BC2).	Number of settlements with developed landscaping project design	<b>3</b>	External experts; Ministry of Culture; Local communities in settlements and property owners											800.000,00
<b>BC7</b>	Establish Incentive Program for projects of restoration and tourist valuation of traditional cultural landscape.	Functional Program; Report on implemented public tenders and projects selected for co-financing; Total value of implemented projects	<b>3</b>	External experts; Ministry of Culture; Local communities in settlements and property owners,											6.000.000,00
<b>BC8</b>	In cooperation with owners, renovate and present traditional house with croft in Končarev Kraj.	Agreed and formalized cooperation with owners; Renovated house with croft, presented within the visitation system.	<b>3</b>	Owners; Ministry of Culture											400.000,00
<b>BC9</b>	Design and implement educational programs connected with methods of restoration or construction of facilities in ways that contribute to the conservation of cultural landscape.	Number of designed programs; Number of program participants	<b>3</b>	External experts, Ministry of Culture; Local communities in settlements and property owners											290.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>BC10</b>	Ensure assistance in project preparation through the Incentive Program (BC7).	Number of projects nominated for the Program	<b>3</b>	External experts; Local communities in settlements and property owners											520.000,00
<b>BC11</b>	Taking into account availability, value and potential for tourist valuation, identify priority facilities and surfaces for purchase, in particular valuable traditional architecture units, as well as their future use, including their integration into the tourism offer of the Park.	Annual list of facilities and surfaces for purchase, important according to the criterion of cultural landscape conservation, integrated into the List of Purchase Priorities of the Public Institution (see theme E)	<b>3</b>	Local communities in settlements and property owners; external experts for value assessment; Ministry of Culture											160.000,00
<b>BC12</b>	Include villages with conserved cultural landscape in the Park's tourism offer.	Number of settlements with developed offer included in the Park's offer to visitors	<b>3</b>	Local communities in settlements and property owners											400.000,00
<b>BC13</b>	Link the restoration of cultural heritage with grassland revitalization (Homoljačko polje, Krge). Priority in restoration supported by the Park to be given to those households that contribute to grassland revitalization.	Restored cultural heritage. Revitalized grasslands.	<b>3</b>	Interested family farms											450.000,00
<b>REMEDIATION OF DETERIORATED LANDSCAPE</b>															
<b>BC14</b>	Ensure minimal devastation of landscapes and viewscapes in Park's area.	Analysis of landscape devastation with proposed measures; Number of implemented measures	<b>3</b>	External experts; Local communities in settlements and property owners											450.000,00
<b>TOTAL:</b>															10.570.000,00



## 3.3 Theme C. Visitor management

### GENERAL OBJECTIVE

**C.** Visitation does not undermine Park values, offering visitors unhindered and comprehensive experience, thus presenting conserved world heritage in the best manner possible, while ensuring revenue required for its conservation, building public support for nature conservation and opening possibilities for sustainable local community development.

### SPECIFIC OBJECTIVES

#### **Sub-theme CA.** **VISITOR USE MANAGEMENT SYSTEM**

**CA.** Diverse visitation programs throughout the Park area imbued with the offer of the local population; code of conduct established and infrastructure adapted to conserve the ecosystem and original beauty of landscapes by directing the visitors and enabling safe visit and presentation of Park values, as well as unforgettable experience of beauty and values of conserved nature.

#### **Indicators**

- Visitor use does not threaten Park values nor the quality of target experience for visitors; i.e. visitor use impacts are maintained within acceptability boundaries determined by standards, as a result of active management, in zones of all ROS classes in the Park area<sup>53</sup>
- Number and diversity of programs throughout the Park area is adjusted to the needs of presentation of values, interests and possibilities of visitors, and management of visitation dynamics
- Visitor infrastructure is safe for visitors, adjusted to the needs of conserving the outstanding universal value and other values of the Park, while enabling the desired experience
- Number of local hospitality and tourism service providers included in the Park offer (traditional farms, crafts, etc.) is growing
- Share of visitors with the highest level of satisfaction in connection with all aspects of the visit
- Share of visitors staying in the Park longer than one day is growing, as well as average length of visitor stay
- Visitation revenue is stable or growing

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<sup>53</sup> Annex 5.15 to the Management Plan: Descriptions of ROS classes.

**Sub-theme CB.**  
HOTELS, CAMPING SITES, RESTAURANTS  
AND SHOPS

**CB.** By managing HORECA (hotels, camping sites, restaurants) and shops in a sustainable manner, through recognizable quality of facilities, services and offer founded upon tradition and originality of the area, the Public Institution is ensuring harmonization of these activities with conservation needs and prerequisites for sustainability and development of the local community, while presenting Park values and ensuring additional revenue for their conservation.

**Indicators**

- All HORECA facilities of the Public Institution are renovated in accordance with the highest architectural and environmental criteria and conservation of outstanding universal value (OUV)
- Quality of accommodation per facility is profiled in accordance with expectations of target visitor markets
- HORECA of the Public Institution is eco-certified, and its ecological footprint is decreasing
- Volume of content in HORECA facilities used to present Park values is growing (food offer, exhibitions, events, decoration and equipment of facilities, etc.)
- Growing number and value of procured local products provided to visitors through HORECA offer of the Park
- Number of employees and productivity per employee are stable or growing
- Length of operating season and average length of stay in hotels and camping sites of the Public Institution are growing
- Highest level of visitor satisfaction in connection with the quality of services and offer
- HORECA revenue per facility is stable or growing
- All existing shops and souvenir shops are renovated in accordance with the highest architectural and environmental criteria and conservation of outstanding universal value
- Growing number of products presenting Park values in shops and souvenir shops
- Value and share of local products in shop and souvenir shop turnover are growing
- Offer is profiled per facility
- Highest level of visitor satisfaction in connection with the quality of services and offer
- Consumption in souvenir shops per visitor is growing
- Revenue per facility from shops and souvenir shops is stable or growing

## **Sub-theme CC.** INTERPRETATION AND EDUCATION

**CC.** Through various interpretation amenities and educational programs, visitors deepen and enrich their experience of unique Park values, realizing the importance of their conservation, and are inspired and motivated to contribute to nature conservation through their own behavior.

### **Indicators**

- Number and diversity of interpretation amenities and educational programs are growing
- Interpretation amenities in space are harmonized with the needs of established visitation programs
- Total number of participants of educational programs is growing
- Support of visitors to the conservation of Park values is growing
- Highest level of visitor satisfaction in connection with interpretation and education amenities and programs

## **Sub-theme CD.** MARKETING

**CD.** The Park is the first sustainable destination in Croatia; a model for other protected areas and tourist destinations in the region, where conserved nature, cultural heritage and local community are intertwined in a sustainable manner.<sup>54</sup>

### **Indicators**

- Sustainability of the Park is certified through obtaining and maintaining relevant globally recognizable certificates at the level of business operations of the Institution, individual HORECA facilities, the destination and partners within the destination
- Park offer is harmonized with the preferences of target markets
- Share of direct sales and sales via partners sharing the same values in the total sales of the Park is growing
- Internal and external information and communication channels are established and used regularly
- Share of Croatian visitors in Park visitation is growing
- Share of visitors from international primary target markets is growing
- Inclusion of the local population and Park staff in marketing activities of the Public Institution is growing
- Growing number of certified partners within the destination in Park offer
- Share of visitors staying in the destination longer than one day is growing, as well as average length of visitor stay
- Length of operating season and average length of stay in the destination are growing

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<sup>54</sup> Taken from the Marketing Strategy: CD. "Become the first sustainable destination of Croatia, a model for other Parks in the region as well as for other tourism destinations; where nature, culture, and community are intertwined in a sustainable way".

### 3.3.1 CA. Visitor use management system

Exquisite beauty and attractiveness for visitors, favorable geographical position, transport connections making the area easily accessible to a large number of visitors, as well as experience and tradition in organizing visitation over the years, have all made the area of the Plitvice Lakes National Park a world-famous tourist attraction. Reception of visitors is done through entry reception points and parking lots with available necessary information and other services (currency exchange, HORECA facilities, stores and souvenir shops, toilets). A well-organized network of trails and boardwalks allows for safe access and exquisite experience of outstanding universal value stemming from the beauty of natural landscape of waterfalls and lakes without destroying them. Visitation of the Park area is organized through tour programs that also include the use of panoramic vehicles and electric boats in addition to walks along the trails and boardwalks. All visitors are insured in case of injury as a result of purchasing their entrance tickets. The Park has experienced teams ready to receive an ever increasing number of visitors, with established procedures in place, and these teams consist of expert staff mostly from the wider Park area. All these factors in place over the years have ensured high visitation resulting in stable income, and the current legal framework enables the Park to independently manage its income in order to improve the system.

Continuous and rapid increase in the number of visitors (from 927,661 visitors in 2007 to 1,720,331 visitors in 2017) has resulted not only in increase in revenues, but also in increasing problems in the visitor reception system. Extreme seasonality of visits poses a particular challenge, with over 90% of visitors arriving in the period from April until October, and approximately 60% of them during the peak summer season. Ten years ago, the recorded maximum stood at 10,718 visitors in a day; in 2017, the record was 16,125 visitors in a single day, and, in August that year, there were as many as 7 days with over 14,000 recorded visitors per day. Capacities of all parts of the existing visitation system (parking lots, entry reception points, trails, boardwalks, docks and boats, stations and panoramic vehicles) are insufficient for peak loads during summer months.

Even though there is no organized system of monitoring visitor satisfaction, it is beyond dispute that such conditions substantially reduce the satisfaction of visitors with their visit. In addition, visitors

sometimes leave the designated trails due to overcrowding, or park in prohibited areas.

Given the increasing number of visitors, the existing number of information points does not satisfy the needs and does not enable quality provision of information to visitors. The existing number of information panels is insufficient for high-quality routing of visitors and for acquainting them with the rules and limitations that they should adhere to. In the course of Park tours, visitors should be informed in a better manner, which requires better tour guide training, but also defining of rules and relations with travel agencies. Special programs should be designed for target groups of visitors with diverse age structures, capabilities and interests.

Substantial opportunities in the development and modernization of the visitation system lie primarily in the establishment of *online* booking system and sale of entrance tickets for an exact time of entry (day and hour), which would allow for time distribution of visitors, control and limitation of the number of visitors entering the visitation system in a given time interval, and, as a consequence, system congestion due to the number of visitors exceeding the capacity of the visitation system would be avoided. In addition, it would be possible to impact upon a more balanced distribution of visitors in space through revised visitation programs. Cooperation with external stakeholders, Public Institutions in the surrounding area (e.g. Baračeve špilje) and other institutions with appropriate content for visitors could assist in achieving a balanced temporal distribution of visitors. A major opportunity for improvement can also be found in enriching the programs in terms of content, by offering visits to areas of the Park outside of the lake zone, and by developing additional interpretation and other amenities. There is a need to use the new marketing strategy to attract visitors interested in the type of offer that the Public Institution wish to provide, in accordance with its National Park and World Heritage Site mandate. Better informing of potential visitors can substantially improve their experience and satisfaction, but also their adherence to the code of conduct in the Park. Renovation of infrastructure will enable better conditions for high-quality experience of visitors and a safe visit. Strategic development of the system, focusing on placing entrance points in boundary areas of the Park, and on rerouting transit traffic through the Park, will allow for much



more room to organize Park visits, in a way that would combine the lake zone with additional attractions in the surrounding area. Ensuring professionalism, motivation and satisfaction of staff will be achieved by introducing work evaluation as a foundation for awards and career promotion. In addition to capacity for performing daily tasks of organizing visitation in a high-quality manner, it is also important to develop capacity for continuous quality monitoring and continuous modernization and development of the system.

Established threats to quality development and modernization of visitation system are development visions that would favor the development of tourism and revenue increase instead of conservation of values and ensuring prerequisites for quality visitation and presentation of values; loss of quality human resources needed for the functioning of the system due to prolonged seasonal worker status; as well as privatization or concession for segments of the Public Institution.

All of the above constituted the reason why the preparation of the Visitor Management Action Plan as integral part of the Management Plan was tackled in parallel with the preparation of the new Management Plan itself. As a result, the section pertaining to visitation is defined in greater detail, with more activities and indicators, in order to try to resolve long-term issues and shortcomings of the system. All of this is necessary in order to ensure visitation in a manner appropriate for a protected area, but also in a manner that enables visitors to learn more about the natural phenomena, and about methods of how these phenomena are protected and managed. Visitor Management Action Plan activities are grouped in several sub-themes, in order to cover and to resolve in a timely manner all aspects of existing and future situations/issues.

CA. VISITOR USE MANAGEMENT SYSTEM															
SUB-THEME	CA. Diverse visitation programs throughout the Park area, imbued with the offer of the local population; code of conduct established and infrastructure adapted to conserve the ecosystem and original beauty of landscapes by directing the visitors and enabling safe visit and presentation of Park values, as well as unforgettable experience of beauty and values of conserved nature.														
SPECIFIC OBJECTIVE															
INDICATORS	Visitor use does not threaten Park values nor the quality of target experience for visitors; i.e. visitor use impacts are maintained within acceptability boundaries determined by standards, as a result of active management, in zones of all ROS classes in the Park area; Number and diversity of programs throughout the Park area is adjusted to the needs of presentation of values, interests and possibilities of visitors, and management of visitation dynamics; Visitor infrastructure is safe for visitors, adjusted to the needs of conserving the outstanding universal value and other values of the Park, while enabling the desired experience; Number of local tourism service providers included in the Park offer (traditional farms, crafts, etc.) is growing; Highest level of visitor satisfaction in connection with all aspects of the visit; Share of visitors staying in the Park longer than one day is growing, as well as average length of visitor stay; Visitation revenue is stable or growing.														
CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
INFORMING VISITORS (opportunities, rules, requirements, conditions...)															
CA1	Across all established digital communication channels, provide updated information about the rules of conduct and specific requirements for visiting the Park.	Updated information about visitation programs on Park website, mobile applications and social networks; Visitation programs described in newsletters for target groups; e-brochure with descriptions of visitation programs	2	External collaborators; Agencies											100.000,00
CA2	Produce printed brochure with a map to be given to each visitor together with the entrance ticket, or provide information about the e-version of the brochure, containing basic information about the Park.	Number of brochures distributed to visitors; Number of link and/or e-brochure clicks; Number of comments received from visitors	2	External experts (designers, etc.)											2.000.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CA3	Inform visitors in real time about difficult conditions for visiting the Park.	Prepared standard text information for typical difficult conditions; Minimum of 4 installed e-panels with updated information about Park conditions; Updated information about conditions in the Park in visible spot ( <i>pop-up</i> window) on Park website; Printed brochure to be distributed to visitors in conditions when maximum carrying capacity is reached (containing suggestions for alternative tour programs)	2												300.000,00
CA4	In the period prior to the establishment of the ticket sale system enabling sale of limited number of tickets per hour and per entrance point, inform visitors, by using all established digital communication channels, about possible restrictions visitors might face when attempting to visit the Park.	Visible warnings on Park website, mobile applications and social networks of the Park; Information provided in newsletters for target groups	3												0,00
CA5	Upon establishment of the ticket sale system enabling sale of limited number of tickets per hour and per entrance point, inform the public about the limitations, with recommendations.	Visible warnings on Park website, mobile applications and social networks of the Park; Information provided in newsletters for target groups	2	The media; Croatian National Tourist Board system; Travel agencies											0,00
CA6	Distribute sufficient numbers of information assistants at entrances, parking lots and dedicated localities along the trails.	Number of present information assistants per entrance, parking lot and information point; Defined set of standard FAQ answers; Visitor satisfaction with the possibility of obtaining information from Park staff	3	Participants of "Green Guard" volunteer program											0,00
SUPERVISION OF RESPECT FOR RULES OF CONDUCT IN THE VISITATION SYSTEM															
CA7	Distribute sufficient number of Public Institution rangers needed for effective control of rule obedience in the Park, in accordance with the number of visitors and the season, and regularly report on the incidents involving illicit behavior.	Number of rangers present at individual locations; Number of recorded cases of illicit behavior; Number of traces of illicit behavior; Visitor satisfaction with the availability of official Park staff	1												0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CA8	In cooperation with the Korenica Police Station and the Municipality of Plitvice Lakes, ensure effective resolution of the issue of illegal parking in the Park.	Presence of traffic police and municipal services monitoring officers in the Park; Number of cases of illicit parking along roads in the Park.	3	Korenica Police Station; Municipal Monitoring Service of Plitvice Lakes Municipality											0,00
CA9	Ensure control over illegal entries into the lake zone visitation system.	Fences and warning signs on the prohibition of entry without a ticket installed at 4 main known routes of illegal entry, with a clearly stated amount of foreseen fine in case of violation; Ensured presence of ranger or another official at 4 main known routes of illegal entry; Decreasing annual number of reports submitted by rangers concerning cases of entry into the Park without a ticket	3												40.000,00
CA10	Upon completion of the revision of classification of roads Čudin klanac – Plitvički Ljeskovac, and their branches in the directions Mirić Štropolina – Jezerce and Liman draga – Bigina Poljana, establish entry control with entry permission granted only to property owners and inhabitants in the area serviced by roads.	Project implemented	1												0,00
MANAGEMENT OF DISTRIBUTION OF PARK VISITS															
CA11	Determine and, in accordance with monitoring results, adjust limitations concerning the number of visitors.	Determined hourly capacities of entrances; Monitored values of determined indicators for ROS classes	2												0,00
CA12	Ensure infrastructure and establish sales system for e-tickets.	Established system of e-ticket sales with hourly limitation; Installed systems for registering entry of visitors to, and their exit from, the visitation system	2												3.000.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CA13	Define a pricing policy that contributes to targeted spatial and temporal distribution of visitors in the Park and extension of the season.	Annually revised price list with various prices on a daily, seasonal and promotional basis, with the timetable of periods with applicable promotional prices	3												0,00
VISITATION PROGRAM DEVELOPMENT															
CA14	Prepare revision of the visitation program that ensures one-way movement within the lake zone.	Established unidirectional movement along the trail network	3												0,00
CA15	Define groups of programs to be offered for each season.	Defined programs per season and type of weather conditions, with procedures and responsibilities. Ensured signalization that is installed on existing basic signalization, depending on the season, for the purposes of seasonal program modification.	3	MEE											0,00
CA16	Design and establish programs that satisfy specific needs and capabilities of guided visitor groups.	Defined programs adapted to guided groups; Share of agency visitors using the programs; Satisfaction of agency visitors with Park visit	3	Associations of agencies; Main partner agencies											0,00
CA17	Define programs for visitors with special needs.	Defined programs adapted for visitors with mobility issues, with seasonal variations; Number of visitors using the programs; Satisfaction of visitors with Park visit	2	Societies or associations bringing together this category of visitors											0,00
CA18	Development of new programs upon relocation of entrance points.	Designed new half-day programs (with approx. 4 km to 10 km of walking tours, taking between 3 hours and 5 hours)	2												0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CA19	In accordance with requirements from the description of ROS class I, within areas foreseen for that purpose, develop new visitation programs.	Number and types of developed programs included into the offer for visitors; Number of visitors per program	3												0,00
CA20	In accordance with requirements from the description of ROS class II, within areas foreseen for that purpose, develop new visitation programs.	Number and types of developed programs included into the offer for visitors; Number of visitors per program	3												0,00
CA21	Develop new programs in areas of ROS class III, in boundary areas of the lake zone, and include them into the visitation system.	Number and types of developed programs included into the offer for visitors; Number of visitors per program	3												0,00
CA22	After ensuring the needed prerequisites for that purpose (through activities in themes B, C and D), develop new programs in areas of ROS class IV defined by the Plan, and include these programs into the visitation system.	Number and types of developed programs included into the offer for visitors; Number of visitors per program	2												0,00
CA23	Preparation of the Study for Development of Joint Programs for Visitors within the project of construction and equipping of visitor center Baraćeve špilje.	Study prepared	1	Baraćeve špilje Public Institution; External collaborator											75.000,00
CA24	Co-financing of the project of construction and equipping of visitor center Baraćeve špilje.	Foreseen co-financing amount paid	1	Baraćeve špilje Public Institution											5.000.000,00
VISITOR SAFETY															
CA25	In cooperation with competent institutions, identify safety standards relevant for visitor infrastructure in the Park, and regularly verify their fulfillment in the Plitvice Lakes National Park	Assessment of competent institutions in connection with the fulfillment of safety standards along active trails in the Park, with recommendations for ensuring compliance with the standards.	2	MEE; Croatian Mountain Rescue Service (CMRS); Competent inspections											0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CA26	Continuously implement all recommended measures for ensuring visitor safety within the visitation system, and introduce additional measures as needed.	Annual reports on undertaken safety measures within the visitation system; All locations where there is a possibility of fall with fatal outcome are properly fenced and labeled according to safety standards; In locations with existing particularly risky improvised trails, all traces of such trails are eliminated, and fences with warning signs are installed; Number of rescue interventions	3	MEE; CMRS; External collaborators - construction of required infrastructure; Competent inspections											150.000,00
CA27	As part of regular maintenance of Park roads and infrastructure, monitor the appearance of erosion risks (rockfall, scree, avalanche), and undertake remediation activities as needed in order to ensure human safety.	Field journals and reports of Park staff; Updated database on recorded risks of erosion and implemented remediation activities	1	External collaborators											500.000,00
CA28	Establish regular inspection of the visitation system in order to identify risks to visitors (trees and rock mass posing risk), and implement safety measures in accordance with determined needs.	Performed works and report on undertaken measures to remove rock mass; Performed works and report on undertaken measures to remove trees posing risk	1	External collaborators equipped for required works; CMRS											2.200.000,00
CA29	Mark all trails based on tour difficulty level.	All trails marked based on tour difficulty level	2												50.000,00
VISITOR INFRASTRUCTURE - MAINTENANCE AND DEVELOPMENT															
CA30	Regularly maintain and improve visitor infrastructure within the visitation system (trails, boardwalks, prepared appreciation points, viewpoints, signalization, information panels, etc.), including both service and access zones.	Length of maintained trails and boardwalks (at annual level); Quantity of various types of material used for maintenance; Number of installed and replaced panels; Number and locations of prepared nature appreciation points; Satisfaction of visitors with visitor infrastructure; Results of monitoring the effectiveness of signalization system	2												3.000.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CA31	Regularly maintain anti-erosion barriers in order to reduce the entry of allochthonous material into the lakes.	Reports on implementation of regular maintenance of anti-erosion barriers; Quantity of material spread on trails	1												50.000,00
CA32	Upgrade the infrastructure in a manner that destimulates or disables unacceptable behavior.	Report on undertaken measures; Number of remediated sites; Occurrence of new illegal trails	2												10.000,00
CA33	Appropriately mark all entrances into the Park area on main access roads.	National Park entrance signs on all main access roads	2	Hrvatske ceste (Croatian Roads); 4 local self-government units; External collaborators (designers, construction)											500.000,00
CA34	In cooperation with the Municipality of Plitvice Lakes, ensure renovation of the existing five official bus stops on the D429 road, along the route Prijeboj/Jezerce, Mukinje, entrance point U1, entrance point U2, village of Korana.	Bus stops renovated and equipped	3	Plitvice Lakes Municipality; Croatian roads; Komunalac d.o.o.											100.000,00
CA35	Resolve property title issues, and remove two obsolete toilet facilities at the location U1 - old camping site, and place container toilet facilities in their place, with the capacity corresponding to the needs of temporary parking lot at location U1.	Location remediated; Container toilet facilities in function, with the capacity in line with the ROS standard; Waiting time for toilet use	2												1.000.000,00
CA36	Ensure sufficient capacity of toilet facilities at temporary parking lot Entrance 2 -> Hladovina.	Required permits obtained; Installed additional container toilet facilities, with the capacity in line with the ROS standard; Waiting time for toilet use	2	External collaborators (designers, construction)											300.000,00
CA37	Regularly monitor the integrity of septic tanks used for the collection of wastewater from toilets at visitation endpoints in the core lake zone, and maintain and renovate the tanks.	Report on regular control, maintenance and emptying of septic tanks within the visitation system	1	External collaborators for inspection											200.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CA38	Maintain the existing areas used as temporary parking lots at sites Entrance 1 and Entrance 2 until official parking lots are prepared at the sites of new entrances.	Annual report on implemented maintenance activities	2												210.000,00
CA39	Improve organization and waiting conditions at electric boat docks and panoramic vehicle stops.	Projects to organize the movement of visitors at docks and stops; Implemented projects of upgrading other stops; Satisfaction of visitors with waiting conditions	3	MEE; Sisak Port Authority											300.000,00
CA40	Renovation of the existing section of the trail leading from Kozjačka draga to Veliki slap (Big Waterfall) above the Lower Lakes canyon, and design and construction of a new section of the trail leading from site P3 to the existing ramp and road branch towards Plitvica Selo.	Prepared design for renovation and construction; Renovated trail and stairs; Trail included in tour programs	2	External collaborators											500.000,00
CA41	Design and build visitor infrastructure resolving the issue of bidirectional circulation along the section of the trail leading towards Veliki slap.	Prepared design for renovation and construction; Trail built and included in tour programs	2	External collaborators											1.500.000,00
CA42	Examine the possibility of construction of pontoon bridge along the P1-P2 boat route, and start project realization subject to the issuance of positive opinion.	Study and project documentation prepared; Pontoon bridge built	3	External collaborators											3.500.000,00
CA43	Develop trails in new areas of the visitation system in accordance with ROS classes I, II and IV, and in accordance with management zoning.	Prepared trail development projects; Trails are developed and included in tour programs	2	MEE											300.000,00
CA44	Prepare project documentation, obtain permits and renovate existing facilities at Entrance 1.	Documentation prepared/permits obtained; Facilities renovated	2												6.500.000,00
CA45	Prepare project documentation, obtain permits and renovate existing facilities at Entrance 2.	Documentation prepared/permits obtained; Facilities renovated	2												6.500.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CA46	Upon construction of new entrances Prijeboj and Catrnja, adapt existing Entrances 1 and 2 to new visitor reception needs.	Prepared projects and performed works	3	External collaborators											10.000.000,00
CA47	Determine exact location, obtain land ownership, prepare projects, obtain permits and build information centers outside of Park boundaries in the settlements of Vrhovine, Saborsko and Korenica.	Obtained Public Institution's ownership of land at designated locations of information points; Prepared projects and obtained permits; Facilities constructed and put into service	3												3.000.000,00
CA48	Procurement of timber for the purposes of maintenance, construction and upgrades of the visitation system.	Procured sufficient quantity of timber for the construction and maintenance of trails, boardwalks, viewpoints and panels (signalization, education and interpretation panels, etc.)	2	External collaborators											2.200.000,00
VISITOR TRANSPORT															
CA49	Continuously aim to reduce or completely eliminate negative impact stemming from panoramic vehicles (noise and gas emissions).	Report on analysis of the possibility to replace diesel power with electric power	2	Examinations and analyses by external collaborators											100.000,00
CA50	Strengthen transport capacities in accordance with needs in order to ensure transport of visitors related to the newly offered programs for visitors in the Park area (primarily for group visits to areas of ROS Class IV).	Ensured capacities in accordance with the number of visitors in new programs; Number of visitors transported by new transport capacity in new programs	2												10.000.000,00
CA51	Ensure transport capacities sufficient for transport of visitors from new entrances to the endpoints of visitation.	Ensured connections between entrances and endpoints	3												60.000.000,00
MONITORING															
CA52	Establish and regularly monitor indicator values for social and managerial conditions for all ROS classes, and provide recommendations for amending management procedures as needed.	Protocol for monitoring ROS indicator values; Annual report on fulfillment of ROS standards	3	Local population in ROS class IV											0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CA53	Establish continuous monitoring program of characteristics, experiences and satisfaction of visitors, and, on the basis of these results, provide recommendations for improvement of the visitor use management system.	Monitoring protocol; Annual monitoring reports with trend analyses and recommendations for improvement of visitor use management; Number of revised visitation programs on the basis of recommendations	2	Park volunteers											0,00
CA54	Establish continuous monitoring of the status of entire visitor infrastructure and traces of illicit behavior.	Monitoring protocol; Updated database with issued maintenance requests and undertaken activities of maintenance and restoration of visitor infrastructure	3												0,00
CA55	Regularly monitor the effectiveness of the signaling system, and provide recommendations for its improvement.	Monitoring protocol; Monitoring reports with recommendations for improvement	3												0,00
APPLIED RESEARCH FOR VISITATION MANAGEMENT PURPOSES															
CA56	Based on need, design and implement targeted research concerning visitor use, its impacts and effects, and provide recommendations for management improvements.	Research report with recommendations	3	External experts											200.000,00
TOTAL:															123.385.000,00

### 3.3.2 CB. Hotels, camping sites, restaurants and shops

#### *Hotels, camping sites and restaurants*

The existing facilities, HR potential, tradition and experience in the HORECA sector represent a significant strength and resource of the Public Institution. The fact that the largest hotels and catering facilities in the Park area are controlled by the Public Institution allows it to control potential negative impacts, and to use these facilities as channels for additional presentation and placement of values and products of the area. On the other hand, this is a very demanding topic, where there is a need for a range of development projects that would improve the quality of the offer, efficiency and effectiveness of management, as well as contribution to achieving the goals of the Park and the Public Institution.

Business operations of the HORECA Branch with all its capacities (see Description of the Area) are extraordinarily important for successful organization of Park visits, but also for the sustainability of livelihoods in the entire area. Locations of facilities, along the core lake zone (three hotels, two restaurants and 5 small visitor facilities), and even at certain sites within the core lake zone (3 small visitor facilities), make them an important constituent part of the visitation system, allowing visitors to take a break and get some refreshment as they explore the most attractive section of the Park for visitors. With over 300 permanent employees and 300 seasonal workers, the Branch represents more than 50% of jobs in the Public Institution, making it an important factor of economic and demographic stability of the area.

There are plenty of opportunities to ensure better business operations of the Branch that have not been capitalized during the previous post-war reconstruction period, due to a range of external and internal factors, and that has resulted in lack of stability, competences and vision in management, needed in order to make a step forward in terms of development.

All facilities require tangible renovation, development and fine-tuning of the offer, in order to strengthen their role in presentation and interpretation of Park values, but also in order to ensure better market recognition, higher value and more profitable business operations. Location of the hotels along the lake zone, as well as their high original architectural quality, in particular in case of Plitvice Hotel, predestine them for becoming

accommodation facilities in top classification categories. Renovation of hotels should also be used to substantially improve their environmental efficiency, moving on from the current situation where fuel oil is used as energy source to using technology and practice that would render these facilities best-practice examples in environmental efficiency.

Substantial steps forward are also needed and possible in developing and profiling the offer. Gastronomic offer based upon tradition and high-quality local produce contributes to the quality, recognizability and market value of catering offer; at the same time, in creating the market for local products, it also contributes to the revival of local production and tradition, and to the preservation and presentation of gastronomic heritage as an important segment of intangible cultural heritage of the Park area. Catering facilities should also be used as venues for programs and events for visitors to a much higher extent, in order to present Park values through permanent interpretive content, variable exhibitions and organized programs. Development of additional offer will also contribute to extension of the tourist season, and thus to better business operations as well. Availability of own catering capacities provides the Public Institution with better opportunities to create special types of educational content for the segment of visitors that recognize and value such type of offer. Offer developed per facility will be tailored to the specific profile of facility and to its market niche.

Educated workforce, as well as long tradition in catering, represent major existing capital. In order to achieve the desired push forward in terms of quality, more intensive and more systematic investments are needed in capacity development, employment and continuous development of high-quality workforce, and it is also important to ensure conditions to retain staff.

Despite quick growth of accommodation and restaurant capacity in the Park area and in the surrounding area, facilities managed by the Public Institution still represent by far the largest HORECA capacity under single management. This provides the Public Institution with the opportunity to substantially impact upon the direction and dynamics of development of the entire destination, serving as pioneer in designing and developing the desired type of offer founded upon tradition and



originality of the area, but also as the core around which a recognizable destination for such type of offer would be developed through networking in a wider area.

The evaluation pointed out a number of reasons why it is necessary to ensure that HORECA activities owned by the Public Institution remain under its management. As already mentioned, HORECA is of major importance not only for the fulfillment of the mission of the Park and the Public Institution, but also for the development of the surrounding area. The Public Institution has the financial strength, but also a clear vision through this Management Plan, to resolve its current weaknesses and to make the described developmental step forward. On the other hand, worldwide experiences point to a conclusion that concession-based management models are connected with risks that are simply not acceptable given the importance of the HORECA segment for the overall functioning of the Park.

### ***Retail shops and souvenir shops***

Retail and souvenir shop facilities are well positioned and cover all the main service zones for Park visitors, but they are mostly quite cramped in terms of available space. In addition, as a consequence of a long period without systematic investment, souvenir shop facilities are in relatively poor condition, lacking visual attractiveness, with outdated interior and furniture.

The existing offer includes all standard types of souvenirs, but there remains substantial room for improvement when it comes to the quality, diversity and profiling of the offer for shoppers with diverse preferences.

The Public Institution ensures the souvenir offer by open calls for bids for souvenirs and by commission sale of approved souvenirs that satisfy the quality criteria, including the key criterion that souvenirs should present the motifs of Plitvice Lakes and the region of Lika in some manner. The chosen commission sale model ensures that bidders have a direct interest in designing and offering visitors as attractive an offer as possible, since their profit depends solely on that, without any mediation of the Public Institution.

The share of locally produced products is currently very low (below 5%), despite the desire of the Public Institution to make it higher, since the current local production of souvenirs is undeveloped.

In addition to quality of the offer, as well as design and attractiveness of interior of souvenir shop premises, a substantial quality improvement is also possible in organizing and presenting the items on offer, and in profiling of the offer in individual facilities for visitors with diverse preferences.

As a result of their kindness and engagement with shoppers, staff members manage to compensate these shortcomings up to an extent. An experiment undertaken in the past, to designate shops for concession, resulted in a series of non-payments, concessionaire bankruptcies and supply problems in the Park area.

Average consumption on souvenirs per visitor in the amount of approximately 11 HRK points to the currently underused potential of souvenir and retail shops in the Plitvice Lakes National Park.

The Public Institution also manages retail shops where consumer goods are on offer, and these shops are particularly significant for the population within the Park. These shops, thanks to their position, but also thanks to the recognizability that they have due to their affiliation with the Park and the Public Institution, also represent major potential for visible and effective placement of locally produced high-quality branded products from the wider area of the Park.

CB. HOTELS, CAMPING SITES, RESTAURANTS AND SHOPS															
SUB-THEME															
SPECIFIC OBJECTIVE	CB. By managing HORECA (hotels, camping sites, restaurants) and shops in a sustainable manner, through recognizable quality of facilities, services and offer founded upon tradition and originality of the area, the Public Institution is ensuring harmonization of these activities with conservation needs and prerequisites for sustainability and development of the local community, while presenting Park values and ensuring additional revenue for their conservation.														
INDICATORS for the Hotels, Camping Sites, Restaurants section	All HORECA facilities of the Public Institution are renovated in accordance with the highest architectural and environmental criteria and conservation of outstanding universal values; Quality of accommodation per facility is profiled in accordance with expectations of target visitor markets ; HORECA of the Public Institution is eco-certified, and its ecological footprint is decreasing ; Volume of content in HORECA facilities used to present Park values is growing (food offer, exhibitions, events, decoration and equipment of facilities, etc.); Growing number and value of procured local products provided to visitors through HORECA offer of the Park; Number of employees and productivity per employee are stable or growing; Length of operating season and average length of stay in hotels and camping sites of the Public Institution are growing; Highest level of visitor satisfaction in connection with the quality of services and offer; HORECA revenue per facility is stable or growing.														
INDICATORS for the Shops section	All existing shops and souvenir shops are renovated in accordance with the highest architectural and environmental criteria and conservation of outstanding universal values; Growing number of products presenting Park values in shops and souvenir shops; Value and share of local products in shop and souvenir shop turnover are growing; Offer is profiled per facility; Highest level of visitor satisfaction in connection with the quality of services and offer; Consumption in souvenir shops per visitor is growing; Revenue per facility from shops and souvenir shops is stable or growing.														
AKTIVNOSTI ZA DIO UGOSTITELJSTVO															
CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
DEVELOPMENT STUDIES AND PLANS															
CB1	Prepare study that would define detailed profile and specific aspects of the offer for each of the facilities, based on specific aspects and character of the offer and target visitor groups determined by this Plan, and based on feasibility analysis for planned investments in renovation and development of hotels, camping sites and catering facilities of the Public Institution.	Identified opportunities for alternative profiles of the offer; Prepared comparative investment feasibility study; Detailed profile and specific aspects of the offer for each individual facility	1	External experts; MEE; Ministry of Tourism											300.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CB2	Prepare terms of reference for the preparation of project documentation for renovation and equipping of Hotel Jezero, with detailed description of profile and specific aspects of the offer.	Prepared detailed terms of reference	1	External experts; MEE; Ministry of Tourism											50.000,00
	Prepare terms of reference for the preparation of project documentation for renovation and equipping of Hotel Bellevue, with detailed description of profile and specific aspects of the offer.	Prepared detailed terms of reference	1	External experts; MEE; Ministry of Tourism											50.000,00
CB4	Prepare terms of reference for the preparation of project documentation for renovation and equipping of Hotel Grabovac, with detailed description of profile and specific aspects of the offer.	Prepared detailed terms of reference	1	External experts; MEE; Ministry of Tourism											50.000,00
	Prepare terms of reference for the preparation of project documentation for renovation of sport and recreation facilities and increase in fixed accommodation capacities in camping site Korana, with detailed description of profile and specific aspects of the offer.	Prepared detailed terms of reference	1	External experts; MEE; Ministry of Tourism											50.000,00
CB6	Prepare terms of reference for the preparation of project documentation for equipping the camping site Borje, with detailed description of profile and specific aspects of the offer.	Prepared detailed terms of reference	1	External experts; MEE; Ministry of Tourism											50.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CB7	Prepare terms of reference for the preparation of project documentation for renovation and equipping of restaurant Poljana, with detailed description of profile and specific aspects of the offer.	Prepared detailed terms of reference	1	External experts; MEE											50.000,00
CB8	Prepare terms of reference for the preparation of project documentation for renovation and equipping of catering facility Vučnica.	Prepared terms of reference	1	External experts											50.000,00
CB9	Prepare terms of reference for the preparation of project documentation for renovation and equipping of catering facility Kupalište.	Prepared terms of reference	1	External experts											50.000,00
CB10	Prepare terms of reference for the preparation of project documentation for renovation and equipping of catering facility Kozjačka Draga.	Prepared terms of reference	1	External experts											50.000,00
CB11	Examine opportunities for development of congress tourism for the purposes of better using the existing capacities and improving the profitability of hotels out of season, while tailoring the offer and marketing activities in accordance with that.	Analysis of options Hotel offer includes congress tourism; Number of held congress events; Realized revenue	1	External experts; MEE; Ministry of Tourism											50.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CB12	Prepare project documentation for capacities and locations of congress facilities.	Offer for use of congress capacities Target groups: conferences, events; Project prepared; Permits and consents obtained; Increased revenue; Extended "season"; longer stay of guests	1	External experts; Ministry of Tourism											250.000,00
CB13	Develop detailed multiannual development plans for individual catering facilities, in accordance with their defined specific offer.	Development plans per facility	1	External experts											450.000,00
CB14	Regularly revise and implement annual work plans in accordance with multiannual development plans and recommendations for improvement based on monitoring results.	Annual work plans, per facility	1												0,00
<b>MONITORING</b>															
CB15	Design and continuously perform monitoring of visitor satisfaction with provided catering services per facility, and provide recommendations for improvement based on results.	Monitoring protocols Monitoring results Recommendations for improvement	1	External experts											400.000,00
<b>MAINTENANCE, RENOVATION, CONSTRUCTION AND QUALITY IMPROVEMENT OF FACILITIES</b>															
CB16	Select the most suitable ecological standard for Public Institution facilities and ensure the fulfillment of required criteria through project documentation for renovation of facilities.	Selected ecological standard; Certified facilities	1	External experts											200.000,00
CB17	Build external hydrant network and fire road around Jezero hotel.	Built external hydrant network; Built fire road	1	External contractors											1.230.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>CB18</b>	Define specific characteristics of the offer for Boutique Hotel Plitvice as high-category hotel, prepare project documentation, obtain the required permits and consents, and renovate Hotel Plitvice.	Project prepared; Permits and consents obtained; Hotel renovated (as high-category hotel)	<b>1</b>	External experts and contractors; Ministry of Culture; Ministry of Tourism											103.000.000,00
<b>CB19</b>	In accordance with the selected profile and specific characteristics of the offer, prepare project of comprehensive hotel renovation, obtain the required permits and renovate Hotel Jezero.	Project prepared; Permits obtained; Hotel renovated	<b>1</b>	External experts and contractors; Ministry of Tourism											200.000.000,00
<b>CB20</b>	In accordance with the selected profile and specific characteristics of the offer for Hotel Bellevue, prepare project documentation, obtain all the required permits and consents, and renovate and upgrade Hotel Bellevue.	Project prepared; Permits and consents obtained; Hotel renovated (as high-category hotel)	<b>1</b>	External experts and contractors; Ministry of Tourism											85.000.000,00
<b>CB21</b>	Preparation of project documentation, obtaining permits and consents, and renovation of tennis courts (Hotel Jezero).	Project prepared; permits and consents obtained; tennis courts renovated; visitor offer expanded	<b>1</b>	External experts and contractors; Ministry of Tourism											950.000,00
<b>CB22</b>	In accordance with the selected profile and specific characteristics of the offer for Hotel Grabovac, prepare project documentation, obtain all the required permits and consents, and renovate and upgrade Hotel Grabovac.	Project prepared; Permits obtained; Hotel renovated	<b>1</b>	External experts and contractors; Ministry of Tourism											90.000.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CB23	In accordance with the selected profile and specific characteristics of the offer for Korana camping site, prepare project documentation, obtain the required permits, build the sport and recreation zone, and increase accommodation capacity of fixed facilities within Korana camping site.	Project prepared; Permits obtained; Increased accommodation capacities (bungalows built) Camping site renovated	1	External experts and contractors; Ministry of Tourism											58.000.000,00
CB24	Preparation of project documentation, obtaining permits and consents, and renovation and upgrade of infrastructure in Korana camping site.	Project prepared; permits and consents obtained; camping site infrastructure improved	1	External experts and contractors; Ministry of Tourism											4.000.000,00
CB25	In accordance with the selected profile and specific characteristics of the offer for Borje camping site, prepare project documentation, obtain the required permits, and renovate the camping site.	Project prepared; Permits obtained; Camping site renovated	2	External experts and contractors; Ministry of Tourism											2.000.000,00
CB26	In accordance with the selected profile and specific characteristics of the offer for Poljana restaurant, prepare project documentation, obtain the required permits, and renovate Poljana restaurant.	Project prepared; Permits obtained; Restaurant renovated	2	External experts and contractors											21.000.000,00
CB27	Obtain the required permits and prepare and implement projects for horticultural design of Kozjačka draga plateau and covered area/awning for approx. 100 persons.	Permits obtained; Horticultural design project; Covered area built	1	External experts and contractors											1.500.000,00
CB28	Obtain all the required permits, complete renovation and put into service Labudovac buffet.	Permits obtained; Labudovac buffet renovated and put into service	1	External experts and contractors											2.500.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CB29	Obtain all the required permits, renovate and put into service Rapajinka cafe.	Permits obtained; Rapajinka cafe renovated and put into service	1	External experts and contractors											900.000,00
CB30	In accordance with the selected profile and specific characteristics of the offer for Flora cafe, prepare project documentation, obtain the required permits, and renovate the facility.	Project prepared; Permits obtained; Facility renovated	1	External experts and contractors											3.500.000,00
CB31	Prepare project documentation, obtain the required permits and consents, and build and equip catering facility Vučnica.	Project prepared; Permits and consents obtained; Catering facility renovated	1	External experts and contractors											6.900.000,00
CB32	Prepare project documentation, obtain the required permits and consents, and build and equip catering facility Kupalište.	Project prepared; Permits and consents obtained; Catering facility renovated	2	External experts and contractors											3.000.000,00
CB33	Prepare project documentation, obtain the required permits and consents, and build and equip catering facility Kozjačka Draga.	Project prepared; Permits and consents obtained; Catering facility renovated	1	External experts and contractors											5.700.000,00
CB34	Renovate the interior and put into service renovated catering facilities at Entrance 2 (Hladovina grill, Hladovina bistro).	Project prepared; Permits obtained; Facilities renovated	1	External experts and contractors											3.600.000,00
CB35	Prepare project documentation, obtain all the required permits and renovate Okrugljak facility in Jezerce, with dual shop and bistro use.	Project prepared; Permits obtained; Facility renovated	1	External experts and contractors											4.100.000,00
CB36	Relocate laundry, meat preparation facility and central confectionery into the new Prijeboj economic zone.	Facilities relocated	1	External experts and contractors											0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CB37	Prepare project documentation, obtain the required permits and consents, build, equip and put into service, and regularly maintain and upgrade the content of the multimedia and congress center.	Project prepared; permits and consents obtained; multimedia and congress center put into service; content for visitors improved	1	External experts and contractors											7.550.000,00
<b>IMPROVING QUALITY AND DIVERSITY OF THE OFFER AND FEASIBILITY OF BUSINESS OPERATIONS</b>															
CB38	Continuously develop the content and quality of HORECA offer presenting and elaborating Park values.	Offer of additional programs and services; Number of implemented programs per facility; Number of participants per program; Visitor satisfaction with provided program/service	1	External experts											2.250.000,00
CB39	Provide logistical support to the Education and Interpretation Program (PEI) of the Public Institution and tailor the catering offer to thematic or seasonal events and activities.	Number of implemented Education and Interpretation Program activities per facility; Number and description of provided HORECA services accompanying the Education and Interpretation Program activities Visitor satisfaction with special offer; Revenue from special offer	1	External experts											450.000,00
CB40	Include high-quality, certified local products "with a story to tell" in the HORECA offer of the Park.	Number and quantity of products included in the HORECA offer Visitor satisfaction with the offer; Realized revenue	1												0,00
CB41	Design and brand HORECA products for which product placement is possible through souvenir shops and retail shops.	Number and description of designed products; Number of placed products; Placement successfulness per product	2												0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>CB42</b>	Examine the possibility of planting traditional orchards, gardens and flower beds in the surroundings of Hotel Grabovac (or camping sites) as part of additional presentation offer for guests.	Analysis of options with proposal for development of the offer	<b>2</b>	External experts											100.000,00
<b>CB43</b>	Procurement of foodstuffs for business operations of HORECA facilities.	Sufficient quantity of food and foodstuffs ensured for HORECA needs; Green Procurement methods used in the procurement of foodstuffs; Placement of foodstuffs through the offer in facilities, with the aim of obtaining income	<b>1</b>	External experts											0,00
<b>TOTAL:</b>															609.330.000,00

ACTIVITIES FOR THE RETAIL AND SOUVENIR SHOPS SECTION															
CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>FACILITIES - PROFILING AND MANAGEMENT</b>															
<b>CB44</b>	Profile souvenir shops so that they jointly cover the preferences of the entire spectrum of visitors with their offer, with each souvenir shop having its own individual narrow profile corresponding to the preferences of one segment of visitors.	Souvenir shops profiled in accordance with selected profiles	<b>3</b>	External experts											1.000.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>CB45</b>	Ensure continuous professional advisory service for all facilities on the issue of organizing, presenting and displaying offered merchandise.	Annual report on provided services of organizing sales and exhibition areas of souvenir shops and retail shops	<b>3</b>	External experts											200.000,00
<b>RENOVATION AND MAINTENANCE OF OLD FACILITIES</b>															
<b>CB46</b>	Within all shops, prepare part of the sales area for souvenir shop purposes.	Newly-prepared sections are put into service	<b>3</b>	External experts											100.000,00
<b>CB47</b>	In all shops, establish a corner with local products (including cheese, honey, jam, brandy (plum, pear, apple), etc.) that are offered and tasted in HORECA facilities of the Park.	Value of local products placed on the market through dedicated shop corners exhibits a constant growth trend	<b>3</b>	Producers of products. External experts											100.000,00
<b>CB48</b>	Design sites with ice cream stands in a manner that would make them better integrated in landscape and stylistically harmonized with neighboring facilities.	Existing sales locations "dressed" in wooden huts that are stylistically harmonized with neighboring facilities	<b>3</b>	External experts											100.000,00
<b>CB49</b>	Renovate the interior of Slap souvenir shop at the site U1, including the renovation of neighboring storage space for sales purposes, and ensure additional needed sales space in the form of sales stands in the area in front of the souvenir shop.	Renovated facility put into service	<b>3</b>												200.000,00
<b>CB50</b>	Renovate the interior of Hladovina souvenir shop at the site U2, including functional reorganization of the entire area as well.	Renovated facility put into service	<b>3</b>	External experts											1.500.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CB51	Modernize the interior of Kozjačka draga souvenir shop, in line with interior design solutions applied in souvenir shops at sites U1 and U2.	Renovated facility put into service	3	External experts											500.000,00
CB52	Regular maintenance of facilities and occasional modernization of interior with the aim of maintaining a high level of innovativeness, attractiveness and functionality.	All facilities underwent at least one modernization of interior in a 10-year period.	3	External experts											2.000.000,00
NEW FACILITIES															
CB53	Include souvenir shop space with needed capacity and functionality in the design of new visitor centers, and prepare this space for use upon construction.	Functional and profiled souvenir shops within new visitor centers	3												0,00
CB54	Within new entrances Prijeboj and Čatrnja, in the process of defining future use, foresee and plan for "Ethno Villages" exhibition and sales areas, where local tradition and crafts would be presented, and where local products would be sold; prepare these areas for use upon construction. (e.g. wool handicraft, wood handicraft, brandy production, honey production, cheese production, etc.).	Functional areas for this purpose ensured within newly built entrances	3	External experts											20.000.000,00
CB55	Within new entrances Prijeboj and Čatrnja, in the process of defining future use, foresee and plan for sufficient area for sales stands where local producers will sell their branded traditional products; prepare this area for use upon construction.	Functional areas for this purpose ensured within newly built entrances	3	External experts											450.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CB60	Design and produce a series of Park souvenirs for sale and/or distribution through educational programs of the Park.	Number of available souvenirs	3	External experts											400.000,00
CB61	Enrich the offer segment with equipment needed for safe visit to the Park (raincoats, umbrellas, simple crampons, sun hats, warm tracksuits, footwear, etc.), especially upon ensuring sufficient sales area as part of new entrances Prijeboj and Catrnja.	Survey of visitor satisfaction with offer of hiking equipment shows a high level of satisfaction.	3												0,00
CB62	Procurement of consumer goods.	Ensured wide assortment of goods in order to provide a better choice and increase the satisfaction of customers and income	2	External experts											0,00
CB63	Procurement of souvenirs.	Ensured choice for various groups of visitors with diverse levels of purchasing power; Introduced autochthonous souvenirs made by local producers, with an educational character (presentation of tradition and culture of the area)	1	External experts											0,00
MONITORING AND CONTINUOUS IMPROVEMENT															
CB64	Regularly examine visitor satisfaction with souvenir offer, and provide recommendations to upgrade the offer based on results.	Protocol for surveying visitor satisfaction; Reports on visitor satisfaction with recommendations for improvement	3	External experts											200.000,00
TOTAL:															31.950.000,00

### 3.3.3 CC. Interpretation and education

The Public Institution is currently implementing a number of activities in various forms of interpretation and education; however, there is both need and opportunity to engage in substantial improvements as regards the intensity, scope and diversity, as well as quality and systematic approach, in tackling this important task. The key recognized weakness is the lack of prepared program for implementation of education and interpretation, which is necessary for systematic work and for the fulfillment of the educational role of the Park.

Available materials include guidebooks and information materials in the form of thematic leaflets, as well as tourist maps, while natural and cultural values of the Park are presented in a user-friendly manner on the website and social network accounts of the Park. It is possible to improve the situation by preparing specialized guidebooks for a wider set of topics and visitor interests, by developing thematic monographs, as well as by developing mobile platforms with information and interpretation, since they have become a standard in visitation of various areas.

Interpretation in the field is available in the core visitation zone along the lakes, in the form of panels that provide key information on a given lake, as well as along hiking trails, in the form of education and interpretation panels in connection with forest ecosystems. A substantial room for improvement remains when it comes to improving the existing interpretation content and developing additional such content, as well as preparing educational trails in boundary areas of the most visited lake zone and elsewhere in the Park, connected with all the natural values and tangible and intangible cultural heritage.

The Public Institution already offers guided tours for tourists and expert tours interpreting the values of the Park; however, it is possible to improve on the offer by developing additional capacity for guided tours, and by systematically developing and standardizing the offer as regards available guided tours. One topic that requires more attention is to ensure proper quality of guided tours offered to visitors, including the tours offered by the Public Institution, but in particular tours provided by external guides, where there is currently no quality control, and where the quality of provided guided tours and interpretation is frequently below the minimum level that the Park wants to ensure for its visitors. Some of the currently

unused opportunities include the development of a "guidebook for guides", training programs for guides, as well as certification of guides as a necessary requirement to obtain concession permit to engage in the provision of guided tours in the Park.

Various educational activities for elementary schools and preschool children are being implemented, and they are very well accepted. However, there is no comprehensive educational program developed in a systematic manner for all topics for which the Park is an ideal environment.

Substantial strengthening of interpretation and education activities of the Public Institution will be achieved through planned establishment of several presentation centers that will predominantly present the natural values of the Park, beginning with the Medveđak presentation center. In addition to these key facilities, one substantial and currently unused opportunity is to develop appropriate interpretation content and exhibitions within other facilities, primarily HORECA facilities managed by the Public Institution.

The Public Institution is already regularly marking important nature conservation days through guided tours, presentations and educational activities, including the International Day of Forests, World Water Day, Earth Day, International Day for Biological Diversity, European Day of Parks and International Bat Night. Improvement is possible through widening the scope of topics covered by organized events and campaigns, by focusing on topics that provide a targeted contribution to the achievement of certain conservation goals, or to the recognition and presentation of certain values and unique characteristics of the Park. The Public Institution is actively participating in the implementation of volunteer programs in protected areas through the Green Guard program, where volunteers perform some ranger activities and provide valuable assistance in the visitation system during summer months. At annual level, volunteer actions are held to clean illegal dumping sites within the Park, thus raising awareness in the local community, but also beyond, concerning the inevitable negative effect of man on environment and nature.

The Public Institution has substantial and relevant experience and capacities in the form of current staff members, including the Service for National



Park Protection, Maintenance, Conservation, Promotion and Use, as well as the Service for Reception, Guided Tours, Information, Visitor Transport and Internal Transport. However, the needed improvements and the development of the interpretation and education program will require substantial further strengthening of these capacities, including through the network of external collaborators trained for the role of interpreters and educators for the developed content. Strengthening of the overall capacity can also be ensured by improving cooperation among services, as well as by establishing a systematic employee training program. Recently held educational “walks” along a section of hiking trails, which also included the participation of employees, were very well accepted, and they represent an example of an initiative that should be strengthened and developed further.

Finally, analysis of the situation has led to a recognition that the planned development of interpretation and education offer will result not only in providing a substantial contribution to the quality of visitor experience and to the fulfillment of an important obligation of the Park to provide presentation and education, but also in an opportunity to obtain additional income for the Park, as well as to employ young, highly educated staff that would substantially strengthen the overall capacities of the Public Institution.

[illegible]

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>PRINTED MATERIALS, WEB AND MOBILE APPLICATIONS (for sale and/or distribution through educational programs of the Park)</b>															
<b>CC4</b>	Establish and continuously develop a series of monographs on Park values, in printed and digital form.	Defined design, format and equipment of the series; Number of issued monographs; Number of sold/distributed copies per year	<b>2</b>	External collaborators											850.000,00
<b>CC5</b>	Establish and continuously develop a series of photo monographs on Park values, in printed and digital form.	Defined design, format and equipment of the series; Number of issued monographs; Number of sold/distributed copies per year	<b>3</b>	External collaborators											550.000,00
<b>CC6</b>	Establish and continuously develop a series of natural history guidebooks about the Park, on various topics and for various age and interest groups.	Defined design, format and equipment of the series; Number of issued guidebooks; Number of sold/distributed copies per year	<b>1</b>	External collaborators											1.080.000,00
<b>CC7</b>	Prepare publications on cultural heritage of the area of Plitvice (guidebooks, children's books, stories, songbooks, recipe books, recordings, collections, etc.).	Number of prepared publications; Number of sold/distributed copies per year	<b>2</b>	External collaborators											600.000,00
<b>CC8</b>	Prepare educational materials for children (children's books, coloring books, notebooks, social games, etc.) that interpret Park values.	Number of prepared materials; Number of sold/distributed copies per year	<b>1</b>	External collaborators											500.000,00
<b>CC9</b>	Design a manual for tour guides of visitor groups (internal Public Institution guides and external guides).	Number of distributed manuals	<b>1</b>	External collaborators											20.000,00
<b>CC10</b>	Establish a platform and develop mobile applications of the Park.	Number of developed applications; Number of app users	<b>1</b>	External collaborators											970.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CC11	Define and create gift sets for participants of individual educational programs.	Defined gift sets per program Number of distributed gift sets	2	External collaborators											300.000,00
EDUCATIONAL TRAILS AND INTERPRETATION CONTENT IN THE FIELD															
CC12	Add interpretation content to the existing ROS class II hiking trails.	Interpretation localities selected; Volume and description of provided/adapted content; Visitor satisfaction with provided content	1	External collaborators											120.000,00
CC13	Design and provide education and interpretation content at selected geologically interesting localities, and adapt the content as needed.	Interpretation localities selected; Volume and description of provided/adapted content; Visitor satisfaction with provided content	2	External collaborators											40.000,00
CC14	Design and prepare short educational trails interpreting the content connected with water ecosystems and forest ecosystems in the boundary area of the lake zone (potential localities of Rječica and Stubica), and renovate educational dendrological trail along the right shore of Lake Kozjak.	Trail development projects; Description of prepared trails and content; Visitor satisfaction with provided content	2	External collaborators											80.000,00
CC15	Design and provide interpretation content for children at Class V localities: catering zones next to Class III sites (Kupalište, Kozjačka draga, Labudovac), in camping sites and at hotels.	Interpretation localities selected; Volume and description of provided/adapted content; Visitor satisfaction with provided content	1	External collaborators											2.000.000,00
CC16	Provide field interpretation for the conserved facility of the previous hydropower plant at Burget.	Description of provided content	3	External collaborators; HEP; Ministry of Culture											30.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CC17	At the locality of Krčingrad, after conservation of the locality, design interpretation that would tell the story about the history of settlement in the area.	Description of provided content; Visitor satisfaction with provided content	2	External collaborators; Ministry of Culture;											180.000,00
CC18	Provide field interpretation for the conserved site of water mill Radekin mlín at Veliki slap (Big Waterfall).	Description of provided content	1	External collaborators											30.000,00
CC19	Upon completed research and conservation, provide field interpretation for archaeological sites in the Park area.	Description of provided content; Visitor satisfaction with provided content	2	External collaborators; Ministry of Culture;											200.000,00
CC20	Provide field interpretation for the history of individual settlements.	Field interpretation	1	Local communities in settlements, local self-government units											350.000,00
CC21	Design and provide education and interpretation content concerning traditional agriculture.	Description of provided content; Visitor satisfaction with provided content	2	External collaborators											100.000,00
<b>EDUCATIONAL PROGRAMS: GUIDED TOURS, LECTURES, WORKSHOPS, COURSES – FOR VISITORS</b>															
CC22	Develop and implement educational programs about the conservation of aquatic ecosystems, tufa formation process and connected priority species and habitats for various age and interest groups.	Number and type of available programs per age/interest group; Number of implemented programs, per type and age/interest group; Number of participants per program	1	Schools and other educational institutions and organizations; MEE											380.000,00
CC23	Design and implement educational programs on the values, function and importance of conservation of forest ecosystems, for various age and interest groups.	Number and type of available programs per age/interest group; Number of implemented programs, per type and age/interest group; Number of participants per program	1	Schools and other educational institutions and organizations; MEE											180.000,00



[illegible]

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CC29	Promote cooperation with universities (including universities of applied sciences) in the development of educational programs for students (field training, etc.) on topics connected with Park management.	List of universities (including universities of applied sciences) with which cooperation is established; Number and description of educational programs for students	2												0,00
CC30	Implement the Green Ranger volunteer program and develop new volunteer programs as needed and depending on possibilities.	Number of implemented programs; Number of participants per program	1												310.000,00
CC31	Enable more favorable visiting conditions for schools and other age and interest groups that participate in educational programs.	Defined more favorable visiting conditions for participants of educational programs; Number of program participants per year	1												0,00
PRESENTATION CENTERS AND EXHIBITIONS															
CC32	Analyze opportunities and needs, and determine the objectives, locations (including as part of new entrances Prijeboj and Čatrnja), content (in connection with conservation of nature and cultural heritage) and capacities of visitor centers.	Presentation center development program	1												0,00
CC33	Design and create a comprehensive exhibition for the Međvedak presentation center, monitor its successfulness, and amend and improve it on the basis of monitoring results.	Exhibition project for the presentation center; Exhibition for the center is designed and put into service Feedback on visitor satisfaction with provided content	1	External collaborators											10.000.000,00
CC34	Design a comprehensive exhibition for presentation centers within new entrances Prijeboj and Čatrnja.	Designs for the exhibition	2	External collaborators											300.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CC35	Design and continuously improve interpretation exhibitions and content in HORECA facilities of the Public Institution.	Volume of interpretation content per HORECA facility of the Public Institution Visitor satisfaction with the content	1	External collaborators											500.000,00
<b>EVENTS, CAMPAIGNS</b>															
CC36	Continue marking important dates for nature conservation.	Number of held events per year; Number of participants per event	1	External collaborators, Schools and other educational institutions; Nature Conservation Sector; Ministry of Culture; Croatian Commission for UNESCO											200.000,00
CC37	Mark the anniversaries of establishment of the Plitvice Lakes National Park and of listing as UNESCO World Heritage Site.	Anniversaries marked	1	External collaborators											700.000,00
CC38	Continue organizing Young Ranger Days.	Young Ranger Day held; Number of students participating in the activity	1	Schools and other educational institutions and organizations											100.000,00
CC39	Develop and implement events and campaigns in connection with various threats to Park values (illegal dumping sites, invasive species, etc.).	Number of implemented events and campaigns; Number of participants in events and campaigns	1	Schools and other educational institutions and organizations; MEE; waste management companies											50.000,00
CC40	In cooperation with folk ensembles and associations, organize the Week of Cultural Heritage event in the Plitvice Lakes National Park.	Number of involved folk ensembles and associations; Number of participants in the event	2	External collaborators; ethnologists; archaeologists; conservators; architects											2.000.000,00
CC41	Organize art colonies on the topic of Plitvice Lakes values.	Number of organized events; Number of participants per event	3	External collaborators											600.000,00
CC42	Organize film festival on the topic of nature conservation.	Number of organized events; Number of participants per event	3	External collaborators											2.800.000,00
<b>TOTAL:</b>															27.020.000,00

### 3.3.4 CD. Marketing

Plitvice Lakes hosted 1,700,000 travelers in 2017, out of which 40% of visitors visited the Park in July and August. The numbers rise to 16,000 visitors per day in the course of summer, with peak visitor density from 11 A.M. to 3 P.M. According to research performed within the framework of United Nations Development Programme (UNDP) activities, 96.4 percent of travelers in 2016 were foreigners, with average duration of stay amounting to 1.5 days. Three key markets are Germany, Italy and the Netherlands, coupled with a substantial rise in the Asian market. Visitation is focusing on the main attraction – Veliki slap (Big Waterfall) – and takes 2 hours on average. Such visitation poses a difficult challenge, especially in the course of the main season, and it has also become a challenge for visitors themselves, who increasingly describe their experience of visit as unpleasant when providing their feedback. Popular Park areas are also very sensitive to impact caused by visitors, which may result in harmful consequences, and that is significant not only from the perspective of nature protection, but also from the point of view of financial losses for the Park and the state.

Plitvice Lakes National Park has all the characteristics of an overcrowded destination. Clear indicators include worsening visitor experience, overloaded infrastructure and impact on nature. Plitvice Lakes National Park is one of the key attractions of Croatia. It is located close enough to well-known tourist destinations in the country, and it is situated along the route from Zagreb to the coast, which makes it a popular destination for a “casual stopover”. The Park offers a number of attractions, and the region as a whole could attract visitors for multi-day stays. Despite that, however, most visitors spend less than half a day in the Park, and – apart from entry ticket funds – the Park and the community obtain little revenue. In addition, visitation has a pronounced seasonal character, and it is at its highest in the period from June to September.

As regards challenges, the key attractions of the Park are the Lower Lakes and the Upper Lakes. These areas are highly sensitive to impact caused by visitors, which may result in harmful consequences, and this issue is significant not only from the perspective of nature protection, but also from the point of view of financial losses for the Park and the state.

Opportunities can be seen in several aspects that

are also defined as marketing objectives: conservation of the Park coupled with achieving tourism-related turnover; attracting visitors who seek harmony with nature and contact with culture, and wish to spend more time in the region; change of perception of the area from serving as a casual stopover point to becoming a destination for long-term stay; ensuring a higher degree of sustainability in the offer of products and services, which also means improving quality, experience and engagement of staff, as well as ensuring support of the community in conservation of unique universal value of the Park, coupled with engagement of the surrounding community in order to expand the tourism offer and harmonize it with Park priorities.

A comprehensive Marketing Strategy of Plitvice Lakes National Park was prepared in parallel with the preparation of this Plan, and it is harmonized with it in functional and substantial terms. It provides a detailed and systematic evaluation of the current status and trends, defines the objectives, and provides guidelines for standard elements of marketing: product, pricing policy, placement and promotion. Since the Strategy is the key planning document guiding and prescribing the objectives and activities of the Public Institution in connection with marketing in the forthcoming period, plans of the Strategy are listed within activities in the Management Plan, and the Strategy is in accordance with the vision, mission and objectives of the Management Plan. Sub-theme “Marketing” entails the fundamental conclusions and guidelines in connection with the constituent elements of “promotion”, “pricing policy” and “placement”. The key conclusions and guidelines in connection with the element of “product” have been integrated into other relevant themes of the Management Plan, including the themes CA, CB, CC and DB, and the comprehensive Marketing Strategy also needs to be used in the implementation of these themes as a more detailed document. What follows is a brief description of key constituent elements of marketing, with an emphasis on recent trends covered primarily by preliminary recommendations from the process of preparation of the Marketing Strategy.

**PRICING:** Prices are differentiated per age group, per season (with three seasons), and, since 2018, also per time of day (with different prices applicable until 4 PM and after 4 PM). In addition, promotional price is introduced in the course of the year, in connection with important dates for the Park and for nature conservation; two times per

year (in April and October), promotional price is applied with the aim of promoting the Park among the Croatian population. Decision on pricing is reached at the level of the Governing Board of the institution while hotels reach the decisions on pricing of HORECA services within their organizational units. In order to promote the tourism offer compatible with the Park offer in a wider destination around Plitvice Lakes, a joint ticket price has been defined in 9 destinations in Park surroundings in 2018, which is a first step in further plans and development of connected products of the National Park, with additional types of offer in Park surroundings.

**PLACEMENT:** Plitvice Lakes National Park currently works with 360 agencies. In recent times, there is increasing work on direct sales through Park website and sales department, already with visible results. One aggravating circumstance in sales is the lack of a comprehensive information system that would satisfy the needs of modern sales.

**PROMOTION:** Plitvice Lakes National Park does not need classical promotion, since the Croatian National Tourist Board, county-level and local-level tourist boards from the wider area and tour operators provide the Park with sufficient publicity. Since all of them target the mass market, a more recent focus in business-to-business (B2B) promotion has been to choose topics of fairs focusing on nature-based and adventure tourism. In the media, the Park is only advertised in magazines dedicated to sustainability and nature conservation.

In business-to-consumer (B2C) promotion segment, a new Park website has recently been established ([www.np-plitvicka-jezera.hr](http://www.np-plitvicka-jezera.hr)), with a clear educational and sales function. There is clear visibility of the so-called "*call to action*" in connection with hotel and camping site booking, new offers connected with the season, and an active blog with information on events in the Park. One important recent novelty is the introduction of warnings about weather conditions, waiting times in the Park, etc. *Facebook* and *Instagram* profiles have been established, and they are actively worked on in order to increase the number of followers on both platforms. Newsletters have also been developed, and they currently serve for internal communication with Public Institution employees; however, the plan is to expand their use to communication with partner agencies and the local community as well.

**PRODUCTS:** Currently, the Park is offering the following products, explained in greater detail in

other segments of the Plan: Park entry tickets, i.e. eight lake tour programs; HORECA offer in hotels, camping sites, restaurants and small HORECA establishments; sale of goods in retail shops and souvenir shops; touristic guided tours, with expert guided tours under development. Since 2018, linking up with surrounding areas has been initiated, with the aim of creating linked products outside of the Park, thus expanding the Park offer and extending the stay of visitors in the surrounding area.

The objectives of the Strategy are to conserve the Park and obtain tourism turnover; to attract visitors interested in nature and culture who wish to spend more time in the region; to change the perception of the area from an incidental destination into a destination for longer-term stay; to achieve higher sustainability in the offer of products and services, which means improving the quality, experience, engagement of staff and support of the community in the conservation of outstanding universal value of the Park; to engage the surrounding communities with the aim of expanding the tourism offer and harmonizing it with Park priorities. Tourism offer directly linked with the Park will constitute the project Plitvice Experiences. When it comes to the offer from the wider area, it is recommended to include it into a regional approach under the supervision of the regional destination management organization.

### **The expected results are as follows:**

#### **1. Change in the number of tourists during the season:**

- 1.1.** Extend pre-season and post-season duration;
- 1.2.** Distribute visitation in the course of a year;
- 1.3.** Attract more visitors from Croatia.

#### **2. Change to the structure of visitors.**

#### **3. Increased turnover by:**

- 3.1.** Extended accommodation and catering season;
- 3.2.** Extended entry ticket season;
- 3.3.** Packages and linked products;
- 3.4.** Increased revenue from accommodation of travelers touring the region.

#### **4. Decreased impact on the Park by:**

- 4.1.** Visitor management;
- 4.2.** Better community relations.



CD. MARKETING															
SUB-THEME	CD. The Park is the first sustainable destination in Croatia; a model for other protected areas and tourist destinations in the region, where conserved nature, cultural heritage and local community are intertwined in a sustainable manner.														
SPECIFIC OBJECTIVE	- Sustainability of the Park is certified through obtaining and maintaining relevant globally recognizable certificates at the level of business operations of the Institution, individual HORECA facilities, the destination and partners within the destination; - Park offer is harmonized with the preferences of target markets; - Share of direct sales and sales via partners sharing the same values in the total sales of the Park is growing; - Internal and external information and communication channels are established and used regularly; - Share of Croatian visitors in Park visitation is growing; - Share of visitors from international primary target markets is growing; - Inclusion of the local population and Park staff in marketing activities of the Public Institution is growing; - Growing number of certified partners within the destination in Park offer; - Share of visitors staying in the destination longer than one day is growing, as well as average length of visitor stay.														
INDICATORS															
CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
MARKETING – framework activities for the implementation of the Marketing Strategy and Annual Marketing Plans of the Plitvice Lakes National Park															
CD1	At annual level, prepare marketing plans founded upon the Marketing Strategy, adjusted to the market situation and Park management needs.	Annual Plans prepared	1												0,00
CD2	Manage the pricing differentiation for products in Park offer based on visitation program, season, time of day, group size, type of visitors, group of products, promotional activities, etc., in accordance with the market situation and visitation management needs in the Park area and in the destination.	Main annual price list of products in the Park offer corresponds to management needs; Additionally created promotional price lists connected with promotional activities during the year	1												0,00
CD3	Establish Customer Relationship Management (CRM).	Functional system established	1	External collaborators											600.000,00
CD4	Establish and improve comprehensive system for direct on-line sale of products in the Park offer.	Functional system established	1	External collaborators											1.000.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CD5	Define the criteria of cooperation with travel agencies and tour operators harmonized with Park management goals.	Defined criteria are communicated to potential partner agencies and used in selection	1												0,00
CD6	Implement and continuously adapt the promotional mix for business to business (B2B) segment, including fairs, bloggers, the media, FAM trips, newsletters for target markets, catalogs, etc.	Annual report on promotional B2B activities and fairs with analysis of results and recommendations for the forthcoming period.	1												17.000.000,00
CD7	Implement and continuously adapt the promotional mix for business to consumer (B2C) segment, including direct mailing, social networks, website, etc.	Annual report on promotional B2C activities and fairs with analysis of results and recommendations for the forthcoming period.	1												500.000,00
CD8	Establish and utilize all communication channels of the on-line marketing strategy developed in the Marketing Strategy of the Park.	Annual report on implemented activities, with analysis of results and recommendations for the forthcoming period.	1												500.000,00
CD9	Through established channels (NL, <i>pop-up</i> , website, <i>Facebook</i> group, etc.), regularly provide all required information and communicate with all stakeholders, including Public Institution staff, tourist boards, local communities, partner agencies, destination service providers, Parks of Croatia, etc.	Regularly maintained contact databases; Number of information recipients per stakeholder type; Number of read e-mails per stakeholder type; Frequency of published content per channel	1												100.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
CD10	Certify business operations of the institution, individual HORECA facilities and the destination, and define framework for partner certification within the destination in accordance with relevant globally recognized certificates.	Obtained certificates; Periodic reports	1	External collaborators											500.000,00
CD11	Prepare project documentation and scenario, perform recording of the National Park in several technical approaches (3600, drone) in all four seasons, and complete post-production of recorded material.	Prepared project and scenario; the Park recorded in all four seasons; production of material performed; material available for use to third parties for remuneration	1	External collaborators											2.500.000,00
TOTAL:															22.700.000,00

## 3.4 Theme D. Support to sustainable development of the local community

### GENERAL OBJECTIVE

**D.** Local community is the main Public Institution partner in Park management and conservation of its values, recognizing the Park as an important part of its identity, grounding its development in sustainable use of opportunities offered by conservation of a World Heritage Site.

### SPECIFIC OBJECTIVES

#### **Sub-theme DA.** REVIVAL OF AGRICULTURAL PRODUCTION

**DA.** Agricultural production of local high-quality branded traditional products has been revitalized in the Park and its surroundings, contributing to the conservation of biodiversity and identity of the area, recognizability of Park offer and economic circumstances of the local community.

##### Indicators

- Growing number of local agricultural producers with which the Park is cooperating
- Growing share of revived traditional agricultural landscape in the Park
- Growing number of revitalized traditional varieties and breeds
- Growing number, quantity and total value of high-quality branded traditional agricultural products placed through the HORECA sector, retail shops and souvenir shops of the Public Institution

#### **Sub-theme DB.** DEVELOPMENT AND NETWORKING OF ECOTOURISM OFFER

**DB.** Through cooperation of all stakeholders in the development and networking of diverse ecotourism offer, harmonized with the needs of conserving Park values and welfare of the local community, the Park and its wider surrounding area have become a globally recognized, all-year ecotourism destination for a multi-day stay.

##### Indicators

- Growing quality and diversity of ecotourism offer (including nature-based rural, gastronomic, cultural and adventure tourism) in the Park and its wider surrounding area
- Growing number of ecotourism service providers in the local community that satisfy the quality standards required for cooperation with the Park
- Stopped and decreasing negative impact of tourism development on the conservation of Park values
- Growing average length of stay in the Park and its wider surrounding area
- Extending duration of the season in the Park and its wider surrounding area

### 3.4.1 DA. Revival of agricultural production

As already clarified in the context of several other themes of this Plan, conservation of traditional agricultural production is the only way to preserve many values of the Park. Disappearance of agricultural activities results in the disappearance of grasslands and their comprehensive biodiversity, as well as the disappearance of cultural landscape marked by these activities. Entire biodiversity of ancient plant varieties and breeds is disappearing as well. The same is true for an important part of identity and intangible heritage of the area. The area is weakening economically and demographically, since an important source of employment is disappearing; settlements that entirely relied on agricultural use of the surrounding area are dying out; security provided by the capacity to produce own food is disappearing too. Due to all these reasons, conservation and revival of traditional agriculture represent an important task of the Public Institution, which takes care of the conservation of all these values.

The fundamental reason behind the disappearance of traditional agriculture is its lack of competitiveness in markets dominated by products stemming from highly productive industrial agriculture. However, this reason is no longer valid in the context of today's so-called "experience economy", assuming that production is placed in the local tourism market that seeks and values - i.e. is prepared to pay a higher price - for branded, traditional, high-quality products. Namely, the destination itself, by offering such products "with a story to tell", would ensure an additional experience for its guests, thus adding to its quality, attractiveness, recognizability and value. The National Park, annually visited by 1.7 million guests from throughout the world that are coming in order to obtain an experience, represents an ideal "business environment" for the revival of traditional agricultural production.

In addition to representing such an ideal market for local products, the Park area, but also a wider surrounding area, have a range of other advantages that constitute excellent foundations for a successful revival of traditional agricultural production. The Park has a conserved natural environment and "healthy" agricultural land, a substantial part of which belongs to the Natura 2000 network (over 50% of the region of Lika), and there is also a noticeable trend of relatively quick growth of certified ecological producers. One part of active agricultural production is still preserved. Only

in 4 local self-government units where the Park is located, there are still over 2,800 bovine animals, 8,500 sheep and 3,000 beehives. Traditional agriculture of Lika provides a large number of already recognizable products, such as Lika potato, škripavac cheese, basa cheese, honey, slivovitz plum brandy, Lika lamb, Lika bacon, pork greaves, sausages, Lika yogurt, strudel and donuts. Traditionally, this area is also home to ancient breeds of Buša cattle and Pramenka sheep of Lika. Tourism tradition is a good foundation for the development of agritourism offer. Finally, revitalization process has already been initiated through recent initiatives that include education, networking, branding and, generally speaking, support to sustainable and integral rural development through LAG Lika Cluster Lika Destination.

However, the list of current obstacles to the desired agriculture revival is fairly long as well at the moment. The production of family farms is organized on relatively small and fragmented land plots (LAG Lika average is approx. 10 hectares per family farm, on 14 land plots). The total production volume is small, with an even smaller part processed into final products with higher value added, partly also due to outdated and insufficient machinery and equipment (cold storage, drying facilities, etc.). Purchase of products is uncertain, with unknown buyers, price and other conditions. Production is fragmented and involves a number of isolated and unorganized producers, while products are overwhelmingly not branded and substantially differ in quality. Such products are not price-competitive in the current market, which then results in insufficient funds for production initiation and development. Average age of the population and of family farm managers is high (over 40% above the age of 65, and less than 10% younger than 40); furthermore, the educational structure is poor, and long-term trends of depopulation, deagrarianization and emigration of young working-age population are not easy to either stop or reverse. One obstacle for product placement within the Park was posed by the legislative public procurement framework that the Public Institution must adhere to, which did not favor local production; in addition, the practice to procure entire groups of products practically excluded small-scale bidders.

The key opportunity lies in the placement of comprehensive production through branded, high-quality tourism offer in the Park, primarily the offer managed by the Public Institution, but also



through other HORECA establishments that would follow market demand for experience and quality. There is room for development, since the current demand substantially exceeds the offer, in terms of both quantity (at least during the high season) and diversity. In addition, products can also be placed through presentation and sales events in the Park and beyond, as well as through the development of agritourism offer and through so-called sales “at the doorstep”. Certification of traditional products (designation of origin, Lika Quality and other quality requirements) would ensure their market recognizability, as well as opportunity to recognize their uniqueness within public procurement procedures. By organizing producers, one can ensure sufficient quantity of guaranteed-quality products. The Public Institution, with its catering sector and its central position in the flow of visitors, can serve as key driver of the process that can ensure very important security and defined character of purchase conditions. One encouraging circumstance is the existing interest among the local population, as well as potential for relatively quick expansion of agricultural production connected with that, including both larger quantities and larger number of strong producers.

Threats to the desired scenario include the continuation of currently dominant depopulation, emigration, aging and deagrarization trends, as well as gradual decrease of interest in agriculture, due to the perception that earnings can be achieved more easily and more quickly through tourism. As regards the Public Institution, the key threat to its potential for implementation of the planned role would be the privatization of Public Institution’s HORECA services or designating them for concession. Namely, regardless of attempts to contractually specify certain obligations, the concessionaire would always focus on increasing the profitability of HORECA services, rather than on using catering to achieve conservation goals concerning Park values that are emphasized in the introduction, or on presentation of Park values to its visitors.

DA. REVIVAL OF AGRICULTURAL PRODUCTION															
SUB-THEME		DA. Agricultural production of local high-quality branded traditional products has been revitalized in the Park and its surroundings, contributing to the conservation of biodiversity and identity of the area, recognizability of Park offer and economic circumstances of the local community.													
SPECIFIC OBJECTIVE		DA. Agricultural production of local high-quality branded traditional products has been revitalized in the Park and its surroundings, contributing to the conservation of biodiversity and identity of the area, recognizability of Park offer and economic circumstances of the local community.													
INDICATORS		Growing number of local agricultural producers with which the Park is cooperating; Growing share of revived traditional agricultural landscape in the Park; Growing number of revitalized traditional varieties and breeds; Growing number, quantity and total value of high-quality branded traditional agricultural products placed through the HORECA sector, retail shops and souvenir shops of the Public Institution.													
CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
DIRECT SUPPORT															
DA1	On the basis of the criterion of relevance for biodiversity conservation, determine priority areas for support to agricultural production.	Defined criteria for valuation of importance for biodiversity; Defined priority areas	1	External experts											30.000,00
DA2	Monitor the methods and intensity of agricultural production in the Park area, establish cooperation with LAG Lika and the Cluster in maintenance and use of database of agricultural producers, and identify farms potentially interested in cultivation of traditional varieties and breeds (Buša cattle, Pramenka sheep, Lika potato, traditional fruit and vegetable varieties), as well as in ecological production.	Conducted interviews; Lists of the number of animals, breeds, methods of grassland use in the established database; Number of producers cultivating traditional varieties and breeds; Number of ecological producers; Total produced quantity exhibits permanent growth trend	1	Owners of agricultural land; Family farms; LAG Lika; Lika Destination Cluster											100.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>DA3</b>	Examine the possibility of Public Institution support to competitiveness and sustainability of agricultural production promoting the conservation of biodiversity (e.g. through conservation of traditional landscapes and sub-natural habitats, conservation and revitalization of traditional varieties and breeds, improvement of market recognizability of branded traditional products, etc.), by engaging in co-financing, procurement of needed equipment, etc.	Report on analysis of opportunities and models that can be used by the Public Institution to promote agricultural production that supports nature conservation	<b>1</b>	MEE; Ministry of Agriculture; External collaborators											100.000,00
<b>DA4</b>	Through Support Program, cooperate with local producers and associations in the development and implementation of projects aimed at initiation and development of agricultural production that supports biodiversity conservation.	Number of involved producers; Number of various types of agricultural production covered by cooperation; Total value of projects supported through the Support Program	<b>1</b>	LAG Lika; Lika Destination Cluster; PAAFRD; MEE; Ministry of Finance; Local self-government units; Interested family farms; External experts											3.800.000,00
<b>DA5</b>	Through Support Program, assist projects aimed at the development of branded traditional high-quality agricultural products with added value that would be competitive in the local tourism market.	Total value of projects; Number of products developed within the projects;	<b>1</b>	External experts; LAG Lika; Lika Destination Cluster; Local self-government units; Interested family farms											1.800.000,00
<b>DA6</b>	Prepare and implement Buša cattle revitalization program through use in grassland management.	Program prepared; Number of sheep on Park grasslands	<b>1</b>	External experts; LAG Lika; Lika Destination Cluster; Local self-government units; Interested family farms											450.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
DA7	Prepare and implement Pramenka sheep revitalization program through use in grassland management.	Program prepared; Number of sheep on Park grasslands	1	External experts; LAG Lika; Lika Destination Cluster; Local self-government units; Interested family farms											450.000,00
	Promote traditional land use methods (mowing and grazing), with incentives for the local population.	Surface of grassland areas used in a traditional manner (mowing and grazing); Number of involved family farms	1	External experts; LAG Lika; Lika Destination Cluster; PAAFRD; MEE; Ministry of Finance; Local self-government units; Interested family farms											450.000,00
MARKET ACCESS / PRODUCT PURCHASE															
DA9	On the basis of criteria of importance for the conservation of biodiversity and autochthonous breeds and varieties, and on the basis of criteria of needs and opportunities of the Public Institution for placement through HORECA services and souvenir sales, prepare and update a catalog of corresponding products that the Public Institution is interested in purchasing.	Defined criteria; Catalog of products that the Public Institution is interested in purchasing in the long-term	1	LAG Lika; Cluster; Local self-government units; Interested family farms; External experts											150.000,00
	In cooperation with local producers and associations, promote alliances of small agricultural producers and the establishment of standards and quality control systems, in order to ensure sufficient quantities of products with guaranteed quality.	Number of producers engaging in production in accordance with the same quality standards; Total quantity of products at the guaranteed quality level in accordance with the standard	1	LAG Lika; Cluster; Local self-government units; Interested family farms; External experts											500.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
DA11	In cooperation with Lika Destination Cluster and LAG Lika, develop criteria for, and brand of, agricultural products that support biodiversity conservation ("Lika Green Quality", products from the National Park, products from Natura 2000 areas).	Number of certified <i>Lika Green Quality</i> products; Total annual turnover of certified <i>Lika Green Quality</i> products	1	LAG Lika; Cluster; Local self-government units; Interested family farms; External experts											500.000,00
DA12	Develop and apply models for purchasing high-quality branded products of local producers, taking into account the securing of multiannual purchase for the purposes of increasing the security of supply and placement.	Report on analysis of the possibility of purchase of branded products from local producers, with proposal of an optimal model; Purchased quantities and value of products exhibit permanent growth trend	1	External experts; Lika Destination Cluster; LAG Lika; Local self-government units; Interested family farms											300.000,00
DA13	Ensure possibility of sales of traditional agricultural products at events organized by the Park.	Total turnover stemming from traditional agricultural products sold either at events or permanent sales stands within Park service zones	1	Lika Destination Cluster; LAG Lika; Interested family farms											200.000,00
DA14	Promote farms and accommodation providers that sell or use branded agricultural products and maintain traditional architecture, crofts and gardens.	Number of farms included in Park visitation programs in ROS class IV areas	1	Interested family farms and accommodation providers											300.000,00
PROVISION OF INFORMATION, RESEARCH AND EDUCATION															
DA15	Contact individuals and family farms interested to engage in traditional agriculture in the Park area, through public events, direct contact, tours of villages, etc.	Number of undertaken activities providing information; Number of contacted family farms and other interested potential producers	1	LAG Lika; Cluster; Local self-government units; Interested family farms; External experts											300.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
DA16	Design, develop and implement research and educational programs in connection with agricultural production that promotes biodiversity conservation, traditional plant varieties and breeds, agricultural processing resulting in products with added value, cultivation and maintenance of traditional gardens and crofts, etc.	Number of implemented programs; Number of participants per implemented program	1	External experts; Lika Destination Cluster; Ministry of Agriculture; Croatian Agricultural and Forestry Advisory Service											1.450.000,00
DA17	Regularly inform the local population on possibilities of using agricultural aid.	Established regular newsletter communication; Regularly updated content on Park website	2	LAG Lika; Ministry of Agriculture; Croatian Agricultural and Forestry Advisory Service											100.000,00
DA18	Inform owners and users of agricultural land, as well as persons with management rights, of the obligation to eliminate and prevent the spread of ragweed and other allochthonous invasive species in the Park area.	Number of undertaken activities providing information; Number of participants	1	LAG Lika; Ministry of Agriculture; Croatian Agricultural and Forestry Advisory Service											100.000,00
DA19	Organize competition for the most beautiful home garden and croft in the Park area and boundary settlements.	Number of competition participants per year	1	Local self-government units; Lika Destination Cluster; Ministry of Agriculture; Croatian Agricultural and Forestry Advisory Service; MPS ; Interested participants											500.000,00
DA20	Put into service and regularly maintain agricultural areas owned by the Park	Agricultural areas put into service and regularly maintained	1	External experts and contractors											3.000.000,00
TOTAL:															14.580.000,00

### 3.4.2 DB. Development and networking of ecotourism offer

Currently, the Park area and its close surroundings are predominantly an excursion destination visited by visitors who come to see the lakes, and then continue with their travel elsewhere. Apart from visiting the Park, which is a world-renowned destination, there is no sufficiently attractive, diverse and abundant offer of additional activities and experiences in the surrounding area that would retain the visitors. Out of the total number of Park visitors, less than 30% spend the night in the area of 4 local self-government units within which the Park is situated; even in case of those who stay overnight, the average is 1.5 overnight stays (1.1 in hotels and 1.7 in camping sites and private accommodation).

There is also a worrying current trend<sup>55</sup> of major proportions, of building new accommodation capacities that transform the original natural or traditional cultural landscape into an extremely touristified space inappropriate for a protected area - frequently at the most valuable and most sensitive localities, without ensured water supply and sewage system. As this is happening, the current form of "development" neglects the fact that currently registered capacities already satisfy accommodation needs in the peak season, i.e., any additional growth in accommodation capacity, taking into account the available data on the number of visitors in overnight stays and on the average duration of stay. This means that one part of the capacity will not be used even during the peak season.<sup>56</sup> In other words, further growth, in addition to degrading the area and its value, also decreases profitability for all accommodation service providers! On the other hand, development of a sufficiently attractive additional tourism offer, in both the Park area and the surrounding area, would ensure that more visitors stay within the destination for a longer period of time, and this would ensure

better occupancy and better business profitability, with less daily visitors of the Park as the main attraction and the reason for visiting the destination.<sup>57</sup> However, this fact has not been sufficiently recognized; interest for further construction is not waning, and the trend of developing new tourism offer is not keeping pace even remotely. The situation is also not helped by the fact that there is no joint vision of destination development; instead, "development" is simply taking place without even elementary prior analysis.

A joint vision should entail maximizing guest-based revenue of the local economy, by developing and widening the offer of experiences, founded upon conserved and innovatively used heritage, with awareness of that heritage, rather than merely developing accommodation capacity and aiming for growth in the number of guests. Local inhabitants are the carriers of such development, and guardians and users of heritage. Such multisectoral development, which also includes traditional agriculture and all other activities that conserve and promote values of the area, enables conservation of heritage and identity; higher employment and better possibilities of employment; better quality of life of the local community; demographic stability and recovery; long-term sustainability; retention and maximization of capital in the area; better resistance to shocks in the tourism market; higher level of local self-sustainability and security. Quality of destination, quality of life and development opportunities of the local population are growing.

There are prerequisites in place to guide development in a more sustainable direction, by a more thoughtful approach to using the values of the Park that was visited by 1.72 million visitors in 2017 (representing 10% of all tourists in the Republic of Croatia during that year). The area has a

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<sup>55</sup> Approximately 500 new beds in private accommodation per year over the past four years, only in Plitvice Lakes Municipality. By comparison, 3 hotels at the site Velika Poljana, managed by the Public Institution, have approximately 700 beds in total. In general terms, this growth is equivalent to one new Jezero Hotel each year.

<sup>56</sup> Pronounced seasonality, with over 40% of visitors arriving during the two summer months, additionally exacerbates the situation, since a large part of accommodation capacity is completely empty outside of the brief high season.

<sup>57</sup> To illustrate the matter: if only 28% of visitors engage in overnight stay in the area, on average for 1.5 days, there would have to be approx. 15,500 visitors to the Park per day in order to fill the existing accommodation capacity - approx. 6,500 beds in built accommodation facilities in the territory of municipalities Plitvice Lakes and Rakovica (approx. 9,000 when including camping sites). Such a number of visitors far exceeds the current estimated maximum number of visitors that can be received by the current lake zone visitation system without jeopardizing the defined quality standards, which amounts to approx. 12,000 visitors per day. If the share of overnight visitors would rise by 50%, it would take only 8,500 visitors to fill the accommodation capacity. If, on top of that, average duration of stay would rise to 3 overnight stays, only 4,500 visitors would be sufficient.

long tradition in tourism, and many current tourism service providers are already working hard on improving their offer, mainly by upgrading their facilities and their environment; facilities are at a relatively high quality level, when compared with the Croatian average. Even though their total number is still far too low, there are more and more providers of additional offer such as horse-back riding, cycling, etc. Most of the area of the Park and its surroundings is still untarnished, and it is possible to preserve it as such. In the Park area itself, there are settlements where tourism offer and preconditions for the experience of authentic tradition can still be ensured, in cooperation with the local community. Again through cooperation, it is also possible to undertake measures that would ensure prerequisites for the experience of authentic tradition and values in touristified areas as well. Critical mass of attractions and tourism offer already exists in the wider destination too, encompassing entire Lika and part of the region of Kordun, and it could represent sufficient reason for multi-day stay through networking, joint promotion and cross-marketing. In addition to Plitvice Lakes, attractions include the Gacka River, Lika region, Velebit, Plješivica, Cerovačke and Baračeve caves, Grabovača Cave Park, attractive karst fields with conserved landscape, diverse cultural heritage, as well as fast-developing offer of various forms of adventure tourism in nature.

A stronger promotion of eco-destination vision as the best option for tourism development in the region; better coordination of all stakeholders around this vision; support to further development of the offer of adventure tourism, agritourism, gastronomic tourism, cultural tourism and ecotourism, with attractiveness based on the offer of authentic experience of all values of the area; use of Plitvice Lakes as the key attractor, while effectively stopping further growth of accommodation capacity and touristification of the area - all that would contribute to faster development of the wider area in the direction of a recognizable ecotourism destination. The Public Institution should take a leading role in this process, since such development also contributes to the fulfillment of its mandate: to ensure conservation and prerequisites for experience of values of the area.

DB. DEVELOPMENT AND NETWORKING OF ECOTOURISM OFFER															
SUB-THEME	DB. Through cooperation of all stakeholders in the development and networking of diverse ecotourism offer, harmonized with the needs of conserving Park values and welfare of the local community, the Park and its wider surrounding area have become a globally recognized, all-year ecotourism destination for a multi-day stay.														
SPECIFIC OBJECTIVE	Growing quality and diversity of ecotourism offer (including nature-based rural, gastronomic, cultural and adventure tourism) in the Park and its wider surrounding area; Growing number of ecotourism service providers in the local community that satisfy the quality standards required for cooperation with the Park; Stopped and decreasing negative impact of tourism development on the conservation of Park values; Growing average length of stay in the Park and its wider surrounding area; Extending duration of the season in the Park and its wider surrounding area.														
INDICATORS															
CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
ESTABLISHMENT OF COOPERATION WITH KEY STAKEHOLDERS, HARMONIZATION OF VISIONS AND DEVELOPMENT PLANS															
DB1	Regularly organize coordination meetings with representatives of local and regional tourist boards, associations and other Protected Area Public Institutions for the purposes of development and harmonization of marketing and development strategies.	Minutes of meetings - at least 3 times per year	1	Lika Destination Cluster; Local/county-level tourist boards; Local self-government units; Counties; Ministry of Tourism											100.000,00
DB2	Establish Cooperation Council for the development and networking of ecotourism offer of the wider area.	Developed and networked ecotourism offer of a wider Plitvice Lakes area (Lika destination)	1	Lika Destination Cluster; Associations; Local/county-level tourist boards; Local self-government units; Counties; Ministry of Tourism											0,00
DB3	Create joint Tourism Development Strategy in the wider region.	Strategy created	2	Lika Destination Cluster; Local/county-level tourist boards; Local self-government units; Counties; Ministry of Tourism; External experts											700.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>DB4</b>	Develop joint marketing brand of the Plitvice Lakes region for the wider area (Lika destination).	Harmonized marketing and promotion activities of Plitvice Lakes National Park Public Institution and local-county-level and local-level tourist boards in the wider area	<b>2</b>	Lika Destination Cluster; DMO; Local/county-level tourist boards; Local self-government units; Ministry of Counties; Ministry of Tourism											1.000.000,00
<b>DEVELOPMENT OF NETWORKED TOURISM OFFER</b>															
<b>DB5</b>	Establish minimum quality standards for inclusion in the joint tourism offer.	Quality standards are adopted by the Cooperation Council	<b>1</b>	Lika Destination Cluster; Local/county-level tourist boards; Local self-government units; Counties; Ministry of Tourism; External experts											50.000,00
<b>DB6</b>	Cooperate in development projects for various types of tourism offer in the wider region, including cyclotourism offer, trekking offer, various types of tourism offer aimed at the experience of nature, gastronomic offer, etc.	Number of various forms of compatible tourism offer where successful cooperation has been achieved through a joint development project / program	<b>1</b>	Lika Destination Cluster; Local/county-level tourist boards; Local self-government units; Counties; Interested private tourism service providers ; External experts											1.000.000,00
<b>DB7</b>	Promote and lead in cross-marketing as one of the key modes of cooperation and creation of joint ecotourism destination.	Number of tourism service providers networked into a joint cross-marketed offer	<b>1</b>	Lika Destination Cluster; Local/county-level tourist boards; Local self-government units; Counties; Interested private tourism service providers											500.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>PROMOTION OF NETWORKED TOURISM OFFER OF THE DESTINATION</b>															
<b>DB8</b>	Create tourist map of a wider area in printed and digital format, as well as mobile app, with marked key tourist attractions and offer.	Regularly published map; Continuously updated digital map with included offer; Mobile app prepared	<b>1</b>	External experts; Lika Destination Cluster; Local/county-level tourist boards; Local self-government units; Counties; Ministry of Tourism											200.000,00
<b>DB9</b>	Design, agree, organize and promote programs for multi-day stay in Plitvice Lakes National Park.	Number of designed one-day and half-day modules that are combined into a multi-day program	<b>1</b>	Lika Destination Cluster; Local/county-level tourist boards; Local self-government units; Interested private tourism service providers ; External collaborators											1.000.000,00
<b>DB10</b>	Design, agree, organize and promote programs for multi-day stay in the wider area.	Number of designed one-day and half-day modules that are combined into a multi-day program	<b>1</b>	Lika Destination Cluster; Local/county-level tourist boards; Local self-government units; Interested private tourism service providers ; External collaborators											1.000.000,00
<b>DB11</b>	Create and ensure sufficient quantity of information materials about the Park and the offer in the wider region for local accommodation providers.	Number of distributed materials	<b>1</b>												500.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>PROMOTING THE DEVELOPMENT OF TOURISM OFFER IN THE PARK AREA IN THE DIRECTION OF ECOTOURISM OFFER</b>															
<b>DB12</b>	Promote, develop and implement research, development projects on selective forms of tourism compatible with the Park offer (including rural tourism, agritourism, ecotourism, adventure and nature-based tourism, gastronomic tourism).	Implemented research and prepared quality projects on selective forms of tourism, compatible with Park offer	<b>1</b>	External experts; Lika Destination Cluster; Local/county-level tourist boards; Local self-government units; Counties; Ministry of Tourism											1.000.000,00
<b>DB13</b>	Promote, develop and implement educational programs (lectures, study trips, etc.) on selective forms of tourism compatible with the Park offer (including rural tourism, agritourism, ecotourism, adventure and nature-based tourism, gastronomic tourism).	Number of implemented programs; Number of participants per implemented program	<b>1</b>	External experts; Lika Destination Cluster; Local/county-level tourist boards; Local self-government units; Counties; Ministry of Tourism											1.000.000,00
<b>DB14</b>	Establish and continuously implement Plitvice Lakes National Park Public Institution Program for the development and stimulation of, and support to, projects of the local community contributing to public interest of the Park through the development of innovative ecotourism offer.	Functional Support Program, with defined objectives, priorities, types of support, criteria of project selection and determination of maximum amounts of support; Report on implemented public tenders and projects selected for co-financing; Total value of implemented projects	<b>1</b>	MEE; Ministry of Tourism; Lika Destination Cluster; Local/county-level tourist boards; Local self-government units; Counties; Interested private tourism service providers ; External experts											1.900.000,00
<b>DB15</b>	Include local accommodation providers in programs of monitoring and surveying of visitor habits, interests and satisfaction, as one of the requirements for issuance of concession approval.	Annual number of collected answers to survey questionnaires	<b>1</b>	Interested private tourism service providers											100.000,00
<b>TOTAL:</b>															10.050.000,00

## 3.5 Theme E. Capacity development and management of Public Institution

### General objective

**E.** Public Institution has all the required legal, organizational, human and material resources to manage the Park, and it is using them to continuously improve all segments of management and organizational culture, while building cooperation with stakeholders and its role in Croatian and international expert circles.

### SPECIFIC OBJECTIVES

#### **Sub-theme EA.** ENSURING LEGAL AND PLANNING FRAMEWORK REQUIRED FOR MANAGEMENT

**EA.** Internal regulations of the Public Institution are harmonized with legal obligations and needs of Park management, and relevant external regulations and plans enable their implementation.

##### Indicators

- All obligatory internal regulations and plans of the Public Institution are in accordance with legal obligations and needs of Park management
- All main business processes and procedures of the Public Institution are regulated by corresponding internal regulations (protocols, guidelines, programs, etc.)
- There are no noticed discrepancies between the provisions of external regulations and plans on the one hand and needs of Park management on the other

#### **Sub-theme EB.** DEVELOPMENT OF INSTITUTIONAL AND HUMAN RESOURCES AND COMPETENCIES

**EB.** Institutional and individual capacities required for efficient and effective Park management and for affirmation of the Public Institution in Croatian and international expert circles are ensured through continuous improvement of competencies of staff and organization of work processes, knowledge and information management, and development of organizational culture.

##### Indicators

- Capacities of human resources are aligned with management needs and Public Institution structure
- Staff competencies are continuously developing in accordance with established needs and priorities
- All existing knowledge and information relevant for Park management are stored in information systems of the Public Institution, taking into account themes and issues in an organized manner, and are available to staff

- Information systems of the Public Institution are continuously supplemented by information and knowledge arising as result of management activities
- Reached management decisions, plans and practices are founded upon best available knowledge
- Organizational culture of the Public Institution (which includes sharing of joint vision, established accepted norms of behavior, effective communication, leadership and cooperation, organizational learning, etc.) contributes to the motivation and effectiveness of staff in performing their duties
- In scientific circles, the Public Institution is recognized as an example of good protected area management, and its staff members actively participate in national and international exchange of experiences and projects as relevant experts for their areas

### **Sub-theme EC.** **ASSET MANAGEMENT**

**EC.** By using pre-emptive rights for purchase of property in the Park area, relocation of entrances and accompanying facilities to boundaries of the Park, putting into service all property in its ownership and rational procurement and use of equipment, the Public Institution ensures pre-requisites and material resources and capacities for the achievement of management objectives.

#### **Indicators**

- Active measures implemented on purchased land plots with the aim of achieving management objectives
- Decreased negative impact of construction in the Park on the conservation of Park values
- All property owned by the Public Institution is used for the purposes of managing the Park
- Two new entrances with all planned amenities for visitors are built on Park boundaries
- Planned visitor centers are established
- System of maintenance and use of Public Institution equipment is established
- All organizational units have well-maintained equipment needed for effective and safe performance of their tasks

## **Sub-theme ED.**

### **INFRASTRUCTURE**

**ED.** Appropriate transport and utility infrastructure without negative impact on Park values is ensured through cooperation with stakeholders and advocacy to competent institutions, enabling the conditions needed for sustainable development of the local community and for Park management.

#### **Indicators**

- All transit traffic is relocated from the Park
- The Park is managing all roads that pass through strict conservation zones or that are significant for the visitation system of the Public Institution
- All existing water intake structures in the Park area are replaced by other solutions found outside of Park boundaries
- All facilities in the Park have infrastructure that prevents the negative impact of their wastewater on Park values
- Decreased negative impact of settlements in the Park on the conservation of Park values



### 3.5.1 EA. Ensuring legal and planning framework required for management

The Public Institution has all the basic internal regulations in place; however, some crucial pieces or regulation, such as e.g. Ordinance on Protection and Conservation, or Rules on Internal Structure, are not updated, and they are thus not harmonized with legal obligations, nor with Park management needs. For example, the existing Rules on Internal Structure do not foresee staff members needed for more effective implementation of certain priority projects of the Park (e.g. architect or project manager for capital renovation projects for HORECA facilities, etc.).

Furthermore, many business processes of the Public Institution are currently not regulated by any internal regulation; as a consequence, procedures are either not possible, or inconsistent and founded upon *ad hoc* decisions of the current Management, which decreases managerial efficiency in the long term. This includes a range of areas important for effective operation of the Public Institution, including, for example, the issuance of concession approvals; provision of donations and sponsorships of the Public Institution; purchase of property; construction, renovation and maintenance of visitor infrastructure; vocational training for staff members; procedures in case of accident, etc. Since 2018, the Public Institution also has the obligation to issue nature conservation conditions for some projects in its territory, which is an important task that also requires internal regulations that would ensure consistent procedures of the Public Institution in accordance with management needs.

Without clear instructions prescribed in relevant internal regulations, even the current practice of entering into contractual relations with other parties frequently overlooks items that are important for efficient management. One example of this issue are contracts with travel agencies: until recently, they did not include provisions that would oblige the agencies to act in a manner consistent with the rules prescribed by the Public Institution, and that would result in an agency losing its partner status in case of repeated violations of these rules.

The Public Institution is also frequently disabled in its operations due to the incomplete and inconclusive character of the relevant legal framework. One of the longer-term examples, currently in the phase of its final resolution, is the situation in connection with the Forest Protection, Care and Regeneration Program. Another longer-term problem, recently partially resolved, was the legal public procurement framework that did not permit procurement of exclusively locally produced products, produced in a manner that contributes to Park management objectives inter

alia. In addition, one problem stems from the inconclusive legal framework and practice in connection with the possibility of the Public Institution to provide financial and other support to private initiatives that contribute to the public good and to the goals of conservation and presentation of Park values (e.g. cultural landscape, semi-natural habitats connected with it, tradition, etc.).

The Public Institution is regularly involved in the creation of sectoral legislative solutions and plans, or some plans and regulations relevant to the Public Institution in other sectors, by providing proposals and suggestions; however, the results are frequently not satisfactory. The most recent example is the Physical Plan for Areas with Specific Features (PPASF) for the Plitvice Lakes National Park, reached in 2014. It is one of the fundamental legal documents that prescribes measures for advancement and protection of nature, environment, cultural assets and other values of the area, as well as conditions of implementation of all spatial interventions planned in the area not covered by urban development plan; however, it has been reached without taking into account the suggestions, requests and objections of the Public Institution. Changes and amendments to the Physical Plan for Areas with Specific Features are currently ongoing, and the Public Institution is actively involved, as one of the initiators of the procedure. Another example is the Physical Plan of Plitvice Lakes Municipality, which includes plans for the construction of a high-capacity tourist facility (hotel, tourist resort and camping site with the total surface of 10 ha) right next to the Park boundary, on a site where this boundary is merely 300 meters away from the core lake zone.

Some obligations also stem from the status of UNESCO World Heritage. One example is the Disaster Risk Management Plan, for which UNESCO has recently issued guidelines for drafting, as well as the submission of periodic reports on the status of world heritage every six years. Disaster Risk Management Plan has not been prepared yet; as a result, there are no dedicated organizational capacities within the institution for activities in case of potential disasters.

In cooperation with competent state institutions, primarily the Police, Emergency Service and Croatian Mountain Rescue Service (CMRS), the Public Institution regularly collaborates on risk assessment (primarily in connection with visitor safety), and ensures the needed teams and management activities in order to monitor the risks and keep them within acceptable boundaries.

[illegible]

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
EA4	Prepare and adopt the Ordinance on the Protection of Personal Data, and harmonize business operations with the General Data Protection Regulation.	Ordinance adopted	1	MEE											0,00
EA5	Prepare and adopt the Guidelines for Property Purchase (for facilities and land) in the Park area, with criteria, procedures, priorities and pricing grades, based upon management needs for the purposes of achieving conservation goals.	Guidelines are prepared, and reasoning of the decisions on purchase is based on the Guidelines; Pricing grades defined in accordance with estimated value; List of priority plots for purchase, per type; List of priority facilities for purchase, per type;	1	MEE; External collaborators (appraisers)											100.000,00
EA6	Prepare and adopt the Guidelines and Standards for the Construction, Renovation and Maintenance of Visitor Infrastructure, in order to ensure conservation of natural values and minimal distortion of landscapes; regularly update the Guidelines and Standards on the basis of research results and new insights.	Guidelines and Standards for the Construction, Renovation and Maintenance of Visitor Infrastructure prepared and updated as needed; Obligation to implement Guidelines and Standards is incorporated into the Ordinance on Protection and Conservation	1	MEE											0,00
EA7	Prepare and adopt Public Institution Protocol for Procedures in Case of Accidents and Other Emergency Situations (including those that do not require evacuation of visitors).	Protocol prepared and implemented	1	MEE; CMRS; Emergency services; Ministry of Interior (Mol)											0,00
EA8	Prepare and adopt the Protocol for Public Institution staff procedures in case of violation of rules of conduct in the Park by visitors.	Protocol prepared and implemented	1	MEE (inspection); Police Mol; Monitoring officers of municipal services											0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
EA9	Prepare and adopt the Forest Protection, Care and Regeneration Program (for forests in State and private ownership).	Forest Protection, Care and Regeneration Program prepared and adopted; Number of activities from the Program incorporated into annual programs	1	External collaborators											0,00
EA10	Regularly update the Fire Threat Assessment and the Fire Protection Plan.	Assessment and Plan updated in accordance with legal obligations	1	External collaborators											100.000,00
EA11	Prepare and update the Disaster Risk Management Plan for the Park, in accordance with UNESCO guidelines on risk management in World Heritage Sites.	Plan prepared	2	External collaborators											130.000,00
EA12	At annual level, make assessments of the status of, and needs for, maintenance, servicing and procurement of equipment per organizational unit.	Annual program includes the needs for maintenance, servicing and procurement of equipment; Procurement plan includes the needs for maintenance, servicing and procurement of equipment; Financial plan includes the needs for maintenance, servicing and procurement of equipment	1												0,00
EA13	In contracts with agencies, permanently integrate the provisions ensuring the responsibility of agencies to abide by the rules of conduct in the Park.	Above items are integrated into contracts with agencies; Number of contracts terminated due to repeated violations of contractual obligations	2	Association of Croatian Travel Agencies ; Main partner agencies											0,00
EA14	Establish standard procedure, inform the interested public on it, and, in accordance with this procedure and the criteria prescribed by the Ordinance on Protection and Conservation of the Plitvice Lakes National Park, issue concession approvals for livestock (cow and sheep) grazing in the Park area.	Total number of received requests for concession approvals; Number of received requests in accordance with the provisions defined by the Ordinance; Number of issued decisions on concession approval; Reports on the monitoring of realization of concession approvals; Total surface and number of animals grazing in the Park per year	2	Interested owners of livestock											0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
EA15	Establish standard procedure, inform the interested public on it, and, in accordance with this procedure and the criteria prescribed by the Ordinance on Protection and Conservation of the Plitvice Lakes National Park, issue concession approvals for bee foraging in the Park area.	Total number of received requests for concession approvals; Number of received requests in accordance with the provisions defined by the Ordinance; Number of issued decisions on concession approval; Reports on the monitoring of realization of concession approvals; Total number of beehives, per locality per year	2	Interested beekeepers; Beekeeping manager in charge											0,00
EA16	Through the issuance of nature conservation conditions in the process of renovation of facilities with recorded bat colonies, introduce condition that roof renovation be adapted in a manner that covers bat needs.	Issued nature conservation conditions; Number of renovated facilities adapted as bat shelters	2	External collaborators; MEE											0,00
EA17	Actively participate in the process of changes and amendments to the Physical Plan for Areas with Specific Features of the Plitvice Lakes National Park, and propose and advocate changes required to achieve Management Plan objectives.	Changes to the Physical Plan for Areas with Specific Features proposed by the Public Institution; Adopted Public Institution proposals for changes to the Physical Plan for Areas with Specific Features	1	MEE; Croatian Institute for Spatial Development (HZPR); 4 local self-government units; Ministry of Construction and Physical Planning (MGIPU); Local associations											0,00
EA18	Actively participate in the processes of creation of local and regional physical and development plans in the wider Park area, and propose and advocate solutions contributing to the achievement of Management Plan objectives.	Official proposals of the Public Institution; Adopted proposals of the Public Institution	2	4 local self-government units											0,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
EA19	Initiate procedure of harmonization of Park boundaries defined by the Decision on Changes to Plitvice Lakes National Park Boundary from 1997 with the actual situation in the field.	Field boundary harmonized with the text of the Decision changing the National Park boundary	2	MEE; External collaborators											100.000,00
	Advocate to the Ministry of Environment and Energy (MEE) and other competent institutions to enable an increase of the buffer zone of hunting prohibition around the Park from 300 meters to 1000 meters.	Number of written requests, initiated meetings, etc.; Increased hunting prohibition buffer zone (through changes to the Hunting Act)	3	MEE; Hunting clubs; Other competent institutions											0,00
EA21	In cooperation with the competent institutions, ensure implementation of speed limit on all roads passing through the Park (for the purposes of traffic safety, conservation of large carnivores and other animal species).	Request submitted to competent institutions; Speed limits established and required traffic signalization installed; Decreased use of roads passing through the Park for the purposes of transit traffic	2	Hrvatske ceste (Croatian Roads); County and local roads											0,00
	Get involved in the processes of drafting of laws and regulations in connection with nature conservation and Park management.	List of processes with participation of the Public Institution; Official proposals of the Public Institution	2	MEE											0,00
EA23	Get involved in the processes of creation of planning documents in connection with species management and nature conservation at the national level, and harmonize connected activities of the Public Institution upon the adoption of these documents.	Number of workshops and meetings with participation of Park staff; Number of connected activities incorporated into annual programs	3	MEE											0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
EA24	In cooperation with the Ministry of Environment and Energy (MEE), find the legal framework and model that enable the Public Institution to financially support private initiatives contributing to the public good and to the goals of conservation and presentation of Park values (e.g. cultural landscape, semi-natural habitats connected with it, tradition, etc.).	Appropriate legal framework and support model established; Number of cases and financial amounts of provided support; Established monitoring system for utilization of support;	1	MEE; Local communities in settlements and property owners											0,00
EA25	Improve insurance models of the Public Institution for accident cases during visitation.	Identified models adapted to visitation programs; Implemented insurance models	1												0,00
EA26	Submit periodic World Heritage Resource reports to UNESCO.	Periodic reports prepared and submitted	1	MEE											0,00
EA27	Prepare Management Plan for the planning period 2029 - 2038.	Selected contractor; Number of workshops or meetings; Management Plan prepared and adopted	1	MEE; External collaborators											1.500.000,00
EA28	Prepare scenario of development of Plitvice Lakes National Park functional region	Prepared population projections for three spatial levels: settlements of the Park, local self-government units of the Park and wider functional area, for 2031 and 2041; Prepared development scenarios for PLNP functional region, at three spatial levels: settlements of the Park, local self-government units of the Park and wider functional area	1	External collaborators											190.000,00
EA29	Ensure all the required capacities for fire protection in accordance with the Fire Threat Assessment and the Fire Protection Plan.	Annual report on the implementation of fire protection	1												10.000.000,00
EA30	Ensure all the required capacities for the implementation of the Disaster Risk Management Plan.	System established in accordance with the Plan	2												500.000,00
TOTAL:															12.870.000,00

### 3.5.2 EB. Development of institutional and human resources and competencies

Plitvice Lakes National Park is the oldest national park in the Republic of Croatia, with almost 70 years of experience in managing protected areas that is transmitted through generations of its staff and accumulated in their individual experience and competencies, but also in competencies of the organization, in terms of established systems, work processes and knowledge base. In its long tradition, the Park was frequently a pioneer in many areas important from management, ranging from scientific research (including the ecology of aquatic ecosystems and tufa formation process, ecology of large carnivores, ecology of forest ecosystems, etc.), to organization of visitation (with visitation system developed in the 1960s and 1970s that still represents best practice in global terms in many of its aspects), to high-quality HORECA offer founded upon tradition (Plitvice Hotel as the first post-war top-category hotel in Croatia, national restaurant “Lička kuća”, etc.). Also thanks to these facts, inter alia, the Park was among the first areas to be listed as UNESCO World Heritage Site back in 1979; it was also among the first to receive the European Diploma from the EUROPARC Federation back in 1976.

On the other hand, bearing in mind that the Park is the largest and the most visited of its kind in the Republic of Croatia, tasks and management challenges before the Public Institution necessitate its further development and capacity building (at both institutional and individual level), in many of its elements where the current status either does not satisfy the needs of efficient management, or simply cannot be improved.

The current structure is not optimal, in terms of organization of the existing capacities and work processes, but also in terms of lacking expert and staff capacities. The Public Institution lacks capacities for efficient management or for the very initiation of activities in many important areas. Particularly prominent is the lack of capacity for the implementation of capital development projects of renovation and development of new HORECA and visitor infrastructure, and for ensuring efficient monitoring, in the context of visitation management (in conditions when having more than 10,000 visitors per day is a standard situation), but also in connection with many other pressures (illegal water extraction, release of wastewater, construction, poaching...). Capacities are also lacking for more active engagement in research and presentation of cultural heritage, for more

intensive cooperation with the local community as partner in many activities where its involvement is necessary for the achievement of management objectives and for more active research, monitoring, conservation and presentation of a major share of natural values that the Public Institution cannot tackle to a sufficient degree given its current capacities (e.g. grasslands, fauna of aquatic ecosystems, birds, etc.). There is also significant lack of capacity for monitoring, management and further development of the visitation system; for the entire extraordinarily important area of interpretation and education (with a capital project of establishment of the visitor center as yet another long-term priority project that has not yet been implemented); for systematic management of human resources; for management of information and knowledge bases; for control and internal audit; for preparation and implementation of projects funded by EU funds; etc.

Communication and cooperation among organizational units exist; however, they could be substantially improved. Due to lacking cooperation and communication, as well as due to insufficient specification of responsibilities and obligations of individual organizational units and posts, the efficiency of overall activity of the Public Institution is decreased due to the “it’s-not-my-job” syndrome. As opposed to this situation, project method of work should be used to a higher degree, so that various organizational units or individual employees in them structure their work as teams working together on implementation of a project, with clearly defined objectives and performance indicators. Such a work method is particularly needed in the implementation of development projects.

A substantial negative impact on overall Public Institution efficiency is also exerted by frequent management changes, not only because they disable long-term planning and activity at the level of the organization, but also due to the fact that they create an atmosphere where both individual employees and organizational units lose motivation for longer-term efforts, since they already have experience where such efforts were interrupted on multiple occasions because of *ad hoc* priority changes brought by the new management.

Contribution to a more stimulating working atmosphere and higher total efficiency could also be made by introducing systematic evaluation, valuation, awarding and promotion for employees;

establishing communication channels that could be used by employees to provide their comments, complaints, suggestions for improvement of work processes; establishing transparent criteria and procedures for employment of new staff.

The Public Institution has a wide network of external collaborators (with which it cooperates in scientific and expert research, through work placements, volunteers, etc.); however further development is also possible in this area, as well as in expanding the areas of activity where external collaborators have a more prominent role (e.g. network of collaborators for managing educational and interpretive content in the Park offer, institutionalization of cooperation with Croatian Waters, etc.).

Many Public Institution employees continuously develop their competences through formal and informal programs of vocational training or academic education. A major step forward in the creation of a more enabling environment would be to introduce a system aimed at assessing the required competences and planning their development, through regular annual activities, in all organizational units. Recognizing the importance of continuous vocational training, also in the context of staff evaluation, valuation, awarding and promotion, would serve as an additional impetus for faster development of competences and, in general terms, for the creation of atmosphere where professionalism is valued and respected.

A system that organizes, stores and optimally uses all collected information and knowledge also represents an important element of infrastructure for the development of institutional and individual competences, and, in general terms, for efficient work of the Public Institution founded upon best available knowledge and information. The Public Institution has established foundations of such a system (the existing library, established GIS database of basic data, orthophoto image database, archive, etc.); however, substantial upgrades are needed. Progress can be achieved in terms of better organization of information that would enable easier use per individual management segment; better availability and established practice of using available knowledge and information; ensuring a higher degree of completeness of information and better discipline in archiving information collected through daily work and various projects.

One important instrument for the development of competences and excellence is also participation in work of various expert organizations, since it

enables exchange of experiences and knowledge, as well as possibility of comparisons with others, which can have an enabling effect in case of participation in fora that bring together the best participants. Bearing in mind its UNESCO status, its tradition and size measured by the number of employees, spectrum of management activities and operations, revenue achieved through visitation, the Park should have a natural role of pioneer and center of excellence, first in Croatia, and then at also the European and global level.

[illegible]



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>EB4</b>	Establish and implement criteria and procedures for employing new staff, including types and methods of testing, etc.	Defined criteria and procedures are implemented	1												0,00
<b>EB5</b>	Establish a network of collaborators for the implementation of education and interpretation content in the Park offer.	Network of collaborators is established and active; Number of active collaborators	2												100.000,00
<b>EB6</b>	Develop culture of communication and cooperation within and between organizational units of the Public Institution.	Established internal information system for Public Institution staff; Regular staff meetings of the Director with Heads of Services; Regular staff meetings within services / organizational units; Number of organized team building events	1												3.000.000,00
<b>EB7</b>	By implementing information and education programs for Public Institution staff about Park values, develop their feeling of belonging to the area and their commitment to the Public Institution vision concerning conservation of Park values.	Number of implemented programs; Number of program participants (per organizational unit); Results of annual survey of staff attitudes show increasing recognition of values of the area and commitment to the vision of the Public Institution	1												0,00
<b>EB8</b>	Once per year, conduct anonymous surveys of staff attitudes (satisfaction and comments in connection with key aspects of organization of work and organizational culture).	Share of surveyed employees; Survey results	2												0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
EB9	Establish a methodological framework for monitoring of social and economic impact and, in accordance with that, regularly monitor and report on the impact of the Park and management policies of the Public Institution on sustainable development of the local community.	Annual reports on social impact of the Public Institution (including both economic and environmental impact)	2												0,00
EB10	In the HORECA Branch, introduce and permanently administer international business quality standards (including both service standards and standards of serving customers).	Annual business operation reports; Report on audit of implementation of standards	1												0,00
EB11	Perform accreditation, regular inspection and re-accreditation of laboratories according to the ISO norm HR17025.	Laboratory accredited; Annual inspections performed; Laboratory re-accreditations performed	2	Croatian Accreditation Agency											275.000,00
EB12	When developing educational programs for schoolchildren, ask the Ministry of Science and Education for recommendations.	Number of programs with the recommendation of the Ministry of Science and Education	3	Ministry of Science and Education											0,00
EB13	Within the Ranger Service, establish and implement supervision according to zones of responsibility.	Supervision established according to zones of responsibility; Supervision implemented according to zones of responsibility	1												0,00
EB14	Implement a comprehensive functional accounting system, and link it with the accounting system of profit-based segments of the Institution.	Functional system established	1												0,00
EB15	Establish Controlling Service.	Controlling Service established	2												0,00
EB16	Regularly implement internal audit of the Public Institution.	Internal audit reports	1												0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
EB17	Upgrade the functionality of IT solutions for reporting and monitoring of business operations of the Public Institution, in accordance with management needs of individual organizational units.	IT solutions correspond to management needs of all organizational units	1												1.500.000,00
EB18	Promote and support cooperation with the local community and civil society organizations in their inclusion into the implementation of activities contributing to Park management objectives.	Number of achieved projects / cases of cooperation; Number of organizations / collaborators of the Public Institution; Achieved forms of governance	1	Local population; civil society organizations; 4 local self-government units											0,00
<b>DEVELOPMENT OF COMPETENCIES, INSTITUTIONALIZATION OF COOPERATION AND MEMBERSHIPS</b>															
EB19	At annual level, perform needs assessments for vocational training (development of competencies) of staff in individual organizational units, and plan and implement vocational training in accordance with that, including participation in formal and informal external educational events, study trips, organization of education within the Public Institution (with own or external lecturers), etc.	Annual needs assessments and plans for vocational training of staff, per organizational unit; Annual number of employees that went through vocational training, per organizational unit; List of implemented internal and external educational programs, with the number of participants from the Public Institution; Results of monitoring progress of staff in the development of needed competencies	1	MEE; various partner institutions (other protected areas, professional associations, etc.)											10.000.000,00
EB20	In addition to professional work, also support scientific work, education and vocational training of staff in their area of work.	Number of scientifically active employees in the previous year (published paper, presentation at a scientific event, defended Master thesis, PhD thesis, etc.); Number of presentations at professional and scientific events	2	Academia											2.000.000,00
EB21	Design and implement training programs for assistant educators (external collaborators) and guides of the Public Institution.	Designed programs; Number of participants per implemented program; Number of certified educators	1												0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
EB22	Design and implement training programs for tour guides from travel agencies bringing visitors to the Park, for guided tours according to standard tour programs in the Park offer.	Designed programs; Number of participants per implemented program; Number of certified guides	1	External collaborators											200.000,00
	Continue cooperation with high schools in organizing work placements and teaching, with the possibility of providing scholarships to pupils.	Number and content of established cooperation programs; Number of schools with which cooperation is established; Number of established cases of cooperation / number of program participants; Number of pupils provided with scholarship; Number of pupils provided with scholarship who became employed in the Public Institution	2												4.000.000,00
EB24	Promote cooperation with universities (including universities of applied sciences) in the development of research projects, including the preparation of term papers and B.A., M.A. and PhD theses, on topics of interest for Park management.	Number of achieved projects; Number of published works	2												0,00
	Agree cooperation and data exchange with the <i>Flora Croatica Database</i> (FCD).	Signed agreement; Number of achieved cases of cooperation per year	2	Faculty of Science, MEE											0,00
EB26	Agree and continuously implement cooperation and data exchange between the Public Institution and State Geodetic Administration (DGU).	Signed agreement; Number of achieved cases of cooperation per year	2	MEE; SGA											0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
EB27	Institutionalize and undertake cooperation with key stakeholders in ensuring safety of visitation and respect for determined rules of conduct.	Signed agreements on cooperation that define long-term relations, rights and obligations; Number of rescue teams of competent authorities available for interventions in the Park meets safety standards	1	Police, Emergency services; CMRS; Local self-government units – monitoring officers of municipal services											5.000.000,00
EB28	Join, exchange experiences and actively participate in other ways in the work of expert organizations.	List of memberships; List of cooperation activities within various associations (conferences, joint projects, etc.)	2												400.000,00
EB29	Organize expert and scientific events on chosen topics relevant for Park management.	Number and themes of organized events; Number of participants per event	2												2.000.000,00
EB30	Establish permanent cooperation with Hrvatske vode (Croatian Waters) in water management in the area of Plitvice Lakes National Park.	Action Plan created and adopted for harmonization of goals of water protection and water ecosystems; Management Plans harmonized between the two institutions	2	Hrvatske vode (Croatian Waters)											10.000,00
EB31	Establish cooperation and exchange of experiences with protected areas in Croatia and the region with the aim of improving protected heritage management.	Number of cooperation initiatives; Type of cooperation initiatives	2	Protected areas in the Republic of Croatia and the region; MEE											500.000,00
EB32	Support local initiatives in undertaking research and presenting natural and cultural heritage.	Number of cooperation initiatives; Type of cooperation initiatives	2	Local associations, societies											500.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>DATABASES</b>															
<b>EB33</b>	Establish functional library that manages the entire library stock of the Public Institution, and regularly supplement it (with recent expert literature, all reports on implementation of management activities, etc.) and improve it (by digitalizing selected content, establishing photo, video and audio archive, etc.).	Functional library established; Number of new titles in the library per year; Number of registered borrowings per year	<b>1</b>												500.000,00
<b>EB34</b>	Implement digitalization of reports on all project activities implemented so far and enable their public availability.	Established digital database with reports on project activities; Database is publicly available	<b>1</b>												0,00
<b>EB35</b>	Establish and regularly update thematic databases of the Plitvice Lakes National Park that will bring together, organize and articulate all existing information about the topic (descriptions of characteristics, results of status monitoring, status evaluations, results of analyses, spatial presentations, links to reports on implemented activities, etc.).	Determined themes of databases and database creation coordinators/administrators per theme; Share of Park characteristics / values covered by a thematic database; Procedures for regular database updating are established; Database available to Public Institution staff, in accordance with needs	<b>1</b>												500.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
EB36	Establish and regularly update Integral GIS Database of the Plitvice Lakes National Park with spatial data and results of status monitoring of natural characteristics (habitats, species, hydrology, geology, pedology, etc.), cultural heritage (facilities, archaeological sites, landscape, etc.), existing and planned methods of use (settlements, roads, agriculture, etc.) and other relevant data (various maps of the area, georeferenced photo documentation, property owned by the Park, etc.).	Chief database administrator determined; Database established and regularly updated with data from thematic databases; Database available to Public Institution staff, in accordance with needs	1												2.000.000,00
EB37	Establish, and update as needed, database on key stakeholders, with contacts, areas of cooperation, interests, etc.	Database established and updated; administrator determined	1												0,00
EB38	Establish and regularly update database of property (facilities and land) owned by and/or managed by the Public Institution, with current and planned method of use, legal status and other relevant data.	Database established and updated; administrator determined	1												0,00
EB39	Establish and regularly update database on issued concession approvals.	Database on issued concession approvals; Number of performed inspections and reconfirmed same concession approvals for different periods; Number of contracts / concession approvals terminated due to repeated violations of contractual obligations	1												0,00
EB40	Digitalize Public Institution archives.	Digitalized Public Institution archives	1	External collaborators											1.000.000,00
EB41	Perform orthophoto imaging of selected sections of the Park.	Orthophoto images created	1												1.000.000,00
TOTAL:															34.485.000,00

### 3.5.3 EC. Asset management

The Public Institution manages substantial property, including numerous and valuable property in the Park area and outside of the Park, diverse and numerous equipment (ranging from equipment for research and monitoring natural values to office, HORECA and store equipment, to boats and panoramic "train" vehicles in the visitation system), as well as substantial funds. The current human resources of the Public Institution are not sufficient for quality and effective management of all that property.

The Public Institution does not have a comprehensive database of properties in its ownership, nor an updated description of their status, prior use, assessment of their significance for Park management or their defined future use and management priorities in accordance with that. Existing capacities were not sufficient for engaging in priority projects of renovation of HORECA facilities, nor for the needed development of visitor infrastructure planned for a long time (primarily the visitor center and new main entrances), so it is no wonder that many other properties owned by the Public Institution remained neglected, unused and left to decay, including many registered cultural heritage facilities. A positive example of managing a valuable property with the potential to be used for management purposes is the recently initiated renovation of forestry house Čorkova uvala as a registered cultural asset.

Additional problem is the unresolved legal status of a large number of properties, including not only some long-unused facilities, but also facilities that are actively used and that are crucial for Park management, such as facilities within visitor infrastructure, HORECA facilities and apartments that the Public Institution needs for housing its employees.

Ensuring housing stock for accommodation of Public Institution employees - particularly in conditions when prices of property in the wider Park area have grown substantially due to the development of tourist accommodation rentals - is a necessary prerequisite for the possibility to ensure the needed expert human resources of the Public Institution, and that is why this issue requires attention in a more systematic and long-term

manner than is currently the case. Use as housing stock for the needs of accommodation of Public Institution staff is one of the most suitable and priority purposes for a substantial part of currently unused facilities owned by the Public Institution, once these facilities are renovated.

Even though purchase of property significant for the achievement of conservation objectives, currently in private ownership, is a significant instrument available to the Public Institution given its legal pre-emptive rights, and even though the Public Institution has been capable of using this instrument for a longer period of time due to its favorable financial situation, utilization of this opportunity has only begun over the past couple of years. Poor management of already owned property was used in this matter as an argument against purchase of new property. One consequence of the absence of timely use of pre-emptive rights can be seen in the fact that the properties in question have been purchased by new private owners who do not plan to use them in the previous traditional manner, which is a change that is contrary to the interests of Park management in most cases.

Legally prescribed possibility of using the bulk of own revenue for own purposes is important for effective work of the Public Institution and for managing the Park. The fact that financial assets of the Public Institution have been accumulating for a number of years,<sup>58</sup> while a number of necessary and needed development projects remain unimplemented at the same time, is a clear indicator of insufficient capacities of the Public Institution for implementation of capital development projects in the previous period.

Thanks to its favorable financial situation, the Public Institution is capable of regularly procuring new equipment and restoring old equipment needed for Park management, in accordance with Procurement Plans. The basic problem as regards procurement of needed equipment in the previous period was not the impossibility of procurement; rather, the problem was posed by insufficient capacities to realize planned procurement projects, and by the establishment of systems consisting of procured new equipment.

<sup>58</sup> With approximately EUR 10 million per year, and total surplus receipts and revenue carried forward and available in the forthcoming period, in 2017 in the amount of HRK 234 million.

EC. ASSET MANAGEMENT														
SUB-THEME	EC. By using pre-emptive rights for purchase of property in the Park area, relocation of entrances and accompanying facilities to boundaries of the Park, putting into service all property in its ownership and rational procurement and use of equipment, the Public Institution ensures prerequisites and material resources and capacities for the achievement of management objectives.													
SPECIFIC OBJECTIVE														
INDICATORS	<ul style="list-style-type: none"><li>- Decreasing share of facilities and land in private ownership in the Park area;</li><li>- Decreased negative impact of construction in the Park on the conservation of Park values;</li><li>- All property owned by the Public Institution is used for the purposes of managing the Park;</li><li>- Two new entrances with all planned amenities for visitors are built on Park boundaries;</li><li>- Planned visitor centers are established;</li><li>- System of maintenance and use of Public Institution equipment is established;</li><li>- All organizational units have well-maintained equipment needed for effective and safe performance of their tasks.</li></ul>													
CODE	COLLABORATORS	PRIORITY	INDICATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
EQUIPMENT AND VEHICLES														
EC1	Regularly, in accordance with annual plans, implement procurement, maintenance and servicing of equipment, per organizational unit.	1	Realization of annual plans											70.000.000,00
EC2	Regularly, in accordance with annual plans, implement procurement, maintenance and servicing of vehicles, per organizational unit.	1	Realization of annual plans											20.000.000,00
PROPERTY (with the exception of HORECA facilities, entrances and cultural heritage)														
EC3	For the purposes of establishment of property database, create list of properties owned by the Public Institution, with a description of their status, prior purpose and significance for Park management, and determine the method of their future use and priorities in accordance with that (including use as administrative facilities, monitoring stations, apartments for housing of staff, facilities in visitation function, etc.).	1	Created list of properties owned by the Public Institution that is regularly updated, with defined future purpose and priorities											0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
EC4	Design, obtain permits and consents, and construct and equip Prijeboj Economic Zone.	Design prepared; permits and consents obtained; Economic Zone put into service; economic activities relocated outside of the Park area	1	External experts and contractors											63.000.000,00
	Regulate legal status of all existing facilities of the Public Institution.	All existing facilities have all the required permits	1	External collaborators											
EC6	In cooperation with the Government of the Republic of Croatia, resolve the status of apartments at Mukinje owned by the Public Institution.	Resolved title issues in connection with apartments owned by the Public Institution	2	Government of the Republic of Croatia; Central State Office for Reconstruction and Housing Care											0,00
EC7	Design, obtain permits and consents, and construct apartments for Park employees (rental).	Project prepared; permits and consents obtained; apartments for housing needs of Park employees built	1	External experts and contractors											40.000.000,00
EC8	In cooperation with the local self-government and the State Geodetic Administration (SGA), undertake cadastral survey and consolidation of land registry, according to the determined management priorities.	Forms of cooperation established; Priorities determined; Cadastral survey and consolidation of land registry implemented;	2	Local self-government; SGA											6.000.000,00
EC9	According to determined priorities at annual level, plan and undertake renovation, use conversion, remediation or removal of properties owned by the Public Institution in the Park area, including for the purposes of ensuring accommodation for Public Institution employees.	Funds spent; Records on renovated, remediated or removed facilities and facilities that are not in use; Number of apartments owned by the Public Institution available for accommodation of employees.	1	MEE: External collaborators											10.000.000,00



CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
EC10	In the renovated forestry house Čorkova uvala, establish research and monitoring station that could also be used for the implementation of specialist educational programs, without services for individual visitors.	Facility Čorkova uvala put into service in accordance with planned use	1												200.000,00
EC11	According to determined priorities, plan and undertake renovation, use conversion, remediation, demolition or sale of properties owned by the Public Institution outside of the Park area.	Funds spent; Records on properties with resolved status and properties owned by the Public Institution that are not in use	2												1.000.000,00
EC12	Prepare terms of reference and project documentation, and renovate and equip, facility Robni centar in Korenica.	Terms of reference prepared, project prepared; Facility Robni centar renovated and put into service	1	External experts and contractors											3.000.000,00
EC13	In accordance with the criteria and priorities determined in the Guidelines on property purchase in the Park area, purchase facilities and construction land in the Park, including cultural heritage facilities.	Funds spent; Number of purchased cultural heritage facilities; Number of purchased facilities within valuable landscape units; Number of other purchased facilities; Number of plots and surface of purchased construction land	1												100.000.000,00
EC14	In accordance with the criteria and priorities determined in the Guidelines on Property Purchase in the Park area, purchase non-construction land (grasslands, forest, agricultural land) in the Park area.	Funds spent; Number of plots and surface of purchased land, per type of habitat	1												50.000.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
EC15	Regularly maintain and renovate facilities used as administrative buildings of the Public Institution, and, as needed, plan for expansion to additional facilities (by renovation and use conversion of existing facilities or construction of new facilities outside of the Park).	Funds spent on maintenance; Status assessment for needed capacities and possibilities of organizing space; Surface of office / laboratory area per Public Institution employee	1												4.000.000,00
EC16	Determine locations and establish monitoring stations in the Park area, using the existing facilities as much as possible.	Funds spent; Locations of established monitoring stations; Share of monitoring stations established in the existing facilities	1												1.000.000,00
EC17	Renovate, put into service / use, and regularly maintain Sport and Recreation Center in Mukinje.	Sport and Recreation Center renovated; Sport and Recreation Center is used for the needs of the local population and the Public Institution; Number of users (individuals and associations)	1	External collaborators; sport associations; local community											38.000.000,00
EC18	Prepare project documentation, obtain the required permits and build and equip the Medvedak presentation center.	Permits obtained; Presentation center built and equipped	1	External collaborators											45.000.000,00
EC19	Remediate dilapidated facility of the old store in Plitvica Selo, and build a facility in the form of traditional Lika house with croft in its place and in its dimensions, for the purposes of visitation, education and interpretation.	Prepared projects and obtained permits; Remediated area; Facility built	1												2.500.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
EC20	Determine exact location, obtain land ownership, prepare projects, obtain permits and build the new main entrance Prijeboj.	Obtained Public Institution's ownership of land at the designated location of future entrance; Prepared projects and obtained permits Construction Phase 1: parking lots, toilets, area for reception of visitors and ticket sales, start station of the Park transport system for visitors Construction Phase 2: facilities with catering, interpretation-presentation and sales functions	1	MEE; Construction Office; External collaborators											60.000.000,00
EC21	Determine exact location, obtain land ownership, prepare projects, obtain permits and build the new main entrance Čatrnja.	Obtained Public Institution's ownership of land at the designated location of future entrance; Prepared projects and obtained permits Construction Phase 1: parking lots, toilets, area for reception of visitors and ticket sales, start station of the Park transport system for visitors Construction Phase 2: facilities with catering, interpretation-presentation and sales functions	1	MEE; Construction Office; External collaborators											40.000.000,00
TOTAL:															554.700.000,00

### 3.5.4 ED. Infrastructure

Inadequate infrastructure - both utility and traffic - has been a permanent problem of the Park from its establishment until today.

Until 1970s, the main road that linked continental Croatia with Dalmatia was cutting through the very heart of the Park. Its one branch was passing through Prijeboj and Korenica, and another branch, linking continental Croatia with the central Adriatic across Plitvički Ljeskovac and Otočac, was passing right next to the lakes. It was only in the 1970s that road traffic was rerouted along bypass roads built at the time, currently labeled as roads D429 and D52. However, these two roads also do not pose a satisfactory solution, since they are still in the impact zone of the sensitive aquatic ecosystem of Plitvice. In addition, D429 road cuts across two visitor reception zones next to Entrance 1 and Entrance 2, and it passes along the core lake zone in general, thus substantially limiting the possibility of organizing visitation in this area of the Park that is most attractive to visitors, and thus most visited. Even the D42 road leading from the direction of Plaško and Saborsko towards Poljanak and Čatrnja, with its status of a state road open for use to all categories of vehicles, does not correspond to modern needs in terms of safety; in addition, the possibilities of using this road that passes through the Park as a tourist road in the visitation context are limited. Roads D429 and D42 are in the process of preparation of documentation for the construction of alternative roads that would bypass the Park area. As for D52 road, which passes through the catchment area of the source zone of the lakes<sup>59</sup>, there is a plan to construct a closed runoff water drainage system along the road, and pollution risk would also substantially decrease by prohibiting the transport of hazardous and heavy cargo, as was done in the past for the D429 road along the Grabovac-Prijeboj section.<sup>60</sup>

Other roads in the Park area that pass through the most sensitive zone, and still include the possibility of traffic, are roads leading from Jezerce via Mirić Štropina to Plitvički Ljeskovac; from Plitvički Ljeskovac to Čudin klanac; from Plitvički Ljeskovac to Bigina Poljana, and from Poljanak to Plitvica Selo

(along the section from the bridge across the Plitvica stream to the branch leading towards Plitvica Selo). Since the area serviced by the first three roads has very few inhabitants, one solution how to decrease the traffic pressure and risk would be to reclassify these roads from public roads to roads under Public Institution management; in such a way, use of roads would be permitted only to the Public Institution within Park management and to a small number of inhabitants and property owners in this area. As for the final mentioned road, leading from Poljanak to the settlement of Plitvica Selo and Bigina poljana - where there are more inhabitants, and development of tourism offer has also been permitted in recent times - a solution would be to ensure an alternative connection along a bypass road with the route turning away from the lake zone prior to the bridge across the Plitvica stream, thus freeing up this area for additional opportunities of organizing visitation.

Wastewater drainage by sewage network is only partially resolved in the Park (for part of the area from Jezerce, Mukinje and Public Institution hotels to Rastovača), and wastewater from the network is released without treatment into a sinkhole near Rastovača - a temporary solution that has been in place for almost 50 years. The system itself would occasionally break down in the previous period (pump station at Kozjački most), which resulted in an occasional substantial pollution of waters of Lower Lakes. Most settlements are outside of this system, and wastewater is collected in septic tanks (and/or slurry tanks along farm facilities); these tanks are frequently not impermeable as they should be, which poses the biggest problem in settlements in the core lake zone (e.g. Plitvički Ljeskovac, Plitvica Selo). Cases of illegal release of wastewater from septic tanks into nature have also been recorded, in violation of the Ordinance of the municipal utility company in charge (in Plitvica Selo). In the context where there is no wastewater drainage system, the problem of new construction in the area of the Park gets an additional negative dimension; in addition to changing the landscape, such construction also exerts additional pressure and risk of pollution of sensitive subterranean

<sup>59</sup> Waters from Homoljačko polje and Brezovačko polje flow through subterranean karst towards the spring of Crna rijeka at the speed of 2.1 - 10.7 cm/s, which amounts to 1.8 - 9.2 km per day; i.e., pollution from these fields reaches the source of Plitvice Lakes in a single day.

<sup>60</sup> Hrvatske Ceste (Croatian Roads) have participated in the preparation of this Management Plan as stakeholder, and have directly informed the process in connection with these plans.

karst and aquatic systems by fecal waters. Agglomeration project that would resolve the wastewater issue in the area from Korenica to Rakovica through a single system is in advanced stage of preparation. One remaining challenge in connection with the project is its feasibility, since small area density of users renders the construction, but also operational use of the system, more expensive per user. Towards the end of 2018, temporary mobile wastewater treatment facility at the sewage release in Rastovača was put into service, which should contribute to the mitigation of wastewater issues in the Plitvice Lakes National Park, coupled with more regular control of technical integrity of septic tanks and adherence to procedures of legal emptying of septic tanks, to be done by competent services.

Water intake structures in the area also exert substantial pressure on Park ecosystems, in particular due to two important existing trends: on the one hand, there is climate change and natural trends of decreasing water discharge; on the other, there are growing water needs in households and HORECA activities in the wider Park area, where consumers obtain supply from these water intake structures, and their peak consumption takes place precisely in the period when natural water discharges are the lowest. In addition to the main water intake structure at Kozjak, perhaps an even more acute problem is the intake of water from smaller watercourses (e.g. the Plitvica stream) and threat of new water intake structures in Vrelo Koreničko and Rudanovac (Vreljske bare).

Currently, alternative water intake structures outside of the Park area are not being explored to a sufficient degree, inter alia also due to the fact that there is insufficient pressure to look for alternative solutions. The existing structures have still not caused obvious disastrous consequences for natural values, and a comprehensive long-term monitoring system does not exist, and therefore cannot warn of negative impacts and trends in a reasoned and convincing manner. Furthermore, unsustainable character of existing solutions has not been explained to the relevant stakeholders with sufficient persuasiveness, bearing in mind the existing trends of fall in water discharge coupled with increasing consumption, the fact that switching to a new solution takes time, and the consequential need to immediately start initiatives in order to prevent much more serious problems on time, such as unacceptable impact on natural values and/or inability to satisfy the needs of the population and economy. The local community, even though it is partially already facing problems in water supply and is aware of the developmental limitations that

this represents, does not have sufficient advocacy strength to initiate such processes.

On the other hand, the water sector as the carrier of all relevant activities and initiatives as prescribed by law does not sufficiently perceive the legal provision on prohibition of water intake structures in the National Park as compulsory in terms of representing an obligation to undertake all available measures. The criterion of economic feasibility, which prefers the existing water intake structures since they are closest to settlements and therefore the cheapest solution, still totally dominates over the criterion of ecological acceptability. Finally, there is a standard barrier in connection with any new initiative, in terms of needed resources and initiative that are always in short supply and that tend to be focused in a direction that manages to impose itself as the most important one.

Measures aimed at repair of water supply system that would at least mitigate the problem were not undertaken for years either. For example, by decreasing losses in the network, required water intake capacity would decrease as well (according to estimates, by as much as 50%). There was no interest for such an intervention, however, because the price of renovation of the system is higher than the financial loss stemming from network losses, and that is the case because extracted water is not paid (and not valued), meaning that it ultimately makes no difference how much water gets lost within the system. Certain intervention measures with the aim of decreasing losses in the existing water supply system were undertaken in the course of 2018, and long-term measures for mitigation of losses and removal of water intake structures from the Park area should be obtained through the preparation of the Plitvice Lakes Water Supply System Conceptual Design, the drafting of which was recently initiated.

Exploration of alternative solutions was done in the past, but it was discontinued. According to expert opinions, more intensive research in the surrounding area would certainly result in more acceptable alternatives; in other words, the spectrum of possible solutions would widen.

Infrastructure needed to the Public Institution, such as mobile telephony and IT systems, is not at satisfactory level, nor the existing installation of high-voltage network passing through the Park area.

Energy supply is not resolved in accordance with high ecological standards and energy efficiency standards.



ED. UTILITY AND TRANSPORT INFRASTRUCTURE															
SUB-THEME	ED. Appropriate transport and utility infrastructure without negative impact on outstanding universal and other Park values is ensured through cooperation with stakeholders and advocacy to competent institutions, enabling the conditions needed for sustainable development of the local community and for Park management.														
SPECIFIC OBJECTIVE	ED. Appropriate transport and utility infrastructure without negative impact on outstanding universal and other Park values is ensured through cooperation with stakeholders and advocacy to competent institutions, enabling the conditions needed for sustainable development of the local community and for Park management.														
INDICATORS	<ul style="list-style-type: none"><li>- All transit traffic is relocated from the Park;</li><li>- The Park is managing all roads that pass through strict conservation zones or that are significant for the visitation system of the Public Institution;</li><li>- All existing water intake structures in the Park area are replaced by other solutions found outside of Park boundaries;</li><li>- All facilities in the Park have infrastructure that prevents the negative impact of their wastewater on Park values;</li><li>- Decreased negative impact of settlements in the Park on the conservation of Park values.</li></ul>														
CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
INFRASTRUCTURE															
ED1	Stimulate Hrvatske vode (Croatian Waters) and other competent institutions to urgently and appropriately resolve the issue of wastewater collection and treatment in the Park area, and be actively involved in these processes.	Number of Public Institution initiatives; Initiated projects; Established appropriate wastewater collection and treatment system	1	Hrvatske vode (Croatian Waters); MEE; Municipal utility companies; Heads of municipalities											0,00
ED2	Co-finance the operation of mobile wastewater treatment facility and remediation of sewage system.	Mobile wastewater treatment facility installed; System remediated	1	External collaborators											4.500.000,00
ED3	Co-finance (through project development or in another feasible manner) remediation of point source pollution (septic tanks, liquid manure, etc.) of agricultural farms in the Park area.	Number of initiated remediation projects; Number of remediated point source pollution sources	2	Heads of municipalities; Agricultural holdings; Utility companies; Sanitary inspection; Agricultural Advisory Service; Paying Agency for Agriculture, Fisheries and Rural Development; External collaborators											1.000.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
ED4	Stimulate Hrvatske vode (Croatian Waters) and other competent institutions to urgently find alternative water sources for water supply, remedy losses in the water supply network and relocate all water intake structures (water extraction) outside of Park boundaries; be actively involved in these processes.	Number of initiated cooperation initiatives; Identified alternative water sources, outside of Park boundaries, in accordance with the needs of conservation of natural values; Water intake structures relocated outside of the Park	1	Hrvatske vode (Croatian Waters); MEE; Municipal utility companies; Heads of municipalities											0,00
	Co-finance remediation of the water supply network in order to decrease water losses.	Network losses remediated	1	External collaborators											1.500.000,00
ED6	Submit an official request to Hrvatske ceste (Croatian Roads) for relocation and ban on transport of heavy and hazardous cargo along D52 road that passes through the catchment area, and for construction of a closed runoff water collection system along the road; establish cooperation in order to resolve this issue.	Request submitted; Introduced ban on transport of heavy and dangerous cargo along D52 road; Built closed runoff water collection system along the road	1	Hrvatske ceste; Local self-government units; MEE; Ministry of Sea, Transport and Infrastructure											0,00
	Establish cooperation with Hrvatske ceste and initiate construction of bypass road that would replace current state roads D1, D429 and D42, as well as bypass for unclassified road Poljanak – Plitvica Selo, in order to bypass the section of the road and the bridge situated above the Big Waterfall.	Number of initiated cooperation initiatives; Bypass roads built	1	Hrvatske ceste; Local self-government units; MEE; Ministry of Sea, Transport and Infrastructure											0,00
ED8	Upon ensuring replacement for the road and the bridge above the Big Waterfall, convert the existing road into a trail within the visitation system.	Road adapted for visitation purposes and integrated into the visitation system	2												500.000,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
<b>ED9</b>	In cooperation with local self-government units, submit reasoned request to Hrvatske ceste to reclassify local roads (P. Ljeskovac – Bigina poljanja-Plitvica Selo and P. Ljeskovac – Mirić štrpina – Prijeboj) into internal Park roads, and take over their maintenance upon acceptance of management responsibility.	Request submitted; Roads are reclassified; Park manages the roads	<b>1</b>	Hrvatske ceste; Local self-government units; MEE; Ministry of Sea, Transport and Infrastructure											1.000.000,00
	Examine technical possibilities and, based on proposed solutions, integrate into the environment, technically upgrade and, if needed, relocate pump station currently at the locality Kozjački mostovi - Milanovačka barijera.	Prepared project documentation; Obtained required permits and conditions; Integrated and upgraded pump station													
<b>ED10</b>			<b>2</b>												500.000,00
<b>ED11</b>	Relocate mobile oil station from the settlement of Mukinje into the economic center in Prijeboj.	Determined location for Mobile oil station relocated to the new location	<b>1</b>	External collaborators											100.000,00
<b>ED12</b>	Assess risks and, as needed, remediate the locality of old petrol station on D429 road.	Assessment of need for remediation; Locality remediated as needed	<b>2</b>												1.000.000,00
<b>ED13</b>	Establish cooperation with competent institutions in connection with digging in of cables and relocation of high-voltage network (or placing cables underground if possible).	Established cooperation; Length of cables placed underground	<b>2</b>	HEP											0,00
<b>ED14</b>	In cooperation with competent institutions, ensure that locations and capacities of antennae and base stations for mobile telephony satisfy the criteria of human safety and impact on nature and landscapes.	Locations of existing and planned antennae and base stations satisfy the required criteria	<b>2</b>	MEE; External collaborators											0,00

CODE	ACTIVITIES	INDICATORS	PRIORITY	COLLABORATORS	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	IMPLEMENTATION COST
ED15	Analyze current status, prepare project documentation and perform works on upgrades and improvements of IT infrastructure of the Park.	Current status analyzed; Project prepared; Functionality of IT infrastructure improved	1	External experts and contractors											3.000.000,00
ED16	Prepare project documentation and establish a comprehensive solution for the system of managing work processes ( <i>software</i> ).	Project prepared; Comprehensive system of managing work processes implemented	1	External experts and contractors											4.200.000,00
ED17	Prepare project documentation and renovate transport areas and parking lots at Mukinje, and construct parking lot at Borje.	Project prepared; Permits and consents obtained; Existing transport areas and parking lots renovated; New parking lot put into service	1	External experts and contractors											4.000.000,00
ED18	Design, obtain permits and consents, and construct new and replace existing on-site power plants, with the aim of improving energy efficiency and supply with ecologically acceptable energy sources.	Project prepared; Permits and consents obtained; Existing on-site power plants replaced and new plants built; Supply of the Park with ecologically acceptable energy sources performed	1	External experts and contractors											15.000.000,00
ED19	Dispose of specific types of waste.	Quantity of disposed waste per waste type (bio-waste, laboratory waste, technical waste...)	1	External collaborators											9.660.000,00
ED20	On roads where animals are killed, install warning system for drivers.	System installed; Number of roadkills decreased	1	External collaborators											200.000,00
ED21	Prepare project documentation, obtain permits and construct access ramp and dock (mooring area) for small boats at Prošćansko Lake.	Prepared project documentation; Permits obtained; Access ramp and mooring area constructed	2	External collaborators											50.000,00
TOTAL:															46.210.000,00

## 3.6 Management zonation

Management zonation has been prepared in accordance with the Guidelines for Protected Areas and/or Natura 2000 Site Management Planning that foresee 3 main zones, from the zone where almost no human impact is present to the zone in which natural area can be substantially changed due to human impact. The order of zones does not imply attaching value to an area; instead, it reflects the needs to manage a protected area with the aim of conserving its specific biodiversity and geodiversity. Management zonation has been prepared on the basis of available spatial and other relevant data on distribution zones for species and habitat types for the area of the Natura 2000 ecological network and on their ecological requirements; data on other significant species and habitats, cultural values and geolocalities; data on

existing and planned infrastructure, settlements, methods of land use, etc. – all in coordinated co-operation of all services and Public Institution staff in joint workshops.

In accordance with characteristics of areas and management needs, all 3 main zones have been determined within the Park, with additional division into subzones (Table 4). In accordance with national and international standards for the category of national parks, the bulk of the Park surface, at the level of 80.7 percent, is within the Strict Conservation Zone (Zone I); 17.1 percent of surface is within the Active Management Zone (Zone II); the lowest share of approx. 2.2 percent is in the Sustainable Use Zone (Zone III).

**Table 4.** Management zones and subzones of Plitvice Lakes National Park

Zone		Subzone		Surface (ha)	Share in Park surface (%)
I	Strict Conservation Zone	IA	No visitation	3,986.9	13.4
		IB	With limited visitation	19,934.8	67.3
		Total for Zone I		23,921.7	80.7
II	Active Management Zone	IIA	Aquatic ecosystems	278.3	0.9
		IIB	Grasslands, fens and bogs	4,384.5	14.8
		IIC	Cultural landscape	405	1.4
		Total for Zone II		5,067.8	17.1
III	Sustainable Use Zone	IIIA	Settlement areas	375.6	1.3
		IIIB	Roads	115.3	0.4
		IIIC	Built areas with services for visitors	79.3	0.3
		IIID	Paths, roads and docks managed by the Public Institution	71.1	0.2
		Total for Zone III		641.3	2.2
Overall				29,630.8	100.0



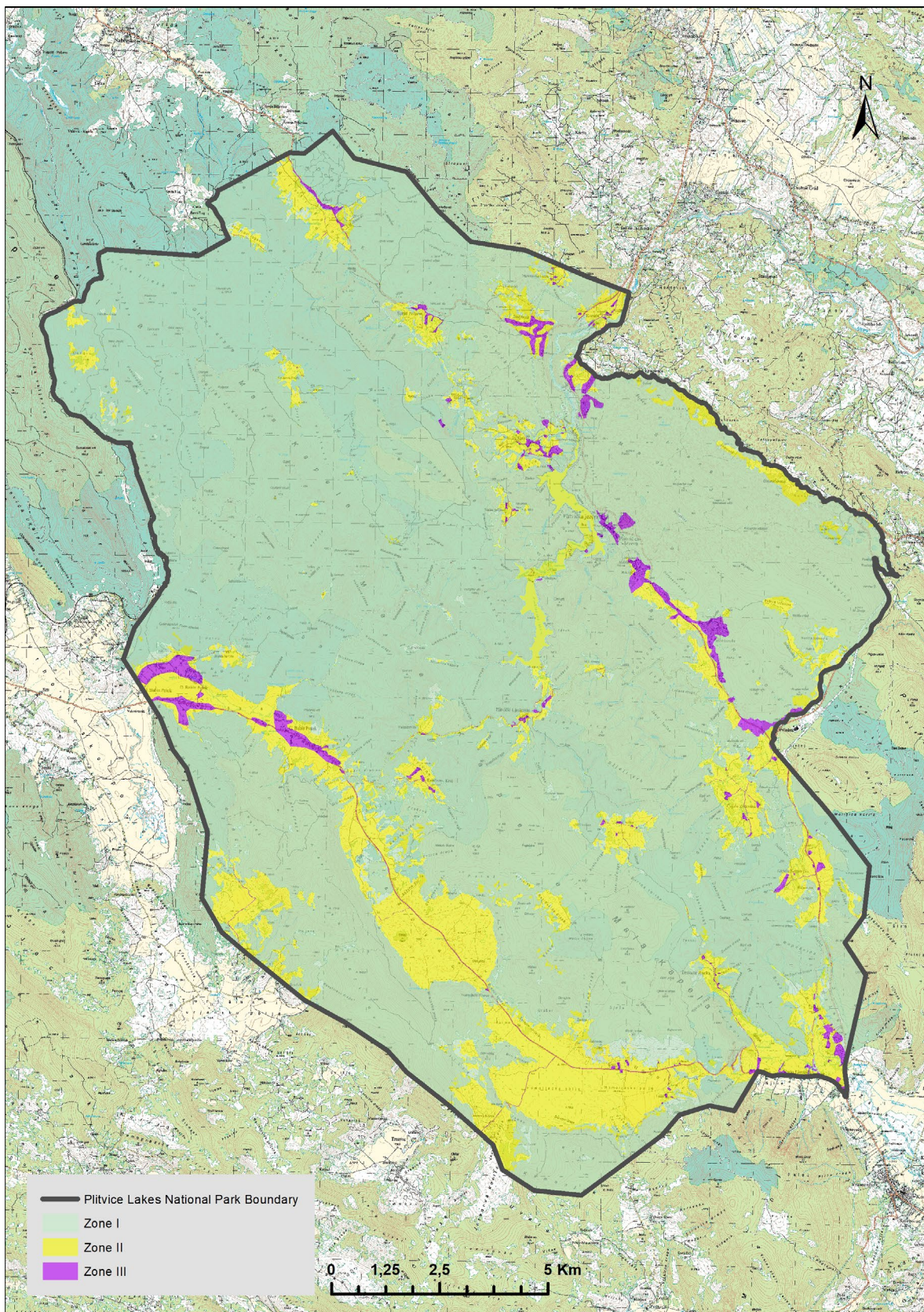
What follows is a more detailed description of management zones and subzones, with management objectives in individual subzones, geographical / spatial description of location and key natural values, including Natura 2000 species and habitats.

Figure 56 depicts the distribution of zones within the Park. Figure 57, figure 58 and figure 59 depict the distribution of subzones of each of the zones within the Park.

## General Guidelines

- Procedure of evaluating the acceptability for ecological network, pursuant to the Nature Protection Act, must be undertaken for all plans, programs and interventions that may have a substantial impact on conservation goals and comprehensiveness of the Ecological Network area.
- Permit with defined nature protection conditions must be obtained from the competent Ministry, pursuant to the Nature Protection Act, for all interventions in the National Park area.
- Prevent entry and spread of alien species and invasive alien species, as well as genetically modified organisms.
- Plan all permitted activities in the National Park, such as sustainable tourism and extensive agricultural production, in a manner and within the scope that do not endanger the natural values of the area, i.e., in accordance with permitted activities in the zone of targeted protection and in the zone of use, while adhering to the provisions of the Nature Protection Act.
- Plan new visitor trails along the existing paths (forest trails and roads, gravel trails, local walking trails, etc.); new routes are permissible only in extraordinary circumstances, and subject to all the required permits, conditions and permissions.
- In maintaining and renovating trails and paths, adhere to the principle of restoration of historical state, i.e., by using wood, autochthonous stone and similar material wherever possible.
- Do not plan opening of cycling trails within the Park; enable cycling traffic exclusively along roads intended for public transport.





**Figure 56.** Management zones of Plitvice Lakes National Park.



### 3.6.1 **ZONE I Strict Conservation Zone**

Strict Conservation Zone encompasses areas of natural ecosystems the characteristics and habitat conservation status of which have not changed due to human impact, and active management measures are not needed for their conservation. This includes areas of ecosystems where characteristics and habitat conservation status have changed, but which are left to natural development. Active management measures are not needed for the recovery of these areas; instead, it is sufficient to protect them from further human impact.

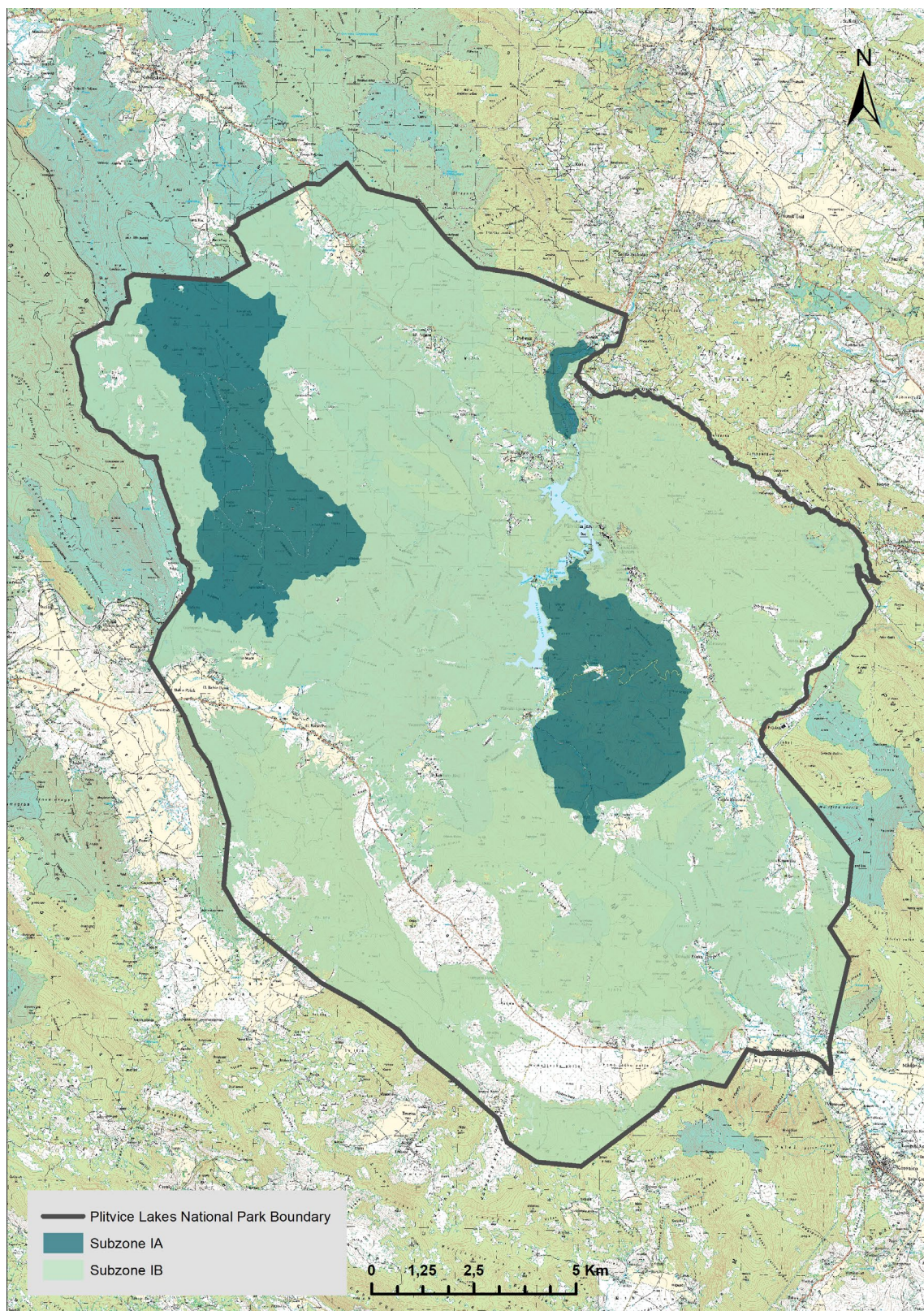
Management objective in this zone is conservation of natural processes and ecosystem naturalness.

This zone has the highest share in Park surface (80.73%), which is in accordance with national and international standards for the category of national parks.

Strict Conservation Zone in the territory of Plitvice Lakes National Park is divided into two subzones (see figure 57).

#### **General guidelines for Strict Protection Zone (I)**

- No activities are permitted, with the exception of research, monitoring and surveillance
- No interventions in the Zone area are permitted
- As an exception, interventions in emergency situations are permitted (e.g. fire containment, elimination of invasive alien species, remediation of damage caused by extreme events such as pollution, accidents, etc.)
- Limited and targeted visitation of very low intensity is permitted, under supervision and guidance of the Public Institution, with the obligation of using trails intended solely for visitors, without special visitation infrastructure; as an exception, interventions in emergency situations are permitted (e.g. fire containment, elimination of invasive alien species, remediation of damage caused by extreme events such as pollution, accidents, etc.)
- Undertake stronger control of adherence to rules of conduct



**Figure 57.** Subzones of Zone I.<sup>61</sup>

<sup>61</sup> Note: Point content is not shown, but it is described in the textual description.



### ***Guidelines for subzone IA***

- No activities permitted, with the exception of research, monitoring and surveillance
- No interventions in area permitted
- Interventions in case of emergency are permitted only in exceptional circumstances (e.g. fire containment, elimination of invasive alien species, remediation of damage caused by extreme events such as pollution, accidents, etc.)
- More intensive control of adherence to rules of conduct required.

### ***Subzone IA No visitation***

Subzone IA consists of best-conserved natural habitats in the Park (beech-fir forests, localities of distribution of lady's slipper orchid, caves and pits, canyon of the river Korana, etc.) and geoheritage that do not require the implementation of active management measures, but are left to natural development instead. One exception is the Korana canyon where the status has deteriorated, but it is expected that stricter conservation and protection from further human impact will ensure conditions for gradual return into original status. Access to this subzone is limited solely to scientific research, status monitoring and surveillance.

Subzone IA (13.46% of Park surface) includes 3 large spatial units: area around Rječica and Crna Rijeka; area of forest ecosystems in the north-western part of the Park including Čorkova uvala and the Korana canyon downstream of Sastavci to the settlement of Korana. There are also smaller (point) localities: all caves and pits (with the exception of the path passing through the lighted entrance part of cave Šupljara which is in subzone IIID); localities with lady's slipper orchid (*Cypripedium calceolus*) (in particular on localities Proščansko Lake and Burgeti, where threat due to visitation already exists). In addition to them, this Zone also includes Baričeve špilje - locality outside of Park boundaries, but within the area of Natura 2000 ecological network - as one of the caves closed to the public, managed by the Plitvice Lakes National Park Public Institution.



### ***Subzone IB With limited visitation***

Subzone IB consists of natural habitat areas the conservation of which does not require implementation of active management measures; in addition to scientific research, status monitoring and surveillance, in this zone limited and targeted visitor use of very low intensity is also permitted, under supervision and guidance of the Public Institution, with the obligation of using trails intended solely for visitors.

Subzone IB encompasses the largest surface of the Park (67.28%), and it includes forest area west of Kozjak (northwestern slopes of Mala Kapela - Preka Kosa and Razdolje, Stubica), northwest of Kozjak (Drage, Križi, Plitvički klanac) and east of Kozjak (Medvjedak); area east of Prošćansko Lake (Prošćanski vrh, Mala Kapela from Seliški vrh to Vrelo Koreničko, part of the area of Visibaba and Borik); peaks and valleys between Uvalica and Rudanovac, Kosa south of Homoljačko polje; Selište, Bačinovac and Kosa west of Brezovac; area of Stajina and Kriva draga.

### ***Guidelines for subzone IB***

- No activities or interventions in the area are permitted, with the exception of research, monitoring and surveillance
- Limited and targeted visitor use of very low intensity is permitted, under supervision and guidance of the Public Institution, with the obligation of using trails intended solely for visitors, without special visitor use infrastructure
- Interventions in case of emergency are permitted only in exceptional circumstances (e.g. fire containment, elimination of invasive alien species, remediation of damage caused by extreme events such as pollution, accidents, etc.).

### 3.6.2 **ZONE II Active Management Zone**

In general terms, Active Management Zone encompasses sub-natural ecosystems, geolocalities and cultural landscape areas that require the implementation of active management measures concerning conservation or restoration for the purposes of long-term conservation. This zone encompasses areas where human presence has resulted in ecosystem changes, in history or recent times, and conservation of their biodiversity therefore requires certain active management measures. These are primarily sub-natural ecosystems that have arisen as a consequence of traditional forms of land use, and without such human impact, as a result of natural processes, they would gradually transform into the primary natural form and disappear. In addition to them, this subzone also includes some parts of natural ecosystems the origin of which does not depend on human presence, but where people in the Park area have influenced the current status of these areas through various forms of use, in history and/or recent times. Certain conservation or restoration measures are therefore needed in such areas, in order to conserve their biodiversity; alternatively, implementation of appropriate nature conservation conditions should be ensured in existing modes of use.

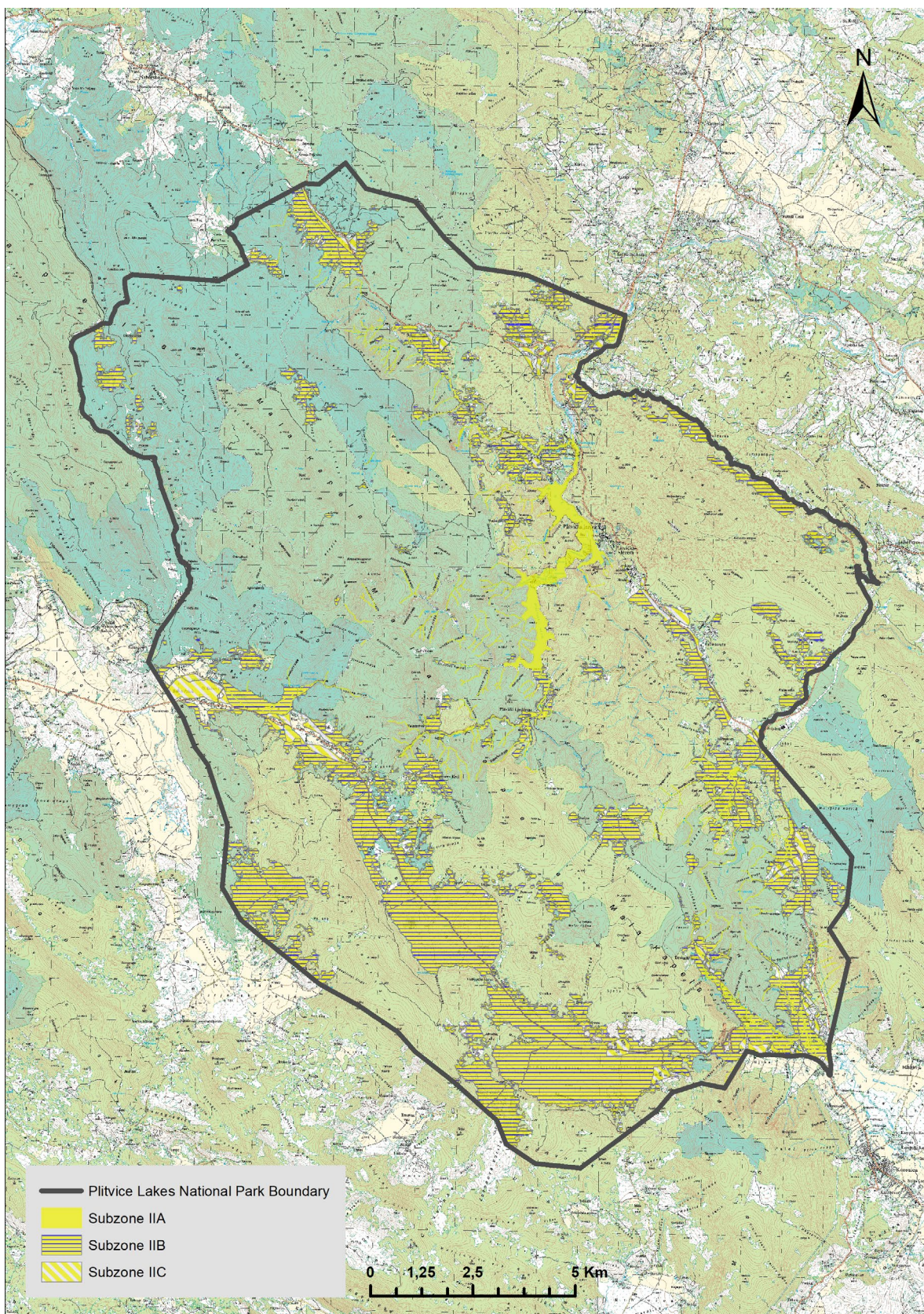
Management objective in this zone is conservation and/or improvement of the status of biodiversity, geodiversity, cultural heritage and cultural landscape.

Active Management Zone in the area of the Plitvice Lakes National Park has the share of 17.12 % of the surface, and it is divided into 3 subzones (see figure 58) focusing on the conservation/improvement of a given ecosystem, geolocality, cultural and historical locality or cultural landscape.

#### **General guidelines for II Active Management Zone**

- Scientific research and status monitoring of natural values are permitted in this zone, as well as surveillance of the area by the Public Institution and implementation of active measures focused on conservation and improvement of the status of ecosystems, geolocalities and cultural landscape
- Agricultural activities may be permitted in this zone, if taking place in accordance with conservation goals for natural and cultural values of the protected area, while respecting the prescribed conservation measures.
- Visitation is permitted provided that special regulations of the Public Institution and applicable conditions prescribed by them depending on conservation goals are adhered to
- In order to decrease pressure on natural and cultural values, there is a possibility to establish minimal interpretation and education content, as well as access trails that do not require management, with the exception of activities for the purposes of maintaining visitor safety (fences, cutting of dangerous trees along the trail, etc.)
- Interventions in space are permitted solely if they are undertaken for the purposes of implementing active measures focused on the conservation and improvement of the status of ecosystems, geolocalities, cultural and historical localities, cultural landscape, as well as placement/maintenance of minimal education and interpretation content.





**Figure 58.** Subzones of Zone II.



### ***Guidelines for subzone IIA***

- It is permitted to undertake active management measures focused on the conservation of aquatic ecosystems in order to prevent succession, eutrophication, etc., and restoration of individual substantially changed elements of habitat for the purposes of conservation of individual species (e.g. brown trout) is also possible, including when requiring substantial interventions in space (e.g. removal of barriers)
- Limited and targeted visitor use is permitted, with the obligation of using trails intended solely for visitors.

### ***Subzone IIA Aquatic ecosystems***

Active management measures in this subzone (0.94% of the Park surface) are focused on the conservation of aquatic ecosystems and key processes (e.g. tufa formation) – out of which some have changed due to anthropogenic impact (barriers, dams, filling, etc.). They pertain to planned and potential habitat maintenance in order to prevent succession / eutrophication, etc., and restoration of individual substantially changed elements of habitat (e.g. restoration of brown trout habitat) is also possible. In addition, adherence to all legal provisions and prescribed nature conservation conditions for use of watercourses for water supply must be ensured in this subzone.

Subzone IIA includes the entire lake system, active tufa barriers, most of permanent watercourses<sup>62</sup> that are not in Zone IA, and small (point) localities of aquatic habitats: ponds, wells and wetland localities.

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<sup>62</sup> Permanent watercourses are mapped on the basis of LIDAR imaging, and intermittent watercourses have been digitalized using the Croatian Basic Map HOK 5000, including 1.5-meter buffer zone on each watercourse side.

### ***Subzone IIB Grasslands, fens and bogs***

Subzone IIB (14.80% of Park surface) includes grasslands, fens, bogs and areas important for conservation of Natura 2000 species connected with them, as well as forest clearings<sup>63</sup> and border forest areas along forest roads and paths, but also all surfaces within the zone IB with forest characteristics (forests arising due to progressive succession) that are registered as meadows, pastures, etc. in the cadastre.<sup>63</sup> In addition to them, this zone also includes dry continental grasslands (6210\*) around Baričeve špilje - locality outside of Park boundaries, but within the area of Natura 2000 HR5000020 Plitvice Lakes National Park, managed by the Plitvice Lakes National Park Public Institution.

### ***Subzone IIC Cultural landscape***

Subzone IIC (1.38% of Park surface) encompasses traditional anthropogenically conditioned landscape around settlements with valuable natural and sub-natural habitats (gardens, crofts, meadows and pastures, as well as other small-scale agricultural surfaces).

<sup>63</sup> For easier overview of surfaces, forest clearings on the map are marked within circles with 50-meter diameter.

### ***Guidelines for subzone IIB***

- It is permitted to undertake active management measures focused on the conservation of grasslands, fens and bogs for the purposes of biodiversity conservation (e.g. by stopping succession, etc.), and restoration of substantially changed parts of habitats or entire habitats is also possible for the purposes of conservation of Natura 2000 plant and animal species and other significant such species
- Agricultural activities are permitted for the purposes of conservation of grasslands and biodiversity connected with them
- Limited and targeted visitor use is permitted, with the obligation of using trails intended solely for visitors.

### ***Guidelines for subzone IIC***

- It is permitted to undertake active management measures focused on the conservation of natural and sub-natural habitats for the purposes of biodiversity conservation (e.g. conservation of traditional cultural landscape (e.g. by stopping succession, by grazing, mowing, etc.)), and restoration of substantially changed parts of habitats or entire habitats is also possible for the purposes of conservation of Natura 2000 and other significant plant and animal species
- Agricultural activities may be permitted in this zone, if taking place in accordance with conservation goals for the protected area
- Priority within this subzone, in cooperation with owners and users of land, is to ensure the establishment of favorable methods of use, and to avoid methods of use that are detrimental to landscape
- Limited and targeted visitor use is permitted.



### 3.6.3 **ZONE III Sustainable Use Zone**

Sustainable Use Zone encompasses Park areas where nature is substantially changed due to the presence of a certain degree of use, and areas that are separated as the most favorable localities for various permitted forms of high-intensity use, all in accordance with area conservation objectives, as a compromise of sorts between nature conservation on the one hand and usage on the other.

Management objective in this zone is sustainability of present and planned usage of space, in accordance with protected area management objectives.

This zone represents 2.15% of Park surface, and it encompasses:

- settlements
- roads
- visitor trails
- area with services for visitors

and it is divided into 4 subzones in accordance with that (figure 59), with specific guidelines per individual subzone.



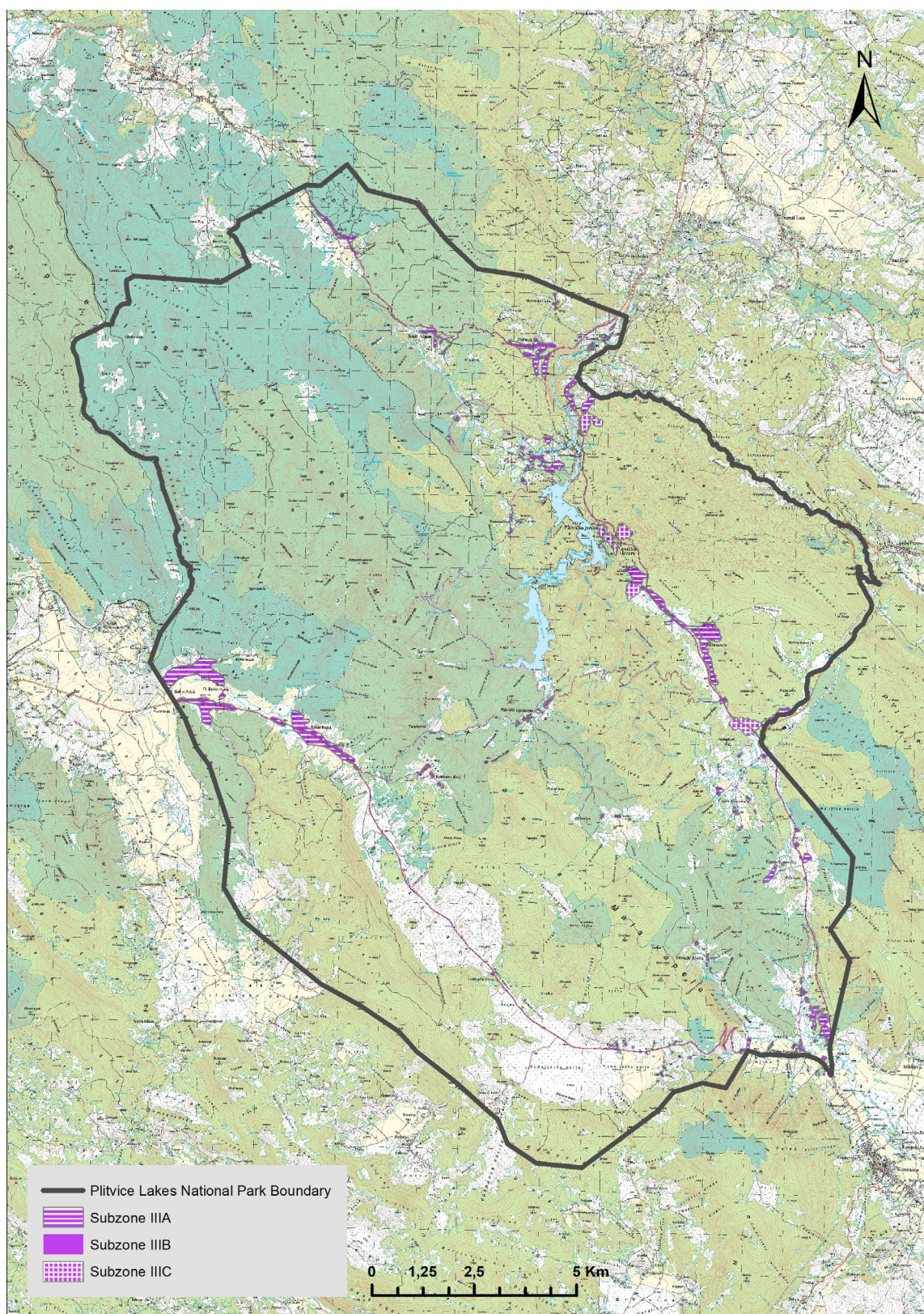


Figure 59. Subzones of Zone III<sup>64</sup>.

<sup>64</sup> Due to scale reasons, subzone IIID is not shown on the map, but it is described in the textual part of the material.



### ***Guidelines for subzone IIIA***

- Within this subzone, the primary need is to ensure adherence to all legal provisions and prescribed nature conservation conditions preventing negative impacts of settlements and construction on Park ecosystems and landscape (e.g. adequate water supply and settlement wastewater treatment, degree of construction, etc.)
- All settlements and inhabited areas in the immediate vicinity of shores and rivers should be planned with particular care, taking into account the exclusion of inhabitation, and the exclusion of HORECA and tourist purposes of space in particular, with the exception of such purposes under management of the Public Institution, at least 200 meters away from river banks, lake shores or cascades.

### ***Guidelines for subzone IIIB***

- Within this subzone, the primary need is to ensure maintenance, degree of use, traffic regulations and infrastructure that minimize negative traffic impacts and risks for the conservation of natural values of the Park.
- It is permitted to maintain roads, cut dangerous trees that can reach the road as a result of their fall (30-50 meters away from road edges) and perform other interventions with the aim of ensuring traffic safety.
- As priority, ensure most effective drainage and procedure of treatment of runoff water from roads, primarily on roads located in the Plitvice Lakes catchment area.

### ***Subzone IIIA Settlements***

Subzone IIIA encompasses all settlements within the Park, including smaller roads within settlements.

List of settlements and their parts, division in certain categories with guidelines for planning of usage, landscaping and protection of area for Physical Plan for Areas with Specific Features are presented in the expert base for changes and amendments of PPASP Plitvice Lakes NP.

### ***Subzone IIIB Main roads***

Subzone IIIB includes all state, county and municipal roads in the Park. The subzone includes all state and county roads 12 meters wide, and local roads 8 meters wide.

### ***Subzone IIIC Built areas with services for visitors***

Subzone IIIC encompasses all built areas with services for visitors managed by the Public Institution, including hotels, restaurants, small Park facilities, existing and new entrances, presentation centers, souvenir shops, retail shops, toilets, roads used by panoramic vehicles, asphalted sections of existing parking lots and facilities within them, ski track and built areas outside of settlements for the needs of the Public Institution (forestry building Čorkova uvala, Ivo Pevalek Research and Conservation Center, and other facilities used for the purposes of Park management).

This subzone includes all visitor infrastructure in the area of the lake system, Velika Poljana, Rastovača (Entrance 1), Hladovina (Entrance 2), ski track Mukinje, planned entrance at Prijeboj, Villa Izvor and restaurant and Borje.

### ***Subzone IIID Paths, roads and docks managed by the Public Institution***

Subzone IIID encompasses the existing walking trails within the lake system (22 kilometers) and hiking trails (37 kilometers), as well as planned new trails along occasional widened areas for nature appreciation stops that require a certain degree of maintenance and small-scale interpretive content; unclassified roads and other local roads managed, used and maintained by the Public Institution; boat docks (three in total), planned pontoon bridge and waterways on Lake Kozjak.

This subzone also includes route of a new visitor trail, still undefined in spatial terms, that would ensure unidirectional movement for Veliki slap (Big Waterfall) tours, as well as a planned new educational trail along the lower course of the Rječica watercourse.

### ***Guidelines for subzone IIIC***

- Within this subzone, the primary need is to ensure the highest achievable level of energy and environmental efficiency that minimizes negative impact on ecosystems and landscape
- Upon construction and putting into service new Park entrances, temporary parking lots at Entrances 1 and 2 need to be remediated
- Villa Izvor, due to its sensitive location, can be used solely for scientific and educational purposes.

### ***Guidelines for subzone IIID***

- Within this subzone, the primary need is to ensure appropriate degree of use, rules of conduct and methods of construction and maintenance of trails and docks, in a manner that avoids negative impact on ecosystems and landscape
- Ensure maximum possible level of energy and environmental efficiency that minimizes negative impact on ecosystems and landscape
- Activities for the purposes of maintaining visitor safety are permitted (installation of fences, removal of trees and rock mass along trails)
- Establishment of new planned hiking trails within subzone IIID polygon is possible.

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# 5. | ANNEXES

## 5.1 List of institutions, associations and other legal entities included in the drafting of the Management Plan, with methods of involvement

#	Name	Interviews and consultations	Workshops			Mgmt. Plan draft sent
			1	2	3	
1	Advisory Service - Karlovačka County		X			X
2	Advisory Service - Ličko-senjska County		X			X
3	Andrija Mohorovičić Geophysical Institute					X
4	Archaeological Museum, Zagreb					X
5	Astronomical Society Korenica					X
6	Association for the Protection and Development of Natural and Cultural Heritage of the City of Karlovac					X
7	Association Hyla					X
8	Association of Biology Students BIUS					X
9	Association of Biotechnology Students of the University of Rijeka					X
10	Association of Blind Persons of Ličko-senjska County					X
11	Association of Croatian Travel Agencies		X	X		X
12	Association of Homeland War Veterans of the Municipality of Plitvice Lakes	X		X	X	X
13	Association of Homeland War Veterans of the Municipality of Rakovica	X	X		X	X
14	Association of Homeland War Veterans of the Plitvice Lakes National Park Public Institution				X	X
15	Association of Tour Guides of Lika					X
16	Association Rudopolje moje			X		X
17	BIOM Association					X
18	Biota j.d.o.o					X
19	Bioteka					X
20	Conservation Department in Gospić for the area of Ličko-senjska County		X	X		X
21	Conservation Department in Karlovac for the area of Karlovačka County		X	X		X
22	County Association of the Region of Kordun, Zagreb			X		
23	Croatian Academy of Sciences and Arts, Ornithological Institute					X
24	Croatian Agency for Environment and Nature (CAEN)	X	X	X	X	X
25	Croatian Biological Society					X
26	Croatian Biospeleological Society					X
27	Croatian Chamber of Forestry and Wood Processing Engineers					X
28	Croatian Conservation Institute			X		X
29	Croatian Federal Association of Persons with Physical Disability (HSUTI)					X
30	Croatian Folk Ensemble Korenica		X		X	X

#	Name	Interviews and consultations	Workshops			Mgmt. Plan draft sent
			1	2	3	
31	Croatian Forest Research Institute					X
32	Croatian Geological Survey, Zagreb				X	X
33	Croatian Geological Survey, Department of Hydrogeology and Engineer Geology					X
34	Croatian Ichthyological Society					X
35	Croatian Institute for Spatial Development	X	X	X		X
36	Croatian Meteorological and Hydrological Service					X
37	Croatian Mountain Rescue Service, Gospić Station	X				X
38	Croatian Mountaineering Association					X
39	Croatian Mountaineering Association, Commission for Speleology					X
40	Croatian Mycological Society					X
41	Croatian Natural History Museum				X	X
42	Croatian Speleological Federation					X
43	Croatian Union of Associations of Persons with Disabilities					X
44	Development Agency of Ličko-senjska County LIRA	X	X	X		X
45	Disabled Homeland War Veterans' Association HVIDR-a Plitvička jezera	X	X	X		X
46	Disabled Homeland War Veterans' Association HVIDR-a Saborsko	X		X		X
47	Education and Teacher Training Agency					X
48	Elektroprojekt d.o.o.					X
49	Elementary School Plitvice Lakes		X			
50	Faculty of Agriculture of the University of Zagreb					X
51	Faculty of Architecture of the University of Zagreb					X
52	Faculty of Civil Engineering of the University of Rijeka, Department of Hydrotechnics				X	X
53	Faculty of Food Technology and Biotechnology of the University of Zagreb					X
54	Faculty of Forestry of the University of Zagreb				X	X
55	Faculty of Geodesy of the University of Zagreb, Department of Geomatics				X	X
56	Faculty of Geotechnical Engineering of the University of Zagreb, Department for Hydrotechnics				X	X
57	Faculty of Geotechnical Engineering Varaždin				X	X
58	Faculty of Humanities and Social Sciences of the University of Zagreb, Department of Archeology					X
59	Faculty of Mining, Geology and Petroleum Engineering of the University of Zagreb (RGNF)					X
60	Faculty of Science of the University of Zagreb, Department of Biology				X	X
61	Faculty of Science of the University of Zagreb, Department of Geophysics				X	X
62	Faculty of Science of the University of Zagreb, Department of Geography				X	X
63	Faculty of Science of the University of Zagreb, Department of Geology				X	X
64	Faculty of Veterinary Medicine of the University of Zagreb, Institute for Biology				X	X
65	Family farm Čubrić					X
66	Family farm Glumac				X	X



#	Name	Interviews and consultations	Workshops			Mgmt. Plan draft sent
			1	2	3	
67	Family farm Krga				X	X
68	Family farm Mažar				X	X
69	Family farm Vujičić				X	X
70	Folk ensemble Izvor Rakovica		X	X	X	X
71	Folk ensemble Lađevčani			X		X
72	Gacko Public Open University			X		
73	Geo log d.o.o.					X
74	Geodetic Institute Rijeka					X
75	HEP Elektrolika Gospić		X	X	X	X
76	Hrvatske ceste (Croatian Roads), Business Unit Zadar, Technical Branch Office Gospić			X		X
77	Hrvatske ceste (Croatian Roads), Business Unit Zagreb, Technical Branch Office Karlovac			X		X
78	Hrvatske ceste (Croatian Roads), Sector for Development and Strategic Planning			X	X	X
79	Hrvatske vode (Croatian Waters), Central Water Management Laboratory					X
80	Hrvatske vode (Croatian Waters), Support Service for Preparation and Implementation of EU Projects			X		X
81	Hrvatske vode (Croatian Waters), Water Management Branch Office for Lika, Velebit Littoral and Islands		X			X
82	Institute of Ethnology and Folklore Research					X
83	Institute of Public Health of Ličko-senjska County					X
84	Karlovačka County, Administrative Department for Construction and Environment		X		X	X
85	Komunalac Korenica		X	X		X
86	Krka National Park Public Institution					X
87	LAG Frankopan		X			X
88	LAG Lika	X	X			X
89	Likaceste d.o.o					X
90	Local Cadastre Office Gospić, Real Estate Cadastre Branch Office Korenica					X
91	Ministry of Agriculture, Directorate of Forestry, Hunting and Wood Processing		X	X		X
92	Ministry of Construction and Physical Planning, Sector for Physical Planning	X			X	X
93	Ministry of Culture, Conservation Department in Zagreb			X		X
94	Ministry of Culture, Directorate for the Protection of Cultural Heritage, Conservation Department in Karlovac		X	X	X	X
95	Ministry of Culture, Service for Cultural Heritage Protection Inspection Activities			X		X
96	Ministry of Culture, Service for UNESCO					X
97	Ministry of Environment and Energy; Inspection Service in Gospić		X	X		X
98	Ministry of Environment and Energy; Nature Conservation Directorate	X	X	X		X
99	Ministry of Interior					X

#	Name	Interviews and consultations	Workshops			Mgmt. Plan draft sent
			1	2	3	
100	Ministry of Tourism		X	X	X	X
101	Mljet National Park Public Institution					X
102	Mountaineering Society Plaške glave					X
103	Municipality of Plitvice Lakes	X	X	X	X	X
104	Municipality of Rakovica	X	X	X	X	X
105	Municipality of Saborsko	X	X	X	X	X
106	Municipality of Vrhovine	X		X		X
107	Municipal utility company Vodovod Korenica		X	X	X	X
108	Oikon d.o.o.					X
109	Outward Bound Croatia					X
110	Paklenica National Park Public Institution					X
111	Paying Agency for Agriculture, Fisheries and Rural Development					X
112	Photo Atelier Jug					X
113	Public Institution for management of protected natural values in Ličko-senjska County and County Administrative Department for Physical Planning, Construction and Environmental Protection		X	X		X
114	Public Institution "Natura viva" for management of protected natural values in Karlovačka County		X	X	X	X
115	Public Open University Slunj					X
116	Rakovica Public Institution - Baračeve špilje		X	X	X	X
117	Representatives of the Croatian Beekeepers' Union, beekeeping association PU „Slap“ Plitvice Lakes					X
118	Roman Ozimec					X
119	Ruđer Bošković Institute, Šibenik					X
120	Ruđer Bošković Institute, Zagreb				X	X
121	SMAK - kreativni kolektiv					X
122	Spelekom Rakovica		X			X
123	State Geodetic Administration, Department for Spatial Data and Services					X
124	Šafarek production					X
125	Tourist Board of Karlovačka County		X	X	X	X
126	Tourist Board of Ličko-senjska County	X	X	X		X
127	Tourist Board of the City of Slunj				X	X
128	Tourist Board of the Municipality of Plitvice Lakes	X	X	X	X	X
129	Tourist Board of the Municipality of Rakovica	X	X	X	X	X
130	Tourist Board of the Municipality of Vrhovine	X		X		X
131	TravAble - World Without Barriers					X
132	UNESCO					X
133	Women's organization Ženska akcija Saborsko			X		
134	WWF Adria				X	X
135	Zelena akcija (Green Action; Friends of the Earth Croatia)		X	X		
136	Zeleni servis d.o.o.					X

## 5.2 List of wild birds for the area of the ecological network HR1000020 Plitvice Lakes National Park

Family	Scientific name of species	Name of species	Species status (G-nesting, P-migrating, Z-wintering)
Strigidae	<i>Aegolius funereus</i>	Boreal owl	<b>G</b>
Alcedinidae	<i>Alcedo atthis</i>	Common kingfisher	<b>G</b>
Strigidae	<i>Asio flammeus</i>	Short-eared owl	<b>G</b>
Phasianidae	<i>Bonasa bonasia</i>	Hazel grouse	<b>G</b>
Strigidae	<i>Bubo bubo</i>	Eurasian eagle-owl	<b>G</b>
Accipitridae	<i>Circus pygargus</i>	Montagu's harrier	<b>G</b>
Rallidae	<i>Crex crex</i>	Corn crane	<b>G</b>
Picidae	<i>Dendrocopus leucotos</i>	White-backed woodpecker	<b>G</b>
Picidae	<i>Dryocopus martius</i>	Black wood-pecker	<b>G</b>
Falconidae	<i>Falco peregrinus</i>	Peregrine falcon	<b>G</b>
Muscicapidae	<i>Ficedula albicollis</i>	Collared flycatcher	<b>G</b>
Muscicapidae	<i>Ficedula parva</i>	Red-breasted flycatcher	<b>G</b>
Strigidae	<i>Glaucidium passerinum</i>	Eurasian pygmy owl	<b>G</b>
Laniidae	<i>Lanius collurio</i>	Red-backed shrike	<b>G</b>
Laniidae	<i>Lanius minor</i>	Lesser gray shrike	<b>G</b>
Alaudidae	<i>Lullula arborea</i>	Woodlark	<b>G</b>
Accipitridae	<i>Pernis apivorus</i>	European honey buzzard	<b>G</b>
Picidae	<i>Picoides tridactylus</i>	Three-toed woodpecker	<b>G</b>
Picidae	<i>Picus canus</i>	Grey-headed woodpecker	<b>G</b>
Strigidae	<i>Strix uralensis</i>	Ural owl	<b>G</b>
Sylviidae	<i>Sylvia nisoria</i>	Barred warbler	<b>G</b>

## 5.3 List of wild fauna and flora species for the area of the ecological network HR5000020 Plitvice Lakes National Park

Family	Scientific name of species	Name of species
Apiaceae	<i>Apium repens</i>	Creeping marshworth
Decapoda	<i>Austropotamobius torrentium</i> *	Stone crayfish
Chiroptera	<i>Barbastella barbastellus</i>	Barbastelle bat
Carnivora	<i>Canis lupus</i> *	Wolf
Liliaceae	<i>Chouardia litardierei</i>	Squill
Odonata	<i>Coenagrion ornatum</i>	Ornate bluet
Orchidaceae	<i>Cypripedium calceolus</i>	Lady`s slipper orchid
Hypnales	<i>Drepanocladus (Hematocaulis) vernicosus</i>	Slender green feather-moss
Lepidoptera	<i>Euphydryas aurinia</i>	Marsh fritillary
Lepidoptera	<i>Euplagia quadripunctaria</i> *	Jersey tiger
Asteraceae	<i>Ligularia sibirica</i>	Siberian rayflower
Carnivora	<i>Lutra lutra</i>	Otter
Carnivora	<i>Lynx lynx</i>	Lynx
Chiroptera	<i>Miniopterus schreibersii</i>	Large bent-winged bat
Coleoptera	<i>Morimus funereus</i>	Long-horned beetle
Chiroptera	<i>Myotis bechsteinii</i>	Bechstein`s bat
Chiroptera	<i>Myotis capaccinii</i>	Long-fingered bat
Chiroptera	<i>Myotis myotis</i>	Greater mouse-eared bat
Coleoptera	<i>Osmoderma eremita</i> *	Hermit beetle
Chiroptera	<i>Rhinolophus euryale</i>	Mediterranean horseshoe bat
Chiroptera	<i>Rhinolophus ferrumequinum</i>	Greater horseshoe bat
Coleoptera	<i>Rosalia alpina</i> *	Rosalia longicorn
Carnivora	<i>Ursus arctos</i> *	Bear
Buxbaumiales	<i>Buxbaumia viridis</i>	Green shield moss
Dicranaceae	<i>Dicranum viride</i>	Dicranum moss
Cypriniformes	<i>Cobitis bilineata</i>	-
Cypriniformes	<i>Sabanejewia larvata</i>	Italian loach

\* Priority species

## 5.4 List of habitats of Plitvice Lakes National Park <sup>65</sup>

NHC code and name (Level I)	NHC code and name (Level II)	NHC code and name (Level III)	NHC code and name (Level IV)	NHC code and name (Level V)
A. Surface inland waters and marsh habitats	A.1. Standing waters	A.1.1. Permanent ponds	A.1.1.1. Permanent ponds	A.1.1.1.2. Mesotrophic waters
				A.1.1.1.4. Oligotrophic-mesotrophic waters rich in limestone
		A.1.2. Seasonal ponds	A.1.2.1. Seasonal ponds	
	A.2. Running waters	A.2.3. Permanent watercourses		
		A.2.5. Waterfalls	A.2.5.1. Waterfalls	A.2.5.1.2. Biogenic waterfalls
	A.3. Hydrophytic freshwater habitats	A.3.1. Submerged vegetation of Charophytes	A.3.1.1. Submerged vegetation of Charophytes	A.3.1.1.1. Charophytes formations of the genus Chara
		A.3.3. Rooted water plant vegetation	A.3.3.2. Rooted water plant communities of running waters	
		A.3.5. Tufa-forming riverine associations		
		A.3.6. Tufa-forming vegetation on cascades		
	A.4. Vegetated banks of surface inland waters and marsh habitats	A.4.1. Reed beds, bulrushes, high sedge	A.4.1.1. Reed beds and bulrushes	
B. Unvegetated and sparsely vegetated inland surfaces	B.1. Unvegetated and sparsely vegetated rocks	B.1.3. Alpine-Carpathian Balkan limestone rocks		

<sup>65</sup> According to the Ordinance on the List of Habitat Types, Habitat Map and Endangered and Rare Habitat Types (Official Gazette 88/14).



NHC code and name (Level I)	NHC code and name (Level II)	NHC code and name (Level III)	NHC code and name (Level IV)	NHC code and name (Level V)
C. Grasslands, fens and bogs and tall herb communities	C.1. Fens and bogs	C.1.1. Basophilous flat fens (Alliance <i>Caricion davallianae</i> )		
		C.1.2. Acidophilous raised bogs and transition fens (Alliances <i>Rhynchosporion albae</i> and <i>Sphagnion fusc</i> )		
	C.2. Hygrophilous and mesophilous grasslands	C.2.2. Central European wetland meadows	C.2.2.2. Central European permanently wet meadows	C.2.2.2.1. Central European purple moor grass meadows
			C.2.2.4. Periodically wet meadows	
		C.2.3. Central European mesophilous meadows	C.2.3.1. Moderately wet meadows	
			C.2.3.2. Central European mesophilous mowed meadows	
		C.2.4. Wet and nitrophilous grasslands and pastures	C.2.4.1. Nitrophilous pastures and meadows – mowed lowland vegetation belt	
		C.2.5. Wet meadows of Sub-Mediterranean vegetation zone	C.2.5.1. Illyrian-sub-Mediterranean river valley meadows	
	C.3. Dry grasslands	C.3.3. Sub-Atlantic mesophilous grasslands and mountain meadows on calcareous soils	C.3.3.1. Mountain brome grass meadows on carbonate base	
		C.3.4. European dry heaths and <i>Nardus stricta</i> dominated grasslands	C.3.4.1. Western European heaths	
			C.3.4.2. Matgrass fields	C.3.4.2.1. Matgrass field
		C.3.5. Sub-Mediterranean and epi-Mediterranean dry grasslands		
	C.5. Tall herb communities	C.5.2. Forest clearings	C.5.2.1. Forest clearing communities	
		C.5.4. Lowland tall herb communities		
D. Scrubs	D.1. Continental scrubs	D.1.1. Willow thickets on dunes (Class <i>Salicetea purpureae</i> )	D.1.1.1. Willow thickets on sand and gravel river dunes	D.1.1.1.5. <i>Salix purpurea</i> thickets

NHC code and name (Level I)	NHC code and name (Level II)	NHC code and name (Level III)	NHC code and name (Level IV)	NHC code and name (Level V)
E. Forests	E.2. Alluvial forests with <i>Quercus robur</i> , <i>Alnus glutinosa</i> and <i>Fraxinus ornus</i>	E.2.1. Alluvial forests of <i>Alnus glutinosa</i> and <i>Fraxinus ornus</i>	E.2.1.6. Black alder forest with elongated sedge	
	E.3. Deciduous oaks forests above flood line	E.3.1. Mixed oak-hornbeam forests and hornbeam forests	E.3.1.5. Durmast oak and hornbeam forest	
		E.3.4. Central European thermophilous oak woods	E.3.4.1. Thermophilous durmast oak and hornbeam forest	
		E.3.5. Submediterranean, thermophilous forests and scrubs of <i>Quercus pubescens</i>	E.3.5.4. Hop hornbeam forest and underbrush with autumn moor grass	
	E.4. Mountain beech forests	E.4.1. Central European neutrophilous to acidophilous, mezophilous beech forests		
		E.4.4. Forests of Alliance <i>Acerion pseudoplatani</i>		
		E.4.5. Mezophilous and neutrophilous pure beech forests	E.4.5.1. Beech forest with giant dead nettle	
		E.4.6. Southeast-Alpine-Illyrian thermophilous beech forests	E.4.6.1. Beech and hop hornbeam forest	
	E.5. Beech-fir forests	E.5.2. Ass. <i>Omphalodo-Fagetum</i>	E.5.2.1. Dinaric beech-fir forest with <i>Omphalodes</i> (typical sub-association)	
			E.5.2.2. Dinaric beech-fir forest with <i>Omphalodes</i> (sub-association with white sedge)	
	E.7. Continental coniferous forests	E.7.3. Spruce forests	E.7.3.5. Spruce forest with Christmas rose on dolomite	
		E.7.4. Forests of <i>Pinus sylvestris</i> and <i>P. nigra</i> on dolomites	E.7.4.1. Scots pine forest with Christmas rose on dolomite	
			E.7.4.2. Hop hornbeam forest with <i>Erica carnea</i>	
	E.9. Anthropogenic forest formations	E.9.2. Conifer plantations	E.9.2.1. Common spruce plantations	
			E.9.2.2. Black pine plantations	
			E.9.2.3. Scots pine plantations	

NHC code and name (Level I)	NHC code and name (Level II)	NHC code and name (Level III)	NHC code and name (Level IV)	NHC code and name (Level V)
H. Subterranean habitats	H.1. Karst caves and pit-caves	H.1.1. Inland karst cave habitats		
I. Cultivated non-forest areas and habitats with weed and ruderal vegetation	I.2. Mosaic cultivated areas	I.2.1. Mosaics of cultivated fields		
	I.8. Unproductive cultivated green spaces	I.8.1. Public unproductive cultivated green spaces	I.8.1.8. Green belts for sports and recreation	I.8.1.8.1. Grass sports grounds for ball games
J. Built and industrial habitats	J.1. Villages			
	J.2. Towns	J.2.3. Other urban zones		
	J.3. Other developed non-commercial zones			
	J.4. Farmland	J.4.3. Open-cast mines	J.4.3.1. Active open-cast mines	J.4.3.1.1. Quarries
		J.4.4. Infrastructural areas	J.4.4.1. Rail traffic zones	

## 5.5 List of forest communities in the Plitvice Lakes National Park <sup>66</sup>

- **Grey willow underbrush** (*Salicetum cinereae*)
- **Black alder forests** (*Alnetum glutinosae s.l.*)
- **Durmast oak and hornbeam forest with pink barrenwort and *Carex pilosa* Scop.** (*As. Epimedio-Carpinetum betuli caricetosum pilosae*), (Horvat 1938, Borhidi 1963)
- **Beech forest with giant dead nettle** (*Lamio orvalae-Fagetum*), (Ht.1938) Borhidi 1963
- **Beech forests with hellebore** *Helleboro nigri - Fagetum*, Zukrigl 1973
- **Beech and fir forests** (*Omphalodo-Fagetum*), (Tregubov 1957) Marinček et al., 1993
- **Beech forest with hop hornbeam** (*Ostryo-Fagetum*), (M.Vraber ex Trinajstić)
- **Sycamore maple and common ash forest** (*Aceri-Fraxinetum s.l.*)
- **Hop hornbeam forest and underbrush with autumn moor grass** (*Seslerio autumnalis Ostryetum*), Ht. et H-ić in Ht. 1950 (alt. *Seslerio-Ostryetum carpinifoliae*, according to Vukelić)
- **Thermophilous durmast oak and hornbeam forest** (*Lathyro nigri-Quercetum petraeae*)
- **Scots pine forest with Christmas rose** (*Helleboro nigri-Pinetum sylvestris*), Ht. 1958
- **Hop hornbeam forest with *Erica carnea*** (*Erico herbaceae-Ostyetum carpinifoliae*), Ht.(1938. 1956)
- **Spruce forest with hellebore on dolomite** (*Helleboro nigri-Piceetum*), (Trinajstić and Pelcer, 2005.)

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<sup>66</sup> According to Vukelić, J. and Šapić, I. (2013): *Fitocenološke značajke i vegetacijska karta šumskih ekosustava Nacionalnog parka Plitvička jezera* [Phytocenological Characteristics and Vegetation Map of PLNP Forest Ecosystems], Faculty of Forestry of the University of Zagreb

## 5.6 List of strictly protected mammal species recorded in the Plitvice Lakes National Park area

ORDER	FAMILY	SPECIES - scientific name	SPECIES - Name	LISTING CRITERION		
				THREAT (Red List)	ZZP	International treaties / EU legislation
Carnivora	Canidae	<i>Canis lupus</i>	Wolf		SZ	BE2, DS4
	Felidae	<i>Lynx lynx</i>	Lynx	CR	SZ	DS4
		<i>Felis silvestris</i>	Wild cat		SZ	BE2, DS4
	Mustelidae	<i>Lutra lutra</i>	Otter	DD	SZ	BE2, DS4
	Ursidae	<i>Ursus arctos</i>	Brown bear		SZ	BE2, DS4
Chiroptera	Rhinolopidae	<i>Rhinolophus euryale</i>	Mediterranean horseshoe bat	VU	SZ	BE2, DS4
		<i>Rhinolophus ferrumequinum</i>	Greater horseshoe bat		SZ	BE2, DS4
		<i>Rhinolophus hipposideros</i>	Lesser horseshoe bat		SZ	BE2, DS4
	Vespertilionidae	<i>Barbastella barbastellus</i>	Western barbastelle	DD	SZ	BE2, DS4
		<i>Eptesicus serotinus</i>	Serotine bat		SZ	BE2, DS4
		<i>Miniopterus schreibersii</i>	Large bent-winged bat	EN	SZ	BE2, DS4
		<i>Myotis alcathoe</i>	Alcathoe bat		SZ	BE2, DS4
		<i>Myotis bechsteinii</i>	Bechstein`s bat	VU	SZ	BE2, DS4
		<i>Myotis brandtii</i>	Brandt`s bat		SZ	BE2, DS4
		<i>Myotis blythii</i>	Lesser mouse-eared bat		SZ	BE2, DS4
		<i>Myotis capaccinii</i>	Long-fingered bat	EN	SZ	BE2, DS4
		<i>Myotis daubentonii</i>	Daubenton`s bat		SZ	BE2, DS4
		<i>Myotis emarginatus</i>	Geoffroy`s bat		SZ	BE2, DS4
		<i>Myotis myotis</i>	Greater mouse-eared bat		SZ	BE2, DS4
		<i>Myotis mystacinus</i>	Whiskered bat		SZ	BE2, DS4
		<i>Myotis nattereri</i>	Natterer`s bat		SZ	BE2, DS4
		<i>Nyctalus leisleri</i>	Leisler`s bat		SZ	BE2, DS4
		<i>Nyctalus noctula</i>	Common noctule		SZ	BE2, DS4
		<i>Pipistrellus pipistrellus</i>	Common pipistrelle		SZ	DS4
		<i>Plecotus auritus</i>	Brown long-eared bat		SZ	BE2, DS4
		<i>Plecotus austriacus</i>	Grey long-eared bat	EN	SZ	BE2, DS4
		<i>Plecotus macrobullaris</i>	Mountain long-eared bat	DD	SZ	BE2, DS4
Rodentia	Castoridae	<i>Castor fiber</i>	Beaver		SZ	DS4



Description of acronyms:	
<b>BE2</b>	Species listed in Appendix II to the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)
<b>DS4</b>	Species listed in Annex IV to the Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora
<b>CR</b>	Threat category: Critically Endangered
<b>EN</b>	Threat category: Endangered
<b>VU</b>	Threat category: Vulnerable
<b>DD</b>	Threat category: Data Deficient
<b>SZ</b>	Strictly protected species
<b>ZZP</b>	Nature Conservation Act

## 5.7 List of strictly protected amphibian species recorded in the Plitvice Lakes National Park area

ORDER	FAMILY	SPECIES - scientific name	SPECIES - Name	LISTING CRITERION			Endemic
				THREAT (Red List)	ZZP	International treaties / EU legislation	
Anura	Bombinatoridae	<i>Bombina variegata</i>	Yellow-bellied toad		SZ	BE2, DS4	
	Bufonidae	<i>Bufo viridis</i>	European green toad		SZ	BE2, DS4	
	Hylidae	<i>Hyla arborea</i>	European tree frog		SZ	BE2, DS4	
	Ranidae	<i>Rana dalmatina</i>	Agile frog		SZ	BE2, DS4	
Caudata	Salamandridae	<i>Salamandra atra</i>	Alpine salamander	DD	SZ	BE2, DS4	YES
		<i>Triturus carnifex</i>	Italian crested newt		SZ	BE2, DS4	YES

### Description of acronyms:

<b>BE2</b>	Species listed in Appendix II to the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)
<b>DS4</b>	Species listed in Annex IV to the Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora
<b>DD</b>	Threat category: Data Deficient
<b>SZ</b>	Strictly protected species
<b>ZZP</b>	Nature Conservation Act

## 5.8 List of strictly protected reptile species recorded in the Plitvice Lakes National Park area

ORDER	FAMILY	SPECIES - scientific name	SPECIES - Name	LISTING CRITERION			Endemic
				THREAT (Red List)	ZZP	International treaties / EU legislation	
Chelonii	Emydidae	<i>Emys orbicularis</i>	European pond turtle		SZ	BE2, DS4	
Squamata	Lacertidae	<i>Podarcis muralis</i>	Common wall lizard		SZ	BE2, DS4	
		<i>Lacerta viridis</i>	European green lizard		SZ	BE2, DS4	
		<i>Lacerta agilis</i>	Sand lizard		SZ	BE2, DS4	
		<i>Zootoca vivipara</i>	Viviparous lizard	DD	SZ	BE2, DS4	
		<i>Iberolacerta horvathi</i>	Horvath`s rock lizard		SZ	BE2, DS4	YES
		<i>Zamenis longissimus</i>	Aesculapean snake		SZ	BE2, DS4	
	Colubridae	<i>Natrix tessellata</i>	Dice snake		SZ	BE2, DS4	
		<i>Coronella austriaca</i>	Smooth snake		SZ	BE2, DS4	
		<i>Vipera ammodytes</i>	Nose-horned viper		SZ	BE2, DS4	

### Description of acronyms:

<b>BE2</b>	Species listed in Appendix II to the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)
<b>DS4</b>	Species listed in Annex IV to the Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora
<b>DD</b>	Threat category: Data Deficient
<b>SZ</b>	Strictly protected species
<b>ZZP</b>	Nature Conservation Act

## 5.9 List of strictly protected butterfly and moth species recorded in the Plitvice Lakes National Park area

ORDER	FAMILY	SPECIES - scientific name	SPECIES - Name	LISTING CRITERION		
				THREAT (Red List)	ZZP	International treaties / EU legislation
Lepidoptera	Lycaenidae	<i>Phengaris alcon alcon</i>	Alcon blue	CR	SZ	
		<i>Phengaris alcon rebeli</i>	Mountain alcon blue	VU	SZ	
		<i>Phengaris arion</i>	Large blue	VU	SZ	BE2, DS4
	Nymphalidae	<i>Euphydryas aurinia</i>	Marsh fritillary		SZ	BE2
	Papilionidae	<i>Papilio machaon</i>	Swallowtail		SZ	
		<i>Parnassius apollo</i>	Apollo	VU	SZ	BE2, DS4
		<i>Parnassius mnemosyne</i>	Clouded Apollo		SZ	BE2, DS4
		<i>Zerynthia polyxena</i>	Southern festoon		SZ	BE2, DS4

### Description of acronyms:

<b>BE2</b>	Species listed in Appendix II to the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)
<b>DS4</b>	Species listed in Annex IV to the Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora
<b>CR</b>	Threat category: Critically Endangered
<b>VU</b>	Threat category: Vulnerable
<b>SZ</b>	Strictly protected species
<b>ZZP</b>	Nature Conservation Act

## 5.10 List of protected tangible cultural heritage assets in the area of Plitvice Lakes National Park <sup>67</sup>

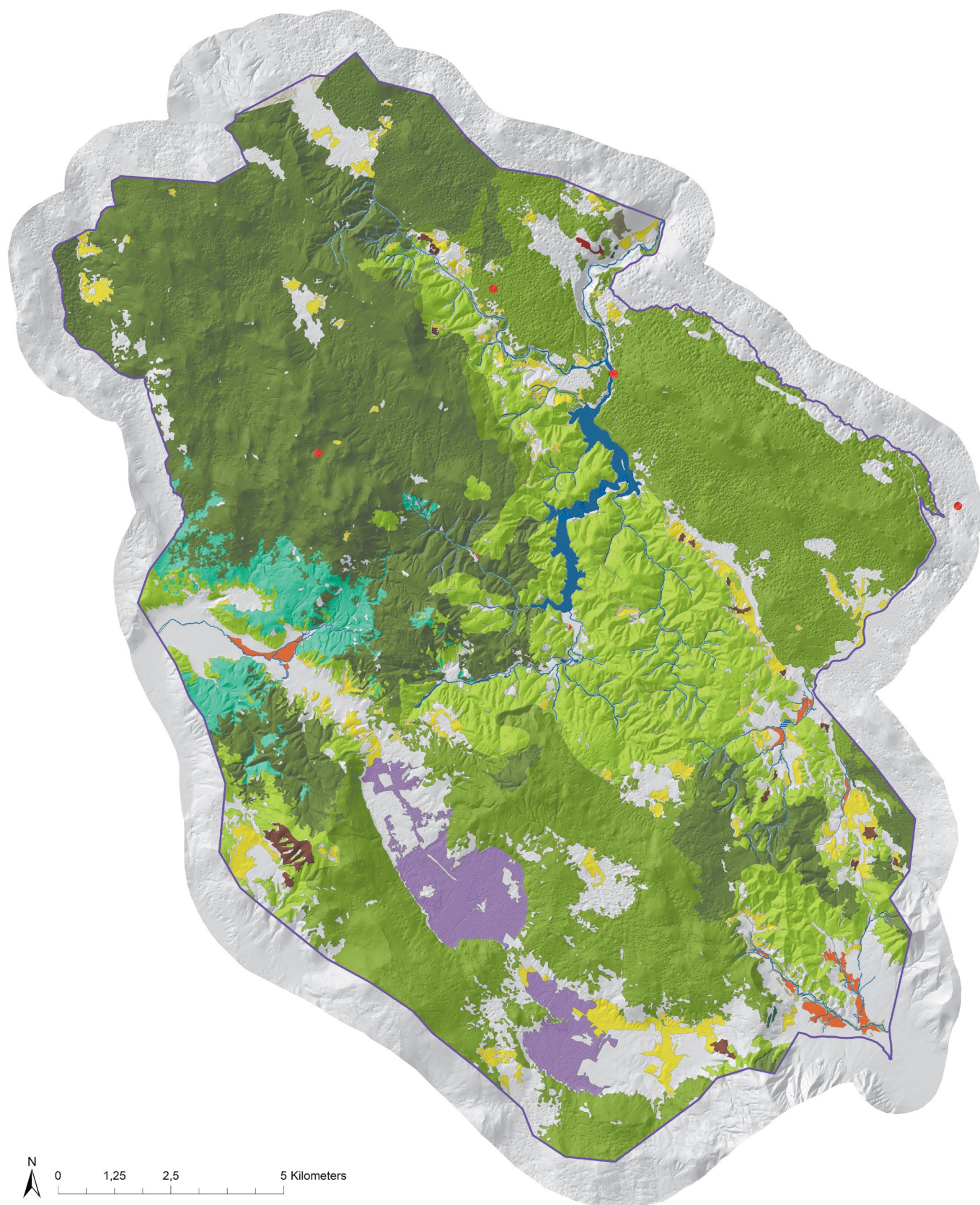
1. Traditional croft, Plitvica Selo 81
2. Archaeological site Gradina Kozjak
3. Four residential buildings in Mukinje
4. Hydropower plant at Lake Burget
5. Hotel Plitvice
6. Building complex Vila Izvor
7. Restaurant Kozjak
8. Workers' restaurant building
9. Building of former post office in Mukinje
10. Rural site, Plitvički Ljeskovac 22 (Stipanov mlin)
11. Forestry house Prijeboj
12. Forestry house Čorkova uvala
13. Church of Ascension of Our Lady in Vrelo Koreničko
14. Water mill in Korana
15. Water-powered sawmill in Korana

























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<sup>67</sup> Register of Cultural Assets of the Republic of Croatia. <https://www.min-kulture.hr/default.aspx?id=31>



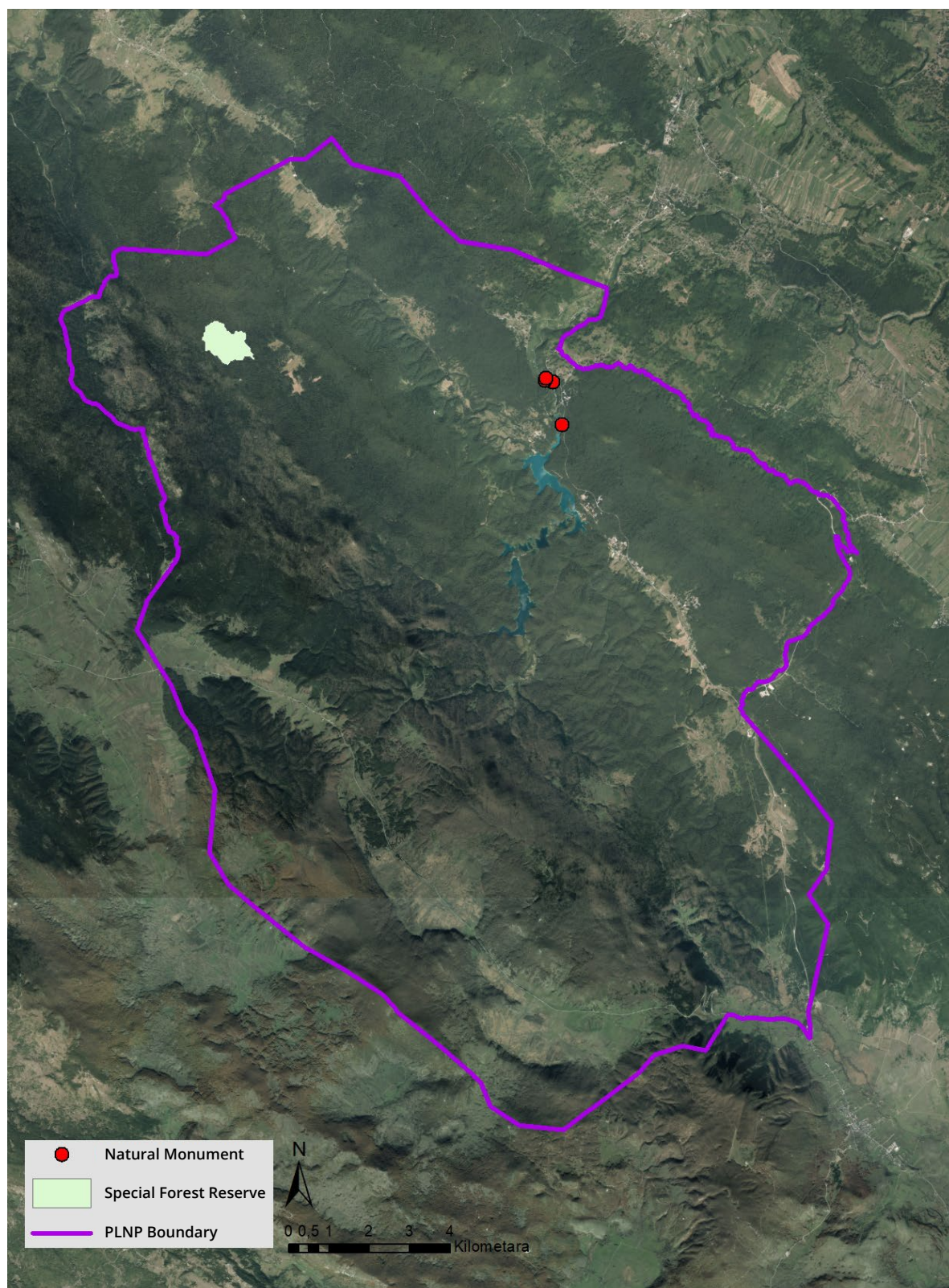
## 5.11 Natura 2000 habitat zones



	PLNP Boundary		Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) 91E0
	Caves and pits closed to the public 8310		Illyrian oak-hornbeam forests (Erythronio-Carpinion) 91L0
	Water courses of plain to montane levels with the <i>Ranunculum fluitans</i> and <i>Callitriche-Batrachion</i> vegetation 3260		Dinaric dolomite Scots pine forests ( <i>Genisto januensis</i> -Pinetum) 91R0
	Transition mires and quaking bogs 7140		Calcareous rocky slopes with chasmophytic vegetation 8210
	Tufa cascades of karstic rivers of the Dinaric Alps 32A0		Tilio-Acerion forests of slopes, screes and ravines 9180
	Hard oligo-mesotrophic waters with benthic vegetation of chara formations (Characeae) 3140		Pannonian-Balkan turkey oak-sessile oak forests 91M0
	Species-rich <i>Nardus</i> grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe) 6230		Acidophilous <i>Picea</i> forests of the montane to alpine levels ( <i>Vaccinio-Piceetea</i> ) 9410
	European dry heaths 4030		Illyrian <i>Fagus sylvatica</i> forests (Aremonio-Fagion) 91K0 Subzone
	<i>Juniperus communis</i> formations on heaths or calcareous grasslands 5130		<i>Helleboro nigri</i> -Fagetum <i>sylvaticae</i>
	Semi-natural dry grasslands and scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> ) (* important orchid sites) 6210		<i>Lamio orvale</i> -Fagetum <i>sylvaticae</i>
	<i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils ( <i>Molinion caeruleae</i> ) 6410		<i>Omphalodo</i> -Fagetum <i>sylvaticae</i>
	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels 6430		<i>Ostrya</i> - Fagetum
	Alkaline fens 7230		

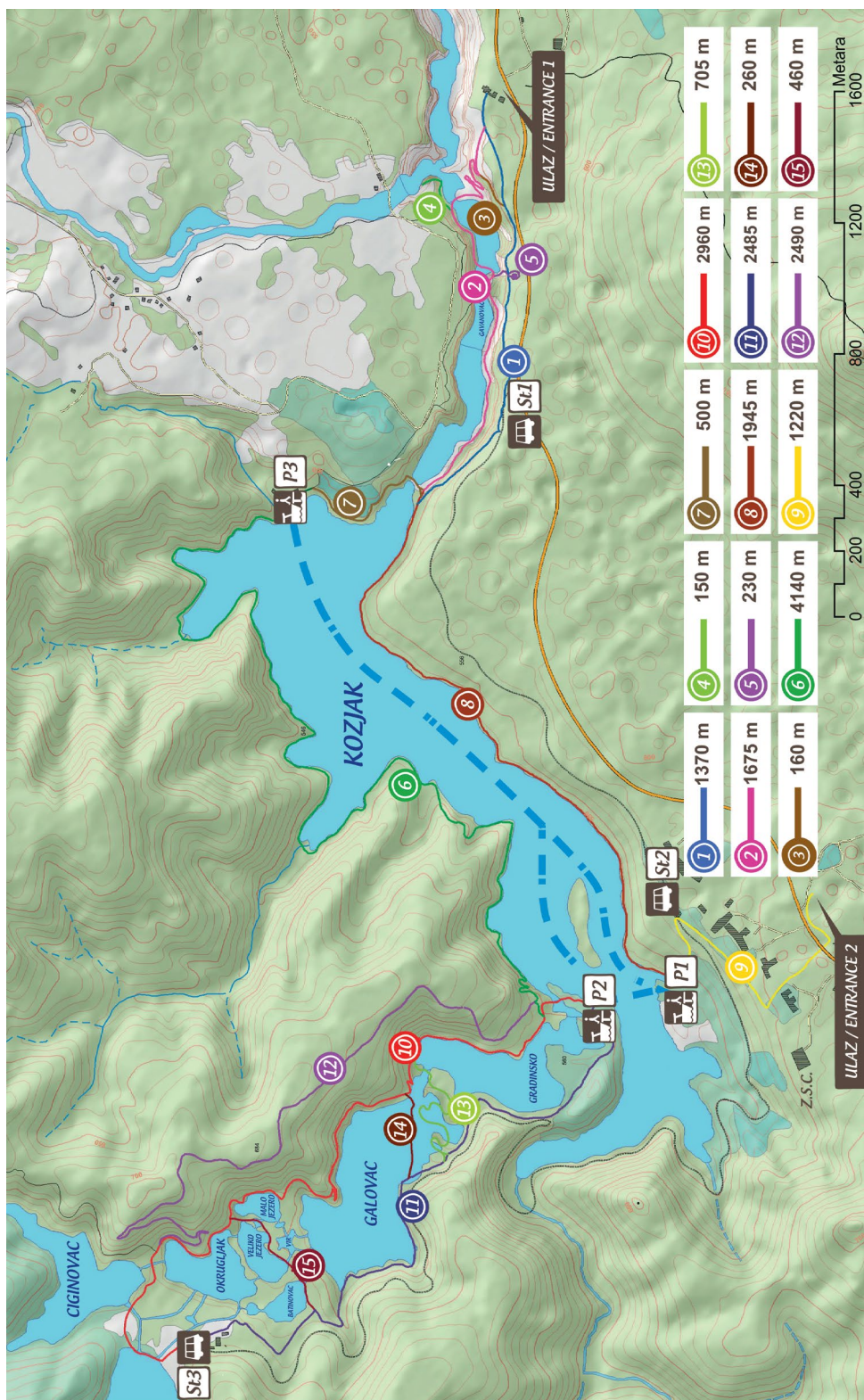


## 5.12 Other categories of conservation in the National Park





## 5.13 Visitor trails in the Plitvice Lakes National Park lake zone



## 5.14 Relation table with conservation measures and management activities (flora and fauna species and habitats)

Overview of conservation objectives and measures with accompanying activities for Natura 2000 species and habitat types					
Area identification number: HR5000020					
Area name: Plitvice Lakes National Park					
Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp	3140	Conserved habitat type in lake zone, 215 ha in surface (representation in all lakes, from the shallowest areas to the depth of 20.5 m, i.e., to the bottom in shallower lakes)	Conserve favorable habitat conditions (pH≥7.4, transparency ≥6m or to the bottom for shallower waters, concentration of nutrients does not exceed values for oligotrophic to mesotrophic waters)	nature conservation	AA23, AA25, AA27, AA37, EB11, EB30
		Conserved habitat type in lake zone, 215 ha in surface (representation in all lakes, from the shallowest areas to the depth of 20.5 m, i.e., to the bottom in shallower lakes)	Conserve diversity of Charophyta and frequency of individual species, including <i>Chara contraria</i> , <i>Ch.globularis</i> , <i>Ch. aspera</i> ( <i>Ch.delicatula</i> ), <i>Ch. vulgaris</i> , <i>Ch. hispida</i> and <i>Nitella opaca</i>	nature conservation	AA12, AA27, AA37, EB30
		Conserved habitat type in lake zone, 215 ha in surface (representation in all lakes, from the shallowest areas to the depth of 20.5 m, i.e., to the bottom in shallower lakes)	Eliminate other existing sources or causes of water pollution in the lakes	nature conservation; water management; environment protection	AA7, AA23, AA25, AA27, AA35, AA63, AA64, CA37, ED3, ED6, ED7, ED9
		Conserved habitat type in lake zone, 215 ha in surface (representation in all lakes, from the shallowest areas to the depth of 20.5 m, i.e., to the bottom in shallower lakes)	Complete planned wastewater drainage and treatment system for facilities and settlements in the National Park	nature conservation; water management	ED1, ED2, ED3
		Conserved habitat type in lake zone, 215 ha in surface (representation in all lakes, from the shallowest areas to the depth of 20.5 m, i.e., to the bottom in shallower lakes)	Relocate the existing water intake structure from Lake Kozjak	nature conservation; water management	AA10, AA49, ED4, ED5
		Conserved habitat type in lake zone, 215 ha in surface (representation in all lakes, from the shallowest areas to the depth of 20.5 m, i.e., to the bottom in shallower lakes)	Prepare visitor management action plan	nature conservation	CA1 to CA57
		Conserved habitat type in lake zone, 215 ha in surface (representation in all lakes, from the shallowest areas to the depth of 20.5 m, i.e., to the bottom in shallower lakes)	Do not permit hydromelioration interventions	nature conservation; water management	AA34, AA35, EB30



Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
Watercourses of plain to montane levels with the <i>Ranuncion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation	3260	Conserved habitat type within 100 km of watercourses (representation in upstream sections of watercourses)	Conserve favorable habitat conditions (concentration of nutrients does not exceed values for oligotrophic to mesotrophic waters)	nature conservation	AA23, AA27, AA38, EB11, EB30
		Conserved habitat type within 100 km of watercourses (representation in upstream sections of watercourses)	Conserve natural hydromorphology of watercourses	nature conservation	AA15, AA34, AA56
		Conserved habitat type within 100 km of watercourses (representation in upstream sections of watercourses)	Prepare visitor management action plan	nature conservation	CA1 to CA57
		Conserved habitat type within 100 km of watercourses (representation in upstream sections of watercourses)	Eliminate existing sources or causes of water pollution in the watercourses	nature conservation; water management; environment protection	AA7, AA23, AA27, AA35, AA63, AA64, CA37, ED3, ED6, ED7, ED9
		Conserved habitat type within 100 km of watercourses (representation in upstream sections of watercourses)	Do not permit hydromelioration interventions	nature conservation; water management	AA34, AA35, EB30
Tufa cascades of karstic rivers of the Dinaric Alps	32A0	Conserved habitat type in lake and watercourse zone, 235 ha	Conserve favorable habitat conditions (concentration of nutrients does not exceed values for oligotrophic to mesotrophic waters, satisfied conditions for tufa sedimentation - pH value above 8, oversaturation of water with calcium salts - $I_{\text{zas}} > 3$ and low concentrations of dissolved organic carbon ( $< 10 \text{ mg/l}$ ))	nature conservation	AA6, AA7, AA23, AA25, AA27, AA39, EB11, EB30
		Conserved habitat type in lake and watercourse zone, 235 ha	Conserve natural hydromorphology of lakes and watercourses	nature conservation	AA15, AA26, AA34, AA56
		Conserved habitat type in lake and watercourse zone, 235 ha	Prevent vegetation succession, with the exception of areas where protection of vegetation is necessary for the conservation of species (e.g. kingfisher)	nature conservation	AA9, AA12, AA24, AA39
		Conserved habitat type in lake and watercourse zone, 235 ha	Complete planned wastewater drainage and treatment system for facilities and settlements in the National Park	nature conservation; water management	ED1, ED2, ED3

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
		Conserved habitat type in lake and watercourse zone, 235 ha	Eliminate other existing sources or causes of water pollution in the lakes and watercourses	nature conservation; water management; environment protection	AA7, AA23, AA25, AA27, AA35, AA63, AA64, CA37, ED3, ED6, ED7, ED9
		Conserved habitat type in lake and watercourse zone, 235 ha	Relocate the existing water intake structure from Lake Kozjak	nature conservation; water management	AA10, AA49, ED4, ED5
		Conserved habitat type in lake and watercourse zone, 235 ha	Prepare visitor management action plan	nature conservation	CA1 to CA57
		Conserved habitat type in lake and watercourse zone, 235 ha	Do not permit hydromelioration interventions	nature conservation; water management	AA34, AA35, EB30
European dry heaths	4030	Conserved 800 ha of the existing surface of habitat type complex 4030 European dry heaths and 6230* Species-rich <i>Nardus</i> grasslands	Conserve favorable habitat conditions through the measure Agriculture, Environment and Climate Change within the Rural Development Programme	nature conservation; agriculture	DA1 to DA8
		Conserved 800 ha of the existing surface of habitat type complex 4030 European dry heaths and 6230* Species-rich <i>Nardus</i> grasslands	Ensure use of land by mowing/grazing or controlled burning in order to conserve favorable habitat conditions	nature conservation; agriculture	DA1 to DA8
		Conserved 800 ha of the existing surface of habitat type complex 4030 European dry heaths and 6230* Species-rich <i>Nardus</i> grasslands	Prevent vegetation succession	nature conservation	DA6, DA7, DA8, AC1, AC13, AC19, AC32, AC33, AC34
<i>Juniperus communis</i> formations on heaths or calcareous grasslands	5130	Conserved 98 ha of the existing surface of habitat type	Remove Cormophyta (woody species) after their height exceeds the height of <i>Juniperus communis</i>	nature conservation	AB58
Semi-natural dry grasslands and scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> ) (* important orchid sites)	6210*	Conserved 867 ha of the existing surface of habitat type, including Kalnik moor grass grasslands along the lakes	Conserve favorable habitat conditions for the development of grasslands of brome grass and hoary plantain (As. <i>Bromo-Plantaginietum mediae</i> ) and Kalnik moor grass ( <i>Seslerietum kalnikensis</i> )	nature conservation	AC1, AC2, AC12, AC19
		Conserved 867 ha of the existing surface of habitat type, including Kalnik moor grass grasslands along the lakes	Conserve favorable habitat conditions through the measure Agriculture, Environment and Climate Change within the Rural Development Programme	nature conservation; agriculture	DA1 to DA8

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
		Conserved 867 ha of the existing surface of habitat type, including Kalnik moor grass grasslands along the lakes	Limit the use of plant protection products and mineral fertilizers	nature conservation; agriculture	AC32, AC33, AC34
		Conserved 867 ha of the existing surface of habitat type, including Kalnik moor grass grasslands along the lakes	Maintain the existing use of land by mowing/grazing in order to conserve favorable habitat conditions	nature conservation; agriculture	DA1 to DA8
		Conserved 867 ha of the existing surface of habitat type, including Kalnik moor grass grasslands along the lakes	Prevent vegetation succession	nature conservation	DA6, DA7, DA8, AC1, AC2, AC12, AC19, AC32, AC33, AC34
Species-rich <i>Nardus</i> grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	6230*	Conserved 800 ha of the existing surface of habitat type complex 4030 European dry heaths and 6230* Species-rich <i>Nardus</i> grasslands	Conserve favorable habitat conditions for the development of purple moor grass and hawksbeard grasslands ( <i>Crepidi conyzaefoliae-Molinietum altissimae</i> )	nature conservation	AC1, AC14
		Conserved 800 ha of the existing surface of habitat type complex 4030 European dry heaths and 6230* Species-rich <i>Nardus</i> grasslands	Conserve favorable habitat conditions through the measure Agriculture, Environment and Climate Change within the Rural Development Programme	agriculture; nature conservation	DA1 to DA8
		Conserved 800 ha of the existing surface of habitat type complex 4030 European dry heaths and 6230* Species-rich <i>Nardus</i> grasslands	Prevent vegetation succession	nature conservation	DA6, DA7, DA8, AC1, AC2, AC14, AC32, AC33, AC34
		Conserved 800 ha of the existing surface of habitat type complex 4030 European dry heaths and 6230* Species-rich <i>Nardus</i> grasslands	Limit the use of plant protection products and mineral fertilizers	nature conservation; agriculture	AC32, AC33, AC34
		Conserved 800 ha of the existing surface of habitat type complex 4030 European dry heaths and 6230* Species-rich <i>Nardus</i> grasslands	Maintain the existing use of land by mowing/ grazing in order to conserve favorable habitat conditions	nature conservation; agriculture	DA1 to DA8
<i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils ( <i>Molinia caerulea</i> )	6410	Conserved 107 ha of the existing surface of habitat type	Conserve favorable habitat conditions through the measure Agriculture, Environment and Climate Change within the Rural Development Programme	nature conservation; agriculture	DA1 to DA8
		Conserved 107 ha of the existing surface of habitat type	Conserve favorable habitat conditions for the development of hay meadows of purple moor grass and Pannonian sweet pea ( <i>Molinio-Lathyretum pannonicum</i> )	nature conservation	AC1, AC2, AC15, AC19

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
		Conserved 107 ha of the existing surface of habitat type	Conserve favorable hydrological regime for the conservation of habitat type (high soil moisture, natural regime of winter and spring floods coupled with summer droughts)	nature conservation	AC1, AC2, AC15, AC19
		Conserved 107 ha of the existing surface of habitat type	Limit the use of plant protection products and mineral fertilizers	nature conservation; agriculture	AC32, AC33, AC34
		Conserved 107 ha of the existing surface of habitat type	Maintain the existing use of land by mowing/grazing in order to conserve favorable habitat conditions	nature conservation; agriculture	DA1 to DA8
		Conserved 107 ha of the existing surface of habitat type	Prevent vegetation succession	nature conservation	DA6, DA7, DA8, AC1, AC2, AC15, AC32, AC33, AC34
		Conserved 107 ha of the existing surface of habitat type	Do not permit hydromelioration interventions	nature conservation; water management	AC1, AC2, AC15, AC19, AC32, AC33, AC34, AA38, AA34, EB30
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	6430	Conserved habitat type in the zone along lake shores and watercourse banks, 250 ha	Conserve favorable habitat conditions for the development of shady butterbur communities (formation <i>Petasition officinalis</i> ) with represented species <i>Petasites hybridus</i> , <i>P. kablikianus</i> and <i>P. albus</i> , and tall herb communities with meadowsweet <i>Filipendula ulmaria</i>	nature conservation	AC2, AC16
		Conserved habitat type in the zone along lake shores and watercourse banks, 250 ha	Prepare visitor management action plan	nature conservation	CA1 to CA57
		Conserved habitat type in the zone along lake shores and watercourse banks, 250 ha	Conserve natural hydromorphology and hydrological regime of lakes and watercourses	nature conservation	AA15, AA26, AA34, AA56
		Conserved habitat type in the zone along lake shores and watercourse banks, 250 ha	Systematically eliminate invasive foreign plant species in habitat in case of their detection	nature conservation	AC11, AC37
		Conserved habitat type in the zone along lake shores and watercourse banks, 250 ha	Do not permit hydromelioration interventions	nature conservation; water management	AA35, AA34, EB30

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
Transition mires and quaking bogs	7140	Conserved transition mire in the zone of 0.6 ha	Regularly eliminate vegetation resulting in mire overgrowth (mowing of purple moor grass, elimination of shrubs of alder and glossy buckthorn), while partially leaving bare surface (devoid of vegetation) for the development of heliophytic mire species	nature conservation	AC1, AC17, AC32, AC34
		Conserved transition mire in the zone of 0.6 ha	Conserve favorable habitat conditions for the development of transition mire vegetation - star sedge and round-leave sundew community ( <i>Drosero-Caricetum echinatae</i> ) and slender sedge association ( <i>Caricetum lasiocarpae</i> )	nature conservation	AC1, AC17, AC32, AC34
		Conserved transition mire in the zone of 0.6 ha	Conserved favorable water regime, including high level of groundwater	nature conservation	AA1, AA10, AA49, AA53, AA54
		Conserved transition mire in the zone of 0.6 ha	Do not permit hydromelioration interventions	nature conservation; water management	AA35, AA34, EB30
Alkaline fens	7230	Conserved alkaline fen in the zone of 1 ha	Conserve favorable habitat conditions for the development of fen vegetation, including: peat sedge fen ( <i>Caricetum davallianae</i> ), Dinaric alkaline peat fen with cotton grass ( <i>Eriophoro-Caricetum paniceae</i> ), alkaline purple moor grass and host sedge bog ( <i>Molinio caeruleae-Caricetum hostianae</i> ), fewflower spikerush bog ( <i>Eleocharis quinqueflora</i> )	nature conservation	AC1, AC18, AC32, AC34, AC35, AC42
		Conserved alkaline fen in the zone of 1 ha	Ensure favorable water regime and permanent hydration of fens	nature conservation	AA49, AA53, AA54
		Conserved alkaline fen in the zone of 1 ha	Conserve favorable habitat conditions through the measure Agriculture, Environment and Climate Change within the Rural Development Programme	nature conservation; agriculture	DA1 to DA8



Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
		Conserved alkaline fen in the zone of 1 ha	Eliminate species in intensive overgrowing detrimental to habitat type (reed, sawgrass, alder, glossy buckthorn) and other woody species	nature conservation	AC34, AC42
		Conserved alkaline fen in the zone of 1 ha	Prohibit the use of plant protection products	nature conservation; agriculture	AC32, AC33, AC34
		Conserved alkaline fen in the zone of 1 ha	Do not permit hydromelioration interventions	nature conservation; water management	AA35, AA34, EB30
Calcareous rocky slopes with chasmophytic vegetation	8210	Conserved habitat type in beech forest distribution zone of 21850 ha	Measures not necessary		AD17, AD18
Caves not open to the public	8310	Conserved seven speleological sites corresponding to the description of habitat type	Conserve favorable habitat conditions in registered sites (darkness, humidity, ventilation, physical and chemical conditions, quantity of water and hydrological regime) and their surface surroundings and immediate vicinity	nature conservation	AD9, AD10, AD19, AD20, AD21, AD22, ED23
		Conserved seven speleological sites corresponding to the description of habitat type	Do not permit commercial use of registered speleological sites	nature conservation	AD4, AD5, AD14
		Conserved seven speleological sites corresponding to the description of habitat type	Do not permit introduction of visitor infrastructure into speleological sites	nature conservation	AD4, AD5, AD14
		Conserved seven speleological sites corresponding to the description of habitat type	Remediation of waste disposal sites in catchment areas of speleological sites	nature conservation, environment protection	AD23, AD26, AD27
		Conserved seven speleological sites corresponding to the description of habitat type	Eliminate existing sources or causes of pollution of surface water and groundwater in karst	nature conservation; water management, environment protection	AA7, AA23, AA27, AA35, AA53, AA63, CA37, ED1, ED2, ED3, ED6, ED7, ED9
<i>Tilio-Acerion</i> forests of slopes, screes and ravines	9180*	Conserved habitat type in the zone of 1.5 ha	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB1, AB30
		Conserved habitat type in the zone of 1.5 ha	Conserve favorable habitat conditions for the development of sycamore maple and common ash forest ( <i>Aceri-Fraxinetum</i> s. l.)	nature conservation	AB1, AB30, AB21, AB44, AB45, AB51, AB53, AB54, AB58, AB60

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> )	91E0*	Conserved 67 ha of the existing surface of habitat type	Conserve favorable habitat conditions for the development of grey willow underbrush ( <i>Salicetum cinereae</i> ) along the edges of wetlands, hygrophilous meadows and bogs, as well as black alder stands ( <i>Alnetum glutinosae</i> s.) in alluvial depressions	nature conservation	AB50, ED4, AB21, AB44, AB45, AB51, AB53, AB54, AB58, AB60
		Conserved 67 ha of the existing surface of habitat type	Do not permit hydromelioration interventions	nature conservation; water management	AB50, AA34, EB30
		Conserved 67 ha of the existing surface of habitat type	Conserve favorable hydrological regime (occasional flooding, high groundwater level) and do not perform water management interventions that might harm hydrological regime	nature conservation	AB50, ED4
Illyrian <i>Fagus sylvatica</i> forests ( <i>Aremonio-Fagion</i> )	91K0	Conserved 21748 ha of the existing surface of habitat type	Conserve favorable habitat conditions for the development of beech-fir forest with Omphalodes ( <i>Omphalodo-Fagetum</i> ), beech forests with Christmas rose ( <i>Helleboro nigri-Fagetum</i> ), mountain beech forests with dead nettle ( <i>Lamio orvalae-Fagetum</i> ) and beech forests with hop hornbeam ( <i>Ostryo-Fagetum</i> )	nature conservation	AB1, AB30, AB21, AB44, AB45, AB51, AB53, AB54, AB58, AB60
		Conserved 21748 ha of the existing surface of habitat type	Conserve characteristic properties (including natural composition of species, abundance and diversity of plant and animal species) and favorable habitat structure (including high share of mature, old and dried trees – standing trees and timber – especially trees with hollows)	nature conservation	AB1, AB30

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
Illyrian oak-hornbeam forests ( <i>Erythronio-Carpinion</i> )	91L0	Conserved 6 ha of the existing surface of habitat type	Conserve favorable habitat conditions for the development of Illyrian oak-hornbeam forests with alpine barrenwort, sub-association with hairy sedge ( <i>Epimedio-Carpinetum betuli caricetosum pilosae</i> )	nature conservation	AB1, AB30, AB21, AB44, AB45, AB51, AB53, AB54, AB58, AB60
		Conserved 6 ha of the existing surface of habitat type	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB57
Pannonian-Balkan turkey oak-sessile oak forests	91M0*	Conserved 14 ha of the existing surface of habitat type	Conserve favorable habitat conditions for the development of thermophilous durmast oak and hornbeam forest	nature conservation	AB1, AB30, AB21, AB44, AB45, AB51, AB53, AB54, AB58, AB60
		Conserved 14 ha of the existing surface of habitat type	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB57
Dinaric dolomite Scots pine forests ( <i>Genisto januensis-Pinetum</i> )	91R0	Conserved 273 ha of the existing surface of habitat type	Conserve favorable habitat conditions for the development of pine forests with hellebore ( <i>Helleboro nigri-Pinetum sylvestris</i> )	nature conservation	AB30, AB21, AB44, AB45, AB51, AB53, AB54, AB58, AB60
		Conserved 273 ha of the existing surface of habitat type	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB58
Acidophilous <i>Picea</i> forests of the montane to alpine levels ( <i>Vaccinio-Piceetea</i> )	9410	Conserved 839 ha of the existing surface of habitat type	Conserve favorable habitat conditions for the development of spruce forests with hellebore on dolomite ( <i>Helleboro nigri-Piceetum abietis</i> );	nature conservation	AB30, AB21, AB44, AB45, AB51, AB53, AB54, AB58, AB60
		Conserved 839 ha of the existing surface of habitat type	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB57

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
Creeping marshwort	<i>Apium repens</i>	Conserved favorable habitat of the species (watercourses with natural hydromorphology and natural shores/banks) in the zone of 100 km of watercourses	Conserve natural hydromorphology of watercourses and bank/shore structure	nature conservation	AA24, AA42
		Conserved favorable habitat of the species (watercourses with natural hydromorphology and natural shores/banks) in the zone of 100 km of watercourses	Maintain nutrient concentration in watercourses in a manner that the concentration of nutrients does not exceed values for oligotrophic to mesotrophic waters	nature conservation	AA7, AA35, AA63, AA64
		Conserved favorable habitat of the species (watercourses with natural hydromorphology and natural shores/banks) in the zone of 100 km of watercourses	Eliminate existing sources or causes of pollution of watercourses	nature conservation; water management, environment protection	AA7, AA35, AA63
		Conserved favorable habitat of the species (watercourses with natural hydromorphology and natural shores/banks) in the zone of 100 km of watercourses	Do not permit hydromelioration interventions	nature conservation; water management	AA35, AA34, EB30
Stone crayfish	<i>Austropotamobius torrentium*</i>	Conserved 10 km of watercourses favorable for the species (watercourses with natural hydromorphology and developed shore/bank vegetation in the zone of at least 2 m)	Conserve natural hydromorphology of watercourses and shore/bank vegetation	nature conservation	AA12, AA24, AA34, AA42, AA38, AA47, AA56, AC16
		Conserved 10 km of watercourses favorable for the species (watercourses with natural hydromorphology and developed shore/bank vegetation in the zone of at least 2 m)	Conserve favorable physical and chemical properties of water	nature conservation	AA7, AA8, AA29, AA30, AA31, AA32, AA34, AA35, AA47
		Conserved 10 km of watercourses favorable for the species (watercourses with natural hydromorphology and developed shore/bank vegetation in the zone of at least 2 m)	Systematically eliminate invasive foreign crustacean species in watercourses (ensure monitoring of occurrence of invasive species that endanger the Natura 2000 species, and perform eradication as needed)	nature conservation	AA47, AA48, AA59, AA60, AA61
		Conserved 10 km of watercourses favorable for the species (watercourses with natural hydromorphology and developed shore/bank vegetation in the zone of at least 2 m)	Conserve bank/shore vegetation in the zone of at least 2 m	nature conservation	AA12, AA24, AA48, AA56, AC16

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
		Conserved 10 km of watercourses favorable for the species (watercourses with natural hydromorphology and developed shore/bank vegetation in the zone of at least 2 m)	Maintain nutrient concentration in watercourses in a manner that the concentration of nutrients does not exceed values for oligotrophic to mesotrophic waters	nature conservation	AA7, AA35, AA63, AA64
		Conserved 10 km of watercourses favorable for the species (watercourses with natural hydromorphology and developed shore/bank vegetation in the zone of at least 2 m)	Eliminate existing sources or causes of watercourse pollution	nature conservation; environmental protection	AA35, AA63, AA64
		Conserved 10 km of watercourses favorable for the species (watercourses with natural hydromorphology and developed shore/bank vegetation in the zone of at least 2 m)	Do not permit hydromelioration interventions	nature conservation; water management	AA35, AA34, EB30
Barbastelle bat	<i>Barbastella barbastellus</i>	Conserved population, shelters and favorable habitats (forest habitats, especially forest habitats with high level of structure and distribution of older age categories of trees and trees with hollows, forest edges, forest glades and ponds in forests)	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB30
		Conserved population, shelters and favorable habitats (forest habitats, especially forest habitats with high level of structure and distribution of older age categories of trees and trees with hollows, forest edges, forest glades and ponds in forests)	In case of tree felling (maintenance of forest surfaces along the trails, paths, viewpoints and facilities), leave trees with hollows determined to contain colonies of the species; leave mature trees on the spot for 24 hours prior to removal	nature conservation	AB52, AB27, AB29
		Conserved population, shelters and favorable habitats (forest habitats, especially forest habitats with high level of structure and distribution of older age categories of trees and trees with hollows, forest edges, forest glades and ponds in forests)	Limit the use of plant protection products in habitats favorable for the species and in their immediate vicinity	nature conservation; agriculture	DA3, DA4
		Conserved population, shelters and favorable habitats (forest habitats, especially forest habitats with high level of structure and distribution of older age categories of trees and trees with hollows, forest edges, forest glades and ponds in forests)	Maintain clearings within forests (meadows, pastures, etc.) and their shrub-like edge surfaces, as well as ponds and standing waters	nature conservation	AB13, AB51, AB52



Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
		Conserved population, shelters and favorable habitats (forest habitats, especially forest habitats with high level of structure and distribution of older age categories of trees and trees with hollows, forest edges, forest glades and ponds in forests)	Implement conservation measures for habitat type 8310	nature conservation	AD19, AD21
Wolf	<i>Canis lupus*</i>	Conserved at least two packs and conserved 29000 ha of habitats favorable for the species (forests and other natural habitats)	Conserve favorable habitat conditions	nature conservation	AB4, AB27, AB21, AB44, AB45, AB51, AB53, AB54, AB58, AB60
		Conserved at least two packs and conserved 29000 ha of habitats favorable for the species (forests and other natural habitats)	When planning road infrastructure, as needed, ensure the construction of crossing points for wild animals (green bridges)	nature conservation; physical planning; transport	ED7
		Conserved at least two packs and conserved 29000 ha of habitats favorable for the species (forests and other natural habitats)	Install only subsurface power lines	nature conservation; energy	ED13
		Conserved at least two packs and conserved 29000 ha of habitats favorable for the species (forests and other natural habitats)	Do not permit substantial fencing of plots, in order to prevent habitat fragmentation	nature conservation	
		Conserved at least two packs and conserved 29000 ha of habitats favorable for the species (forests and other natural habitats)	Remediate existing waste disposal sites and do not permit illegal waste dumping in the area	nature conservation; environment protection	AD23, AD26
Squill	<i>Chouardia litardierei</i>	Conserved 107 ha of habitats favorable for the species (open, periodically wet grassland communities where the species appears)	Conserve favorable habitat conditions through the measure Agriculture, Environment and Climate Change within the Rural Development Programme	agriculture; nature conservation	DA1 to DA8
		Conserved 107 ha of habitats favorable for the species (open, periodically wet grassland communities where the species appears)	Conserve favorable habitat conditions in open, periodically wet grassland communities and alkaline fens where the species is present	nature conservation	AC1, AC2, AC18, AC20, AC24, AC32, AC33, AC34
		Conserved 107 ha of habitats favorable for the species (open, periodically wet grassland communities where the species appears)	Limit the use of plant protection products and mineral fertilizers in favorable habitats for the species and in their immediate vicinity	nature conservation; agriculture	DA3, DA4

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
		Conserved 107 ha of habitats favorable for the species (open, periodically wet grassland communities where the species appears)	Maintain the existing use of land by mowing/grazing in order to conserve favorable habitat conditions	nature conservation; agriculture	DA1 to DA8
		Conserved 107 ha of habitats favorable for the species (open, periodically wet grassland communities where the species appears)	Prevent vegetation succession	nature conservation	DA6, DA7, DA8, AC1, AC13, AC19, AC32, AC33, AC34
		Conserved 107 ha of habitats favorable for the species (open, periodically wet grassland communities where the species appears)	Do not permit hydromelioration interventions	nature conservation; water management	AA35, AA34, EB30
Ornate bluet	<i>Coenagrion ornatum</i>	Conserved 688 ha of habitats favorable for the species (watercourses with natural hydromorphology and developed water and shore/bank vegetation, as well as wet grasslands, fens and bogs)	Conserve favorable habitat conditions by maintaining water quality, favorable water regime, bottom/bed structure and shore/bank vegetation	nature conservation	AC16, AC32, AC33, AC34, AA7, AA17, AA37, AA38, AA43, AA44, AA56
		Conserved 688 ha of habitats favorable for the species (watercourses with natural hydromorphology and developed water and shore/bank vegetation, as well as wet grasslands, fens and bogs)	Conserve wet grasslands and fens/bogs	nature conservation	AC1, AC2, AC17, AC18, AC20, AC32, AC33, AC34, AC35
		Conserved 688 ha of habitats favorable for the species (watercourses with natural hydromorphology and developed water and shore/bank vegetation, as well as wet grasslands, fens and bogs)	Limit the use of plant protection products and mineral fertilizers at favorable species habitats and near their close vicinity	nature conservation; agriculture	AC32, AC33, AC34, AA7
		Conserved 688 ha of habitats favorable for the species (watercourses with natural hydromorphology and developed water and shore/bank vegetation, as well as wet grasslands, fens and bogs)	Conserve natural hydromorphology of watercourses and shore/bank vegetation	nature conservation	AA12, AA17, AA24, AA34, AA43, AA44, AA38, AA56, AC16
		Conserved 688 ha of habitats favorable for the species (watercourses with natural hydromorphology and developed water and shore/bank vegetation, as well as wet grasslands, fens and bogs)	Do not permit hydromelioration interventions	nature conservation; water management	AA35, AA34, EB30

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
Lady`s slipper orchid	<i>Cypripedium calceolus</i>	Conserved four localities and favorable habitats for the species (deciduous and mixed forests and scrubs) in the zone of 29400 ha	Conserve favorable habitat conditions in forest habitats	nature conservation	AB1, AB14, AB30, AB40, AB52, AC3, AB21, AB44, AB45, AB51, AB53, AB54, AB58, AB60
		Conserved four localities and favorable habitats for the species (deciduous and mixed forests and scrubs) in the zone of 29400 ha	Regulate activities connected with visitation and tourism and recreation use in the vicinity of localities where the species is present	nature conservation	AB40, CA1, CA2, CA6, CA7, CA30, CA32
		Conserved four localities and favorable habitats for the species (deciduous and mixed forests and scrubs) in the zone of 29400 ha	Do not permit hydromelioration interventions	nature conservation; water management	AA35, AA34, EB30
Slender green feather-moss	<i>Drepanocladus vernicosus</i>	Conserved favorable habitat for the species (star sedge and round-leave sundew fen (As. <i>Drosero-Caricetum echinatae</i> ) and slender sedge association ( <i>Caricetum lasiocarpae</i> )) in the zone of 0.6 ha	Conserve favorable habitat conditions in fens/bogs	nature conservation	AC1, AC17, AA27, AA32
		Conserved favorable habitat for the species (star sedge and round-leave sundew fen (As. <i>Drosero-Caricetum echinatae</i> ) and slender sedge association ( <i>Caricetum lasiocarpae</i> )) in the zone of 0.6 ha	Regularly eliminate vegetation resulting in mire overgrowth (mowing of purple moor grass, elimination of shrubs of alder and glossy buckthorn), while partially leaving bare surface (devoid of vegetation) for the development of heliophytic mire species	nature conservation	AC1, AC15, AC17, AA27, AA29, AA31, AA32
		Conserved favorable habitat for the species (star sedge and round-leave sundew fen (As. <i>Drosero-Caricetum echinatae</i> ) and slender sedge association ( <i>Caricetum lasiocarpae</i> )) in the zone of 0.6 ha	Conserve favorable habitat conditions for the development of fen vegetation - star sedge and round-leave sundew fen ( <i>Drosero-Caricetum echinatae</i> ) and slender sedge association ( <i>Caricetum lasiocarpae</i> )	nature conservation	AC1, AC17, AA27, AA29, AA31, AA32
		Conserved favorable habitat for the species (star sedge and round-leave sundew fen (As. <i>Drosero-Caricetum echinatae</i> ) and slender sedge association ( <i>Caricetum lasiocarpae</i> )) in the zone of 0.6 ha	Conserved favorable water regime	nature conservation	AA49, AA53, AA54
		Conserved favorable habitat for the species (star sedge and round-leave sundew fen (As. <i>Drosero-Caricetum echinatae</i> ) and slender sedge association ( <i>Caricetum lasiocarpae</i> )) in the zone of 0.6 ha	Do not permit hydromelioration interventions	nature conservation; water management	AA35, AA34, EB30

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
Marsh fritillary	<i>Euphydryas aurinia</i>	Conserved 710 ha of habitats favorable for the species (grassland areas)	Conserve favorable habitat conditions through the measure Agriculture, Environment and Climate Change within the Rural Development Programme	nature conservation; agriculture	AC28, DA1 to DA8
		Conserved 710 ha of habitats favorable for the species (grassland areas)	Remove woody species where they result in intensive grassland overgrowth	nature conservation	DA6, DA7, DA8, AC1, AC13, AC19, AC28, AC32, AC33, AC34
		Conserved 710 ha of habitats favorable for the species (grassland areas)	Do not permit conversion of use of agricultural land in the categories of meadows and (karst) pastures into other categories	nature conservation; agriculture	AC1, AC12 to AC19, AC28, AC32, AC33, AC34
		Conserved 710 ha of habitats favorable for the species (grassland areas)	Limit the use of plant protection products and mineral fertilizers in habitats favorable for the species and in their immediate vicinity	nature conservation, agriculture	DA3, DA4
		Conserved 710 ha of habitats favorable for the species (grassland areas)	Do not permit hydromelioration interventions	nature conservation; water management	AA35, AA34, EB30
Jersey tiger	<i>Euplagia quadripunctaria*</i>	Conserved favorable habitats for the species in the zone of 28400 ha	Maintain clearings within forests (meadows, pastures, etc.)	nature conservation	AB52
Siberian rayflower	<i>Ligularia sibirica</i>	Conserved favorable habitats for the species (wet meadows and watercourses with developed vegetation of edges in the zone of 3 ha)	Conserve natural hydromorphology of watercourses and shore/bank vegetation along watercourses	nature conservation	AA12, AA24, AA34, AA56, AC2, AC16, AC20, AC25, AC32, AC34
		Conserved favorable habitats for the species (wet meadows and watercourses with developed vegetation of edges in the zone of 3 ha)	Complete planned wastewater drainage and treatment system for facilities and settlements Vrelo Koreničko and Rudanovac	nature conservation; water management	ED1, ED2, ED3
		Conserved favorable habitats for the species (wet meadows and watercourses with developed vegetation of edges in the zone of 3 ha)	Do not permit hydromelioration interventions	nature conservation; water management	AA35, AA34, EB30

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
Otter	<i>Lutra lutra</i>	Conserved 600 ha of habitats favorable for the species (lakes and watercourses with natural hydromorphology and developed shore/bank vegetation), necessary for maintenance of species population of at least 7 to 8 individuals	Conserve natural hydromorphology of watercourses	nature conservation	AA11, AA12, AA24, AA34, AA40, AA56
		Conserved 600 ha of habitats favorable for the species (lakes and watercourses with natural hydromorphology and developed shore/bank vegetation), necessary for maintenance of species population of at least 7 to 8 individuals	Decrease and prevent pollution of watercourses and their channeling	nature conservation	AA7, AA11, AA21, AA35, AA40, AA56, AA64, AC37
		Conserved 600 ha of habitats favorable for the species (lakes and watercourses with natural hydromorphology and developed shore/bank vegetation), necessary for maintenance of species population of at least 7 to 8 individuals	Eliminate other existing sources or causes of water pollution in the lakes	nature conservation; water management; environment protection	AA7, AA21, AA35, AA64
		Conserved 600 ha of habitats favorable for the species (lakes and watercourses with natural hydromorphology and developed shore/bank vegetation), necessary for maintenance of species population of at least 7 to 8 individuals	Complete planned wastewater drainage and treatment system for facilities and settlements in the National Park	nature conservation; water management	ED1, ED2, ED3
		Conserved 600 ha of habitats favorable for the species (lakes and watercourses with natural hydromorphology and developed shore/bank vegetation), necessary for maintenance of species population of at least 7 to 8 individuals	Do not permit hydromelioration interventions	nature conservation; water management	AA35, AA34, EB30
Lynx	<i>Lynx lynx</i> *	Conserved 29200 ha of habitats favorable for the species (forests and other natural habitats)	Conserve favorable habitat conditions	nature conservation	AB5, AB21, AB44, AB45, AB51, AB53, AB54, AB58, AB60
		Conserved 29200 ha of habitats favorable for the species (forests and other natural habitats)	When planning road infrastructure, as needed, ensure the construction of crossing points for wild animals (green bridges)	transport; nature conservation; spatial planning	ED7
		Conserved 29200 ha of habitats favorable for the species (forests and other natural habitats)	Do not permit substantial fencing of plots, in order to prevent habitat fragmentation	nature conservation	



Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
Large bent-wing bat	<i>Miniopterus schreibersii</i>	Conserved bat nursery of 1000 to 2000 individuals with conserved shelter (Modra pečina); conserved migratory colonies of 140 to 230 individuals with conserved shelters (Vila jezerkinja, Mračnjača); conserved favorable hunting habitats (deciduous forest habitats rich in structures, scrub vegetation, shrubs)	Conserve favorable habitat conditions for the conservation of species by maintaining forest habitats, tree alleys and open ponds	nature conservation	AA13, AA36, AA55, AB7, AB13, AB29, AB45, AB52, AB53, AB21, AB44, AB51, AB54, AB58, AB60
		Conserved bat nursery of 1000 to 2000 individuals with conserved shelter (Modra pečina); conserved migratory colonies of 140 to 230 individuals with conserved shelters (Vila jezerkinja, Mračnjača); conserved favorable hunting habitats (deciduous forest habitats rich in structures, scrub vegetation, shrubs)	Limit the use of plant protection products in habitats favorable for the species and in their immediate vicinity	nature conservation; agriculture	DA3, DA4
		Conserved bat nursery of 1000 to 2000 individuals with conserved shelter (Modra pečina); conserved migratory colonies of 140 to 230 individuals with conserved shelters (Vila jezerkinja, Mračnjača); conserved favorable hunting habitats (deciduous forest habitats rich in structures, scrub vegetation, shrubs)	Do not permit disturbance of nursing colonies of bats in shelters in the period from the beginning of April until the end of October; do not install doors with horizontal bars in entrance areas of caves	nature conservation	AD9, AD10, AD22
		Conserved bat nursery of 1000 to 2000 individuals with conserved shelter (Modra pečina); conserved migratory colonies of 140 to 230 individuals with conserved shelters (Vila jezerkinja, Mračnjača); conserved favorable hunting habitats (deciduous forest habitats rich in structures, scrub vegetation, shrubs)	Do not light entrances into bat shelters	nature conservation	AD10
		Conserved bat nursery of 1000 to 2000 individuals with conserved shelter (Modra pečina); conserved migratory colonies of 140 to 230 individuals with conserved shelters (Vila jezerkinja, Mračnjača); conserved favorable hunting habitats (deciduous forest habitats rich in structures, scrub vegetation, shrubs)	Implement conservation measures for habitat type 8310	nature conservation	AD19, AD21, AD20, AD22; AD23

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
Long-horned beetle	<i>Morimus funereus</i>	Conserved 23700 ha of favorable habitats for the species (forest habitats with natural structure of forest cover, sufficient share of bulk wood material (logging remains, naturally died trees, accumulated fresh dead trees) and a substantial number of tree stumps)	Conserve favorable habitat conditions in forest habitats	nature conservation	AB18, AB38, AB21, AB44, AB45, AB51, AB53, AB54, AB58, AB60
		Conserved 23700 ha of favorable habitats for the species (forest habitats with natural structure of forest cover, sufficient share of bulk wood material (logging remains, naturally died trees, accumulated fresh dead trees) and a substantial number of tree stumps)	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB30
Bechstein's bat	<i>Myotis bechsteinii</i>	Conserved population, shelters and favorable habitats (forest habitats, especially forest habitats with high level of structure and distribution of older age categories of trees and trees with hollows, forest edges, forest glades and ponds in forest)	Limit the use of plant protection products in habitats favorable for the species and in their immediate vicinity	nature conservation, agriculture	DA3, DA4
		Conserved population, shelters and favorable habitats (forest habitats, especially forest habitats with high level of structure and distribution of older age categories of trees and trees with hollows, forest edges, forest glades and ponds in forest)	In case of tree felling (maintenance of forest surfaces along the trails, paths, viewpoints and facilities), leave trees with hollows determined to contain colonies of the species; leave mature trees on the spot for 24 hours prior to removal	nature conservation	AB52, AB7, AB29
		Conserved population, shelters and favorable habitats (forest habitats, especially forest habitats with high level of structure and distribution of older age categories of trees and trees with hollows, forest edges, forest glades and ponds in forest)	Implement conservation measures for habitat type 8310	nature conservation	AD19, AD21, AD20, AD22, AD23
		Conserved population, shelters and favorable habitats (forest habitats, especially forest habitats with high level of structure and distribution of older age categories of trees and trees with hollows, forest edges, forest glades and ponds in forest)	Maintain clearings within forests (meadows, pastures, etc.) and their shrub-like edge surfaces, as well as standing waters	nature conservation	AA13, AA36, AA55, AB7, AB13, AB29, AB30, AB45, AB52, AB53
		Conserved population, shelters and favorable habitats (forest habitats, especially forest habitats with high level of structure and distribution of older age categories of trees and trees with hollows, forest edges, forest glades and ponds in forest)	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB30

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
Long-fingered bat	<i>Myotis capaccinii</i>	Conserved nursing colonies of at least 750 individuals, as well as shelters (Modra špilja and Baričeva špilja) and hunting habitats (forested areas and watercourses in natural condition, including bank/shore vegetation)	Conserve favorable habitat conditions in forest habitats for the conservation of species	nature conservation; forestry	AA13, AA36, AA55, AB7, AB13, AB28, AB29, AB45, AB52, AB53, AB21, AB44, AB51, AB54, AB58, AB60
		Conserved nursing colonies of at least 750 individuals, as well as shelters (Modra špilja and Baričeva špilja) and hunting habitats (forested areas and watercourses in natural condition, including bank/shore vegetation)	Conserve natural hydromorphology of watercourses, shore/bank vegetation along watercourses and good water quality	nature conservation	AA12, AA24, AA34, AA56, AC2, AC16, AC20, AC32, AC34
		Conserved nursing colonies of at least 750 individuals, as well as shelters (Modra špilja and Baričeva špilja) and hunting habitats (forested areas and watercourses in natural condition, including bank/shore vegetation)	Limit the use of plant protection products in habitats favorable for the species and in their immediate vicinity (especially near water surfaces)	nature conservation; agriculture	DA3, DA4, AC32, AC34
		Conserved nursing colonies of at least 750 individuals, as well as shelters (Modra špilja and Baričeva špilja) and hunting habitats (forested areas and watercourses in natural condition, including bank/shore vegetation)	Do not permit disturbance of nursing colonies of bats in shelters in the period from the beginning of April until the end of October	nature conservation	AD9, AD10, AD22
		Conserved nursing colonies of at least 750 individuals, as well as shelters (Modra špilja and Baričeva špilja) and hunting habitats (forested areas and watercourses in natural condition, including bank/shore vegetation)	Implement conservation measures for habitat type 8310	nature conservation	AD19, AD21, AD20, AD22, AD23

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
Greater mouse-eared bat	<i>Myotis myotis</i>	Conserved nursing colony of at least 250 to 350 individuals, as well as shelters (Modra špilja and Vila jezerkinja) and hunting habitats (deciduous and mixed forests with small quantity of leaf litter, hay meadows, pastures)	Conserve favorable habitat conditions for the species by conserving forests, forest glades, forest paths and grasslands	nature conservation	AA13, AA36, AA55, AB7, AB13, AB29, AB30, AB45, AB52, AB53, AC12 to AC19, AB21, AB44, AB51, AB54, AB58, AB60
		Conserved nursing colony of at least 250 to 350 individuals, as well as shelters (Modra špilja and Vila jezerkinja) and hunting habitats (deciduous and mixed forests with small quantity of leaf litter, hay meadows, pastures)	Conserve the mosaic character of habitats and promote regular maintenance by mowing and/or extensive grazing	nature conservation; agriculture	AC12 to AC19, AC32, AC33, AC34, DA1 to DA8
		Conserved nursing colony of at least 250 to 350 individuals, as well as shelters (Modra špilja and Vila jezerkinja) and hunting habitats (deciduous and mixed forests with small quantity of leaf litter, hay meadows, pastures)	Conserve corridors between shelters and hunting areas	nature conservation	AB29, AB52, AB53
		Conserved nursing colony of at least 250 to 350 individuals, as well as shelters (Modra špilja and Vila jezerkinja) and hunting habitats (deciduous and mixed forests with small quantity of leaf litter, hay meadows, pastures)	Do not permit disturbance of nursing colonies of bats in shelters in the period from the beginning of April until the end of October	nature conservation	AD9, AD10, AD22
		Conserved nursing colony of at least 250 to 350 individuals, as well as shelters (Modra špilja and Vila jezerkinja) and hunting habitats (deciduous and mixed forests with small quantity of leaf litter, hay meadows, pastures)	Do not light entrances into bat shelters	nature conservation	AD10
		Conserved nursing colony of at least 250 to 350 individuals, as well as shelters (Modra špilja and Vila jezerkinja) and hunting habitats (deciduous and mixed forests with small quantity of leaf litter, hay meadows, pastures)	Limit the use of plant protection products in the vicinity of colonies	nature conservation; agriculture	DA3, DA4
		Conserved nursing colony of at least 250 to 350 individuals, as well as shelters (Modra špilja and Vila jezerkinja) and hunting habitats (deciduous and mixed forests with small quantity of leaf litter, hay meadows, pastures)	Implement conservation measures for habitat type 8310	nature conservation	AD19, AD21, AD20, AD22, AD23

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
Hermit beetle	<i>Osmoderma eremita</i> *	Conserved 23700 ha of favorable habitats for the species (forest habitats with natural structure of forest cover, sufficient share of bulk wood material (logging remains, naturally died trees, accumulated fresh dead trees) and a substantial number of tree stumps)	In case of tree felling (maintenance of forest surfaces along the trails, paths, viewpoints and facilities), first determine and record individual trees inhabited by the species through monitoring prior to felling, and exclude these trees from felling	nature conservation	AB18, AB19, AB38
		Conserved 23700 ha of favorable habitats for the species (forest habitats with natural structure of forest cover, sufficient share of bulk wood material (logging remains, naturally died trees, accumulated fresh dead trees) and a substantial number of tree stumps)	Conserve favorable habitat conditions in forest ecosystems for the conservation of species	nature conservation	AB18, AB19, AB38, AB45, AB21, AB44, AB45, AB51, AB53, AB54, AB58, AB60
		Conserved 23700 ha of favorable habitats for the species (forest habitats with natural structure of forest cover, sufficient share of bulk wood material (logging remains, naturally died trees, accumulated fresh dead trees) and a substantial number of tree stumps)	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB30



Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
Mediterranean horseshoe bat	<i>Rhinolophus euryale</i>	Conserved nursing colony numbering 620 to 1150 individuals and conserved shelters of the colony (Modra špilja, Baričeva špilja, Vila izvor); conserved migratory colony of 20 to 40 individuals and conserved shelter of the colony (Vila Jezerkinja), as well as favorable hunting habitats ((broad-leaved) deciduous forest habitats, mosaic forest habitats, scrub, thicket and meadows with orchards linked with linear landscape elements (tree alleys, hedges))	Conserve favorable habitat conditions in forest habitats for the conservation of species	nature conservation; forestry	AA13, AA36, AA55, AB7, AB13, AB29, AB30, AB45, AB52, AB53, AB21, AB44, AB45, AB51, AB53, AB54, AB58, AB60
		Conserved nursing colony numbering 620 to 1150 individuals and conserved shelters of the colony (Modra špilja, Baričeva špilja, Vila izvor); conserved migratory colony of 20 to 40 individuals and conserved shelter of the colony (Vila Jezerkinja), as well as favorable hunting habitats ((broad-leaved) deciduous forest habitats, mosaic forest habitats, scrub, thicket and meadows with orchards linked with linear landscape elements (tree alleys, hedges))	Limit the use of plant protection products in habitats favorable for the species and in their immediate vicinity	nature conservation; agriculture	DA3, DA4
		Conserved nursing colony numbering 620 to 1150 individuals and conserved shelters of the colony (Modra špilja, Baričeva špilja, Vila izvor); conserved migratory colony of 20 to 40 individuals and conserved shelter of the colony (Vila Jezerkinja), as well as favorable hunting habitats ((broad-leaved) deciduous forest habitats, mosaic forest habitats, scrub, thicket and meadows with orchards linked with linear landscape elements (tree alleys, hedges))	Conserve corridors between shelters and hunting areas	nature conservation	AB29, AB52, AB53
		Conserved nursing colony numbering 620 to 1150 individuals and conserved shelters of the colony (Modra špilja, Baričeva špilja, Vila izvor); conserved migratory colony of 20 to 40 individuals and conserved shelter of the colony (Vila Jezerkinja), as well as favorable hunting habitats ((broad-leaved) deciduous forest habitats, mosaic forest habitats, scrub, thicket and meadows with orchards linked with linear landscape elements (tree alleys, hedges))	Do not permit disturbance of nursing colonies of bats in shelters in the period from the beginning of April until the end of October	nature conservation	AD9, AD10, AD22

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
		Conserved nursing colony numbering 620 to 1150 individuals and conserved shelters of the colony (Modra špilja, Baričeva špilja, Vila izvor); conserved migratory colony of 20 to 40 individuals and conserved shelter of the colony (Vila Jezerkinja), as well as favorable hunting habitats ((broad-leaved) deciduous forest habitats, mosaic forest habitats, scrub, thicket and meadows with orchards linked with linear landscape elements (tree alleys, hedges))	Implement conservation measures for habitat type 8310	nature conservation	AD19, AD21, AD20, AD22, AD23
		Conserved nursing colony numbering 620 to 1150 individuals and conserved shelters of the colony (Modra špilja, Baričeva špilja, Vila izvor); conserved migratory colony of 20 to 40 individuals and conserved shelter of the colony (Vila Jezerkinja), as well as favorable hunting habitats ((broad-leaved) deciduous forest habitats, mosaic forest habitats, scrub, thicket and meadows with orchards linked with linear landscape elements (tree alleys, hedges))	Do not light entrances into bat shelters	nature conservation	AD10

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
Greater horseshoe bat	<i>Rhinolophus ferrumequinum</i>	Conserved nursing colony numbering at least 50 to 100 individuals and conserved shelter of the colony (Baričeva špilja, Vila izvor); conserved migratory colony of 30 to 150 individuals and conserved shelter of the colony (Vila Jezerkinja, Mračnjača and Baričeva špilja); conserved wintering colony numbering 16 to 40 individuals and conserved shelter of the colony (Vila Jezerkinja, Baričeva špilja, Mračnjača), as well as favorable hunting habitats of the species (mosaics of various habitat types of deciduous forest, pastures, bushes, thicket, tree alleys, meadows with orchards mutually linked with hedges and other linear landscape elements)	Conserve favorable habitat conditions for the conservation of species by maintaining rich structure of landscape, by decreasing the effects of habitat fragmentation, and by maintaining the mosaic character of forest habitats, areas under extensive traditional agriculture, grasslands, pastures and open ponds in the hunting area	nature conservation; forestry	AA13, AA36, AA55, AB7, AB13, AB29, AB45, AB52, AB53, AB21, AB44, AB51, AB54, AB58, AB60
		Conserved nursing colony numbering at least 50 to 100 individuals and conserved shelter of the colony (Baričeva špilja, Vila izvor); conserved migratory colony of 30 to 150 individuals and conserved shelter of the colony (Vila Jezerkinja, Mračnjača and Baričeva špilja); conserved wintering colony numbering 16 to 40 individuals and conserved shelter of the colony (Vila Jezerkinja, Baričeva špilja, Mračnjača), as well as favorable hunting habitats of the species (mosaics of various habitat types of deciduous forest, pastures, bushes, thicket, tree alleys, meadows with orchards mutually linked with hedges and other linear landscape elements)	Limit the use of plant protection products in habitats favorable for the species and in their immediate vicinity	nature conservation; agriculture	DA3, DA4
		Conserved nursing colony numbering at least 50 to 100 individuals and conserved shelter of the colony (Baričeva špilja, Vila izvor); conserved migratory colony of 30 to 150 individuals and conserved shelter of the colony (Vila Jezerkinja, Mračnjača and Baričeva špilja); conserved wintering colony numbering 16 to 40 individuals and conserved shelter of the colony (Vila Jezerkinja, Baričeva špilja, Mračnjača), as well as favorable hunting habitats of the species (mosaics of various habitat types of deciduous forest, pastures, bushes, thicket, tree alleys, meadows with orchards mutually linked with hedges and other linear landscape elements)	Conserve corridors between shelters and hunting areas by maintaining (or cultivating) tall hedges, tree alleys or forest habitat	nature conservation	AB52, AB53

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
		Conserved nursing colony numbering at least 50 to 100 individuals and conserved shelter of the colony (Baričeva špilja, Vila izvor); conserved migratory colony of 30 to 150 individuals and conserved shelter of the colony (Vila Jezerkinja, Mračnjača and Baričeva špilja); conserved wintering colony numbering 16 to 40 individuals and conserved shelter of the colony (Vila Jezerkinja, Baričeva špilja, Mračnjača), as well as favorable hunting habitats of the species (mosaics of various habitat types of deciduous forest, pastures, bushes, thicket, tree alleys, meadows with orchards mutually linked with hedges and other linear landscape elements)	Avoid the use of antiparasitic drugs for livestock (ivermectin) and similar products	nature conservation; agriculture	DA3, DA4
		Conserved nursing colony numbering at least 50 to 100 individuals and conserved shelter of the colony (Baričeva špilja, Vila izvor); conserved migratory colony of 30 to 150 individuals and conserved shelter of the colony (Vila Jezerkinja, Mračnjača and Baričeva špilja); conserved wintering colony numbering 16 to 40 individuals and conserved shelter of the colony (Vila Jezerkinja, Baričeva špilja, Mračnjača), as well as favorable hunting habitats of the species (mosaics of various habitat types of deciduous forest, pastures, bushes, thicket, tree alleys, meadows with orchards mutually linked with hedges and other linear landscape elements)	Do not permit disturbance of nursing colonies of bats in shelters in the period from the beginning of April until the end of October	nature conservation	AD9, AD10, AD22
		Conserved nursing colony numbering at least 50 to 100 individuals and conserved shelter of the colony (Baričeva špilja, Vila izvor); conserved migratory colony of 30 to 150 individuals and conserved shelter of the colony (Vila Jezerkinja, Mračnjača and Baričeva špilja); conserved wintering colony numbering 16 to 40 individuals and conserved shelter of the colony (Vila Jezerkinja, Baričeva špilja, Mračnjača), as well as favorable hunting habitats of the species (mosaics of various habitat types of deciduous forest, pastures, bushes, thicket, tree alleys, meadows with orchards mutually linked with hedges and other linear landscape elements)	Implement conservation measures for habitat type 8310	nature conservation	AD19, AD21, AD20, AD22, AD23

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
		Conserved nursing colony numbering at least 50 to 100 individuals and conserved shelter of the colony (Baričeva špilja, Vila izvor); conserved migratory colony of 30 to 150 individuals and conserved shelter of the colony (Vila Jezerkinja, Mračnjača and Baričeva špilja); conserved wintering colony numbering 16 to 40 individuals and conserved shelter of the colony (Vila Jezerkinja, Baričeva špilja, Mračnjača), as well as favorable hunting habitats of the species (mosaics of various habitat types of deciduous forest, pastures, bushes, thicket, tree alleys, meadows with orchards mutually linked with hedges and other linear landscape elements)	Do not light entrances into bat shelters	nature conservation	AD10
Rosalia longicorn	<i>Rosalia alpina</i> *	Conserved 23700 ha of favorable habitats for the species (warm and sunny forest habitats with sufficient quantity of fresh dead or cut trees large in dimensions)	Conserve favorable habitat conditions in forest ecosystems for the conservation of species	nature conservation	AB18, AB38
		Conserved 23700 ha of favorable habitats for the species (warm and sunny forest habitats with sufficient quantity of fresh dead or cut trees large in dimensions)	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB30
Bear	<i>Ursus arctos</i> *	Conserved 25 individuals and conserved favorable habitats (forests and other natural habitats)	Conserve favorable habitat conditions	nature conservation	AB3, AB26, AB21, AB44, AB45, AB51, AB53, AB54, AB58, AB60
		Conserved 25 individuals and conserved favorable habitats (forests and other natural habitats)	When planning road infrastructure, as needed, ensure the construction of crossing points for wild animals (green bridges)	nature conservation; spatial planning; transport	ED7
		Conserved 25 individuals and conserved favorable habitats (forests and other natural habitats)	Do not permit substantial fencing of plots, in order to prevent habitat fragmentation	nature conservation	
		Conserved 25 individuals and conserved favorable habitats (forests and other natural habitats)	Remediate existing waste disposal sites and do not permit illegal waste dumping in the area	nature conservation; environment protection	AB30



Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
Green shield-moss	<i>Buxbaumia viridis</i>	Conserve favorable habitats for the species (old forest formations and beech-fir forests) in the zone of 22200 ha	Conserve favorable habitat conditions in shady forests	nature conservation	AB1, AB30, AB41, AB17, AB21, AB44, AB45, AB51, AB53, AB54, AB58, AB60
		Conserve favorable habitats for the species (old forest formations and beech-fir forests) in the zone of 22200 ha	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB1, AB30, AB41, AB17
		Conserve favorable habitats for the species (old forest formations and beech-fir forests) in the zone of 22200 ha	Implement conservation measures for habitat type 91K0	nature conservation	AB1, AB30, AB41, AB17
Dicranum moss	<i>Dicranum viride</i>	Conserve favorable habitats for the species (old forest formations and beech-fir forests) in the zone of 22200 ha	Conserve favorable habitat conditions in old forests	nature conservation	AB1, AB30, AB41, AB17, AB21, AB44, AB45, AB51, AB53, AB54, AB58, AB60
		Conserve favorable habitats for the species (old forest formations and beech-fir forests) in the zone of 22200 ha	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB1, AB30, AB41, AB17
		Conserve favorable habitats for the species (old forest formations and beech-fir forests) in the zone of 22200 ha	Implement conservation measures for habitat type 91K0	nature conservation	AB1, AB30, AB41, AB17
	<i>Cobitis bilienata</i>	Conserved favorable habitats for the species (standing waters and slow-flowing waters and lakes with the bottom covered by sand, mud or small gravel and dense underwater vegetation) in the zone of 77 ha	Conserve favorable habitat conditions with a view to ecological requirements for the species (e.g. favorable hydrological regime, physical and chemical properties of water, without pollution and eutrophication)	water management; nature conservation	AA15, AA46, AA56
		Conserved favorable habitats for the species (standing waters and slow-flowing waters and lakes with the bottom covered by sand, mud or small gravel and dense underwater vegetation) in the zone of 77 ha	Undertake the activities of elimination and decrease of populations of alien species (chub, pike, rainbow trout, etc.)	nature conservation	AA45, AA57, AA61

Name of species / Name of habitat	Scientific name of species / Code of habitat type	Conservation objective	Conservation measures	Administrative area	Activity code
Italian loach	<i>Sabanejewia larvata</i>	Conserved favorable habitats for the species (standing waters and slow-flowing waters and lakes with the bottom covered by sand, mud or small gravel and dense underwater vegetation) in the zone of 77 ha	Conserve favorable habitat conditions with a view to ecological requirements for the species (e.g. favorable hydrological regime, physical and chemical properties of water, without pollution and eutrophication)	water management; nature conservation	AA15, AA16, AA46, AA56
		Conserved favorable habitats for the species (standing waters and slow-flowing waters and lakes with the bottom covered by sand, mud or small gravel and dense underwater vegetation) in the zone of 77 ha	Undertake the activities of elimination and decrease of populations of alien species (chub, pike, rainbow trout, etc.)	nature conservation	AA45, AA57, AA61

\* Priority species

## 5.15 Relation table with conservation measures and management activities (wild birds)

Overview of conservation objectives and measures with accompanying activities for wild birds									
Area identification number: HR1000020									
Area name: Plitvice Lakes National Park									
Scientific name of species	Name of species	Category for species	Species status			Conservation objective	Conservation measures	Administrative area	Activity code
			Nesting	Migratory	Wintering				
<i>Aegolius funereus</i>	Boreal owl	1	G			Conserved population and favorable structure of beech-fir forest, fir and spruce forest for maintenance of nesting population of 20 to 30 pairs.	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB1, AB30, AB31, AB42, AB53
<i>Alcedo atthis</i>	Common kingfisher	1	G			Conserved population and habitats (river banks, areas with slow-flowing watercourses and standing waters) for maintenance of nesting population of at least 1 to 2 pairs.	Maintain steep sections of banks without vegetation along watercourses, favorable for use of holes for nesting; in areas where <i>Alcedo atthis</i> presence has been recorded, maintain as much vegetation in river bed and along watercourse banks as possible. Undertake works of tree and shrub removal only if necessary for the purposes of National Park management, in accordance with the Management Plan and Annual Plans, and in the period from 1 September until 31 January	water management; nature conservation	AA12, AA19, AA22, AA24

Scientific name of species	Name of species	Category for species	Species status			Conservation objective	Conservation measures	Administrative area	Activity code
			Nesting	Migratory	Wintering				
<i>Asio flammeus</i>	Short-eared owl	1	G			Conserved population and favorable habitats (open heaths and grasslands) for maintenance of nesting population of at least 1 pair.	Conserve favorable habitat conditions through the measure Agriculture, Environment and Climate Change within the Rural Development Programme	agriculture; nature conservation	DA1, DA3, DA4, DA8
<i>Bonasa bonasia</i>	Hazel grouse	1	G			Conserved population and favorable forest structure (forests with dense ground-level vegetation and forest clearings) for maintenance of nesting population of 100 to 200 pairs.	In the area of <i>Bonasia bonasia</i> reproduction, promote clearings within forests (meadows, pastures, etc.) and their shrub-like edge surfaces	nature conservation	AB37, AB52, AB53

Scientific name of species	Name of species	Category for species	Species status			Conservation objective	Conservation measures	Administrative area	Activity code
			Nesting	Migratory	Wintering				
<i>Bubo bubo</i>	Euroasian eagle-owl	1	G			Conserved population and habitats (rocky areas, rocky grasslands) for maintenance of nesting population of at least 1 to 2 pairs.	Conserve favorable habitat conditions through the measure Agriculture, Environment and Climate Change within the Rural Development Programme; do not undertake sport and recreation activities in the period from 1 February until 15 June within 150 meters from known nests; plan and construct electricity infrastructure in a manner that prevents bird collisions with long-distance high-voltage (HV) power lines and electrocution of birds on long-distance medium-voltage (MV) power lines; along sections of known long-distance power lines where increased risk of collision or electrocution is confirmed on the basis of monitoring, undertake technical measures of preventing further bird kills	agriculture; energy; nature conservation	DA1, DA3, DA4, DA8, ED13
						Conserved population and habitats (rocky areas, rocky grasslands) for maintenance of nesting population of at least 1 to 2 pairs.	Do not plan (restore) visitor infrastructure on the right side of the canyon downstream of Entrance 1	nature conservation	CA19, CA20
						Conserved population and habitats (rocky areas, rocky grasslands) for maintenance of nesting population of at least 1 to 2 pairs.	Increase surveillance (especially in the period from February until July) and prevent visitors leaving the trail with the aim of coming close to the edge of the canyon or descending to the bed of the Korana River	nature conservation	CA7, CA9



Scientific name of species	Name of species	Category for species	Species status			Conservation objective	Conservation measures	Administrative area	Activity code
			Nesting	Migratory	Wintering				
<i>Circus pygargus</i>	Montagu's harrier	1	G			Conserved population and habitats (open grasslands, open mosaic habitats) for maintenance of nesting population of at least 1 pair.	Conserve favorable habitat conditions through the measure Agriculture, Environment and Climate Change within the Rural Development Programme; plan and construct electricity infrastructure in a manner that prevents bird collisions with long-distance high-voltage (HV) power lines and electrocution of birds on long-distance medium-voltage (MV) power lines; along sections of known long-distance power lines where increased risk of collision or electrocution is confirmed on the basis of monitoring, undertake technical measures of preventing further bird kills	agriculture; energy; nature conservation	DA1, DA3, DA4, DA8, ED13
<i>Crex crex</i>	Corn crake	1	G			Conserved population and habitats (wet grasslands, primarily hay meadows) for maintenance of nesting population of 40 to 60 singing males	Conserve favorable habitat conditions through the measure Agriculture, Environment and Climate Change within the Rural Development Programme – operation Pilot Measure for Corncrake ( <i>Crex crex</i> ) Protection	agriculture; water management; nature conservation	AC21, AC32, AC33, AC34, DA1 to DA8
<i>Dendrocopos leucotos</i>	White-backed woodpecker	1	G			Conserved population and favorable structure of beech forest and beech-fir forest for maintenance of nesting population of 50 to 100 pairs.	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB1, AB30, AB32, AB42, AB53, AB57

Scientific name of species	Name of species	Category for species	Species status			Conservation objective	Conservation measures	Administrative area	Activity code
			Nesting	Migratory	Wintering				
<i>Dryocopus martius</i>	Black woodpecker	1	G			Conserved population and favorable structure of forest for maintenance of nesting population of 15 to 30 pairs.	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB1, AB30, AB32, AB42, AB53
<i>Falco peregrinus</i>	Peregrine falcon	1	G			Conserved population and nesting habitats (high rocks, steep cliffs) for maintenance of nesting population of at least 1 pair.	Do not undertake sport and recreation activities in the period from 15 February until 15 June within 750 meters from known nests; undertake protection measures for long-distance power lines against bird electrocution and collisions; plan and construct electricity infrastructure in a manner that prevents bird electrocution and collisions;	nature conservation; energy	AB34, AB60, ED13
						Conserved population and nesting habitats (high rocks, steep cliffs) for maintenance of nesting population of at least 1 pair.	Do not plan (restore) visitor infrastructure on the right side of the canyon downstream of Entrance 1	nature conservation	CA19, CA20
<i>Ficedula albicollis</i>	Collared flycatcher	1	G			Conserved population and favorable structure of beech forests for maintenance of nesting population of 400 to 1000 pairs.	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB1, AB30, AB33, AB42, AB52

Scientific name of species	Name of species	Category for species	Species status			Conservation objective	Conservation measures	Administrative area	Activity code
			Nesting	Migratory	Wintering				
<i>Ficedula parva</i>	Red-breasted flycatcher	1	G			Conserved population and favorable structure of forests (especially along aquatic habitats – streams, springs, etc.) for maintenance of nesting population of 10 to 20 pairs.	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB1, AB30, AB33, AB42, AB52
<i>Glaucidium passerinum</i>	Eurasian pygmy owl	1	G			Conserved population and favorable structure of beech-fir forest, fir forest and spruce forest (including the conservation of small grassland surfaces in forests) for maintenance of nesting population of 8 to 12 pairs.	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB1, AB30, AB31, AB42, AB52
<i>Lanius collurio</i>	Red-backed shrike	1	G			Conserved population and habitats (open mosaic habitats) for maintenance of nesting population of 1500 to 2000 pairs.	Conserve favorable habitat conditions through the measure Agriculture, Environment and Climate Change within the Rural Development Programme	agriculture; nature conservation	AC22, DA1, DA3, DA4, DA8
<i>Lanius minor</i>	lesser gray shrike	1	G			Conserved population and habitats (open mosaic habitats, especially along water) for maintenance of nesting population of at least 2 to 4 pairs.	Conserve favorable habitat conditions through the measure Agriculture, Environment and Climate Change within the Rural Development Programme	agriculture; nature conservation	AC22, DA1, DA3, DA4, DA8
<i>Lullula arborea</i>	Woodlark	1	G			Conserved population and open mosaic habitats for maintenance of nesting population of 10 to 20 pairs.	Conserve favorable habitat conditions through the measure Agriculture, Environment and Climate Change within the Rural Development Programme	agriculture; nature conservation	AC22, DA1, DA3, DA4, DA8

Scientific name of species	Name of species	Category for species	Species status			Conservation objective	Conservation measures	Administrative area	Activity code
			Nesting	Migratory	Wintering				
<i>Pernis apivorus</i>	European honey buzzard	1	G			Conserved population and favorable structure of forests for maintenance of nesting population of 1 to 2 pairs.	Conserve habitats	nature conservation	AB35
<i>Picoides tridactylus</i>	Three-toed woodpecker	1	G			Conserved population and favorable structure of beech-fir forest, fir forest and spruce forest for maintenance of nesting population of 50 to 100 pairs.	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB1, AB30, AB32, AB44, AB53
<i>Picus canus</i>	Grey-headed woodpecker	1	G			Conserved population and favorable structure of forests for maintenance of nesting population of 50 to 80 pairs.	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure	nature conservation	AB1, AB30, AB32, AB42, AB53, AB57
<i>Strix uralensis</i>	Ural owl	1	G			Conserved population and favorable structure of beech-fir forest for maintenance of nesting population of 70 to 80 pairs.	Leave forests to natural development, with the exception of maintenance works in connection with visitor infrastructure		
<i>Sylvia nisoria</i>	Barred warbler	1	G			Conserved open mosaic habitats for maintenance of nesting population of 100 to 300 pairs.	Conserve favorable habitat conditions through the measure Agriculture, Environment and Climate Change within the Rural Development Programme	agriculture; nature conservation	AC22, DA1, DA3, DA4, DA8

## 5.16 Spectrum of experience opportunities and allocation of various classes within the Plitvice Lakes National Park

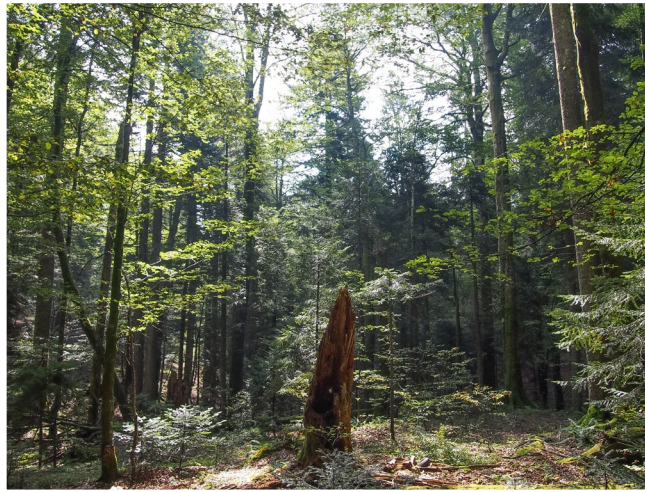
The objective of visitor use management system, i.e., the target state of this system, is defined in great detail by the so-called ROS (*Recreation Opportunity Spectrum*) classes describing a spectrum of experience opportunities that the Park is offering, and each of the classes in the spectrum is described by the following:

- Key elements of experience;
- Biophysical, social and managerial preconditions for the desired experience;
- Indicators that represent variables measurable through monitoring, and that are used to monitor the fulfillment of individual specified preconditions; and
- Indicator standards that represent the values of indicators for which specified preconditions are still fulfilled at threshold value; i.e., in case the threshold is crossed, the standards are no longer fulfilled, and this means that a key element of the desired experience is no longer enabled.

Tables in continuation provide the description of ROS classes defined for the Plitvice Lakes National Park, and the attached zoning map depicts the allocation of ROS classes (i.e. various target experience opportunities) within the Park.



5.16.1 Description of ROS classes for the Plitvice Lakes National Park

PARK AREAS OUTSIDE OF THE VISITATION SYSTEM	
	KEY ELEMENT
	<ul style="list-style-type: none"><li>• Zone of prohibited independent entry</li><li>• Ensured monitoring of adherence to prohibition of independent entry</li><li>• Sole permitted activities are scientific research and status monitoring</li></ul>

## CLASS I



### KEY ELEMENTS OF EXPERIENCE

- Direct experience of pristine wilderness;
- Experience of encounter with wildlife and its traces and sounds (bear, roe deer, wild boar, small mammals, owls, woodpeckers)
- Sense of adventure, remoteness from civilization
- Solitude, possibility of spiritual immersion
- Independent orientation and movement in space along marked trails; challenge of physically demanding trails
- High level of self-reliance

### BIOPHYSICAL CONDITIONS

- Pristine nature, sounds, images, colors, scents and traces of numerous wild species (birdsong, sound of wind, tree-creaking sounds)
- No sign of man-made changes in the ecosystem (built facilities, roads, utility infrastructure, traces of forestry or agricultural activities, waste, etc.)
- Visitor infrastructure includes only markings on raw hiking trails; informative content can be found only at trail endpoints
- Physically demanding or very demanding trails, requiring mountaineering experience, equipment and physical fitness
- Area is remote from tourist service zones and major roads; high level of self-reliance
- Trail length (duration of tour to experience wilderness) - at least 8 km
- Remote area - maximum distance from tourist service zone is 12 km

### INDICATORS AND STANDARDS

- Presence and state of conservation of significant species and habitats (monitoring of biodiversity points to good conservation status)
- Noise level from unnatural sources, including visitors (noise not present or negligible)
- Number of traces of illicit behavior: improvised trails, traces of fire, damaged trees or signposts, waste, traces of defecation (no traces present)
- Level of trail use (width, how trodden is the path) (only surface-beaten trail without any signs of widening)

### SOCIAL CONDITIONS

- Individual visitors or small groups; hikers only
- Small probability of encountering other people

### INDICATORS AND STANDARDS

- Encounter with other visitors on the trail (99-percent probability of not more than 3 encounters with other visitors during the tour)

## MANAGEMENT CONDITIONS

- Rules of conduct are applicable along the trail, and the visitors are informed about these rules, as well as about the trail difficulty level prior to entry (via the website, when purchasing tickets, or at trail entrances at the latest). These rules of conduct are as follows: reporting of entry to and exit from the trail is compulsory for the purposes of visitor safety (to an official, when purchasing the ticket, *on-line*, etc.); movement is permitted only along marked trails; use of bicycles and motor vehicles is not allowed; pets are not allowed; group size may be limited; compulsory and/or recommended directions of movement may be enforced in order to decrease the probability of encountering other visitors; trails may be used by visitors only during defined time periods; camping or overnight stay are not permitted; limitations concerning trail use are enforced depending on weather conditions and the season; recommendations are in place concerning the needed equipment and behavior along the trail (moving in silence, etc.); "*leave no trace*" policy
- Warnings are provided to visitors at trail endpoints concerning trail difficulty level, needed equipment, etc.
- Probability of encountering rangers and other Park staff is very low
- Possibility of organizing guided thematic tours (birdwatching, botanical tours, etc.) for small groups
- Limited GSM network coverage
- Ensured assistance in response to call in case of accident

## INDICATORS AND STANDARDS

- Number of reported visits to trails in a day (only monitoring should be ensured in the beginning of Plan implementation; the standard will be defined as needed based on implementation experiences)
- Presence of rangers and other Park staff (regular trail patrols by rangers; the frequency of patrols will be defined for each trail following the establishment of the approach, depending on visitation intensity - the more used a trail is, the higher the frequency of patrols)
- Number of interventions due to injury or visitors getting lost (only monitoring should be ensured in the beginning of Plan implementation; the standard will be defined as needed based on implementation experiences)
- Response time in case of accident (1 lifeguard team on duty available for the entire Park during the visitation season; response time in case of call: up to 4 hours on any trail section within this class)
- Visitor satisfaction with the experience of pristine nature by encountering wildlife, noticing trails of wild animals, etc.; with information received prior to entering the trail; with the quality of trail markings (individual satisfaction scores for each surveyed element are higher than 8 on a scale from 1 to 10)

## CLASS II



### KEY ELEMENTS OF EXPERIENCE

- Direct experience of conserved nature;
- Experience of encounter with wildlife and its traces and sounds (bear, roe deer, wild boar, small mammals, owls, woodpeckers);
- Feeling of remoteness from civilization;
- Opportunity to learn about Park values through educational trails;
- Guided independent movement along the trails;
- Medium level of self-reliance

### BIOPHYSICAL CONDITIONS

- Pristine nature, sounds, images, colors, scents and traces of numerous wild species (birdsong, sound of wind, tree-creaking sounds)
- No sign of man-made changes in the ecosystem (no built facilities, major roads, municipal infrastructure, traces of forestry or agricultural activities, waste, etc.), with the exception of forest roads and prepared hiking trails with interpretation content
- There are developed hiking trails, on natural surface, with trail markings, signposts, information and interpretation content (e.g., panels, small-scale interpretation equipment, *beacon* transmitters, etc.), viewpoints and nature appreciation stops that do not disturb the overall experience of naturalness
- Trails are at medium-difficulty level in fitness terms, and touring them does not require any particular mountaineering experience, equipment (with the exception of appropriate footwear and clothes) or physical readiness
- The area is easily accessible; medium level of self-reliance
- Trail length - maximum 9 km
- Maximum distance from tourist service zone is 6 km

### INDICATORS AND STANDARDS

- Presence and state of conservation of significant species and habitats (monitoring of biodiversity points to good conservation status)
- Noise level from unnatural sources, including visitors (noise not present or negligible 70% of the time)
- Number of traces of illicit behavior: improvised trails (none present), traces of fire, damaged trees or visitation equipment, waste, traces of defecation (traces not present or sporadic)
- Level of trail use (width, how trodden is the path) (only surface-beaten trail up to 1 meter wide)

### SOCIAL CONDITIONS

- Individual visitors or small groups with or without a guide; hikers only
- Occasional encounters with other people; more frequent encounters possible in high season

### INDICATORS AND STANDARDS

- Encounter with other visitors on the trail (80-percent probability of not more than 5 encounters with other visitors during the tour)

## MANAGEMENT CONDITIONS

- Rules of conduct are applicable along the trail, and the visitors are informed about these rules, as well as about the trail difficulty level prior to entry (via the website, when purchasing tickets, or at trail entrances at the latest). These rules of conduct are as follows: movement is permitted only along the trails, with possible stops at interpretation points or nature appreciation points; recommended direction of movement is enforced (for the purposes of interpretation flow and decreased number of encounters); use of bicycles and motor vehicles is not allowed; pets are not allowed; trails are open for visitors only during defined time periods in a day; limitations concerning trail use are enforced depending on weather conditions and the season; recommendations are in place concerning appropriate footwear and clothes, water, etc.; „leave no trace“ policy
- Warnings are provided to visitors at trail endpoints concerning trail difficulty level, needed equipment, etc.
- Probability of encountering rangers and other Park staff is high
- Possibility of guided tours with additional interpretation
- No organized transport
- Ensured assistance in response to call in case of accident

## INDICATORS AND STANDARDS

- Number of visitors per day (only monitoring should be ensured in the beginning of Plan implementation; the standard will be defined as needed based on implementation experiences)
- Presence of rangers and other Park staff (at least one ranger or another official constantly present on the trail in times when the trail is open for visitors)
- Number of interventions due to injury or visitors getting lost (only monitoring should be ensured in the beginning of Plan implementation; the standard will be defined as needed based on implementation experiences)
- Response time in case of accident (1 lifeguard team on duty available for the entire Park during the visitation season; response time in case of call: up to 4 hours on any trail section within this class)
- Visitor satisfaction with the experience of nature by encountering wildlife, noticing trails of wild animals, etc.; with information received prior to entering the trail; with the quality of trail markings; with the level of disturbance caused by other visitors (individual satisfaction scores for each surveyed element are higher than 8 on a scale from 1 to 10)



## CLASS III



### KEY ELEMENTS OF EXPERIENCE

- Exhilaration with outstanding nature - the „wow effect“
- Direct experience and feeling of pristine nature, in particular water („crispy air“)
- Connecting with other people by sharing the experience of exhilaration with nature
- Opportunity for active and passive learning about outstanding universal values of the Park recognized as UNESCO World Heritage Site;
- Feeling of pleasure and safety; opportunity for light recreation, walking and spending time in nature - low level of self-reliance

### BIOPHYSICAL CONDITIONS

- Conserved water ecosystem and natural landscape with outstanding universal values of the lake zone, with minimal disruption due to visitor infrastructure that fits well into the landscape
- Built trails, boardwalks, docks and nature appreciation points are present in the area, with minimal impact on nature (including no static damage risk for tufa barriers), harmonized with the existing visual identity, without any facilities that would ruin natural landscapes and views. Signalization and prohibition signs (regulation) are frequent but unobtrusive, and guide the visitors through independent touring. Electric boats and rowing boats may be present in the area.
- Interpretation and information content elements are present in the area, but to a lesser degree, and on locations where they do not interfere with the experience. Short educational trails with educational content may be arranged within the class, in boundary areas, outside of the core lake zone with the highest visitation density.
- Other elements of the touring system are visible from the trail (*cross-viewing*) - minimal distance to another trail visible to visitors is 200 m
- Trail difficulty level is low to medium, with trails ranging from those suitable for visitors with mobility impairments to trails with medium difficulty level that do not require special mountaineering experience, equipment or physical fitness
- The area is easily accessible; low level of self-reliance. HORECA service zones are present in the outer area of this class.
- Maximum distance from tourist service zone is 3 km

### INDICATORS AND STANDARDS

- Conservation status of aquatic ecosystem and presence of key species (monitoring of biodiversity points to good conservation status)
- Impact of visitor infrastructure on tufa barrier statics (there are no noticeable changes in barrier statics) and soil erosion from trails into the lakes (no erosion present)
- Presence of panoramic vehicles and boats (current number of panoramic vehicles and boats, with harmonization of their capacity)
- Presence of rowing boats (on Lake Kozjak) (maximum 12 boats; impact on birds and on experience of other visitors should be examined, and seasonal differences in use should be defined depending on bird nesting, etc.)
- Number of traces of illicit behavior: visitors leaving the trail; widening of trails; improvised trails; traces of fire (none present); damaged trees or visitation equipment (damage not present or sporadic); waste (potentially visible on occasion, but not older than one day, with frequency of occurrence lower than 1% of the number of visitors per day)

## SOCIAL CONDITIONS

- Very frequent presence of other visitors nearby, or permanent presence in high season, but without congestion along the trail
- Possible short waits when boarding the boat or panoramic vehicle

## INDICATORS AND STANDARDS

- Number of visitors in one trail segment (standard to be defined by monitoring congestion spots and by comparison with the number of visitors entering per hour)
- Number of persons at one time (PAOT) in nature appreciation points (standard to be defined by monitoring the number of visitors and time spent on site; needs for additional nature appreciation points to be defined)
- Waiting time when boarding the boat or panoramic vehicle (20 minutes maximum)
- Number of people at individual information panel along the educational trail (surveys showing that people do not feel crowded and that they had sufficient available time and space to use interpretation content)

## MANAGEMENT CONDITIONS

- Visitors are informed about rules of visitation and methods of booking and purchasing tickets in a timely manner
- Movement and behavior of visitors within the visitation system are highly regulated and organized; there are restrictions and rules that the visitors are informed about prior to entry (via the web or when purchasing tickets), at the entrances and within the visitation system. Rules and restrictions include the following: limited maximum number of entries per hour; compulsory movement along defined trails, with possible stops at nature appreciation points; compulsory direction of movement is enforced (unidirectional movement established in order to avoid congestion and visitors bypassing each other in opposite directions); trails are open for visitors only during defined time periods in a day; changes of rules concerning trail use are possible depending on weather conditions and the season; recommendations are in place concerning appropriate footwear and clothes, water, etc.; use of bicycles and motor vehicles is not allowed; pets are not allowed; „leave no trace“ policy
- There is organized transport by boats and panoramic vehicles
- Part of the visitation system is adapted for wheelchair users and strollers
- Warnings are provided to visitors at trail entrances concerning trail difficulty level, needed equipment, etc.
- Trail safety is ensured according to design and regularly maintained
- Frequent encounters with rangers and other Park staff
- Possibility of guided educational tours outside of the peak season or along educational trails outside of the core lake zone with the highest visitation density
- Defined rules in connection with group visits (number and size of groups, method of guided tours for groups of visitors)
- Ensured assistance in response to call in case of accident

## INDICATORS AND STANDARDS

- Number of visitors entering per hour (standard to be defined by status monitoring with testing of system capacity per hour with a defined number of visitors; number of visitors entering per hour and per entrance point to be defined depending on season)
- Presence of rangers and other Park staff (at least one ranger or another official present at each critical point (waiting points, locations with higher visitor density, locations where rules are frequently violated) in times when the trail is open for visitors)
- Number of warnings issued to visitors by rangers or other Park staff for disobeying rules of conduct (number of occurrences lower than 1% of the number of visitors per day)
- Number of interventions due to injury or visitors getting lost (only monitoring should be ensured in the beginning of Plan implementation; the standard will be defined as needed based on implementation experiences)
- Response time in case of accident (1 lifeguard team on duty available for the entire Park during the visitation season; response time in case of call: up to 2 hours on any trail section within this class)
- Visitor satisfaction with the experience - according to elements of the existing Visitor Questionnaire (individual satisfaction scores for each surveyed element are higher than 8 on a scale from 1 to 10)

## CLASS IV



### KEY ELEMENTS OF EXPERIENCE

- Experience of the ambiance of traditional settlements and architecture
- Experience of various modes of coexistence of man and nature, modes of land use (agricultural land, gardens, crofts, grasslands, traditional varieties and breeds) and crafts (sawmills, mills, shingles, ...)
- Getting to know the way of life in this area by communicating with the local population
- Accommodation and other HORECA services in tourist family farms or in traditional family accommodation; rest and relaxation
- Possibility to purchase local products directly from producers („at the doorstep“)
- Learning about cultural heritage and other values of the area

### BIOPHYSICAL CONDITIONS

- Small traditional settlements (widely spread), with conserved traditional rural landscape; traditional gardens, orchards, crofts, fences (braided brushwood), hedges, facilities for traditional crafts (mills, sawmills, etc.); agriculture and semi-natural habitats (grasslands) are present in favorable conservation status
- **OR** other conserved cultural heritage facilities and localities
- **OR** living (permanently inhabited) settlements
- There are no facilities or economic activities that would substantially harm the ambiance
- Interpretive content and informative signalization (signposts, information panels and interpretation of main attractions) may be present; Educational trails corresponding in their infrastructure and difficulty level to trails present in ROS class II may also be present
- There are public roads in the area

### INDICATORS AND STANDARDS

- Share of houses with preserved traditional elements (architecture, crofts, agricultural land, traditional craft facilities) (at least one third of the houses per settlement)
- **OR** conserved cultural landscape of grasslands (there are no facilities or economic activities that would substantially harm the ambiance)
- **OR** presence of other conserved cultural heritage facilities and localities (at least one presented cultural heritage facility/locality)
- **OR** share of households (including ruins) that are uninhabited (not more than one third of the settlement)
- Number of traces of illicit behavior: damaged infrastructure or cultural heritage facilities (no traces present)

## SOCIAL CONDITIONS

- Presence of population engaged in agriculture in accordance with biodiversity conservation, or in traditional crafts
- **OR** presence of authentic local way of life
- Offer of traditional products and HORECA services
- Possible public events and gatherings (local markets, fairs, Cheese Days, Days of Wild Garlic, traditional festivities, etc.)
- Presence of visitors is such that it does not harm the experience of ambiance of a living traditional settlement

## INDICATORS AND STANDARDS

- Number of active traditional agricultural households or traditional crafts in the settlement (at least 20% of households)
- **OR** share of permanently inhabited households (at least 70% of permanently inhabited households per settlement)
- Share of households offering traditional food made of locally produced foodstuffs or selling traditional products at their doorstep or offering other complementary tourism content (at least 20% of households)

## MANAGEMENT CONDITIONS

- Respecting private ownership and conditions set by the local population, as well as customs
- **OR** respecting the rules of conduct for visiting cultural heritage facilities and localities
- Ensured organized transport and/or parking places
- Possibility of guided tours

## INDICATORS AND STANDARDS

- Annual number of visitors (only monitoring should be ensured in the beginning of Plan implementation; the standard will be defined as needed based on implementation experiences)
- Number of complaints of the local population in connection with the presence of visitors (less than 30% of population has complaints)
- Visitor satisfaction with the experience (total satisfaction score on the basis of visitor survey is higher than 8 on a scale from 1 to 10)

## CLASS V



### KEY ELEMENTS OF EXPERIENCE

- Entry into the Park; first contact with the Park; feeling of welcome in contacts with staff; creation of expectations in connection with Park visit
- Receiving information and messages (rules of conduct, information about the wider area, entire offer of the Park, etc.)
- Availability of tourism services; low level of self-reliance; rest
- Indirect experience of Park values and of the purpose of the protected area through presentation center, information points, etc.
- Experiencing tradition and identity of the area through the offer of HORECA facilities (hotels, camping sites, restaurants) and souvenir shops
- Meeting people from different cultures

### BIOPHYSICAL CONDITIONS

- Substantially altered natural ambiance with built trails, roads and large facilities
- High architectural quality of facilities and horticultural design that fit well into the landscape, founded upon cultural heritage and identity of the area, with the design and technological solutions that ensure minimal impact on landscape, nature and environment while respecting unique features of the area

### INDICATORS AND STANDARDS

- Number of traces of illicit behavior: improvised trails; damaged infrastructure; waste (only monitoring and regular maintenance should be ensured in the beginning of Plan implementation; the standard will be defined as needed based on implementation experiences)
- Construction development level (planned long-term growth of construction development level of the area does not exceed x% of the current built-up surface (to be determined through discussions as part of the process of changes and amendments to the Physical Plan for Areas with Specific Features))

### SOCIAL CONDITIONS

- Highly motivated, cordial and professional Park staff, available to visitors in the entire area
- HORECA offer is unique and recognizable, and founded upon natural and cultural heritage of the area and its long tourism tradition, coupled with high quality of HORECA services
- Constant presence of other visitors in the vicinity, but without congestion; short waits for certain services are possible (visitor center, restaurants, etc.)

### INDICATORS AND STANDARDS

- Share of facilities owned by the Public Institution offering some form of local products (at least 50% of facilities)
- Number of cultural events held in Public Institution facilities (at least one event per week during peak visitation season)
- Share of souvenirs in souvenir shop offer that are founded upon the local tradition (at least 20% of souvenirs on offer)
- Number of visitors visiting the presentation center (usage of visitor center exceeds 75% of its capacity)
- Visitor satisfaction with the availability of information, cordiality and professionalism of staff, HORECA services, experiences in the visitor center, souvenir offer, waiting time for entry into the Park, waiting time for toilet facilities (individual satisfaction scores for each surveyed element are higher than 8 on a scale from 1 to 10)



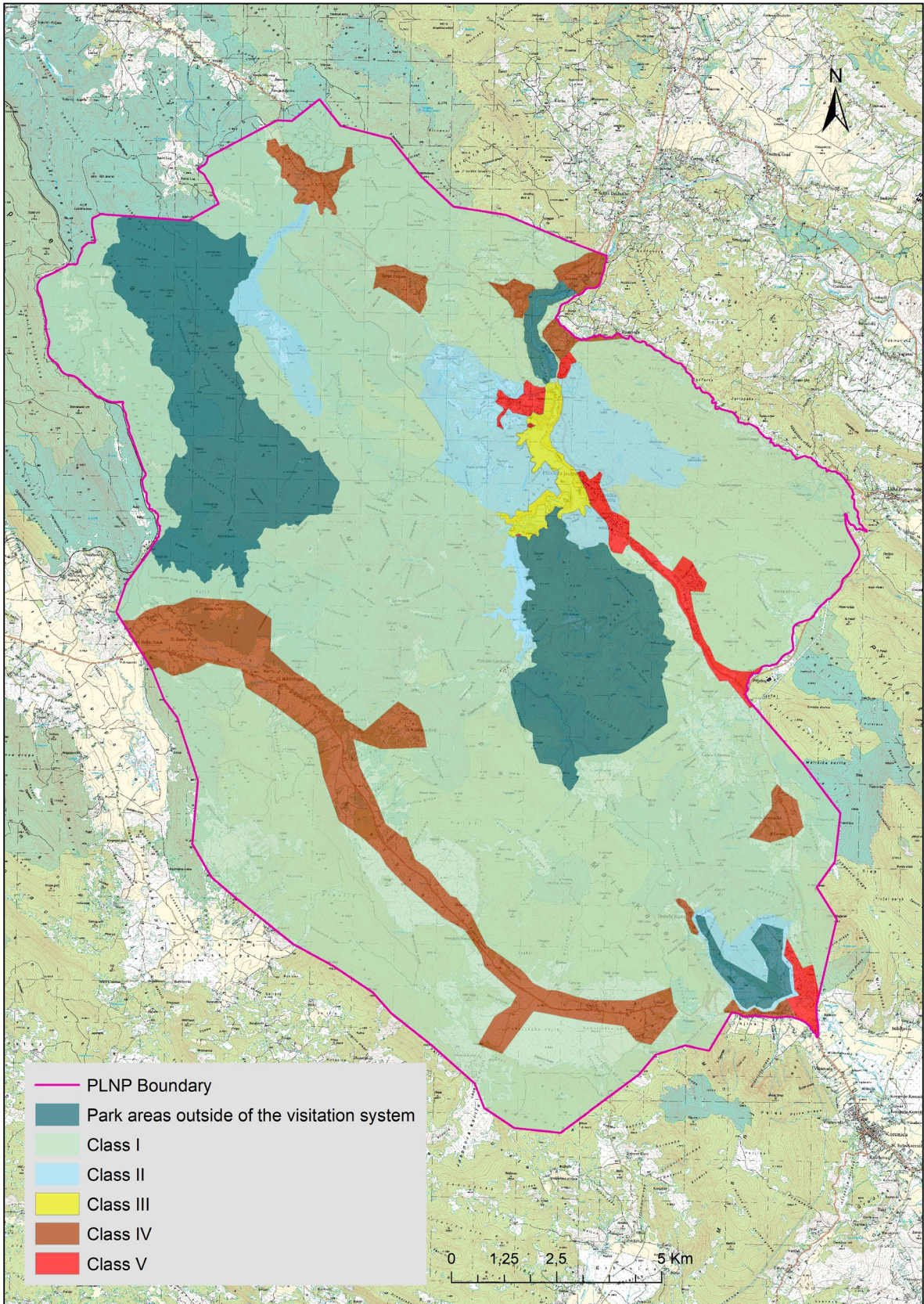
## MANAGEMENT CONDITIONS

- High level of rules / regulation for usage of all services
- Adequate level of organization, capacity and equipment of Park entrance points, parking lots, signalization and information points
- Adequate level of organization, capacity and equipment of presentation centers, HORECA facilities and souvenir shops
- Suitability of facilities and content for various needs of visitors, including children, visitors with disabilities, etc.
  -
- entertainment and education offer for children is present at most locations in the class; access to visitors with mobility impairments is enabled for most facilities and content on offer
- Pets are allowed (with the exception of interior of Public Institution facilities)
- Sufficient capacity of services is available throughout the year

## INDICATORS AND STANDARDS

- Impact of facilities on environment and nature (at least 70% of facilities have eco-certificates)
- Number of daily inquiries in connection with finding certain content in the area (not more than 10% of visitors asking the same question)
- Traffic congestion and illegal parking (none present)
- Number of vehicles in parking lot (and parking time of vehicles) (at least 5% of free parking spaces in parking lot)
- Categorization of HORECA facilities (minimum facility category: 3 stars)
- Number of warnings issued to visitors by rangers or other Park staff for disobeying the rules of conduct (no more than x? warnings per day)

5.16.2 Allocation of ROS classes within the Park









# PLITVIČKA JEZERA

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