Investor: WORLD BANK

Clients: AGENCY FOR WATERSHED OF ADRIATIC SEA MOSTAR

FEDERAL MINISTRY OF AGRICULTURE, WATER MANAGEMENT AND FORESTRY

Contractor: ecoplan

Subconsultant: elektroprojekt Established 1949

THE HUTOVO BLATO NATURE PARK

MANAGEMENT PLAN

Management Plan
Multidisciplinary design
L53.00.01
2014

elektroprojekt Established 1949

AREA OF SPECIAL FEATURES FOR THE AREA OF IMPORTANCE FOR THE HERZEGOVINA-NERETVA CANTON „THE HUTOVO BLATO NATURE PARK“

~ MANAGEMENT PLAN~

Mostar, Zagreb
June 2014

AREA OF SPECIAL FEATURES FOR THE AREA OF IMPORTANCE FOR THE HERZEGOVINA-NERETVA CANTON

„THE HUTOVO BLATO NATURE PARK“

~ MANAGEMENT PLAN ~

INVESTOR:	**WORLD BANK**
CLIENTS:	**AGENCY FOR WATERSHED OF ADRIATIC SEA MOSTAR (through FPIT) &** **FEDERAL MINISTRY OF AGRICULTURE, WATER MANAGEMENT AND FORESTRY**
CONTRACTOR:	**ecoplan d.o.o. Mostar** Dr Ante Starčevića, bb 88 000 Mostar Tel/fax: +387 36 397-400; 397-410 e-mail: eco-plan@eco-plan.ba website: www:ecoplan.ba
RESPONSIBLE PARTY FOR THE COMPILATION OF THE MANAGEMENT PLAN THROUGH A SUBCONSULTATION CONTRACT:	**ELEKTROPROJEKT** **Consulting Engineers** Alexandera von Humboldta 4, 10 000, Zagreb Tel: +385 1 6307 777 Fax: +385 1 6152 685 e-mail: ured.gd@elektroprojekt.hr website: www:elektroprojekt.hr

EXPERT TEAM

Project leader:	mr.sc. Zlatko Pletikapić, dipl.ing.građ.
Project engineers:	dr.sc. Stjepan Mišetić, prof.biol. Iva Vidaković, prof.biol. mr.sc. Zlatko Pletikapić, dipl.ing.građ. Alen Kereković, dipl.ing.geol.
Prepared by:	dr.sc. Ivan Vučković, dipl.ing.biol. Mirela Šetka Prlić, dipl.ing.građ. Mladen Plantak, mag.geogr. Dragutin Mrđan, struč.spec.ing.org. Jakov Dulčić, dipl.biol. Krešimir Kuštrak, mag.ing.aedif. dr.sc. Ferdo Bašić, dipl.ing.agr. Marta Srebočan, mag.oecol./prot.nat. Koni Čargonja-Reicher, gipl.ing.građ. Luka Goja, ing.građ.
PROJECT NO.:	L53.00.01
CONTRACT NO.:	I-205-266/12
GENERAL MANAGER **„Ecoplan“ d.o.o. MOSTAR**	dr.sc. Borislav Puljić, dipl.ing.arh

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Table of Contents

1 INTRODUCTION

1.1 FOREWORD

'If there is no general Management Plan, preservation, development and use activities in a park will occur in a haphazard basis, often in response to political pressures with little consideration as to the implications for the future. The result is likely to be lost opportunities and irreversible damage to park resources and values' (Young and Young 1993).

The Hutovo Blato Nature Park is situated on the left side of the Neretva River valley, in the territory of Municipalities of Čapljina and Stolac, North-East Herzegovina. The Hutovo Blato Nature Park was designated a nature park in 1995. It encompasses surface area of 7,411 hectares. A Public Enterprise Nature Park Hutovo Blato was established in 1995.

The Hutovo Blato Nature Park Management Plan preparations run in parallel with the development of the Hutovo Blato Nature Park Physical Plan (Eco Plan d.o.o. Mostar). Both Plans are prepared under the same contract, within the Neretva and Trebišnjica River Basin Management Project for which Bosnia and Herzegovina and the Republic of Croatia received the grant by the World Bank, namely by its foundation "Global Environment Facility" (GEF) for the preparation of documentation and implementation of priority activities and measures.

Project: The Neretva and Trebišnjica River Basin Management Project GEF Trust fund grant No. TF091969

Contract: Development of a Physical Plan and Management Plan for the Hutovo Blato Nature Park No. BA-FPIT-NTMP-GEF-QCBS-CS-11-04

Clients: Agency for Watershed of Adriatic Sea Mostar (through FPIT – Federal Project Implementation Team)
Federal Ministry of Agriculture, Water Management and Forestry

1.2 DEVELOPERS AND ACKNOWLEDGEMENTS

Document developers: Eco Plan d.o.o. Mostar
Elektroprojekt Consulting Engineers Zagreb

Name and surname	Company	Expertise / Section covered
Zlatko Pletikapić	EPZ	Zoning, vision, objectives, measures
Iva Vidaković	EPZ	Action plans, natural characteristics
Stjepan Mišetić	EPZ	Biology/ecology of species
Mirela Šetka Prlić	Eco plan	Physical planning
Ivan Vučković	EPZ	Water quality
Alan Kereković	EPZ	Geology
Marta Srebočan	EPZ	Flora and fauna
Ferdo Bašić	EPZ	Pedology
Jakov Dulčić	EPZ	Ichthyofauna, protection measures

Acknowledgements: Public Enterprise Nature Park Hutovo Blato, Federal Ministry of Agriculture, Water Management and Forestry, Agency for Watershed of Adriatic Sea Mostar, World Bank.

1.3 GENERAL DATA

1.3.1 Basic Information about the Nature Park

State:	Bosnia and Herzegovina
Protected area:	Hutovo Blato
Protection category:	Nature park / Ramsar site
Geographic coordinates:	17° 43' - 17°31 E 43° 00' - 43°06 N
Area:	7,411 ha (*)
Brief description:	Hutovo Blato encompasses wetland, lakes and rivers that provide good conditions for survival of numerous species living in wetlands, and ensure permanent habitats for numerous endangered species. This area is a significant nesting site for the migratory birds on their way from northern and central Europe towards Africa, which use this area to rest, feed and satisfy other needs. The birds use this area during the periods of migration, but also for wintering or permanently, as a habitat for some endangered species. The Hutovo Blato Nature Park was established in 1995. Total 2,050 ha is under strict and active protection, and about 5,750 ha is under active development regime. (**) The Spatial Analysis expanded the area under consideration for approximately 5,800 ha. (***)
Protection designation documents:	Decree on Designation (Official Journal of HR HB No. 13/95) Act on the Hutovo Blato Nature Park (in enactment)
Relevant planning documents:	Physical Plan for Areas of Special Features for the Area of Importance for the Herzegovina-Neretva Canton - the Hutovo Blato Nature Park – 2013-2023
Responsible institution:	Herzegovina-Neretva Canton, Agency for Watershed of Adriatic Sea Mostar
Management:	Public Enterprise Hutovo Blato Nature Park, Čapljina (Official Journal of HR HB No. 45/95), established by the Herzegovina-Neretva Canton Assembly
Public enterprise founded:	In 1995 by a Decision of the Government of HR HB (Official Journal of HR HB No. 45/95)
Contact:	Address: Karaotok bb, 88307 Višići Herzegovina-Neretva Canton, Bosnia and Herzegovina Manager: Nikola Zovko E-mail: info@hutovo-blato.ba, nikola.zovko.karaotok@tel.net.ba Tel: +387 36 814 716 Fax: +387 36 814 715

Note: (*) Nature Park area acc. to the designation documents
(**) Nature Park area acc. to the georeferenced maps is about 400 ha larger than the designated area
(***) Buffer zone

1.3.2 National and International Importance

1.3.2.1 National importance

Hutovo Blato is one of two nature parks in Bosnia and Herzegovina. It encompasses 8.05% of all areas under the state protection in Bosnia and Herzegovina, i.e. 10.4% of total area of all protected areas in Federation of Bosnia and Herzegovina. Hutovo blato is also on the "Temporary list of national monuments of Bosnia and Herzegovina" registered in 2002.

Table 1.1: Protected areas in Bosnia and Herzegovina

No	Name	Area (ha)
National parks		
1	Sutjeska (RS)	17,250.00
2	Kozara (RS)	3,494.00
3	Una (FB&H)	19,800.00
Natural monuments		
4	Skakavac (FB&H)	1,430.70
5	Prokoško lake (FB&H)	2,119.00
6	Vrelo Bosne (FB&H)	603.00
7	Tajan (FB&H)	3,591.35
Nature parks		
8	Hutovo Blato (FB&H)	7,411.00
9	Blidinje (FB&H)	35,800.00
Protected landscapes		
10	Bijambare (FB&H)	367.36
11	Bembaša (FB&H)	147.70
	Total:	**92,014.11**

1.3.2.2 International importance

RAMSAR: Hutovo Blato has been recognized as a wetland of international importance and entered on the Ramsar list on 24 September 2001. The Ramsar Convention[1] was signed in February 1971 in the City of Ramsar in Iran, and it came into force in 1975. The Convention's mission is the conservation and wise use of all wetlands (primarily as bird habitats) through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world. The Ramsar Convention is not a part of United Nations and UNESCO systems of environmental conventions and treaties, thus its accountability goes only to the Conference of the Contracting Parties (COP), and its daily administration is entrusted to the secretariat overseen by the Standing Committee elected by the COP. The Ramsar Secretariat is housed by the IUCN - the International Union for the Conservation of Nature in its headquarters building in Gland, Switzerland.

[1] For original tekst of the Convention with all other key documents please visit http://www.ramsar.org/cda/en/ramsar-documents-texts/main/ramsar/1-31-38_4000_0__.
The convention in local language is available from:
http://www.mvteo.gov.ba/org_struktura/sektor_prirodni_resursi/odjel_zastita_okolisa/Konvencije_i_sporazumi/Ratifikovane_od_BiH/Archive.aspx?template_id=17&pageIndex=1

Important Bird and Biodiversity Areas – IBAs: The International Council for Bird Preservation (ICBP) enlisted Hutovo Blato as an internationally important bird habitat in 1998. The IBAs are key areas for preservation, sufficiently small to be preserved in their entirety, and frequently already included into a network of protected areas. They meet one (or more) of the below criteria:

1. The site regularly holds significant numbers of one or more globally threatened species,
2. The site combined with other sites holds a significant component of the restricted-range species or species whose breeding distributions are largely or wholly confined to one biome,
3. The site holds a significant number of migratory and congregatory bird species.

Within IBA, two wetland-dependent threatened bird species have been recognized which regularly appear in Hutovo Blato in significant numbers. These are *Aythya nyroca* (ferruginous duck) and *Phalacrocorax pygmeus* (pygmy cormorant).

Figure 1.1: *Aythya nyroca* (ferruginous duck)

Figure 1.2: *Phalacrocorax pygmeus* (pygmy cormorant)

Transboundary: Hutovo Blato belongs to the Neretva River Delta, which is of transboundary nature and importance (Figure 1.3). The Delta encompasses 30 km long reach of the Neretva River, from Hutovo Blato to the confluence. The lower Neretva valley occupies about 20,000 ha, of which 37% belongs to Hutovo Blato and 63% to the Neretva Delta. These two sites are equal considering ecological aspects, and the same birds use both sites during migration, wintering and mating.

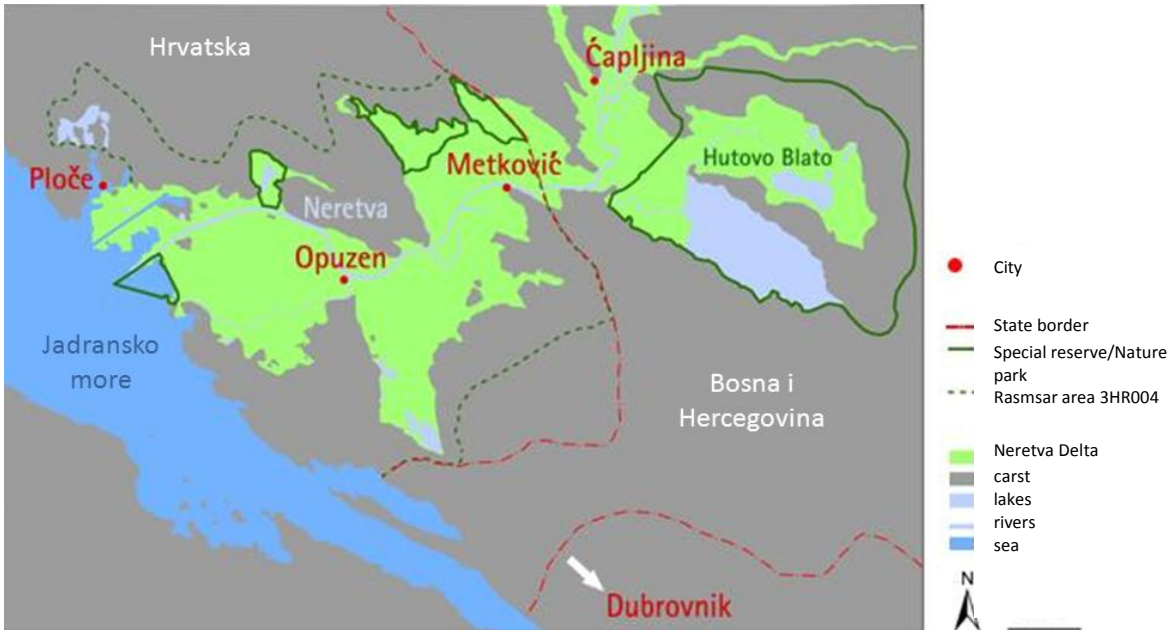


Figure 1.3: The Neretva Delta, (courtesy www.euronatur.org © Borut Stumberger, Kerstin Sauer) Adapted by EPZ.

1.4 MANAGEMENT VISION

Vision for protection of Hutovo Blato within the designated nature park area has been developed for decades, as a reaction from local population which has always been aware of value of the space they live in, and as response of scientific and professional community to threats that have started impairing its essential natural features.

It could generally be considered that realization of this vision started with designating of the Blato Nature Park. It should not, however, be neglected that the designation had been preceded by considerable encouragement from both local population and scientific and professional community aware of specific geomorphological, geological, hydrological and biological characteristics of this area who are still pro-actively involved in its preservation.

Therefore, the below could be accepted as a clear vision of the protection and conservation of the Hutovo Blato Nature Park:

***Hutovo Blato** is a Ramsar site in which the Neretva River transits from its canyon reach into the delta area, unique for its specific geomorphological, geological, hydrological, biological and landscape characteristics, significant for archaeological sites and economically valuable for the local population and greater region.*
Conservation and preservation of these characteristics and valuable assets for the present and future generations relies on setting up of high and exemplary standards of the environmental management and creation of a baseline for survival and development of local community as the only safeguard of the Hutovo Blato sustainability and its protection against external impacts.

The initial, namely priority steps towards realization of this vision are:

- Hutovo Blato Nature Park Public Enterprise capacity building.
- Adopting of the Draft Spatial Analysis for the Physical Plan for Areas with Special Features for the Area of Importance for the Herzegovina-Neretva Canton - the Hutovo Blato Nature Park – 2013-2023 and preparation of the Physical Plan which will determine future land-use within the Nature Park boundaries and earmark the sites and corridors for the future development respecting the requirements for protection of the existing assets.
- Drafting and adopting of the Protected Area Management Plan as the baseline document the Public Enterprise to be used for gradual realization of the vision.

The Management Plan is prepared so that each topic presented in the document focuses on resolving of actual issues, offering practical information and ensuring long-term sustainability of institutions, and planning, implementation and monitoring processes in the Nature Park management.

1.5 MANAGEMENT PLAN DEVELOPMENT GOAL AND PURPOSE

In line with the vision of the Hutovo Blato Nature Park protected area management, the management goal would be:

To ensure comprehensible guidelines for future management of this valuable space, while steering its management authority towards implementation of activities related to conservation, use and management of the existing natural resources, protection and preservation of valuable cultural and historical heritage, respecting and harmonization of the local community needs with the requirements for protection of valuable spatial assets, and towards an overall mitigation of external pressures and risk management of uncontrolled changes.

Realization of a long-term vision and management goal for any protected area is elaborated in the so called Protected Area Management Plan.

The Hutovo Blato Nature Park Management Plan clearly identifies:

- Vision and mission of the Hutovo Blato Nature Park,
- Long-term objectives,
- Policies, measures and activities for achieving of objectives,
- Monitoring method of the plan implementation and state of nature in the Hutovo Blato Nature Park
- Hutovo Blato Nature Park organization management, and
- Financing of Hutovo Blato Nature Park management,

respecting the key purposes of the protected areas:

- Scientific research,
- Wildlife protection,
- Preservation of species and genetic diversity,
- Providing of environmental protection services
- Protection of specific natural and cultural features,
- Tourism and recreation,
- Education,
- Sustainable use of natural ecosystems, and
- Maintenance of cultural and traditional features.

The Management Plan is one of documents essential for management of any protected area. In addition to the fact that such plan gives and overview of relevant knowledge on the natural value of the protected area, its well elaborated vision and set up objectives should result in its implementation through action plans covering 10-year period.

The Management Plan has to contain basic information and guidelines for protection and sustainable use of the area including, in particular, interests of the local community when they rely on traditional activities and various tourist activities. A particularly important part of the Management Plan is the one related to harmonization of interests of all stakeholders (users of the space) with the nature protection requirements and conditions, and the part that covers their education and education of visitors.

1.6 NATURE PARK ESTABLISHMENT GOALS AND PROTECTION CATEGORIES

Hutovo Blato was designated a nature park in 1995. This is the last remnant of a wetland in the river basin of the lower Neretva River course in Bosnia and Herzegovina that encompasses an area of 7,411 hectares. Generally, this area is valuable for preservation of an overall landscape and biological diversity of Europe, particularly because of:

- its importance for migrations and survival of numerous bird species,
- diversity of its vegetation which is unique because of the vicinity of the Adriatic Sea and abundance of water surrounded by karst mountain land,
- its specific geomorphological and hydromorphological characteristics since it is, together with the Neretva Delta, a rare remnant of a wetland in the Mediterranean, and a rare remnant of a wetland in karst.

Therefore, the following objectives should be achieved by placing of Hutovo Blato into the nature park category:

- Preservation of water regime in line with the requirements for preservation of ecological processes, biodiversity and specific features of the area under consideration;
- Conservation of ecosystem and specific animal and plant habitats;
- Enabling scientific research and education;
- Enabling recreational use and development of tourist industry;
- Supporting local population in protection of traditional values;
- Enabling economic development of the local community.

IUCN protection areas categories

These objectives are in line with standards set up by the International Union for Conservation of Nature (IUCN), which recognizes six categories of protected area management (Table 1.2.).

Although in principle one protected area corresponds with one protection category, an area zoning is sometimes necessary (this particularly applies to inland waters, aquatic and wetland habitat protection areas) and determination of several protection categories within a subdivided area, so that protection levels and allowed human activities within them could be determined.

This is the case with the Hutovo Blato area, where several protection and management zones are determined because of exceptional sensitivity of the ecosystem and the local community need for sustainable development.

Table 1.2: IUCN protected areas categories by management system (1994)

Category	Description
Ia **Ib**	Strict Nature Reserve: Protected areas managed for scientific research Wilderness Area: Protected areas managed so as to preserve their natural condition.
II	National Park: Protected areas managed mostly in order to protect ecosystems and enable recreational activities.
III	Natural Monument or Feature: Protected areas managed mainly in order to preserve specific natural features.
IV	Habitat/Species Management Area: Protected areas managed for their conservation, subject to management intervention
V	Protected Landscape/Seascape: Protected areas managed mainly for their conservation.
VI	Protected area with sustainable use of natural resources: Protected areas managed mainly for sustainable use of natural ecosystems.

Ramsar sites may have all the IUCN protection categories, thus the Hutovo Blato that is protected under the Ramsar Convention may also have all the IUCN protected areas categories (Table 1.3).

Table 1.3 Compatibility of Ramsar site protection and IUCN protection categories

Protected area type	Compatibility with protected area category							Area
	Ia	Ib	II	III	IV	V	VI	
Recognized by international convention or program:								
Ramsar site	✓	✓	✓	✓	✓	✓	✓	Hutovo Blato

Protected area categories acc. to the Nature Protection Act (Official Gazette of FB&H 66/13)

According to Article 134 of the Nature Protection Act (Official Gazette of FB&H 66/13), natural assets protection categories are as follows:

Table 1.4: Protected areas categories acc. to the Nature Protection Act (Official Gazette of FB&H 66/13)

Category	Description
Ia	Strict nature reserve
Ib	Wilderness area
II	National park
IIIa	Nature park
IIIb	Natural monument or feature
IV	Habitat/species management area
V	a) Protected - Landscapes - Seascapes b) Regional park
VI	Protected area with sustainable use of natural resources

1.7 MANAGEMENT CONDITIONS

Area use conditions and limitations

The use conditions and limitations apply exclusively to the area of designated Nature Park which is managed by the responsible Public Enterprise.

The Public Enterprise shall take care of areas outside the Nature Park boundaries that might play a role of buffer zones only by indirect measures of encouraging development of complementary activities, steering the spatial development and ways of land-use, and by education of local population.

Conditions for protection, conservation and sustainable use within the Nature Park are as follows:

Zone 1 – Strict protection zone

The strict protection zone includes areas of outstanding nature whose conservation is very important, which do not require or require only minimum human intervention. Generally, the main purpose of this zone conservation of nature and natural processes. According to the IUCN protection categories system, this category would include categories Ia and Ib, and categories II and III. Such area should include outstanding, special or unique valuable features, such as important historical, geological or geomorphological sites, important habitats, endemic and threatened species. These areas should be dominated by natural processes and no infrastructural development should be allowed.

Therefore, the management goal for these areas is strict control and monitoring of the area state, carrying out of scientific research, aimed at the soonest pinpointing and mitigation of negative factors. The goal also includes response in emergencies.

The strict protection zone may be subdivided into:

- areas where only scientific research and monitoring are allowed (IUCN category Ia);
- areas with minimum human intervention where, in addition to the scientific research and monitoring, only limited visitations are allowed (occasional, limited in time and numbers, only guided visitations with special vehicles) (IUCN category Ib);
- areas where, in addition to the scientific research and monitoring, recreation is allowed to visitors as regulated visits (IUCN category II);
- areas (limited in area) where some specific features are strictly protected (IUCN category III).

Zone 2 – Active protection zone

The zones of active protection include areas of earlier recorded outstanding nature which require human intervention for their protection and conservation or, if necessary, regeneration and revitalisation of earlier natural features. Generally, this category includes the protected areas which would experience change in their important features without the active protection, either by losing biological diversity or by decrease in landscape diversity. This zone should not be allowed for use of resources which does not comply with the protection objectives. These zones also encompass e.g. the areas of extensive use of natural resources by local population (e.g. pastures and meadows, forests and agricultural land). The zones of active protection could be further divided into subzones, depending on the protection objectives for valuable natural features, such as:

- areas important for conservation of individual animal species (ornithofauna, ichthyofauna),
- areas important for conservation of individual plant species and communities,
- areas important for conservation of specific landscape values.

The active protection zones include areas which belong under IUCN category IV (Habitat/species management area) and category V (Protected landscapes/seascapes).

Zone 3 – Active development / use zone

A zone of active development or use is generally a zone of conservation of lower values managed for other reasons important for conservation of the entire protected area. This zone is a sort of compromise between the protected area preservation objectives and its use. The sustainable development principles have to apply in this zone in all traditional economic activities so as not to threaten primary goals of nature protection. The zone of use could be divided according to types and planned use into different subzones:

- populated or urban subzone,
- subzone of traditional agriculture and other traditional economic activities,
- subzone of recreational and tourist infrastructure.

The zones of use fall under IUCN category VI (Protected area with sustainable use of natural resources). Same as for the active protection zone, the use zone management objectives and activities are defined through separate action plans for different subzones. Having in mind the that the zone of use asks for the top level management, it is very important to carefully identify the boundaries and locations of such areas.

Zone 4 – Transition / protection zone

The transition zones (protection zones) are usually situated in outer edges of a protected area or the ones situated between different zones within the protected areas. They are determined by a need to reduce impact of the surrounding areas outside the protected area on the natural values protected, or by a need to reduce impact of one zone on another zone within the same protected area. Management and control of the outer protection zones could be introduced indirectly, by an agreement with third parties and/or through the physical plans.

Management basis is determined for each zone, e.g.:

- General description and location of the zone
- Management objectives for the zone, including protection level, allowable development, public use
- Relevant strategies to be implemented.

It should be noted that when applying these categories and types of zones on a concrete space, it should never be neglected what is a vision for that space condition in the future so, for example, a space might be placed under a higher protection level regardless of its current state if its future role is important for survival of a valuable habitat or species, provided the compensation measures are envisaged for the space users residing there at that time.

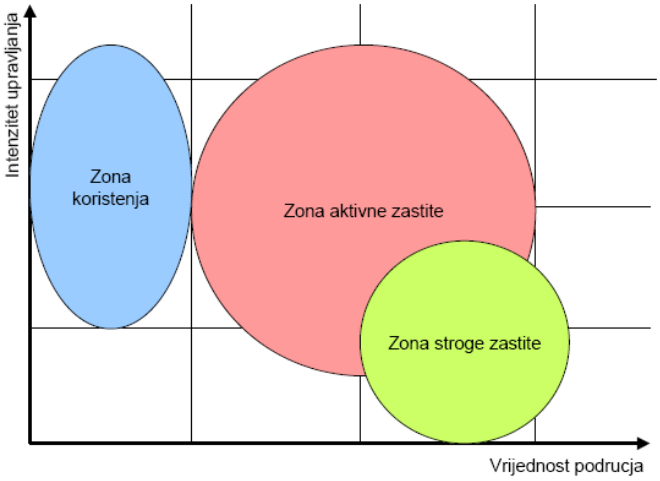
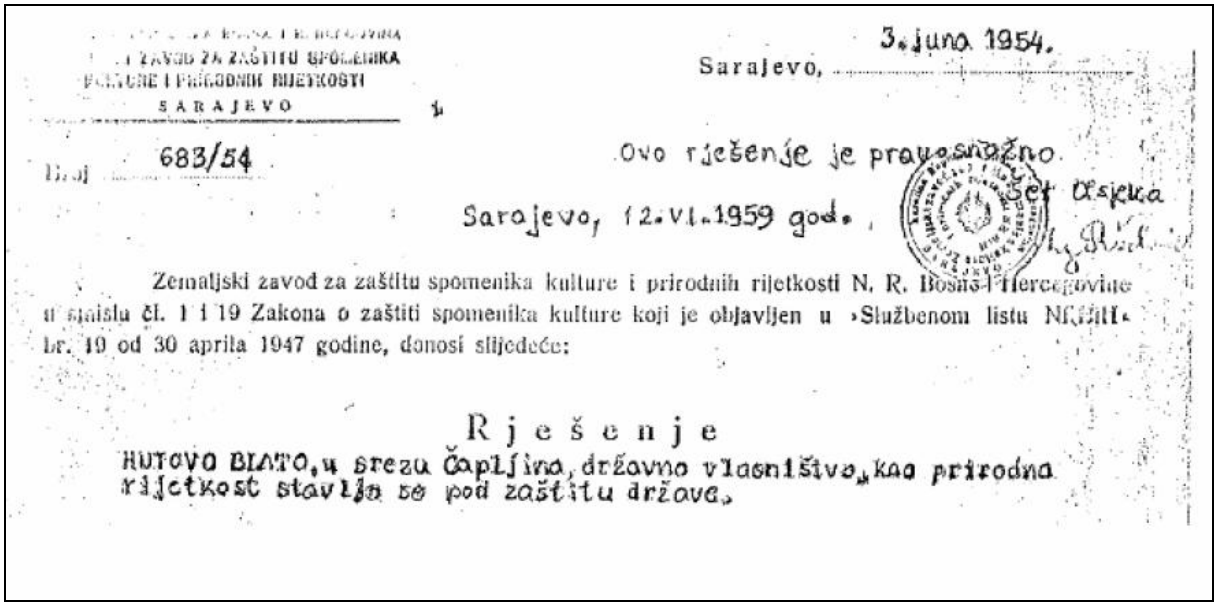


Figure 1.4: Zone management schematic

1.8 LEGAL GROUNDS FOR ESTABLISHING OF PROTECTION AND MANAGEMENT

The Hutovo Blato was protected as rare natural asset already in 1954, and it was designated a Nature Park in 1995 by a Decree on Designation (Official Journal of HRHB No. 13/95). In 2006, the Assembly of the Herzegovina-Neretva Canton (herein below: HN Canton, HNC) Assembly adopted a Decision on Assuming the Rights and Obligations of a Founder of the Public Enterprise Hutovo Blato Nature Park, Karaotok, Čapljina and a Decision on Nature Park Management (Official Journal of HNC No. 2/06). The Nature Park status was also confirmed by Articles 56 and 79 of the Nature Protection Act of the HN Canton (Official Journal of HNC No. 3/05). The protected area is managed by a specialized Public Enterprise Hutovo Blato Nature Park, Karaotok, Čapljina, whose activities are presently limited because of unregulated funding from the state budget.



ZAVOD ZA ZAŠTITU SPOMENIKA
KULTURE I PRIRODNIH RIJETKOSTI
SARAJEVO

Broj 683/54

Sarajevo, 3. juna 1954.

Ovo rješenje je pravosnažno.
Sarajevo, 12.VI.1959 god.
Sekretar odjeka

Zemaljski zavod za zaštitu spomenika kulture i prirodnih rijetkosti N. R. Bosne i Hercegovine
u smislu čl. 1 i 19 Zakona o zaštiti spomenika kulture koji je objavljen u »Službenom listu N[illegible]
br. 19 od 30 aprila 1947 godine, donosi slijedeće:

R j e š e n j e

HUTOVO BLATO, u srezu Čapljina, državno vlasništvo, kao prirodna rijetkost stavlja se pod zaštitu države.

Figure 1.5: Decision of the State Institute for the Protection of Cultural Monuments and Rare Natural Assets in the Hutovo Blato area of 3 June 1954

Further, according to the Nature Protection Act (Official Gazette of FB&H, No. 66/13), the Nature Park falls under category IIIa – protected natural values and features, and Article 138 defines a nature park as a "vast natural or partly cultivated area of land and/or sea with ecological features of cantonal, federal or international importance with strong landscape, educational, cultural, historical, tourist and recreational assets. The nature park is allowed for economic and other activities that do not threat its essential characteristics and role. Method of performing economic activities and use of natural resources in the nature park are regulated by the nature protection requirements."

According to the territorial input data used for water resources management, the Hutovo Blato Nature Park area belongs to the Neretva River basin district, namely to the Adriatic Sea catchment. According to the Water Act of the Federation of Bosnia and Herzegovina (Official Gazette of FB&H, No. 70/06), the Hutovo Blato is a natural lake of the first category, thus management of water resources in the Hutovo Blato area is responsibility of the Agency for Watershed of Adriatic Sea Mostar.

The nature park is a vast natural or partly cultivated area of land and/or sea with ecological features of cantonal, federal or international importance with strong landscape, educational, cultural, historical, tourist and recreational assets.

The nature park is allowed for economic and other activities that do not threat its essential characteristics and role. Method of performing economic activities and use of natural resources in the nature park are regulated by the nature protection requirements.

1.9 PHYSICAL PLANNING REQUIREMENTS

The Physical Plan for areas of special features has been prepared for the Hutovo Blato Nature Park, setting up spatial conditions which are in harmony with the principles and requirements for protection and management of the area. A brief description of harmonization of the spatial conditions with the management requirements is given in the sections below (area description, state assessment, and overview of threats and management solutions).

1.10 PROCESS OF MANAGEMENT PLAN DRAFTING, ENACTMENT AND IMPLEMENTATION

1.10.1 Management Plan Drafting Process

The Management Plan drafting process complies with the internationally adopted approach and standards and guidelines for development of Management Plans issued by the International Union for the Conservation of Nature (IUCN). The process includes setting up a design team which, in addition to the Consultant's representatives, includes experts for specific disciplines. Development of the Management Plan runs simultaneously with the preparation of the Physical Plan for Areas of Special Features for the Area of Importance for the Herzegovina-Neretva Canton - the Hutovo Blato Nature Park (hereinafter: the Physical Plan), and the two documents are in the process of harmonization with each other.

During the drafting process, both the Physical Plan and the Management Plan were entered the standings and opinions of the stakeholders from specific areas, which is useful for better understanding of protection and use issues related to the Hutovo Blato space, and for finding of possible solutions for improvement in management of protected valuable assets. The Physical Plan and Management Plan drafting process involved representatives of the local,

regional and national administration, businesses, local population, academia and NGOs with specific knowledge of the areas encompassed by the Physical Plan and Management Plan, or which are in any way parties interested in participation of their drafting.

Involvement of stakeholders takes place in the following phases of the MP and PP drafting process:

1. Planning preparation
- Defining the team (a multidisciplinary team of different areas expertise)
- Analysis of legislative framework
- Setting of timeline
- Distribution of planning documents (ensuring the whole team has the same information available)

2. Collection of data
- Collecting materials and information
- Biological inventarisation (analysis of available data)
- Examination of literature (considering all existing studies and research papers)
- Socio-economic analysis

3. SWOT Analysis **–** prior to setting the management vision. ← **(workshop / NP staff)**

4. Defining the long-term vision – the plan is made for future use hence it should include a comprehensive vision for the Park. ← **(workshop / NP staff, other stakeholders)**

5. Public participation
- Stakeholder analysis
- Notifying the public and stakeholders
- Consultation meetings with stakeholders ← **(meetings, workshops / all relevant stakeholders** (individually, focus groups, public)**)**
- Evaluation of consultation results
- Public consultations ← **(public meeting / all relevant stakeholders)**

6. Identification of problems, politics and goals

7. Zoning
- Management zones (sub-division of the park for management needs) ← **(meetings / NP staff, other stakeholders)**
- Analysis of biological data (habitat and species distribution in protected area)
- Zoning criteria

8. Draft Management Plan – integration of all the above elements. **(workshop, public insight into document / all relevant stakeholders)**

9. Revision of the Draft and preparation of the Final Management Plan

The Management Plan, same as the Physical Plan, becomes a public document after its promulgation, available to the local population, nature protection community, business community, tourist industry and any other interested group or individual.

1.10.2 Management Plan Drafting Process

This Management Plan is prepared in order to give guidelines for the Hutovo Blato Nature Park management in the future, in order to encourage conservation of natural and cultural values and to create a framework for sustainable management of resources. If implemented correctly, the Management Plan for the Hutovo Blato Nature Park should ensure achieving of the area management vision and goals, provide those responsible for management with clear guidelines on successful application of tools and measures for a long term conservation of biodiversity and for development and maintenance of the management system in line with the sustainable use principles and conservation of natural and cultural heritage. Guidelines for management, organization of activities and monitoring of implementation and state of the biological diversity are important elements of this Management Plan.

The Management Plan contents are determined by the Ordinance on the Contents and Method of Preparation of the Protected Areas Management Plan (Official Gazette of FB&H No. 65/06). This Management Plan contains a description of the area (abiotic and biotic factors, socio-economic conditions and cultural assets), an overview of the state and an overview of threats to the protected area. The Management Plan also defines the protection and use concept which includes an overview of threats, management zones, objectives, measures, indicators and measures implementation control. Action plans are detailed, including the expenses and funding sources, as well as the monitoring and evaluation methods.

1.10.3 Management Plan Implementation Responsibility

Institution and address:

Public Enterprise Hutovo Blato Nature Park d.o.o., Karaotok bb, Čapljina, 88307 Višići
Herzegovina-Neretva Canton, Bosnia and Herzegovina

Contacts:

E-mail: info@hutovo-blato.ba and/or nikola.zovko.karaotok@tel.net.ba

Telephones:

Switchboard: +387 36 814 716
Director: +387 36 814 715
Fax: +387 36 814 715

1.10.4 Competent Environmental Protection Ministries and Institutions in the Federation of Bosnia and Herzegovina

Based on Annex 4 to the Dayton Peace Agreement and the Constitution of Bosnia and Herzegovina, the entities have jurisdiction over all environmental issues. Since the Constitution allows that some responsibilities for the environment be delegated to the state authorities (e.g. international cooperation and harmonization of state issues), some state institutions have assumed authority for the environmental issues in case the responsibility of the state is required. Therefore, the Bosnia and Herzegovina Ministry of Foreign Affairs is in charge of negotiations and ratification of international environmental treaties. The Bosnia and Herzegovina Ministry of Foreign Trade and Economic Relations (MOFTER) is responsible for implementation of the environmental protection programs ensuing from ratified conventions, and for intersectoral coordination between different environment-related sectors. The MOFTER is also the GEF Focal Point for Bosnia and Herzegovina. The Directorate for European Integration of Bosnia and Herzegovina is responsible for monitoring implementation of the environmental projects. An Environmental Coordination Board for Bosnia and Herzegovina has been founded for coordination of entity environmental activities (Krilašević, 2009).

The nature protection activities which are the responsibility of the Federation of Bosnia and Herzegovina are carried out by the Federal Ministry for Environment and Tourism. The nature protection activities which are the responsibility of the cantons are performed by the cantonal ministry in charge of the environment and cantonal institute for nature protection within the responsibilities entrusted to them by the foundation act and the Statutes. The nature protection activities which are the responsibility of municipalities are carried out by the municipal services established in line with the Local Self-government Act.

Several federal ministries in the Federation of Bosnia and Herzegovina are in charge of the environmental protection. The Federal Ministry for Environment and Tourism is the key institution competent for the environmental protection (Parliament of the FB&H, 2003), which is also a National Focal Point of the Convention on Biological Diversity. Other ministries in the Federation of Bosnia and Herzegovina in charge of specific aspects of the environmental protection are:

- Federal Ministry of Physical Planning ,
- Federal Ministry of Agriculture, Water Management and Forestry,
- Federal Ministry of Culture and Sports.

1.10.5 Management Plan Implementation and Review Procedure

Preparation, drafting and enactment of the Hutovo Blato Nature Park Management Plan are based on the provisions of the Nature Protection Act (Official Gazette of FB&H No. 66/13) which stipulates its enactment for the protected areas in the Federation of Bosnia and Herzegovina.

The Management Plan for a protected area is enacted by the Government of the Federation of Bosnia and Herzegovina or a cantonal government for a ten-year period, based on a proposal of the federal ministry and cantonal ministry, and the physical and legal persons carrying out activities in the protected area are bound to respect the Management Plan provisions.

The following bodies, which are involved in the Management Plan implementation under the law, are established by the Decision on Founding of the Public Enterprise: Assembly, Supervisory Board, Management Board and Audit Committee. The Supervisory Board supervises, *inter alia*, the activities of the Management Board. The Public Enterprise Management Board comprises a director responsible for implementation of annual programs and business plans. Authorities of the Audit Committee are defined by the Public Sector Internal Auditing Act of the FB&H (Official Gazette of FB&H No. 48/08). The Audit Committee appoints an internal audit department manager. Since the enterprise has limited capacities, authorities of the internal audit could initially be entrusted to a single person. The internal audit needs to ensure achieving of defined objectives and targeted spending of the budget.

The Management Plan implementation monitoring system should be set up at the onset of its implementation. After a five-year period, the Management Plan implementation results are analyses and, if necessary, a revision of the Management Plan is made according to a procedure stipulated when the Management Plan was enacted.

Responsibility for the Management Plan implementation is primarily on the Public Enterprise. Based on the Management Plan, the Public Enterprise prepares annual work program with detailed objectives and activities envisaged for the subject year. The annual work program is submitted to a competent authority for approval. The work program elaborates in detail the activities of the Public Enterprise, and methods of technical assistance and counselling offered to the local population regarding their activities that should result in sustainable development of the area.

The Management Plan defines basic objectives of the Nature Park management to be achieved within a ten-year period, and gives a detailed implementation plan based on defined action plans. In this way, detailed priority activities are set up according to the key areas of management, the necessary funds are estimated as well as possible funding sources for implementation of protection and other measures. A proposal of responsibilities for the Management Plan implementation is also given.

The business plan, as one of instruments for the Management Plan implementation, is passed by the Public Enterprise Assembly and it defines, *inter alia*[2]:

- prediction of revenues and expenses;

- capital expenditures proposed for the period covered by the business plan.

Capital expenditures during the initial period of the Public Enterprise work need to enable carrying out of priority activities determined by the action plans.

In addition to the above requirements, it is very important to set up an internal system for the Management Plan implementation monitoring from the onset of the implementation, and to report to the Supervisory Board (which is, in addition to the Assembly, Management Board and Audit Committee, one of four bodies managing the Nature Park under the law) on the implementation every six months. The report is prepared by the Public Enterprise director. It is particularly important to estimate the implementation progress during the first two years of the Public Enterprise work.

The management plans define basic monitoring indicators and verification sources for each of the defined objectives that will enable evaluation of their achievement. Defined indicators and verification sources may considerably facilitate setting up of a monitoring system for implementation of defined objectives. The director, acting on behalf of the Public Enterprise Management Board, is responsible for implementation of recommendations of the Audit Committee, within the time frame determined by the Committee.

The Management Plan implementation demands a high level of participation of identified stakeholders, particularly of the local community. Therefore, the Public Enterprise needs to prepare a Stakeholders Involvement Plan promptly after the Management Plan has been passed.

1.10.6 Framework Documentation for Social Impacts Mitigation and Adequate Planning

All framework documentation/policies aimed at mitigation of social and environmental impacts currently applied, and the documents giving general guidelines for adequate planning and management of protected areas have been taken into consideration during the Management Plan drafting.

A framework process for mitigation of possible unwanted impacts on the population subsistence capacity (FMPAP project[3], 2007) is used to determine the objectives and procedures in case when restricted access to natural resources has negative impact on population subsistence capacity, to ensure support to such population in reinstigating and improving sources of subsistence in a manner that enables environmental sustainability of the subject natural area.

This document offers guidelines for implementation of a participative process within which specific components are prepared and implemented, criteria determined for gaining a status

[2] Public Enterprises Act of the Federation of Bosnia and Herzegovina 8/05
[3] GEF project “Forest and Mountain Protected Area Management Project”, 2007

of affected persons, measures identified for support to these persons and measures determined for resolving of potential conflicts including the affected persons. A considerable part of this document is dedicated to the description of the implementation and monitoring procedures.

Environmental Assessment/Environment Management Plan Framework (FMPAP Project, 2007) is prepared in accordance with the World Bank safeguard policy OP/BP 4.01, and it analyses and describes the administrative framework, relevant national legislation and the applicable World Bank safeguard policies. The key part of this document is an analysis of possible project-related environmental impacts on aesthetics, watercourses, hydrology, biodiversity and habitats, local population and development of the project areas, and the Environmental Management Plan Framework with recommendations of impact mitigation measures and monitoring methodology. The document also elaborates criteria for the environmental monitoring in the implementation areas and elaborates guidelines for the environmentally acceptable development of infrastructure.

Stakeholder Participation Plan (FMPAP Project, 2006) has been prepared in order to identify key social issues of the local population within the project area, as well as potential social impacts. The Management Plan also includes a comprehensive analysis of the stakeholders and elaborates a strategy for their participation.

According to the Stakeholder Participation Plan, the project preparation, implementation, monitoring and evaluation shall be carried out using participatory methods elaborated in the Management Plan in a form of practical instructions on use of these methods within a project cycle, namely planning of involvement of all stakeholders in different stages.

2 PROTECTED AREA DESCRIPTION

2.1 GENERAL

2.1.1 Location

The Hutovo Blato Nature Park is situated in the territory of Čapljina and Stolac municipalities, Herzegovina-Neretva Canton, the SE part of the Federation of Bosnia and Herzegovina, Bosnia and Herzegovina. It is situated 20 km from the state border with the Republic of Croatia, on the left bank of the Neretva River, namely on the left side of the Neretva Delta belonging to Bosnia and Herzegovina as well. It occupies an area of approximately 7,400 hectares, and its major part is under some sort of anthropogenic impact. This area comprises mountain areas of Londža and Košćela, with the summit on el. 588 m a.s.l. (Budisavina), aquatic parts consisting of six larger lakes: Deran, Svitava, Jelim, Orah, Drijen and Škrka (at elevations of 1.5 – 2.5 m a.s.l.), and springs some of which are as deep as 15 m below the sea level, and the Krupa River which is a direct connection of the Hutovo Blato with the Lower Neretva River course (Figure 2.1).

Two major transport corridors intersect in immediate vicinity of the Hutovo Blato Nature Park, connecting the Herzegovina-Neretva Canton (herein below HN Canton) with South East and Central Europe, namely with international transport routes. The international transport corridor Vc, running along the Bosnia and Neretva river courses, passes through the territory of the HN Canton and connects it with the Ploče Port. This corridor is a backbone of traffic routes through Bosnia and Herzegovina which accepts all the lateral roads and combines them into an integrated transport system of the country. Development of this transport corridor has so far been focusing on development of road and railway transport with their transport nodes. An arterial M 6 Imotski-Grude-Ljubuški-Čapljina- Stolac-Trebinje is the major transverse road, while the major longitudinal road is an arterial M 17 Sarajevo-Mostar-Čapljina-Ploče.

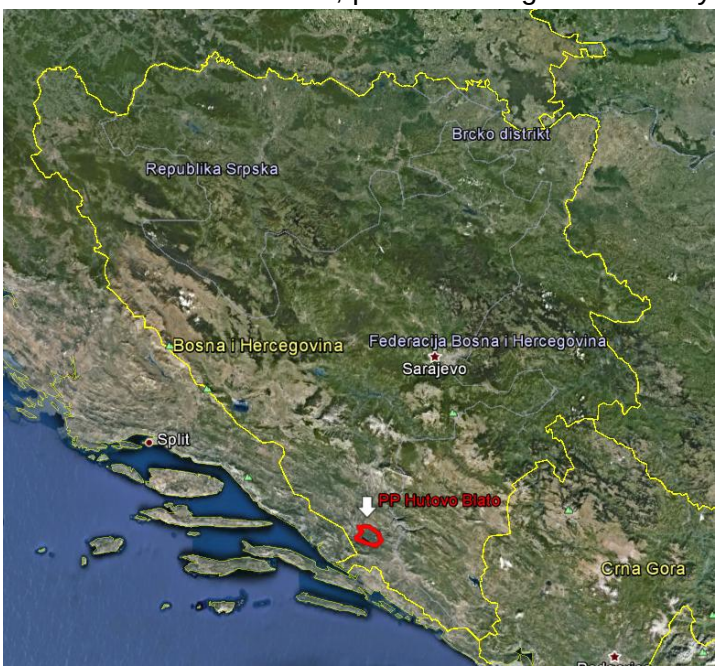


Figure 2.1: The Hutovo Blato Nature Park location

2.1.2 Nature Park Boundaries

Boundaries of the Hutovo Blato Nature Park start from the bridge on the Bregava River and ascend towards the SE, the Klepašnica hill (el. 108 m a.s.l.), to continue along the hill summit to the Kučevo Brdo hill (el. 118 m a.s.l.) towards east, i.e. to the Moračina Kuća, descent to Topolnica and exist to the Klepci – Karaotok road. It than returns along the same paths towards west, turns towards south in the cow farm direction and continues along the Višići football field through Zgone to exit directly to the Krupa River. It than continues along the

embankment on the right side of the Krupa River, and goes in SW direction to the bridge on the Krupa River (road MI7). It crosses the bridge and returns towards east along the embankment on the left side of the Krupa River to the Sjekoški Kanal mouth. It than goes to the bridge on this channel, and exits to the Dračevo - Svitava road, wherefrom goes by the road along Lake Svitava and enters the settlement of Svitava (Čapljina PSHPP), ascends through a gully to Budisavina (el. 67, 189, 588 m a.s.l.), crosses over (el. 442 m a.s.l.) to Gradac and descends to el. 117 m a.s.l. (Drenovac – Londža road). The boundary passes through the middle between elevations 210 and 478 m a.s.l., exits at the Popova Glava summit (elevation 379 m a.s.l.), goes in NE direction over Babina Glava and crosses the Cerovo - Drijen road to exit at Gradac (el. 257 m a.s.l.), continue in NE direction along the hill top over elevations 272, 347, 416 m a.s.l., and descend into the village of Grlići and than continue through a populated settlement of Prebilovci to the bridge on the Bregava River.

Figure 2.2: The Hutovo Blato Nature Park boundaries, Google Earth

2.1.3 Land Use

The Hutovo Blato Nature Park area encompasses state and privately owned land. Below is an overview of state and private property by cadastral districts (CD):

1) STOLAC MUNICIPALITY

CD Kruševo (Stolac Municipality)

Property	m^2	%
State	66,674	1
Private	8,435,598	99
Total	**8,502,272**	

CD Bjelojevići (Stolac Municipality)

Property	m^2	%
State	4,483,056	23
Private	15,321,703	77
Total	**19,804,759**	

2) ČAPLJINA MUNICIPALITY

CD Blato (Čapljina Municipality)		
Property	m^2	%
State	14,950,508	100
Private	0	0
Total	**14,950,508**	

CD Donje Hrasno (Čapljina Municipality)		
Property	m^2	%
State	505,492	19
Private	2,279,069	81
Total	**2,784,561**	

CD Dračevo (Čapljina Municipality)		
Property	m^2	%
State	220,621	24
Private	789,533	76
Total	**1,010,154**	

CD Klepci (Čapljina Municipality)		
Property	m^2	%
State	1,349,229	95
Private	67,651	5
Total	**1,416,880**	

CD Prebilovci (Čapljina Municipality)		
Property	m^2	%
State	5,079,751	56
Private	3,929,490	44
Total	**9,009,241**	

CD Svitava (Čapljina Municipality)		
Property	m^2	%
State	11,859,485	81
Private	2,801,274	19
Total	**14,660,759**	

CD Višići (Čapljina Municipality)		
Property	m^2	%
State	3,009,118	49
Private	3,091,813	51
Total	**6,100,931**	

THE HUTOVO BLATO NATURE PARK, GRAND TOTAL

Property	m^2	%
State	41,523,934	53
Private	36,716,131	47
Total	**78,240,065**	100

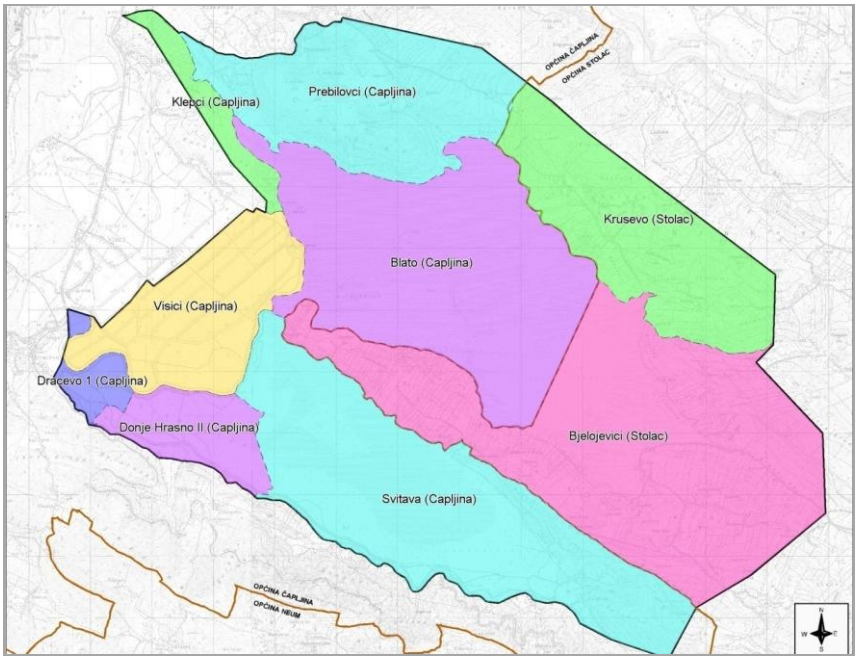


Figure 2.3: Cadastral districts within the Hutovo Blato Nature Park boundaries

2.2 ABIOTIC FACTORS[4]

2.2.1 Climate

2.2.1.1 General

Climate of the Hutovo Blato Nature Park, which belongs to the Neretva River basin, are determined by its geographical position, relief, altitude, and vicinity of the Adriatic Sea, i.e. the Mediterranean basin.

Since, besides the geographical position, climate is most affected by the relation between land and sea and relief characteristic, i.e. altitude, and this area has the altitude which is from 1.5 m a.s.l. to 6.0 m a.s.l. in the lowest and the most widespread part, and average temperature above 22°C in the warmest month, it belong to the climate region Csa (Köppen). This is the Mediterranean climate type with extremely warm summers. This climate type is characterized by dry and warm summers, and mild and rainy winters.

The entire area is directly affected by the sea air flow. Due to the vicinity of the Adriatic Sea, which in winter radiates heat accumulated during the summer months, average air temperatures during the winter months are rather high. Autumns are warmer than springs.

Annual isotherms in the Neretva River basin, which encompasses the Krupa River basin along with the Hutovo Blato Nature Park area, run in parallel with the Adriatic coast and indicate to a global thermal regime at the sea level. Horizontal temperature gradient is about 5°C/100 km, positive towards the Adriatic Sea. An adopted vertical temperature gradient is -0.55°C/100 m.

Abundant precipitation occurs usually during the coldest part of the year, in November and December. The precipitation is mainly caused by cyclone movements related to the general circulation of air over the European continent.

Snow is rare and its occurrence is related to cold air ingress from the inland.

Figure 2.4 i 2.5: Snow in February 2012 that caused food shortages and large exodus of birds from this area. Photo: Frano Matić

[4] Data used for presentation of abiotic factors have been taken over from the Spatial Analysis for the Physical Plan for Areas of Special Features for the Area of Importance for the Federation of Bosnia and Herzegovina - the Hutovo Blato Nature Park.

Table 2.1: Čapljina Meteorological Station with location data

Meteorological Station	Latitude	Longitude	Elevation (m a.s.l.)
Čapljina	43°05´	17°43´	5.0

Table 2.2: Average annual air temperature at the Čapljina Meteorological Station (1961-1990)

Meteorological Station	T°C (average monthly)												T°C Average annual
	Jan	Feb	March	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	
Čapljina	4.9	6.8	9.6	13.1	17.6	21.0	23.7	22.9	19.2	14.3	9.8	6.1	14.1

2.2.1.2 Air temperatures

Average air temperature in the warmest month of July is 23.7°C, and absolutely highest recorded temperature is 41.0°C. Average annual air temperature is 14.1°C.

Average air temperature in the coldest month of January is 4.9°C, and the lowest measured temperature of -14.2 °C was also recorded in January.

Table 3.3: Absolute maximum, minimum and average monthly air temperatures for the Čapljina Meteorological Station (1961-90)

°C	Jan	Feb	March	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Absolute max.T	19.5	24.0	26.5	28.0	32.5	37.0	40.5	40.5	38.5	32.5	25.5	21.0	**40.5**
Average max.T	9.5	11.2	14.3	18.2	23.2	27.2	30.6	30.9	26.7	21.4	15.5	10.8	**30.9**
Absolute min. T	-14.2	-7.8	-6.6	-0.2	2.2	4.8	8.0	8.5	0.2	-3.0	-6.5	-10.0	**-14.2**
Average min. T	0.4	2.1	4.2	7.1	11.1	13.8	15.6	15.6	12.2	8.1	4.5	1.6	**0.4**

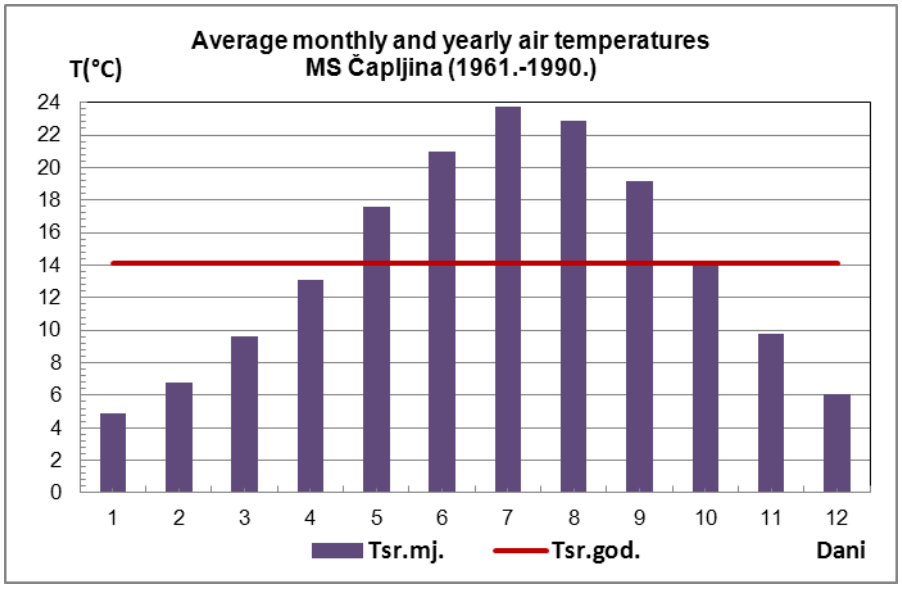


Figure 2.6: Distribution of average monthly air temperatures - Čapljina MS (1961-1990)

2.2.1.3 Precipitation

Annual precipitation distribution within the Hutovo Blato Nature Park area is very uneven with unfavourable time distribution, which means that precipitation quantity is considerably higher during the cold than during the warm part of the year which is the growing season. The highest precipitation is recorded in late autumn, in November and December, while the spring quantities should not be neglected. Weather fronts carrying most precipitation are generally those related to the Mediterranean cyclones.

Average annual precipitation is 1107.0 l/m^2. Monthly precipitation during the colder part of the year is from 116.0 l/m^2 to 144.0 l/m^2 (the most abundant precipitation is in November, with average 144.0 l/m^2). During the summer, precipitation is minimum or not at all, thus droughts last for three to five months on average. Average precipitation during summer is from 35.0 l/m^2 to 69.0 l/m^2. Average precipitation in the driest month, July, is 35.0 l/m^2.

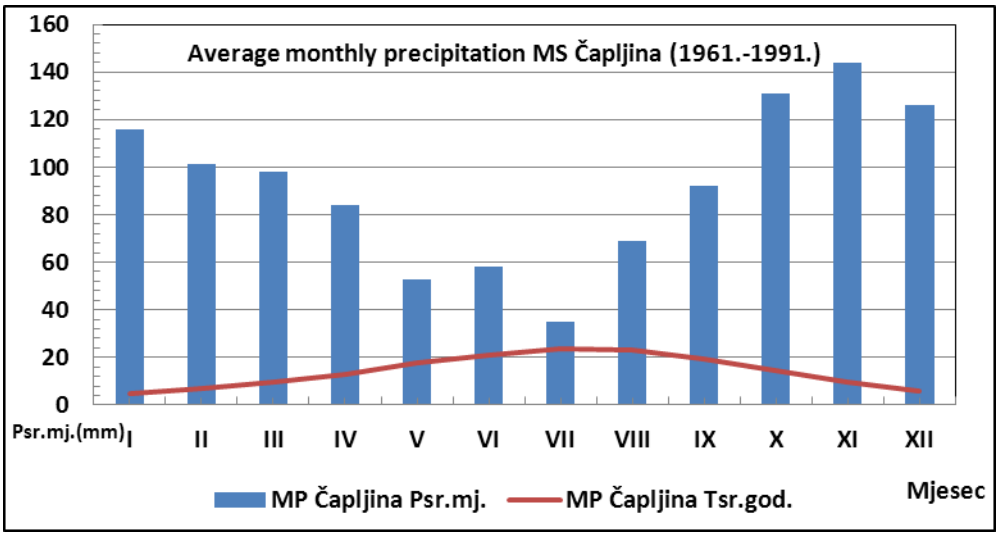


Figure 2.7: Distribution of average monthly precipitation - Čapljina MS (1961-1990)

Snow is rare, although not impossible. An average number of snow days is three. Snow most frequently falls in January, February and December, but it lasts for a short period of time.

2.2.1.4 Wind

A wind rose recorded at the Čapljina Meteorological Station shows that northern (bora) and southern (sirocco) winds are dominant. Bora is a northern wind blowing from the inland. It blows in gasps bringing cold and dry air that dries out the soil and lowers the temperature. It occurs suddenly during the coldest period of year, although it might occur throughout a year.

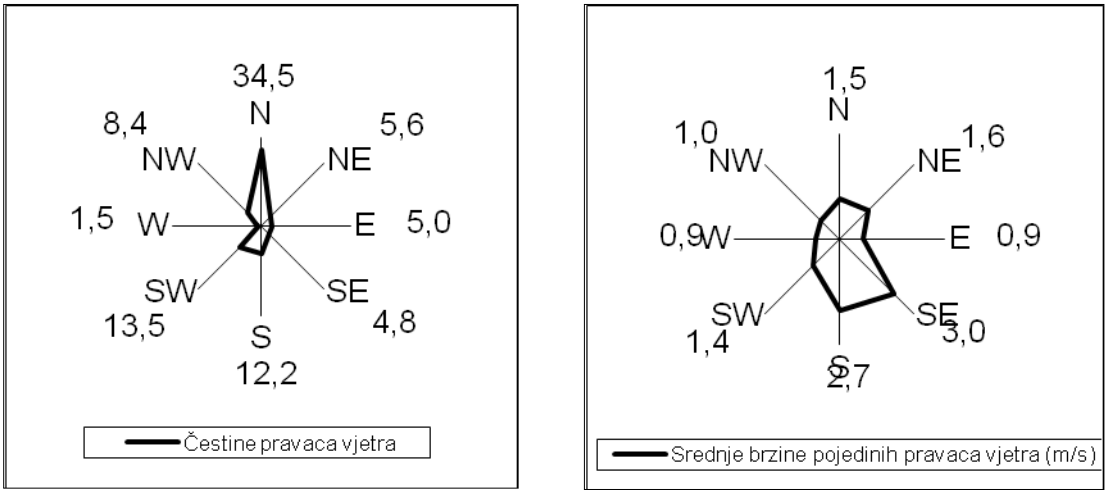


Figure 2.8: Wind rose

Sirocco blows from north-east and brings warm and rainy weather. It may blow in any part of year, but it is more frequent in autumns, winters and springs. It usually blows for several days and brings abundant precipitation.

2.2.1.5 Air humidity

Relative humidity of air is a climate element directly related to air temperature and cloud cover. Its course is opposite to the air temperature course through a year. Mean annual humidity in the Hutovo Blato Nature Park area, measured at the Čapljina MS, is 76%. Minimum average monthly humidity in July is 68%, and maximum average monthly humidity in November is 81%.

2.2.2 Landscape

The area under consideration is surrounded with a range of karst hills, except on the north-west side. The area is enclosed by Humina massif on the north, karst descending towards Derane and Svitava on the south-east, and again karst descending towards Svitavsko Blato on the south-west. Between Derane and Svitava runs a peninsula of a limestone ridge - Ostrvo, which gradually descends from the elevation of Budisavina towards the north-west, to the Krupa River.

The ground configuration comprises:

- Permanent water surfaces,
- Wetland surfaces-occasionally submerged,
- Ameliorated lowland surfaces,
- Hilly area.

A major landscape factor and the most impressive element in the greater area is the combination of karst hilly ranges, lowland surfaces, aquatic surfaces, and their combination with the surface cover. The scenery is created by surfaces covered with white and yellow pond-lily, wetland overgrown in sedge, forest and meadow vegetation rich in characteristic species that complement biological diversity of Hutovo Blato.

The ground has several gazebos with attractive panoramic view of landscape assets which need to be preserved and, if necessary, improved.

Exceptional landscape assets are built structures, such as traditional houses and other buildings, historical images comprising settlements, their outlines and finishing works on such structures, as well as the landscape surrounding these structures, farming cultures and traditional land cultivation.

Figure 2.9: Abandoned houses in Grlići

Since livestock breeding and agriculture as traditional economic activities are becoming rare, pastures and agricultural land are becoming overgrown. A consequence is degradation of valuable parts of traditional farming landscape which is assuming natural characteristics. Revitalization of traditional and organic production and development of rural tourism are options for revitalisation of agricultural production and livestock breeding.

Figure 2.10: Prebilovci panoramic view

It is necessary to maintain and increase the existing forest resources by preserving natural forests, their protection, rehabilitation, regeneration, adequate management, and reforestation of earlier forested land, and planting of trees aimed at maintaining or recovery of ecological balance. It is also necessary to protect the forest against contamination, fires, pests, diseases and other impacts, and to encourage vegetating of areas in settlements and landscape improvement.

It is considered that, in order to preserve their identity, karst areas within the Management Plan area not covered with indigenous vegetation need to remain as they are, since they represent a unique landscape. The natural spatial identity should be based on respect for its diversity and complexity. Special attention should be paid to built structures and natural areas, particularly in order to protect the existing valuable assets and architectural tradition.

2.2.3 Hydrology

2.2.3.1 General Characteristics

The Hutovo Blato Nature Park is situated in the Dinaric karst in the SE Herzegovina. It is surrounded by massive uplifts and karst fields with typical geological forms characteristic for karst, so surface runoff is extremely reduced. Water is mainly running under the ground, through a complex system of underground flows. Storage of water in enclosed karst fields, happening because of large quantity of precipitation, and consequently large inflow of water during the period of rains, causes activation of sinkholes and sinkhole zones which replenish springs at the lower horizons. Under natural conditions, during dry periods, when the fields are dry, there is no water infiltration into the underground and, consequently, no replenishment of Hutovo Blato.

A marsh depression of Hutovo Blato is simultaneously affected by two large hydrological systems: the Trebišnjica River (with the Bregava River) hydrological system and the Neretva River hydrological system. The Svitavsko Blato and Deransko Blato depressions are positioned so that they are open towards the Neretva River valley.

The entire quantity of water flowing into the Hutovo Blato comes from the immediate Hutovo Blato catchment, from sinking water in the lower reach of the Bregava channel, from water sinking in the lower part of Popovo Polje field, and from water which is under the influence of the Neretva River.

The area is replenished with water from springs and spring areas in the northern and north-western edge of the Svitavsko Blato depression, and southern, eastern and north-western edge of the Deransko Blato depression. These springs have determined underground connections with sinkholes in the downstream part of Popovo Polje (Crnulja and Doljašnica), and in sinkhole zones in Dabarsko Polje and the Bregava River channel.

The ground elevations in the area of the Svitavsko Blato-Deransko Blato depression are between 1.5 and 3.0 m a.s.l., while the Krupa River bottom elevation along the entire length is 1.5 m below sea level (el. -1.5 m a.s.l.). As consequence, when the Neretva River water levels are extremely high the water flows upstreams, i.e. the Neretva flows upstream into the Krupa River and Deransko Blato depression (determined by measurement, Z. Barbalić, 1978). This is the reason that under natural conditions Hutovo Blato has a role of natural retention basin, mitigating high water waves in the downstream reach of the Neretva River.

Figure 2.11: Hutovo Blato, Drijen and Orah springs

2.2.3.2 The Hutovo Blato catchment

Generally, the Bregava River course could be taken as the northern catchment border, while the downstream part of the Popovo Polje (the Trebišnjica River sinkhole zone from the Hutovo compensating basin to the settlement of Velja Međa) is taken as the northern catchment border. The eastern catchment border is approximately determined against Ljubinjsko Polje and Fatničko Polje, while the Krupa River is the eastern catchment border.

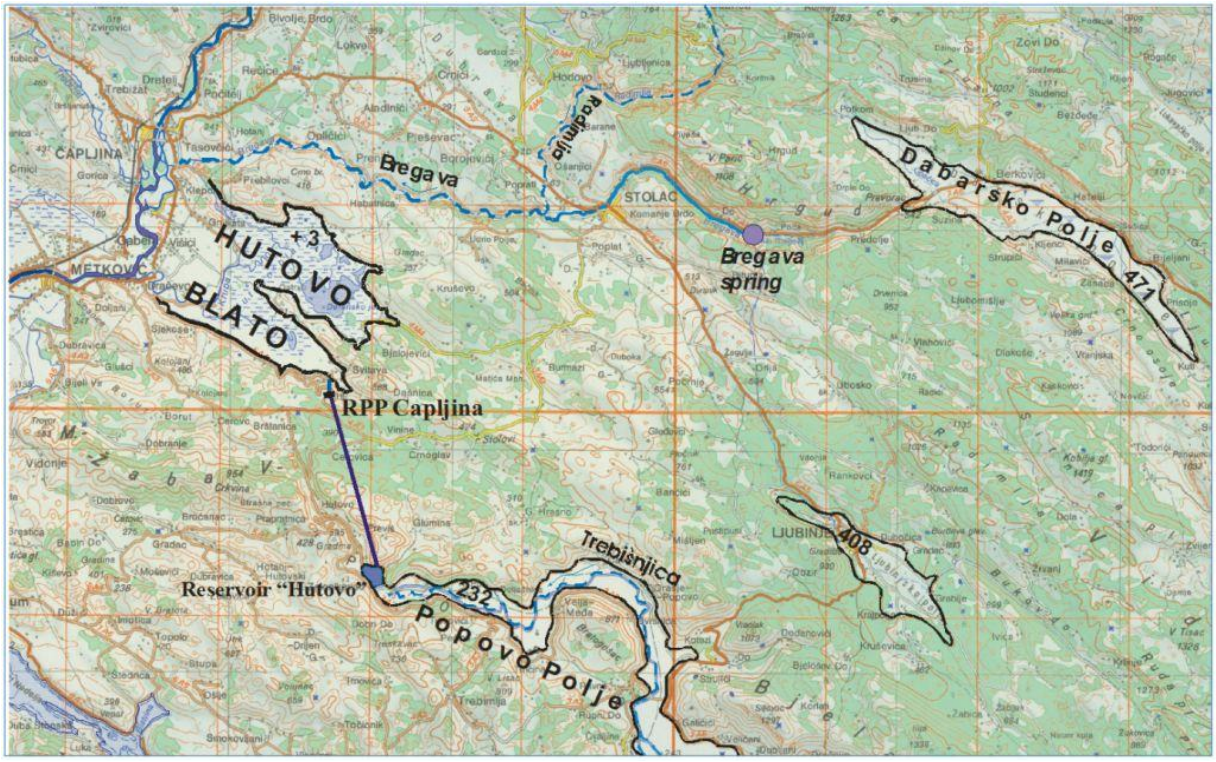


Figure 2.12: Karst fields in the Hutovo Blato catchment area

2.2.3.3 Hydrogeological characteristics

Hutovo Blato is situated on the left bank of the Lower Neretva River course. Downstream from Čapljina, by the Neretva River left bank, runs a deep Hutovo Blato depression which is occasionally flooded by high waters during rainy periods. Parts of depression going from elevation +1 m a.s.l., including the Škrka, Jelim, Drijen, Radanovac, Orah, Lake Deran and Svitava Reservoir are permanently flooded. Škrka, Jelim, Drijen and Orah lakes have rocky bottom at 2 to 7 m below sea level, where permanent upward springs are present.

Water from the Hutovo Blato area run off by the Krupa River into the Neretva, and when the Neretva water level is high, water flows in opposite direction and the entire Hutovo Blato and Svitavsko Blato areas are flooded.

The greater area of the Hutovo Blato Nature Park is built of permeable carbonate deposits with cavernous-fissure porosity and of Cretaceous and Palaeogene age. The limestones are well karstified and fissured, particularly on the north-east from Klepci–Ostrova–Svitava overthrust. The limestone rocks are a basic aquifer of shallow groundwater. Surface flows have completely disappeared, since the precipitation falling on the karstified layer sink immediately to reappear in a limited number of springs in erosive bases or in contact areas with impermeable flysch deposits.

According to results of hydrogeological investigations carried out for the hydroelectric power plants project on the Trebišnjica River, the Hutovo Blato hinterland has the highest effective porosity in the dinaric karst which is 2.8 – 3.6 %. Considering hydrogeological function of rocks and ground, greater area of Hutovo Blato and its catchment belong to well permeable grounds, and these are primarily karstified limestones from Cretaceous, Paleocene and Eocene. This is where privileged directions of underground flows are created with cavernous-fissure porosity. This type of dissolution caused porosity results in good aquitard (reservoir) characteristics. Flows in marly limestones are related with zones that are exposed to intensive tectonic deterioration.

Poorly permeable Quaternary deposits with intergranular porosity build the Hutovo Blato depression. Since depth of Quaternary lacustrine-marsh sediments exceeds 120 m, they build a lateral impermeable barrier to groundwater from the surrounding well permeable Carbonate deposits of cavernous-fissure porosity and cause its runoff on the northern, eastern and southern edges of the Hutovo Blato and Svitavsko Blato depressions.

Eocene flysch sediments are a rock mass of variable composition with alternating aquitard (reservoir) and aquiclude (barrier) function. Sandstones, marls and marly limestones occasionally have medium developed fissure porosity which in the greater area has a character of separated aquitards of groundwater.

Sediments of the Hutovo Blato and Svitavsko Blato depressions are of silty-clay or peat composition, with poor intergranular and capillary porosity and, regarding hydrogeological aspects, they represent aquicludes.

In the area by the Neretva River, alluvial loose sediments of gravel and sand represent hydrogeological aquitards with intergranular porosity and very good conductivity.

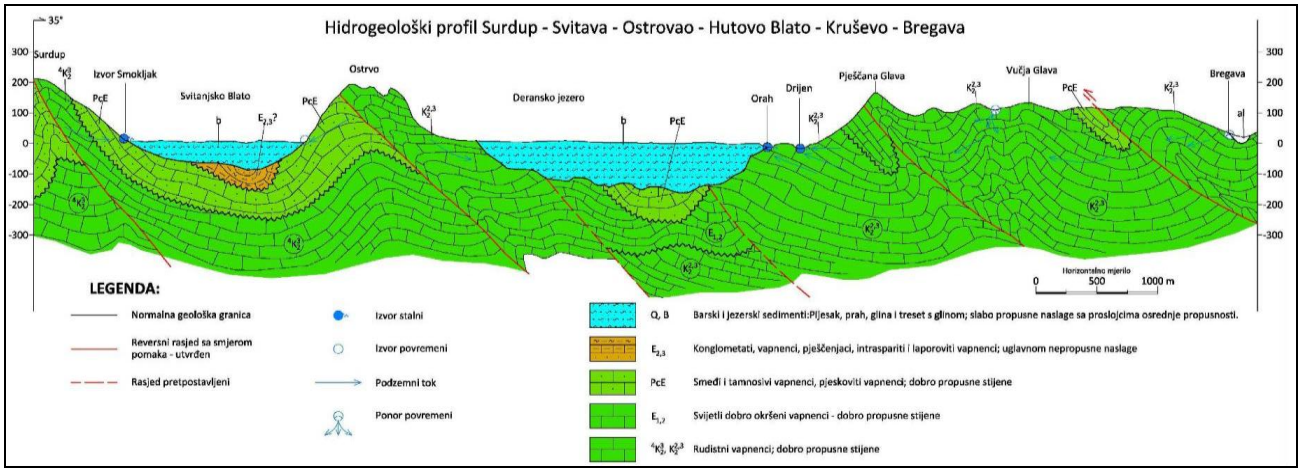


Figure 2.13: Hydrogeological profile Svitava-Ostrovo-Lake Deran-Bregava River

The largest quantities of groundwater flow into the Hutovo Blato from indirect river basins of the Trebišnjica and Bregava. These are lost rivers from the lower part of the Popovo Polje and Dabarsko Polje fields (Figure 2.14). Springs related to the Bregava sinkholes supply Hutovo Blato with colder water, which is particularly important for survival of some endemic species in the northern part of the Hutovo Blato.

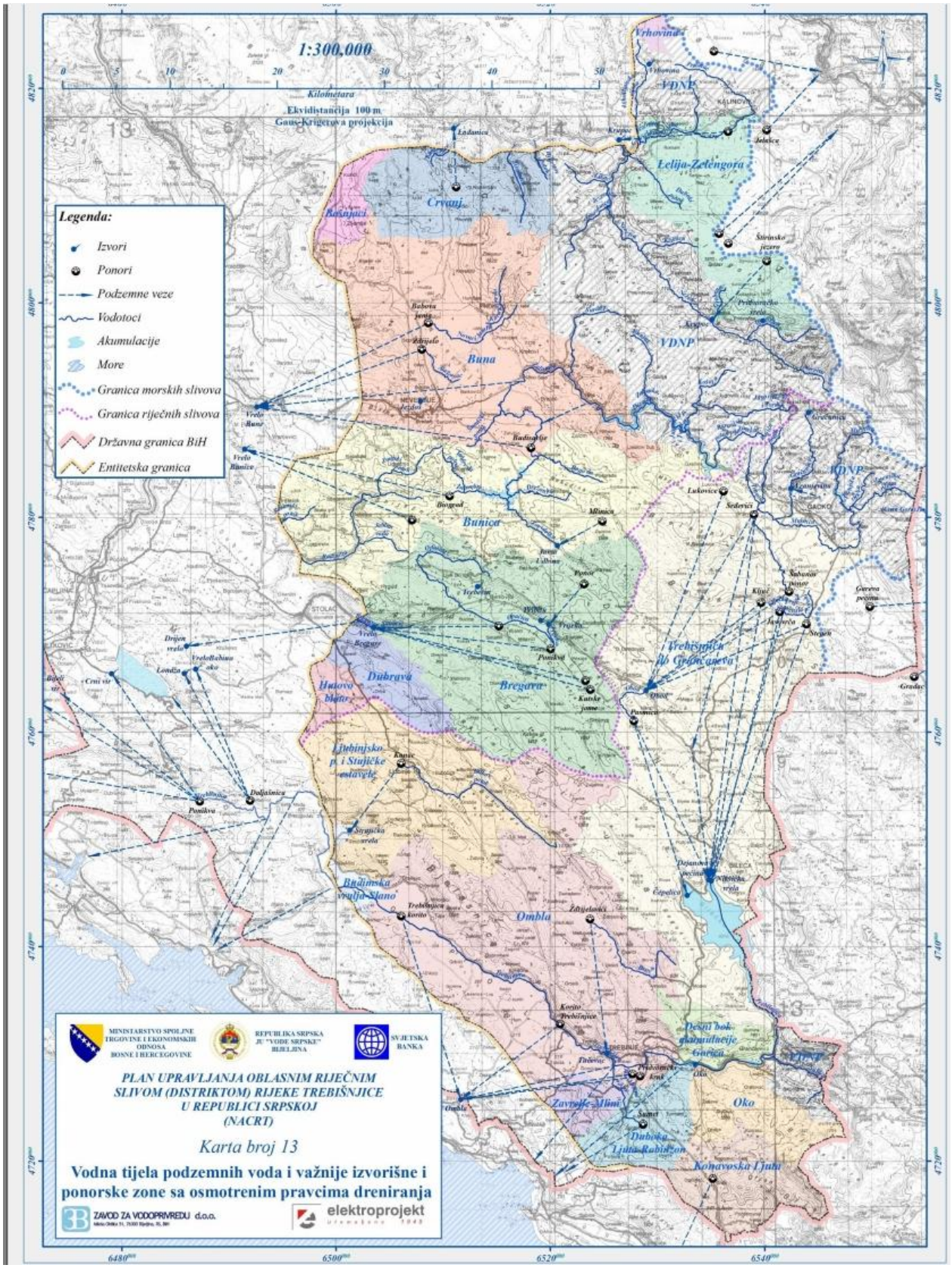


Figure 2.14: Major spring and sink zones in the Trebišnjica River basin (courtesy: ZZV Bijeljina, 2013)

Surface of the immediate river basin is approx. 460 km^2 including the Hutovo Blato area with the Krupa River catchment through which water is drained into the Neretva River. This part of the catchment runs towards east and it approximate border is on the line Čavaš – Žegulja.

Minor part of water from the direct catchment of the Donje (Lower) Popovo Polje field drains towards Hutovo Blato, and a major part towards the Neretva River basin, the springs in the left river valley downstream from Metković and submarine and coastal springs from Neum to Slano. Majority of water sinks in two sink zones in Popovo Polje, at el. 470 m a.s.l. (Ponikva and Kuti). Groundwater connections from Popovo Polje towards Hutovo Blato have been confirmed from the Lisac, Crnulja, Doljašnica, Provalija and Velja Međa sinkholes.

During a year with average humidity, the Popovo Polje floods prior to the construction of the hydroelectric power plants in the upper Trebišnjica River course lasted for 250 days. The Trebišnjica River course through Popovo Polje is 90 km long, and the permanent course before the hydroelectric power plants were built on the Trebišnjica River was 28 km. Over 500 sinkholes were recorded in the Trebišnjica channel and lateral sides of Popovo Polje (P. Milanović 2006). During lower groundwater levels, minimum 75 m^3/s of water has been sinking along 65 km long river channel reach, and during high water levels between 600 and 1000 m^3/s. Part of water sinking between Velja Međa and Lisac sinkhole occasionally flow towards the Hutovo Blato area. Participation of sinkholes from Popovo Polje is considerably lower in the water balance for Deran, and higher in the water balance for Svitava. The sinkholes in Popovo Polje have the following maximum capacities: Doljašnica sinkhole approximately 40 m^3/s; Crnulja and Provalija sinkholes about 10 m^3/s; Dobri Do sinkhole Q = 40 m^3/s at the flood water column of 4 m, and Q = 120 m^3/s at the flood water column of 8 m – during major floods experienced prior to the construction of the hydropower system on the Trebišnjica River.

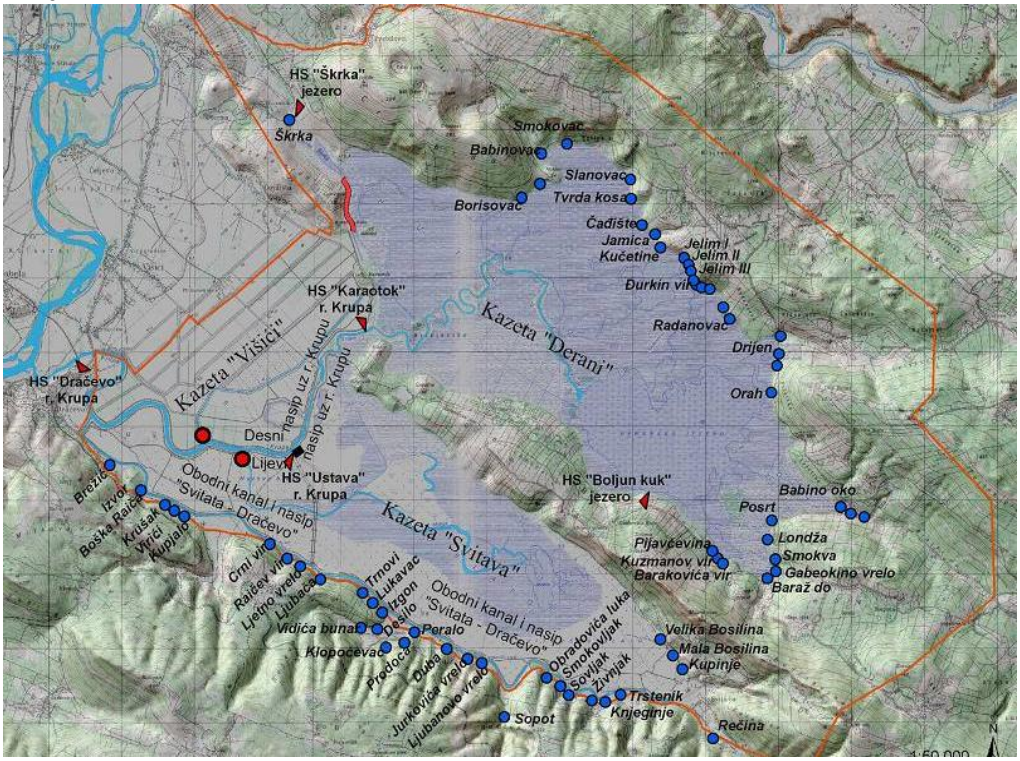


Figure 2.15: Permanent and intermittent springs in Hutovo Blato (Svitavsko Blato and Deransko Blato depressions)

In addition to waters in its immediate basin, Deransko Blato (lake) encompasses waters of the indirect Bregava River basin. Therefore, some waters that sink in Ponikva sinkhole in Dabarsko Polje and waters that sink along the Bregava River channel to its mouth into the Neretva River, including waters of the Radimlja River, flow into Deransko Blato through

underground. This is confirmed by the results of borehole BR-1 tracing in the Bregava River upstream from Stolac.

The most important springs at which groundwaters are discharged from the indirect Bregava River basin and immediate river basin of the karst Kruševljani tableland by the NE edge of the Deransko Blato depression are: Škrka, Jamica, Kučine Jelim, Drijen, Orah and Babino Oko. Total minimum inflow into Deransko Blato is estimated at 3 m^3/s.

Sublacustrine (underwater) spring Jelim rises by uplifting from a submerged *doline* at the NE edge of Hutovo Blato, where marsh sediments are from 6 to 12 m high, and water springs from rocky bottom. Several smaller lacustrine (lake) springs are situated around Karaotok at the west end of Hutovo Blato.

The most important permanent spring at the SE edge of Hutovo Blato through which water from Popovo Polje is drained is Londža (Qmin.= 60 – 100 l/s), while connections with the Bregava River have not been confirmed. Some 450 m to the south from Londža, permanent water also springs at the Smokvica spring. Several intermittent springs are located in its vicinity.

There are numerous permanent and intermittent springs at the SE edge of Svitavsko Blato, and they are all replenished from Popovo Polje and karst tableland of Hutovo, Hrasno and northern hill slopes of Žaba mountain massif. Major springs in this area are: Crni Vir, Desilo, Ljubanovo Vrelo, Smokovljak, Trstenik, Ljubač, Knjeginje, Živinjak, Lukavac, Svitava I and II (impounded by creation of a reservoir). Waters from these springs are drained by a lateral canal to the Krupa River. The Desilo spring rises upwards from a larger karst pit at the depth from 9 to 10 m. Small springs Smrijeka, Međugorje and Na Dolu are situated between Budisavljevići and Dašnica, and they rise at the limestone-flysch interface. There is a number of intermittent springs, in addition to the permanent ones, which are active only when water levels are high. It is estimated that inflow into Svitavsko Blato during recession period is about Qmin.= 2m^3/s, and during the period of rain when water levels are high total inflow is about 90 m^3/s.

Total number of springs in Hutovo Blato is about 40. Most of them are of intermittent nature.

After construction of the Čapljina PSHPP, Svitavsko Blato depression was turned into a Svitava lower compensating basin, separated from the Krupa River by an embankment and Krupa weir. The compensating basin capacity is 44 hm^3, and its water level varies between 3.2 and 3.35 m a.s.l. When the power plant operates at full capacity, the Svitava basin receives 225 m^3/s of water, and when it operates at minimum capacity the inflow is 70 m^3/s.

After concrete has been placed on the Trebišnjica channel and sides, activity of sinkholes in Popovo Polje reduced to minimum. A weir has been built in the canal running towards Doljašnica for controlled discharge of water into the sinkhole. This sinkhole has a role of a spillway for the Upper Compensating Basin of the Čapljina PSHPP. The *doline* and sinkhole upstream from Velja Međa are separated, and Crnulja and Lisac are active only during the periods of high water. They receive flood water spilled over the right spillway bay in a canal situated upstream from the Klek tunnel, which is a headrace tunnel to the Upper Compensating Basin. Under conditions created after the construction of the Čapljina PSHPP, Hutovo Blato inflows depend on precipitation in the immediate river basin between Popovo Polje and Hutovo Blato edge, and losses from the Trebišnjica River concrete channel. Since the Popovo Polje floods are reduced to minimum, the inflows into Hutovo Blato will certainly be considerably lower during the period of rain, while they should be expected to increase considerably during the recession period. This primarily depends on maintenance of the Trebišnjica River channel and repair of cracks in the concrete lining.

Further construction plans of the hydropower systems in „Upper horizons“ in Republika Srpska must take into consideration the vulnerability of Hutovo blato to further changes in its recharge regime through the Bregava River and sink-hole zones of the Trebišnjica River.

2.2.4 Geology

2.2.4.1 General geological characteristics

Geologically and structurally, the Hutovo Blato area belongs to Dinarides and Adriatic (Adriatic Carbonate Platform) striking generally in NW – SE direction. An area of the Hutovo Blato Nature Park is 78 km^2, of which 40 km^2 of lowlands, and it consists of two depressions, Svitavsko Blato and Hutovo Blato, which are separated by Ostrova carbonate ridge. Border parts of the depressions towards north, east and south are built of Upper Cretaceous, Mesozoic and Paleogene Tertiary high-permeability limestones from Paleocene and Eocene. Lower parts of Svitavsko Blato are at altitude between 1.5 and 3.5 m a.s.l., and of Hutovo Blato from -1.5 m to 2.5 m a.s.l. The lowland parts of the Hutovo Blato and Svitavsko Blato depressions are built of Quaternary alluvial, deluvial and marsh low-permeability sediments. Sedimentation conditions in the area changed during Quaternary, thus marsh-brackish sediments are deposited in parallel with sinking of the depression.

Upper Cretaceous (K_2)
Basic and most frequently encountered rocks in the Quaternary bedrock and edges of Hutovo Blato are karstified Upper Cretaceous limestones ($K_2^{2,3}$ and ${}_4K_2^{2,3}$). These are mainly pure rudista limestones with rare interlayers of Dolomitic limestone. Here, karst phenomena developed (dolinas, caves, pits, caverns, etc.) both on the surface and within the rock masses. These deposits are up to 500 m thick.

Paleogene (Pc,E; $E_{1,2}$; $E_{2,3}$)
Four tectonic movements happened in the External Dinarides belt during Paleogene, with immersion (subsiding) and emersion (uplifting) of some parts of the ground as consequence. The Liburnian Paleocene-Eocene deposits (Pc,E) are represented by foraminiferous miliolid limestones developed as narrower and wider zones of Dinarides striking direction NWZ-SE. These deposits crop out under alveolinid - nummulitid limestone (E1,2). They build narrow zones to the south and east of Svitavsko Blato in the Surdup and Kozarica area. Narrow zones of alveolinid and nummulitid limestone, only 300-600 m wide, stretch to the north-east of Orah and Drijen. Eocene deposits occasionally have the character of flysch ($E_{2,3}$), which is visible in the area eastern from Svitava, where conglomerates, breccias, marls and marly limestones alternate in narrow stretches, and they are supposed to be a base layer to Quaternary sediments in the Svitavsko Blato depression.

Quaternary (al; d; b)
Quaternary sediments are represented by alluvial coarse clastic deposits of gravel, sand and silt in the Neretva and Bregava valleys (al), while in Deransko Blato and Svitavsko Blato depression areas marsh sediments are represented by clays, silt, peat and sand interlayers (b). Deluvial deposits in form of detritus are encountered occasionally, is smaller scale, along the edges of the valley under cliff line (d).

A number of boreholes were drilled in the vicinity of Hutovo Blato through Quaternary marsh deposits for investigations carried out to support land reclamation activities during the sixties of the last century, and the following deposits were encountered from the surface into depth:

0.0 – 10.0 m – clays, sands and peat,
10.0 – 25.0 m – sands and mud (silt),
25.0 – 50.0 m – peat alternating with silt and clay.

The deepest borehole was 50 m deep and it remained within the Quaternary sediments. According to geophysical measurements, maximum depth of paleorelief (hard rock) is about 120 m, which has still not been confirmed by structural drilling. At the edges of Svitavsko Blato boreholes ended in paleorelief at depths up to 25.0 m, which is also true for the Hutovo Blato edges where after rocky bottom, at the depth to 10.0 meters, karst upward springs rise. In the central part of Svitavsko Blato paleorelief is probably also built of Eocene flyshes, which can be determined from absence of groundwater circulation under mostly carbonate Ostravska Greda ridge that separates Svitavsko Blato from Hutovo Blato.

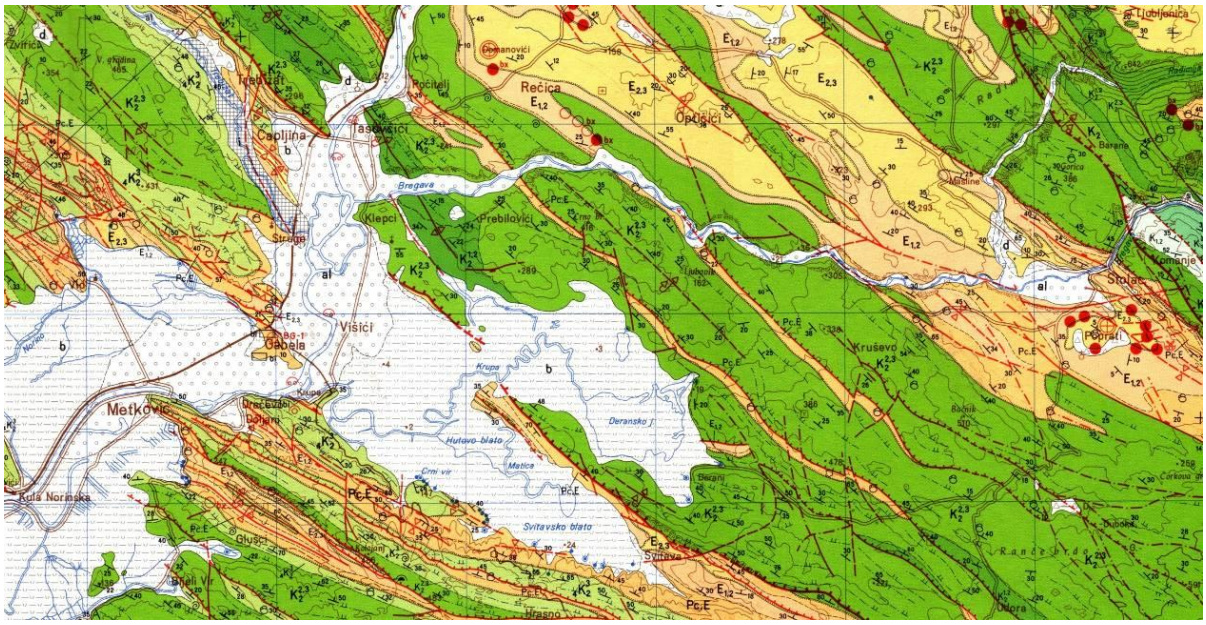


Figure 2.16: Excerpt from general geological map; scale 1:100,000 (OGK SFRY, sheet Metković) for the Hutovo Blato Nature Park area.

2.2.4.2 Structural-tectonic characteristics

In south-eastern zone of the Herzegovina High Karst, Hutovo Blato has been singled out in the tectonic unit Gabela – Svitava – Ljubinje, with structural features reflected in development of a series of imbricate folds. The imbricate structures are built of Cretaceous and Peleogene sediments. A boundary between Cretaceous and Paleogene is marked by minor bauxite occurrences.

Considering tectonics, general structural characteristics of the Hutovo Blato area are folds and overthrusts striking in NW-SE direction over the entire greater area. In this tectonic unit, the most prominent is Ljubuški-Stolac overthrust running along the Ostravaska Greda ridge along which Cretaceous limestones are overthrust on Paleogene limestones and Eocene flysch.

2.2.4.3 Engineering geology characteristics

As regards engineering geology, Upper Cretaceous carbonate rocks and Paleogene limestone rocks near the Hutovo Blato and Svitavsko Blato depressions are hard rock mass of excellent physical and mechanical characteristics, which considerably deteriorates in the shallowest parts of the ground and in narrow zones of intensive degradation. Such rocks are suitable as building material, sometimes and decorative stone for interior usage, while finely layered limestone is sometimes suitable as road construction material.

Eocene flysch sediments are rock mass of variable composition, and therefore of variable engineering geology characteristics. Hard rock masses (sandstone and marl) have good physical and mechanical characteristics, while semi-solid or loose rocks (breccia and rock) have poor engineering geology characteristics.

Sediments of the Hutovo Blato and Svitavsko Blato depressions are of silty-clayey or peat composition, cemented to semi-loose soil of low hardness which is not suitable as building material, with exception of its local use for construction of smaller structures.

In the area by the Neretva River, alluvial loose sediments of gravel and sand are suitable as building material and as base for construction of medium and small size structures.

2.2.4.4 Seismic characteristics

According to the seismic hazard map of the Seismological Service of the Republic of Croatia, for a 500-year recurrence period (Kuk *et al.*, 1987), scale 1:100,000, the territory to the west and east of Metković belongs to an area with magnitude 8º MSK scale (Medvedev-Sponheuer-Karnik, 1964; used in Eastern European countries, 12-degrees scale same as the MCS, Mercalli-Cancani-Siebergova scale). This seismicity degree refers to carbonate rocks. However, in a point of transition of the Neretva River and its valley Quaternary clastic alluvial deposits are encountered with increased seismicity degree is increased, particularly because these deposits are saturated with water. According to an Medvedev's empirical formula, seismicity degree increases by as much as 1.75. Consequently, total seismicity in the Neretva Delta deposits, and similar deposits in Hutovo Blato, would be 9.75° MSK.

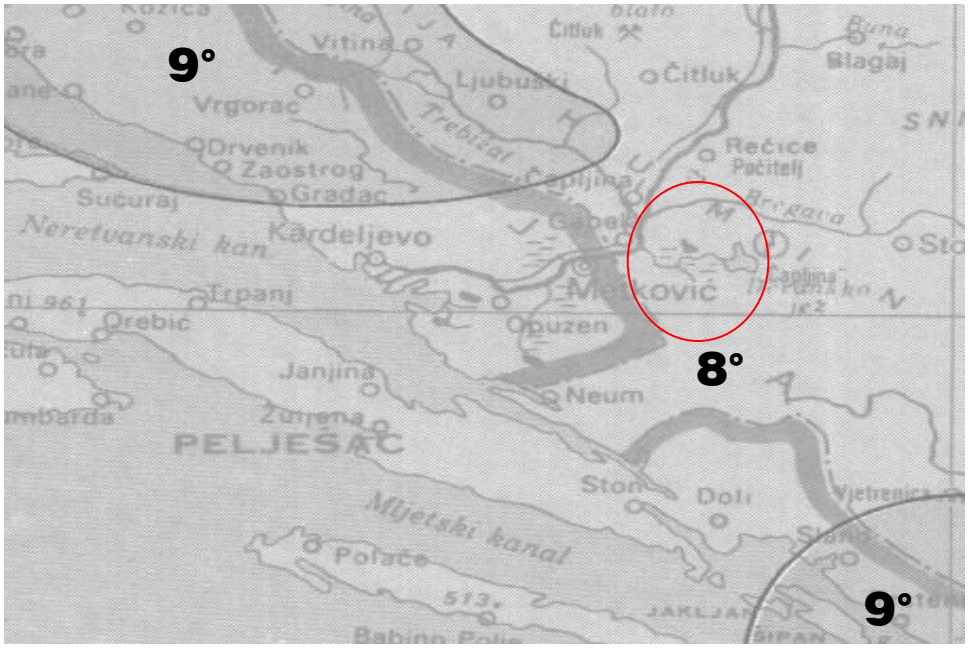


Figure 2.17: Excerpt from a seismic hazard map for the greater Hutovo Blato area

2.2.5 Pedology

2.2.5.1 Soil role and significance for the Hutovo Blato Nature Park

Pedological (soil science) approach to soil considers it as natural resource which is the basis for food, energy and water supply, support to biodiversity and source of climate change. Clearly soil is a decisive factor which determines, shapes and maintains the overall life, primarily autotrophic – plant life and through it, indirectly, animal life in the Nature park. Soil determines a method of land use outside the protected area which certainly affects the Nature Park. It is, therefore, clear that all soils within the Hutovo Blato Nature Park area are exceptionally important for survival and sustainability of the Nature Park.

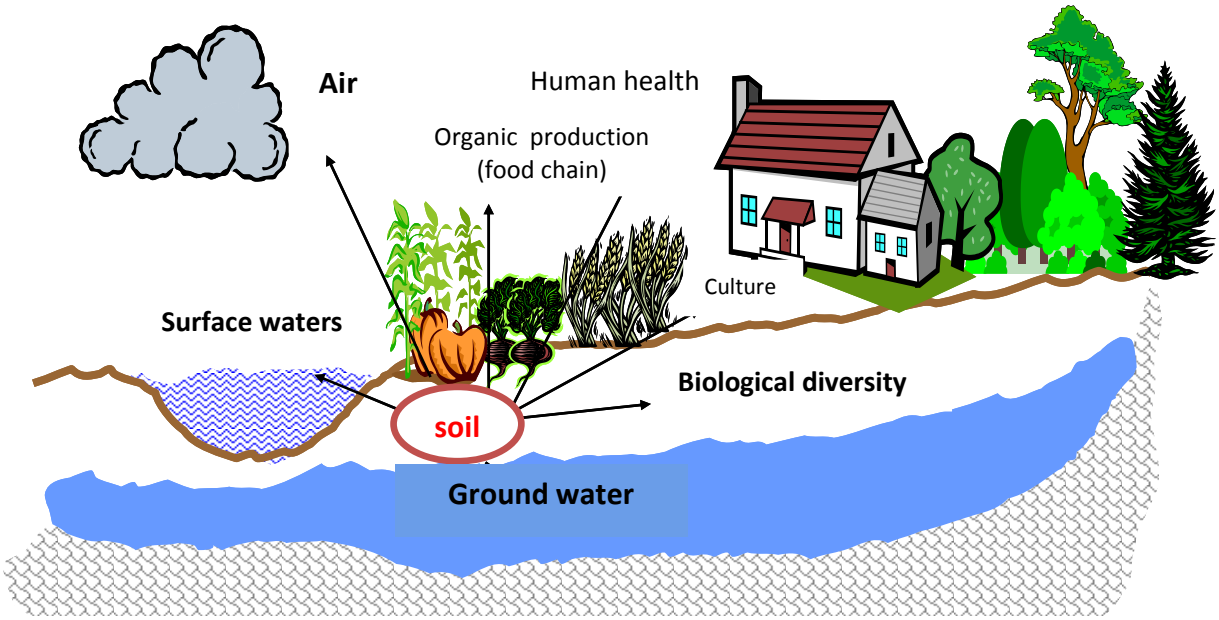


Figure 2.18: Roles – soil purpose and resources the soils offers, Blum (2004)

The figure clearly shows that soil affects all other spheres of life, but it does not show how other spheres affect the soil. The impacts are bilateral, with interactions cross-linking in indefinite number of ways, with countless impacts. These are the most subtle relations between living and non-living, organic and mineral, liquid, solid and gaseous, etc.

Since the entire Hutovo Blato is surrounded by rivers, it is clear that inadequate soil management in the entire Nature Park catchment reflects on the park itself, mostly although not always, depending on a distance from the Nature Park. An incident happening in any point within the catchment causing probable damage will be “diluted” or mitigated going downstream.

2.2.5.2 Cartographic presentation

A number of automorphic and hydromorphic types of soil are singled out in the study area because of their diversity under natural – biological (vegetation), climate, hydrothermal, geological-lithological and particularly hydrological conditions described above, as well as under human impact of different intensity. Soil cover in the Nature Park area is given in a soil map. The soil map (by H. Čustović) is based on the data from the basic document, the

General Soil Map of Bosnia and Herzegovina, scale 1:50,000, with sections that cover the Hutovo Blato area as well.

A basic map unit is the so called cartographic unit which, as a rule, is an association of a number of several soil types. Since this is a karst region, soil formation and distribution is most intensively affected by a substratum, i.e. Mesozoic limestones and dolomites, and hydrological conditions which are particularly complex. Due to underground and surface hydrographic network, any occurrence in the Hutovo Blato area shall reflect in completely unpredictable locations.

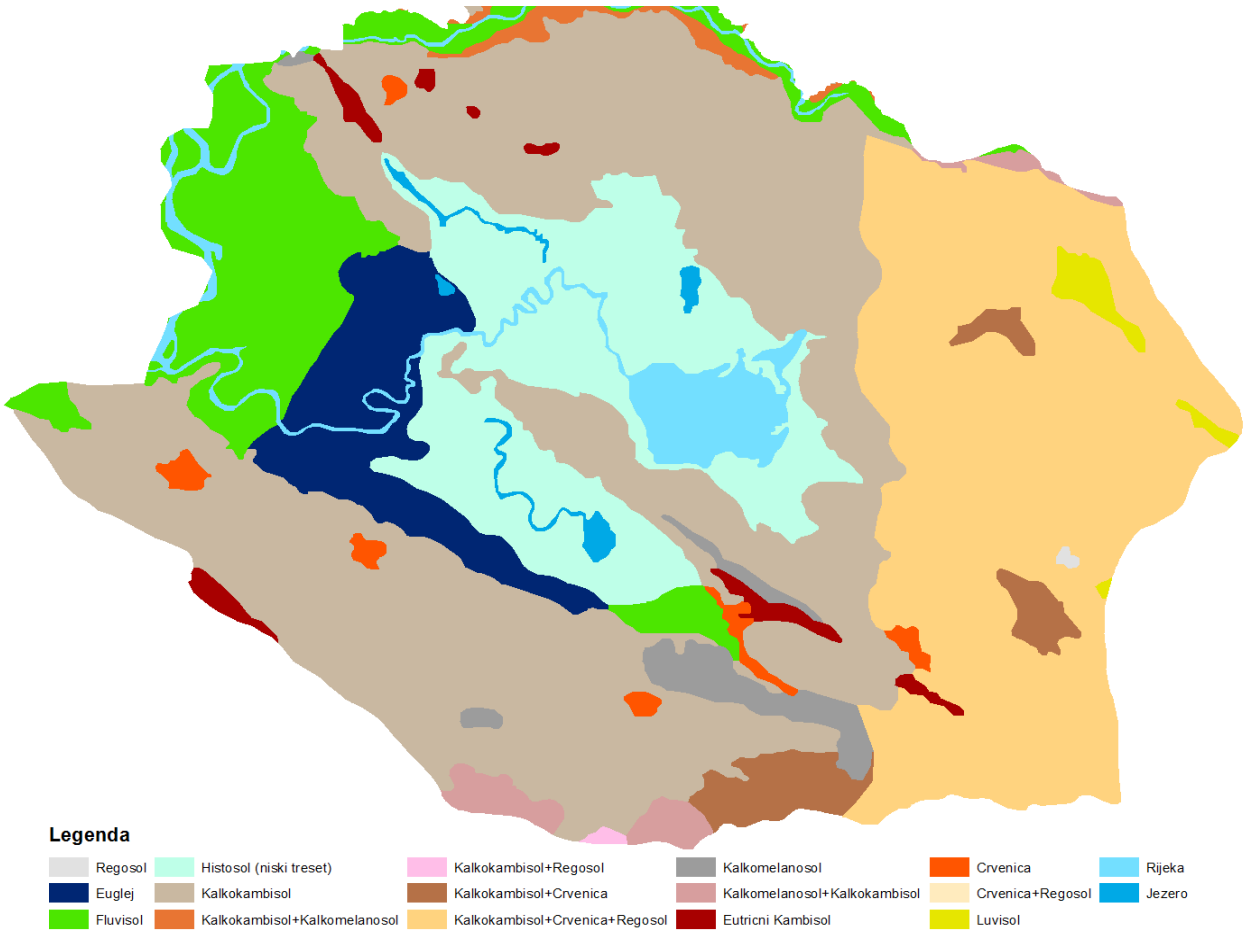


Figure 2.19: Soil map with legend for the greater Hutovo Blato Nature Park area (Čustović 2012)

General presentation and description of soil characteristics and surface area based on the soil map is given in Tables 2.4 and 2.5.

Table 2.4: Map units with description of basic characteristics of automorphic soils.

MAP CARTOGRAPHIC UNIT			BASIC CHARACTERISTICS OF CARTOGRAPHIC UNIT SOILS
No	Name and structure	Area (ha)	
AUTOMORPHIC – TERRESTRIAL SOILS Terrestrial soils are soils whose genesis and evolution conditions are related to wettening by precipitation only, there is no surplus water, exceptionally after heavy rains. They are dominantly encountered in the area encompassed by this study outside the flood zone of the watercourses forming and maintaining the Nature Park. Dominant genesis factors for these soils are parent material – limestone and dolomite substratum, tertiary sediments (marl, clay, clayey marls and sands) and climate conditions.			
1	Regosol	8.9	Weakly developed soil in initial stage of pedogenesis, in Croatian literature referred to as sierozem, (A)-C profile, formed on loose, permeable substratum – marl, which remains in this stage because of permanent tillage and removal by water erosion during autumn, winter and spring periods of rain. It is used for planting of grapevine and fruit trees, as Mediterranean policulture – water melon and melon are grown between widely set rows of fruit trees different vegetables or. All cultures are of high quality. Across-the-slope tillage and planting should be used.
2	Calcomelansol	327.0	Accumulative humus, A-C/R profile, in Croatian literature referred to as limestone; terra rossa over dolomite is an undeveloped soil evolution stage over limestone. It is A-R or A-C-R profile, developed from fragmented rock (lithosol) after the accumulation of humus, as the most important and morphologically pronounced and visible process of soil formation has progressed, so the accumulative humus horizon is deep black in colour (thus the name) and it covers the entire surface which is only partly interrupted by protruding stones or rocks. These soils are good for grass vegetation – hill or mountain pastures or meadows. They are used in this way, although if deeper than 20-30 cm they could be planted with potato and, provided irrigation, with vegetable crops, particularly the root crops – carrot, parsley and celery, etc. Milk and meat of sheep bred on such pastures or hay are of excellent quality.
3	Calcomelansol + Calcocambisol	228.7	Soils of this unit belong to A-C/R or A-(B)rz-C/R profile. Dry and skeletonic to skeletal soils. Genetically, they are rather young soils, and in their younger stages of evolution they are retained by eolic (wind) and hydraulic (water) erosion. They are encountered at somewhat higher positions, but they are mostly represented by barren land with poor pasture vegetation for goats and sheep or karst macquis dominated by Christ's thorn.
4	Calcocambisol	7,116.0	Belongs to brown or cambic soils, in Croatian literature referred to as brown soil over limestone. The most widespread soil unit in the Hutovo Blato area and its narrow surroundings. Soil is of A-(B)rz-R or A-(B)rz-C-R profile. This is a substratogenic soil, with characteristics and genesis specific for limestone or dolomite as substratum, and additionally it is a polygenic soil, which means that its formation lasted very long and that during the process the soil formations changed all environmental characteristics. It is created by limestone dissolution and accumulation of the so called nondissolving residue. The soil structure is very stable, as well as its other physical characteristics, it has favourable chemical properties thus its suitability and commercial value mostly depends on its depth and skeletal content. Deep varieties are highly fertile, they are used for growing of all sorts of plants, from field to forage crops, vegetables and fruits, and grapevine. Abundant heat results in cultures of excellent quality. Shallower varieties are under macquis or garrigue, which is characterized by domination of Christ's thorn *(Poliurus spina christi)*. Soils on higher altitudes are good habitats for pubescent oak, Adriatic oak and oriental hornbeam forests. The soils are equally used for good quality meadows for sheep and goats. Lamb meat from these meadows is of excellent quality.
5	Calcocambisol + Regosol	14.6	It is encountered on screes accumulated on negative relief forms – at the slope bottom or in valleys. These are dry work soils, habitats to xerothermic vegetation and vegetation of screes where old man's beard *(Clematis vitalba)* is an indicator. When cultivated and in positions suitable regarding relief and topography, these soils are good habitats for plantations of peach, plum and grapevine.
6	Calcocambisol+ Calcomelansol	156.8	This unit is similar the previous one, but encountered on higher altitudes, where its is exposed to more intensive erosion. Genesis has progressed, so these soils are somewhat deeper. They are often highly skeletal. They are natural habitats to pubescent oak, oriental hornbeam or macquis dominated by Christ's thorn *(Paliurus spina christi).*
7	Calcocambisol + Terra rossa + Regosol	4.272.9	The most widespread cartographic unit after unit No. 4. These soils occur as mosaics in the western part of the area covered by this study. Calcocambisol and terra rossa are formed by earlier described accumulation of nondissolving residue, and here it is nondissolving residue of Upper Cretaceous limestone, colour red, unlike other limestones which contain brown nondissolving residue with a smaller or greater share of reddish shade. What they have in common is stable structure and, consequently, very favourable physical characteristics. Chemical characteristics include neutral reaction, high adsorption capacity, and low phosphorus content which needs to be made up by abundant fertilization. Terra rossa and calcocambisol are highly fertile agricultural soils for all purposes. They share inveterate lack of water, usually when it is most needed. Therefore, irrigation is the best way towards safe and stable yield of all cultures. Regosol occurs, as a rule, on marly soils occurring irregularly as mosaics in the entire area of this part of Herzegovina.

8	Calcocambisol+ Terra rossa	392.8	This unit is characterized by very suitable mosaic alteration of two favourable and fertile soil units. They are used as agricultural land for growing of all cultures, including fruit plantations and vineyards.
9	Terra rossa	158.8	The soil is of A-(B)rz-R profile. It occurs in several smaller and isolated locations, separated from calcocambisol, although they usually come together and share high similarities. These soils have very similar genesis. The soil has high fertility potential due to its stable structure and consequently favourable physical and chemical characteristics. Terra rossa has general characteristics of soils over limestone – generic lack of phosphorus, thus all cultures cultivated on this soil react well to phosphorus fertilization. When used for greenhouse cultivation, salination occurs thus rising a question whether to change the substrate or move the greenhouses to new locations and leave the soil to scouring.
10	Terra rossa + Regosol	0,1	This unit is separate in a location where, along terra rossa, small surfaces of marl occur on which undeveloped soils are formed. These soils are locally referred to as “yellow earth” because of yellow colour typical for Tertiary marls from which they are formed. These soils also demand water, since numerous spring areas are of poor capacity and dry out when water is most needed.
11	Eutric cambisol	182,4	This soil is of A-(B)v–C profile, formed on loose Tertiary sediment and Cretaceous flysch. It occurs on smaller surfaces, in positions with more stable relief. It has some characteristics of heavy soils, and there are some indications on difference in age of surface and deeper layers, thus the soil is of double-layer texture. Its physical and chemical characteristics are favourable, and compared to all other soils it is more fresh and colder, therefore fruit and grapes cultivated on it are juicier and have higher acid content compared to the ones cultivated on limestone substrate. It is more resistant to drought. It is used for all agricultural crops, including plantations.
12	Luvisol	118,9	Like the previous unit, luvisol is the most developed soil stage. It is a deep soil, with lighter and more favourable A+E profile, namely surface horizons mixed by ploughing and considerably modified by tillage and use, since it is a plough-land horizon. Its characteristics depend on usage intensity. It is a good soil for permanent plantations, and more resistant to drought than the soil over karst.

Table 2.5: Map units with description of basic characteristics of hydromorphic soils.

MAP CARTOGRAPHIC UNIT			BASIC CHARACTERISTICS OF CARTOGRAPHIC UNIT SOILS
No	Name and structure	Area (ha)	
HYDROMORPHIC SOILS Hydromorphic, hydrogenic or marshy soils are soils in which a genesis horizon occurs within 100 cm saturated with water during most of the year, it is bluish in colour because of reduced compounds and, based on its origin, water could be upper (flood water) or lower (groundwater). Another indicator is occurrence of peat, a specific organic matter formed by humification of abundant vegetation in water, i.e. in anaerobic conditions. It is black in colour when wet, and light gray when dry. A peat horizon is initial stage, which turns into peats with increase in depth. This soil order also includes an alluvial soil– fluvisol, formed by disposal of earth material from riverine or torrential deposits.			
13	Eugley	950,6	Eugleys are soils of A-Gr, A-Gr–C or A/TGr-Gso-Gr profile encountered to the south-east from Višić, between Višićka Kazeta and Lake Deran, in an area exposed to floods and impact of excessive water occurring either as underground or as flood water due to spilling of the Matica and Krupa rivers. In any case, excessive water is retained at the depth of less than 100 cm in the soil profile for a longer period of time, causing reduction processes of hydromorphism or initial stages of peat formation. As regards endomorphology, they are noticed for their bluish colour of reduced compounds (Fe phosphates – siderite). It should be underscored that in soils, i.e. in earth material originally generated from nondissolving residue of limestone, intensity of bluish colour of the gley horizon does not correlate with the intensity of the reduction process in soil due to lack of phosphate. In the Hutovo Blato area, gleying was determined – a hypogley regime of hydromorphism, so the soil has Aa-Gso,r-Gr profile or T-G profile in peaty hypogley soil. Additionally, amphygley regime of hydromorphism is encountered (on both sides) in case of gleying by upper and lower water (groundwater), so the soil profile is Gr-Gso-Gr. Common characteristic of these soils is water regime unfavourable for growing of all cultures. However, this soil is a very suitable substrate for abundant vegetation of common reed *(Phragmites sp)* and common bulrush *(Typha* latifolia), True fox sedge and Acute sedge *(Carex vulpina and acuta),* soft rush *(Juncus effusus),* yellow iris and Siberian iris *(Iris pseudacorus and Iris sibirica)*, willow **(***Salix sp.),* European alder *(Alnus glutinosa),* etc. This vegetation is a good shelter for ornithofauna and game, important members of the Hutovo Blato Nature Park fauna.
14	Fluvisol	1.715,2	A stratified soil, namely recent irregular riverine deposit, which is a consequence of frequent changes in river channel and cutting of new watercourse channels. The soil is of (A)-II-III-IV... etc. profile with possible occurrence of gleyed horizon. A largest integral unit is the one situated between the Neretva and Krupa rivers in the western part of the Hutovo Blato Nature Park. All layers are different and very heterogeneous, some are skeletonic,

			other skeletal, carbonate, acid, etc. These are the most fertile soils in Hutovo Blato, excellent for a wide array of vegetable cultures and strawberries. Yields and quality of vegetables grown here indoors (plastic tunnels, greenhouses, glasshouses), or outdoors are well recognized in the market. This type of production demands irrigation, and conditions for introduction of irrigation are favourable since immense quantity of fresh water suitable for irrigation is available in the vicinity. Conditions for organic vegetables production are favourable, which makes the prospects for entry into the most squeamish and attractive markets very realistic.
15	Histosol (low peat)	2.368,8	These soils belong to T-G category, i.e. peat soils. They are formed by humification of enormous quantities of organic matter generated under conditions dominant in the area. Large quantities of water and high temperatures create very favourable conditions for development of wetland plants, such as: common reed *(Phragmites sp)*, common bulrush *(Typha latifolia),* True fox sedge and Acute sedge *(Carex vulpina and acuta),* soft rush *(Juncus effusus),* yellow iris and Siberian iris *(Iris pseudacorus and Iris sibirica),* but also of woody plants such as: willow *(Salix sp.),* European alder *(Alnus glutinosa),* etc. At the end of the vegetation period, large quantities of willow and alder leaves fall into the water, large quantities of leaves from common reed and common bulrush wither away and humificate, actually carbonize under anaerobic conditions. Peat is generated, a dark-coloured organic matter which reveals the components it was formed from. The peats of Hutovo Blato were studied by Kurtović (1963, 1965), and peat management in the Livanjsko Polje field was studied in detail by Čustović and Bašić (2008). According to Kurtović, quality of the Hutovo Blato peat is very high, but we have reservations about any use of peat. Because of its high adsorption capacity, peat is the most efficient natural protection, a barrier, against all pollution since it attracts, like sponge, all pollutants that might enter rivers, protects lakes and groundwater and spring water against contamination. Thus, although it is an excellent material for greenhouse production, it should not be exploited within the Nature Park and in the greater area, and its use should be strictly controlled!
Surface area			**73,000,000 m^2 or 730.00 ha**
Inland area of the greater (researched) area:			**180,124,000 m^2 or 18,012.40 ha**
Narrower Hutovo Blato Nature Park area			**78,240,064 m^2 or 7,824.00 ha**

Figure 2.20: Calcocambisol – brown soil over limestone (the most widespread soil unit in the Hutovo Blato Nature Park area)

Figure 2.21: In lower positions of relief, calcocambisol from the above photograph is used as a highly fertile soil for high-input vegetable production, indoors and outdoors (Photo: Bašić)

2.3 BIOTIC FACTORS

2.3.1 Water Characterisation

A characterization was made of all surface and groundwaters in the territory of the Federation of Bosnia and Herzegovina in the Neretva and Trebišnjica Management Plan for the Federation of Bosnia and Herzegovina project development, in line with the Water Framework Directive (2000/60/EC). The directive covers inland surface waters (rivers and lakes), transitional waters, coastal waters and groundwaters. The WFD objectives are to maintain "high status"of water where it exists, to prevent degradation of the current status, and to achieve at least "good status" of all waters by 2015.

Table 2.6: Surface water status classification acc. to WFD

Status	Description
high	No deterioration
good	Negligible deterioration
moderate	Moderate deterioration
poor	Significant deterioration
bad	Complete deterioration

The characterization also encompassed the waters of Hutovo Blato, Lakes Deran and Svitava and the Krupa River. Lakes Deran and Svitava belong to Type J1 Dinaric, medium sized, medium deep lowland lakes on calcareous substrate. Lake Deran represents a reference status for this type of lake. The Krupa River belongs to Type 3c Lowland small and mid-sized rivers on organogenic substrate.

Excerpt from the Neretva and Trebišnjica Management Plan for the Federation of Bosnia and Herzegovina – Lakes:

General: Upper part of Hutovo Blato is lake Deran, a natural limnological system, lake surface area 3.7 km^2, depth 3.3 m, and maximum lake width 2.4 km. Total length of the lake coast is 13 km, maximum depth 11 m, average depth 2 m; latitude 43°3'0.56" north, longitude 17°47'38.02" east.

Abiotic profile:

Lake:	Deran	Svitava
Lake area (km^2):	3.7	10
Substrate:	Calcareous	Calcareous
Altitude (m a.s.l.):	<200	<200
Mean depth (m):	2	5

Physico-chemical characteristics:

Trophic state	Transparency (m)	Total P mg P/l	Total N mg N/l	Chlorophyll -*a* (µg/l)
oligotrophic	>5	<0.01	<0.15	<2
mesotrophic	1-5	0.01-0.04	0.15-0.30	2.0-3.5
moderately eutrophic	1-0.5	0.04-0.1	0.30-0.50	3.5-5.5
eutrophic	< 0.5	0.1-0.15	0.50-0.60	5.5-7.0
hypereutrophic	< 0.5	> 0.15	> 0.60	>7.0

Phytoplankton community: *Peridinium incospicum, Peridinium willeii, Dinobryon divergens, Cyclotella sp., Fragilaria sp., Synedra acus, Synedra capitata, Chlamydomonas sp., Gonium pectorale, Pediastrum boryanum, Scenedesmus ecornis.*

According to available measurement data, ecological status of the Deran lake is good, while its chemical status was not determined because of data unavailability (see section 2.3.2 below).

Excerpt from the Neretva and Trebišnjica Management Plan for the Federation of Bosnia and Herzegovina - the Krupa River:

General: Type 3, subtype 3c, includes two abiotic reaches of lowland rivers (< 200 m a.s.l.): lowland small rivers (catchment size 10-100 km^2), on organic substrate, and lowland mid-sized river (catchment size 100-1000 km^2), on organic substrate. This subtype includes the Krupa and Matica rivers. The Krupa River runs out of the Lake Deran. Water temperature in this type of rivers is to max. 28°C. Allowable change in maximum temperature is T=3°C.

Abiotic profile:

Catchment size (km^2):	10 – 100 – 1000 (small to mid-sized)
Slope (m/km):	<1 (small)
Flow rate (m^3/s):	2 - 20
Channel substrate:	organogenic
Altitude (m a.s.l.):	<200 (lowland)

Physico-chemical characteristics:

Status	Conduct. μScm^{-1}	Alkalinity $mgCaCO_3/l$	pH-value	Oxygen content mgO_2/l	BOD mgO_2/l	COD-Mn mgO_2/l	Ammoni-um mgN/l	Nitrates mgN/l	Total N mgN/l	Total P mgP/l
High	<550	>210	8.8-8.6	>7.5	<2.0	<4.0	<0.10	<0.5	<1.5	<0.10
Good	550-600	210-155	8.5-6.5	7.5-6.5	2.0-2.5	4.0-5.5	0.10-0.25	0.5-1.5	1.5-2.0	0.10-0.25
Moderate	601-650	155-100	6.4-6.3 8.6-9.0	6.4-5.5	2.6-3.0	5.6-6.5	0.26-0.40	1.6-2.0	2.1-3.0	0.26-0.35
Poor	651-700	99-70	6.2-6.0 9.1-9.3	5.4-4.5	3.1-4.2	6.6-7.5	0.41-0.55	2.1-3.0	3.0-4.0	0.35-0.45
Bad	>700	<70	<6.0 >9.3	<4.5	>4.2	>7.5	>0.55	>3.0	>4.0	>0.45

Macrozoobenthos community: **Gastropoda:** *Bithynia tentaculata, Emmericia patula,* Hydrobiidae Gen. sp.; **Crustacea:** *Asellus aquaticus* ssp., *Echinogammarus thoni, Gammarus balcanicus*; **Ephemeroptera:** *Baetis rhodani., Ephemera danica*; , *Ephemera zeettana;* **Trichoptera**: Brachycentridae Gen. sp., *Hydropsyche* sp., *Hydroptila* sp., Lepidostomatidae Gen. sp., Leptoceridae Gen. sp., *Sericostoma* sp

Phytobenthos community: *Chladophora* sp., *spyrogira* sp., *Achnantidium minutissima,Cocceneis pediculus, C. placentula, Denticula tenuis, Diploneis oblogella, Encyonema* sp., *Encyonema ventricosa, Gomphonema ventricosum, Gomphonema intricatum, Eunotia arcus, Eunotia lunaris, Eunotia valida, Navicula tripunctata, Nitzschia* sp., *Nitzschia acicularis, Nitzchia plaea, Rhoicosphenia curvata, Surirella linearis var. helvetica, Suirrella robustra var. slendida*, *Synedra biceps, Synedra capitata*.

Macrophyte community: *Myriophyllum* tip (*Ranunculus fluitans* zajednica), *Sparganium emersum* zajednica, *Potamogeton lucens* tip

Saprobic characteristics:

Saprobic index (SI)

high	good	moderate	poor	bad
1.9	2.15	2.85	3.35	>3.35

Extended biotic index (EBI) for benthic invertebrates only

high	good	moderate	poor	bad
>9	7-8	5-6	3-4	<3

The Krupa River is divided into two water bodies (water body code BA_NTRB_Kru_1 from mouth into the Neretva to the end of the embankment, and water body code BA_NTRB_Kru_2 from the end of the embankment to Hutovo Blato). According to the measured ecological status parameters and available measurements they are both have good status, while chemical status has not been determined (see section 2.3.2 below).

2.3.2 Water Status

Good status for Hutovo Blato means at least good chemical and ecological status of water.

The Water Framework Directive sets additional criteria for protected areas thus, since Hutovo Blato is the Ramsar site, additional more stringent requirements are imposed for water preservation and protection.

Table 2.7: Limit values for individual water parameters in the Hutovo Blato Nature Park to maintain high water status

Physico-chemical parameters supporting biological elements										
General			Oxygen regime			Nutrients				
Conductivity μScm^{-1}	Alkalinity $mgCaCO_3/l$	pH-value	Oxygen contentmgO_2/l	BOD mgO_2/l	COD-Mn mgO_2/l	Ammonium mgN/l	Nitrates mgN/l	Total N mgN/l	Total P mgP/l	Chlorophyll-*a* (µg/l)
<440	>230	8.8-8.6	>8.5	<1.5	<3.0	<0.09	<0.5	<0.8	<0.06	< 5

Water sampling in the Hutovo Blato area is responsibility of the Agency for Watershed of Adriatic Sea and it is carried out by the Health Ecology Service, Public Health Institute of the Federation of Bosnia and Herzegovina, at Krupa – Karaotok, Derane – Šarčevac, Derane – Drijen and Svitava Gornja locations (Figure 2.22).

General physico-chemical parameters, nutrients, heavy metals, microbiological and other parameters are measured, but systematic monitoring of biological quality elements (fish, macrozoobenthos, phytobenthos, phytoplankton and microphytes) has not been established. Measurements have been carried out since 2007, and sampling results show that water quality satisfies provisions of the Regulation on Water Classification (Official Gazette of SRB&H No. 19/80), namely stipulated water class (I and II) regarding physico-chemical aspects. Insufficiency in chlorophyll is observed, which is characteristic for wetlands, while increase in conductivity is present during the summers, which points to increase in salt content in water. However, it is generally concluded that water meets stipulated water quality criteria. Actually, a problem is reduction in water inflow into Lake Deran. Under such conditions, gullies and lakes are overtaken by vegetation, wetland vegetation dries out and settles. In order to improve water regime in spring areas, water circulation and replenishment of lakes in the Derane area, it is necessary to clear overgrown springs and gullies.

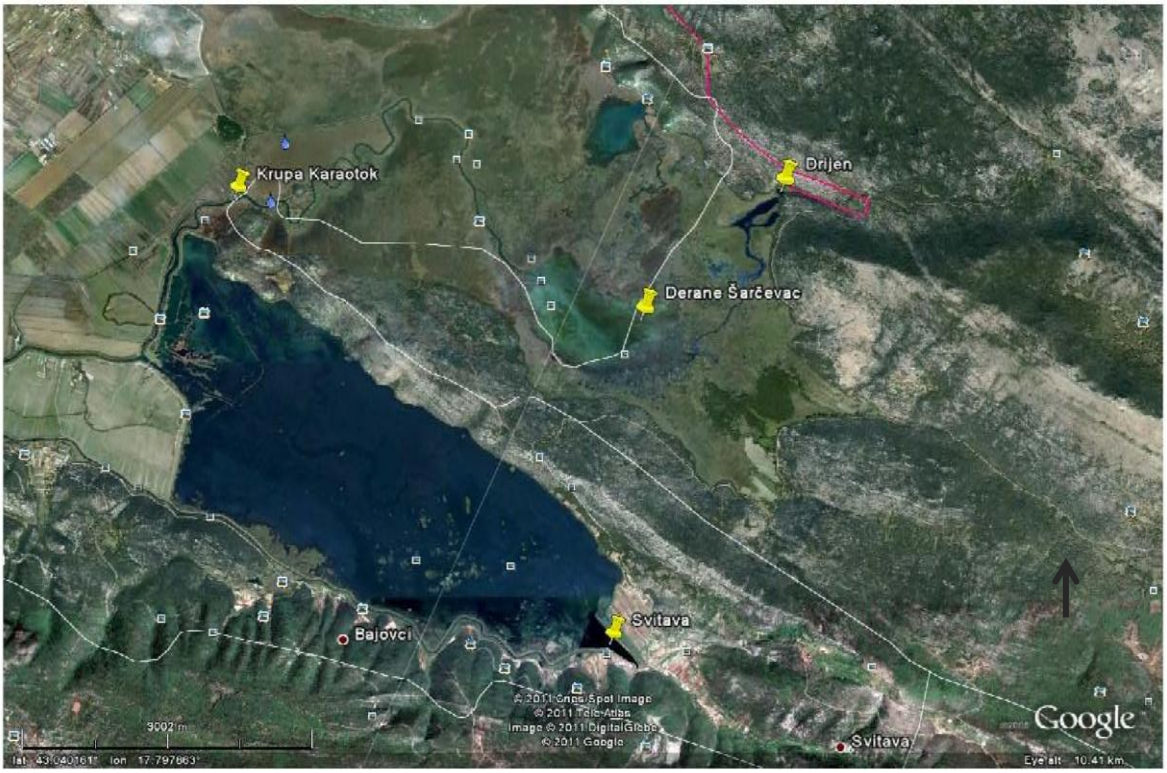


Figure 2.22: Water quality monitoring sites at Hutovo Blato

Unlike Lake Deran, sampling in Lake Svitava area is not carried out systematically. There are, however, data on one-year monitoring of nutrients (2011) at the Čapljina PSHPP outlet. The sampling results indicate that phosphorus content is somewhat increased, which is probably a consequence of farming activities in the area.

In addition to agriculture, a site visit determined a number of solid waste dump sites, which also contribute to contamination of the water in Lake Svitava.

Results of physico-chemical parameters monitoring at the Hutovo Blato stations in 2010:

STATION: SVITAVA GORNJA, lake							
	PHYSICO-CHEMICAL ANALYSIS					Unit	Assessment
Sampling date / **Parameter**	09/08/2010	09/09/2010	11/10/2010	11/11/2010	15/12/2010		
Oxygen content	12.26	12.26	14.39	12.31	13.27	O_2 mg/l	high
Total P	0.047	0.025	0.037	0.017	0.006	P mg/l	high
Orthophosphates	0.000	0.015	0.000	0.016	0.004	P mg/l	high
Chlorophyll-a	3.99	5.73	5.554	1.121	3.213	µg/l	good

Overall assessment: Good status achieved

STATION: DERANE – DRIJEN, lake						
	PHYSICO-CHEMICAL ANALYSIS				Unit	Assessment
Sampling date / **Parameter**	11/08/2010	09/09/2010	12/10/2010	24/11/2010		
Oxygen content	12.87	10.43	13.46	13.88	O_2 mg/l	high
Total P	0.027	0.104	0.046	0.015	P mg/l	high
Orthophosphates	0.000	0.015	0.014	0.009	P mg/l	high
Chlorophyll-a	0.88	0.469	1.175	0.000	µg/l	high
Transparency (Secchi disk)	7.5	8.0	9.5	2.7	m	-

Overall assessment: High status achieved

STATION: DERANE – ŠARČEVAC, lake						
	PHYSICO-CHEMICAL ANALYSIS				Unit	Assessment
Sampling date / Parameter	11/08/2010	09/09/2010	12/10/2010	24/11/2010		
Oxygen content	11.32	10.54	9.00	10.06	O_2 mg/l	high
Total P	0.000	0.021	0.015	0.034	P mg/l	high
Orthophosphates	0.003	0.013	0.004	0.005	P mg/l	high
Chlorophyll-a	0.15	1.00	1.730	0.897	µg/l	high

Overall assessment: High status achieved

STATION: KRUPA, river						
	PHYSICO-CHEMICAL ANALYSIS				Unit	Assessment
Sampling date / Parameter	09/08/2010	09/09/2010	11/10/2010	11/11/2010		
Ammonium	0.049	0.037	0.000	0.003	N mg/l	high
Nitrates	0.336	0.412	0.415	0.390	N mg/l	high
Total N	0.457	0.483	0.494	0.472	N mg/l	high
Total P	0.034	0.008	0.020	0.028	P mg/l	high
Orthophosphates	0.000	0.000	0.000	0.011	P mg/l	high

Overall assessment: High status achieved

Ecological status of water is determined on the basis of **biological**, **physico-chemical and hydromorphological** elements of quality. The EU Water Framework Directive requires that each element achieves at least “good status”, and final assessment is based on the element with the poorest status.

Due to hydromorphological changes, Lake Svitava is a heavily modified water body candidate. Thus its ecological potential is determined, since the criteria for good status of ecological potential are less stringent than the criteria for good ecological status.

Hydromorphological condition of Lake Deran according to the WFD is based on assessment of the **hydrological regime** (quantity and dynamics of water flow, residence time and connection to the groundwater bodies) and **morphological conditions** (lake depth variations, quantity and structure of substrate, structure and condition of the lake shore). Good hydromorphological condition has to ensure conditions for achieving of good status of biological quality elements.

Since hydromorphological condition affects the final assessment of the ecological status, namely an overall status of water, it is considered that specific measures regarding inter-entity impacts would result in maintaining good overall and ecological status of Lake Deran even after the planned changes in the Trebišnjica River basin are implemented.

Construction of a number of civil engineering and technical facilities in the Neretva River channel since 1953, and subsequently in the Trebišnjica River basin, has caused a considerable loading of the area. However, construction of new hydroelectric power plants and reservoirs is planned in the Upper Neretva area and the Trebišnjica River basin in the near future. Generally, reservoirs built for these power plants should help balancing of the Neretva at the profiles in its middle and lower course, as well as balancing of the Trebišnjica regime. However, a problem could arise due to inadequate operating mode of the hydropower system that might cause additional decrease in discharge from the springs in the Hutovo Blato area during the period of low waters and ingress of saline water towards the upstream parts of the river course. Salination might cause large problems in the protected area of Hutovo Blato, which could actually result in destruction or modification of the entire flora and fauna in this protected area.

Salination of soil, lowering of surface waters and groundwaters, conveying of waters, drainage of karst regions, reduction in inflow of fresh water has already been observed in the Neretva Delta downstream from Čapljina, and there is tendency of future worsening of the condition.

2.3.3 Aquatic Habitats

Waters occupy the majority of the Hutovo Blato Nature Park area, i.e. 39% of total surface area. The Nature Park consists of two separate geomorphological units: Lake Deranor Gornje Blato and Lake Svitava or Donje Blato. Gornje Blato consists of 5 smaller lakes: Deran, Orah, Drijen, Jelim and Škrka, interconnected by gullies, while Donje Blato, namely Lake Svitavawas converted into a reservoir of the Čapljina Pumped-storage Hydroelectric Power Plant during the 1960ies. The wetland is supplied with water from numerous karst springs and the Neretva River connected with the Deran lake through the Krupa River.

Figure 2.23: Location of The Hutovo Blato waters (western view)

Lake Svitava

Aquatic habitat description: Lake Svitava is a man-made ecosystem. The reservoir area is about 1000 ha (Glamuzina *et al.*, 2001). Originally, this was an area comprising several gullies and smaller lakes. Water is shallow, its depth is one to two meters. The bottom is mostly covered by algae and aquatic plants, with several remnant muddy areas. The reservoir is rich in nutrients originating from greenhouses set up in its vicinity. Water temperature fluctuates from 8°C in winter to 23 °C in summer thus, according to these characteristics, it is a typical cyprinid water.

Lake Deran

Aquatic habitat description: Among all water bodies in Gornje Blato, Lake Deran is the largest and richest. Lake Deran area is 297 ha (Glamuzina *et al.*, 2001). The lake is shallow, its depth fluctuates between 20 and 100 cm, and its area reduces by one third during summer. Bottom is covered with microalgae in spots where the water flow is slow, thus making them favourable for fry growth. In middle part and there where the current is faster, there is no algae cover. The entire shore is overgrown with thick vegetation, common reed and sedge, which create shelter for various fish species of different sizes. Water temperature fluctuates from 10 °C in winter to 21 °C in summer.

Lake Škrka

Aquatic habitat description: Lake Škrka area is 10.7 ha, and its depth fluctuates from one to 10 meters. The bottom is covered with algae, and the entire shore is overgrown with common reed. Originally, the lake was connected with the Krupa River by a long and narrow gully which passed through a large area of common reed and sedge, situated between Škrka and Jelim lakes. Several years ago a new canal was cut near to the western boundaries of the Nature Park. This new gully drains majority of water and leaves the old one flowless and prone to overgrowth with aquatic plants and sedge. This is a typical cold-water lake, with temperatures fluctuating from 13^0 to 17^0C.

Drijen and Orah springs

Aquatic habitat description: The Drijen and Orah springs belong to the Gornje Blato lakes. Their total area is 11.2 ha. These lakes are deep and cold, with rocky bottom rich in springs.

Lake Jelim

Aquatic habitat description: Total area 27.5 ha. Based on differences in depth and plant community composition it could be subdivided into three ecosystems:

- deeper, max. depth 17 m, oligotrophic, with numerous springs, connected with hills (one fourth of total area).
- shallow, depth 1-5 m, oligotrophic part of bottom covered with aquatic plants (two fourths of total area),
- shallow zone of common reed and sedge, overgrown with higher hygrophytic plants, such as *Phragmites*, warmer and richer in decomposing organic material; area of this part varies depending on hydrological conditions.

Water temperature in the first two parts fluctuates between 13°C and 17 °C. In shallow zone of common reed and sedge, temperature is higher in summer and reaches up to 20 °C.

The Krupa River

Aquatic habitat description: The Krupa River level fluctuates from 89 to 208 cm (Glamuzina *et al.*, 2001). The river connects the wetland with the Neretva River. It is 6 km long, rises in the Deran lake, and collects water from other lakes and gullies and Lake Svitava. The river depth fluctuates from 1 to 5 m and width from 10 to 30 m. The bottom is covered with algae and higher aquatic plants. In the second part of its course, the river is trained by an embankment, while the upper course is overgrown with common reed and sedge. Under normal conditions, the river is running from the wetland towards the Neretva River, and when the Neretva water levels are high it flows into the wetland.

Mačja Ljut reed-patches

Aquatic habitat description: It covers a considerable surface of Gornje Blato, particularly between the Škrka and Jelim lakes, where the ecosystem is completely different. The depth fluctuates between several centimetres and 0.5 meter. The bottom is muddy, sandy only in points closer to the springs, but these areas are of limited spread. The muddy bottom is very soft, with numerous holes ideal as fish shelter. The bottom is covered with microalgae in points. During summer, because of the hydrological regime the depth decreases and water temperature reaches 25 °C.

Gullies

Londža gully – The gully is 1 km long, its width fluctuates from 1 to 3 m, and depth from 0.5 to 2 m. The bottom is overgrown with algae and higher plants. The shore is covered with common reed in the last several hundred meters only, while the rest is overgrown with trees growing in immediate vicinity of shore and forming stands similar to mangrove forests. Temperature is stable at the spring (13-13.2 °C), and it fluctuates downstream the gully from 13 °C to 17°C. The gully also collects waters from the neighbouring springs thus forming a small estuary at the entry into Lake Deran.

Jelimski Potok gully – This gully, about one kilometre long, connects Lake Jelim with the Krupa River passing through a natural zone of common reed and sedge. The width fluctuates between half meter and two meters, depth from 0.5 to 1.5 m. Temperature of water fluctuates between 13 °C and 17 °C. The bottom is partly covered with algae.

Jelimska Rječina gully – The Jelimska Rječina River connects Lake Jelim and Lake Deran. It is about 2 km long, width fluctuates from several to 20 meters, depth from 1 to 5 meters. The bottom in the majority of course is fine sand and with no demersal vegetation because of rapid flow. Where flow is slower, the bottom is muddy, overgrown with algae and aquatic plants. Temperature of water fluctuates between 13 °C and 17 °C. The river bank is overgrown with common reed and, in some parts, with trees.

2.3.4 Potential Natura 2000 Habitats

Considerable biodiversity of habitats has been recorded in the Hutovo Blato area - **45 associations grouped in 16 vegetation types**. Fragmentation and destruction of habitats and overexploitation of resources in the post-war period caused dramatic increase in the environmental degradation in the territory of Bosnia and Herzegovina generally, including the Hutovo Blato area. One of methods of valorisation is proclaiming of the European ecological network Natura 2000 and incorporating of the habitats at the Nature Park area into this network. Natura 2000 established a biological relation between the ecologically significant sites (natural, nearly natural and protected natural areas) and their buffer zones secured by ecological corridors.

Some of the below habitats are potential Natura 2000 sites within Hutovo Blato:

- Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoëto-Nanojuncetea* (3130), i.e. amphibious habitats which are occasionally flooded – vegetation of coastal fresh water areas, class *Isöeto-Nanojuncetea*, order *Isöetalia*, alliance *Nanocyperion flavescentis,* association *Eleocharetum ovatae*. In the Hutovo Blato area, communities are described of brown flatsedge and Knotgrass of the association *Cypero-Paspaletum distichi* and *Paspaleto - Leersietum oryzoides* from the alliance *Fimbrystilion dichotomae*.

- Mediterranean temporary ponds (3170) – habitat characterized by very shallow ponds, a few centimetres deep, occurring occasionally during year (in winter or spring), isolated from larger permanent water surfaces. In the Hutovo Blato area, this habitat is represented by alliance *Fimbristylion dichotomae*. It is populated by characteristic flora adapted to periodic cycles of intensive flood or drought: *Paspalum paspaloides*, *Leersia oryzoides*, *Cyperis michelianus*, *Cyperis flavescens*, *Crypsis alopecuroides*, *Fimbristylis dichotoma*, *Eleocharis quinquefflora,* etc. In the Hutovo Blato area, this threatened and rare habitat is represented by communities of the Cypero-Paspaletum digitarii (distichii), *Dichostyli-Fibristyletum dichotomae* and *Paspaleto- Leersietum oryzoidis*. Habitat of Mediterranean temporary ponds has limited distribution, and according to the references it is encountered in several locations in the Hutovo Blato Nature Park: the Krupa River and lakes

Deran, Jelim, Orah and Škrka, Karaotok and Donje Blato. In the Hutovo Blato Nature Park area this habitat has not been seriously degraded. The basic problem is operation of the hydroelectric power plants on the Neretva River, since the Nature Park is situated in the Neretva Delta. During dry periods, operation of these power plants causes low water levels because water is retained in the reservoirs.

- Alluvial forest on *fluvisols* (91E0) - Typical *edafogene*, less orogene, azonal phytocenoses, following wider alluvial belts along the banks of small rivers and rivers. They are mostly on different fluvisols, less on other hygrophilic soils. They are briefly but regularly flooded. Main differentiating factor for heterogeneity of this widely distributed type of habitat is grain size of the soil solid phase, which is coarser on higher and finer on lower alluvial terraces. Temperature gradient vector usually acts in parallel. This habitat is characteristic for the following species: *Alnus glutinosa, A. incana, Salix alba, S. fragilis, S. purpurea, Populus nigra, P. alba, Euonymus europaea, Festuca gigantea, Carex remota, Aegopodium podagraria, Sambucus nigra, Impatiens noli-tangere, Circaea lutetiana, Stellaria nemorum, Plagiomnium undulatum, Ficaria verna ssp. bulbifera, Chaerophyllum hirsutum, Athyrium filix-femina, Galeobdolon luteum agg., Ranunculus lanuginosus, Rumex sanguineus, Chrysosplenium alternifolium, Lamium maculatum, Primula elatior, Oxalis acetosella, Ajuga reptans, Lysimachia nemorum, Crepis paludosa, Rubus caesius, Cardamine amara, Glechoma hederacea agg., Alliaria petiolata, Geranium robertianum, Equisetum sylvaticum, Cirsium oleraceum,* etc.

The habitats map has not been prepared within the Management Plan development because several years of research are needed to determine exact extent and boundaries of particular habitats and species, which asks for adequate financial resources. Generation of a detailed map is planned under measure B.1. (Section 5.3 Objectives, Measures, Indicators and Measures Implementation Control)

2.3.5 CORINE Land Cover

According to the Corine Land Cover database on the state and changes in land cover and land use, the following land cover categories are present in the Hutovo Blato Nature Park area:

1. ARTIFICIAL AREAS	3. FORESTS AND SEMI-NATURAL AREAS
1.1. Urban fabric 112 Discontinuous urban fabric	**3.1 Forests** 311 Broad-leaved forest **3.2 Shrub and/or herbaceous vegetation associations** 322 Moors and heathland 323 Sclerophyllous vegetation 324 Transitional woodland shrub
2. AGRICULTURAL AREAS	**4. WETLANDS**
2.1. Arable land 211 Non-irrigated arable land 212 Permanently irrigated land **2.2. Permanent crops** 222 Fruit trees and berry plantations 231 Pastures **2.4 Heterogeneous agricultural areas** 242 Complex cultivation 243 Land principally occupied by agriculture, with significant areas of natural vegetation	**4.1. Inland wetlands** 411 Inland marshes **5. WATER BODIES** **5.1. Inland waters** 512 Water bodies

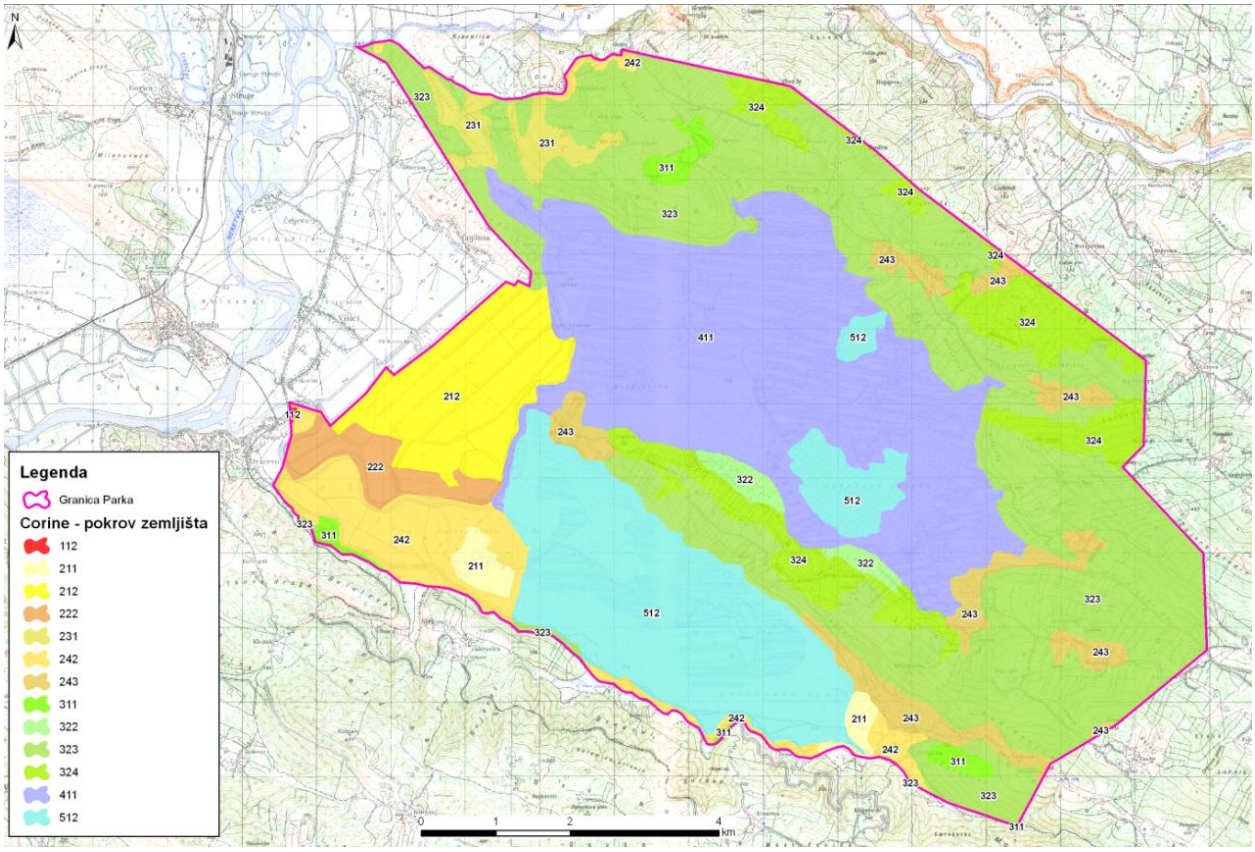


Figure 2.24: Land cover in the Hutovo Blato Nature Park area

2.3.6 Flora

The studies and various projects conducted in the Nature Park area established presence of over 700 plant species (Jasprica 2009). Hygrophytic and aquatic plant communities are the basic ecosystems in the Nature Park, and the basic factor for development of individual types of vegetation is groundwater level. Hygrophytic vegetation mostly belongs to class of the *Phragmitetea*, order of the *Phragmitetalia*, alliance of the *Phragmition*, association of the *Scirpo Phragmitetum*. It covers larger surfaces of uncultivated marsh, and borders channels, canals, brooks and the Krupa River. Association of the *Myriophyllo Nupharetum* occurs sporadically. Among aquatic vegetation, it is important to mention Yellow pond-lily (*Nuphar luteum*) L and white water-lily (*Nymphaea alba*) L, and species of wetland habitats, such as narrowleaf cattail (*Typha angustifolia*), common reed (*Phragmites communis*) Trin. and sedge (*Carex sp*.). The saw-sedge (*Cladium mariscus*) (L.) *Pohl*. and Bowles' golden sedge (*Carex elata*) All are encountered in somewhat higher, dryer grounds.

The species to be mentioned among ground flora are common sage (*Salvia officinalis*) L., immortelle (*Helichrysum italicum*) (Roth.) Mill. Corr. Guss., winter savory (*Satureja montana*) L. etc.

Different species of trees include South European flowering ash (*Fraxinus ornus*) L., Hop hornbeam (*Ostrya carpinifolia*) Scop., Mediterranean hackberry (*Celtis australis*) L., and shrubs include pomegranate (*Punica granatum*) L., Christ's thorn (*Paliurus spina christi*) Mill., Dalmatian laburnum (*Petteria ramentacea*) Presl., European cornel (Cornus mas) L., etc. Within the Nature Park, a natural revitalization is happening of the Narrow-leafed Ash (Fraxinus *angustifolia*) L. Another plants encountered here include osier (*Salix purpurea*) L., white willow (*Salix alba*) L., white mulberry (*Morus alba*) L., and fig tree (*Ficus carica*) L.

In the surrounding hills, element of maquis are encountered typical for sub-Mediterranean areas, such as the Prickly juniper (*Juniperus oxycedrus*) L. and European holly (*Phillyrea media*) L.), and the largest areas under these trees are established on Crno Brdo. Among significant species, terebinth (*Pistacia terebinthus*) L. was found, and laurel (*Laurus nobilis*) L. was found in only one isolated island within the marsh.

Changes caused by anthropogenic impact, particularly on water regime, interact with the natural process of wetland overgrowth and change natural appearance of wetland habitats.

The plant cover in the Nature Park could be divided into four types of vegetation: aquatic, hygrophytic, meadow and forest. Water surfaces in Hutovo Blato are mostly covered with white water-lily (Nymphaea alba) and yellow pond-lily (Nuphar luteum). Aquatic plants include pondweed (Potamogeton sp.), buttercup (Ranunculus sp.) etc. The marsh is mostly overgrown with endless reed-patches with dominant species being: common reed (Phragmites sp.), narrowleaf cattail (Typha sp.), sedge (Carex sp.) and rushes (Juncus sp.).

The forest and meadow vegetation is represented by numerous characteristic species adding to biological diversity of Hutovo Blato. Significant species of this type of vegetation are: ash (Fraxinus sp.), oak (Quercus sp.), butcher's broom (Ruscus sp.), pomegranate (Punica sp.), juniper (Juniperus sp.), willow (Salix sp.), elm (Ulmus sp.), alder (Alnus sp.), blackberry (Rubus sp.), mulberry (Morus sp.), deadnettle (Lamium sp.), clover (Trifolium sp.) Some plant communities are developed only sporadically, while others are widespread and cover large surfaces.

Table 2.8 List of only those species determined in Hutovo Blato in 2008, within the WWF Project No. 9E0752.01 (Jasprica 2009) and LIFETCY 99/B&H/035 project (Meštrović, 2001) with endangerment categories

No	Taxa	IUCN (glob. /reg)	No	Taxa	IUCN (glob. /reg)
1	*Abutilon teophrasti* Med.		126	*Medicago arabica (L.) Hudson*	
2	*Acanthus spinossisimus* Pers.	VU	127	*Mentha aquatica L.*	
3	*Acer monspessulanum* L.		128	*Mentha pulegium L.*	
4	*Agrostis alba* Auct.		129	*Molinia arundinacea Schrank*	
5	*Agrostis stolonifera* L.		130	*Moltkea petraea (Tratt.) Griesb.*	
6	*Alisma plantago-aquatica* L.		131	*Myosotis scorpioides L.*	
7	*Althaea officinalis* L.		132	*Myriophyllum spicatum L.*	
8	*Amaranthus retroflexus* L.		133	*Myriophyllum verticillatum L.*	
9	*Artemisia verlotiorum, Lamotte*		134	*Najas marina L.*	
10	*Asparagus acutifolius* L.		135	*Najas minor All.*	
11	*Asphodelus aestivus* Brot.		136	*Nasturtium officinale R. Br.*	
12	*Atriplex latifolia* Wahlenb.		137	*Nitella sp.*	
13	*Avena sterilis* L.		138	*Nuphar lutea (L.) Sm.*	VU
14	*Baldellia ranunculoides* (L.) Parl.	CR/EN	139	*Nymphaea alba L.*	
15	*Ballota foetida*		140	*Nymphoides peltata (Gmel.) Kuntze*	VU
16	*Ballota nigra* L.		141	*Oenanthe aquatica (L.) Poiret*	
17	*Berula erecta* (Hudson) Coville		142	*Onopordon illyricum*	
18	*Bidens cernua* L.		143	*Orchis laxiflora Lam.*	
19	*Bidens subalternans,* DC		144	*Orchis palustris Jacq.*	
20	*Bidens tripartita* L.		145	*Orchis simia Lam.*	VU(NT)/NT
21	*Bolboschoenus maritimus* (L.) Palla		146	*Orchis spitzelii Saut.*	EN/VU
22	*Bromus hordeaceus* L.		147	*Paliurus australis*	
23	*Bromus racemosus* L.		148	*Papaver rhoeas L.*	
24	*Bromus sterilis* L.		149	*Parietaria diffusa M. et K.*	
25	*Butomus umbellatus* L.	VU	150	*Parietaria vulgaris*	
26	*Calamintha nepeta*		151	*Paspalum dilatatum, Poir.*	
27	*Callitriche palustris* L.		152	Paspalum distichum L.	
28	*Callitriche stagnalis* Scop.		153	*Paspalum paspaloides (Michx.) Scribner*	
29	*Caltha palustris* L.		154	*Periploca graeca L.*	EN/EN
30	*Calystegia sepium* (L.) R. Br.		155	*Petrorhagia saxifraga (L.) Link*	
31	*Carduus pycnocephalus* L.		156	*Petteria ramentacea (Sieb.) C.Presl*	
32	*Carex distans* L.		157	*Peucedanum palustre (L.) Moench*	
33	*Carex divisa* Hudson	EN/VU	158	*Phalaris arundinacea L.*	
34	*Carex elata* All.		159	*Phragmites australis (Cav.) Trin.*	
35	Carpinus orientalis Mill.		160	*Phytolacca americana, L.*	
36	*Catapodium rigidum* (L.) Hubbard		161	*Pistacia terebinthus L.*	
37	*Celtis australis* L.		162	*Plantago bellardii All.*	
38	*Celtis tournefortii* Lam.	VU	163	*Plantago lanceolata L.*	
39	*Centaurea calcitrapa* L.		164	*Plantago major L.*	
40	*Centaurium pulchellum* (Swartz) Druce		165	*Plumbago europaea L.*	
41	*Ceratophyllum demersum* L.		166	*Poa annua L.*	
42	*Ceratophyllum submersum* L.		167	*Poa sylvicola Guss.*	
43	*Chara hispida* L.		168	*Polygonum amphibium L.*	
44	*Chenopodium album* L.		169	*Polygonum aviculare L.*	
45	*Chenopodium glaucum* L.		170	*Polygonum hydropiper L.*	
46	*Chenopodium murale* L.		171	*Polygonum lapathifolium L.*	
47	*Chenopodium polyspermum* L.		172	*Polygonum mite Schrank*	
48	*Cichorium intybus* L.		173	*Polygonum persicaria L.*	
49	*Cirsium arvense* (L.) Scop.		174	*Polypogon monspeliensis (L.) Desf.*	
50	*Cladium mariscus* (L.) Pohl.		175	*Populus alba L.*	
51	*Colutea arborescens* L.		176	*Populus nigra L.*	
52	*Convolvulus arvensis* L.		177	*Potamion eurosibiricum*	
53	*Conyza canadensis* (L.) Cronq.		178	*Potamogeton acutifolius Link*	
54	*Crypsis alopecuroides* (Pill. et M.) Schrader		179	*Potamogeton crispus L.*	
55	*Cyclamen neapolitanum* Ten.	VU	180	*Potamogeton fluitans Roth.*	
56	*Cyclamen repandum* S. et S.	VU	181	*Potamogeton lucens L.*	
57	*Cynodon dactylon* (L.) Pers.		182	*Potamogeton natans L.*	
58	*Cyperus flavescens* L.	VU/NT	183	*Potamogeton pectinatus L.*	
59	*Cyperus fuscus* L.	VU/NT	184	*Potamogeton perfoliatus L.*	
60	*Cyperus longus* L.	VU/NT	185	*Potamogeton pussilus L.*	
61	*Cyperus michelianus* (L.) Delile	VU/VU	186	*Potentilla reptans L.*	
62	*Cyperus serotinus* Rottb.	VU/VU	187	*Pulicaria vulgaris Gaertner*	
63	*Dactylis hispanca* Roth		188	*Punica granatum L.*	
64	*Daucus carota* L.		189	*Quercus pubescens* Willd.	

No	Taxa	IUCN (glob. /reg)	No	Taxa	IUCN (glob. /reg)
65	*Digitaria sanguinalis* (L.) Scop.		190	*Quercus trojana* Webb	
66	*Dittrichia viscosa* (L.) W. Greuter		191	*Ranunculus lingua L.*	
67	*Ecbalium elaterium* (L.) Rich. f.		192	*Ranunculus ophioglossifolius Vill.*	EN(VU)/VU
68	*Echinochloa crus-galli* (L.) Beauv.		193	*Ranunculus sceleratus L.*	
69	*Echinocystis lobata, (Michx.) Torr. & A.Gray*		194	*Ranunculus trichophyllus Chaix*	
70	*Eleocharis palustris* (L.) R. et S.		195	*Rhamnus intermedius Steud. et Hohst.*	
71	*Eleocharis ovata* (Roth) Roem. & Schult.	EN(CR)/EN	196	*Rhamnus rupestris Scop.*	
72	*Eleusine tristachya* (Lam.) Lam.		197	*Roripa sylvestris (L.) Besser*	
73	*Elodea canadensis* Michx.		198	*Rorippa amphibia (L.) Besser*	
74	*Epilobium parviflorum* Schreber		199	*Rubus dalmaticus Tratt.*	
75	*Equisetum palustre* L.		200	*Rubus ulmifolius Schott*	
76	*Eryngium amethystinum* L.		201	*Rumex pulcher L.*	
77	*Eupatorium cannabinum* L.		202	*Ruscus aculeatus L.*	VU
78	*Euphorbia palustris* L.		203	*Salix purpurea L.*	
79	*Fimbristyllis bisumbellata* (Forssk.) Bubani	CR/CR	204	*Sambucus ebulus L.*	
80	*Fimbristylis dichotoma* (L.) Vahl.		205	*Samolus valerandi L.*	
81	*Foeniculum vulgare* Miller		206	Schoenoplectus lacustris (L.) Palla	
82	*Fontinalis antipyretica* L.		207	(Schoenoplectus litoralis (Schrad.) Palla	
83	*Fraxinus angustifolia* Vahl		208	*Schoenoplectus tabernaemontani (Gmel.) Palla*	
84	*Galanthus nivalis* L.	VU	209	*Schoenoplectus triqueter (L.) Palla*	
85	*Galium aparine* L.		210	*Scolymus hispanicus L.*	
86	*Galium palustre* L.		211	*Scutellaria galericulata L.*	
87	*Galium verum* L.		212	*Sedum sexangulare L.*	
88	*Geranium dissectum* L.		213	*Senecio paludosus L.*	
89	*Geranium molle* L.		214	*Setaria glauca (L.) Beauv.*	
90	*Gratiola officinalis* L.		215	*Setaria virids (L.) Beauv.*	
91	*Hedera helix* L.		216	*Sherardia arvenisis L.*	
92	*Helianthus tuberosus* L.		217	*Silene latifolia Poir.*	
93	*Hippuris vulgaris* L.	EN/VU	218	*Silybum marianum (L.) Gaertner*	
94	*Hordeum leporinum* Link		219	*Sisymbrium officinale (L.) Scop.*	
95	*Hordeum secalinum* Schreber	EN(VU)/EN	220	*Sium latifolium L.*	
96	*Hottonia palustris* L.	EN/EN	221	*Solanum dulcamara L.*	
97	*Humulus lupulus* L.		222	*Solanum tuberosum L.*	
98	*Hydrocharis morsus-ranae* L.	VU	223	*Sonchus arvensis L.*	
99	*Hydrocotyle vulgaris* L.	CR/EN	224	*Sonchus asper (L.) Hill.*	
100	*Iris pseudacorus* L.		225	*Sonchus oleraceus L.*	
101	*Juncus anceps* Laharpe		226	*Sparganium erectum L.*	
102	*Juncus articulatus* L.		227	*Stachys palustris L.*	
103	*Juncus bufonius* L.		228	*Stratiotes aloidesL.*	VU(EN)/VU
104	*Juncus compressus* Jacq.		229	*Tagetes minuta L.*	
105	*Juncus subnodulosus* Schrank		230	*Taraxacum officinale Weber*	
106	*Juniperus oxycedrus* L.		231	*Teucrium scordium L.*	
107	*Lamium maculatum* L.		232	*Thelypteris palustris Schott*	VU
108	*Leersia oryzoides* (L.) Swartz		233	*Trifolium fragiferum L.*	
109	*Lemna minor* L.		234	*Trifolium pratense L.*	
110	*Lemna trisulca* L.		235	*Trifolium repens L.*	
111	*Lepidium graminifolium* L.		236	*Trifolium resupinatum L.*	VU/VU
112	*Leucojum aestivum* L.		237	*Typha angustifolia L.*	
113	*Lolium perenne* L.		238	*Typha latifolia L.*	
114	*Lonicera implexa* Ation		239	*Ulmus laevis Pall.*	
115	*Lotus corniculatus* L.		240	*Urtica dioica L.*	
116	*Lotus tenuis* W. et K.		241	*Utricularia vulgaris L.*	VU
117	*Ludwigia palustris* (L.) Elliott	EN	242	*Verbena officinalis L.*	
118	*Lycopus europaeus* L.		243	*Veronica anagallis-aquatica L.*	
119	*Lysimachia nummularia* L.		244	*Veronica anagalloides Guss.*	VU
120	*Lysimachia vulgaris* L.		245	*Veronica beccabunga L.*	
121	*Lythrum salicaria* L.		246	*Vitex agnus-castus L.*	
122	*Malva parviflora* L.	EN/VU	247	*Vitis vinifera L. subsp. sylvestris(Gmel.)Hegi*	
123	*Malva sylvestris* L.		248	*Xanthium spinosum L.*	
124	*Marrubium incanum Desr.*		249	*Xanthium strumarium L.*	
125	*Marsilea quadrifolia L.*	EN(VU)/VU	250	*Zannichelia palustris L.*	VU

IUCN Regional and global status: VU - "vulnerable", EN - "endangered", CR - "critically endangered"

Table 2.9: Only plants with IUCN category presented

Acanthus spinossisimus Pers.

IUCN: VU www.baystateperennial.com

Baldellia ranunculoides (L.) Parl.

IUCN: CR/EN ©Maurizio Zarpellon

Butomus umbellatus L.

IUCN:VU www.zelen.cz

Carex divisa Hudson

IUCN: EN/VU ©Yvonne Duchene

Celtis tournefortii Lam.

IUCN: VU www.asianflora.com

Cyclamen neapolitanum Ten.

IUCN: VU www.crocus.co.uk

Cyclamen repandum S. et S.

IUCN: VU http://botany.cz

Cyperus flavescens L.

IUCN: VU/NT http://luirig.altervista.org

Cyperus fuscus L.

IUCN: VU/NT wikimedia.org

Cyperus longus L.

IUCN: VU/NT wikimedia.org

Cyperus michelianus (L.) Delile

IUCN: VU/VU http://botany.cz

Cyperus serotinus Rottb.

IUCN: VU/VU www.actaplantarum.org

Eleocharis ovata (Roth) Roem. & Schult.

IUCN: EN(CR)/EN www.redorbit.com

Fimbristyllis bisumbellata (Forssk.) Bubani

IUCN: CR/CR www.wildflowers.co.il

Galanthus nivalis L.

IUCN: VU wikimedia.org

Hippuris vulgaris L.

IUCN: EN/VU wikimedia.org

Hordeum secalinum Schreber

IUCN: EN(VU)/EN wikimedia.org

Hottonia palustris L

IUCN: EN/EN www.kuleuven-kulak.be

Hydrocharis morsus-ranae L.

IUCN: VU wikimedia.org

Hydrocotyle vulgaris L.

IUCN: CR/EN www.floracyberia.net

Nuphar lutea (L.) Sm.

IUCN: VU wikimedia.org

Nymphoides peltata (Gmel.) Kuntze

IUCN: VU wikimedia.org

Orchis simia Lam.

IUCN: VU(NT)/NT acaorchids.blogspot.com

Orchis spitzelii Saut.

IUCN: EN/VU wikimedia.org

Periploca graeca L.

IUCN: EN/EN http://luirig.altervista.org

Ranunculus ophioglossifolius Vill.

IUCN: EN(VU)/VU www.naturemp.org

Ruscus aculeatus L.

IUCN: VU wikimedia.org

Stratiotes aloidesL.

IUCN: VU(EN)/VU http://iazz.ro

Thelypteris palustris Schott

IUCN: VU http://luirig.altervista.org

Trifolium resupinatum L.

IUCN: VU/VU wikimedia.org

Utricularia vulgaris L.

IUCN: VU www.thismia.com

Veronica anagalloides Guss.

IUCN: VU http://luirig.altervista.org

Zannichelia palustris L.

IUCN: VU jcho.masgc.org

2.3.7 Fauna

2.3.7.1 Invertebrates

Fauna of terrestrial invertebrates in Hutovo Blato cannot be described within this Management Plan because there has been no systematic investigation into the area. Presence of individual microzoobenthos groups typical for the Krupa River is mentioned in section 2.3.1 and within the water characterization elaboration.

2.3.7.2 Fish

Hutovo Blato is a significant hatchery for fish within the Neretva River basin. The area had been traditionally used for fisheries. The fish fauna in Hutovo Blato is rather well researched. Long-time fish fauna researches in the Hutovo Blato wetland area recorded **43 fish species** (Tables 2.10 and 2.11).

More than half of species are indigenous, 12 of them endemic species of very narrow areal, and 15 are foreign species. A specific characteristic of the Hutovo Blato water is presence of a number of marine fish species residing there on temporary basis.

Thirty per cent of all species is included in Appendix III to the Bern Convention, and almost 45% of species populating this area belongs to some of STI categories, mainly the endemics. The most numerous family are cyprinids with 15 fish species, followed by salmonids with 5, and Gobiidae, Mugilidae and Percidae with 3 species each, while the other families are represented by one species each.

Twelve species: Lombardy lamprey *Lethenteron zanandreai* (Vladykov, 1955), Toothtrout *Salmo dentex* (Heckel, 1852), Marble trout *Salmo marmoratus (Cuvier,* 1829), Balkan brook trout *Salmo farioides* (Karaman, 1938.), Soft-muzzled trout *Salmo obtusirostris* (Heckel, 1852.), Dalmatian roach *Rutilus basak* (Heckel, 1843), Adriatic dace *Squalius svallize* (Heckel and Kner, 1858), Adriatic rudd *Scardinius plotizza* (Heckel and Kner, 1858), Neretvan nase *Chondrostoma knerii* (Heckel, 1843), Neretvan bleak *Alburnus neretvae* (Buj, Šanda et Perea, 2010), Neretvan spined loach *Cobitis narentana* (Karaman, 1928), Croatian goby *Knipowitschia croatica* (Mrakovčić et al., 1994) and Radović's goby *Knipowitschia radovici (*Kovačić*,* 2005) are endemic species recorded in the wetland. Such high endemism demands scientific confirmation, since taxonomic position of several species is still not sufficiently researched.

However, the trophic status of Hutovo Blato has been changed by human activities during the last four decades, which resulted in numerous serious negative changes. It is estimated that more than 20 foreign species have been introduced into the wetland since 1970ies, mainly as a consequence of carp stocking. Such import, some of which is accidental, caused significant changes in fish community which is presently dominated by foreign species, mostly the Pumpkinseed sunfish (*Lepomis gibbosus).*

According to recent researches, Lake Svitava, today a reservoir communicating with other water bodies, is populated by 14 fish species. Foreign species dominate, such as goldfish *(Carrasius auratus*), Tench *(Tinca tinca),* Brown bullhead *(Ameiurus nebulosus*) and Pumpkinseed sunfish *(Lepomis gibbosus),* and indigenous species include Adriatic dace *(Squalius svalizze).* The reservoir is a living space for small endemic species from taxa *Cobitis* and *Knipowitschia,* while predators such as eel and trout are in very small numbers.

In Gornje Blato, which is presently rather undisturbed and includes habitats of lakes, brooks, springs and submerged meadows, there are considerable differences in the fish community composition which are mainly due to the differences in temperature.

Lake Deran is the largest of all the Gornje Blato water bodies, and the most abundant in fish population. Seventeen fish species, predominantly significant commercial species, have been recorded in the lake.

Cyprinid species are dominant in the major part of the lake, while endemic species have been encountered in border areas with lower water temperatures where the brooks enter Lake Deran.

Eleven fish species have been caught in the Londža brook. Indigenous and endemic species are dominant, while foreign species are poorly represented because of low temperatures. Fourteen fish species live in cold Jelim lake characteristic for numerous springs. Significant commercial indigenous species are dominant. Eight species were found in the Škrka lake, and indigenous fish species are dominant same as in the cold Jelim lake. Ten fish species have been caught in the Krupa River, which is major route for daily and seasonal migrations of fish species in Hutovo Blato. Only four fish species have been found in the Jelimska Rječina gully which connects Lakes Jelim and Deran because of rapid flow, colder water and absence of vegetation. Eleven fish species have been detected in the Jelimska Jaruga gully. Three indigenous endemic species are dominant: Dalmatian roach, Adriatic dace and Neretvan rudd.

Current status of fish fauna in the Hutovo Blato wetland and its greater area could be marked as threatened and affected by numerous negative factors which have a considerable impact on survival of indigenous species which are mostly endemics.

Tables 3.10 and 3.11 give a detailed overview of all fish species established in Hutovo Blato and recorded during the recent studies, as well as those referred to in the references, while Table 2.12 is an overview of protection categories and international protection levels. Figure 2.25 shows the Hutovo Blato areas sampled in the period 1999 – 2001.

Although Bosnia and Herzegovina is not under obligation to respect the EU directives, enlisting the species protected under the Habitats Directive 92/43/EEC and Natura 2000 highlights international significance of these species.

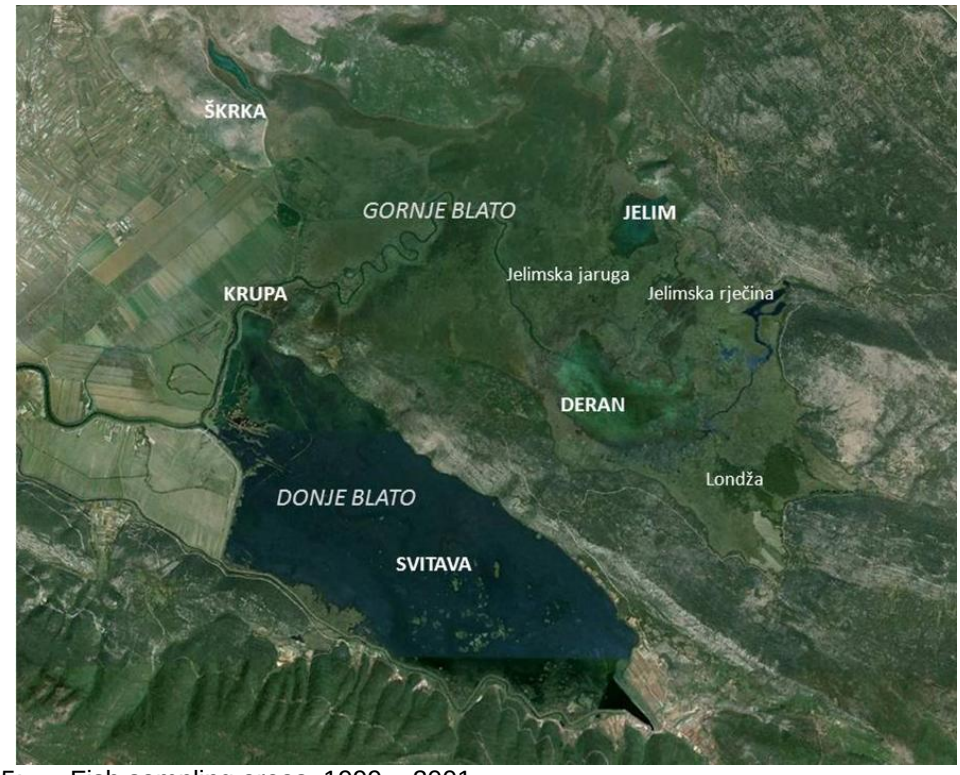


Figure 2.25: Fish sampling areas, 1999 – 2001

Table 2.10: List of indigenous, foreign and migratory fish species caught during sampling in Hutovo Blato in period 1999-2001, with fish determination locations (Glamuzina *et al.*, 2001)

No.	Species		Analysed area							
			Svitava	Deran	Londža	Jelim	Škrka	Krupa	Jelimska Rječina	Jelimska Jaruga
Indigenous species –endemic species of the narrow Neretva area										
1	*Salmo dentex*	Toothtrout		+	+	+	+	++		+
2	*Rutilus basak*	Dalmatian roach	+	++	++++	++	++	++	+++	+++
3	*Squalius svallize*	Adriatic dace	++	++	+++	+	+	++		++
4	*Scardinius plotizza*	Adriatic rudd	++	++	++	++		++	+	++
5	*Knipowitschia radovici*	Radovic's goby	+++	+++						
6	*Knipowitschia croatica*	Croatian goby	+							
7	*Chondrostoma kneri*	Dalmatian nase	+	+	++++	++		++	+	++
8	*Alburnus neretvae*	Neretva bleak					+			
9	*Cobitis narentana*	Neretvan spined loach	++	+++						
Indigenous species – endemic species of the greater Adriatic watershed										
10	*Squalius squalus**	Cavedano Chub								
11	Perca fluviatilis	European perch		+						
12	Sander lucioperca	Zander		+						
Foreign species - introduced into the wetland in the last 100 years										
13	*Tinca tinca*	Tench	++	++	++	++	+	++	+	++
14	*Lepomis gibbosus*	Pumpkinseed sunfish	+++	++++	++	+	++	++++		++
15	*Gambusia holbrooki*	Eastern mosquitofish	++							
16	*Ameiurus nebulosus*	Brown bullhead	++	++	+	+				+
17	*Cyprinus carpio*	Carp	+	+		+	+			+
18	*Carassius gibelio*	Prussian carp	++	+	+	+	+	++		+
19	*Gymnocephalus cernuus*	Ruffe		+						
20	*Gasterosteus aculeatus*	Three-spined Stickleback			+					
Migratory species – entering the wetland in a specific part of their life cycle										
21	*Anguilla anguilla*	European eel	+	++	++	++		++		++
22	*Platichthys flesus*	European flounder						++		
23	*Mugil cephalus*	Flathead mulllet				+				
24	*Liza ramada*	Thinlipped (Grey) Mullet		+		+				
25	*Liza saliens*	Sharpnose (Grey) Mullet				+				

* Established subsequently (2001), no location data

Catch size 1999 – 2001

\+ = 1 – 10 caught specimens
++ = 11 – 50
+++ = 51 – 100
++++ = >100

Table 2.11: Number of other indigenous, foreign and migratory fish species recorded in the period 1999–2010, and according to historical data and other researches without reference to location. * Only additionally recorded species not mentioned in Table 2.10

No.	Species		Comment
Indigenous species – endemic species of the greater Adriatic watershed			
26	*Lethenteron zanandreai*	Lombardy lamprey	Recorded in: 2007
27	*Pomatoschistus canestrinii*	Canestrini´s Goby	
28	*Squalius cephalus*	Common Chub	
29	*Salmo trutta*	Brown trout	
30	*Salmo marmoratus*	Marble trout	Recorded in: 1971
31	*Salmo farioides*	Balkan brook trout	
32	*Salmo obtusirostris*	Soft-muzzled trout	
33	*Atherina boyeri*	Big-scale sand smelt	migratory and amphidromic

No.	Species		Comment
Foreign species - introduced into the wetland in the last 100 years			
34	*Pseudorasbora parva*	Stone moroko	
35	*Abramis brama*	Common bream	Recorded in: 2007
36	*Hipophthalmichthys molitrix*	Silver carp	Recorded in: 2004
37	*Ctenopharyngodon idella*	Grass carp	Recorded in: 2004
38	*Silurus glanis*	Wels catfish	
39	*Esox lucius*	Northern pike	Recorded in: 1974
Migratory species - entering the wetland in a specific part of their life cycle			
40	*Petromyzon marinus*	Sea lamprey	
41	*Alosa fallax nilotica*	Mediterranean shad	Recorded in: 1962
42	*Dicentrarchus labrax*	European seabass	
43	*Sparus aurata*	Gilt-head bream	

Table 2.12: Systematic list of fish in IUCN protection category and protection under international conventions

	SPECIES		IUCN Reg.	IUCN Glob.	HABITATS DIRECTIVE	NATURA 2000	BERN CONVENTION
PETROMYZONTIDAE							
1	*Lethenteron zanandreai*	Lombardy lamprey	EN	EN	Annexes II &V	YES	App. II & III
2	*Petromyzon marinus*	Sea lamprey	LC	DD	Annex II	YES	Appendix III
SALMONIDAE							
3	*Salmo dentex*	Dentex trout	CR	DD			
4	*Salmo marmoratus*	Marble trout	CR	DD	Annex II	YES	
5	*Salmo farioides*	Balkan brook trout	EN	-			
6	*Salmo obtusirostris*	Adriatic trout	CR	DD			
CYPRINIDAE							
9	*Rutilus basak*	Dalimatian roach	NT	-			
10	*Leuscius svallize*	Adriatic dace	VU	VU			Appendix III
11	*Leuscius cephalus*	Chub	VU	LC			
12	*Scardinius plotizza*	Adriatic rudd	DD	-			
13	*Chondrostoma knerii*	Dalmatian nase	EN	DD			Appendix III
14	*Alburnus neretvae*	Neretva bleak	VU	VU	Annex II	YES	Appendix III
15	*Cobitis narentana*	Neretvan spined loach	VU	-		YES	
19	*Cyprinus carpio*	Carp	EN	VU			
23	*Abramis brama*	Common bream		LC			
ESOCIDAE							
24	Esox lucius	Northern pike		LC			
GOBIIDAE							
25	*Knipowitschia croatica*	Croatian goby	CR	VU	Annex II	YES	
26	*Knipowitschia radovici*	Radovic's goby	DD	VU			
27	*Pomatoschistus canestrinii*	Canestrini´s Goby	EN	LC	Annex II		Appendix II
PERCIDAE							
30	*Perca fluviatilis*	European perch		LC			
31	*Sander lucioperca*	Zander		LC			
SILURIDAE							
33	*Silurus glanis*	Wels catfish	-	LC			
GASTEROSTEIDAE							
36	*Gasterosteus aculeatus*	Three-spined stickleback	EN	LC			
MORONIDAE							
39	*Dicentrarchus labrax*	European seabass		LC			

IUCN Regional and Global status: LC - least concern, VU - vulnerable, EN - endangered, CR - critically endangered, DD - data deficient,
Bern Convention: Appendix II = strictly protected fauna species, Appendix III = protected fauna species
Habitats Directive: Annex II: animal and plant species of Community interest (excluding birds)
Annex V: animal and plant species of Community interest whose taking in the wild and exploitation may be subject to management measures

Table 2.13: Only the fish with established sensitivity or fish particularly protected under international conventions and directives presented (Photos: fishbase.org)

Lethenteron zanandreai
Lombardy lamprey

IUCN: Regional and Global status: EN/EN
Causes of threats: 1.1.1, 1.4.6, 6.3.1, 6.3.3, 6.3.7, 6.3.8, 9.7, 9.9 Conservation actions: 1.1.1, 1.2.1.2, 2.2, 3, 4.4.2, 5.7.2
Habitats Directive: Annexes II and V
Bern Convention: Appendices II & III
Natura 2000

Petromyzon marinus
Sea lamprey

IUCN:
Regional and Global status: LC/DD
Habitats Directive: Annex II
Bern Convention: Appendix III
Natura 2000

Salmo marmoratus
Marble trout

IUCN: Regional and Global status: CR/D.D.
Causes of threats: 1.1.1, 1.1.7, 1.4, 2.1, 6.1.1, 6.3.1, 6.3.3, 6.3.8, 9.9.
Conservation actions: 1.1.1, 1.2.1, 1.3.3, 2.2, 3, 4.1, 4.2, 4.4, 5.1, 5.4, 5.7.2
Habitats Directive: Annex II
Natura 2000

Salmo dentex
Dentex trout

IUCN: Regional and Global status: CR/D.D.
Causes of threats: 1.1.1, 1.4, 3.1.1, 6.1.1, 6.3.1, 6.3.3, 6.3.8, 9.9
Conservation actions: 1.1.1, 1.2.1, 1.3.3, 2.2, 3, 4.1, 4.2, 4.4, 5.4, 5.7.2

Salmo farioides
Balkan brook trout

IUCN: Regional and Global status: EN
Causes of threats: 1.1.1, 1.1.7, 1.4, 2.1, 6.1.1, 6.3.1, 6.3.3, 6.3.8, 9.9
Conservation actions: 1.1.1, 1.2.1, 1.3.3, 2.2, 3, 4.1, 4.4, 5.4, 5.7.2

Salmo obtusirostris
Adriatic trout

IUCN: Regional and Global status: CR/DD

Leuscius svallize
Adriatic dace

IUCN: Regional and Global status: VU/VU
Causes of threats: 1.1.1, 1.3.7, 1.4.2, 1.4.6, 6.3.1, 6.3.3, 6.3.8, 9.9
Conservation actions: 1.2, 2.2, 3, 4.1, 4.2, 4.4.2, 5.7.2
Bern Convention: Appendix III

Leuscius cephalus
Chub

IUCN: Regional and Global status: VU/LC, Causes of threats: 1.1.1, 1.3.7, 1.4.2, 1.4.6, 6.3.1, 6.3.3, 6.3.8
Conservation actions: 1.2.2.2, 1.3.3, 3, 4.1

Chondrostoma knerii
Dalmatian nase

IUCN: Regional and Global status: EN/D.D. Causes of threats: 1.1.1, 1.4.6, 3.1.1, 6.3.1, 6.3.3, 6.3.8, 9.9
Conservation actions: 1.1.1, 1.2, 1.3.3, 2.2, 3, 4.1, 4.2, 4.3, 4.4.2, 5.4, 5.7.2
Bern Convention: Appendix III

Knipowitschia croatica
Croatian goby

IUCN: Regional and Global status: CR/VU
Causes of threats: 1.1.1, 1.3.6, 1.4.2, 3.1.1, 6.3.1, 6.3.3, 6.3.8, 9.9
Conservation actions: 1.1, 1.2, 2.2, 3, 4.1, 4.2, 4.4.2, 5.7.2
Habitats Directive: Annex II
Natura 2000

Gasterosteus aculeatus
Three-spined stickleback

IUCN: Regional and Global status: EN/LC,
Causes of threats: 1.1.1, 6.3.1, 6.3.3, 6.3.8, 9.1 Conservation actions: 1.1.1, 3.2, 3.4, 3.8, 3.9, 4.1
Habitats Directive: Annex II
Natura 2000

Cyprinus carpio
Carp

IUCN: Regional and Global status: EN/VU
Causes of threats: 1.1.1, 1.1.7, 1.4.6, 2.1, 2.3, 2.4, 3.1, 6.3.1, 6.3.3, 6.3.8, 10.1
Conservation actions: 1.1.1, 1.3.3, 3.2, 3.9, 4.4.2, 5.4

Alburnus neretvae
Neretvan bleak

IUCN: Regional and Global status: VU/VU
Habitats Directive: Annex II
Bern Convention: Appendix III
Natura 2000

Cobitis narentana
Neretvan spined loach

IUCN: Regional and Global status: VU/-
Natura 2000

Pomatoschistus canestrinii
Canestrini´s Goby

IUCN: Regional and Global status: EN/LC
Habitats Directive: Annex II
Bern Convention: Appendix II

Knipowitschia radovici
Radovic's goby

IUCN: Regional and Global status: DD/VU
Causes of threats: 1.9, 2.6, 6.5
Conservation actions: 3.1, 3.2, 3.3, 3.4, 3.5, 3.8, 3.9

2.3.8 Amphibians

A recent research conducted in 2011 established presence of specimen of nine amphibian species. These species are enlisted in Tables 2.14 and 2.15.

Large local population was recorded only for marsh frog (*Pelophylax Ridibundus*) and agile frog (*Rana dalmatina*), while other species were represented sporadically.

The most frequently encountered and the most numerous amphibians are: *Pelophylax ridibundus* and *Rana dalmatina*, and species *Pelophylax ridibundus* and *Rana dalmatina* are the most frequently represented by juvenile or annual animals.

Table 2.14: Systematic presentation of all amphibians in The Hutovo Blato Nature Park established during the 2011 research Source: Monitoring and biodiversity list for the Hutovo Blato Nature Park, IGH Mostar, Oikon, 2012

Species	
CAUDATA	
SALAMANDRIDAE	
Lissotriton vulgaris	Smooth newt
Ichthyosaura alpestris	Alpine newt
ANURA	
BOMBINATORIDAE	
Bombina variegata	Yellow-bellied toad
BUFONIDAE	
Bufo bufo	Common toad
Pseudepidalea viridis	European green toad
HYLIDAE	
Hyla arborea	European tree frog
RANIDAE	
Rana dalmatina	Agile frog
Rana graeca	Greek stream frog
Pelophylax ridibundus	Marsh frog

Table 2.15: Overview of amfibians in The Hutovo Blato Nature Park established during 2011 research with protection categories

No.	SPECIES		IUCN Reg.	IUCN Glob.	HABITATS DIRECTIVE	NATURA 2000	BERN CONVENTION
CAUDATA							
SALAMANDRIDAE							
1	*Lissotriton vulgaris*	Smooth newt					
2	*Ichthyosaura alpestris*	Alpine newt					
ANURA							
BOMBINATORIDAE							
3	*Bombina variegata*	Yellow-bellied toad			Annexes II & IV	YES	Appendix II
BUFONIDAE							
4	*Bufo bufo*	Common toad					
5	*Pseudepidalea viridis*	European green toad					
HYLIDAE							
6	*Hyla arborea*	European tree frog	NT	NT	Annex II		Appendix II
RANIDAE							
7	*Rana dalmatina*	Agile frog			Annex II		Appendix II
8	*Rana graeca*	Greek stream frog			Annex IV		
9	*Pelophylax ridibundus*	Marsh frog					

IUCN Regional and Global status: NT - near threatened
Bern Convention - Appendix II = strictly protected fauna species, Appendix III – protected fauna species
Habitats Directive: Annex II: animal and plant species of Community interest (excluding birds) and Annex IV: animal and plant species of Community interest in need of strict protection

Table 2.16: Only the amphibians with established sensitivity or amphibians particularly protected under international conventions and directives presented

Bombina variegate
Yellow-bellied toad

Habitats Directive: Annexes II and IV
Bern Convention: strictly protected
Natura 2000

Hyla arborea
European tree frog

IUCN: Regionalni i globlani status: NT
Causes of threats: 1.1, 1.2.2, 1.4, 6.3
Conservation actions: 4.
Habitats Directive: Annex II
Bern Convention: strictly protected
Natura 2000

Rana dalmatina
Agile frog

Habitats Directive: Annex IV
Bern Convention: strictly protected

Rana graeca
Greek stream frog

Habitats Directive: Annex IV

2.3.9 Reptiles

Analysis of the existing references on the Hutovo Blato Nature Park reptiles is rather poor, and there have been practically no systematic researches of this area. According to the data from the *Records of the National Museum of Bosnia and Herzegovina,* Sarajevo, the following species have been custodied from the area under consideration: *Archaeolacerta oxycephala, Podarcis melisellensis, Malpolon monspessulanus, Coluber gemonensis, Natrix tessellata, Coronella austriaca* and *Vipera ammodytes.*

According to the recent researches (2011) specimens of 13 reptile species were recorded in the Hutovo Blato Nature Park, as given in Table 2.17.

Species with most numerous specimens in local population are Dalmatian wall lizard (*Podarcis melisellensis*) and European legless lizard (*Pseudopus apodus*).

Expected species: Montpellier snake, *Malpolon monspessulanus* (Hermann, 1804), smooth snake, *Coronella austriaca* Laurenti, 1768, and sharp snouted rock lizard, *Archaeolacerta oxycephala* (Duméril & Bibron, 1839) were not confirmed. Local people, however, insisted that there is local population of these species in the Hutovo Blato Nature Park area.

The most frequently encountered and the most numerous lizard species are: Dalmatian wall lizard (*Podarcis melisellensis)* and European legless lizard (*Pseudopus apodus)*, while the most frequently encountered and the most numerous snake species are: dice snake (*Natrix tessellata)* and Balkan whip snake (*Hierophis gemonensis)*. The data from references shows findings of Montpellier snake (*Malpolonn monspessulanus* Hermann, 1804), smooth snake (*Coronella austriaca* Laurenti, 1768), and sharp snouted rock lizard, *Archaeolacerta oxycephala* (Duméril & Bibron, 1839), which have not been confirmed by recent researches but should be treated as expected species.

Table 2.17: Systematic presentation of expected and established reptiles the Hutovo Blato Nature Park established during the 2011 research

Species	
CHELONII	
EMYDIDAE	
Emys orbicularis	European pond turtle
TESTUDINIDAE	
Testudo hercegovinensis (Testudo hermanni)	Hermann's tortoise
SQUAMATA	
SAURIA	
ANGUIDAE	
Pseudopus apodus	European legless lizard
LACERTIDAE	
Lacerta trilineata	Balkan green lizard
Lacerta viridis	European green lizard
?Archaeolacerta oxycephala	Sharp snouted rock lizard
Podarcis melisellensis	Dalmatian wall lizard
SERPENTES	
COLUBRIDAE	
Platyceps najadum	Dahl's Whip Snake
Hierophis gemonensis	Balkan whip snake
?Coronella austriaca, not confirmed	Smooth snake
Zamenis longissima	Aesculapian snake
Elaphe quatuorlineata	Four-lined snake
NATRICIDAE	
Natrix natrix	Grass snake
Natrix tesselata	Dice snake
LAMPROPHIIDAE	
?Malpolon monspessulanus	Montpellier snake
VIPERIDAE	
Vipera ammodytes	Nose-horned Viper

Table 2.18: Overview of reptiles in the Hutovo Blato Nature Park established during 2011 research with protection categories

No.	SPECIES		IUCN Reg.	IUCN Glob.	HABITATS DIRECTIVE	NATURA 2000	BERN CONVENTION
CHELONII							
EMYDIDAE							
1	*Emys orbicularis*	European pond turtle	NT	NT	Annex II & IV	YES	Appendix II
	TESTUDINIDAE						
2	*Testudo hercegovinensis (Testudo hermani)*	Hermann's tortoise	NT	NT	Annex II & IV	YES	Appendix II
SQUAMATA							
SAURIA							
ANGUIDAE							
3	*Pseudopus apodus*	European legless lizard			Annex IV		
LACERTIDAE							
4	*Lacerta trilineata*	Balkan green lizard			Annex IV		Appendix II
5	*Lacerta viridis*	European green lizard	NT		Annex IV		Appendix II
6	*?Archaeolacerta oxycephala*	Sharp snouted rock lizard					
7	*Podarcis melisellensis*	Dalmatian wall lizard			Annex IV		Appendix II
SERPENTES							
COLUBRIDAE							
8	*Platyceps najadum*	Dahl's Whip Snake			Annex IV		
9	*Hierophis gemonensis*	Balkan whip snake			Annex IV		
10	*?Coronella austriaca*,unconfirmed	Smooth snake			Annex IV		Appendix II
11	*Zamenis longissima*	Aesculapian snake			Annex IV		Appendix II
12	*Elaphe quatuorlineata*	Four-lined snake			Annex II & IV	YES	Appendix II
NATRICIDAE							
13	*Natrix natrix*	Grass snake					
14	*Natrix tesselata*	Dice snake	DD	EN	Annex IV		Appendix II
LAMPROPHIIDAE							
15	*?Malpolon monspessulanus*	Montpellier snake					
VIPERIDAE							
16	*Vipera ammodytes*	Nose-horned Viper			Annex IV		Appendix III

IUCN Regional and Global status: EN - endangered, NT – nearly threatedned, DD - data deficient,
Bern Convention: Appendix II = strictly protected fauna species, Appendix III = protected fauna species
Habitats Directive: Annex II: animal and plant species of Community interest (excluding birds)
Annex IV: animal and plant species of Community interest in need of strict protection

Table 2.19: Only the reptiles with established sensitivity or reptiles particularly protected under international conventions and directives presented (Photos: OIKON, except Emys orgicularis)

Emys orbicularis
European pond turtle

IUCN: Regional and Global status: NT/NT
Causes of threats: 1.1, 1.2.1, 1.4.9, 6.3,
Conservation actions: 4.1, 4.3
Habitats Directive: Annexes II and IV
Bern Convention: Appendix II
Natura 2000

Testudo hercegovinensis
Hermann's tortoise

IUCN: Regional and Global status: NT/NT
Causes of threats: 1.1, 1.2.1, 1.4.9, 6.3,
Conservation actions: 4.1, 4.3
Habitats Directive: Annexes II and IV
Bern Convention: Appendix II
Natura 2000

Lacerta viridis
European green lizard

IUCN: Regional and Global status: NT
Habitats Directive: Annex IV
Bern Convention: Appendix II

Lacerta trilineata
Balkan green lizard

Habitats Directive: Annex IV
Bern Convention: Appendix II

Coronella austriaca
Smooth snake

Habitats Directive: Annex IV
Bern Convention: Appendix II

Podarcis melisellensis
Dalmatian wall lizard

Habitats Directive: Annex IV
Bern Convention: Appendix II

Platyceps najadum
Dahl's Whip Snake

Habitats Directive: Annex IV

Hierophis gemonensis
Balkan whip snake

Habitats Directive: Annex IV

Pseudopus apodus
European legless lizard

Habitats Directive: Annex IV

Zamenis longissima
Aesculapian snake

Habitats Directive: Annex IV
Bern Convention: Appendix II

Elaphe quatuorlineata
Four-lined snake

Habitats Directive: Annex II and IV
Bern Convention: Appendix II
Natura 2000

Natrix tesselata
Dice snake

IUCN: Regional and Global status: DD/EN
Habitats Directive: Annex IV
Bern Convention: Appendix II

Vipera ammodytes
Nose-horned Viper

Habitats Directive: Annex IV
Bern Convention: Appendix III

2.3.10 Birds

Ornithofauna is a special natural asset of Hutovo Blato. Hutovo Blato is situated in one of four migration routes for birds travelling fron Northern and Central Europe towards Asia and Africa. During migration, when the abiotic conditions (climate, geographic position, water, soil, and the like) and biotic conditions (vegetation, microfauna and macrofauna, etc.) are favourable, the birds find abundant food, tranquillity and silence for their rest in Hutovo Blato, thus this area has been known as an important habitat for waterbirds since ancient times. Most species have been recorded during the autumn and spring migration, but a large number of species stay here for wintering and nesting.

According to the recent Life project research conducted in the the Hutovo Blato Nature Park, **163 bird species from 39 families** were recorded. According to the seasonal status, the majority of birds, i.e. 53 species, belong to wintering birds.

During the winter bird migration, several thousand specimens of various bird species reside at Hutovo Blato. It is fascinating to watch flocks of birds comprising thousands of individual birds moving over the area.

Due to favourable climate conditions and abundancy of food, certain number of birds stays in Hutovo Blato throughout a year, nests and rears their young. Some of these species are: pygmy cormorant (*Phalacrocorax pygmeus*) Pallas, little egret (*Egretta garzetta*) L., grey heron (*Arde cinerea*) L., purple heron (*Ardea purpurea*) L., squacco heron (*Ardeola ralloides*) Scopoli, black-crowned night heron (*Nycticorax nycticorax*) L., mallard (*Anas platyrhynchos*) L. and other species.
The following species are singled out from rich bird stock: mallard (*Anas platyrhynchos*) L., ferruginous duck (*Aythya nyroca*) Guldenstadt, Eurasian widgeon (*Anas penelope*) L., garganey (*Anas querquedula*) L., Eurasian coot (*Fulica atra*) L., great white egret heron (*Egretta alba*) L., common buzzard (*Buteo buteo*) L., Euroasian eagle-owl (*Bubo bubo*) L., hooded crow (*Corvus cornix*) L., etc. These species are present in the area during the winter.

Some other species are present here, such as: common crane (*Grus grus*) L., common quail (*Coturnix coturnix*) L., grey partridge (*Perdix perdix*) L., wood pigeon (*Columba palumbus*) L., herring gull (*Larus argentatus*) Pontoppidan, white stork (*Ciconia ciconia*) L., purple heron (*Ardea purpurea*) L., skylark (*Alauda arvensis*) L., and other species.

Almost all bird species (i.e. 160 of 163) living in the Hutovo Blato area are protected under international conventions and directives.

Table 2.20: Bird fauna in Hutovo Blato (list of birds the Integrated Ecosystem Management of Neretva and Trebisnjica River Basin - Transboundary Assessment of the Water Dependent Ecosystems and Water Resource Management in the Neretva and Trebišnjica River Basins (NTRB), 2005

No..	SPECIES		IUCN Reg.	BIRDS DIRECTIVE (Directive 2009/147/EC)	CITES	BERN CONV.	BONN CONV.	NATURA 2000
PODICIPEDIDAE								
1	*Podiceps (Tachybaptus) ruficollis*	Little grebe	LC			-	-	
2	*Podiceps nigricollis*	Black-necked grebe	EN			II	-	
3	*Podiceps cristatus*	Great Crested Grebe	LC			III	-	
PHALACROCORACIDAE								
4	*Phalacrocorax carbo*	Great cormorant	VU			III	-	
5	*Phalacrocorax pygmaeus*	Pygmy cormorant	CR	Annex I		II	II	Category 1
ARDEIDAE								
6	*Ixobrychus minutus*	Little bittern	NT	Annex I		II	II	Category 1
7	*Nycticorax nycticorax*	Black-crowned night heron	NT	Annex I		II	-	Category 1
8	*Ardeola ralloides*	Squacco heron	EN	Annex I		II	-	Category 1
9	*Egretta alba*	Great White Egret	VU	Annex I		II	-	
10	*Egretta garzetta*	Little egret	VU	Annex I		II	-	Category 1
11	*Ardea cinerea*	Grey heron	-			III	-	
12	*Ardea purpurea*	Purple heron	EN	Annex I		II	II	Category 1
THRESKIORNITHIDAE								
13	*Plegadis falcinellus*	Glossy ibis	CR/EN	Annex I		II	II	Category 1
14	*Platalea leucorodia*	Eurasian spoonbill	EN	Annex I	Append. II	II	II	Category 1
CICONIDEA								
15	*Ciconia ciconia*	White stork	NT	Annex I		II	II	Category 1
ANATIDAE								
16	*Anser anser*	Greylag Goose	EN	Annexes IIa IIIb		III	II	Categories 1 & 2
17	*Anser albifrons*	Greater white-fronted goose	NT	Annexes I IIb IIIb		III	II	Category 2
18	*Anas platyrhynchos*	Mallard duck	-	Annexes IIa IIIa		III	II	Category 2
19	*Anas crecca*	Eurasian teal	NT	Annexes IIa IIIb		III	II	Category 2
20	*Anas strepera*	Gadwall	EN	Annex IIa		III	II	Categories 1 & 2
21	*Anas penelope*	Eurasian wigeon	NT	Annexes IIa IIIb		III	II	Category 2
22	*Anas acuta*	Northern Pintail	EN/RE	Annexes IIa IIIb		III	II	Category 2
23	*Anas querquedula*	Garganey	NT	Annex IIa		III	II	Category 2
24	*Anas clypeata*	Northern shoveler	VU/RE	Annexes IIa IIIb		III	II	Category 2
25	*Aythya ferina*	Common pochard	LC	Annexes IIa IIIb		III	II	Category 2
26	*Aythya nyroca*	Ferruginous duck	VU/NT	Annex I		III	I & II	Category 1
PANDIONIDAE								
27	*Pandion haliaetus*	Osprey	RE/NT	Annex I		II	II	Category 1
ACCIPITRIDEA								
28	*Milvus korschun*	Black kite						
29	*Accipiter gentilis*	Northern goshawk	-	Annex I		II	II	
30	*Accipiter nisus*	Eurasian sparrowhawk	LC	Annex I		II	II	
31	*Buteo buteo*	Common buzzard	-			II	II	
32	*Buteo lagopus*	Rough-legged buzzard	-			II	II	
33	*Aquila clanga*	Greater spotted eagle	CR	Annex I		II	I & II	Category 1
34	*Aquila chrysaetos*	Golden eagle	CR	Annex I		II	II	Category 1
35	*Aquila pomarina*	Lesser spotted eagle	EN	Annex I		II	II	Category 1
36	*Circaetus gallicus*	Short-toed snake eagle	EN	Annex I		II	II	Category 1
37	*Circus cyaneus*	Hen Harrier	NT	Annex I		II	II	Category 1
38	*Circus macrourus*	Pallid harrier	-	Annex I		II	II	
39	*Circus pygargus*	Montagu's harrier	EN	Annex I		II	II	Category 1
40	*Circus aeruginosus*	Western Marsh-harrier	EN	Annex I		II	II	Category 1
FALCONIEA								
41	*Falco biarmicus*	Lanner falcon	CR	Annex I		II	II	
42	*Falco peregrinus*	Peregrine falcon	EN	Annex I	Append. I	II	II	Category 1

No..	SPECIES		IUCN Reg.	BIRDS DIRECTIVE (Directive 2009/147/EC)	CITES	BERN CONV.	BONN CONV.	NATURA 2000
43	*Falco subbuteo*	Eurasian hobby	NT			II	II	
44	*Falco columbarius*	Merlin	EN	Annex I		II	II	Category 1
45	*Falco tinnunculus*	Common kestrel	-			II	II	
PHASIANIDAE								
46	*Alectoris graeca*	Rock partridge	NT	Annexes I IIa		III	-	Category 1
47	*Coturnix coturnix*	Common quail	NT	Annex IIb		III	II	
48	*Phasianus colchicus*	Ring-necked Pheasant	-	Annexes IIa IIIa		III	-	
GRUIDAR								
49	*Grus grus*	Common crane	NT	Annex I	Append. II	II	II	Category 1
RALLIDAE								
50	*Rallus aquaticus*	Water Rail	NT	Annex IIb		III	-	Category 2
51	*Porzana porzana*	Spotted crake	(EN)	Annex I		II	II	Category 1
52	*Porzana parva*	Little Crake	(EN)	Annex I		II	II	Category 1
53	*Porzana pusilla*	Baillon's Crake	(CR)	Annex I		II	II	Category 1
54	*Gallinula chloropus*	Common moorhen	-	Annex IIb		III	-	
55	*Fulica atra*	Eurasian coot	NT*	Annexes IIa IIIb		III	II*	Category 2
CHARADRIIDEA								
56	*Vanellus vanellus*	Northern lapwing	LC	Annex IIb		III	II	Category 2
SCOLOPACIDAE								
57	*Calidris alpina*	Dunlin	EN/NT			II	II	Category 1
58	*Tringa erythropus*	Spotted Redshank	LC	Annex IIb		III	II	Category 2
59	*Tringa totanus*	Common redshank	CR	Annex IIb		III	II	Categories 1 & 2
60	*Tringa nebularia*	Common greenshank	LC	Annex IIb		III	II	Category 2
61	*Tringa ochropus*	Green sandpiper	-			II	II	
62	*Tringa glareola*	Wood sandpiper	LC	Annex I		II	II	Category 1
63	*Tringa (Actitis) hypoleucos*	Common sandpiper	VU	-		II	II	Category 1
64	*Limosa limosa*	Black-tailed godwit	LC	Annex IIb		III	II	Category 2
65	*Gallinago gallinago*	Common snipe	CR/NT	Annexes IIa IIIb		III	II	Categories 1 & 2
66	*Gallinago media*	Great snipe	-	Annex I		II	II	
LARIDAE								
67	*Larus minutus*	Little gull	-	Annex I		II	-	Category 1
68	*Larus ridibundus*	Black-headed gull	LC	Annex IIb		III	-	
69	*Larus argentatus*	Herring Gull	-	Annex IIb		-	-	
70	*Larus canus*	Mew Gull	-	Annex IIb		III	-	
71	*Chlidonias niger*	Black tern	RE/LC	Annex I		II	II	Category 1
72	*Chlidonias leucopterus*	White-winged tern	-			II	II	
73	*Chlidonias hybridus*	Whiskered tern	VU/NT	Annex I		II	-	Category 1
74	*Sterna hirundo*	Common tern	NT	Annex I		II	II	Category 1
COLIMBIDAE								
75	*Columba palumbus*	Wood pigeon	-	Annexes IIa IIIb		-	-	
76	*Columba livia*	Rock dove	-	Annex IIa		III	-	
77	*Streptopelia decaocto*	Eurasian collared dove	-	Annex IIb		III	-	
78	*Streptopelia turtur*	European turtle dove	LC	Annex IIb		III	-	
CUCULIDAE								
79	*Cuculus canorus*	Common cuckoo	-			III	-	
STRIGIDAE								
80	*Bubo bubo*	Eurasian eagle-owl	NT	Annex I		II	-	Category 1
APODIDAE								
81	*Apus apus*	Common swift	-			III	-	
82	*Apus (Tachymarptis) melba*	Alpine swift	-			II	-	
ALCENIDIDAE								
83	*Alcedo atthis*	Common kingfisher	NT	Annex I		II	-	Category 1
MEROPIDAE								
84	*Merops apiaster*	European Bee-eater	LC			II	II	
UPUPIDAE								
85	*Upupa epops*	Hoopoe	NT			II	-	
PICIDA								
86	*Jynx torquilla*	Eurasian wryneck	-			II	-	
87	*Picus viridis*	European Green Woodpecker	NT			II	-	

No..	SPECIES		IUCN Reg.	BIRDS DIRECTIVE (Directive 2009/147/EC)	CITES	BERN CONV.	BONN CONV.	NATURA 2000
88	*Dendrocopos major*	Great Spotted woodpecker	-			II	-	
89	*Dendrocopos medius*	Middle Spotted woodpecker	LC	Annex I		II	-	18 Categories 1
HIRUNDINIDAE								
90	*Riparia riparia*	Sand martin	NT			II	-	Category 1
91	*Hirundo rustica*	Barn swallow	LC			II	-	
92	*Hirundo (Cecropis) daurica*	Red-rumped swallow	NT			II	-	
93	*Delichon urbica*	Common house martin	-			II	-	
ALAUDIDAE								
94	*Eremophyla alpestris*	Horned Lark	EN			II	-	
95	*Galerida cristata*	Crested Lark	LC			III	-	
96	*Lullula arborea*	Woodlark	LC	Annex I		III	-	Category 1
97	*Alauda arvensis*	Eurasian skylark	LC	Annex IIb		III	-	
MOTACILLIDAE								
98	*Anthus pratensis*	Meadow Pipit	-			II	-	
99	*Anthus spinoletta*	Water Pipit	NT			II	-	
100	*Motacilla flava*	Western Yellow Wagtail	NT			II	-	
101	*Motacilla cinerea*	Grey Wagtail	-			II	-	
102	*Motacilla alba*	White Wagtail	-			II	-	
LANIIDAE								
103	*Lanius collurio*	Red-backed shrike	-	Annex I		II	-	Category 1
104	*Lanius senator*	Woodchat shrike	-			II	-	
105	*Lanius minor*	Lesser Grey Shrike	LC	Annex I		II	-	Category 1
106	*Lanius excubitor*	Great grey shrike	-			II	-	
ORIOLIDAE								
107	*Oriolus oriolus*	Eurasian Golden Oriole	-	-		II	-	
STURNIDAE								
108	*Sturnus vulgaris*	Common starling	-	Annex IIb		III	-	
CORVIDAE								
109	*Garrulus glandarius*	Eurasian Jay	-	Annex IIb		III	-	
110	*Pica pica*	Eurasian magpie	-	Annex IIb		III	-	
111	*Corvus monedula*	Eurasian Jackdaw	-	Annex IIb		-	-	
112	*Corvus corone cornix*	Hooded crow	-					
113	*Corvus corax*	Common raven	-			III	-	
CINCLIDAE								
114	*Cinclus cinclus*	White-throated Dipper	-			II	-	
TROGLODYTIDAE								
115	*Troglodytes troglodytes*	Eurasian Wren	-			II	-	
PRUNELLIDAE								
116	*Prunella modularis*	Dunnock	-			II	-	
SYLVIIDAE								
117	*Cettia cetti*	Cetti's Warbler	-			II	II	
118	*Locustella naevia*	Common grasshopper warbler	NT			II	II	
119	*Lusciniola (Acrocephalus) melanopogon*	Moustached warbler	CR/LC	Annex I		II	II	Category 1
120	*Acrocephalus schoenobaenus*	Sedge Warbler	-			II	II	
121	*Acrocephalus scirpaceus*	Eurasian reed warbler	-			II	II	
122	*Acrocephalus arundinaceus*	Great reed-warbler	-			II	II	
123	*Hippolais pallida*	Eastern olivaceous warbler	-			II	II	
124	*Sylvia hortensis*	Western Orphean Warbler	-	-	-			
125	*Sylvia atricapilla*	Eurasian Blackcap	-			II	II	
126	*Sylvia communis*	Common Whitethroat	-			II	II	
127	*Sylvia curruca*	Lesser Whitethroat	-			II	II	
128	*Sylvia melanocephala*	Sardinian Warbler	-			II	II	

No..	SPECIES		IUCN Reg.	BIRDS DIRECTIVE (Directive 2009/147/EC)	CITES	BERN CONV.	BONN CONV.	NATURA 2000
129	*Sylvia cantillans*	Subalpine Warbler	-			II	II	
130	*Phylloscopus collybitus*	Common Chiffchaff	-			II	II	
131	*Phylloscopus trochilus*	Willow warbler	NT			II	II	
132	*Phylloscopus sibilatrix*	Wood Warbler	NT			II	II	
TURDIDAE								
133	*Saxicola rubetra*	Whinchat	LC			II	II	
134	*Saxicola torquata*	Common Stonechat	LC			II	II	
135	*Oenanthe hispanica*	Black-eared wheatear	-			II	II	
136	*Phoenicurus ochruros*	Black Redstart	-			II	II	
137	*Erithacus rubecula*	European robin	-			II	II	
138	*Luscinia megarhynchos*	Common nightingale	-			II	II	
139	*Turdus pilaris*	Fieldfare	NT	Annex IIb		III	II	
140	*Turdus merula*	Common blackbird	-	Annex IIb		III	II	
141	*Turdus viscivorus*	Mistle thrush	-	Annex IIb		III	II	
AEGITHALIDAE								
142	*Aegithalos caudatus*	Long-tailed Tit	-			III	-	
PARIDAE								
143	*Parus (Poecile) lugubris*	Sombre Tit	-			II	-	
144	*Parus (Cyanistes) coeruleus*	Eurasian Blue Tit	-			II	-	
145	*Parus major*	Great Tit	-			II	-	
REMIZIDAE								
146	*Remiz pendulinus*	Eurasian Penduline Tit	-			III	-	
PASSERIDAE								
147	*Passer domesticus*	House sparrow	-			III	-	
148	*Passer hispaniolensis*	Spanish Sparrow	-			III	-	
149	*Passer montanus*	Eurasian tree sparrow	-			III	-	
FRINGILLIDAE								
150	*Fringilla coelebs*	Common chaffinch	-			III	-	
151	*Fringilla montifringilla*	Brambling	-			III	-	
152	*Serinus serinus*	European Serin	-			II	-	
153	*Carduelis chloris*	European Greenfinch	-			II	-	
154	*Carduelis spinus*	Eurasian Siskin	LC			II	-	
155	*Carduelis carduelis*	European Goldfinch	-			II	-	
156	*Acanthis cannabina*	Eurasian linnet	-			II	-	
157	*Coccothraustes cocaothraustes*	Hawfinch	-			II	-	
EMBERIZIDAE								
158	*Emberiza calandra*	Corn Bunting	LC			III	-	
159	*Emberiza citrinella*	Yellowhammer	-			II	-	
160	*Emberiza cia*	Rock Bunting	-			II	-	
161	*Emberiza cirlus*	Cirl Bunting	-			II	-	
162	*Emberiza melanocephala*	Black-headed Bunting	-			II	-	
163	*Emberiza schoeniclus*	Common Reed Bunting	LC			II	-	

IUCN Regional and Global status: LC - least concern, NT – near threatened, VU - vulnerable, EN - endangered, CR - critically endangered, RE - regionally extinct.
Bern Convention - Appendix II = strictly protected fauna species, Appendix III = protected fauna species
Bonn Convention – Convention on the Conservation of Migratory Species of Wild Animals
Category for target species: 1=internationally important species areas for which are singled out based on Articles 3 and 4, para. 2. of Directive 2009/147/EC ; 1=regular migratory species areas for which are singled out based on Article 4, para. 2. of Directive 2009/147/EC

Table 2.21: The most endangered birds (excluding species placed on Bern Convention List only)

Podiceps nigricollis
Black-necked grebe

IUCN: EN www.ulika.net
Bern Convention: Appendix II

Phalacrocorax pygmaeus
Pygmy cormorant

IUCN: CR http://ibc.lynxeds.com
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Ixobrychus minutus
Little bittern

IUCN: NT www.sevcikphoto.com
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Nycticorax nycticorax
Black-crowned night heron

IUCN: NT http://commons.wikimedia.org
Birds Directive: Annex I
Bern Convention: Appendix II
Natura 2000: Category 1

Ardeola ralloides
Squacco heron

IUCN: EN http://ibc.lynxeds.com
Birds Directive: Annex I
Bern Convention: Appendix II
Natura 2000: Category 1

Egretta alba
Great egret

IUCN: VU www.biolib.cz
Birds Directive: Annex I
Bern Convention: Appendix II

Egretta garzetta
Little egret

IUCN: VU http://es.wikipedia.org
Birds Directive: Annex I
Bern Convention: Appendix II
Natura 2000: Category 1

Ardea purpurea
Purple heron

IUCN: EN http://commons.wikimedia.org
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Plegadis falcinellus
Glossy ibis

IUCN: CR/EN www.treknature.com
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Platalea leucorodia
Eurasian spoonbill

IUCN:EN birdwatchinglajesdopico.blogspot
Birds Directive: Annex I
Cites: Appendix II
Bern Convention: Appendix II
Bonn Convention:
Natura 2000: Category 1

Ciconia ciconia
White stork

IUCN: NT http://ibc.lynxeds.com
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Anser anser
Greylag goose

IUCN: EN http://commons.wikimedia.org
Birds Directive: Annexes IIa,IIIb
Bern Convention: Appendix III
Bonn Convention: Appendix II
Natura 2000: Categories 1 & 2

Anser albifrons
Greater white-fronted goose

IUCN: NT www.naturephoto-cz.com
Birds Directive: Annexes I,IIa,IIIb
Bern Convention: Appendix III
Bonn Convention: Appendix II
Natura 2000: Category 2

Anas platyrhynchos
Mallard

www.birding.in
Birds Directive: Annexes IIa,IIIb
Bern Convention: Appendix III
Bonn Convention: Appendix II
Natura 2000: Category 2

Anas crecca
Eurasian teal

IUCN:NT http://tolweb.org
Birds Directive: Annexes IIa,IIIb
Bern Convention: Appendix III
Bonn Convention: Appendix II
Natura 2000: Category 2

Anas strepera
Gadwall

IUCN: EN www.luontoportti.com
Birds Directive: Annex IIa
Bern Convention: Appendix III
Bonn Convention: Appendix II
Natura 2000: Categories 1 and 2

Anas penelope
Eurasian wigeon

IUCN: NT http://ibc.lynxeds.com
Birds Directive: Annexes IIa,IIIb
Bern Convention: Appendix III
Bonn Convention: Appendix II
Natura 2000: Category 2

Anas acuta
Northern pintail

IUCN:EN/RE www.kenyabirds.org.uk
Birds Directive: Annexes IIa,IIIb
Bern Convention: Appendix III
Bonn Convention: Appendix II
Natura 2000: Category 2

Anas querquedula
Garganey

IUCN: NT http://en.wikipedia.org
Birds Directive: Annex IIb
Bern Convention: Appendix III
Bonn Convention: Appendix II
Natura 2000: Category 2

Anas clypeata
Northern shoveler

IUCN: VU/RE http://commons.wikimedia.org
Birds Directive: Annexes IIa,IIIb
Bern Convention: Appendix III
Bonn Convention: Appendix II
Natura 2000: Category 2

Aythya ferina
Common Pochard

IUCN: LC http://commons.wikimedia.org
Birds Directive: Annexes IIa,IIIb
Bern Convention: Appendix III
Bonn Convention: Appendix II
Natura 2000: Category 2

Aythya nyroca
Ferruginous duck

IUCN:VU/NT biodiversitatecbc-apmis.ro
Birds Directive: Annex I
Bern Convention: Appendix III
Bonn Convention: Append. I & II
Natura 2000: Category 1

Pandion haliaetus
Osprey

IUCN: RE/NT http://nathistoc.bio.uci.edu
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Accipiter gentilis
Common buzzard

http://redbuttecanyon.net
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II

Accipiter nisus
Eurasian sparrowhawk

IUCN: LC www.treknature.com
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II

Aquila clanga
Greater Spotted Eagle

IUCN: CL www.birding.se
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Append. I & II
Natura 2000: Category 1

Aquila chrysaetos
Golden eagle

IUCN: CR www.pbase.com
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Aquila pomarina
Lesser Spotted Eagle

IUCN: EN www.pbase.com
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Circaetus gallicus
Short-toed snake-eagle

IUCN: EN http://es.wikipedia.org
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Circus cyaneus
Hen harrier

IUCN: NT www.greglasley.net
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Circus macrourus
Pallid harrier

http://orientalbirdimages.org
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II

Circus pygargus
Montagu's harrier

IUCN: EN http://focusingonwildlife.com
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Circus aeruginosus
Western Marsh-harrier

IUCN: EN http://ibc.lynxeds.com
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Falco biarmicus
Lanner Falcon

IUCN: CR creagrus.home.montereybay.com
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II

Falco peregrinus
Peregrine falcon

IUCN:EN www.ontfin.com
Birds Directive: Annex I
CITES: Appendix I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Falco columbarius
Merlin

IUCN: EN http://ibc.lynxeds.com
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Alectoris graeca
Rock Partridge

IUCN: NT http://eol.org
Birds Directive: Annexes I, IIa
Bern Convention: Appendix III
Natura 2000: Category 1

Coturnix coturnix
Common quail

IUCN: NT www.pbase.com
Birds Directive: Annex IIb
Bern Convention: Appendix III
Bonn Convention: Appendix II

Phasianus colchicus
Ring-necked Pheasant

www.hidephotography.com
Birds Directive:Annexes IIa,IIIa
Bern Convention: Appendix III

Rallus aquaticus
Water Rail

IUCN: NT www.treknature.com
Birds Directive: Annex IIb
Bern Convention: Appendix III
Natura 2000: Category 2

Grus grus
Common crane

IUCN: NT http://ibc.lynxeds.com
Birds Directive: Annex I
CITES: Appendix II
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Porzana porzana
Spotted Crake

IUCN: (EN) https://naturfotografen-forum.de
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Porzana parva
Little Crake

IUCN:(EN) birdingeasterneurope.blogspot.com
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Porzana pusilla
Baillon's Crake

IUCN:(CR) leesbirdblog.files.wordpress.com
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Gallinula chloropus
Common moorhen

www.wildaboutbritain.co.uk
Birds Directive: Annex IIb
Bern Convention: Appendix III

Fulica atra
Eurasian coot

IUCN: NT www.flicr.com
Birds Directive: Annexes IIa,IIIb
Bern Convention: Appendix III
Bonn Convention: Appendix II
Natura 2000: Category 2

Vanellus vanellus
Northern lapwing

IUCN: LC www.pbase.com
Birds Directive: Annex IIb
Bern Convention: Appendix III
Bonn Convention: Appendix II
Natura 2000: Category 2

Calidris alpina
Dunlin

IUCN: EN/NT www.luontoportti.com
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Tringa erythropus
Spotted redshank

IUCN: LC www.agroturismesonllado.com
Birds Directive: Annex IIb
Bern Convention: Appendix III
Bonn Convention: Appendix II
Natura 2000: Category 2

Tringa totanus
Common redshank

IUCN: CR en.wikipedia.org
Birds Directive: Annex IIb
Bern Convention: Appendix III
Bonn Convention: Appendix II
Natura 2000: Category 1 & 2

Tringa nebularia
Common greenshank

IUCN: LC www.luontoportti.com
Birds Directive: Annex IIb
Bern Convention: Appendix III
Bonn Convention: Appendix II
Natura 2000: Category 2

Tringa glareola
Wood sandpiper

IUCN: LC www.avesphoto.com
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Actitis hypoleucos
Common sandpiper

IUCN:VU http://commons.wikimedia.org
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Limosa limosa
Black-tailed godwit

IUCN: LC www.rawbirds.com
Birds Directive: Annex IIb
Bern Convention: Appendix III
Bonn Convention: Appendix II
Natura 2000: Category 2

Gallinago gallinago
Common snipe

IUCN: CR/NT www.ontfin.com
Birds Directive:Annexes IIa,IIIb
Bern Convention: Appendix III
Bonn Convention: Appendix II
Natura 2000: Category 2

Gallinago media
Great snipe

http://cartinafinland.fi
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II

Larus minutus
Little gull

www.flickr.com
Birds Directive: Annex I
Bern Convention: Appendix II
Natura 2000: Category 1

Larus ridibundus
Black-headed gull

IUCN: LC http://commons.wikimedia.org
Birds Directive: Annex IIb
Bern Convention: Appendix III

Larus argentatus
European Herring Gull

http://birds.nature4stock.com
Birds Directive: Annex IIb

Larus canus
Common gull

http://nathistoc.bio.uci.edu
Birds Directive: Annex IIb
Bern Convention: Appendix III

Chlidonias niger
Black tern

IUCN: RE/LC http://tolweb.org
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Chlidonias hybridus
Whiskered tern

IUCN: VU/NT http://ibc.lynxeds.com
Birds Directive: Annex I
Bern Convention: Appendix II
Natura 2000: Category 1

Sterna hirundo
Common tern

IUCN: NT www.ctbirding.org
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Columba palumbus
Wood pigeon

www.biopix.com
Birds Directive: Annex IIa,IIIb

Columba livia
Rock dove

http://commons.wikimedia.org
Birds Directive: Annex IIa
Bern Convention: Appendix III

Streptopelia decaocto
Eurasian collared dove

www.hlasek.com
Birds Directive: Annex IIb
Bern Convention: Appendix III

Streptopelia turtur
European turtle dove

IUCN: LC www.avesphoto.com
Birds Directive: Annex IIb
Bern Convention: Appendix III

Bubo bubo
Eurasian eagle-owl

IUCN: NT http://my.opera.com
Birds Directive: Annex I
Bern Convention: Appendix II
Natura 2000: Category 1

Alcedo atthis
Common Kingfisher

IUCN: NT http://es.wikipedia.org
Birds Directive: Annex I
Bern Convention: Appendix II
Natura 2000: Category 1

Dendrocopos medius
Middle Spotted Woodpecker

IUCN: LC www.digitale-naturfotos.de
Birds Directive: Annex I
Bern Convention: Appendix II
Natura 2000: Category 1

Riparia riparia
Sand martin

IUCN: NT http://ibc.lynxeds.com
Bern Convention: Appendix II
Natura 2000: Category 1

Eremophila alpestris
Horned Lark

IUCN: EN www.ctbirding.org
Bern Convention: Appendix II

Lullula arborea
Woodlark

IUCN: LC www.birdforum.net
Birds Directive: Annex I
Bern Convention: Appendix III
Natura 2000: Category 1

Alauda arvensis
Skylark

IUCN:LC www.worldbirder.com
Birds Directive: Annex IIb
Bern Convention: Appendix III

Lanius collurio
Red-backed shrike

www.hidephotography.com
Birds Directive: Annex I
Bern Convention: Appendix II
Natura 2000: Category 1

Lanius minor
Lesser Grey Shrike

IUCN: LC www.treknature.com
Birds Directive: Annex I
Bern Convention: Appendix II
Natura 2000: Category 1

Sturnus vulgaris
Common starling

www.wildaboutbritain.co.uk

Birds Directive: Annex IIb
Bern Convention: Appendix III

Garrulus glandarius
Eurasian Jay

http://ibc.lynxeds.com

Birds Directive: Annex IIb
Bern Convention: Appendix III

Pica pica
Eurasian magpie

www.ihunt.gr

Birds Directive: Annex IIb
Bern Convention: Appendix III

Corvus monedula
Eurasian Jackdaw

www.luontoportti.com

Birds Directive: Annex IIb

Locustella naevia
Grass warbler

IUCN: NT www.hlasek.com
Bern Convention: Appendix II
Bonn Convention: Appendix II

Acrocephalus melanopogon
Moustached Warbler

IUCN: CR/LC pbase.com/image/86188968
Birds Directive: Annex I
Bern Convention: Appendix II
Bonn Convention: Appendix II
Natura 2000: Category 1

Turdus pilaris
Fieldfare

IUCN:NT www.pbase.com
Birds Directive: Annex IIb
Bern Convention: Appendix III
Bonn Convention: Appendix II

Turdus merula
Common blackbird

www.pbase.com
Birds Directive: Annex IIb
Bern Convention: Appendix III
Bonn Convention: Appendix II

Turdus viscivorus
Mistle Thrush

http://enfo.agt.bme.hu
Birds Directive: Annex IIb
Bern Convention: Appendix III
Bonn Convention: Appendix II

2.3.11 Mammals

Biodiversity of mammals in the Hutovo Blato Nature Park has not been systematically researched. Most data is collected from unpublished inventories, preliminary overviews of individual groups within the projects, and small number of published papers.

In the IUCN List, the European otter (*Lutra lutra)* belongs to the NT category. The European otter is also included in Appendix II to the Bern Convention, Appendix I to the CITES Convention, Appendix I to the Bonn Convention and Appendices II, IV and V to the EU Habitats Directive. The European otter is permanently protected species under the hunting legislation of the Federation of Bosnia and Herzegovina and Republika Srpska (Ruiz-Olmo *et al.*, 2008). The largest population in the area is that of wild boar, fox and brown hare. These species are frequent and their survival in the area is not endangered. Other species of wild animals, primarily mammals, are rare or sporadically encountered.

Numbers and generally presence of individual species, as well as research results, are certainly significantly affected by the events happening late in September 2011, when a police operation was carried out within the Nature Park, with helicopters that flew over the area for days, and involvement of a large number of people both on land and water. After a brief period of time, several days only, a large fire burst out in the Nature Nark which, according to SOME sources, burned over 80% of this protected areas.

Table 2.22: Systematic presentation of mammals in the Hutovo Blato Nature Park *Source: Monitoring and biodiversity list for the Hutovo blato Nature Park, IGH Mostar, Oikon, 2012*

No.	Species	
ARTIODACTYLA		
1	*Sus scrofa*	Wild boar
2	*Capreolus capreolus*	Roe deer
CARNIVORA		
3	*Vulpes vulpes*	Red fox
4	*Martes foina*	Beech marten
5	*Meles mele*	European badger
6	*Lutra lutra*	European otter
INSECTIVORA		
7	*Erinaceus concolor*	Southern white-breasted hedgehog
DUPLICIDENTATA		
8	*Lepus europaeus*	European hare

Table 2.23: List of mammals and protection categories

No.	Vrsta		IUCN Reg.	IUCN Glob.	HABITATS DIRECTIVE	NATURA 2000	BERN CONVENTION	CITES
ARTIODACTYLA								
1	*Sus scrofa*	Wild boar		LC				-
2	*Capreolus capreolus*	Roe deer		LC			Appendix III	-
CARNIVORA								
3	*Vulpes vulpes*	Red fox		LC				-
4	*Martes foina*	Beech marten		LC			Appendix III	-
5	*Meles mele*	European badger		LC			Appendix III	-
6	*Lutra lutra*	European otter	DD	VU	Annexes I, IV, V	Cat.1	Appendix III	Appendix I
INSECTIVORA								
7	*Erinaceus concolor*	Southern white-breasted hedgehog		LC				-
DUPLICIDENTATA								
8	*Lepus europaeus*	European hare	NT	LC			Annex III	-

IUCN Regional and Global status: LC - least concern, NT – near threatened, VU - vulnerable DD - data deficient
Habitats Directive: Annex II: animal and plant species of Community interest (excluding birds) Annex IV: animal and plant species of Community interest in need of strict protection
Bern Convention - Appendix II = strictly protected fauna species, Appendix III = protected fauna species
CITES: Appendix I: species that are threatened with extinction and are or may be affected by trade.

Table 2.24: Only the mammals with established sensitivity or mammals particularly protected under international conventions and directives presented

Sus scrofa
Wild boar

IUCN: LC

Vulpes vulpes
Red fox

IUCN: LC

Capreolus capreolus
Roe deer

IUCN: LC
Bern Convention: Appendix III

Martes foina
Beech marten

IUCN: LC
Bern Convention: Appendix III

Meles meles
European badger

IUCN: LC
Bern Convention: Appendix III

Lutra lutra
European otter

IUCN: Regional and Global status: DD/VU
Habitats Directive: Annex II
Bern Convention: Strictly protected
Natura 2000

Erinaceus concolor
Southern white-breasted hedgehog

Habitats Directive: Annex IV
Bern Convention: strictly protected

Lepus europaeus
European hare

Habitats Directive: Annex IV

2.4 SOCIO-ECONOMIC CHARACTERISTICS OF THE AREA

2.4.1 Population of the Čapljina and Stolac Municipalities

It could be said that the Hutovo Blato Nature Park area is not populated, with exception of the settlement of Svitava which is situated at the Nature Park boundary. It is estimated that population has not changed since the last Bosnia and Herzegovina Census of 1991. Accoding to the data of the Čapljina municipal authorities, the population in the area is about 300 persons.

2.4.1.1 Čapljina Municipality population

In the period 1961-1991, population of the Čapljina Minicipality increased by approximately 7,500 persons, which is an increase of almost 37%. Migratory trends included both emigration of local population and immigration of population from other regions.

According to the 1991 Census, the Čapljina Municipality population was 27,882 persons living in 32 settlements. Accoding to data available from the municipal authorities, Čapljina population has slightly decreased compared to the last census, thus population of the Municipality is 27,705 persons living in 35 settlements. After the war, due to migrations caused by the war operations in Bosnia and Herzegovina, new settlements have been established (Modrič, Šuškovo naselje and Bobanovo selo).

Although the population of the Čapljina Municipality has not suffered significant decrease in size compared to 1991, its age structure has seriously changed. In 2007, number of population younger than 15 years of age decreased, and of those beyond 65 years of age rapidly increased. The middle-aged population has also reduced, but somewhat less than the youngest population.

According to the data of the Neretva-Herzegovina Canton Job Center records, Čapljina Municipality had 3,247 employed and 2,906 unemployed persons in 2007. An unemployment breakdown indicates that majority of unemployed is qualified, dominantly male work force.

2.4.1.2 Stolac Municipality population

Population of the Stolac Municipality has been on decrease since 1971. However, during the period 1961-1991, a minute increase of 103 persons, i.e. 0.7% was recorded. Since the population the Stolac Municipality was expected to be higher at the end of the period under consideration due to the natural increment, it could be rightfully said that the Stolac Municipality has constantly been an emigration region.

The presently available data on situation in the Stolac Municipality indicate continuation of a general pre-war trend and it has reached an extent when it could be described as natural depopulation of the area, and this without taking into consideration possible migrations outside the Municipality territory. The 1991 Census determined the population of 16,420 stanovnika, and the Federation statistics estimates the population in the Stolac Municipality territory to be 13,360 persons.

A considerable decrease in natural contingent (children reaching the age of 15 years) and abrupt increase in post-working age population is noticable. In addition to the population aging process, the situation also reveals war losses that damaged the working-age population contingent the most.

Natality rate changes are negative and mortality rate changes positive, which results in negative rates of natural increment. Higher annual mortality results in loss of reproductive capacities of population.

Compared to the pre-war situation, number of active jobs has decreased by 2,948, which is a sign of inconsistent development policy (if it has ever been determined).

Therefore, no favourable population trends in the Stolac Municipality should be expected in future unless demographic and economic development incentives are offered.

2.4.1.3 Settlements and population within the Nature Park

The Hutovo Blato Nature Park area encompassess the settlement of Svitava (entire area), Prebilovci (majority of the area), and Gnjilišta (expansion planned by the Čapljina Physical Plan towards the Nature Park area), Klepci (small portion of area planned for expansion of the settlement) and Sjekose with a small part of its area entering the Nature Park on the Čapljina Municipality side.

On the Stolac Municipality side, Londža, Ćore, Drijen, Marića Kuće and Košćela villages are situated within the Nature Park. The Košćela village belongs to the settlement of Kruševo, and other villages belong to the settlement of Bjelojevići.

According to the Čapljina Physical Plan population data:

- Prebilovci: population 60
- Svitava: population 310
- Sjekose: population 140 (the entire settlement population taken)

Total population: 510

The Čapljina Physical Plan projection does not envisage increase in population during the planning period.

Since there is no official data on population in the Stolac Municipality villages, the available data is unofficial and obtained by an interview with the Stolac Municipality officer.

- Košćela: population 1
- Ćore: populatin 15

Total population: 16

Therefore, total population living within the Hutovo Blato Nature Park area is 526.

Since no data on demographic characteristics of this population is available, it is assumed to be farming population. In smaller settlements, majority population is probably older, and as regards education, percentage of those with higher education is negligible.

2.4.1.4 Social Infrastructure in the Čapljina and Stolac Municipalities

Municipal seats of Čapljina and Stolac do not have all necessary functions of municipal government and adnimistration, thus their municipal governance powers are incomplete. The following social infrastructure has been determined: governance and administration, education, health care, social welfare, culture and sports (Tables 2.25 – 2.28).

Table 2.25: Governance and administration

Municipality	Governance	Administration	Police	Court	Lawyer	Prison	Tax office
Čapljina	municipal government	municipal administration	police department	municipal court	N.A.	N.A.	local tax office
			police station 1	magistrate court			local customs office
Stolac	municipal government	municipal administration	police station	N.A.	municipal lawyer	N.A.	local tax office

The educational system in Čapljina Municipality is organized on municipal level, there is a number of secondary schools and a considerable number of pupils and students attending the primary and secondary schools. The educational system in the Stolac Municipality is organized on municipal level, and number of secondary school students is small.

Table 2.26: Školstvo

Municipality	Higher education	Secondary education	Primary education
Čapljina	N.A.	- Grammar school 1 - Vocational school 1	- 9-year school 1 - 8-year schools 3 - Branch schools 19 - Musical school 1
Stolac	N.A.	- Vocational school 1	- 8-year schools 2 - Branch schools 5

The health care facilities in the Čapljina Municipality satisfy the criteria for municipality centers, and walfare facilities are relatively satisfactory. Availability of the health care facilities in the Stolac Municipality does not satisfy minicipal needs, while the walfare facilities are relatively satisfactory.

Table 2.27: Health care, social welfare and child welfare

Municipality	Health care facilities		Welfare facilities
Čapljina	- medical centre 1 - GP clinics 30 - city pharmacy 1	- private pharmacies 4 - private clinics 10 - private pharmacies 1	- retirement home 1 - kindergarten 1
Stolac	- medical centre 1 - GP clinics 2 - private pharmacy 1	- private clinics 1 - private pharmacies 1	- disabled adults home 1 - kindergarten 1

Availability of cultural and sports facilities in the Čapljina Municipality is satisfactory, unlike the Stolac Municipality where it is unsatisfactory.

Table 2.28: Culture and sports

Municipality	Culture	Sports
Čapljina	- community centres 4 - museum 1 - cinema 1 - cultural societies 9	- stadiums 5 - sports hall 1 - sports societies 8
Stolac	- universal hall 1	- stadium 1 - sports hall 1

Availability of social infrastructure amenities is satisfactory mainly in the City of Čapljina as the municipal seat, while other parts of the Municipality are negleced. Thus, investment into urban facilities construction and street furniture should be planned, particularly in the so called transitional settlements. The entire Stolac Municipality is characterized by inadequate availability of social functions.

2.4.2 Land-Use

2.4.2.1 Basic land-use and balance categories

The Hutovo Blato Nature Park area consists mainly of aquatic surfaces, i.e. about 39 % (3,038.31 ha), and agricultural land (categories 1, 2 and 3) with 32% (2,503.27 ha) with the highest concentration in the south-west part of the Nature Park. Water surfaces are situated on the northern and eastern side, mostly surrounded by forest land (categories VI and VII) alternating with agricultural land (categories 2 and 3).

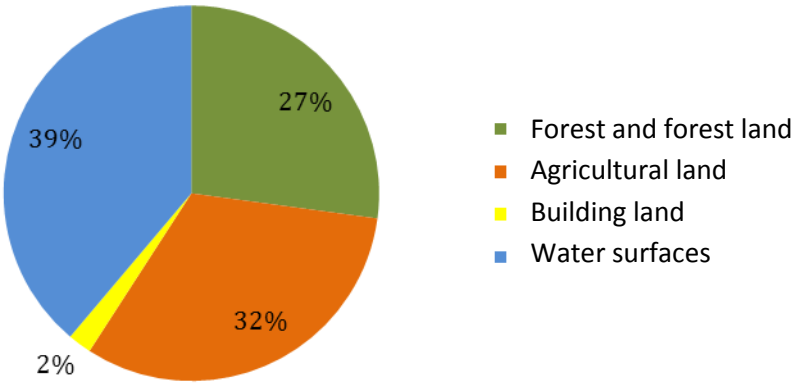


Figure 2.26: Land-use breakdown inside the Hutovo Blato Nature Park

2.4.2.1.1 Forests and forest land

Checks with the competent Ministry of Agriculture, forestry and Water Management of the Herzegovina-Neretva Canton confirmed that the forests and forest land within the Hutovo Blato Nature Park boundaries do not belong to the forest management zone and they are not covered by the forestry plans which are responsibility of Public Enterprise "Šume Hercegovačko Neretvanske" d.o.o. at the canton level.

There is no internal spatial division of forest vegetation in the Hutovo Blato Nature Park into compartments and sections, and no forest categorization has been made, which is a crucial step in planning and management of all forests.

2.4.2.1.2 Agricultural land

Total surface area of agricultural land is 2,503.27 ha, and the surfaces are shown according to the land quality:

Table 2.29: Agricultural land category

Agricultural land	AREA (ha)
zone I	866.85
zone II	630.96
zone III	1,005.46
T o t a l	2,503.27

Agricultural land in the greater Hutovo Blato Nature Park area is used as:

- arable land, and
- pastures

Arable land is used to cultivate plants which differ from plants in the rest of Bosnia and Herzegovina by being sub-Mediterranean plants of warmer climate. Conditions are excellent for growing of corn, tobacco and beans, grapevine, fig, peach, neactarine and tangerine. The cultivation method used are plantations (orchards, vineyards, hopfields), field crops such as row crops or wide row crops (corn, potato, sunflower), high-density crops (wheat, barley, flax, hemp, etc.) and forage crops (grasses, clovers, silage crops, etc.). Cultivated plants are intended as human and cattle food when fresh (vegetables, fruit), as raw material for processing, or as medicinal, pot and aromatic herbs (camommilla, melissa, common sage, lavander). Conditions are exeptionally favourable for cultivation of insecticidal plants, in particular pyrethrum (*Chrysanthemum cinerariefolium*) in English also known as Dalmatian pellitory).

2.4.2.1.3 Building land

Total building land area within the Hutovo Blato Nature Park is 159.25 ha, which is only 2%, of the total Nature Park area.

2.4.2.1.3.1 Development and improvement areas and surfaces

Building area in settlements

The Čapljina Municipality Physical Plan determines an urban area earmarked as building land for development of housing projects which are important for the Hutovo Blato Nature Park, i.e.:

- Svitava
- Prebilovci
- Gnjilišta
- Sjekose
- Klepci

The surfaces determined for these settlements are: developed part of building land and undeveloped part of building land in the settlements.

Settlements of Gnjilišta, Sjekose and Klepci enter into the Nature Park with small areas, area of Prebilovci is larger, while almost entire area of the settlement of Svitava is encompassed.

The villages of Londža, Ćore, Drijen, Marića kuće and Košćela are detected. The Košćela village belongs to the settlement of Kruševo, and other villages belong to the settlement of Bjelojevići in the Stolac Municipality.

Building area outside the settlements

The Čapljina Municipality Physical Plan envisages Karaotok, and the area towards south, by the Krupa River, downstream from Karaotok as a tourist and food & beverage services zone. The As-built Survey Documentation incluedes this zone and shows it as the existing state. This zone, in addition to the existing Karaotok area focusing on tourist industry, spreads on the southern part by the embankment, which is agricultural land, and crosses the canal.

Table 2.30: Building land breakdown

Purpose	AREA (ha)
graveyard	1.43
tourism and food & baverage services	23.36
unbuilt	53.28
built	82.61
T o t a l	159.25

2.4.2.1.3.2 Individual structures and complexes outside building area

A site visit, digital orthophoto and cadastral plans reveal that there are some (more exactly 12) civil structures built outside the building zone situated within the Nature Park area. In most cases these are self-standing, abandoned and demolished structures in the vacated Stolac part of the Nature Park. The data on these structures is currently insufficient, and the structures themselves are inaccessible. They need to be additionally investigated.

A separate problem is developed area in Sjekoštak, a village formed of some 10 houses in an agricultural, marshy and flooded land, which is not included in building plans. The Čapljina Municipality Physical Plan addressed this issue and proclaimed this as an usurpation of land.

2.4.2.1.4 Mineral resources exploitation

No activities related to exploitation of mineral resources are carried out in the Nature Park, but architectural stone is mined in its immediate vicinity, near Dračevo, and illegal gravel mining activities are carried out in the Bregava River channel downstream from Prebilovci. The querry in Dračevo has negative impact on landscape values of the Nature Park, however the Čapljina Municipality Physical Plan envisages continuation of exploitation of architectural stone in this site.

The gravel mining in the river channels has considerable impact, it results in degradation of river channels, causes increase in flow rates and affects groundwater levels. Therefore, care should specially be focused on ensuring that planned exploitation does not impact the river channels negatively.

2.4.2.1.5 Water surfaces

Water occupies the largest surface of the Hutovo Blato Nature Park, i.e. 39% of its total area. According to the data of the *Agency for Watershed of Adriatic Sea,* water cadastre is currently in preparation. The data given in the table are obtained from land survey maps made in scale 1:10,000.

Table 2.31: The Hutovo Blato Nature Park water surfaces breakdown

Description	AREA (ha)
watercourse	81.36
wetland	2,039.83
lakes	422.57
reservours	493.12
T o t a l	7,824.00

The water surfaces are currently used for:

- water supply and in agriculture
- power generation
- fish farming
- recreation.

2.4.3 Infrastructure

2.4.3.1 Traffic communications

2.4.3.1.1 Current status

Regional road

A regional road **R426 Dračevo-Cerovica,** which connects municipal seats of Čapljina and Neum, runs within the Nature Park area, namely along the park boundary. Technical characteristics of this road are very poor, particularly in the section from Svitava towards Cerovica. Carriageway is 3.0-5.0 m wide. The Nature Park boundary from Sjekos to Svitava runs along this road route.

The road is planned for reconstruction.

Local roads

The internal road network in the Hutovo Blato Nature Park primarily connects to the **arterial road M17**, and through it to other traffic routes.

The Nature Park is entered from a **local road L3 Klepci-Gnjilišta-Karaotok**. The road is 4.5 km long, carriageway width is 5-6m, asphalt pavement, horizontal conditions on the route are poor, while the vertical aspect is good. The road runs through densely populated settlements of Klepci and Gnjilišta. This local road is responsibility of the Čapljina Municipality.

Another connection to M17 is realized by a local road **L2 Klepci-Prebilovci-Karaotok**. This road is 5.2 km long (Klepci-Prebilovci 1.4 km, Prebilovci-Karaotok 3.8 km). Carriageway width is 4-6 m on average, asphalt pavement, horizontal and vertical conditions are good. The road is responsibility of the Čapljina Municipality. Section Prebilovci-Karaotok was built in 2007, when the World Fishing Championship was held in Karaotok, and it runs in the immediate vicinity of the Škrka lake, namely the Gornje Blato area.

The Svitava settlement is connected to the regional road R426 through a **local road L4 R426-Svitava-Kneževića Kuće**. The road R426-Svitava has asphalt carriageway, 2.2 km long and 4-5 km wide, with good horizontal and vertical elements. This road provides an access to the Svitava HPP. Road Svitava-Kneževića Kuće is a macadam road, 0.9 km long, 3 m wide, with poor technical characteristics, which runs through the settlement. This road is responsibility of the Čapljina Municipality.

On the Stolac Municipality side, the Nature Park is connected by the **local road L M17.3-Drenovac-Londža**. Total length of this road is about 10 km, carriegeway is partly asphalt surfacing (to the settlement of Boljuni), and after Boljuni it turns into a macadam road. Carriageway width is 2-3 m. Technical characteristics of this road are poor.

The Stolac Municipality is connected with the Nature Park by another local road **L Aladinići-Prenj-Bregava-Košćela.** The first section of this road runs from Aladinići to Mt. Prenj, and it is asphalt surfacing, has good technical elements, and both horizontal and vertical conditions. This section is 2.4 km long. The next section descends from Mt. Prenj to the Bregava River, crosses it over a concrete bridge, to ascend on the hill and enter the Nature Park boundaries and reach the village of Košćela. This section is in poorer condition than the first one, it is a macadam road with rather poor technical characteristics, and poor horizontal and vertical conditions. The section is 8.2 km long. Therefore, from Košćela to the arterial road M17.3 (section Stolac-Mostar) is 10.6 km long with additional 10 km to the centre of Stolac.

Public paths

Public path Prebilovci-Prebilovci Gornji connects the settlements of Prebilovci with the local road L2 Klepci-Prebilovci-Karaotok. Its total length is 3.1 km, pavement is asphalt surfacing, width is 2-3 m. Technical characteristics of this road are poor. This road is responsibility of the Čapljina Municipality.

Other unclassified roads

Macadam road running along the north-eastern side of the Hutovo Blato Nature Park
In 1990s, roads needed for war operations were made in the Nature Park vicinity. A macadam road ascends on the southern part of Ostrvo to the Rovač location, and than ascends along the northern side of Ostrovo to Londža. Total length of this path is 10 km, it is not easily passable and has some difficult vertical elements.

From Londža to the location downstream from the village of Ćora, the path overlaps with the local road Drenovac-Londža. From Ćora (spring area Babino Oko), the path goes to the villages of Drijen and Košćela, than to the nort around the Deranska Kaseta and Crno Brdo to reach Prebilovci. From here, a public path Prebilovci-Prebilovci runs, than a local road L2 Prebilovci-Klepci, which is a connection to M17. Total length of this road is 11.8 km. Vertical and horizontal elements of this route are not poor.

Access road to the Krupa dam
In the part of Donje Blato (Svitavska Kaseta) from the settlement of Dračevo through the field there is a road running to Sjekoštak and the Krupa River dam, asphalt surfacing, 3 m wide, total length 3.2 km.

Table 2.32: Roads within the Nature Park area (Section 6.3)

Code	Class	Section	Length (km)	Condition
R426	Regional road	Dračevo-Cerovica		Asphalt surfacing. Technical characteristics poor. Reconstruction planned.
L2	Local road (Čapljina Mun.)	Klepci-Prebilovci-Karaotok	5.2	Asphalt surfacing. Condition good.
L3	Local road (Čapljina Mun.)	Klepci-Gnjilišta-Karaotok	4.5	Asphalt surfacing. Horizontal elements poor, vertical elements good. Runs through settlement.
L4	Local road (Čapljina Mun.)	R426-Svitava-Kneževića Kuće.	3.1	First section of R426-Svitava asphalt coated. Condition good. Second section Svitava-Knežića Kuće, poor elements, no asphalt surfacing.
L	Local road (Stolac Mun.)	M17.3-Drenovac-Londža	10	Partly asphalt surfacing. Elements poor.
L	Local road (Stolac Mun.)	Aladinići-Prenj-Bregava-Košćela	10.6	Partly asphalt surfacing. Elements poor.
S	Public path	Prebilovci-Prebilovci Gornji	3.1	Asphalt surfacing. Elements poor.
N	Other unclassified paths	Macadam road Prebilovci - Crno Brdo – Košćela – Drijen – Londža	11.8	Macadam. Conditionally good elements.
N	Other unclassified paths	Macadam path on the NE side of the Hutovo Blato Nature Park	10	Macadam. Elements poor.
N	Other unclassified paths	Road to the Krupa dam	3.2	Asphalt surfacing. Elements good.

2.4.3.1.2 Waterways

An inland waterway runs by the Krupa River to Lake Deran, and further through narrow canals and gullies to destinations such as Londža, Drijen and Jelim. Navigation is possbile by small boats, capacity to 25 persons, and boats for 8 persons and logs used to move through narrow gullies (Jelimska, Škrkina).

The waterway Karaotok-Kanal Sunce-Krupa River-Kanal Lopoča-Karaotok is used for photo safari.

In the part of Lake Svitava, navigability is ensured for boats, small ships, and logs alike at the entire surface.

2.4.3.1.3 Projection

The existing road infrastructure meets the needs of the Hutovo Blato Nature Park, but it needs to be improved, i.e. reconstructed, which particularly refers to road connections to the Stolac Municipality (local road Aladinići-Prenj-Bregava-Košćela and local road M17.3-Drenovac-Londža).

The macadam road Prebilovci - Crno brdo – Košćela – Drijen – Londža, total length 11.8 km, built in 1990s, is planned for walking and cycling only.

The macadam road Londža – Ostrvo – Svitava, total length 10 km, not easily passable, difficult elements, but smaller repairs could make it suitable for walking and cycling. There are some other unclassified paths on Ostrvo that could also be improved and used for walking and cycling.

To ensure continuity of walking paths and cycling trails, it is necessary to build a **pedestrian bridge over the Krupa** to connect the Ostrovo peninsula with Višićka Kaseta.

All roads need to be improved to enable cycling, marked and provided rest areas and information boards.

Stationary traffic also needs to be regulated. The existing parking lot in Karaotok satisfies the needs, but increase in number of visitors will result in its extension and additional regulation of the stationary traffic. Building activities in Karaotok are regulated by the Physical Plan.

Making Londža a secondary Hutovo Blato visitor centre, with necessary infrastructure, is expected to result in increase in number of visitors, thus a parking lot will need to be built. Navigation routes need to be marked, mapped and their use should be determined in sense of who, when, under what conditions and with what type of vessels are allowed. It is also necessary to ensure access from the Stolac Municipality direction.

As regards railway traffic, cooperation is required with relevant instutions in order to relocate the planned Čapljina-Nikšić railway off the transitional zone of the Hutovo Blato Nature Park.

2.4.3.2 Power system

2.4.3.2.1 Current status

A number of electric power facilities at different voltages is situated within the Hutovo Blato Nature Park area.

The power transmission facilities crossing over the Hutovo Blato Nature Park area include:

1. 220 kV MOSTAR 4 (Čule) Substation –Čapljina 1 HPP overhead line
2. 220 kV MOSTAR 4 (Čule) Substation – Čapljina 2 HPP overhead line
3. 110 kV ČAPLJINA (Tasovčići) Substation - Opuzen overhead line

Overhead lines (OHLs) between 220 kV MOSTAR 4 (Čule) Substation and Čapljina 1 HPP, and 220 kV MOSTAR 4 Substation (Čule) and Čapljina 2 HPP pass over the north-eastern and south-eastern part of the Nature Park, mostly through the Nature Park territory belonging to the Stolac Municipality, while the 110 kV ČAPLJINA (Tasovčići) Substation - Opuzen OHL cuts the Nature Park area in two points, on the north-west and south-west, and both these areas belong to the Čapljina Municipality.

The power distribution facilities crossing over the Hutovo Blato Nature Park area include:

1. 35 kV OHL from 110/x kV ČAPLJINA (Tasovčići) Substation to 220/35 kV Čapljina PSHPP Substation;
2. 10(20) kV OHL from 110/x kV ČAPLJINA (Tasovčići) Substation to Višići;
3. MV cable line from 10(20) kV Svitava switchgear to Bajovci;
4. 10(20) kV OHL from 110/x kV Stolac Substation to Burmazi;

while 35 kV OHL from 35/x kV Svitava Substation to 35/x kV Hutovo Substation, 10(20) kV Hrasno OHL (feeder to Neum) and 10(20) kV Svitava OHL pass adjacent to the above Nature Park area.

The 35 kV OHL from 110/35/10 kV ČAPLJINA (Tasovčići) Substation to 220/35 kV Čapljina PSHPP Substation cuts the Nature Park area in two points, on the north-west and south-west, and both these areas belong to the Čapljina Municipality.

The 10(20) kV OHL from 110/35/10 kV ČAPLJINA (Tasovčići) Substation to Višići enters the Nature Park is several points, on the north-west and south-west, and they all belong to the Čapljina Municipality.

The MV cable line from 10(20) kV Svitava switchgear to Bajovci is lied in its full length along the edge of the Nature Park area.

The 10(20) kV OHL between 110/35/10 kV Stolac Substation and Burmazi enters the Nature Park area in one point and it supplies the power to two substations located in this area.

The Hutovo Blato Nature Park accomodates eight 10(20) kV power distribution facilities, i.e the following substations:

- 10(20)/0.4 kV, 160 kVA STS PREBILOVCI
- 10(20)/0.4 kV, 250 kVA ZTTS ŠKRKA,
- 10(20)/0.4 kV, 160 kVA STS KARAOTOK
- 10(20)/0.4 kV, 630 kVA BTS PROKOP
- 10(20)/0.4 kV, 630 kVA BTS SJEKOŠTAK
- 10(20)/0.4 kV, 50 kVA DSTS USTAVA (OVANJ)

supplied from the 10(20) kV Višići terminal fed from 110/35/10 kV Čapljina Substation and substations:

- 10(20)/0.4 kV, 100 kVA STS BLATO (DERANI) and
- 10(20)/0.4 kV, 100 kVA STS ĆORE

which are supplied from 10(20) kV Burmazi terminal fed from 110/35/10 kV Stolac Substation.

Electricity supply of the settlements is satisfactory.

2.4.3.2.2 Projection

No new electric power projects are planned for construction within the Nature Park boundaries, and cooperation is necessary with relevant institutions in order to relocate HV overhead lines off the Nature Park boundaries, and to provide all distribution lines with grounding system.

2.4.3.3 Telecommunication system

2.4.3.3.1 Current status

Telecommunication infrastructure for fixed and mobile networks is available in the Čapljina Municipality area. There are no facilities for telephone cable route within the Hutovo Blato Nature Park area.

However, transmitter-converter facilities and a base station for mobile telephony are situated within the Hutovo Blato Nature Park area.

2.4.3.3.2 Projection

Telecommunications using mobile networks have been developing intensively in the last decade. The level of coverage in the Čapljina Municipality territory is satisfactory. The existing base stations are set up so that they do not affect the Nature Park use and protection of the environment and cultural heritage amenities. No construction of facilities and infractructure for fixed telecommunication network or mobile telephony facilities is epected in the Hutovo Blato Nature Park area.

2.4.3.4 Water resources management

2.4.3.4.1 Current status

As regards water resources management, the Svitava Reservoir belongs to the water management system supporting the Čapljina PSHPP, and its condition is permanently modified. Protection against water damage in the Nature Park is ensured by embankments, which have not been maintained. A network of canals used in agriculture is also neglected.

2.4.3.4.2 Projection

The Svitava Reservoir will be used for development of fish farming, sports and recreation, and it will remain within the Čapljina PSHPP system. Remediation of embankments and drainage structures should be done in collaboration with the relevant institutions.

Figure 2.27: Lower compensating basing of the Čapljina PSHPP – Svitava

2.4.4 Municipal Utilities

2.4.4.1 Water supply

2.4.4.1.1 Current status

The Hutovo Blato Nature Park area is supplied with water from the Čapljina public water supply system, namely from the Bjelava River spring area.

The narrow area of the Nature Park, namely the Karaotok Motel site has, in addition to the connection to the water supply system, its own private well (pump) with which all the facilities are networked so in case there is a failure in water supply for any reason it is continued from this source. A hydrant network is built around all the buildings and other facilities for fire protection, with sufficient number of hydrants. A water tank with capacity of approimately 100 m^3 is ensuring sufficient quantity of fire fighting water and water used in any other accidents, and the tank is used solely for this purpose.

The settlements in the Čapljina Municipality, i.e. Prebilovci, Gnjilišta, Karaotok, Sjekose, Bajovci and Svitava are supplied with water. In the Nature Park area that belongs to the Stolac Municipality territory there is no public water supply system connection.

2.4.4.1.2 Projection

It is necessary to build a water supply system for the settlements in the Stolac Municipality are, i.e. Košćela, Londža and Ćore, tapping to the spring areas in Hutovo Blato, since these settlements are planned for development of tourist and food and beverage amenities, as well as to service the needs of the local population.

2.4.4.2 Sewerage system

2.4.4.2.1 Current status

No public sewerage system and wastewater disposal is provided in the Nature Park area. Wastewater from a restaurant in Karaotok is discharged into a biodisc treatment facility, which is presently out of operation, and than forwarded into a closed septic tank.

There is no information about methods used for domestic effluent treatment in the populated part of the Hutovo Blato Nature Park. It is supposed that households dispose of their wastewater into the septic pits, but there is no information on whether they are properly built, emptied and maintained.

2.4.4.2.2 Projecion

All settlements and buildings within Nature Park boundaries need to treat their wastewater properly. The settlemnts need to be build sewerage systems with wastewater treatment plants, so that all wastewater reaches an adequate level of purity before its discharge into the nature. For some buildings/structures outside the building areas in the settlements, and in locations where it is not cost-efficient to build sewerage systems, wastewater disposal shall be organized in properly built septic tanks which need to be emptied regularly and in places earmarked for the purpose.

2.4.4.3 Waste management

2.4.4.3.1 Current status

Solid waste management in the Čapljina Municipality territory, including the area encompassed by the Physical Plan for Hutovo Blato, is responsibility of the Čapljina Municipal Utility. Waste collection is carried out using individual and municipal metal containers.

The waste is tipped at the municipal Ada landfill, situated in the greater urban zone of the City of Čapljina. The waste is not separately collected and no environmental protection activities are undertaken at the ladnfill.

Waste collection and disposal within the Hutovo Blato Nature Park is organized so that solid waste is collected in trash bins and moved to large containers (V=1,100 litre) which are emptied by the municipal utility.

In the greater area of the Physical Plan for the Hutovo Blato, waste is a serious problem since it is disposed of in inadequate places which results in fly tipping on illegal dump sites. The sutiation with waste management is not satisfactory.

The area covered by the Physical Plan is not provided waste collection service and therefore numerous illegal dump sites are encountered. Waste on such dump sites, particularly in the remote settlements, is burned thus creating an air pollution source.

2.4.4.3.2 Projection

The waste management objective is to address the problem of already generated waste in an adequate manner, to reduce quantities of generated waste and introduce waste generation prevention measures, introduce waste recovery, waste recycling, waste treatment and the envirnmentally suitable management. Also, it is also necessary to envisage remediation and closing down of illegal dump sites.

2.4.5 Other Visitor Infrastructure

In addition to providing telecommunication services in the Nature Park area, as well as the roads for motor vehicles, regulation of traffic, walking paths and cycling trails with rest areas and information boards, navigation connections and vessels, it is planned to arrange for the accompanying tourist and recreation amenities within the Zones of Use of the Nature Park area, i.e.:

- Development of eco/ethno villages offering accomodation in the existing facilities in the settlements of: Loznica, G.Prebilovci, Košćela and Londža;
- Reconstruction and change in use of the Hunters' Lodge in Londža (visitor info centar, restaurant);
- Development of small food and beverage services in the village of Košćela, with highlight on gastro tourism, accompanied with sports and recreation amenities for horseback riding, trekking and cycling;
- Setting up of a camping site in Glavica, near Karaotok;
- The Svitava Reservoir should be used for fish farming, sports and recreation: it is necessary to mark access paths to the lake and accompanying facilities for rental of boats and other sports equipment;
- Setting up of new bird watching towers;
- Setting up and preparation of new educational trails;
- Improvement of the existing football field;
- Encorporating cultural assets into the tourist offer.

2.4.6 Economy

2.4.6.1 Forestry

On parts of the Svitava kazeta there were once oak and European ash forests. Today there is only sporadic forest of oak and the rest is composed of shrubbery. From these scarce forests and shrubs there is no economic use.

Unfortunately, in autum of 2011, 80% of Park the wetland surface was destroyed by a fire and this is also a reason the leftover forest surfaces should be protected as they represent habitats to many fauna. In this sense, it is of great importance to raise and protect forests. According to existing research it is affirmed that the natural conditions of the Sivtavska kaseta are suitable for cultivation of poplar and willow forests.

The forests within the boundary of the Hutovo blato Nature Park are not included in the forest management documents implemented in the Canton by the "Šume Hercegovačko Neretvanske" ltd. public enterprise.

Therefore there is also a lack of data regarding the current forest reserves in the Nature Park in terms of tree species. Management of forests is possible under the condition that the wood stock, annual increment and mean annual produce is known. A forest Management Plan establishes the species and extent of works for direct managemement of forests and forest lands aswell as long term guidelines for the validity period the Plan.

Generally, forests of the nature Park, apart from their possible economic function have an emphasied ecological, aesthetic, touristic and recreative role. Consequently, it is important to adopt special forest management conditions for the area of Hutovo Blato Nature Park as forests are one of the basic factors in conserving and enhancing the ecosystem of this area.

Forestry as an economic activity in the case of the Hutovo Blato Nature Park can not commence until the problems which appear regarding forest management are eliminated, and it has to be in accordance to the Nature Park protection measures.

2.4.6.2 Fisheries

Based on an extent to which it is used for fiesheries, Hutovo Blato can be divided into the Gornje (Upper) Blato and Donje (Lower) Blato.

One of the zones in Gornje Blato includes cold and deeper lakes and rapid and cold gullies. The area is dominated by indigenous species, althouth spreading of foreign species is obvious. These areas need to be placed under strict protection, and all fishing activities need to be banned, with exception of fishing for controlled scientific research. It is also necessary to mark and protection known hatching sites of endemic species, such as Dalmatian nase and Dalmatian roach, which might be used for educational purposes and as tourist attraction.

Another part of the Gornje Blato area includes shallow and warmer lakes, one of them being Lake Deran, where introduced species are dominant (tench, brown bullhead and pumpkinseed sunfish) (Dulčić, 2012). The Donje Blato (Svitava Reservoir) as an artificial lake. The most numerous species in the reservoir are the introduced and commercially less valued species, such as pumpkinseed sunfish and Prussian carp.

It is planned to turn Lake Svitava into an area for angling, provided certain protection measures are taken. Fishing could generate a considerable income and enable crating of new jobs for the local population.

Intensive-input cage breeding of fish is possible in deeper or deepened parts of Lake Svitava, and the entire reservoir can be turned into a low-input fish farm partitioned in several ponds and shallow lagoons.

Fish ponds play a very important role in protection of the Nature Park biodiversity since they are used by waterfawl as resting and feeding spots, particularly during the period in which the flood plane is dry. Therefore, in order to protect an overall biodiversity in the Nature Park, it is particularly important to care about the fish stock breeding. Previously elaborated plans have confirmed that fish breeding under natural conditions in Hutovo Blato must be preserved in order to preserve the balance of the ecosystem.

The main target fish species are those which are easy catch, such as eel or larger carps, and endemic species during hatching migratins (Dulčić, 2012). Same as in the Neretva mouth area, eel is highly valued species in the Hutovo Blato wetland area, and it represents a considerable part of the fishing activities. Since its market price is high and social conditions in the area are poor, the local population has intensified eel fishing during the last several years.

The present day eel catch, however, is minute compared to the past periods, and eel is one of the most endangered species in wetlands (Glamuzina *et al.*, 2008). According to the data collected and published by Aganović (1952), annual eel catch in the area has once been about 50 ton.

Being a highly valued fish, the eel is included in high-input aquicultural activities in Europe, and its present production is about 8,000 t/year, which is approximately equal to an amount caught in the wild. Aquicultural production is presently based on catch in the wild, so the number of European eel specimens is on decrease. However, it is still not a typical endangered species, but the value of traditional eel fishing is being diminished.

Based on length-weight relationship for eel, it has been concluded that the eel with weight of 50 – 300 grams live in colder and smaller gullies, while reed-patches and lakes are populated with eel of all age groups. The majority of specimens are heavier than half a kilogram.

During the last ten odd years, the catch increased ten times in the majority of fishing areas on the Croatian side of the border. Since the European eel migration from the sea along the Neretva River has never been scientifically researched, there is no answer to this significant question. There is an opinion based on the earlier data that the eel population in the Neretva River is becoming commercially negligible and insignificant, which creates a need for more intensive and better management of the population of this exceptionally valued fish species (Dulčić, 2012).

Lake Deran, with large surfaces under common reed, is an optimum habitat for eel, which has been confirmed by the catch rates.

According to the *Hutovo blato Nature Park internal Regulations,* sports fishing is permitted only in the traditional form. According to this Regulation, in areas of Gornje blato and the foot hill lakes (Jelim, Škrka, Drijen, Orah, Radanovac and Babino oko), fast streams (Londža, Jelimska jaruga and jelimska rječina, Šarčevac and Merdžanovac) as well as the rest of the smaller gullies, **fishing is prohibited.**

Figure 2.28: Eel specimen caught in the Hutovo Blato wetland (the upper specimens are from Londža, and the lower from the reed-patches of Lake Deran)

According to the Public Enterprise Hutovo blato Nature Park, the fishing amount per location is as follows:

Table 2.33: Fished amounts per location

Species	Deran lake	Krupa	Svitava lake	Total (kg)
carp	200	300	1.000	1.500
eel	500	500	300	1.300
Dalmatian roach, Adriatic Rudd	2.000	200	5.000	7.200
Prussian carp, pumpkinseed sunfish	500	300	1.000	1.800
Tench	300	100	1.000	1.400
Brown bullhead	200	100	1.500	1.800
Dace, Common chub, Dalmatian nase	200	500	-	700
European flounder	100	100	-	200
Mullet	500	100	50	650

These amounts correspond to the fish caught illegally by the local population from which the Park does not benefit.

2.4.6.3 Agriculture

Since livestock breeding and agriculture as traditional economic activities are becoming rarely pursued, pastures and agricultural land is becoming overgrown. The consequence is degradation of valuable part of a traditional farming landscape which is assuming natural characteristics. Revitalization of agricultural and animal production should be based on production of traditional and organic products and development of rural tourism.

Agricultural surfaces under plough land located at the Nature Park boundaries are mainly used for growing of cultures intended for game feeding. Other agricultural surfaces are under orchards, vineyards, meadows and pastures, and in collaboration with farms managing them they are used for production of organic food (table grapes, dairy products), which could become a component of gastronomic offer in the Nature Park.

Production and growing of seedlings in nurseries situated within the Nature Park boundaries is a good potential opportunity of educational activities for the Nature Park to organize for pupils and students.

An abundant and diverse plant cover that includes numerous medicinal, honey and edible plants (mint, marshmallow, winter savoury, Dalmatian laburnum, common laburnum, Christ's thorn, black locust, nut tree, fig, pomegranate, Mediterranean hackberry and others) is certainly a good grounds for development of medicinal products and potions as indigenous products (honey, dried figs, nuts and the like) that would improve tourist offer in the Nature Park.

Since pyrethrum is used for preparation of a natural insecticide applied in organic agriculture, that type of production should be encouraged in future in the Hutovo Blato Nature Park. Growing of pyrethrum could, provided an adequate promotion, become a direction in which growing and processing could expand in this region. It would be advisable to carry out branding of all food produced in this area. Possibilities for export of pyrethrum and its preparations are unponderable.

Potentially fertile but insufficiently used arable land plots in the greater Nature Park area are karst fields (*polje*) and *dolines*. The *dolines* are enclosed or semi-open depressions where earth material is collected from the ground that encloses karst valleys and dolines. General characteristic of karst fields is unfavourable hydrological regime because of alternating floods outside the growing season and droughts in the growing period.

The agricultural land and pastures, as well as all other surfaces within the Nature Park, can be sustainably managed, provided quality monitoring and control is set up, proper orientation taken, and professional and financial support ensured.

It is mandatory to ensure an integrated, ecologically and socially sustainable and acceptable management of the area, since all the impacts of human activities, including agriculture and its impact through soil being a source of emission of substances applied or generated in the agricultural ecosystem, affect waters in all watercourses and lakes in the Hutovo Blato Nature Park.

2.4.6.4 Hunting

2.4.6.4.1 Legal grounds

Legal grounds for conducting activities in this economic sector is the Hunting Act (Official Gazette of FB&H No. 4/06 of 1 February 2006). Article 6 of this Act envisages that hunting grounds do not include specially protected parts of nature in case when the document on their designation bans hunting within the subject area. Taking into consideration the decisions passed so far, i.e.:

- Decree on designation of the Hutovo Blato ornithological reserve of 1954,
- Decree on designation strict bird reserve Škrka,
- Decree on list of wetlands of international importance of 1971,
- Decree on Hutovo Blato joining an international project for protection of Mediterranean wetlands of 1980,
- Decree on designation of the Hutovo Blato Nature Park of 1995,
- Decree on Hutovo Blato entry on the list of internationally important bird habitats of 1998,
- Decree on entry on the list of wetlands of international importance according to the Ramsar Convention of 2001,

have not imposed this ban (with exception of the decree from 1959), until an ultimate decision hunting is an activity that can be pursued in the Hutovo Blato Nature Park under special conditions. However, according to the "resolution" number 13-II-400/2000 issued by the Cantonal Ministry of Physical Planning, Construction and Environmental Protection, which is still in force, **hunting in the area of Hutovo Nature Park is prohibited**. The Ministry has on several occasions rejected requests for initiation of hunting activities.

At the same time, the Federal Government passed a Decision on Foundation of Special Hunting Grounds in the Territory of the Federation of Bosnia and Herzegovina (Official Gazette of FB&H No. 80/12 of 19 September 2012) on its 60th session of 11 September 2012, designated the Hutovo Blato Nature Park a special hunting grounds.

Hunting as an activity (commercial, sports, commercial and sports combined, and hunting for special purposes) could only be pursued in line with the provisions of legislation and the hunting master plan, all in the determined area within the hunting grounds. The hunting master plans are adopted on municipal level. The Stolac and Čapljina Municipalities, where the Hutovo Blato Nature Park is situated, have not enacted these documents for a 10-year period, thus hunting is carried out on the basis of annual hunting grounds management plans. In practice, the hunting grounds areas are not exactly determined by georeferencing, thus the entire municipal territory is considered as hunting grounds, with exception of the areas excluded under law (Articles 31 – 44 of the Hunting Act). In these documents, same as in the draft hunting management plan, which has still not been passed, the Hutovo Blato Nature Park is excluded from the hunting grounds.

All the above said indicates there is a lack of legal harmonization regarding this issue.

Such a status has reflected directly on the situation in the field. On one side the Public Enterprise Hutovo Blato Nature Park makes efforts to protect this area while on the other side there is pronounced pressure from the poachers who take advantage of this current status.

2.4.6.4.2 Economic aspects of hunting

Until 1995, Hutovo Blato had been an organized hunting ground. The pre-war indicators show that hunting, as commercial and sports activity, had considerably contributed to an overall business activity of the Nature Park. The income was generated by hunting organization and kill, as well by rendering accommodation and food and beverage services to the hunters as accompanying activities. Consequently, hunging was considered an activity necessary for sustainability of the Hutovo Blato Nature Park.

Having in mind that until 1995 Hutovo Blato had been a commercial hunting grounds for hunting tourism, and that by its Decision on Foundation of Special Hunting Grounds in the Territory of the Federation of Bosnia and Herzegovina of 19 September 2012 the Federal Government designated the Hutovo Blato Nature Park as special hunting grounds

nominating the Public Enterprise Hutovo Blato Nature Park, Karaotok-Čapljina as user, this is considered as a step which reopened the hunting development chances.
It is necessary to determine the number of game in the hunting grounds, and to take care of maintaining biologically and reproductively healthy game population, which is enabled by available hunting facilities (feeding sites, watching stands) and harmonize the legislation Federation and County level.

A possible solution is to create an agreement between hunting associations Čapljine i Stoca and the Public Enterprise in which hunting zones can be harmonized through the Law on Concessions. Through this cooperation agreement, favourable concession conditions could be created for the hunting associations' and their hunting areas. The Nature Park Hutovo Blato would then take over the breeding component as a binding part of the agreement and this would lower the hunting associations' expenses while at the same time increase the protective and useful function in this protected area aswell as reclaim the one-time income from hunting tourism.

The hunting organization must respect the limitations imposed for by the Nature Protection Act and Hunting Act, and those ensuing from a need for harmonized management of forests and business operations of the Public Enterprise Hutovo Blato Nature Park.

2.4.7 Education and Research

Development of the Nature Park amenities intended for education was enabled by implementation of the educational trails project targeting pupils and students from primary and secondary schools. The bird watching stands were built in the nature park, and a database was set up according to the provisions of the Ramsar Convention. To round up the educational program, a building was built to accommodate a botanical and ornithological collection that will significantly contribute to a more complete and targeted school field trips.

Due to large interest of schools in field trips, educational workshops, seminars, technical symposiums, lectures, art colonies and exhibitions are organized in the Motel Karaotok. This considerably contributes to visitor rates and revenues from the food and beverage services. The main objective of these trips is gaining additional knowledge in biology. In addition to the Hutovo Blato area, there are optional visits to the neighbouring destinations which meet the part of educational curriculum focusing on study of ecological systems.

These activities of the Public Enterprise Hutovo Blato Nature Park bring certain income. In 2013 this amounted to around oko 6.000 KM from tickets sold to pupils on organised visits and photo safari boat rides (ticket price is 1,00 KM).

2.4.8 Tourism

Composition of visitors shows that there is a significant increase in school trips, and a negligible increase in foreign tourists enjoying this type of tourist offer. The majority of foreign tourists visit the Nature Park in organized one-day excursions, while the domestic tourists mostly come individually. Pupils come in organized on day trips on their way to other destinations. The Public Enterprise generates a relatively small income from these visits (90% is generated from tickets and and photo safari boat rides), and the total amount of visitors yearly does not exceed 8.000 people. From the total number of visitors in 2013, the income was as follows:

Table 2.34: Generated income from visitors in 2013

Month 2013	Number of rides	amount KM
04.	17	1.587,00
05.	99	9.402,00
06.	76	6.021,00
07.	64	4.424,00
08.	66	4.056,00
09.	37	2.637,00
10.	19	1.719,00
11.	6	430,00
12.	1	70,00
Total		**30.346,00**

Gross income from photo safari (01.04.2013. – 31.12.2013.) is 30.346,00 KM, after covering the following expenses:

1.	Pay for the drivers - total:		3.830,00 KM
2.	Gas:		3.366,00 KM
3.	Tax:		4.410,00 KM
		Total:	**11.606,00 KM**

The remaining netto income of the Public Enterprise in 2013. amounted to 18.740,00 KM.

Tourist offer in the greater area comprises primarily natural and cultural assets in the neighbouring areas:

- canoe safari on the Trebižat River and rafting on the Neretva River,
- Roman villa rustica Mogorjelo,
- medieval town of Počitelj,
- religious pilgrimage site Međugorje,
- Vjetrenica cave as a pothole feature,
- the City of Mostar as a central tourist attraction in the region,
- Neum and its hintherland (Hutovo, Hrasno, Radimlja, Ošanići).

Events with high number of visitors in the neighbouring areas are: Etno Fest in Neum, Ivanjski Kresovi in Hutovo, Summer Carnival in Čapljina, Cherry Sunday in Počitelj, the holiday of the Assumption of Mary in Međugorje, the Youth Festival in Međugorje, Art Colonies in Čapljina and Počitelj, adventurous and canoe races, jumps from the Old Bridge in Mostar, boats marathon in Metković.

Competitive tourist projects are excursions to the wetland in the neighbouring Republic of Croatia. These trips are organized to visit several locations (Kuti, Norin, Baćinska Jezera lakes) and number of tourists is on increase reaching up to 20,000 a year.

The visitors are offered accomodation within the Nature Park in Motel Karaotok, with 36 beds, and the hunters lodge Londža with 16 beds situated in the Stolac Municipality, where several private accomodation facilities in Londža are also offered by the families of Brajkovići, Boškovići, Raguži, along with several old houses owned by the Krešić family.

In addition to the motel, the Public Enterprise Hutovo Blato Nature Park has its administrative building and a building for a museum and collection, dereilict buildings in Karaotok, and the vehicle and vessel fleet consists of 4 large boats (capacity 25 persons), 8 smaller wooden boats (capacity 6 persons), a van for transport of tourists, and 10 smaller “trupicas” (small boats with flat bottom) used by the Nature Park personnel.

The Motel Karaotok has a rich gastronomic offer, particularly local meals from Hutovo Blato: brodetto (fish stew), spit-roasted eel, grilled carp, meals with venison, and the like. The motel

offers accomodation, reception services, caffe restaurant, hunters' salon, central restaurant, two terrases and summer garden.

The Čapljina Municipality Tourist Board undertakes the activities aimed at promotion of tourist capacities of the municipality, thus they traditionally organize summer events in Mogorjela, Hutovo Blato and Počitelj participated and attended by actors and painters, singers, arts clubs, and harmony-singing groups which promote local folk tradition.

They also support various NGOs involved in conservation of natural and cultural assets of the municipality, and monitors and supports promotion of the Nature Park in tourist fairs (the Mostars Fair), and marks important dates related to the nature protection and Nature Park anniversaries.

Tourist Board of the Herzegovina-Neretva Canton supports promotion of the Nature Park by printing brochures and guides on various attractions. It also works on the Nature Park promotion in international and national tourist and commercial fairs (Italy, Germany, Croatia).

With support of the Cantonal Ministry of Physical Planning, Construction and Environmental Protection, the Nature Park management printed a brochure, released a short documentary on natural beauties of the park, created a web page, and promoted the Hutovo Blato Nature Park on technical excursions to European and eastern countries.

Sorts clubs from the inland part of the state have shown an interest in services related to preparations for sports competitions. Construction of a footbal field with accompanying facilities (lockers) enabled development of this tourist offer, primarily during the winter period. Favourable climate conditions in winter (mild winters without snow and ice) enabled preparations of sport teams from the hinterland (Mostar, Sarajevo, Zenica).

Use of full capacities of the football fields, and accessibility of other tourist attractions, give the Nature Park an advantage over other similar amenities in the neighbouring areas. The sports facilities are isolated, of quarantine type, which provides the sports teams with all they need for successful preparations. The winter preparations fit well into the Nature Park offer, since the park activities are reduced to minimum in this period.

Due to abundance of indigeneous fish species (carp, tench, rudd, eel, catfish), fishing on Hutovo Blato water surfaces has been considered as both tourist and commercial activity since the ancient times. Ordinance on fish stock exploitation, plans and positive laws, and the Nature Protection Act all determine the way in which this activity is carried out in the Nature Park area. Controlled commercial fishing of eel, using drift nets and coops is practiced in the upper course of the Krupa River, from Strug to Bučin.

Game fishing is practiced in a 4 km long reach of the Krupa River course, from Bučin to the Neretva mouth and in Lake Svitava with area of 1,000 ha.
As provided for by the Fresh-water Fisheries Act, fishing from boat using fishing rod with a specified number of hooks (2 baits) is allowed in the Nature Park area. The anglers pay specified fees to be issued annual permits. It is estimated that the fish stock in game fishing sites is about 120 kg per hectare.

The traditional fishing (fishing rod) is on decrase, and use of illegal fishing methods has been noticed. The number of true sport fishermen sticking to the traditional and game fishing tools, who have not succumbed to challenge of poaching, is on decrease.

Regardless of a long tradition in commercial and game fishing and angling, these activities are on decrease in the Hutovo Blato Nature Park area. This is confirmed by the data on fish catch quantities and number of daily and annual permits sold, as well as on number of reports on violations of the Fresh-water Fisheries Act.

Table 2.35: Number of daily and annual permits sold and reported violations

Year	No. of annual permits	No. of daily permits	No. of offenses	Eel catch in commercial fishing, kg
2000	15	44	8	259
2001	10 + 1 lease	6	15	652
2002	3		8	163
2003	2+ 1 lease		7	105.84
2004	4+ 1 lease	1	8	124.70
2005	2+2 lease	1		210
TOTAL	**36 +5**	**52**	**46**	**1,514.54**

The yearly income from sports fishing in 2013 and a few previous years was:

- permits in 2013 = 650,00 (in 2013. 3 yearly permits at 100,00 KM and 35 daily at 10,00 KM),
- previous years average was 1.300,00 KM (10 yearly and 30 daily)
- average gross income from eel sports fishing from 1996 to 2009 (after cutbacks on donations and adjournment of the field guards) was 15.000,00 KM.

2.5 PROTECTED CULTURAL ASSETS

2.5.1 Cultural Monuments

The Neretva valley has been and remained a natural route of communication between the Adriatic and the inland, which sustained life in this region since the ancient times. Numerous traces have remained from these historical times of mobile and immobile valuable cultural and historical assets.

Hutovo Blato is an area that had certainly offered good conditions for life of the population, and in particular for development of fisheries and hunting, for exchange of goods by trade using the Krupa and Neretva waterways going both inland and towards the Adriatic Sea. The situation was also good because of the vicinity of Narona ((Vid near Metković), an ancient trading hub. According to Karl Patcsh, the Hotovo area was rich in vegetation, forests, dear, and was certainly rather densly populated in the Roman times.

According to the archeological lexicon of Bosnia and Herzegovina, which encompasses all the archeological sites in the territory of Bosnia and Herzegovina, the slopes on the perimeter of Hutovo Blato have a large number of archelogical sites from prehistory, ancient times and middle ages.

The farmenrs living in the area have been encountering various objects: ancient bricks, amphoras, decorated architectural stone fragments, ceramics, pots, remains of ancient buildings, even the tumbstones.

The most famous and important archeological site in Hutovo Blato, with great reputation and importance, is certainly the Desilo find. Desilo is situated in a shaltered cove suitable for creation of a natural harbour. A hill-fort is situated above Desilo, and a necropolis (burial grounds) was found nereby. The first finds were revealed in 1971, when the local population found several amphoras by chance, when the water level was low, which triggered more detailed expert archeological research.

In 2007, a team of experts revived archeological research at the Desilo site, and on this occasion two Illiric ships were found, which was the first find of its kind on a global level. Age of these ships is estimated at about 2,200 years.

Regretfully, these archeological investigations were disrupted due to inadequate protection of the site since it was and has remained freely accessible to anyone. The Desila site is not

situated within the Nature Park area, but it has to be considered within plans for protection of the cultural and historical heritage of Hutovo Blato.

It should be assumed that similar sites are probably present at the Hutovo Blato lake bottom, since remains of structures at the lake bottom are visible from some locations, while similar sites are supposed to exhist. Possible sites need to be researched, and adequately protected. The have to be under protection of the Nature Park as its component, and as withesses of history of this region.

Analysis of cultural and historical heritage within the area covered by the Management Plan, and its neighbouring area, has revealed that it is not possible to clearly delineate the sites since nost of them are closely related, particularly those from prehistory. In the vicinity of Hutovo Blato, namely on roads running towards the lake from Čapljina and Stolac, national monuments exist that need to be mentioned and should later be included in the touristic offer of the Nature Park.

Three national monuments are situated in the immediate vicinity of the Nature Park, and they have been designated as such by the Commission to Preserve National Monuments of Bosnia and Herzegovina.

STOLAC MUNICIPALITY:
- Necropolis with medieval Bosnian standing thumb-stones in Boljuni, a historical site - to be included in the wider context

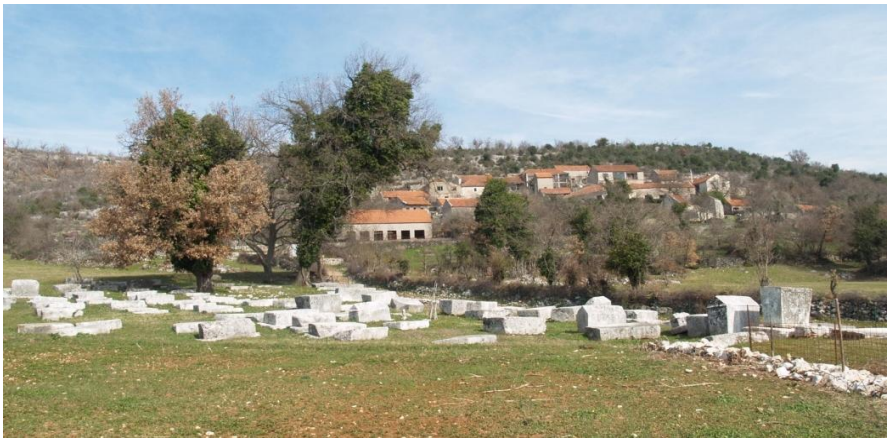


Figure 2.28: Boljuni necropolis

ČAPLJINA MUNICIPALITY:
- Bridge in Klepci, a historical structure, Ottoman period, and
- Villa Rustica in Višići, archeological site, ancient period

Figure 2.29: Bridge in Klepci

The monuments designated by the Commission are subject to the conservation actions determined in line with the Act on Enforcement of the Commission to Preserve National Monuments Decisions, in compliance with Annex 8 to the General Framework Agreement for Peace in Bosnia and Herzegovina (Official Gazette of FB&H, No. 2/02, 27/02, 6/04).

Other archeological sites are recorded in the Study of Cultural and Historical Heritage of the Herzegovina-Neretva Canton:

STOLAC MUNICIPALITY:
- RAVNA GOMILA, Ostrovo, prehistorical period, prehistorical tumulus
- CRKVINE, Derani, ancient period, Roman settlement, wall remains, brick and amphora fragments
- GRADINA, Boljuni, prehistorical hill-fort – outside the Management Plan area

ČAPLJINA MUNICIPALITY:
- Begića gomila, Gnjilište, prehistorical hill-fort from bronze and Iron Age, stone tumulus on the hill top, ceramics and Roman bricks found in the vicinity
- Bulutovac, Sjekose, prehistorical hill-fort and Roman fortress (burg). On high grounds remains of hill-fort dry-wall and roman wall with mortar and brick fragments
- Gomila, Sjekose, Dubravica, prehistorical tumulus
- Gomile, Klepci, prehistorical tumulus
- Gradina, Klepci, prehistorical hill-fort and Roman settlement
- Gradina, Pribilovci (Ekmečića gradina), Ekmečići, prehistorical hill-forts
- Klepci, prehistorical tumulus, Roman settlement (Telac site)
- Mala gradina, Gnjilište, prehistorical and Roman settlement
- Macina gomila, Gnjilište, prehistorical tumulus
- Noktac, Pribilovci, Mrvići site, prehistorical tumuluses (three) and remains of Roman settlement
- Rašića gomila, Gnjilište, prehistorical tumulus
- Suhića gradina, Pribilovci, prehistorical hill-fort
- Rovač gomila, Svitava, large prehistorical tumulus from bronze and Iron Age
- Velika gradina, Gnjilište, prehistorical settlement
- Velika Ratašnica, Klepci, large prehistorical tumulus
- Dvorišta, Svitava, Roman settlement and late ancient period necropolis, 5th century
- Gradina, Svitava, Roman fortress, remains of roofing-tiles and ceramics, ancient monument 3rd century
- Grkov dol, Klepci, Roman settlement, ancient site
- Podvornice, Bajovci, Roman settlement, ancient site of cat. 3, to be protected
- Rit dol, Loznica, Klepci, ancient settlement
- Spilice (Plandišta), Bajovci, Roman building, roof-tile remains
- Varda, Dračevo, Roman settlement
- Zgoni, Gnjilišta, Roman settlement
- Grčko Greblje, Svitava, necropolis with 30 medieval Bosnian standing thumb-stones, plates, coffins and crosses
- Pribilovci 1, medieval necropolis, 7 standing thumb-stones preserved
- Pribilovci 2, ten standing thumb-stones recorded within an ortodox graveyard
- Sjekose, six standing thumb-stones recorded in the catholic graveyard
- Stećak, Sjekose, two standing thumb-stones preserved
- Svitava 2, two standing thumb-stones preserved in the catholic graveyard and 6 in the immediate vicinity
- Zagrebnica, Klepci, prehistorical tumulus and medieval graveyard with 11 standing thumb-stones
- Desilo, Bajovci, underwater village at the edge of Hutovo Blato; during researches carried out in 1972 and 2007 quite a large number of fragments of amphoras found, some with manufacturer seals, (type Dressel 1 and 2, Lamboglia 2), Roman spear, remains of medieval log coffins, necropolis from iron age nearby, prehistorical, ancient and medieval monument
- Kula, Svitava, Ottoman era

While locating the monuments, it has been noticed that a large number of hill-forts and tumuluses is situated at the Klepašnica and Kučevo hills streatching along the north-western access to the Nature Park, while the Physical Plan boundary goes through the hill centre. All these sites are mentioned in the text since they are part of an area and should be considered in its entirety. The monuments need to be protected as entirety and organized as an archeological park that would become an item in tourist offer of the Nature Park.

2.5.2 Intangible Cultural Heritage – Traditional Crafts and Customs

Intengible cultural heritage means the practices, representations, expressions, knowledge, and skills – as well as the instruments, objects, artifacts and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognize as part of their cultural heritage.

This intangible cultural heritage, transmitted from generation to generation, is constantly recreated by communities and groups in response to their environment, their interaction with nature and their history, and provides them with a sense of identity and continuity, thus promoting respect for cultural diversity and human creativity.

The greater area of the Hutovo Blato Nature Park is an ideal area for research into and interpretation of intangible heritage. This region is, considering this aspect, well preserved and can be used for promotion of intangible cultural heritage.

Intangible cultural heritage in the Hutovo Blato Nature Park area includes:

- language heritage, including: dialects, local speaches, toponimy (place names), anthroponymy (given names and surnames), oral literature – traditions, riddles, legends, customs, beliefs, holiday celebrations, skills, rituals and the like,
- social heritage, including: chants, dances, games, culinary tradition, festivities, traditional sports, living/ cultural patterns and the like,
- traditional crafts and trades.

Awareness of gloal intengible cultural heritage has started to raise at the beginning of this century. Modern hectic times of the state-of-the-art techologies makes us forget old ways of living, and causes loss of specific skills and knowledge. In order to preserve national traditions as global heritage, the General Assembly of the United Nations Education, Science and Culture Organization, UNESCO adopted, at its session of 17 October 2003, a Convention for the Safeguarding of the Intengible Cultural Herigate. The purposes of the Convention are: to safeguard the intangible cultural heritage, to ensure respect for the intangible cultural heritage of the communities, groups and individuals concerned, to raise awareness at the local, national and international levels of the importance of the intangible cultural heritage, and of ensuring mutual appreciation thereof, and to provide for international cooperation and assistance.

The “intangible cultural heritage” is manifested *inter alia* in the following domains important for the region under consideration: oral traditions and expressions, including language as a vehicle of the intangible cultural heritage, performing arts, social practices, rituals and festive events, knowledge and practices concerning nature and the universe, traditional craftsmanship.

Traditional activities refer to knowledge, from housing construction crafts to art of food preparation and preservation. The housing construction crafts are usually those generally supressed by modern building patterns, but food preparation methods (production of diary products, drying of meet) have generally been preserved.

In the Hutovo Blato Nature Park area, traditions started to disappear only recently. In some areas, there are still persons who remember times when the folk costumes have been borne on a daily basis, and the living conditions and way of living were the same as several hundred yeas ago, when social behaviour of local communities complied with traditional perceptions, beliefs and attitudes. This is a good starting point for an informed decision-making to preserve intangible heritage, but it asks for urgent professional action regarding research, censuses, validation and professional support to local communities aimed at transfer of knowledge.

The language heritage, which includes legends, is particularly rich.

3 PROTECTION AND USAGE CONCEPT

3.1 THREATS

3.1.1 Introduction

The long-term sustainability criterion is the most important among the criteria used for determination of possible threats to preservation of the Hutovo Blato Nature Park as valuable natural asset.

Long term sustainability could only be achieved through harmonization of anthropogenic impacts with resilience of the Hutovo Blato ecological system, having in mind external pressures and risks caused by infavourable changes that could not be influenced from the local level (e.g. construction of new reservoirs and hydraulic structures in the inflow area, same as the climate changes, global political and economic crysis, etc.).
The threats could be grouped as follows:

- threats from local anthropogenic impacts
- natural threats resulting in decrease in ecological system resistance to changes
- threats from the greater region.

The most comprehensive overview of the threats related to the Hutovo Blato Nature Park area is given in the Physical Plan for Areas of Special Features for Hutovo Blato, however it mainly focuses on removal of local anthropogenic impacts. The threats caused by natural impacts, namely changes in the ecological systems (species and habitats) have not been comprehensively considered as a specific issue regarding management of the entire region. Among the threats in the greater region, only possible pressures on the Trebišnjica River basin due to continuation of the Trebišnjica Hydropower System construction have been considered within the Framework Neretva and Trebišnjica River Basin Management Plan[5], and the earlier prepared studies.

Threats to the Hutovo Blato Nature Park might be summarized as follows:

1) Threats from local anthropogenic impacts

- Activities of local population related to the traditional activities and land use that affect the main environmental components in the area (water, soil, biodiversity),
- Existing infrastructure (traffic, municipal utilities, energy sector, water supply) and planned infrastructure development, which affects the protected area either by occupation of new land (land-take) or creation of new barriers and environmental emissions,
- Inadequate spatial, financial, administrative and regulatory support to the protection system, resulting in insufficient spatial management capacities and options for their efficient use.

[5] Neretva and Trebišnjica River Basin Management Plan – Framework Management Plan, Elektroprojekt Consulting Engineers Zagreb and Zavod za Vodoprivredu Bijeljina, 2014.

2) Natural threats resulting in decrease in ecological system resistance to changes

- Natural pressures on quantitative status of surface waters and groundwaters, and pressures on the surface water qualitative status, which also affect the water dependent ecosystems so that they result in extinction or reduction in number of sensitive species which, in turn, could result in extinction of entire ecosystem through the food chains,

- Extinction of individual species and ecosystems could result in appearance of a number of new adjustible species and creation of new ecosystems.

3) Threats from the greater region

- Projects carried out outside the local area could affect quantitative status of water in the greater inflow area and its physico-chemical characteristics, which could result in disturbance of the basic elements of the protected ecosystem,

- Possible consequences of climate changes might be a threat taking the form of increased reduction in inflows from tributaries and decrease in water levels in lakes and groundwater tables,

- On a global level, occurrence of plant diseases and pests and introduction of foreign species into the protected area,

- Intensification of severe climate could additionally intensify an overal threat to the water protection system and protection of water dependent ecosystem,

- The economic and political threats could result in decline in interest of local population for water protection and nature protection and adjustment to the new management conditions.

Due to lasting anthropogenic impacts and significant changes that happened in the area under consideration during the last 50 years, and because of lack of data on earlier natural state, it is presently not possible to distinguish between the natural and anthropogenic threats to the Hutovo Blato contidition. Also, since the anthropogenic impacts are a component of the pressures imposed by the greater region, they need to be studied in more detail since the Nature Park management shall strive towards their avoiding or reduction. It should be mentioned that, considering local relations, the threats could go in opposite direction as well (as threats to the local population as a result of diminished value of the Nature Park value) through a number of feedbacks, and such threats could include:

- Deterioration in public health conditions (drinking water quality deterioration, deterioration of living conditions because of frequent damages and increasing risks),

- Deterioration in economic conditions (loosing revenue sources caused by loss of natural resources, frequent economic damages because of changes in space, such as the Hutovo Blato water level drop, which result in losses in tourist offer: boat rides, photo safary, etc.).

Therefore, management of threats to the condition of the Hutovo Blato protected area is useful for the local community as well.

Therefore, a more detailed elaboration of all anthropogenic threats is given below. Further, they will be related to the biodiversity aspects they affect the most. The Hutovo Blato biodiversity aspect is based on the value of this protected area, thus resolving of the anthropogenic threats singled out in this way has priority.

3.1.2 Anthropogenic Threats

An overview of anthropogenic threats includes local threats and threats from the greater region, including the existing status of impacts and expected anthropogenic impacts in the Hutovo Blato area.

The most important threat to the survival of the entire area is the anthropogenic pressure on hydrological and morphological condition of Hutovo Blato. This anthropogenic impact occurs in several forms and affects different environmental components with varying dynamics. Therefore, this pressure is described in most detail. Other pressures described are organized by their importance, in order to highlight priority activities on their removal or mitigation.

Table 3.1: Summary of major anthropogenic threats to Hutovo Blato

Noticed threat	Description	Impact/Consequences
Hydromorphological pressures	Changes in the Neretva hydromorphological conditions	The hydropower systems (hydroelectric power plants) built on the Neretva River, flood control systems, water abstraction and exploitation of the bed load all cause cutting of the Neretva into its channel and lowering of mean and low water levels, which results in increased impact of sea on the water quality in the Delta, and changes in hydrology of the Krupa River which flows into the Neretva, including reduced inflow from the Neretva by the Krupa during the Neretva floods.
	Changes in Lake Svitava hydromorphology	Converting of Lake Svitava into an artificial water body, drainage of a part of flood plain (Svitavska Kazeta), and separation of springs (which now flow into a lateral canal) has all changed morphology of this part of Hutovo Blato and quality of Lake Svitava water.
	Changes in the Krupa River hydromorphology	Construction of the flood control system has reduced the flood plain, and its additional reduction was caused by conversion of a part of this area into arable land, which narrowed down the Hutovo Blato wetland to the present shape.
	Construction of the Trebišnjica Hydropower System	The hydropower system constructed on the Trebišnjica affects the water regime in the Trebišnjica sinking zone and the morphology of Lake Svitava, indirectly affecting the regime of springs in Hutovo Blato, i.e. Gornje Blato
	Continuation of the Trebišnjica Hydropower System construction	Further construction of the hydropower system on the Trebišnjica (the so called Upper Horizons) shall, due to connections between groundwater bodies and springs of the Buna, Bunica and the Bregava River in particular, affect the water regime in these watercourses and, indirectly through Bregava, the spring zone in Hutovo Blato.
	Climate changes	The expected future decrease in water balance, along with considerable climate extremes, affecting the sensitive water-dependant ecosystems
Pressures on water quality	Agriculture	Modern agriculture increasingly uses fertilizers, pesticides and herbicides, causing increase in nutrients (phosphorus in particular) in the Hutovo Blato waters through soils, groundwater and surface water, thus causing accelerated eutrophication of water
	Wastewaters and urban sewerage systems	Domestic wastewaters and storm waters from urban surfaces reach either groundwater (through septic tanks) or by flowing down towards depressions, channels and watercourses, thus affecting quality of groundwater and indirectly surface water in Hutovo Blato (e.g. through the Krupa during the Neretva floods)
	Wastewaters from production facilities	Wastewaters from farms and other smaller production facilities have the same effect as the urban wastewaters because of the drainage system inadequacy. However, the risk from increase in pollutant concentrations and occurrence of priority substances in water is higher in this case.
	Landfills	Two landfills by the roads running around the area (local road to Prebilovci, regional road R426) and along the Svitava Reservoir affect the water quality by leakage (considerable risk from occurrence of priority substances in water) as well as the local landscape

Noticed threat	Description	Impact/Consequences
Biological pressures	Introduction of foreign species	Intentional introduction of commercial fish species and commercial plant species results in reduction of natural habitat areas and decrease in population of species depending on these habitats, and causes reduction of biodiversity.
	Occurrence of invasive species	Invasive species of fauna (e.g. pumpkinseed sunfish among ichthyofauna) and flora (e.g. common ragweed), occupy habitats of indigenous species and reduction of biodiversity of the area.
	Global biological changes	Diseases of plant and animal species (e.g. ornithofauna) might cause extinction of some species living or regularly visiting the Nature Park area, which would case reduction of its biodiversity.
	Succession of plant species	Long term replacement of one habitat with another that might happen because of permanent shrinking of the Hutovo Blato water surfaces, as well as because of abandoning of some traditional activities (reduction of low- external input livestock breeding results in abandoning of pastures and meadows).
Pressures from traditional activities	Fisheries	Over catch, poaching, and introduction of foreign species disturb sensitive ecological balance and make survival of indigenous fish species difficult.
	Hunting	Over catch, unregulated hunting, and poaching endanger indigenous game populations, disturb balance and peace in the Nature Park, and disturb the species
	Agriculture	Abstraction of groundwater for irrigation purposes changes relations in the aquifers which are connected with the Neretva, Krupa and Hutovo Blato (water level drop, change in flow direction), which could, under specific conditions, cause salination. Use of agrochemicals causes soil and water contamination. Absence and abandoning of low-external input livestock breeding causes disappearance of pastures and meadows, which affects the landscape as well as biodiversity.
	Medicinal plants collecting	Excessive and uncontrolled collecting of different medicinal, ornamental and commercially valuable plants causes damage to particularly valuable rare species, damage to plants and habitats, disturbance of fauna and reduction of biodiversity of the area.
Pressures from other activities	Tourism	Uncontrolled patterns of tourist visits to the area could cause disturbance, damage to species, uncontrolled waste disposal, incidents (fires, injuries) and many other forms of disruption of the natural state of the area.
	Mining	Stone mining in quarries in the greater Nature Park area degrades natural landscape
	Traffic infrastructure	Roads running along the edge or through the Nature Park area occupy natural space and create barriers in corridors used for passage of some animal species, cause disturbance (noise, night lightning), and pose a possible contamination source of the surrounding soil
	Energy infrastructure	Energy infrastructure occupies the space, disturbs natural landscape, and is possible radiation source
Incidents and extreme phenomena	Fires	Fires, which frequently break out in the Hutovo Blato flood meadows during winter (dry period), and on the surrounding hills in summer, when their spreading without control could endanger valuable habitats in the Nature Park, as well as population of valuable species and the Nature Park infrastructure and neighbouring settlements
	Drought	Lasting droughts might affect population rates of some vulnerable and rare species already exposed to the pressures considerably
	Snow and ice	Occasional snow and ice, which are not usual climate conditions, threaten populations of some species which come to this area for food and shelter
Insufficient capacities	Legislation	Inadequate legislation or lack enforcement of legislation covering waste management, hunting sector, environmental protection, water resources protection could considerably complicate protection of the Nature Park and its biodiversity

Noticed threat	Description	Impact/Consequences
	Management resources (funds, human resources, equipment)	Lack of resources needed for basic functions of Nature Park protection and control, lack of human resources for the management system, lack of equipment and other resources could affect the area protection considerably
	Lack of harmonization and cooperation between different institutions and sectors	The Nature Park being highly exposed to external impacts demands harmonized actions of different environmental protection sectors, particularly with regard to water, municipal utilities, physical planning and land use, and absence of such cooperation raises new risks
	Lack of knowledge and educations of local population	Local population with interest in preservation of the valuable Nature Park assets and knowledge of how to do it is the best guardian of the area, while lack of cooperation causes double damage –instead of protecting the Nature Park the local population harvests for its own needs it without control.

3.1.3 Threats to Biodiversity

The above elaborated anthropogenic threats, individually or collectively, directly or indirectly, affect the biological diversity in Hutovo Blato. According to the IUCN, various types of anthropogenic threats could affect individual species very unfavourably. The IUCN defined general anthropogenic threats for specific endangered fish, amphibians, and reptiles in the Hutovo Blato area (Table 3.2 – 3.7)

3.1.3.1 Fish

Table 3.2: Overview of valuable ichthyofauna species in Hutovo Blato with list of threats

	SPECIES		IUCN Threat (code)
1	*Lethenteron zanandreai*	Lombardy lamprey	1.1.1, 1.4.6, 6.3.1, 6.3.3, 6.3.7, 6.3.8, 9.7, 9.9
3	*Salmo dentex*	Dentex trout	1.1.1, 1.4, 3.1.1, 6.1.1, 6.3.1, 6.3.3, 6.3.8, 9.9
4	*Salmo marmoratus*	Marble trout	1.1.1, 1.1.7, 1.4, 2.1, 6.1.1, 6.3.1, 6.3.3, 6.3.8, 9.9
5	*Salmo farioides*	Balkan brook trout	1.1.1, 1.1.7, 1.4, 2.1, 6.1.1, 6.3.1, 6.3.3, 6.3.8, 9.9
9	*Rutilus basak*	Dalmatian roach	1.1.1, 1.3.6, 1.4.1, 1.4.2, 1.4.6, 6.3.1, 6.3.3, 6.3.8, 9.9
10	*Leuscius svallize*	Adriatic dace	1.1.1, 1.3.7, 1.4.2, 1.4.6, 6.3.1, 6.3.3, 6.3.8, 9.9
11	*Leuscius cephalus*	Chub	1.1.1, 1.3.7, 1.4.2, 1.4.6, 6.3.1, 6.3.3, 6.3.8
12	*Scardinius plotizza*	Neretvan rudd	1.1.1, 1.3.7, 1.4.2, 1.4.6, 6.3.1, 6.3.3, 6.3.8, 9.9
13	*Chondrostoma knerii*	Dalmatian nase	1.1.1, 1.4.6, 3.1.1, 6.3.1, 6.3.3, 6.3.8, 9.9
14	*Alburnus neretvae*	Neretva bleak	1.4, 2.1, 2.2, 9.1
15	*Cobitis narentana*	Neretvan spined loach	1.1.1, 1.3.7, 1.4, 2.2, 6.3.1, 6.3.3, 6.3.8, 9.9
19	*Cyprinus carpio*	Carp	1.1.1, 1.1.7, 1.4.6, 2.1, 2.3, 2.4, 3.1, 6.3.1, 6.3.3, 6.3.8, 10.1
25	*Knipowitschia croatica*	Croatian goby	1.1.1, 1.3.6, 1.4.2, 3.1.1, 6.3.1, 6.3.3, 6.3.8, 9.9
26	*Knipowitschia radovici*	Radovic's goby	1.9, 2.6, 6.5
36	*Gasterosteus aculeatus*	Three-spined Stickleback	1.1.1, 6.3.1, 6.3.3, 6.3.8, 9.1

Table 3.3: IUCN threat codes explanation

Threats
1. Habitat loss/degradation (human induced)
1.1. Agriculture
1.1.1. Crops
1.1.1.1. Shifting agriculture
1.1.1.2. Small holder farming
1.1.1.3. Agro-industry farming
1.1.7. Freshwater aquaculture
1.3.6. Groundwater extraction
1.3.7. Other
1.4. Infrastructure development
1.4.1. Industry
1.4.2. Human settlement
1.4.6. Dams
2. Invasive alien species (directly affecting the species)
2.1. Competitors
2.2. Predators
2.6. Unknown
3. Harvesting [hunting/gathering]
3.1 Food
3.1.1. Subsistence use/local trade
6. Pollution (affecting habitats and/or species)
6.1. Atmospheric pollution
6.1.1. Global warming/oceanic warming
6.3. Water pollution
6.3.1. Agricultural
6.3.3. Commercial/industrial
6.3.7. Sediment
6.3.8. Sewage
6.5. Unknown
9. Intrinsic factors
9.1. Limited dispersion
9.7. Slow growth rates
9.9. Restricted range
10. Human disturbance
10.1. Recreation/tourism

Amphibians

3.4: Overview of valuable amphibian species in Hutovo Blato with list of threats

SPECIES		IUCN Threat (code)
Hyla arborea	European tree frog	1.1, 1.2.2, 1.4, 6.3

3.5: IUCN threat codes explanation

Threats
1. Habitat loss/degradation (human induced)
1.1. Agriculture
1.2 Land management of non-agricultural areas
1.2.2. Changes of management regime
1.4. Infrastructure development
6. Pollution (affecting habitats and/or species)
6.3. Water pollution

Reptiles

3.6: Overview of valuable reptile species in Hutovo Blato with list of threats

SPECIES		IUCN Threat (code)
Emys orbicularis	European pond turtle	1.1, 1.2.1, 1.4.9, 6.3
Natrix tesselata	dice snake	1.2.2, 1.4, 9.9

3.7: IUCN threat codes explanation

Threats
1. Habitat loss/degradation (human induced)
1.1. Agriculture
1.2. Land management of non-agricultural areas
1.2.1. Abandonment
1.2.2. Change of management regime
1.4. Infrastructure development
1.4.9. Other
6. Pollution (affecting habitats and/or species)
6.3. Water pollution
9. Intrinsic factors
9.9. Restricted range

In principle, the fish, amphibians and reptiles in Hutovo Blato are most sensitive to anthropogenic threats, therefore elimination of these threats is a condition for survival of not only singled out valuable and endangered species, but also of other species related to them, most of all of ornithofauna, and indirectly of some mammal species.

Therefore, all the above enlisted general threats could be considered to pose a threat for ornithofauna and mammals endangering survival of associated valuable and endangered species. Uncontrolled hunting and poaching, as well as incidents and extreme phenomena in the Nature Park area should also be mentioned.

3.1.4 Threats to effective management of the Nature Park

The problems of the Public Enterprise Hutovo blato Nature Park should be considered as a separate threat. Problems in the work of the Public Enterprise can be examined specifically from the aspect of financing conditions and current expenses.

According to the previously analysed current state, the income of the Public Enterprise originates from own-services which are limited to income from ticket sales, photo-safari boat rides organized for groups and individual visitors, fishing permits and HN County budget.

Income from own-services according to Public Enterprise are estimated to 20.000 KM yearly, however, this income has had several drops due to changes in conditions in the protected area and conducts of the Public Enterprise (e.g. in 2009 after eel fishing ban within the Nature Park waters). Also, from 2008, income from the HN County budget declined which can be seen in the following table.

OVERVIEW OF ACHIEVEMENT OF THE FINANCIAL PLAN – INCOME FROM HN COUNTY BUDGET 2007 – 2013

YEAR	NUMBER OF EMPLOYEES	PLANNED YEARLY (KM)	PLANNED MONTHLY (KM)	REALIZED YEARLY (KM)	REALIZED MONTHLY AVERAGE (KM)	CUTBACK YEARLY (KM)
2007	18	360.000,00	30.000,00	360.000,00	**30.000,00**	00,00
2008	18	360.000,00	30.000,00	288.000,00	**24.000,00**	-72.000,00
2009	18	360.000,00	30.000,00	157.200,00	**13.100,00**	-202.800,00
2010	18	360.000,00	30.000,00	115.200,00	**9.600,00**	-244.800,00
2011	17	360.000,00	30.000,00	42.960,00	**3.580,00**	-317.040,00
2012	17	360.000,00	30.000,00	100.413,00	**8.368,00**	-259.587,00
2013	18	360.000,00	30.000,00	157.333,27	**13.111,10**	-202.666,73
2014	18	360.000,00	30.000,00			
					UKUPNO:	**-1.298.893,73**

On the other hand, the Public Enterprise has not adapted its organisation to the new conditions (according to submitted data, the Public Enterprise has 18 employees, parts of the legal work and bookkeeping is outsourced, there are no significant stimulations from other possible sources of donation and subventions, there are no bigger projects dealing with attracting more visitors and opening new services), which all has significantly lowered the capacity of the Public Enterprise in terms of effective surveillance of the area, especially in the sense of improving the management and development in the direction of long term sustainable protection and land use of Hutovo blato.

The result of this troublesome state is possible drop in interest from the local population for problems in Hutovo blato NP, drop in interest for cooperation in achieving a common benefit and an increase in threats to this area due to illegal use of its natural resources (poaching, illegal fishing, illegal picking of herbs etc.)

3.2 MANAGEMENT CONCEPT

3.2.1 Management Zones

"Zoning defines what can and cannot occur in different areas of the park in terms of natural resources management; cultural resources management; human use and benefit; visitor use and experience; access; facilities and park development; maintenance and operations. Through management zoning the limits of acceptable use and development in the park are established" (Young and Young 1993).

In order to achieve harmony between the need for management and demands for use of protected area, a number of management zones is determined, each of which underscores its specific purpose. The zones are determined on the basis of the Physical Plan of an area of special features prepared for the Nature Park according to a special regulation.

A key issue in determining zone types is a level of allowable human impact or allowed use within the area under consideration.

The Hutovo Blato Nature Park zoning was based on general data on the area under consideration, including:

- Protected area boundaries;
- Administrative borders of local government units;
- Natural characteristics of the area: morphology, geology and hydrogeology, meteorology, hydrology, pedology, biological diversity (species and habitats),
- Particularly valuable areas (e.g. water resources, landscape and harbours, coves, etc.);
- Exposure of protected valuable assets to pressures;
- Infrastructure, settlements, commercial amenities;
- Traditional activities and land use (forestry, hunting, agriculture, fisheries, fish farming, etc.);
- Demographic trends, social and economic relations in local communities, plans and visions towards an overall development and growth.

The zone determination procedure started with field visit of the area under consideration and consultations with the Nature Park Management. The next step was detailed analysis of available documentation (Figure 4.1), studies and references, and collaboration with authors of the Physical Plan for areas of special features. Special attention was paid to valuable and endemic species, fish fauna in particular, presence of which by sites had an important role in determination of a proposal for the zones of water surfaces within the Nature Park. The prepared proposal was discussed in a workshop resulting in conclusions made in cooperation with the Management.

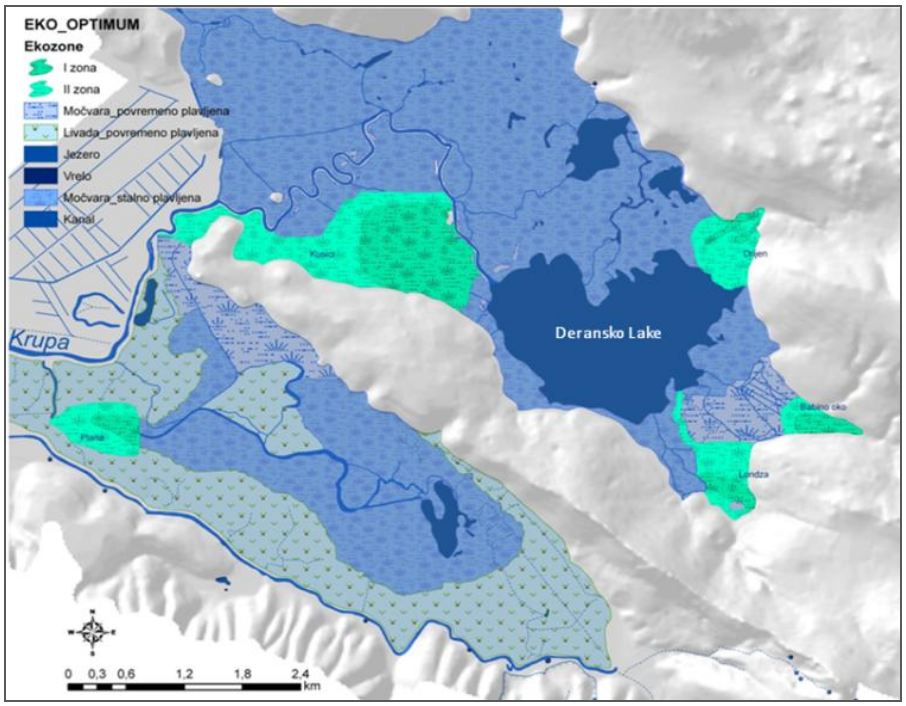


Figure 3.1: Aquatic habitats and habitats dependant on water with proposed zones (from presentation Flora and Vegetation, N. Jasprica, 2010)

Based on an analysis of natural and artificial conditions, and of the Nature Park development concept, the protection zones are divided based on their specific characteristics. In zones of strict protection and zones of active protection these are biological specific characteristics, and for the use zone the specific characteristics refer to the land use analysed in the basic concept of spatial development.

The zones are subdivided as follows:

Strict protection zone (SPZ)

1. Wilderness zone
2. Ecosystem protection zone
3. Particularly valuable natural locations protection zone

Active protection zone (APZ)

1. Aquatic and wetland habitats, ichthyofauna and ornithofauna protection zone
2. Aquatic habitats and ichthyofauna protection zone
3. Aquatic and wetland habitats protection zone
4. Ornithofauna protection zone
5. Aquatic ecosystem protection zone

Use zone (UZ)

1. Recreation and tourism zone
2. Directed water management zone
3. Directed agriculture zone
4. Low-external input forestry and hunting
5. Residential zone

Transition zone (TZ)

1. High-external input agriculture and urbanization zone
2. Low-external input forestry, hunting and natural values zone
3. Urbanization and forestry zone
4. Special valuable assets zone
5. Low-external input forestry and hunting, valuable cultural and historical assets zone

General presentation of the Hutovo Blato Nature Park protection zones is given in Figure 3.2, areas are given in Table 3.8, and position of all defined zones is shown in Figure 3.3 with descriptions in Table 3.9.

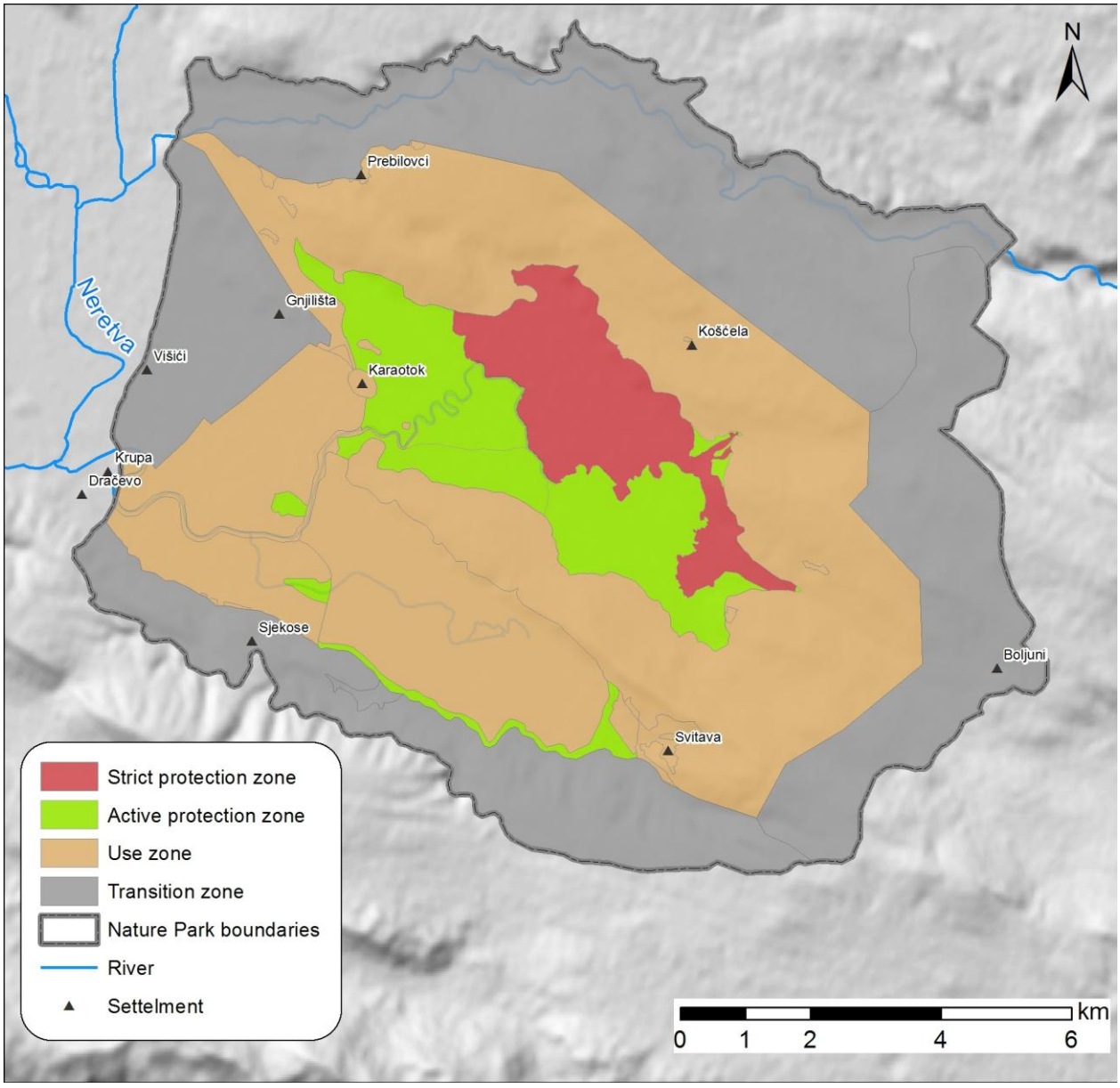


Figure 3.2: Areas of defined protection zones

Table 3.8: Protection zones surface areas

	Zone	Area (ha)	Percentage (%)
	Strict protection zone	810,78	5,95%
	Active protection zone	1.237,75	9,08%
	Use zone	5.775,48	42,39%
	subtotal	**7,824.13**	
	Transition zone	5.799,96	42,57%
	TOTAL	**13,624.08**	**100%**

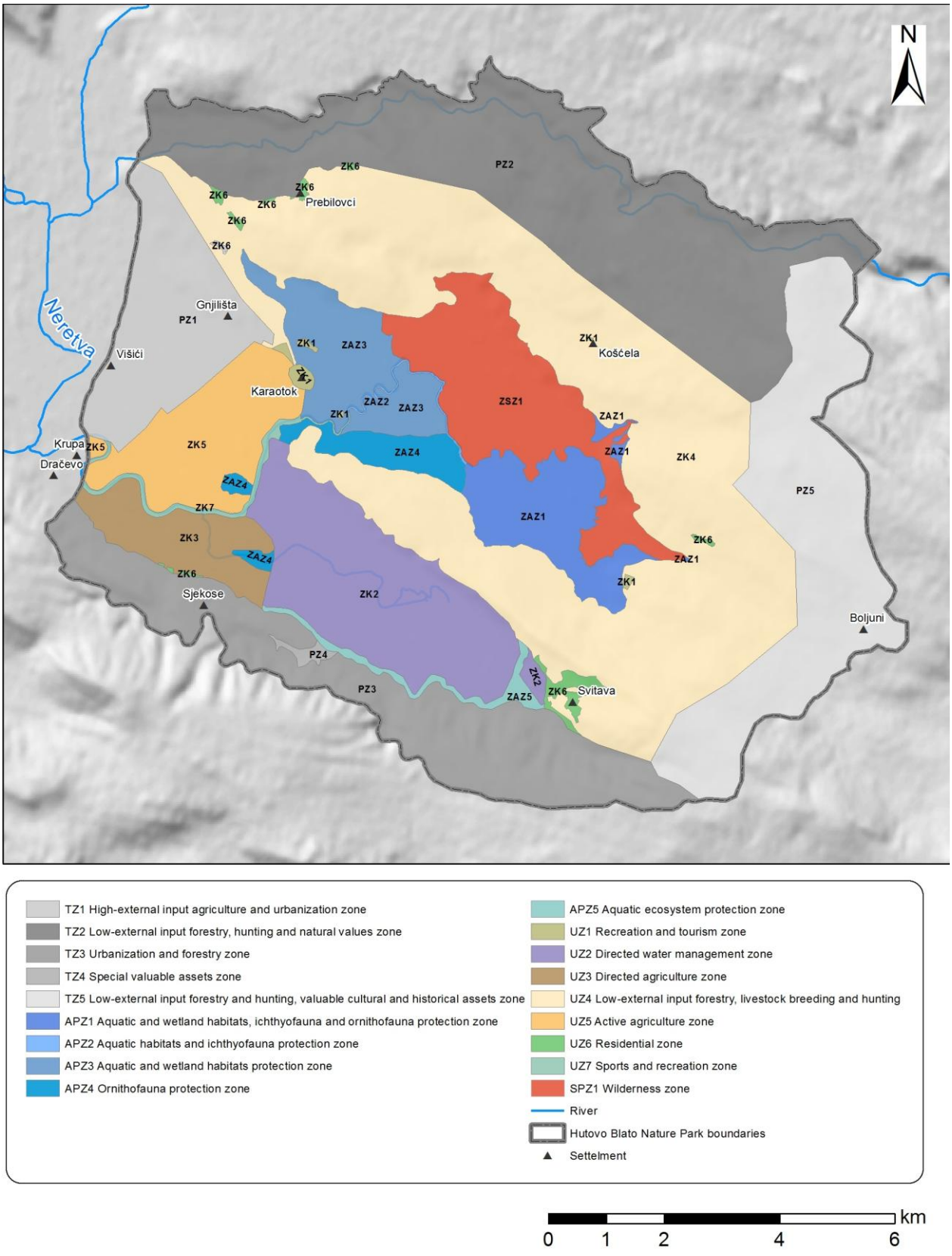


Figure 3.3: Detailed presentation of zone positions

Table 3.9: Description of zones and allowed activities

	Zone	Area (ha)	Subzone	Location	Ecosystem type	Management objectives	Allowed activities	Tourist activities
Strict protection zone	**SPZ1**	810,78	Wilderness zone	Gornje Blato, Duboko Plesno – peat bog	Inland waters, wetlands	Strict ecosystem protection and conservation, preservation of hatching conditions and conditions for living of endemic fish species	Scientific research, status monitoring, emergency response, strictly restricted access	Ban
	TOTAL:	**810,78**						
Active protection zone	**APZ1**	459,58	Aquatic and wetland habitats, ichthyofauna and ornithofauna protection zone	Lake Deran + spring Babino Oko spring Drijen and Orah spring areas	Inland waters, wetlands	Ecosystem protection and conservation and water management, regulating population of introduced fish species	Status monitoring, supervision, maintenance, water regime management, emergency response, regulated visitor access, strictly restricted use for traditional fishing methods, controlled catch of foreign fish species	Zone of restricted tourist activity
	APZ2	14,40	Aquatic habitats and ichthyofauna protection zone	Krupa River	Inland waters	Ecosystem protection and conservation and water regime management particularly for ichthyofauna conservation	Status monitoring, supervision, maintenance, water regime management, emergency response, regulated visitor access, strictly restricted use for traditional fishing methods	Zone of moderate tourist activity
	APZ3	487,38	Aquatic and wetland habitats protection zone	Gornje Blato	Inland waters, wetlands	Ecosystem protection and conservation and water regime management particularly for ornithofauna conservation	Status monitoring, supervision, maintenance, water regime management, emergency response, regulated visitor access	Zone of restricted tourist activity
	APZ4	196,54	Ornithofauna protection zone	Meadows and pastures in Gornje Blato and Donje Blato	Wetlands, meadows, inland waters	Ecosystem protection and conservation and water regime management particularly for ornithofauna conservation	Status monitoring, supervision, maintenance, water regime management, emergency response, regulated visitor access, low-input grazing	Zone of restricted tourist activity
	APZ5	79,86	Aquatic ecosystem protection zone	Springs and Svitava-Dračevo lateral canal by Lake Svitava	Inland waters	Ecosystem protection and conservation, water regime management, spring capacity preservation, archaeological research	Status monitoring, supervision, maintenance, water regime management, emergency response, research, regulated visitor access	Zone of restricted tourist activity
	TOTAL:	**1237,75**						

Table 3.9: Description of zones and allowed activities - continued

Zone		Area (ha)	Subzone	Location	Ecosystem type	Management objectives	Allowed activities	Tourist activities
Use zone	UZ1	27,77	Recreation and tourism zone	Karaotok	Terrestrial, aquatic and wetland habitats, forest, nitrophilic and wetland vegetation	Conservation of valuable landscape, setting up research, educational and tourist infrastructure	Maintenance, supervision, tourism and recreation	Zone of intensive tourist activity
				Glavica				
				Đinavica				
				Košćela	Forest	Conservation of valuable landscape, setting up tourist infrastructure, eco-ethno tourism		
				Londža	Forest	Conservation of valuable landscape, setting up tourist infrastructure, ethno-tourism	Maintenance, residence, supervision, tourism and recreation	
	UZ2	1013,13	Directed water management zone	Lake Svitava	Inland waters, wetlands	Conservation of valuable landscape, revitalisation of lake parts, controlled fish catch	Maintenance, supervision, fishing and fish farming, sport and recreation	Zone of intensive tourist activity
							Maintenance, supervision, fishing and fish farming	
	UZ3	329,95	Directed agriculture zone	Dračevo, Krupa River left bank, Sjekoštak	Terrestrial, aquatic and wetland habitats, nitrophilic vegetation	Conservation of valuable landscape, setting up fishing paths, education and harmonization of agricultural production with NP functions	Maintenance, supervision, agriculture	Zone of intensive tourist activity
	UZ4	3719,91	Low-external input forestry livestock breeding	Nature Park edges, Škrka-Svitava	Forest	Conservation of valuable landscape, setting up recreation and tourist amenities, revitalisation of old settlements	Maintenance, supervision, forestry, tourism and recreation	Zone of intensive tourist activity
	UZ5	554,97	Directed agriculture zone	Kazeta Višići	Terrestrial, wetland and ruderal	Conservation of valuable landscape, harmonisation of agricultural production with NP functions	Supervision, agriculture	-
	UZ6	71,24	Residential zone	Prebilovci – Loznica	Forest	Conservation of valuable landscape, setting up tourist infrastructure, eco-ethno tourism	Maintenance, residence, tourism and recreation	Zone of intensive tourist activity
				Prebilovci		Conservation of valuable landscape, setting up tourist infrastructure, eco-ethno tourism	Residence, traditional economy	-
				Prebilovci		Conservation of valuable landscape, development of services	Residence, traditional economy	-
				Prebilovci - Grlici		Conservation of valuable landscape, development of services	Residence, traditional economy	-
				Sjekose		Conservation of valuable landscape, development of services	Residence, traditional economy	-
				Sjekose		Conservation of valuable landscape, development of services	Residence, traditional economy	-
				Sjekose		Conservation of valuable landscape, development of services	Residence, traditional economy	-
				Svitava		Conservation of valuable landscape, development of services	Residence, traditional economy, agriculture	
				Prebilovci – G. Prebilovci		Conservation of valuable landscape, setting up tourist infrastructure, eco-ethno tourism	Maintenance, residence, tourism and recreation	-
				Prebilovci – G. Prebilovci		Conservation of valuable landscape, setting up tourist infrastructure, eco-ethno tourism	Maintenance, residence, tourism and recreation	Zone of intensive tourist activity
				Core		Tourism and catering	Maintenance, residence, tourism and recreation	-

Zone		Area (ha)	Subzone	Location	Ecosystem type	Management objectives	Allowed activities	Tourist activities
	UZ7	58,51	Sports and recreation zone	Krupa River downstream from Karaotok	Inland waters	Conservation of valuable landscape, revitalisation of lake parts, controlled fish catch	Maintenance, supervision, fisheries and fish farming, sports and recreation	Zone of intensive tourist activity
	TOTAL:	**5775,48**						
Transition zone	**TZ1**	748,60	High-external input agriculture and urbanization zone	Višići – westwards from NP to the road Čapljina - Metković	Plough land, ruderal habitats	Support to improvement of utility infrastructure and agricultural production	No restrictions	-
	TZ2	2361,66	Low-external input forestry, hunting and natural values zone	Bregava River canyon	Forests, inland waters	Support to improvement of traffic infrastructure	No restrictions	-
	TZ3	1217,16	Urbanization and forestry zone	Settlements by Lake Svitava above regional road R425	Forests, ruderal habitats	Support to improvement of utility and traffic infrastructure	No restrictions	-
	TZ4	21,28	Special valuable assets zone	Desilo spring and archaeological site	Forest, inland waters, ruderal habitats	Support to protection of spring areas and research of archaeological sites	No restrictions	-
	TZ5	1451,26	Low-external input forestry and hunting, valuable cultural and historical assets zone	Boljuni I and II necropolis, tumuluses and hill-forts	Forests, ruderal habitats	Support to improvement of utility and traffic infrastructure , valuation of historical heritage	No restrictions	-
	TOTAL:	**5799,96**						

Because of the vision and goal of the Hutovo Blato Nature Park area management aimed at establishing correlation between protection and interest of the local community, it is particularly important to consider which are possible "services" of the protected area that could generate new income for the local population. This primarily refers to tourism, and the primary condition for harmonization with the protection is to determine which tourist activities are possible in particular zones. To that end, a separate overview of allowed tourist activities by zones is given below.

Ban on tourist activities

Zones from which tourists are banned and zones with no tourist infrastructure include: strict protection zones **SPZ1**, i.e. greater area of Lake Deran toward Škrkina Jaruga. This is an area that has never been accessed by man, and the area of the deepest peat.

Zones of restricted tourist activity

Zones of restricted tourist activity include Active protection zone. These are areas of Gornje Blato (**APZ1**, **APZ3**, **APZ4**, **APZ5**). This area is allowed for limited, organized and controlled visitations organized as group vessel tours on water trails, and visits of smaller groups accompanied by expert guides along the walking trails.

Zones of moderate tourist activity

The Krupa River upstream from Karaotok to Lake Deran and the lateral canal along Lake Svitava (**APZ2**) are zones of moderate tourist activity. This zone is allowed for development of tourist activities compatible with the environment and causing no relevant environmental impact. The visitor load could be higher in this zone than in the zone of restricted tourist activity.

Zones of intensive tourist activity

Zones of intensive tourist activity include the Karaotok area and the Krupa River downstream from Karaotok, with tourist and food and beverage services zones of Prebilovci Gornji, Loznica, Košćela, Londža (**UZ 1**, **UZ7**), Lake Svitava area (**UZ2**), agricultural zones in Višićka Kaseta, Sjekose and Dračevo (**UZ3**, **UZ5**, **UZ6**), a large area at the edge of the Nature Park (**UZ4**). In these zones it is necessary to single out a “transfer zone“, i.e. Karaotok as an area where information, food and beverage and other services are to be rendered. This is where the area use regime not adequate for a protected area ceases.

3.2.2 Management Goals and Objectives

The goal was determined on the basis of vision for the Hutovo Blato Nature Park protection when the Management Plan development started, and it is to ensure transparent guidelines for future management of this valuable area while directing its management towards implementation of activities aimed at conservation, usage and management of the existing resources, towards protection and preservation of valuable cultural and historical heritage, towards respecting and harmonization of needs of the local community with the requirements for valuable spatial assets protection, and towards an overall decrease in external pressures and risk management to avoid uncontrolled changes. In line with the vision and goal for management of this protected area, and according to the threats to its preservation that have been noticed, the management objectives have been set up by topics specified so as to make clear delineation between individual management tasks.

Table 3.10: The main topics based on which the Hutovo Blato Nature Park management system will be elaborated include:

A	Efficient Nature Park management
B	Biodiversity protection
C	Education and local population
D	Land-use sustainability
E	Infrastructure
F	External impacts elimination

Table 3.11: Topics and management objectives

Topic		Subtopics		Objectives
A	**EFFICIENT AREA MANAGEMENT**	**Management capacity building**		Improve management capacities (human, material)
		Preparation of long-term management documentation		Achieve management sustainability
		Resolving property-law relations		Regulate property ownership issues within the Nature Park boundaries to ensure nature protection and sustainable development
		Setting up safety and security systems		Create prevention and protection system for all human, material and natural assets in the Nature Park
		Management of visitors		Enable quality and safe stay to all visitors and ensure minimum impact of visitors on nature in the Nature Park
B	**BIODIVERSITY PROTECTION**	**Conservation of aquatic ecosystems**		Conserve aquatic habitats populated by important animal and plant species
		Conservation and revitalization of wetland habitats		Ensure natural condition of wetland habitats (coastal zone, springs) and revitalize sites of former wetland ecosystems
		Conservation of landscapes		Conserve landscape values of the Nature Park
		Conservation of flora		Protect endemic plant species
		Conservation of fauna	*Fish*	Conserve and protect indigenous and endemic fish species
			Amphibians	Conserve and protect indigenous and endangered amphibian species
			Reptiles	Conserve and protect indigenous and endangered reptile species
			Birds	Conserve and protect the Hutovo Blato birds
			Mammals	Conserve and protect the Hutovo Blato mammals
		Status research and monitoring		Collect data on all the Hutovo Blato ecosystems (habitats and species) for better area management, and initiate regional and international scientific research projects

Topic		Subtopics	Objectives
C	EDUCATION AND LOCAL POPULATION	**Education and informing of visitors**	Raise awareness of visitors of need to protect nature, targeting in particular the young population
		Education of local population	Educate local population on all forms of sustainable land-use, environmental protection, development options and importance of preservation of natural, cultural and historical heritage.
		Education of farmers	Educate farmers on possibilities of environmentally suitable production and measures for land protection against erosion and excessive pollution
		Education of large water users	Educate large water users on limitations of the Nature Park and importance of its conservation in order to find commonly accepted protection solutions
		Socio-economic studies	Determine status and monitor changes in awareness and behaviour of visitors, local population, and large users, and particularly trends of change in economic and social relations within the Nature Park area.
		Development projects	Support organization of education, particularly of the younger population (workshops, incubators, lectures) so that they adopt new approach to the land-use in the Nature Park, and establish international collaboration for launching research and development projects important for the greater region
D	LAND-USE	**Tourism**	Determine sites, reception capacities, conditions for visual integration of tourist facilities, determine target groups, establish cooperation with tourist organizations and harmonize offer and promotion
		Recreation	Establish cooperation in planning, education and training of NGOs into the Public Enterprise activities
		Fisheries	Cooperate on harmonization and monitor implementation of lake fishing requirements
		Hunting	Cooperate on game protection programs
		Agriculture	Cooperate on programs for organic production and grazing revival
		Beekeeping	Cooperate on apicultural programs and support the beekeeping development
		Plant collecting	Cooperate on programs for conservation and sustainable collecting of plants
		Forestry	Cooperate and make agreements on joint programs for revitalization of forest communities along the banks of lakes and tributaries
		Historical heritage	Conserve, protect, ensure access and organize visits to historical sites

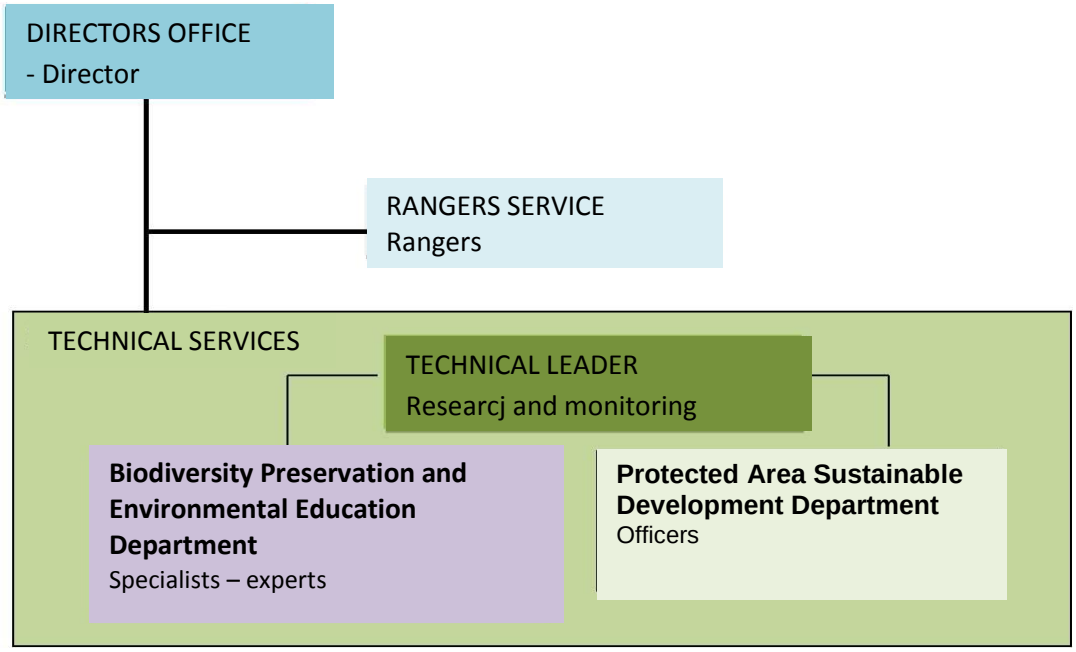
Topic		Subtopics	Objectives
E	INFRA-STRUCTURE	**Traffic and accesses**	Cooperate on improvement of access roads and marking of accesses, set up seasonal tourist connections with local centres
		Infrastructure for visitors	Prepare educational trails, gazebos, jetties, rest areas, walking and cycling trails, bathing areas, information points
		Protective infrastructure	Cooperate with responsible national and local authorities on improvement of banks, municipal utility infrastructure for waste management, waste waters and landscape improvement
		Infrastructure for research and monitoring	Set up a system of continuous monitoring, recording, storing and display of basic hydrological, meteorological, physico-chemical and biological indicators of the area condition, including continuous CCTV supervision of the area
F	EXTERNAL IMPACTS ELIMINATION	**Water regime**	Cooperate with competent state, Federation, cantonal, municipal authorities, participate in processes of interstate and inter-entity cooperation on projects creating or reducing pressures on the quantitative status of waters
		Water protection	Cooperate with competent state, Federation, cantonal, municipal authorities, participate in processes of interstate and inter-entity cooperation on projects creating or reducing pressures on the qualitative status of waters
		Environmental protection in buffer zone	Cooperate with competent cantonal and municipal authorities, participate in processes and projects creating or reducing pressures on the quantitative status of waters
		Landscape in greater region	Cooperate with competent cantonal and municipal authorities, participate in processes and projects creating or reducing pressures on the landscape

It should be noted that the division into topics is, above all, important for organization of the system of funding and management of the Hutovo Blato Nature Park, thus within the common organizational chart for the protected area management each topic is assigned a professional or professionals with best knowledge to “cover” the specific topics.

3.3 OBJECTIVES, MEASURES, INDICATORS AND MEASURES IMPLEMENTATION CONTROL

TOPIC A: Efficient Nature Park Management

Validation (assessment): The Hutovo Blato Nature Park is managed by the Public Enterprise Hutovo Blato Nature Park. The Public Enterprise was established by the Government of the HR HB in 1995, in order to protect, conserve and improve the state of the area. Activities of the Public Enterprise are funded from the budget of the Herzegovina-Neretva Canton Government, but it is not sufficient for the Nature Park development and plans, thus own revenues need to be earned from the Nature Park activities throughout a year.



A1: Management capacity building

Objective: Improve management capacities (human, material)

Measures:

- Ensure engagement of Nature Park key personnel, rangers in particular, in line with the Public Enterprise organization
- Ensure conditions for continuous involvement of volunteers and trainees in the Public Enterprise activities
- Improve ranger activities and organize occasional tours of the greater area to identify external pressures
- Ensure continuous professional education of the Nature Park rangers
- Procure, renew and maintain ranger equipment
- Continuous training and education of other Public Enterprise personnel, including special education of leaders in project preparation for international funds applications
- Set up a business and area management information system (relational databases, GIS)

Indicators: Number of full-time employees according to the planned organizational and human resources structure, number of persons included as trainees, volunteers and in external activities, adequately equipped rangers, professional approach of rangers to their tours and implementation of legal provisions, number of project applications to external funding sources, motivated Public Enterprise personnel, educated and equipped for all required management activities, set up information system

Implementation control: Interviews with key personnel and the Director, written evidence on number of employees and collaborators, number of projects and other external sources of revenue, Examine budgetary funds for the Public Enterprise, examine the ranger equipment.

A2: Preparation of long-term management documentation

Objective: Achieve management sustainability

Measures:

- Active involvement in harmonization and adopting of detailed plans for development of tourist locations (sites, capacities, visual integration)
- Prepare annual financial management plans
- Prepare annual plans for stakeholders involvement
- Prepare long-term financial plan of the Public Enterprise expenses and revenues in order to achieve the protected area sustainability, including risk analysis
- Create new ways to earn revenues
- Ensure additional funding sources by project applications to tenders and programs initiated by national and international institutions
- Develop guidelines for design engineering and construction of new projects and infrastructure in the Nature Park aimed at nature protection, increase in visitor amenities, and increase in Public Enterprise revenues, provided they are in harmony with requirements for landscape characteristics preservation

Indicators: A long-term financial plan prepared, contracts and documents adopted ensuring funding of action plans for a 10-year period, local community involved in the Management Plan implementation, number of project applications to external funding sources, continuous revenue increase ensured, annual revenues stable and cover the planned expenses.

Implementation control: Examine documentation, number of projects and other documents providing for external revenues, examine budgetary funds for the Public Enterprise.

A3: Resolving property-law relations

Objective: Regulate property ownership issues within the Nature Park boundaries to ensure nature protection and sustainable development

Measures:

- Obtain cadastral documents and land title deeds for plots within the Nature Park boundaries
- Evaluate privately owned-land
- Determine priorities and purchase dynamics towards protection and sustainable use of the Nature Park
- Resolve continuously conflicts regarding use and ownership of land within the Nature Park boundaries
- Direct continuously surpluses towards purchase of land important for protection and sustainable use of land within the Nature Park boundaries
- Elaborate and apply a system of concession permits for land users within the Nature Park

Indicators: Land ownership relations determined and recorded in the Public Enterprise GIS database, land value determined, purchase priorities determined, ownership conflicts resolved, continuous land purchase established, concession permits system elaborated and become functional.

Implementation control: Examine GIS database, number of resolved ownership conflicts, money invested in purchase, size of purchased plots, number of approved concession permits.

A4: Setting up safety and safety and security systems

Objective: Create prevention and protection system for all human, material and natural assets in the Nature Park

Measures:

- Appoint a person in Public Enterprise responsible for safety
- Prepare emergency plans (fires, floods, storms, freezing, accidents)
- Adopt emergency procedures
- Purchase equipment and means for emergency response
- Set up an alert and quick response system connected with relevant authorities
- Equip, train and organize regular drills for all Public Enterprise employees in rescue procedures and implementation of safety measures in the Hutovo Blato area

Indicators: Person responsible for safety and security appointed, action plans prepared, organization and procedures adopted, communications set up, equipment purchased, Public Enterprise personnel trained.

Implementation control: Interviews with key personnel and the Director, examine plans, examine equipment, examine communication system, drills followed up.

A5: Management of visitors

Objective: Enable quality and safe stay to all visitors and ensure minimum impact of visitors on nature in the Nature Park

Measures:

- Ensure well marked entrance, determine sites particularly attractive for visitors, ensure quality information about the Nature Park (printed guide)
- Improve visitors' guidance system (trained and accredited tourist guides, sports and recreation guides and organizers)
- Introduce keeping records of visitors and their indirect surveys (system of small sponsorships)
- Mark the area (mark protection boundaries, notice boards, information boards)
- Determine carrying capacity of the area, particularly of aquatic ecosystems, and method of regulating number of visitors (issuing permits for sports and recreation activities, control of permit holders, regulation of access to aquatic ecosystems),
- Implement measures important for safety of visitors during their stay (warning and prohibition signs, boards and leaflets with rules of safe visit, ensuring safety equipment, rangers' method of work)
- Regulate visitors' entry into the protected area (physical barriers and use of specific vehicles/vessels)
- Create comprehensive integrated programs for the most frequently visited sites – banks, lake
- Regularly monitor visitors' impact on nature (rangers' activities) and follow up their satisfaction with the offer at the Nature Park area (surveys).

Indicators: Number of attractive sites with prepared amenities, number and type of signs, boards, equipment set up, number of measures and rules regulating entry of visitors and their stay in the Nature Park adopted, records on number of permits issued, records on ranger activities, records on number of visitors and visitor surveys showing increase in number of visitors and their satisfaction, amenities for visitors provided.

Implementation control: Reports on visitors, processed results of small sponsorships and surveys on protected area visits, tours of amenities provided, reports on ranger activities.

TOPIC B: NATURE PARK BIODIVERSITY PROTECTION (flora, fauna and ecosystems)

Validation (assessment): Total 700 plant species, potential Natura 2000 habitats, have been recorded in the area, 43 fish species 12 of which are endemics of very narrow areal, 9 amphibian species, 13 reptile species, 163 bird species and 8 mammal species.

Many species living in this area, same as some habitats, belong under the high protection category according to IUCN, they are enlisted for protection according to the Habitats Directive, Birds Directive, Bern Convention, Bonn Convention and the ecological network Natura 2000. Exposure of the area to anthropogenic pressures is a threat to their survival.

B1: Conservation of aquatic ecosystems

Objective: Conserve aquatic habitats populated by important animal and plant species

Measures:

- Generate a detailed map of aquatic habitats, scale 1:5000, enter it into GIS database
- Determine indicators of critical changes in key aquatic habitats
- Introduce systematic monitoring of water surface status, coordinate supervision of aquatic surfaces with conditions for guiding visitor tours and recreational activities, control all these activities on all lakes and gullies in the Nature Park
- Coordinate the planned river basin management measures with the conditions for aquatic habitats conservation
- Record and control anthropogenic impacts contributing to increase in water eutrophication degree (anthropogenic contamination from local sources)
- Elaborate emergency procedures in case of any disturbances determined by permanent visual supervision and monitoring of status, indicators and parameters indicating the degree of eutrophication in the area
- Elaborate rules for preservation of aquatic habitats in as natural state as possible, and correct the preservation concept, if necessary
- Determine plant species characteristic for habitat types, prevent and strictly ban introduction and control and limit development of foreign species, remove existing foreign species wherever possible
- Encourage development of vegetation in specific stretches along the lake banks or tributaries to create conditions favourable for hatching and as fish shelters

Indicators: Habitats map generated, no degradation of aquatic ecosystem biodiversity according to the aquatic habitats control, status conservation results harmonized with indicators for similar aquatic habitats, corrections of water status conservation measures and measures related to fisheries, actions against protection measures violations, valuable habitat surfaces revitalized.

Implementation control: Examine habitats map, status registers with photo documentation, reports on works completed and harmonization with water status conservation measures and measures related to fisheries, reports on actions by rangers and inspection officers.

B2: Conservation and revitalization of wetland habitats

Objective: Ensure natural condition of wetland habitats (coastal zone, springs) and revitalize sites of former wetland ecosystems

Measures:

- Generate a map of wetland habitats, scale 1:5000, and reconstruct a historical habitats map (showing state before the Trebišnjica Hydropower System construction), enter it into GIS database
- Create habitats revitalisation program for banks and springs, prioritize revitalization activities
- Elaborate emergency procedures in case of any disturbances determined by permanent visual supervision and monitoring of status, indicators and parameters indicating changes in wetland habitats
- Create revitalization programs for former valuable habitats (e.g. wetland meadows, indigenous forests) and prioritize revitalization activities
- Elaborate rules for preservation of wetland habitats in as natural state as possible, and correct the preservation concept, if necessary
- Determine indicators and introduce systematic monitoring of wetland surface status, coordinate supervision of aquatic and wetland surfaces with conditions for guiding visitor tours and recreational activities, control all these activities.

Indicators: Habitats map generated, no degradation of habitats according to the wetland habitats control, status conservation results harmonized with indicators for similar wetland habitats, actions against protection measures violations, wetland meadow habitat surfaces revitalized.

Implementation control: Examine habitats map, status registers with photo documentation, reports on works completed and harmonization with status conservation measures, reports on actions by rangers and inspection officers.

B3: Landscape

Objective: Conserve landscape values of the Nature Park

Measures:

- Declare the area of Lake Deran towards the Skrka gully a strict reserve (it is the area of deepest peat)
- Carry out mapping, set up supervision and control of all excavation activities within the Nature Park boundaries, and create a visual "remediation" concept
- Carry out mapping and resolve waste fly tipping within the Nature Park boundaries
- Determine sections and sites and introduce regular mowing and clearing of overgrown sections and sites with particularly attractive view/scenery (e.g. mowing of access road shoulders)
- Promote traditional land use and traditional farming crops within the Nature Park boundaries, prepare a concept for visual integration of anthropogenic landscape with natural landscape)

Indicators: No further landscape degradation, strict protection of springs set up, control set up of excavation and disposal within the Nature Park boundaries, waste disposal within the Nature Park boundaries resolved, preservation of valuable scenery set up, actions against protection measures violations

Implementation control: Status registers with photo documentation, examine mapped data on degraded landscape and implemented solutions, reports on performed activities

B4: Conservation of flora

Objective: Protect endemic plant species

Measures:

- Determine plant species characteristic for habitat types, and protected and endemic species, their sites and extent of occurrence, carry out mapping and entry into GIS database
- Prevent introduction, control and limit development of foreign species, remove existing foreign species (such as common ragweed) wherever possible
- Prepare inventories and maps of commercially valuable wild species, enter into GIS database, set up supervision and control of activities carried out by local population regarding collecting of protected plant species, including education and alternative solutions
- Prepare establishment of the Seed Bank and Gene Bank.

Indicators: Inventories and mapping of the Nature Park flora completed, data entered into GIS database, control set up of activities of local population, actions against protection measures violations

Implementation control: Status registers with photo documentation, examine GIS database, reports on performed activities

B5: Conservation of fauna - Fish

Objective: Conserve and protect indigenous and endemic fish species

Measures:

- Carry out mapping of important ichthyofauna habitats, their entry into GIS database, introduce continuous supervision and ban access to hatching areas
- Harmonize planned river basin management measures with conditions for conservation of ichthyopopulation and improvement in ichthyoproduction in the area
- Prepare, protect and maintain hatcheries for endemic species and prepare a program of their reintroduction into the wetland
- Set up supervision and control of expansion of invasive fish species, such as pumpkinseed sunfish from Lake Deran
- Organize controlled fishing of commercially valuable foreign species
- Prepare fisheries master plan in line with the provisions of the freshwater fisheries act
- Improve management and control of human activities at the Krupa River for protection of fish migratory paths towards the wetland.

Indicators: Mapping and continuous supervision of valuable habitats carried out, population of endemic species stable and on increase, population of invasive species does not increase and its expansion to other parts of the Nature Park (e.g. from Lake Deran into the gullies and springs) not recorded, fisheries master plan prepared.

Implementation control: Examine GIS database, ichthyopopulation status monitoring results, reports on activities and supervision carried out, control of fisheries master plan.

B6: Conservation of fauna - Amphibians

Objective: Conserve and protect indigenous and endangered amphibian species

Measures:

- Identify and remove threats to amphibians
- Prepare management plans for protected amphibians
- Determine sites of their living, map them and enter into GIS database, set up status monitoring of the population of yellow-bellied toad, European tree frog, Agile frog and Greek stream frog
- Introduce sponsorship programs for individual species of amphibians the proceeds of which will be used for conservation and research

Indicators: Mapping completed, protected species population stable, management plans for protected species prepared, data entered into GIS database

Implementation control: Status monitoring results, examine GIS database, examine management plans

B7: Conservation of fauna - Reptiles

Objective: Conserve and protect indigenous and endangered reptile species

Measures:

- Set up control and ban of trade in reptiles, particularly the Hermann's tortoise
- Identify and remove threats to reptiles
- Determine sites of their living, map them and enter into GIS database, prepare and set up monitoring programs for reptiles
- Prepare management plans for protected reptiles
- Introduce sponsorship programs for individual species of reptiles the proceeds of which will be used for conservation and research

Indicators: Mapping completed, protected species population stable, management plans for protected species prepared, data entered into GIS database

Implementation control: Status monitoring results, examine GIS database, examine management plans

B8: Conservation of fauna - Birds

Objective: Conserve and protect indigenous and endangered Hutovo Blato bird species

Measures:

- Pinpoint nests, map them, enter them into GIS database, create protection and supervision, and protect nests by access ban
- Organize tourist routes so that the birds are not disturbed
- Provide food reserves for birds wintering in the area in case of snow, ice and other unfavourable weather conditions
- Regularly monitor status of population of migratory and nesting birds
- Set up strict control of poaching
- Prepare management plans for individual protected bird species
- Ensure protection, survival and recovery of population of critically endangered species
- Organize bird ringing actions
- Introduce sponsorship programs for individual species of birds the proceeds of which will be used for conservation and research
- Prepare a catalogue and monograph of the most important bird species

Indicators: Mapping completed, data entered into GIS database, number of 163 currently determined species not decreasing, management plans prepared, monograph prepared

Implementation control: Examine maps and GIS database, photo documentation, Customs report on wild birds export, status monitoring results, examine management plans, examine monograph

B9: Conservation of fauna - Mammals

Objective: Conserve and protect indigenous and endangered Hutovo Blato mammal species

Measures:

- Regular status monitoring of endangered species (sites, numbers, health condition)
- Determine sites of their living, map and enter them into GIS database, prepare and set up protection of endangered and protected species
- Prepare Management Plan for European otter population
- Set up strict control of poaching
- Introduce sponsorship programs for individual species of mammals the proceeds of which will be used for conservation and research

Indicators: European otter population stable, mapping completed, data entered into GIS database, Management Plan for European otter prepared

Implementation control: Photo documentation, status monitoring results, examine Management Plan, examine GIS database

B10: Status research and monitoring

Objective: Collect data on all the Hutovo Blato ecosystems (habitats and species) for better area management

Measures:

- Ensure equipment and software for mapping, recording and storing of status monitoring data
- Regular status monitoring of endangered species (sites, numbers, health condition) and monitoring of habitats (sites, area of occupancy, status), recording of changes
- Process data and determine indicators of change
- Prepare status reports on endangered species and habitats

Indicators: Public Enterprise is provided with equipment for status monitoring and recording, and data storage and processing

Implementation control: Photo documentation, examine maps and GIS database

TOPIC C: Education and local population

Validation (assessment):

EDUCATION OF VISITORS: Protected areas play an important role in general education as examples of natural areas that have not surrendered to hasty development, and they are places where the young and adults are given an opportunity to learn about importance of nature conservation and positive experience with nature protection. Due to a large diversity of natural, landscape, cultural and historical values within a small area, and because of its position, the Hutovo Blato Nature Park is an ideal educational site. By interpretation of its valuable assets, a visitor will receive several important messages:

- about value of aquatic, meadow and forest habitats in karst for man, flora and fauna, about the value of individual animal species, and about the reasons for which they are endangered in the developed world;
- why is good status of aquatic system a condition for conservation of nature and sustainable development of the area;
- what was an interaction between nature and human activities like in the history of this area;
- what is this area unique for and what is local population proud of;
- which are natural beauties of area of independent and unique value.

Students from local schools have already become involved in a number of educational activities within the Nature Park, such as organization of field trips and school excursions, marking the dates related to the nature protection, and organising educational classes at the schools. Future cooperation of the Nature Park with this population shall have excellent results, and it needs to be additionally elaborated. An ultimate goal of education is that the visitors understand this exceptional and diverse space using all their senses and thus become aware of the fact that a man is nothing more than a part of nature.

EDUCATION OF LOCAL POPULATION AND SPACE USERS: Activities of local population and other users of the Nature Park space and its neighbouring areas do not comply with the protected area conservation objectives, thus it is necessary to set up cooperation and work on education and building of awareness on local community, other space users and management of the protected area sharing the same interests. Education needs to focus on local population as the major user of this protected space and its neighbourhood, in order to inform them about limits of sustainable use of natural resources in the Nature Park and its neighbourhood, and particularly as regards the use of the space under consideration for food production (farming, livestock breeding, fish farming) and similar traditional activities (hunting, fisheries, plant collecting). The education needs to encompass an overall raising of awareness about the environmental protection and development possibilities based on activities and businesses complementary with the protection requirements, and particularly respecting specific cultural characteristics and traditions. The education should particularly focus on large water users and users of the neighbouring area in order to inform them about the limitations imposed by nature in the Nature Park and to encourage finding common solutions for the space protection.

SOCIO-ECONOMIC STUDY: Activities complementary to education and cooperation are socio-economic studies aimed at monitoring of changes in the local community and of an impact of the education program on local population, in order to monitor success and effects of the education program on the visitors and other space users in particular, as well as to envisage trends of changes and focuses of future education programs. To that end, cooperation is planned with the universities in the region in order to achieve a multiple effect: education of students through research projects, development of scientific knowledge on effect the protected areas have on local population and visitors, and adopting new knowledge about the Nature Park management.

C1: Education and informing of visitors

Objective: Raise awareness of visitors of need to protect nature, targeting in particular the young population

Measures:

- Prepare a comprehensive program for interpretation of valuable natural assets and education on the Hutovo Blato natural values
- Organize that the school groups from the local and regional schools attend workshops and field trips, organize educational and research programs for students
- Create interactive thematic programs for the younger visitors to learn about the natural values of the area, such as fish, birds and flora (environmental schools and workshops)
- Create educational materials for target visitor groups

Indicators: Programs, promotional and educational materials prepared, workshops organized and carried out, number of workshop participants and school and university groups

Implementation control: Reports on workshops and environmental education groups, examine created educational materials.

C2: Education of local population

Objective: Educate local population on all forms of sustainable land-use, environmental protection, development options and importance of preservation of natural, cultural and historical heritage.

Measures:

- Determine priorities in education of local population based on the environmental protection criteria and creating new chances for development (agriculture, hunting, fisheries, waste management, cultural heritage, other development programs) and create educational programs (topics, lecturers, sites, dates, methods for attracting and gathering of participants)
- Organize educational and topical workshops for the local population in order to create common conservation and protection activities
- Involve population into the status monitoring activities and protection of natural values of Hutovo Blato, particularly the young (open telephone, setting up "young rangers" by settlements, procurement of bicycles and computers with internet connection for the "young rangers", ensuring premises for the "young rangers") activities
- Encourage regular communication with local NGOs and population in order for them to submit their proposals and initiatives

Indicators: Quality and purposeful cooperation of the Public Enterprise with the local population, education programs created, workshops and meetings organized on regular basis, open telephone introduced, "young rangers" organized and provided with necessary equipment and premises

Implementation control: Examine reports on workshops and meetings, examine number of participants, examine number of contacts and proposals received by the Public Enterprise

C3: Education of farmers

Objective: Educate farmers on possibilities of environmentally suitable production and measures for land protection against erosion and excessive pollution

Measures:

- Determine and map surfaces near the lake within the Nature Park boundaries where the runoff direction is towards the lake, and which are used for agriculture, determine their ownership and usage (cultures, application of agrochemicals and fertilizers), enter the data into GIS database
- Organize and carry out education of agricultural land owners regarding options for organic production without application of agrochemicals, options for marketing of such products, and issues related to the erosion mitigation
- Initiate organized collection of agricultural waste
- Determine interest of local population in grazing revival and possible conditions necessary for grazing revival on strictly controlled surfaces including a strictly controlled number of animal units
- Elaborate conditions for maintenance and use of surfaces suitable for agricultural production (remaining surfaces and new surfaces)
- Prepare programs for harmonization of activities of the local population on surfaces of common interest and those interesting for conservation and improvement of biodiversity

Indicators: Mapping and data collection completed, data entered into GIS database, specific surfaces used in line with the priorities in sustainable local natural values protection based on the registers and supervision of the area, regular collection of agricultural waste, marketing of organic products to interested customers started, quantities of agrochemicals in production reduced

Implementation control: Examine maps and database, examine registers with photo documentation, examine reports on agriculture status, examine records on agricultural waste collection, examine product marketing results, examine soil contamination in the inflow areas

C4: Education of large users

Objective: Educate large water users on limitations of the Nature Park and importance of its conservation in order to find commonly accepted protection solutions

Measures:

- Determine necessary limitations on future use of space in the Nature Park for large space users (without population, agriculture and traditional activities): power generation, water management, transport, mining
- Record large space users, determine contact persons, determine aspects of possible impacts and issues to be covered by education
- Carry out preliminary consultations with each individual or a number of large users about the limitations and issues
- Establish contacts and conduct regular consultations with representatives of large users
- Determine which issues can be resolved and what are methods of cooperation and coordination
- Prepare programs for harmonization of activities on surfaces of common interest

Indicators: Control of space used is carried out in line with the priorities in sustainable local natural values protection based on the registers and supervision of the area, contacts and regular consultations with the space users established, possible solutions and coordination of activates agreed on, programs for coordination of activities prepared

Implementation control: Registers with photo documentation, examine the state of the environmental reports for the areas used by large space users, examine list of representatives, examine minutes of meetings, consultations and coordination, examine programs prepared

C5: Socio-economic studies

Objective: Determine status and monitor changes in awareness and behaviour of visitors, local population, and large users, and particularly trends of change in economic and social relations within the Nature Park area.

Measures:

- Organize and carry out surveys of visitors, target population and local population, record the data and process them, enter the data in relational database
- Collect and process demographic and economic indicators, enter the data in the database
- Collect and process quantitative data on agricultural production and other land use aspects (number of employed, income, structure)
- Monitor and record quantitative indicators of operation of all types of local NGOs and societies
- Determine key indicators of social and economic changes, record, store and process the data in order to monitor the change trends
- Establish contacts with local producers and entrepreneurs and determine their interests and goals
- Acquire all available data on earlier research (to complete the basic database and avoid repetition of already conducted studies)
- Carry out scientific socio-economic researches in cooperation and agreement with other protected areas in the region (joining the ongoing research programs, creation of joint studies) and larger space users
- Determine needs and prepare program for initiation of own targeted studies based on the status monitoring results (determining and research into the targeted segment of population, determining sensitivity of specific groups to changes, etc.)

Indicators: Number of scientific and technical research projects, continuous observation of status of selected parameters and indicators and entry into the database

Implementation control: Reports on study results, examine database, reports on status checks, reports on research project results

C6: Development projects

Objective: Support organization of education, particularly of the younger population (workshops, incubators, lectures) so that they adopt new approach to the land-use in the Nature Park, and establish international collaboration for launching research and development projects

Measures:

- Initiate setting up a special web site for organized education and information exchange
- Organize invited lectures and discussions on different topics regarding sustainable use of natural resources
- Initiate special educational programs for acquiring new knowledge and skills regarding sustainable use of local natural resources
- Assist in preparation of investment programs and applications for funding of small businesses in the field of sustainable use of the local area
- Prepare program of development and scientific research activities
- Establish contacts with scientific research centres interesting for the area, and with donors of scientific research programs
- Set up a genetic research and data storage system
- Set up a scientific research laboratory
- Create and elaborate scientific research programs.

Indicators: Continuous increase in interest for the web site, invited lectures and discussions organized, educational programs launched, preparation of various investment programs initiated. Scientific research activities program prepared, international contacts established, laboratory set up, projects launched.

Implementation control: Examine number of web site hits, number of invited lectures, discussions, educational programs and investment programs. Number of established international contacts, number of scientific research projects implemented.

TOPIC D: LAND-USE

Validation (assessment):

TOURISM AND RECREATION: Hutovo Blato offers the following attractions to its visitors: photo-safari, angling, game fishing, hunting, sports preparations, congress tourism. Generally, the visitation rates are currently much lower compared to the pre-war period when as many as 8,000 visitors have been recorded during a year. The Nature Park needs a new concept and new amenities to be offered to both domestic and foreign tourists. Revenues from photo safari are adequate, but revenues from additional services are still rather low. Based on earlier indicators, number of visitors and visitor carrying capacity assessment by structure, the Nature Park could account on total annual carrying capacity for about 53,000 visitors.

FISHERIES: All lakes, watercourses and springs in the Hutovo Blato wetland are situated within the Nature Park boundaries and they are under relatively efficient control. There is a need for regulation of fisheries through controlled catch, mainly referring to angling and game fishing, which should generate additional income that would be invested in protective activities. The existing project and management plans for the Hutovo Blato Nature Park area envisage Lake Svitava for development of aquaculture and game fishing.

AGRICULTURE: Agricultural land in the greater Hutovo Blato Nature Park area is used as arable land and as pastures. Arable land is used for cultivation of plants which differ from vegetation in other parts of Bosnia and Herzegovina by being sub-Mediterranean plants of warmer climate. The agricultural land under plough land within the Nature Park boundaries is sawn with cultures intended for game feeding. Other agricultural land is under orchards, vineyards, meadows and pastures, and they are used for production of organic food in cooperation with companies managing them. Within the organic agriculture framework, complementary programs of beekeeping and collecting of medicinal plants are interesting. Conservation and revival of grazing/low-input livestock breeding are important for the biodiversity and conservation of landscape.

FORESTRY: Forests and forest land within the Hutovo Blato Nature Park boundaries do not belong to the forest management area and they are not encompassed by the forest management documents, unlike other forest land in the cantonal territory managed by the Public Enterprise "Šume Hercegovačko-neretvanske" d.o.o. Therefore, the forest vegetation in Hutovo Blato Nature Park is not internally divided into compartments and sections, and no forest categorization has been carried out as an essential basis for planning and management of all forest areas in the Nature Park. A part of Svitavska Kaseta has once been under oak and ash forests. Today, there is only a low oak forest in points, and the remainders of the once forest land are presently under osier-beds and underbrush. Such poor forests and underbrush are of no commercial value. However, forest conservation and revitalization in the area is very important, since forests are valuable habitats and offer living conditions for a part of fauna in the Hutovo Blato Nature Park.

HUNTING: Hunting in the Nature Park area has not been banned until the present day, with exception of a decree issued in 1959, thus until an ultimate decision is made hunting is an activity that can be pursued under specific conditions within the Hutovo Blato Nature Park. Until 1995, Hutovo Blato was a pronounced hunting grounds. The pre-war indicators show that hunting, as an economic and sport activity, was crucial since it affected an overall operation of the Nature Park. Revenues had been earned from hunting organization and kill rates, as well as from accommodation and food and beverage services as accompanying services. Therefore, hunting is considered as an activity necessary for sustainable management of the Hutovo Blato Nature Park.

HISTORICAL HERITAGE: Archeological and historical sites within the Nature Park and in its neighbouring areas create a good potential for increase in value of the Nature Park and entire region, which in turn asks for a systematic approach to research, conservation and improvement of individual sites (to include them in tourist offer).

D1: Tourism

Objective: Determine target groups, establish cooperation with tourist organizations and harmonize offer and promotion

Measures:

- Prepare study on carrying capacity of the lake and banks regarding tourist activities and target visitor groups
- Establish cooperation with authors of detailed plans for tourist locations
- Establish more intensive collaboration with tourist organizations in the region
- Harmonize capacities required for safe and purposeful visit of tourists with carrying capacity of the area
- Introduce facilities used to protect natural values against the impact of the visitors (waste collection, rest areas equipped with necessary facilities, organize a sufficient number of environmentally sound container toilets)
- Determine touring conditions (routes, ways and means of touring) and conditions for various recreational activities (walking, running, cycling, horseback riding, swimming, rowing)
- Encourage improvement in quality of accommodation and food and beverage capacities in the neighbouring settlements
- Support programs for development of complementary tourist offer in the boundary area (theme parks, gastronomic offer, ethnological collections, archaeological sites, museums).

Indicators: Increase in number of bed nights in accommodation capacities in the boundary settlements, increase in number of visitors, facilities and amenities ensured, environmental protection organized.

Implementation control: Registers with photo documentation, examine tourist board reports, examine programs.

D2: Recreation

Objective: Establish cooperation in planning, education and training of sports and recreational clubs into the Nature Park offer

Measures:

- Establish permanent communication and exchange of information with fishing and hunting clubs, mountaineering clubs, and other NGOs involved in recreational activities in the open, and particularly with responsible inspections
- Initiate common activities on promotion and attracting game fishermen (conditionally hunters as well) from the greater region to the lake area (activities, events, competitions)
- Carry out education of fishermen and hunters, and members of local fishing and hunting clubs
- Initiate new societies and clubs related to sports and recreation in the open (cycling, photo safari, bird watching, orienteering), carry out education, include these activities into the offer

Indicators: Land use in harmony with the priorities in sustainable local natural values protection based on the registers and supervision of the area, game population stabilized on optimum level, increase in number of game fishing permits, ichthyoproduction of quality indigenous fish on increase, increase in number of hunting permits, introduction and increase in other recreational activities.

Implementation control: Registers with photo documentation, examine reports of hunting and fishing clubs, examine revenues from permits issued, examine number of members in existing and new NGOs and societies within the Nature Park area.

D3: Fisheries

Objective: Cooperate on harmonization and monitor implementation of Hutovo Blato fishing requirements

Measures:

- Supervise implementation of the fisheries master plan
- Carry out regular inventorisation of commercially interesting fish species
- Stock indigenous species in line with the ecological requirements

Indicators: Land use in harmony with the priorities in sustainable local natural values protection based on the registers and supervision of the area, ichthyoproduction of quality indigenous fish on increase.

Implementation control: Registers with photo documentation, examine status reports.

D4: Hunting

Objective: Cooperate on game protection programs

Measures:

- Harmonize hunting requirements with conditions for carrying out other activities within the Nature Park (hunting times, areas of hunting ban because of the visitors, hunting grounds marking, preventing damage caused by game to other space users)
- Establish permanent communication and exchange of information with the Public Enterprise and hunting clubs in the greater area under consideration
- Ban and strictly supervise wetland birds hunting
- Prevent poaching and organize game rescue actions together with hunting clubs and local population
- Remove poaching structures and facilities together with the hunting club
- Remove continuously stray cats and dogs from the hunting grounds
- Construct, repair or reconstruct hunting facilities which do not comply with the professional hunting requirements, nature and landscape protection requirements, and requirements of other space users
- Connect local population with hunting clubs in rendering organized services in hunting tourism
- Carry out education of hunters and members of local hunting clubs on sustainable use of the lake area and education of other space users on game conservation conditions

Indicators: Land use in harmony with the priorities in sustainable local natural values protection based on the registers and supervision of the area, game species on increase.

Implementation control: Registers with photo documentation, examine status reports.

D5: Agriculture

Objective: Cooperate on programs for organic production and grazing revival

Measures:

- Prepare a list/register of farmers interested in organic production and grazing revival
- Prepare a program for interconnecting of organic agriculture and the Nature Park, including a solution for products marketing under the name and with a certificate of the Nature Park
- Prepare a program for grazing revival, including a solution for ensuring subsidies
- Create an implementation supervision, product labelling and product/producer certification system
- Initiate and monitor programs, offer technical and professional support in implementation
- Initiate a program of cooperation with regional producers and users of organic products
- Set up a financial support system

Indicators: Register of producers set up, programs prepared, certification, labelling and product control system set up, financial support system set up, regional cooperation established

Implementation control: Examine programs, examine producers' register, examine quantitative indicators of implementation of the organic production and grazing revival program

D6: Beekeeping

Objective: Cooperate on apicultural programs and support the beekeeping development

Measures:

- Determine possible surfaces for setting up of beehives
- Regulate relations with local beekeepers (permits, promotion, label use)
- Carry out regular inventorisation of used land

Indicators: Land use in harmony with the priorities in sustainable local natural values protection based on the registers and supervision of the area, number of beehives and honey production on increase.

Implementation control: Registers with photo documentation, examine status reports.

D7: Plant collecting

Objective: Cooperate on programs for conservation and sustainable collecting of plants

Measures:

- Prepare list, determine and map areas, periods of growth and approaches, and enter them into GIS database
- Monitor situation and demand on the market, anticipate pressures
- Monitor situation by species and seasons, enter changes into GIS database
- Prepare conservation and sustainable collecting program
- Support establishment of a society and attract members by offering benefits
- Set up a strict and intensified system of control during seasons and in important locations

Indicators: A list and habitats map for medicinal plants prepared, data entered into the database, market demand monitoring established, conservation program prepared, society established, control of locations during the season intensified

Implementation control: Examine lists and maps, examine GIS database, examine data on monitoring demand and situation in habitats, examine program, examine number of society members.

D8: Forestry

Objective: Cooperate and make agreements on joint programs for revitalization of forest communities along the banks of lakes and tributaries

Measures:

- Establish cooperation with authorities responsible for forest conservation and exploitation, coordinate supervision and forest management requirements
- Exclude from cutting individual trees or smaller forest areas important as shelter and for survival of individual species in agreement with ornithologists
- Maintain good condition of forest edges and clearances
- Prolong cutting maturity of indigenous tree species

- Reduce, avoid and control use of plant protection products, prevent use of genetically modified species in cultivation and conservation of forest land
- Determine possible areas for revitalization of wetland pastures and meadows and measures for their revitalisation in agreement with the Public Enterprise and biologists

Indicators: Land use in harmony with the priorities in sustainable local natural values protection based on the registers and supervision of the area, forest land on increase.

Implementation control: Registers with photo documentation, examine status reports.

D9: Historical heritage

Objective: Conserve, protect, ensure access and organize visits to historical and archaeological sites

Measures:

- Support archaeological and ethnological studies (sacral buildings, archaeological sites, collections and museums, conservation or religious, ethnological, and cultural heritage)
- Include historical structures in the protected area offer
- Participate in arrangement of access and organization of visits to individual structures
- Participate in revitalization of traditional crafts, cultural and ethnological values

Indicators: Increase in number of visits to relations, archaeological, ethnological and cultural heritage sites.

Implementation control: Registers with photo documentation, examine reports.

TOPIC E: Maintenance and construction of new infrastructure

Validation (assessment):
Although the current traffic, visitor, and protective infrastructure in the Hutovo Blato Nature Park is functional and has been maintained, and improvements are permanent, there is a need for and possibility of additional investment into the protection of the local natural values and local population as well as into improvement of the Nature Park tourist offer. This primarily refers to the waste management systems and remediation of contaminated surfaces, to future improvement and marking of access and local roads, and creating new and more profuse amenities available to the visitors.

Along with the new infrastructure, it is necessary to introduce a system of continuous status monitoring and continuous supervision of those environmental components of the Nature Park which are under the most intensive anthropogenic pressures, thus it is necessary to improve the quantitative status and ecological status monitoring systems for the waters in Hutovo Blato, and install a CCTV system in specific key sites within the Nature Park in the future.

E1: Traffic and accesses

Objective: Cooperate on improvement of access roads and marking of accesses, set up seasonal tourist connections with local centres

Measures:
- Cooperate with competent authorities in prioritization and determining a method for improvement and maintenance of the Nature Park access roads
- Set up visible signposts, boards and other access signs on the roads leading to the Nature Park
- Initiate seasonal tourist line connections between Čapljina and Metković
- Develop a system for rental of alternative means of transportation for the Nature Park tours
- Mark and maintain marks at the Nature Park access roads.

Indicator: Controlled motor vehicle traffic set up, parking lots and other zones earmarked for alternative transport modes prepared, increase in number of rentals of bikes and other alternative means of transport, seasonal tourist transport organized between the Nature Park and its neighbouring areas (Čapljina, Metković) by vehicles operated by local transport operators

Implementation control: Examine traffic status, tour of entry zones, examine availability of alternative means of transport for visitor tours, examine a number of rented alternative means of transportation, examine number of visitors on seasonal transport lines

E2: Infrastructure for visitors

Objective: Prepare educational trails, gazebos, jetties, rest areas, walking and cycling trails, bathing areas, information points

Measures:
- Prepare educational trails and gazeboes
- Prepare and mark cycling trails and rest areas for cyclers with information points
- Prepare and mark walking trails and rest areas
- Prepare bird watching sites (towers with telescopes and binoculars) in particularly interesting points

Indicators: Number of attractive sites with prepared amenities, number and type of signs, boards, equipment set up, number of measures and rules regulating entry of visitors and their stay in the Nature Park adopted, records on number of permits issued, records on ranger activities, records on number of visitors and visitor surveys showing increase in number of visitors and their satisfaction, amenities for visitors provided.

Implementation control: Reports on visitors, processed results on small sponsorships and surveys on protected area visits, tours of amenities provided, reports on ranger activities and interventions

E3: Protective infrastructure

Objective: Cooperate with responsible national and local authorities on improvement of banks, municipal utility infrastructure for waste management, waste waters and landscape improvement

Measures:

- Create, along with competent local authorities, program for construction of municipal utilities lacking in the settlements
- Encourage and support implementation of planned municipal utility projects and possible new projects complementary with the environmental protection requirements (recycling centres, remediation of septic tanks and slurry pits, biowaste recovery, alternative energy sources and energy efficiency in households, and the like)
- Monitor and encourage through media and various institutions activities related to remediation of illegal and unengineered dump sites

Indicators: Registers for monitoring local impacts of municipal utilities on the ecological status of Lake Deran, rivers and gullies (wastewater collection, collection and disposal of waste), remediation programs

Implementation control: Examine registers with photo documentation, examine programs for construction of the remaining municipal utilities and complementary programs, examine the remediation results and results of landfill (dump site) environmental impact monitoring

E4: Infrastructure for research and monitoring

Objective: Set up a system of continuous monitoring, recording, storing and display of basic hydrological, meteorological, physico-chemical and biological indicators of the area condition, including continuous CCTV supervision of the area

Measures:

- Create a comprehensive concept of continuous monitoring and recording system for hydrological, meteorological, and ecological parameters for Hutovo Blato
- Create a CCTV supervision system for key locations (sites, interconnection, data recording, submittal and storing method)
- Initiate procedures for obtaining of funds needed for setting up of the monitoring system
- Enable continuous access to the key data and area records made by CCTV system on the Nature Park web site

Indicators: Monitoring system concepts elaborated, procedures for obtaining funds for the monitoring systems initiated, access to key data on the Nature Park web site enabled

Implementation control: Examine concepts, examine procedures, examine equipment set up, examine web site

TOPIC F: EXTERNAL IMPACTS ELIMINATION

Validation (assessment):

Presently assessed external impacts on the Hutovo Blato Nature Park area are:

- impacts on water regime of springs supplying water for the Hutovo Blato replenishment, on water regime of the Neretva and Krupa rivers "draining" Hutovo Blato, on water regime of Lake Svitava which is under an impact of the Čapljina PSHPP and separated from the spring area, and on the groundwater regime,
- water quality impacts are primarily indirect, through decrease in yield of spring zones and impact of external soil and water contamination sources within the inflow areas of springs and catchments of Hutovo Blato,
- impacts on overall protection status in the area through anthropogenic pressures from the "buffer" zone,
- impacts on landscape through mining activities (queries) and unresolved waste collection and disposal system.

F1: Water regime

Objective: Cooperate with competent state, Federation, cantonal, municipal authorities, participate in processes of interstate and inter-entity cooperation on projects creating or reducing pressures on the quantitative status of waters

Measures:

- Determine boundary conditions for allowable water regime changes in water bodies belonging to or interconnected with the Hutovo Blato water bodies, depending on a season and other significant current or previous conditions (meteorological, hydrological, vegetation, operational)
- Support all programs, plans and actions affecting decision-making on water management systems, power generation and environmental protection which are related to maintaining the water regime in the greater Hutovo Blato catchment area
- Active participation in all procedures regarding the adoption of projects in the „Upper horizons" with the goal of setting conditions which will prevent further deterioration of the Hutovo blato Nature Park.
- Begin cooperation with the HPP Čapljina on determining compensations due to the adverse effects of the HPP on the Parks water regime (defining impacts, evaluation of negative impacts, proposal of compensations, negotiation)

Indicators: Boundary conditions determined, participation in programs and actions

Implementation control: Examine boundary conditions, examine programs and actions participated by the Nature Park

F2: Water protection

Objective: Cooperate with competent state, Federation, cantonal, municipal authorities, participate in processes of interstate and inter-entity cooperation on projects creating or reducing pressures on the qualitative status of waters

Measures:

- Determine boundary conditions for allowable ecological status changes in water bodies belonging to or interconnected with the Hutovo Blato water bodies, depending on a season and other significant current or previous conditions (meteorological, hydrological, vegetation, operational, ecological, farming)
- Encourage and support all programs, plans and actions affecting decision-making on water management systems, power generation, agriculture and environmental protection which are related to maintaining the water quality in the greater Hutovo Blato catchment area

Indicators: Boundary conditions determined, participation in programs and actions

Implementation control: Examine boundary conditions, examine programs and actions participated by the Nature Park

F3: Environmental protection in buffer zone

Objective: Cooperate with competent cantonal and municipal authorities, participate in processes and projects creating or reducing pressures on the quantitative status of waters

Measures:

- Determine boundary conditions for allowable impacts of municipal utility and business activities in the Hutovo Blato buffer zone, depending on a season and other significant current or previous conditions (meteorological, vegetation, ecological, farming)
- Encourage and support all programs, plans and actions affecting decision-making on municipal utility and other land-use system in the buffer zone, which are related to conservation the water and land quality and biodiversity of Hutovo Blato

Indicators: Boundary conditions determined, participation in programs and actions

Implementation control: Examine boundary conditions, examine programs and actions participated by the Nature Park

F4: Landscape in greater region

Objective: Cooperate with competent cantonal and municipal authorities, participate in processes and projects creating or reducing pressures on the landscape

Measures:

- Determine critical points and section of degraded landscape in the Nature Park access areas and its catchment area significantly affecting the impression the Nature Park has on its visitors
- Encourage and support all plans and actions affecting decision-making on land-use planning. environmental protection and municipal utility systems, which are related to preservation and remediation of degraded landscapes important for the Nature Park

Indicators: Boundary conditions determined, participation in programs and actions

Implementation control: Examine boundary conditions, examine programs and actions participated by the Nature Park

4 MANAGEMENT PLAN IMPLEMENTATION

4.1 MANAGEMENT PLAN REFERENCE TO OTHER DOCUMENTS

Physical plans are the basic spatial management documents which, in line with the existing conditions and development interests, coordinate the use of land covered by the plans, namely its protection, usage and furnishing in order to achieve balanced and sustainable development.

The physical plans of the Herzegovina-Neretva Canton and Čapljina and Stolac Municipalities, as well as the Physical Plan for Areas of Special Features for the Areas of Importance for the Federation of Bosnia and Herzegovina are background documents used in setting up a concept of protection and sustainable use of Hutovo Blato since they determine where and what can be used in this area. The Physical Plan for Areas of Special Features prepared for the Hutovo Blato protected area complies with the physical planning provisions for the greater region, and it is the most important background document since it establishes in detail optimum spatial relations in the Nature Park.

The Management Plan is based on this physical planning documentation, and it determines how is an allowable land use in the Hutovo Blato Nature Park used to achieve the purpose, with priority concern of protection of its basic natural values.

Therefore, the Physical Plan for Area of Special Features and the Management Plan for the Hutovo Blato Nature Park are inseparable documents and in case physical plans are changing it will result in change of the Management Plan, while failure to meet some provisions regarding implementation of the management plans (due to spatial conditions) shall cause amendments of the physical planning documents.

4.2 ACTION PLANS

According to the Nature Protection Act, the Management Plan is passed for a 10-year period, with a revision carried out after 5 years. In order to ensure implementation of the Management Plan, it is important to adopt action plans intended for achievement of specific objectives in management of the Hutovo Blato Nature Park. Achieving of these objectives shall result in achieving of the goal and vision for the protection of the area under consideration. The action plans are based on previously determined objectives and measures for the Nature Park management, and they elaborate in detail implementation of the measures, time frames, and human and financial resources needed for their implementation.

By determination of the Hutovo Blato Nature Park management objectives, grounds are set for determination of action plans the Public Enterprise has to implement in the 10-year period. The Public Enterprise shall detail each action plan in its annual plans, having in mind available human and financial resources. Therefore, the action plans are implemented by conducting regular annual programs of protection, preservation, conservation, promotion and use of the Nature Park area adopted by the Public Enterprise.

It should be noted that, due to initially limited capacities of the Public Enterprise, the actions plans are envisaged for gradual implementation, first by carrying out the activities the Public Enterprise can do on its own with the available human and financial resources. The next step includes activities carried out with support of other stakeholders, namely space users, accompanied by gradual increase in own and cantonal investments by drawing of considerable assets from the federal and international funds, and all this during the first 5

years. Gradual capacity building of the Public Enterprise, including knowledge and skills of the employees and procurement of new equipment and infrastructure which are to generate new income, turns into activities for status conservation and improvement in protection conditions, focusing on a comprehensive and integrated protection of the entire area, encompassing business activities which are compatible with the protection and important for the local population. These activities are carried out during the next 5 years, and they correspond with the objectives and measures not included in the priority actions. It is underscored that implementation of most action plans is significantly determined by possibilities for obtaining the funds from external sources.

It should also be noted that action plans do not include the planned water management measures and projects related to improvement of the overall water status within the river basin district and the immediate Hutovo Blato area, since they will be carried out independently by competent institutions of the Federation of Bosnia and Herzegovina, but the action plans do include actions regarding decision-making on the water management measures and projects participated by the Public Enterprise. An elaborate description of the action plans is given below.

A: EFFICIENT NATURE PARK MANAGEMENT, ADMINISTRATION AND SUSTAINABILITY						
Subtopic		**Objective**	**Activities**		Implement-ation (years)	Action plan budget (BAM / year)
A1	Management capacity building	Improve management capacities (human, material)	A.1.1	Ensure engagement of Nature Park key personnel, rangers in particular, in line with the Public Enterprise organization	2- 5	/
					6 - 10	/
			A.1.2	Ensure conditions for continuous involvement of volunteers and trainees in the Public Enterprise activities	2 – 5	5.000
					6 – 10	8.000
			A.1.3	Improve ranger activities and organize occasional tours of the greater area to identify external pressures	3 – 5	3.000
					6 – 10	3.000
			A.1.4	Ensure continuous professional education of the Nature Park rangers	2 – 5	3.000
					6 – 10	3.000
			A.1.5	Procure, renew and maintain ranger equipment	2 – 5	/
					6 – 10	/
			A.1.6	Create a Sustainable resources department with personnel which can meet the new demands (creating and managing development projects, search for international donors and financing)	3 – 5	5.000
					6 – 10	5.000
			A.1.7	Continuous training and education of other Public Enterprise personnel, including special education of leaders in project preparation for international funds applications	2 – 5	5.000
					6 – 10	5.000
			A.1.8	Set up a business and area management information system (relational databases, GIS)	3 – 4	15.000
		Budget, BAM	*Year 1* - / *Year 2* - 18,000 *Year 3* - 35,000 *Year 4* - 35,000 *Year 5* - 21,000	*Year 6* - 24,000 *Year 7* - 24,000 *Year 8* - 24,000 *Year 9* - 24,000 *Year 10* - 24,000		
		Participation in costs:	10 % Public Enterprise (own revenues), 5 % Canton, 30% FB&H funds, 60% international funds			
		Time frame:	10 years			
		Implementation entity:	Public Enterprise			
		Implementation zones:	All zones			
A2	Preparation of long-term management documentation	Achieve management sustainability	A.2.1	Active involvement in harmonization and adopting of detailed plans for development of tourist locations (sites, capacities, visual integration)	1 – 5	/
					6 – 10	/
			A.2.2	Develop financial consolidation plan of enterprise including adaptation and improving staff structure of enterprise	1 – 5	/
					6 – 10	/
			A.2.3	Prepare annual financial management plans	1 – 5	2.000
					6 – 10	
			A.2.4	Prepare annual plans for stakeholders involvement	1 – 5	1.000
					6 – 10	
			A.2.5	Prepare long-term financial plan of the Public Enterprise expenses and revenues in order to achieve the protected area sustainability, including risk analysis	2 – 3	20.000
			A.2.6.	Create new ways to earn revenues	2 – 5	10.000
					6 – 10	10.000
			A.2.7.	Ensure additional funding sources by project applications to tenders and programs initiated by national and international institutions	2 – 5	10.000
					6 – 10	10.000
			A.2.8	Develop guidelines for design engineering and construction of new projects and infrastructure in the Nature Park aimed at nature protection, increase in visitor amenities, and increase in Public Enterprise revenues, provided they are in harmony with requirements for landscape characteristics preservation	2 – 5	10.000
		Budget, BAM:	*Year 1* - 3,000 *Year 2* - 53,000 *Year 3* - 53,000 *Year 4* - 33,000 *Year 5* - 33,000	*Year 6* - 24,000 *Year 7* - 24,000 *Year 8* - 24,000 *Year 9* - 24,000 *Year 10* - 24,000		

A: EFFICIENT NATURE PARK MANAGEMENT, ADMINISTRATION AND SUSTAINABILITY						
Subtopic		**Objective**		**Activities**	Implement-ation (years)	Action plan budget (BAM / year)
Participation in costs:			10 % Public Enterprise (own revenues), 30 % Canton, 20% FB&H funds, 40% international funds			
Time frame:			10 years			
Implementation entity:			Public Enterprise			
Implementation zones			All zones			
A3	Resolving property-law relations	Regulate property ownership issues within the Nature Park boundaries to ensure nature protection and sustainable development	A.3.1	Obtain cadastral documents and land title deeds for plots within the Nature Park boundaries	2 – 3	20.000
			A.3.2	Evaluate privately owned-land	2 – 3	10.000
			A.3.3	Determine priorities and purchase dynamics towards protection and sustainable use of the Nature Park	4	20.000
			A.3.4	Resolve continuously conflicts regarding use and ownership of land within the Nature Park boundaries	4 – 5 6 – 10	10.000 10.000
			A.3.5	Direct continuously surpluses towards purchase of land important for protection and sustainable use of land within the Nature Park boundaries	6 – 10	/
			A.3.6	Start process of including Desilo into NP boundaries	4 - 5 4 – 5	/ 15.000
			A.3.7	Elaborate and apply a system of concession permits for land users within the Nature Park	6 – 10	/
Budget, BAM:			*Year 1* - / *Year 2* - 30,000 *Year 3* - 30,000 *Year 4* - 45,000 *Year 5* - 25,000	*Year 6* - 10,000 *Year 7* - 10,000 *Year 8* - 10,000 *Year 9* - 10,000 *Year 10* - 10,000		
Participation in costs:			10% Public Enterprise, 40% Canton, 50% international funds			
Time frame:			10 years			
Implementation entity:			Public Enterprise			
Implementation zones:			All zones			
A4	Setting up safety and security systems	Create prevention and protection system for all human, material and natural assets in the Nature Park	A.4.1	Appoint a person in Public Enterprise responsible for safety	2	/
			A.4.2.	Prepare emergency plans (fires, floods, storms, freezing, accidents)	2 – 3	10,000
			A.4.3.	Adopt emergency procedures	3 – 4	/
			A.4.4	Purchase equipment and means for emergency response	4 – 5	20,000
			A.4.5.	Set up an alert and quick response system connected with relevant authorities	3 – 4	10,000
			A.4.6	Equip, train and organize regular drills for all Public Enterprise employees in rescue procedures and implementation of safety measures in the Hutovo Blato area	3 – 5 6 – 10	10,000
Budget, BAM:			*Year 1* - / *Year 2* - 10,000 *Year 3* - 30,000 *Year 4* - 40,000 *Year 5* - 30,000	*Year 6* - 10,000 *Year 7* - 10,000 *Year 8* - 10,000 *Year 9* - 10,000 *Year 10* - 10,000		
Participation in costs:			20% Public Enterprise, 50% Canton 30% international funds/donations			
Time frame:			10 years			
Implementation entity:			Public Enterprise			
Implementation zones:			All zones			
A5	Management of visitors	Enable quality and safe stay to all visitors and ensure minimum impact of visitors on nature in the Nature Park	A.5.1.	Ensure well marked entrance, determine sites particularly attractive for visitors, ensure quality information about the Nature Park (printed guide)	2 - 5	15.000
			A.5.2	Improve visitors' guidance system (trained and accredited tourist guides, sports and recreation guides and organizers)	3 – 5 6 – 10	5.000 5.000
			A.5.3	Introduce keeping records of visitors and their indirect surveys (system of small sponsorships)	2 – 5 6 – 10	3.000 3.000

A: EFFICIENT NATURE PARK MANAGEMENT, ADMINISTRATION AND SUSTAINABILITY						
Subtopic		**Objective**	**Activities**		Implement-ation (years)	Action plan budget (BAM / year)
			A.5.4	Mark the area (mark protection boundaries, notice boards, information boards)	4 – 5	20.000
			A.5.5	Determine carrying capacity of the area, particularly of aquatic ecosystems, and method of regulating number of visitors (issuing permits for sports and recreation activities, control of permit holders, regulation of access to aquatic ecosystems)	2 – 4	10.000
			A.5.6.	Implement measures important for safety of visitors during their stay (warning and prohibition signs, boards and leaflets with rules of safe visit, ensuring safety equipment, rangers' method of work)	3 – 5	5.000
					6 – 10	5.000
			A.5.7	Regulate visitors' entry into the protected area (physical barriers and use of specific vehicles/vessels)	4 – 5	5.000
					6 – 10	5.000
			A.5.8	Create comprehensive integrated programs for the most frequently visited sites – banks, lake	4 – 5	15.000
			A.5.9	Regularly monitor visitors' impact on nature (rangers' activities) and follow up their satisfaction with the offer at the Nature Park area (surveys).	4 – 5	/
					6 – 10	/
Budget, BAM:			*Year 1* - / *Year 2* - 28,000 *Year 3* - 38,000 *Year 4* - 78,000 *Year 5* - 68,000		*Year 6* - 18,000 *Year 7* - 18,000 *Year 8* - 18,000 *Year 9* - 18,000 *Year 10* - 18,000	
Participation in costs:		80% Public Enterprise, 20% Funds (FB&H, international)				
Time frame:		10 years				
Implementation entity:		Public Enterprise				
Implementation zones:		All zones				

B: BIODIVERSITY PROTECTION (FLORA, FAUNA AND ECOSYSTEMS)						
Subtopic		**Objective**	**Activities**		Implement-ation (years)	Action plan budget (BAM / year)
B1	Conservation of aquatic ecosystems	Conserve aquatic habitats populated by important animal and plant species	B.1.1	Generate a detailed map of aquatic habitats, scale 1:5000, enter it into GIS database	3 – 4	25.000
			B.1.2	Determine indicators of critical changes in key aquatic habitats	3 – 4	25.000
			B.1.3	Introduce systematic monitoring of water surface status, coordinate supervision of aquatic surfaces with conditions for guiding visitor tours and recreational activities, control all these activities on all lakes and gullies in the Nature Park	4 – 5	/
					6 – 10	/
			B.1.4	Coordinate the planned river basin management measures with the conditions for aquatic habitats conservation	4 – 5	/
			B.1.5	Record and control anthropogenic impacts contributing to increase in water eutrophication degree (anthropogenic contamination from local sources)	3 – 5	5.000
					6 – 10	5.000
			B.1.6	Elaborate emergency procedures in case of any disturbances determined by permanent visual supervision and monitoring of status, indicators and parameters indicating the degree of eutrophication in the area	4 – 5	25.000
			B.1.7	Elaborate rules for preservation of aquatic habitats in as natural state as possible, and correct the preservation concept, if necessary	4 – 5	25.000
			B.1.8	Determine plant species characteristic for habitat types, prevent and strictly ban introduction and control and limit development of foreign species, remove existing foreign species wherever possible	3 – 5	10.000
					6 – 10	5.000
			B.1.9	Encourage development of vegetation in specific stretches along the lake banks or tributaries to create conditions favourable for hatching and as fish shelters	6 – 10	5.000
Budget, BAM:			*Year 1* - / *Year 2* - / *Year 3* - 65,000 *Year 4* - 115,000 *Year 5* - 65,000		*Year 6* - 10,000 *Year 7* - 10,000 *Year 8* - 10,000 *Year 9* - 10,000 *Year 10* - 10,000	
Participation in costs:			10% Public Enterprise, 10% Canton, 20% FB&H funds, 60% international funds			
Time frame:			10 years			
Implementation entity:			Public Enterprise			
Implementation zones:			Strict protection zones, active protection zones, APZ1, APZ2, APZ3, APZ5			
B2	Conservation and revitalization of wetland habitats	Ensure natural condition of wetland habitats (coastal zone, springs) and revitalize sites of former wetland ecosystems	B.2.1	Generate a map of wetland habitats, scale 1:5000, and reconstruct a historical habitats map (showing state before the Trebišnjica Hydropower System construction), enter it into GIS database	3 – 4	25,000
			B.2.2	Create habitats revitalisation program for banks and springs, prioritize revitalization activities	4 – 5	20,000
			B.2.3	Elaborate emergency procedures in case of any disturbances determined by permanent visual supervision and monitoring of status, indicators and parameters indicating changes in wetland habitats	4 – 5	25,000
			B.2.4	Elaborate rules for preservation of wetland habitats in as natural state as possible, and correct the preservation concept, if necessary	4 – 5	25,000
			B.2.5	Create revitalization programs for former valuable habitats (e.g. wetland meadows, indigenous forests) and prioritize revitalization activities	4 – 5	30,000
			B.2.6	Determine indicators and introduce systematic monitoring of wetland surface status, coordinate supervision of aquatic and wetland surfaces with conditions for guiding visitor tours and recreational activities, control all these activities.	4 – 5	20,000
					6 – 10	/

B: BIODIVERSITY PROTECTION (FLORA, FAUNA AND ECOSYSTEMS)						
Subtopic		**Objective**	**Activities**		Implement-ation (years)	Action plan budget (BAM / year)
		Budget, BAM:	*Year 1* - /	*Year 6* - /		
			Year 2 - /	*Year 7* - /		
			Year 3 - 25,000	*Year 8* - /		
			Year 4 - 145,000	*Year 9* - /		
			Year 5 - *120*,000	*Year 10* - /		
		Participation in costs:	10% Public Enterprise, 10% Canton, 20% FB&H funds, 60% international funds			
		Time frame:	5 years			
		Implementation entity:	Public Enterprise			
		Implementation zones:	Active protection zones, APZ 1,APZ3, APZ4, use zone UZ1, UZ2, UZ3			
B3	Landscape	Conserve landscape values of the Nature Park	B.3.1.	Declare the area of Lake Deran towards the Skrka gully a strict reserve (it is the area of deepest peat)	2 – 3	20,000
			B.3.2	Carry out mapping, set up supervision and control of all excavation activities within the Nature Park boundaries, and create a visual "remediation" concept	3	10,000
			B.3.3	Carry out mapping and resolve waste fly tipping within the Nature Park boundaries	3	10,000
			B.3.4	Determine sections and sites and introduce regular mowing and clearing of overgrown sections and sites with particularly attractive views (e.g. mowing of access road shoulders)	3 – 5	5,000
					6 – 10	5,000
			B.3.5	Promote traditional land use and traditional farming crops within the Nature Park boundaries, prepare a concept for visual integration of anthropogenic landscape with natural landscape)	4 – 5	10,000
		Budget, BAM:	*Year 1* - /	*Year 6* - 5,000		
			Year 2 - 20,000	*Year 7* - 5,000		
			Year 3 - 45,000	*Year 8* - 5,000		
			Year 4 - 15,000	*Year 9* - 5,000		
			Year 5 - 15,000	*Year 10* - 5,000		
		Participation in costs:	20% Public Enterprise, 30% Canton, 50% FB&H fund			
		Time frame:	10 years			
		Implementation entity:	Public Enterprise			
		Implementation zones:	SPZ2, active protection zones, use zones			
B4	Flora	Protect endemic plant species	B.4.1	Determine plant species characteristic for habitat types, and protected and endemic species, their sites and extent of occurrence, carry out mapping and entry into GIS database	3 – 4	20,000
			B.4.2	Prevent introduction, control and limit development of foreign species, remove existing foreign species (such as common ragweed) wherever possible	4 – 5	10,000
					6 – 10	5,000
			B.4.3	Prepare inventories and maps of commercially valuable wild species, enter into GIS database, set up supervision and control of activities carried out by local population regarding collecting of protected plant species, including education and alternative solutions	4 – 5	15,000
					6 – 10	5,000
			B.4.4	Prepare establishment of the Seed Bank and Gene Bank.	6 – 10	5,000
		Budget, BAM:	*Year 1* - /	*Year 6* - 10,000		
			Year 2 - /	*Year 7* - 10,000		
			Year 3 - 20,000	*Year 8* - 10,000		
			Year 4 - 45,000	*Year 9* - 10,000		
			Year 5 - 25,000	*Year 10* - 10,000		
		Participation in costs:	10% Public Enterprise, 20% Canton, 20% FB&H fund, 50% international funds			
		Time frame:	10 years			
		Implementation entity:	Public Enterprise			
		Implementation zones:	All zones			

B: BIODIVERSITY PROTECTION (FLORA, FAUNA AND ECOSYSTEMS)						
Subtopic		**Objective**	**Activities**		Implement-ation (years)	Action plan budget (BAM / year)
B5	Conservation of fauna - Fish	Conserve and protect indigenous and endemic fish species	B.5.1	Carry out mapping of important ichthyofauna habitats, their entry into GIS database, introduce continuous supervision and ban access to hatching areas	3 – 4	10,000
			B.5.2	Harmonize planned river basin management measures with conditions for conservation of ichthyopopulation and improvement in ichthyoproduction in the area	4 – 5	10,000
			B.5.3	Prepare, protect and maintain hatcheries for endemic species and prepare a program of their reintroduction into the wetland	6 – 10	5,000
			B.5.4	Set up supervision and control of expansion of invasive fish species, such as pumpkinseed sunfish from Lake Deran	6 – 10	5,000
			B.5.5	Organize controlled fishing of commercially valuable foreign species	6 – 10	5,000
			B.5.6	Prepare fisheries master plan in line with the provisions of the freshwater fisheries act	4 – 5	20,000
			B.5.7	Improve management and control of human activities at the Krupa River for protection of fish migratory paths towards the wetland.	6 – 10	5,000
Budget, BAM:			*Year 1* - / *Year 2* - / *Year 3* - 10,000 *Year 4* - 40,000 *Year 5* - 30,000		*Year 6* - 20,000 *Year 7* - 20,000 *Year 8* - 20,000 *Year 9* - 20,000 *Year 10* - 20,000	
Participation in costs:			20% Public Enterprise, 30% Canton, 20% FB&H fund, 30% international funds			
Time frame:			10 years			
Implementation entity:			Public Enterprise			
Implementation zones:			Strict protection zones, active protection zones APZ1, APZ2, APZ3, APZ5, use zones UZ1, UZ2			
B6	Conservation of fauna - Amphibians	Conserve and protect indigenous and endangered amphibian species	B.6.1	Identify and remove threats to amphibians	4 – 5	10,000
			B.6.2.	Prepare management plans for protected amphibians	6 – 10	5,000
			B.6.3.	Determine sites of their living, map them and enter into GIS database and set up status monitoring of the population of yellow-bellied toad, European tree frog, Agile frog and Greek stream frog	4 – 5	10,000
			B.6.4	Introduce sponsorship programs for individual species of amphibians the proceeds of which will be used for conservation and research	6 – 10	1,000
Budget, BAM:			*Year 1* - / *Year 2* - / *Year 3* - / *Year 4* - 20,000 *Year 5* - 20,000		*Year 6* - 6,000 *Year 7* - 6,000 *Year 8* - 6,000 *Year 9* - 6,000 *Year 10* - 6,000	
Participation in costs:			20% Public Enterprise, 30% Canton, 20% FB&H funds, 30% international funds			
Time frame:			10 years			
Implementation entity:			Public Enterprise			
Implementation zones:			All zones in the Nature Park			
B7	Conservation of fauna - Reptiles	Conserve and protect indigenous and endangered reptile species	B.7.1	Set up control and ban of trade in reptiles, particularly the Hermann's tortoise	3 – 5 6 – 10	/ /
			B.7.2	Identify and remove threats to reptiles	4 – 5	10,000
			B.7.3	Determine sites of their living, map them and enter into GIS database, prepare and set up monitoring programs for reptiles	4 – 5	10,000
			B.7.4	Prepare management plans for protected reptiles	6 – 10	5,000
			B.7.5.	Introduce sponsorship programs for individual species of reptiles the proceeds of which will be used for conservation and research	6 – 10	1,000

B: BIODIVERSITY PROTECTION (FLORA, FAUNA AND ECOSYSTEMS)						
Subtopic		**Objective**	**Activities**		Implement-ation (years)	Action plan budget (BAM / year)
		Budget, BAM:	*Year 1* - /	*Year 6* - 6,000		
			Year 2 - /	*Year 7* - 6,000		
			Year 3 - /	*Year 8* - 6,000		
			Year 4 - 20,000	*Year 9* - 6,000		
			Year 5 - 20,000	*Year 10* - 6,000		
		Participation in costs:	20% Public Enterprise, 30% Canton, 20% FB&H funds, 30% international funds			
		Time frame:	10 years			
		Implementation entity:	Public Enterprise			
		Implementation zones:	All zones in the Nature Park			
B8	Conservation of fauna - Birds	Conserve and protect indigenous and endangered Hutovo Blato bird species	B.8.1	Pinpoint nests, map them, enter them into GIS database, create protection and supervision, and protect nests by access ban	3 – 5	20,000
			B.8.2	Organize tourist routes so that the birds are not disturbed	6 – 10	/
			B.8.3	Provide food reserves for birds wintering in the area in case of snow, ice and other unfavourable weather conditions	6 – 10	1,000
			B.8.4	Regularly monitor status of population of migratory and nesting birds	6 – 10	/
			B.8.5	Set up strict control of poaching	6 – 10	/
			B.8.6	Prepare management plans for individual protected bird species	6 – 10	10,000
			B.8.7	Ensure protection, survival and recovery of population of critically endangered species	6 – 10	2,000
			B.8.8	Organize bird ringing actions	6 – 10	1,000
			B.8.9	Introduce sponsorship programs for individual species of birds the proceeds of which will be used for conservation and research	6 – 10	2,000
			B8.10	Prepare a catalogue and monograph of the most important bird species	6 – 10	10,000
		Budget, BAM:	*Year 1* - /	*Year 6* - 26,000		
			Year 2 - /	*Year 7* - 26,000		
			Year 3 - 20,000	*Year 8* - 26,000		
			Year 4 - 20,000	*Year 9* - 26,000		
			Year 5 - 20,000	*Year 10* - 26,000		
		Participation in costs:	20% Public Enterprise, 30% Canton, 20% FB&H funds, 30% international funds			
		Time frame:	10 years			
		Implementation entity:	Public Enterprise			
		Implementation zones:	All zones in the Nature Park			
B9	Conservation of fauna - Mammals	Conserve and protect indigenous and endangered Hutovo Blato mammal species	A.9.1	Regular status monitoring of endangered species (sites, numbers, health condition)	6 – 10	/
			A.9.2	Determine sites of their living, map and enter them into GIS database, prepare and set up protection of endangered and protected species	4 – 5	10,000
			A.9.3	Prepare Management Plan for European otter population	6 – 7	25,000
			A.9.4	Set up strict control of poaching	3 – 5	/
					6 – 10	/
			A.9.5	Set up strict control of poaching Introduce sponsorship programs for individual species of mammals the proceeds of which will be used for conservation and research	6 – 10	1,000
		Budget, BAM:	*Year 1* - /	*Year 6* - 21,000		
			Year 2 - /	*Year 7* - 21,000		
			Year 3 - /	*Year 8* - 1,000		
			Year 4 - 10,000	*Year 9* - 1,000		
			Year 5 - 10,000	*Year 10* - 1,000		
		Participation in costs:	20% Public Enterprise, 30% Canton, 20% FB&H funds, 30% international funds			
		Time frame:	10 years			
		Implementation entity:	Public Enterprise			
		Implementation zones:	All zones in the Nature Park			

B: BIODIVERSITY PROTECTION (FLORA, FAUNA AND ECOSYSTEMS)						
Subtopic		**Objective**	**Activities**		Implement-ation (years)	Action plan budget (BAM / year)
B10	Status research and monitoring	Collect data on all the Hutovo Blato ecosystems (habitats and species) for better area management	A10.1	Ensure equipment and software for mapping, recording and storing of status monitoring data	3 – 5	20,000
			A10.2	Regular status monitoring of endangered species (sites, numbers, health condition) and monitoring of habitats (sites, area of occupancy, status), recording of changes	6 – 10	/
			A10.3	Process data and determine indicators of change	6 – 10	5,000
			A10.4	Prepare status reports on endangered species and habitats	6 – 10	5,000
Budget, BAM:			*Year 1* - / *Year 2* - / *Year 3* - 20,000 *Year 4* - 20,000 *Year 5* - 20,000	*Year 6* - 10,000 *Year 7* - 10,000 *Year 8* - 10,000 *Year 9* - 10,000 *Year 10* - 10,000		
Participation in costs:			20% Public Enterprise, 30% Canton, 20% FB&H funds, 30% international funds			
Time frame:			10 years			
Implementation entity:			Public Enterprise			
Implementation zones:			All zones			

C: EDUCATION AND LOCAL POPULATION						
Subtopic		**Objective**	**Activities**		Implement-ation (years)	Action plan budget (BAM / year)
C1	Education and informing of visitors	Raise awareness of visitors of need to protect nature, targeting in particular the young population	C.1.1	Prepare a comprehensive program for interpretation of valuable natural assets and education on the Hutovo Blato natural values	2 – 3	10,000
			C.1.2	Organize that the school groups from the local and regional schools attend workshops and field trips, organize educational and research programs for students	2 – 5 6 – 10	5,000 /
			C.1.3	Create interactive thematic programs for the younger visitors to learn about the natural values of the area, such as fish, birds and flora (environmental schools and workshops)	6 – 10	5,000
			C.1.4	Create educational materials for target visitor group	6 – 10	5,000
		Budget, BAM:	*Year 1* - / *Year 2* - 15,000 *Year 3* - 15,000 *Year 4* - 5,000 *Year 5* - 5,000	*Year 6* - 10,000 *Year 7* - 10,000 *Year 8* - 10,000 *Year 9* - 10,000 *Year 10* - 10,000		
		Participation in costs:	30% Public Enterprise, 30% Canton, 40% international funds			
		Time frame:	10 years			
		Implementation entity:	Public Enterprise			
		Implementation zones:	All zones			
C2	Education of local population	Educate local population on all forms of sustainable land-use, environmental protection, development options and importance of preservation of natural, cultural and historical heritage.	C.2.1	Determine priorities in education of local population based on the environmental protection criteria and creating new chances for development (agriculture, hunting, fisheries, waste management, cultural heritage, other development programs) and create educational programs (topics, lecturers, sites, dates, methods for attracting and gathering of participants)	4 – 5	20,000
			C.2.2	Organize educational and topical workshops for the local population in order to create common conservation and protection activities	6 – 10	2,000
			C.2.3	Involve population into the status monitoring activities and protection of natural values of Hutovo Blato, particularly the young (open telephone, setting up "young rangers" by settlements, procurement of bicycles and computers with internet connection for the "young rangers", ensuring premises for the "young rangers") activities	6 – 10	3,000
			C.2.4	Encourage regular communication with local NGOs and population in order for them to submit their proposals and initiatives	6 – 10	2,000
		Budget, BAM:	*Year 1* - / *Year 2* - / *Year 3* - / *Year 4* - 20,000 *Year 5* - 20,000	*Year 6* - 7,000 *Year 7* - 7,000 *Year 8* - 7,000 *Year 9* - 7,000 *Year 10* - 7,000		
		Participation in costs:	20% Public Enterprise, 40% Canton, 40% international funds			
		Time frame:	10 years			
		Implementation entity:	Public Enterprise			
		Implementation zones:	Use zones, transition zones			
C3	Education of farmers	Educate farmers on possibilities of environmentally suitable production and measures for land protection against erosion and excessive pollution	C.3.1	Determine and map surfaces near the lake within the Nature Park boundaries where the runoff direction is towards the lake, and which are used for agriculture, determine their ownership and usage (cultures, application of agrochemicals and fertilizers), enter the data into GIS database	5	15,000
			C.3.2	Organize and carry out education of agricultural land owners regarding options for organic production without application of agrochemicals, options for marketing of such products, and issues related to the erosion mitigation	6 – 10	4,000

C: EDUCATION AND LOCAL POPULATION						
Subtopic		**Objective**	**Activities**		Implement-ation (years)	Action plan budget (BAM / year)
			C.3.3	Initiate organized collection of agricultural waste	6 – 10	8,000
			C.3.4	Determine interest of local population in grazing revival and possible conditions necessary for grazing revival on strictly controlled surfaces including a strictly controlled number of animal units	4 – 5	10,000
			C.3.5	Elaborate conditions for maintenance and use of surfaces suitable for agricultural production (remaining surfaces and new surfaces)	5	10,000
			C.3.6	Prepare programs for harmonization of activities of the local population on surfaces of common interest and those interesting for conservation and improvement of biodiversity	5	10,000
		Budget, BAM:	*Year 1* - / *Year 1* - / *Year 3* - / *Year 4* - 10,000 *Year 5* - 45,000	*Year 6* - 12,000 *Year 7* - 12,000 *Year 8* - 12,000 *Year 9* - 12,000 *Year 10* - 12,000		
		Participation in costs:	10% Public Enterprise, 60% Canton, 30% FB&H funds			
		Time frame:	10 years			
		Implementation entity:	Public Enterprise			
		Implementation zones:	Use zones, transition zones			
C4	Education of large users	Educate large water users on limitations of the Nature Park and importance of its conservation in order to find commonly accepted protection solutions	C.4.1	Determine necessary limitations on future use of space in the Nature Park for large space users (without population, agriculture and traditional activities): power generation, water management, transport, mining	4 – 5	10,000
			C.4.2	Record large space users, determine contact persons, determine aspects of possible impacts and issues to be covered by education	2 – 3	5,000
			C.4.3	Carry out preliminary consultations with each individual or a number of large users about the limitations and issues	3 – 4	5,000
			C.4.4	Establish contacts and conduct regular consultations with representatives of large users	6 – 10	5,000
			C.4.5	Determine which issues can be resolved and what are methods of cooperation and coordination	6 – 7	20,000
			C.4.6	Prepare programs for harmonization of activities on surfaces of common interest	7 – 8	30,000
		Budget, BAM:	*Year 1* - / *Year 2* - 5,000 *Year 3* - 10,000 *Year 4* - 15,000 *Year 5* - 10,000	*Year 6* - 25,000 *Year 7* - 55,000 *Year 8* - 35,000 *Year 9* - 5,000 *Year 10* - 5,000		
		Participation in costs:	10% Public Enterprise, 20% Canton, 70% Agency			
		Time frame:	10 years			
		Implementation entity:	Public Enterprise, Agency for Watershed of Adriatic Sea Mostar			
		Implementation zones:	All zones			
C5	Socio-economic studies	Determine status and monitor changes in awareness and behaviour of visitors, local population, and large users, and particularly trends of change in economic and social relations within the Nature Park area.	C.5.1	Organize and carry out surveys of visitors, target population and local population, record the data and process them, enter the data in relational database	3 – 5 6 – 10	5,000 5,000
			C.5.2	Collect and process demographic and economic indicators, enter the data in the database	3 – 5 6 – 10	5,000 5,000
			C.5.3	Collect and process quantitative data on agricultural production and other land use aspects (number of employed, income, structure)	3 – 5 6 – 10	5,000 5,000
			C.5.4	Monitor and record quantitative indicators of operation of all types of local NGOs and societies	3 – 5 6 – 10	5,000 5,000
			C.5.5	Determine key indicators of social and economic changes, record, store and process the data in order to monitor the change trends	3 – 5 6 – 10	8,000 5,000

C: EDUCATION AND LOCAL POPULATION						
Subtopic		**Objective**	**Activities**		Implement-ation (years)	Action plan budget (BAM / year)
			C.5.6	Establish contacts with local producers and entrepreneurs and determine their interests and goals	3 – 5 6 – 10	5,000 /
			C.5.7	Acquire all available data on earlier research (to complete the basic database and avoid repetition of already conducted studies)	3 – 4	10,000
			C.5.8	Carry out scientific socio-economic researches in cooperation and agreement with other protected areas in the region (joining the ongoing research programs, creation of joint studies) and larger space users	4 – 5	10,000
			C.5.9	Determine needs and prepare program for initiation of own targeted studies based on the status monitoring results (determining and research into the targeted segment of population, determining sensitivity of specific groups to changes, etc.)	4 – 5	10,000
			Budget, BAM:	*Year 1* - / *Year 2* - / *Year 3* - 43,000 *Year 4* - 63,000 *Year 5* - 53,000	*Year 6* - 25,000 *Year 7* - 25,000 *Year 8* - 25,000 *Year 9* - 25,000 *Year 10* - 25,000	
			Participation in costs:	20% Public Enterprise, 30% Canton, 30% FB&H funds, 20% international funds		
			Time frame:	10 years		
			Implementation entity:	Public Enterprise		
			Implementation zones:	Use zones, transition zones		
C6	Developmen t projects	Support organization of education, particularly of the younger population (workshops, incubators, lectures) so that they adopt new approach to the land-use in the Nature Park, and establish international collaboration for launching research and development projects	C.6.1	Initiate setting up a special web site for organized education and information exchange	3	35,000
			C.6.2	Organize invited lectures and discussions on different topics regarding sustainable use of natural resources	4 – 5 6 – 10	3,000 3,000
			C.6.3	Initiate special educational programs for acquiring new knowledge and skills regarding sustainable use of local natural resources	6 – 10	4,000
			C.6.4.	Assist in preparation of investment programs and applications for funding of small businesses in the field of sustainable use of the local area	4 – 5 6 – 10	5,000 5,000
			C.6.5	Prepare program of development and scientific research activities	4 – 5	20,000
			C.6.6	Establish contacts with scientific research centres interesting for the area, and with donors of scientific research programs	4 – 5 6 – 10	5,000 5,000
			C.6.7	Set up a genetic research and data storage system	6 – 10	10,000
			C.6.8	Set up a scientific research laboratory	6 – 10	10,000
			C.6.9	Create and elaborate scientific research programs.	6 – 10	5,000
			Budget, BAM:	*Year 1* - / *Year 2* - / *Year 3* - 3,000 *Year 4* - 33,000 *Year 5* - 33,000	*Year 6* - 42,000 *Year 7* - 42,000 *Year 8* - 42,000 *Year 9* - 42,000 *Year 10* - 42,000	
			Participation in costs:	10% Public Enterprise, 40% Canton, 50% international funds		
			Time frame:	10 years		
			Implementation entity:	Public Enterprise, Canton		
			Implementation zones:	Use zones, Transition zones		

D: LAND-USE						
Subtopic		**Objective**	**Activities**		Implement-ation (years)	Action plan budget (BAM / year)
D1	Tourism	Determine target groups, establish cooperation with tourist organizations and harmonize offer and promotion	D.1.1	Prepare study on carrying capacity of the lake and banks regarding tourist activities and target visitor groups	2 – 4	20,000
			D.1.2	Establish cooperation with authors of detailed plans for tourist locations	2 – 5	/
					6 – 10	/
			D.1.3	Establish more intensive collaboration with tourist organizations in the region	2 – 5	/
					6 – 10	/
			D.1.4	Harmonize capacities required for safe and purposeful visit of tourists with carrying capacity of the area	6 – 10	10,000
			D.1.5	Introduce facilities used to protect natural values against the impact of the visitors (waste collection, rest areas equipped with necessary facilities, organize a sufficient number of environmentally sound container toilets)	4 – 5	10,000
					6 – 10	10,000
			D.1.6	Determine touring conditions (routes, ways and means of touring) and conditions for various recreational activities (walking, running, cycling, horseback riding, swimming, rowing)	4 – 5	10,000
			D.1.7	Encourage improvement in quality of accommodation and food and beverage services in the neighbouring settlements	4 – 5	5,000
					6 – 10	5,000
			D.1.8	Support programs for development of complementary tourist offer in the boundary area (theme parks, gastronomic offer, ethnological collections, archaeological sites, museums)	4 – 5	5,000
					6 – 10	5,000
Budget, BAM:			*Year 1* - / *Year 2* - 20,000 *Year 3* - 20,000 *Year 4* - 50,000 *Year 5* - 30,000		*Year 6* - 30,000 *Year 7* - 30,000 *Year 8* - 30,000 *Year 9* - 30,000 *Year 10* - 30,000	
Participation in costs:			10% Public Enterprise, 40% Canton, 50% international funds			
Time frame:			10 years			
Implementation entity:			Public Enterprise, Canton			
Implementation zones:			Active protection zones, use zones, transition zones			
D2	Recreation	Establish cooperation in planning, education and training of sports and recreational clubs into the Nature Park offer	B.2.1	Establish permanent communication and exchange of information with fishing and hunting clubs, mountaineering clubs, and other NGOs involved in recreational activities in the open, and particularly with responsible inspections	6 – 10	3,000
			D.2.2	Initiate common activities on promotion and attracting anglers (conditionally hunters as well) from the greater region to the lake area (activities, events, competitions)	6 – 10	4,000
			D.2.3	Carry out education of fishermen and hunters, and members of local fishing and hunting clubs	6 – 10	3,000
			D.2.4	Initiate new societies and clubs related to sports and recreation in the open (cycling, photo safari, bird watching, orienteering), carry out education, include these activities into the offer	6 – 10	5,000
Budget, BAM:			*Year 1* - / *Year 2* - / *Year 3* - / *Year 4* - / *Year 5* - /		*Year 6* - 15,000 *Year 7* - 15,000 *Year 8* - 15,000 *Year 9* - 15,000 *Year 10* - 15,000	
Participation in costs:			30% Public Enterprise, 70% Canton			
Time frame:			5 years			
Implementation entity:			Public Enterprise, Canton			
Implementation zones:			Active protection zones, use zones			

D: LAND-USE						
Subtopic		**Objective**	**Activities**		Implement-ation (years)	Action plan budget (BAM / year)
D3	Fisheries	Cooperate on harmonization and monitor implementation of Hutovo Blato fishing requirements	D.3.1	Supervise implementation of the fisheries master plan	4 – 5	/
					6 – 10	/
			D.3.2	Carry out regular inventorisation of commercially interesting fish species	6 – 10	5,000
			D.3.3	Stock indigenous species in line with the ecological requirements	6 – 10	5,000
		Budget, BAM:	*Year 1* - / *Year 2* - / *Year 3* - / *Year 4* - / *Year 5* - /	*Year 6* - 10,000 *Year 7* - 10,000 *Year 8* - 10,000 *Year 9* - 10,000 *Year 10* - 10,000		
		Participation in costs:	100% Canton			
		Time frame:	10 years			
		Implementation entity:	Public Enterprise, Canton, Game fishing clubs			
		Implementation zones:	All zones in the Nature Park			
D4	Hunting	Cooperate on game protection programs	D.4.1	Harmonize hunting requirements with conditions for carrying out other activities within the Nature Park (hunting times, areas of hunting ban because of the visitors, hunting grounds marking, preventing damage caused by game to other space users)	3 – 5	5,000
			D.4.2	Establish permanent communication and exchange of information with the Public Enterprise and hunting clubs in the greater area under consideration	3 – 5	/
					6 – 10	
			D.4.3	Ban and strictly supervise wetland birds hunting	3 – 5	/
					6 – 10	
			D.4.4	Prevent poaching and organize game rescue actions together with hunting clubs and local population	4 – 5	/
					6 – 10	
			D.4.5	Remove poaching structures and facilities together with the hunting club	4 – 5	/
			D.4.6	Remove continuously stray cats and dogs from the hunting grounds	6 – 10	/
			D.4.7	Construct, repair or reconstruct hunting facilities which do not comply with the professional hunting requirements, nature and landscape protection requirements, and requirements of other space users	6 – 10	5,000
			D.4.8	Connect local population with hunting clubs in rendering organized services in hunting tourism	6 – 10	/
			D.4.9	Carry out education of hunters and members of local hunting clubs on sustainable use of the lake area and education of other space users on game conservation conditions	6 – 10	2,000
		Budget, BAM:	*Year 1* - / *Year 2* - / *Year 3* - 5,000 *Year 4* - 5,000 *Year 5* - 5,000	*Year 6* - 7,000 *Year 7* - 7,000 *Year 8* - 7,000 *Year 9* - 7,000 *Year 10* - 7,000		
		Participation in costs:	100% Canton			
		Time frame:	10 years			
		Implementation entity:	Public Enterprise, Canton, hunting societies			
		Implementation zones:	Active protection zones, use zones			
D5	Agriculture	Cooperate on programs for organic production and grazing revival	D.5.1	Prepare a list/register of farmers interested in organic production and grazing revival	3	5,000
			D.5.2	Prepare a program for interconnecting of organic agriculture and the Nature Park, including a solution for products marketing under the name and with a certificate of the Nature Park	4	5,000
			D.5.3	Prepare a program for grazing revival, including a solution for ensuring subsidies	4	10,000
			D.5.4	Create an implementation supervision, product labelling and product/producer certification system	5	10,000
			D.5.5	Initiate and monitor programs, offer technical and professional support in implementation	5	5,000
					6 – 10	5,000
			D.5.6	Initiate a program of cooperation with regional producers and users of organic products	6 – 10	3,000
			D.5.7	Set up a financial support system	6 – 10	5,000

D: LAND-USE						
Subtopic		**Objective**	**Activities**		Implement-ation (years)	Action plan budget (BAM / year)
		Budget, BAM:	*Year 1* - /	*Year 6* - 13,000		
			Year 2 - /	*Year 7* - 13,000		
			Year 3 - 5,000	*Year 8* - 13,000		
			Year 4 - 15,000	*Year 9* - 13,000		
			Year 5 - 15,000	*Year 10* - 13,000		
		Participation in costs:	10% Public Enterprise, 70% Canton, 20% FB&H funds			
		Time frame:	10 years			
		Implementation entity:	Public Enterprise, Canton			
		Implementation zones:	Use zones, transition zones			
D6	Beekeeping	Cooperate on apicultural programs and support the beekeeping development	D.6.1	Determine possible surfaces for setting up of beehives	3	5,000
			D.6.2	Regulate relations with local beekeepers (permits, promotion, label use)	4 – 5	5,000
			D.6.3	Carry out regular inventorisation of used land	6 – 10	5,000
		Budget, BAM:	*Year 1* - /	*Year 6* - 2,000		
			Year 2 - /	*Year 7* - 2,000		
			Year 3 - 5,000	*Year 8* - 2,000		
			Year 4 - 5,000	*Year 9* - 2,000		
			Year 5 - 5,000	*Year 10* - 2,000		
		Participation in costs:	50% Public Enterprise, 50% Canton			
		Time frame:	10 years			
		Implementation entity:	Public Enterprise, Canton			
		Implementation zones:	All zones in the Nature Park			
D7	**Plant collecting**	Cooperate on programs for conservation and sustainable collecting of plants	D.7.1	Prepare list, determine and map areas, periods of growth and approaches, and enter them into GIS database	4 – 5	8,000
			D.7.2	Monitor situation and demand on the market, anticipate pressures	6 – 10	2,000
			D.7.3	Monitor situation by species and seasons, enter changes into GIS database	6 – 10	2,000
			D.7.4	Prepare conservation and sustainable collecting program	4 – 5	5,000
			D.7.5	Support establishment of a society and attract members by offering benefits	4 – 5	3,000
			D.7.6	Set up a strict and intensified system of control during seasons and in important locations	6 – 10	/
		Budget, BAM:	*Year 1* - /	*Year 6* - 4,000		
			Year 2 - /	*Year 7* - 4,000		
			Year 3 - /	*Year 8* - 4,000		
			Year 4 - 16,000	*Year 9* - 4,000		
			Year 5 - 16,000	*Year 10* - 4,000		
		Participation in costs:	50% Public Enterprise, 50% Canton			
		Time frame:	10 years			
		Implementation entity:	Public Enterprise, Canton			
		Implementation zones:	All zones in the Nature Park			
D8	**Forestry**	Cooperate and make agreements on joint programs for revitalization of forest communities along the banks of lakes and tributaries	D.8.1	Establish cooperation with authorities responsible for forest conservation and exploitation, coordinate supervision and forest management requirements	3 – 5 6 – 10	/ /
			D.8.2	Exclude from cutting individual trees or smaller forest areas important as shelter and for survival of individual species in agreement with ornithologists	6 – 10	/
			D.8.3	Maintain good condition of forest edges and clearances	6 – 10	5,000
			D.8.4	Prolong cutting maturity of indigenous tree species	6 – 10	/
			D.8.5	Reduce, avoid and control use of plant protection products, prevent use of genetically modified species in cultivation and conservation of forest land	6 – 10	/
			D.8.6	Determine possible areas for revitalization of wetland pastures and meadows and measures for their revitalisation in agreement with the Public Enterprise and biologists	3 – 8	5,000

D: LAND-USE							
Subtopic		**Objective**	**Activities**			Implement-ation (years)	Action plan budget (BAM / year)
			Budget, BAM:	*Year 1* - /	*Year 6* - 5,000		
				Year 2 - /	*Year 7* - 5,000		
				Year 3 - 5,000	*Year 8* - 5,000		
				Year 4 - 5,000	*Year 9* - 5,000		
				Year 5 - 5,000	*Year 10* - 5,000		
			Participation in costs:	50% Public Enterprise, 50% Canton			
			Time frame:	10 years			
			Implementation entity:	Public Enterprise, Canton			
			Implementation zones:	All zones in the Nature Park			
D9	Historical heritage	Conserve, protect, ensure access and organize visits to historical and archaeological sites	D.8.1	Support archaeological and ethnological studies (sacral buildings, archaeological sites, collections and museums, conservation or religious, ethnological, and cultural heritage)		3 – 5	4,000
						6 – 10	5,000
			D.8.2	Include historical structures in the protected area offer		4 – 5	3,000
			D.8.3	Participate in arrangement of access and organization of visits to individual structures		6 – 10	5,000
			D.8.4	Participate in revitalisation of traditional crafts, cultural and ethnological values		6 – 10	3,000
			Budget, BAM:	*Year 1* - /	*Year 6* - 13,000		
				Year 2 - /	*Year 7* - 13,000		
				Year 3 - 4,000	*Year 8* - 13,000		
				Year 4 - 7,000	*Year 9* - 13,000		
				Year 5 - 7,000	*Year 10* - 13,000		
			Participation in costs:	10% Public Enterprise, 40% Canton, 50% FB&H funds			
			Time frame:	10 years			
			Implementation entity:	Public Enterprise, Canton, FB&H funds			
			Implementation zones:	All zones in the Nature Park			

E: INFRASTRUKTURA							
Subtopic		**Objective**	**Activities**			Implement-ation, (years)	Action plan budget (BAM / year)
E1	Traffic and accesses	Cooperate on improvement of access roads and marking of accesses, set up seasonal tourist connections with local centres	E.1.1	Cooperate with competent authorities in prioritization and determining a method for improvement and maintenance of the Nature Park access roads		2 – 5	/
						6 – 10	/
			E.1.2	Set up visible signposts, boards and other access signs on the roads leading to the Nature Park		3 – 5	2,000
			E.1.3	Initiate seasonal tourist line connections between Čapljina and Metković		4 – 5	3,000
						6 – 10	3,000
			E.1.4	Develop a system for rental of alternative means of transportation for the Nature Park tours		6 – 10	5,000
			E.1.5	Mark and maintain marks at the Nature Park access roads.		6 – 10	1,000
Budget, BAM:			*Year 1* - /		*Year 6* - 9,000		
			Year 2 - /		*Year 7* - 9,000		
			Year 3 - 2,000		*Year 8* - 9,000		
			Year 4 - 5,000		*Year 9* - 9,000		
			Year 5 - 5,000		*Year 10* - 9,000		
Participation in costs:			50% Public Enterprise, 30% Canton, 20% Municipality				
Time frame:			10 years				
Implementation entity:			Public Enterprise, Canton, Municipality				
Implementation zones:			Use zones, transition zones				
E2	Infra-structure for visitors	Prepare educational trails, gazebos, jetties, rest areas, walking and cycling trails, bathing areas, information points	E.2.1	Prepare educational trails and gazeboes		2 – 5	20,000
			E.2.2	Prepare and mark cycling trails and rest areas for cyclers with information points		6 – 7	50,000
			E.2.3	Prepare and mark walking trails and rest areas		6 – 8	50,000
			E.2.4	Prepare bird watching sites (towers with telescopes and binoculars) in particularly interesting points		4 – 5	20,000
Budget, BAM:			*Year 1* - /		*Year 6* - 100,000		
			Year 2 - 20,000		*Year 7* - 100,000		
			Year 3 - 20,000		*Year 8* - 50,000		
			Year 4 - 40,000		*Year 9* - /		
			Year 5 - 40,000		*Year 10* - /		
Participation in costs:			10% Public Enterprise, 10% Canton, 80% international funds				
Time frame:			8 years				
Implementation entity:			Public Enterprise				
Implementation zones:			Active protection zones, use zones				
E3	Protective infrastructure	Cooperate with responsible national and local authorities on improvement of banks, municipal utility infrastructure for waste management, waste waters and landscape improvement	E.3.1	Create, along with competent local authorities, program for construction of municipal utilities lacking in the settlements		4 – 5	10,000
			E.3.2	Encourage and support implementation of planned municipal utility projects and possible new projects complementary with the environmental protection requirements (recycling centres, remediation of septic tanks and slurry pits, biowaste recovery, alternative energy sources and energy efficiency in households, and the like)		6 – 10	10,000
			E.3.3	Monitor and encourage through media and various institutions activities related to remediation of illegal and unengineered dump sites		6 - 10	3,000
Budget, BAM:			*Year 1* - /		*Year 6* - 13,000		
			Year 2 - /		*Year 7* - 13,000		
			Year 3 - /		*Year 8* - 13,000		
			Year 4 - 10,000		*Year 9* - 13,000		
			Year 5 - 10,000		*Year 10* - 13,000		
Participation in costs:			10% Public Enterprise, 50% Canton, 40% Municipality				
Time frame:			10 years				
Implementation entity:			Public Enterprise, Canton, FB&H funds				
Implementation zones			All zones in the Nature Park				

E: INFRASTRUKTURA						
Subtopic		**Objective**	**Activities**		Implement-ation, (years)	Action plan budget (BAM / year)
E4	Infra-structure for research and monitoring	Set up a system of continuous monitoring, recording, storing and display of basic hydrological, meteorological, physico-chemical and biological indicators of the area condition, including continuous CCTV supervision of the area	E.4.1	Create a comprehensive concept of continuous monitoring and recording system for hydrological, meteorological, and ecological parameters for Hutovo Blato	3	10,000
			E.4.2	Create a CCTV supervision system for key locations (sites, interconnection, data recording, submittal and storing method)	4 – 5	30,000
			E.4.3	Initiate procedures for obtaining of funds needed for setting up of the monitoring system	5	20,000
			E.4.4	Enable continuous access to the key data and area records made by CCTV system on the Nature Park web site	6 – 10	5,000
Budget, BAM:			*Year 1* - / *Year 2* - / *Year 3* - 10,000 *Year 4* - 30,000 *Year 5* - 50,000	*Year 6* - 5,000 *Year 7* - 5,000 *Year 8* - 5,000 *Year 9* - 5,000 *Year 10* - 5,000		
Participation in costs:			30% Public Enterprise, 20% FB&H funds, 50% international funds			
Time frame:			10 years			
Implementation entity:			Public Enterprise, Canton			
Implementation zones:			All zones in the Nature Park			

F: EXTERNAL IMPACTS ELIMINATION						
Subtopic		**Objective**	**Activities**		Implement-ation, (years)	Action plan budget (BAM / year)
F1	Water regime	Cooperate with competent state, Federation, cantonal, municipal authorities, participate in processes of interstate and inter-entity cooperation on projects creating or reducing pressures on the quantitative status of waters	F.1.1	Determine boundary conditions for allowable water regime changes in water bodies belonging to or interconnected with the Hutovo Blato water bodies, depending on a season and other significant current or previous conditions (meteorological, hydrological, vegetation, operational)	2 – 5	20,000
			F.1.2	Support all programs, plans and actions affecting decision-making on water management systems, power generation and environmental protection which are related to maintaining the water regime in the greater Hutovo Blato catchment area	6 – 10	5,000
			F.1.3	Active participation in all procedures regarding the adoption of projects in the „Upper horizons“ with the goal of setting conditions which will prevent further deterioration of the Hutovo blato Nature Park. "	1 – 10	-
			F.1.4	Begin cooperation with the HPP Capljina on determining compensations due to the adverse effects of the HPP on the Parks water regime (defining impacts, evaluation of negative impacts, proposal of compensations, negotiation)	1 - 10	-
Budget, BAM:			*Year 1* - / *Year 2* - 20,000 *Year 3* - 20,000 *Year 4* - 20,000 *Year 5* - 20,000	*Year 6* - 5,000 *Year 7* - 5,000 *Year 8* - 5,000 *Year 9* - 5,000 *Year 10* - 5,000		
Participation in costs:			100% Agency			
Time frame:			10 years			
Implementation entity:			Public Enterprise, Agency for Watershed of Adriatic Sea Mostar			
Implementation zones:			All zones			
F2	Water protection	Cooperate with competent state, Federation, cantonal, municipal authorities, participate in processes of interstate and inter-entity cooperation on projects creating or reducing pressures on the qualitative status of waters	F.2.1	Determine boundary conditions for allowable ecological status changes in water bodies belonging to or interconnected with the Hutovo Blato water bodies, depending on a season and other significant current or previous conditions (meteorological, hydrological, vegetation, operational, ecological, farming)	2 – 5	20,000
			F.2.2	Encourage and support all programs, plans and actions affecting decision-making on water management systems, power generation, agriculture and environmental protection which are related to maintaining the water quality in the greater Hutovo Blato catchment area	6 – 10	5,000
Budget, BAM:			*Year 1* - / *Year 2* - 20,000 *Year 3* - 20,000 *Year 4* - 20,000 *Year 5* - 20,000	*Year 6* - 5,000 *Year 7* - 5,000 *Year 8* - 5,000 *Year 9* - 5,000 *Year 10* - 5,000		
Participation in costs:			100% Agency			
Time frame:			10 years			
Implementation entity:			Public Enterprise, Agency for Watershed of Adriatic Sea Mostar			
Implementation zones:			All zones			
F3	Environmental protection in buffer zone	Cooperate with competent cantonal and municipal authorities, participate in processes and projects creating or reducing pressures on the quantitative status of waters	F.3.1	Determine boundary conditions for allowable impacts of municipal utility and business activities in the Hutovo Blato buffer zone, depending on a season and other significant current or previous conditions (meteorological, vegetation, ecological, farming)	2 – 5	10,000
			F.3.2	Encourage and support all programs, plans and actions affecting decision-making on municipal utility and other land-use system in the buffer zone, which are related to conservation the water and land quality and biodiversity of Hutovo Blato	6 – 10	3,000
Budget, BAM:			*Year 1* - / *Year 2* - 10,000 *Year 3* - 10,000 *Year 4* - 10,000 *Year 5* - 10,000	*Year 6* - 3,000 *Year 7* - 3,000 *Year 8* - 3,000 *Year 9* - 3,000 *Year 10* - 3,000		

F: EXTERNAL IMPACTS ELIMINATION						
Subtopic		**Objective**		**Activities**	Implement-ation, (years)	Action plan budget (BAM / year)
		Participation in costs:	100% Canton			
		Time frame:	10 years			
		Implementation entity:	Public Enterprise, Canton			
		Implementation zones	Transition zones			
F4	Landscape in greater region	Cooperate with competent cantonal and municipal authorities, participate in processes and projects creating or reducing pressures on the landscape	F.4.1	Determine critical points and section of degraded landscape in the Nature Park access areas and its catchment area significantly affecting the impression the Nature Park has on its visitors	4 – 5	10,000
			F.4.2	Encourage and support all plans and actions affecting decision-making on land-use planning. environmental protection and municipal utility systems, which are related to preservation and remediation of degraded landscapes important for the Nature Park	6 – 10	2,000
		Budget, BAM:	*Year 1* - / *Year 2* - / *Year 3* - / *Year 4* - 10,000 *Year 5* - 10,000	*Year 6* - 2,000 *Year 7* - 2,000 *Year 8* - 2,000 *Year 9* - 2,000 *Year 10* - 2,000		
		Participation in costs:	100% Canton			
		Time frame:	10 years			
		Implementation entity:	Public Enterprise, Canton			
		Implementation zones:	Transition zones			

4.3 COSTS AND FUNDING

The Management Plan implementation costs are shown below in total amounts and by topics, as well as by years of implementation, shown separately for the Public Enterprise costs and the ones covered from other planned funding sources.

It is assumed that majority of costs will be covered by other stakeholders/space users whose interest complies with the interest to protect the Hutovo Blato Nature Park. It is necessary the Canton Environmental Protection Fund monitors the realization dynamic of the Management Plan.

It should be noted that this overview is based on estimated costs of individual actions given by action plans described in the previous section of the Management Plan. However, these are only estimates to be tailored to the market conditions in the future, elaboration of individual actions and actual financing capacities.

Table 4.1: Management costs by years and total cost by action plans

A: EFFICIENT NATURE PARK MANAGMENT, ADMINISTRATION AND SUSTAINABILITY					
Action plan	**Year**	**Budget (BAM) per year**	**Cost**		**Total (BAM)**
A1	1	0	Year 1 – 5	111.000	**231.000**
	2	18.000			
	3	36.000			
	4	36.000			
	5	21.000			
	6	24.000	Year 6 – 10	120.000	
	7	24.000			
	8	24.000			
	9	24.000			
	10	24.000			
A2	1	3.000	Year 1 – 5	175.000	**295.000**
	2	53.000			
	3	53.000			
	4	33.000			
	5	33.000			
	6	24.000	Year 6 – 10	120.000	
	7	24.000			
	8	24.000			
	9	24.000			
	10	24.000			
A3	1	0	Year 1 – 5	130.000	**180.000**
	2	30.000			
	3	30.000			
	4	45.000			
	5	25.000			
	6	10.000	Year 6 – 10	50.000	
	7	10.000			
	8	10.000			
	9	10.000			
	10	10.000			
A4	1	0	Year 1 – 5	110.000	**160.000**
	2	10.000			
	3	30.000			
	4	40.000			
	5	30.000			
	6	10.000	Year 6 – 10	50.000	
	7	10.000			
	8	10.000			
	9	10.000			
	10	10.000			
A5	1	0	Year 1 – 5	212.000	**302.000**
	2	28.000			
	3	38.000			
	4	78.000			
	5	68.000			
	6	18.000	Year 6–10	90.000	
	7	18.000			
	8	18.000			
	9	18.000			
	10	18.000			
Summary management costs through 10 years					**1,230,000**

Table 4.2: Funding sources and participation by action plans through 10 years.

Action plan	Public Enterprise	Canton	FB&H funds	International funds	Agency	Municip ality	Total
	Participation in funding						
A1	5 %	5 %	30 %	60 %	-	-	**231.000**
Amount	**11.550**	**11.550**	**69.300**	**138.600**			
A2	10%	30%	20%	40%	-	-	**195.000**
Amount	**19.500**	**58.500**	**39.000**	**78.000**			
A3	20%	40%	-	50%	-	-	**180.000**
Amount	**36.000**	**72.000**		**90.000**			
A4	20%	50%	-	30%	-	-	**160.000**
Amount	**32.000**	**80.000**		**48.000**			
A5	80%	-	20%		-	-	**302.000**
Amount	**241.600**		**60.400**				

Table 4.3: Biodiversity protection costs by years and total cost by action plans

B: BIODIVERSITY PROTECTION (FLORA, FAUNA I ECOSYSTEMS)					
Action plan	**Year**	**Budget (BAM) per year**	**Cost**		**Total (BAM)**
B1	1	0	Year 1 – 5	245,000	**295,000**
	2	0			
	3	65,000			
	4	115,000			
	5	65,000			
	6	10,000	Year 6 – 10	50,000	
	7	10,000			
	8	10,000			
	9	10,000			
	10	10,000			
B2	1	0	Year 1 – 5	290,000	**290,000**
	2	0			
	3	25,000			
	4	145,000			
	5	120,000			
	6	0	Year 6 – 10	0	
	7	0			
	8	0			
	9	0			
	10	0			
B3	1	0	Year 1 – 5	95,000	**120,000**
	2	20,000			
	3	45,000			
	4	15,000			
	5	15,000			
	6	5,000	Year 6 – 10	25,000	
	7	5,000			
	8	5,000			
	9	5,000			
	10	5,000			
B4	1	0	Year 1 – 5	90,000	**140,000**
	2	0			
	3	20,000			
	4	45,000			
	5	25,000			
	6	10,000	Year 6 – 10	50,000	
	7	10,000			
	8	10,000			
	9	10,000			
	10	10,000			
B5	1	0	Year 1 – 5	80,000	**180,000**
	2	0			
	3	10,000			
	4	40,000			
	5	30,000			
	6	20,000	Year 6 – 10	100,000	
	7	20,000			
	8	20,000			
	9	20,000			
	10	20,000			
B6	1	0	Year 1 – 5	40,000	**70,000**
	2	0			
	3	0			
	4	20,000			
	5	20,000			

	6	6,000	Year 6 – 10	30,000	
	7	6,000			
	8	6,000			
	9	6,000			
	10	6,000			
B7	1	0	Year 1 – 5	40,000	**70,000**
	2	0			
	3	0			
	4	20,000			
	5	20,000			
	6	6,000	Year 6 – 10	30,000	
	7	6,000			
	8	6,000			
	9	6,000			
	10	6,000			
B8	1	0	Year 1 – 5	60,000	**190,000**
	2	0			
	3	20,000			
	4	20,000			
	5	20,000			
	6	26,000	Year 6 – 10	130,000	
	7	26,000			
	8	26,000			
	9	26,000			
	10	26,000			
B9	1	0	Year 1 – 5	20,000	**65,000**
	2	0			
	3	0			
	4	10,000			
	5	10,000			
	6	21,000	Year 6 – 10	45,000	
	7	21,000			
	8	1,000			
	9	1,000			
	10	1,000			
B10	1	0	Year 1 – 5	60,000	**110,000**
	2	0			
	3	20,000			
	4	20,000			
	5	20,000			
	6	10,000	Year 6 – 10	50,000	
	7	10,000			
	8	10,000			
	9	10,000			
	10	10,000			
Summary biodiversity protection costs through 10 years					**1,530,000**

Table 4.4 : Funding sources and participation by action plans through 10 years.

Action plan	Public Enterprise	Canton	FB&H funds	International funds	Agency	Municipality	Total
	Participation in funding						
B1	10%	10%	20%	60%			**295,000**
Amount	**29.500**	**29.500**	**59.000**	**177.000**			
B2	10%	10%	20%	60%			**290,000**
Amount	**29.000**	**29.000**	**58.000**	**174.000**			
B3	20%	30%	50%				**120,000**
Amount	**24.000**	**36.000**	**60.000**				
B4	10%	20%	20%	50%			**140,000**
Amount	**14.000**	**28.000**	**28.000**	**70.000**			
B5	20%	30%	20%	30%			**180,000**
Amount	**36.000**	**54.000**	**36.000**	**54.000**			
B6	20%	30%	20%	30%			**70,000**
Amount	**14.000**	**21.000**	**14.000**	**21.000**			
B7	20%	30%	20%	30%			**70,000**
Amount	**14.000**	**21.000**	**14.000**	**21.000**			
B8	20%	30%	20%	30%			**190,000**
Amount	**38.000**	**57.000**	**38.000**	**57.000**			
B9	20%	30%	20%	30%			**65,000**
Amount	**13.000**	**19.500**	**13.000**	**19.500**			
B10	20%	30%	20%	30%			**110,000**
Amount	**22.000**	**33.000**	**22.000**	**33.000**			

Table 4,5: Education costs by years and total cost by action plans

C: EDUCATION AND LOCAL POPULATION					
Action plan	**Year**	**Budget (BAM) per year**	**Cost, year 1-5 Cost, year 6-10**		**Total (BAM)**
C1	1	0	Year 1 – 5	40,000	**90,000**
	2	15,000			
	3	15,000			
	4	5,000			
	5	5,000			
	6	10,000	Year 6 – 10	50,000	
	7	10,000			
	8	10,000			
	9	10,000			
	10	10,000			
C2	1	0	Year 1 – 5	40,000	**75,000**
	2	0			
	3	0			
	4	20,000			
	5	20,000			
	6	7,000	Year 6 – 10	55,000	
	7	7,000			
	8	7,000			
	9	7,000			
	10	7,000			
C3	1	0	Year 1 – 5	55,000	**115,000**
	2	0			
	3	0			
	4	10,000			
	5	45,000			
	6	12,000	Year 6 – 10	60,000	
	7	12,000			
	8	12,000			
	9	12,000			
	10	12,000			
C4	1	0	Year 1 – 5	40,000	**165,000**
	2	5,000			
	3	10,000			
	4	15,000			
	5	10,000			
	6	25,000	Year 6 – 10	125,000	
	7	55,000			
	8	35,000			
	9	5,000			
	10	5,000			
C5	1	0	Year 1 – 5	159,000	**284,000**
	2	0			
	3	43,000			
	4	63,000			
	5	53,000			
	6	25,000	Year 6 – 10	125,000	
	7	25,000			
	8	25,000			
	9	25,000			
	10	25,000			
C6	1	0	Year 1 – 5	69,000	**279,000**
	2	0			
	3	3,000			
	4	33,000			
	5	33,000			
	6	42,000	Year 6 – 10	210,000	
	7	42,000			
	8	42,000			
	9	42,000			
	10	42,000			
Summary education costs through 10 years					**1,008,000**

Table 4.6: Funding sources and participation by action plans through 10 years

Action plan	Public Enterprise	Canton	FB&H funds	International funds	Agency	Municip ality	Total
	Participation in funding						
C1	30%	30%		40%			**90,000**
Amount	**27,000**	**27,000**		**36,000**			
C2	20%	40%		40%			**75,000**
Amount	**15,000**	**30,000**		**30,000**			
C3	10%	60%	30%				**115,000**
Amount	**11,500**	**69,000**	**34,500**				
C4	10%	20%			70%		**165,000**
Amount	**16,500**	**33,000**			**115,500**		
C5	20%	30%	30%	20%			**284,000**
Amount	**56,800**	**85,200**	**85,200**	**56,800**			
C6	10%	40%		50%			**279,000**
Amount	**27,900**	**111,600**		**139,500**			

Table 4.7: Land-use management costs by years and total cost by action plans

D: LAND-USE					
Action plan	**Year**	**Budget (BAM) per year**	**Cost, year 1-5 Cost, year 6-10**		**Total (BAM)**
D1	1	0	Year 1 – 5	120,000	**270,000**
	2	20,000			
	3	20,000			
	4	50,000			
	5	30,000			
	6	30,000	Year 6 – 10	150,000	
	7	30,000			
	8	30,000			
	9	30,000			
	10	30,000			
D2	1	0	Year 1 – 5	0	**75,000**
	2	0			
	3	0			
	4	0			
	5	0			
	6	15,000	Year 6 – 10	75,000	
	7	15,000			
	8	15,000			
	9	15,000			
	10	15,000			
D3	1	0	Year 1 – 5	0	**50,000**
	2	0			
	3	0			
	4	0			
	5	0			
	6	10,000	Year 6 – 10	50,000	
	7	10,000			
	8	10,000			
	9	10,000			
	10	10,000			
D4	1	0	Year 1 – 5	15,000	**50,000**
	2	0			
	3	5,000			
	4	5,000			
	5	5,000			
	6	7,000	Year 6 – 10	35,000	
	7	7,000			
	8	7,000			
	9	7,000			
	10	7,000			
D5	1	0	Year 1 – 5	35,000	**100,000**
	2	0			
	3	5,000			
	4	15,000			
	5	15,000			
	6	13,000	Year 6 – 10	65,000	
	7	13,000			
	8	13,000			
	9	13,000			
	10	13,000			

D6	1	0	Year 1 – 5	15,000	**25,000**
	2	0			
	3	5,000			
	4	5,000			
	5	5,000			
	6	2,000	Year 6 – 10	10,000	
	7	2,000			
	8	2,000			
	9	2,000			
	10	2,000			
D7	1	0	Year 1 – 5	32,000	**52,000**
	2	0			
	3	0			
	4	16,000			
	5	16,000			
	6	4,000	Year 6 – 10	20,000	
	7	4,000			
	8	4,000			
	9	4,000			
	10	4,000			
D8	1	0	Year 1 – 5	15,000	**40,000**
	2	0			
	3	5,000			
	4	5,000			
	5	5,000			
	6	5,000	Year 6 – 10	25,000	
	7	5,000			
	8	5,000			
	9	5,000			
	10	5,000			
D9	1	0	Year 1 – 5	18,000	**83,000**
	2	0			
	3	4,000			
	4	7,000			
	5	7,000			
	6	13,000	Year 6 – 10	65,000	
	7	13,000			
	8	13,000			
	9	13,000			
	10	13,000			
Summary land-use management costs through 10 years					**745,000**

Table 4.8: Funding sources and participation by action plans through 10 years.

Action plan	Public Enterprise	Canton	FB&H funds	International funds	Agency	Municip ality	Total
	Participation in funding						
D1	10%	40%		50%			**270,000**
Amount	**27,000**	**108,000**		**135,000**			
D2	30%	70%					**75,000**
Amount	**22,500**	**52,500**					
D3		100%					**50,000**
Amount		**50,000**					
D4		100%					**50,000**
Amount		**50,000**					
D5	10%	70%	20%				**100,000**
Amount	**10,000**	**70,000**	**20,000**				
D6	50%	50%					**25,000**
Amount	**12,500**	**12,500**					
D7	50%	50%					**52,000**
Amount	**26,000**	**26,000**					
D8	50%	50%					**40,000**
Amount	**20,000**	**20,000**					
D9	10%	40%	50%				**83,000**
Amount	**8,300**	**33,200**	**41,500**				

Table 4.9: Infrastructure costs by years and total cost by action plans

E: INFRASTRUCTURE					
Action plan	**Year**	**Budget (BAM) per year**	**Cost, year 1-5 Cost, year 6-10**		**Total (BAM)**
E1	1	0	Year 1 – 5	12,000	**57,000**
	2	0			
	3	2,000			
	4	5,000			
	5	5,000			
	6	9,000	Year 6 – 10	45,000	
	7	9,000			
	8	9,000			
	9	9,000			
	10	9,000			
E2	1	0	Year 1 – 5	120,000	**370,000**
	2	20,000			
	3	20,000			
	4	40,000			
	5	40,000			
	6	100,000	Year 6 – 10	250,000	
	7	100,000			
	8	50,000			
	9	0			
	10	0			
E3	1	0	Year 1 – 5	20,000	**85,000**
	2	0			
	3	0			
	4	10,000			
	5	10,000			
	6	13,000	Year 6 – 10	65,000	
	7	13,000			
	8	13,000			
	9	13,000			
	10	13,000			
E4	1	0	Year 1 – 5	90,000	**115,000**
	2	0			
	3	10,000			
	4	30,000			
	5	50,000			
	6	5,000	Year 6 – 10	25,000	
	7	5,000			
	8	5,000			
	9	5,000			
	10	5,000			
Summary infrastructure costs through 10 years					**627,000**

Table 4.10: Funding sources and participation by action plans through 10 years.

Action plan	**Public Enterprise**	**Canton**	**FB&H funds**	**International funds**	**Agency**	**Municip ality**	**Total**
	Participation in funding						
E1	50%	30%				20%	**57,000**
Amount	**28,500**	**17,100**				**11,400**	
E2	10%	10%		80%			**370,000**
Amount	**37,000**	**37,000**		**296,000**			
E3	10%	50%				40%	**85,000**
Amount	**8,500**	**42,500**				**34,000**	
E4	30%		20%	50%			**115,000**
Amount	**34,500**		**23,000**	**57,500**			

Table 4.11: External impacts elimination costs by years and total cost by action plans

F: EXTERNAL IMPACTS ELIMINATION					
Action plan	**Year**	**Budget (BAM) per year**	**Cost, year 1-5 Cost, year 6-10**		**Total (BAM)**
F1	1	0	Year 1 – 5	80,000	**105,000**
	2	20,000			
	3	20,000			
	4	20,000			
	5	20,000			
	6	5,000	Year 6 – 10	25,000	
	7	5,000			
	8	5,000			
	9	5,000			
	10	5,000			
F2	1	0	Year 1 – 5	80,000	**105,000**
	2	20,000			
	3	20,000			
	4	20,000			
	5	20,000			
	6	5,000	Year 6 – 10	25,000	
	7	5,000			
	8	5,000			
	9	5,000			
	10	5,000			
F3	1	0	Year 1 – 5	40,000	**55,000**
	2	10,000			
	3	10,000			
	4	10,000			
	5	10,000			
	6	3,000	Year 6 – 10	15,000	
	7	3,000			
	8	3,000			
	9	3,000			
	10	3,000			
F4	1	0	Year 1 – 5	20,000	**30,000**
	2	0			
	3	0			
	4	10,000			
	5	10,000			
	6	2,000	Year 6 – 10	10,000	
	7	2,000			
	8	2,000			
	9	2,000			
	10	2,000			
Summary external impacts elimination costs through 10 years					**295,000**

Table 4.12: Funding sources and participation by action plans through 10 years.

Action plan	**Public Enterprise**	**Canton**	**FB&H funds**	**International funds**	**Agency**	**Municip ality**	**Total**
	Participation in funding						
F1					100%		**105,000**
Amount					**105,000**		
F2					100%		**105,000**
Amount					**105,000**		
F3		100%					**55,000**
Amount		**55,000**					
F4		100%					**30,000**
Amount		**30,000**					

4.4 MONITORING AND EVALUATION

4.4.1 Management Plan Implementation Monitoring and Evaluation

The Management Plan implementation monitoring aims at ensuring that any deviations from the implementation of planned measures and results related to achieving the area conservation and protection objectives and goals are noticed on time. Monitoring also ensures gathering of experience needed for evaluation and corrections of the Management Plan.

The measures for monitoring of the management effects consist of collection of data on indicators which are used to prove implementation of specific measures taken in order to realize objectives by determined topics. Annual evaluation of indicators is used for preparation of the Public Enterprise annual work program, and for revision of the Management Plan after the first five years of management.

The Management Effectiveness Monitoring Tool prepared by the WWF International in 2003, which deals with monitoring and reporting on progress in protected areas management could be used for management effectiveness monitoring in our case as well. This document is one of a number of management effectiveness monitoring tools developed according to the Framework for Evaluating Management Effectiveness by the World Commission on Protected Areas (WCPA) which offers guidance for development of the evaluation system and standards for evaluation and reporting. This tool is used to help managers in monitoring progress of fulfilling their commitments in protected areas under the Convention on Biological Diversity and Ramsar Convention on Wetlands. All GEF projects for protected areas have to apply this tool three times during the project cycle.

Therefore, considering all possible indicators used to control implementation of the measures taken to achieve the Nature Park management objectives, the major indicators used for monitoring of the Management Plan implementation effectiveness are:

- monitoring of visitor management (indicator of successful achievement of objectives (“Efficient Nature Park Management” and “Land-use Sustainability”)

- monitoring of biodiversity (indictor of successful achievement of objectives „Biodiversity Protection“,(“Efficient Nature Park Management”, “Land-use Sustainability” and “External Impacts Elimination“).

4.4.2 Monitoring of Visitors

Key principles that need to be taken into consideration when developing an effective visitor management monitoring system are given below. The principles are based on numerous studies of visitor monitoring results for the protected areas and the best practice.

Table 4.13: Key principles for establishing a visitor monitoring system in protected areas

Visitor monitoring system	
Principle 1	Develop partnerships with government authorities and agencies, business sector and general public. This type of partnership can improve relations with stakeholders and significantly reduce monitoring costs.
Principle 2	Create and use the visitor monitoring system based on clear objectives. Understanding why the data is needed and what it will be used for is crucial for setting up of a successful system.
Principle 3	Make data available to all management levels and other stakeholders. If data is not available to the personnel and stakeholders, its potential value will not be harnessed.
Principle 4	When preparing new or improving the existing visitor management system, it should be tested on a smaller area in order to limit expensive and time-consuming modifications.
Principle 5	Create and use adjustable systems for data collection in different areas.
Principle 6	Consider simple and innovative data collection techniques that can be used either individually or combined with other techniques. It needs to be recognized that each area has different possibilities and limitations regarding visitor data collection.
Principle 7	Use sufficient and representative sample. Collection of accurate data relies on selection of an adequate visitor sample. Data which is not representative will not be used as grounds for decision-making.
Principle 8	Use systematic approach and regular collection of visitor data. Monitoring of changes in visitor characteristics is of greater value than one-off studies/researches.
Principle 9	Ensure that collected data is temporarily and spatially determined. Spatial and temporal components increase benefits the visitor data has in protected area management planning.
Principle 10	Use limited resources sensibly. Only accurate data may adequately help in the decision-making process.
Principle 11	Strive to standardize the monitoring procedure on the regional and national level. Comparison and synthesis of similar data is useful in many ways. Standardisation of data contributes to reliability of conclusions based on data comparison and synthesis.
Principle 12	Create and use key questions in visitor surveys. Surveying of visitors needs to include questions on all protected areas, as well as questions specific for each particular area. Such approach ensures flexibility and, at the same time, standardisation of study/research.
Principle 13	Use the existing and secondary data. Possibility to use these data needs to be investigated into prior to introducing the monitoring system or starting with collection of new area-specific data.
Principle 14	Aim at data quality rather than quantity. Resources need to be focused on collecting accurate data rather than on regular collection of lower quality data.
Data storing	
Principle 15	Ensure that data is accurate before its storing and use. The entered data needs to be checked before use. Control is a part of the system maintenance and it is necessary for ensuring data consistency as regards data entry and storing. Such maintenance is also useful for data use efficiency.
Principle 16	Georeference data so that it can be used on spatial databases and similar applications. Spatial management and use of data collected for this purpose might enable visual presentation of a number of visitors, their movement in the park and might significantly help in visitor management. Such spatial dataset might be combined with biophysical data (e.g. vegetation maps) in order to make integrated management of protected areas stronger.
Principle 17	Create and maintain databases so that they are accessible to the users for data entry, storing and use. Such approach saves time needed by the personnel for data entry and use, reduces number of mistakes, and increases options for data use in decision-making.
Principle 18	Guarantee data confidentiality. Some data may be too sensitive to be made public, thus they require security measures and personnel training.

Principle 19	Present resulting data so that they are readily used as decision-making grounds. The databases should enable that the data be defined and presented in a way which gives a simple and accurate ground for decision-making.
Data use	
Principle 20	Use existing visitor data for various applications. Avoid doubling of data collecting activities.
Principle 21	Collect data to increase visitor understanding, perception, motivation and attitudes. Good management of protected areas is based on research of not only visitor numbers but also of visitor attitudes and their opinions. Such information is needed in order to respond to expectations of present and possible land uses. It is also necessary to introduce demand and supply management as regards recreation and tourism in protected areas.
Principle 22	Establish and maintain firm interrelation between data collection and use. The data use method should be in line with the data collection method. In case data use changes, it is necessary to change the data collection methods as well.

Based on these principles, the most suitable visitor management system for the Hutovo Blato Nature Park is considered to be introduction of indirect records made based on a system of "small sponsorships". Instead of introducing visitation control and payment of tickets, the indirect system of receipts/certificates of sponsorship of selected endangered (plant and animal) species living in the protected area is used. A system would be completely voluntary, the certificates would be sold at the entrance into the protected area, ordered from the Public Enterprise or sold in specially selected locations. Species (selected taxa whose protection is sponsored), categories (value of sponsorship) and number of sold certificates would be recorded and used in processing of visitation monitoring data.

This system asks for the Public Enterprise capacity building (information system, education of personnel, generating own income), and implementation of all the measures related to the area management (research, promotion, education and management of visitors). So, if these measures prove to make results through years (increase in sponsorships), and become a valuable source of information for the Hutovo Blato management, such approach could be applied to other similar areas in the region.

4.4.3 Monitoring of Biodiversity

Monitoring of biological diversity is related, most of all, to achieving of specific biodiversity objectives, namely to conservation of aquatic and wetland ecosystems, conservation of forest ecosystems, and management of the area (research and status monitoring), and indirectly to achieving the objectives related to the Hutovo Blato use (sustainable use of space for agriculture, forestry, hunting, fisheries and tourism) and the objectives related to removal of unfavourable impacts (mitigation of unfavourable impacts of local population and infrastructure on the Hutovo Blato ecological status).

In area under consideration, it is necessary to carry out systematic and continuous monitoring of changes in status on which biological diversity of the protected area depends by:

- establishing continuous status monitoring of all major biological components of the protected areas (by habitats and indicator species) through prospecting and mapping of all represented habitats (using the detailed habitat map as a background document), and monitoring population of individual indicator species (using background documents collected during preparatory investigations),

- establishing separate continuous status monitoring and supervision of the remaining meadow ecosystems, various successions, indicator species of ichthyofauna and ornithofauna, and monitoring of the results of removal of macrovegetation and foreign species and reintroduction of indigenous species (primarily fish), based on recommendations of scientists,

- establishing monitoring of water status as regards soil and water contamination in the greater area under consideration, in particular monitoring of status of parameters responsible for eutrophication processes and those related to agricultural activities within the Hutovo Blato catchment area.

To mitigate threats to biodiversity, it is recommended to apply A Guide to Threat Reduction Assessment for Conservation, prepared by the Biodiversity Support Program (BSP) in 2001. It is a practical tool for preparation and implementation of projects for protected areas. The document offers guidelines for application of the Threat Reduction Assessment (TRA) model based on project success indicators regarding mitigation of threats to conservation in a specific area, i.e. the Threat Reduction Assessment (TRA) Index.

Although this document does not recommend that the traditional biological approach to the project impact be abandoned, use of this Guideline helps to establish a more simple and cost-efficient approach to this issue.

4.5 COOPERATION WITH OTHER SPACE USERS

Cooperation with local authorities (Herzegovina-Neretva Canton and Čapljina and Stolac Municipalities) has priority in a system of cooperation with other users of the Hutovo Blato space.

Cooperation with the authorities from the Federation of Bosnia and Herzegovina, and particularly with competent authorities, with the Agency for Watershed of Adriatic Sea and the Environmental Protection Fund ensures realistic sources of funds for implementation of the action plans in the initial stage of the area management, while cooperation with tourist agencies and local fishing and hunting clubs ensures money for upgrading of the system.

Cooperation with local population and NGOs is beneficial because of their participation in the Nature Park preservation and protection. Cooperation with power generation sector and farmers is useful and needed in the same sense.

It is important to establish cooperation with scientific and educational institutions (institutes, universities, schools), in order to conduct research and monitor status of Hutovo Blato, as well as to educate younger generations through their participation in scientific projects and raising their awareness about the need to protect nature.

All these actors could be considered as stakeholders in implementation of the Hutovo Blato Nature Park Management Plan. List of these and other stakeholders could be used as the grounds for creation of the Public Enterprise database containing names and addresses of all stakeholders that need to be involved in specific activities related to the implementation of this Management Plan.

4.6 ECOSYSTEM APPROACH AND ADAPTIVE MANAGEMENT

The ecosystem approach is a strategy based on integrated management of soil, water and living resources which promotes conservation, sustainable use and equitable sharing of benefits. Use of this approach shall help to achieve balance of conservation, sustainable use and equitable sharing of benefits arising out of the utilization of resources, which are three

objectives of the Convention on Biological diversity (CBD). The ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organization, which encompass the essential structure, processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of many ecosystems. The Convention on Biological Diversity supports application and implementation of this approach in and outside the protected areas alike. The ecosystem approach consists of five points and determines particular spatial units, but can refer to any functioning unit, depending on the issues attempted to be resolved by this approach.

The ecosystem approach requires the so called “adaptive management” to deal with the complex and dynamic nature of ecosystems and the absence of complete knowledge or understanding of their functioning. Ecosystem processes are often non-linear, and the outcome of such processes are comparatively uncertain. Management must be adaptive in order to be able to respond to such uncertainties and respond to them. The ecosystem approach does not preclude other management approaches, but could, rather, integrate all approaches and other methodologies to deal with complex situations.

Ecosystem processes are complex, and their level of uncertainty is increased by anthropogenic impacts, which need to be better understood. Therefore, ecosystem management must involve a learning process, which helps to adapt methodologies and practices to the ways in which these systems are being managed and monitored. Implementation programmes should be designed to adjust to the unexpected, rather than to act on the basis of a belief in certainties. Ecosystem management needs to recognize the diversity of social and cultural factors affecting natural-resource use. Similarly, there is a need for flexibility in policy-making and implementation. Long-term, inflexible decisions are likely to be inadequate or even destructive. Ecosystem management should be envisaged as a long-term experiment that builds on its results as it progresses. This “learning-by-doing” will also serve as an important source of information to gain knowledge of how best to monitor the results of management and evaluate whether established goals are being attained.

4.7 TRANSBOUNDARY COOPERATION

According to Article 134 of the Nature Protection Act (Official Gazette of FB&H 66/13), the areas of protected natural value can establish transboundary cooperation with protected areas in other states. The Management Plan and measures for the protected area with transboundary relations are determined upon agreement between the competent authorities of a state in which the transboundary part of the natural value is situated.

The Hutovo Blato Nature Park, for which this Management Plan is prepared, is only a part of the Neretva Delta belonging to the Republic of Croatia. The Delta part situated in the territory of the Republic of Croatia has several protected areas, but the complete Delta area situated in the Republic of Croatia is on the Ramsar list of wetland sites since it ensures survival of a large number of endangered species of international importance.

The part of the Delta in the Croatian territory was entered on the Ramsar list in 1993. A part of the Delta situated in Bosnia and Herzegovina has a status of the protected area because of the Hutovo Blato Nature Park, and has been on the Ramsar list since 24 September 2001, after being recognized as a wetland of international importance. Therefore, this is a unique case of a Ramsar site which is an integral natural entity divided between two states.

Therefore, it is important for the Public Enterprise Nature Park Hutovo Blato to establish cooperation with the relevant authority in the Dubrovnik-Neretva County in Croatia which is responsible for management of the Delta protected areas, as well as with the relevant national authorities in the Republic of Croatia (Environmental and Nature Protection Ministry, State Institute for Nature Protection). The cooperation should be based on:

- joint projects for status monitoring of endangered species to restitution of wetland habitats
- joint promotion in local and international markets
- implementation of consistent management of similar habitats
- exchange of information on protected area management
- organization of meetings and exhibitions.

Since quantity and quality of water is very important for survival of the Delta wetland habitats, and the natural water regime of the Neretva River has been modified considerably, it is of utmost importance that the Public Enterprise Nature Park Hutovo Blato cooperates with the relevant Croatian authorities in drafting, enactment and implementation of water resources management plans and management plans for the upstream part of the Neretva and Trebišnjica river basin.

In addition to the protected areas in the Neretva Delta, the Public Enterprise should establish cooperation with public enterprises managing other protected areas in Croatia, particularly similar protected wetland areas, such as Lake Vrana Nature Park and Kopački Rit Nature Park, but also with other similar areas in the region (Montenegro, Macedonia). The cooperation should be based on:

- coordination of monitoring status and scientific research studies
- implementation of consistent management of the same and similar shared wetland habitats and natural values
- protection of individual species with large area of occupancy
- joint tourist offer
- joint promotion in local and international markets
- exchange of information on protected area management.

Figure 5.1: Vicinity of boundaries of the Natura 2000 area Neretva Delta in the Republic of Croatia and boundaries of the Hutovo Blato Nature Park in the Federation of Bosnia and Herzegovina.

The basis of international cooperation, in addition to the Hutovo Blato status as a Ramsar site, are multilateral treaties on the environmental and nature protection ratified by Bosnia and Herzegovina:

- Convention on Biological Diversity, signed in Rio de Janeiro on 13 June 1992, ratified by Bosnia and Herzegovina on 31 December 2002 *(Official Gazette of B&H – International Treaties 12/02),*
- Convention on the Conservation of European Wildlife and Natural Habitats, Bern, Switzerland, 19 September 1979, ratified by Bosnia and Herzegovina on 15 September 2008. (*Official Gazette of B&H – International Treaties 8/08*),
- Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, USA, 3 March 1973, ratified on 5 December 2008 (*Official Gazette of B&H – International Treaties 11/08*),
- International Plant Protection Convention (IPPC), Rome, Italy, 12 June 1951, ratified on 30 June 2003 (*Official Gazette of B&H – International Treaties 8/03*).

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6 ANNEXES

6.1 HUTOVO NATURE PARK STAKEHOLDERS

Key stakeholders:

- Eko-plan d.o.o. Mostar
- Agency for Watershed of Adriatic Sea Mostar
- Federal Ministry of Agriculture, Water Management and Forestry
- State (Lack of resources from the state budget limits activities)

Primary stakeholders:

- Ministry of environment and tourism HN Canton (responsible for spatial planning and management).
- Public Enterprise Nature Park Hutovo Blato, Karaotok
- Ministry of construction and physical planning, HN Canton

Secondary stakeholders:

- Ministries
- Local politicians/representatives of the local authorities
- Customs (information regarding the export of protected species)
- Public agency for protected areas management
- Meteorological and Hydrological Bureau
- HET – Trebišnjica HPP, Local Power Company
- Land use representatives (fisheries, hunting, forestry, agriculture)
- Tourism/Catering employees
- Municipal/utility companies at the local government level
- Interested citizens / NGO's

6.2 PUBLIC PARTICIPTION

During preparation of the Management Plan for the Hutovo Blato Nature Park, two workshops were organized for the population living in the Nature Park and greater area.

FIRST WORKSHOP, June 7th, 2013: The first workshop was held at the hotel “Park” in Karaotok. The invitation to the workshop was announced via local radio station, Radio Čapljina on several occasions. The objective of the first workshop was to determine the values and threats to the Hutovo Blato Nature Park and determining preliminary protective zone boundaries.

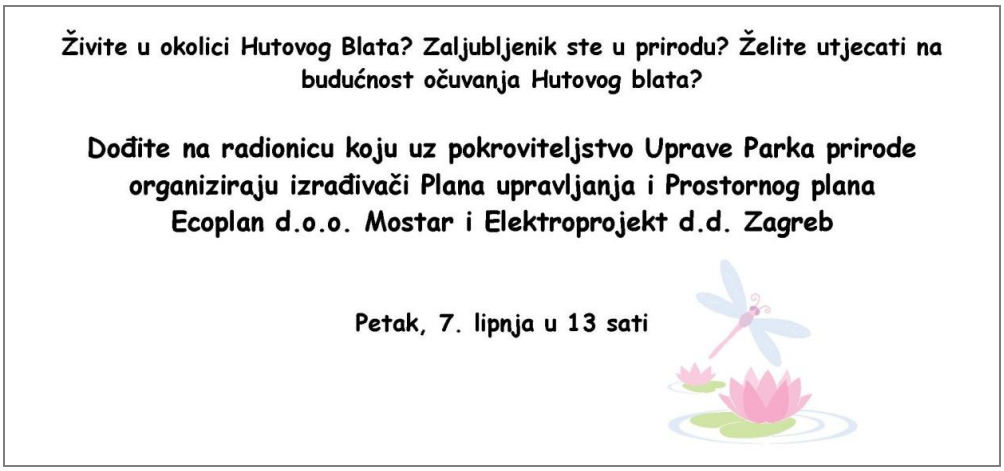

Figure 6.1: The invitation to the workshop broadcasted at the Radio Čapljina and posted on the Motel Karaotok notice board.

Figure 6.2 a and b: The first workshop

SECOND WORKSHOP, September 26th, 2014: The second workshop was also held within the Nature Park, in hotel "Park" Karaotok. The invitation was published in the Local Paper on September 20th 2014 and also sent via e-mail to all of the identified stakeholders and NGO's. The objectives of the second workshop were to present the Draft Management Plan, confirm the protected zones and collect comments on the Action Plans. At the end of the workshop, participants were given the contact e-mail to which they can send additional comments in the next 3 weeks post workshop. No comments were received.

Kompanija Centrotrans Eurolines obilježila 66 godina postojanja

Kvalitetni autobusi, internet, redovitost i urednost prijevoza

Svakodnevne pohvale i kontinuirano povećanje broja putnika govore nam da svojim uslugom ispunjavamo njihova očekivanja i potrebe – kazao je direktor Centrotransa Safudin Čengić

Međunarodni sajam turizma i zdravlja

Predstaviti Banju Luku kao grad dobrih domaćina i gostoljubivih građana

POZIV ZA SUDJELOVANJE NA RADIONICI ZA PLAN UPRAVLJANJA PARKOM PRIRODE HUTOVO BLATO

Živite u okolici Hutovog Blata i želite utjecati na budućnost njegovog očuvanja?

Dodite na radionicu koju uz pokroviteljstvo Agencije za vodno područje Jadranskog mora i Federalnog ministarstva poljoprivrede, vodoprivrede i šumarstva organiziraju izrađivači Plana upravljanja i Prostornog plana Parka prirode Hutovo blato Ecoplan d.o.o. Mostar i Elektroprojekt d.d. Zagreb

Mjesto: Hotel PARK, Karaotok bb
Datum: Petak 26. rujna 2014.
Vrijeme: od 13. - 15. sati

Figure 6.3: Invitation to the workshop in the local newspaper

Figure 6.4: Second workshop, sign in list, materials and presentation

Figure 6.5: Second workshop participants

Table 6.1: List of participants at the 2nd workshop (September 26th 2014.)

	Name	Institution	Contact
1	Stjepan Mišetić	Elektroprojekt Zagreb	stjepan.misetic@elektroprojekt.hr
2	Zlatko Pletikapić	Elektroprojekt Zagreb	zlatko.pletikapic@elektroprojekt.hr
3	Iva Vidaković	Elektroprojekt Zagreb	iva.vidakovic@elektroprojekt.hr
4	Anđelka Vojvodić	Ecoplan d.o.o. Mostar	andjelka.mikulic@eco-plan.ba
5	Toni Šimunović	Ecoplan d.o.o. Mostar	zonix077@hotmail.com
6	Marko Puljić	Ecoplan d.o.o. Mostar	marko.puljic@eco-plan.ba
7	Mirela Šetka Prlić	Ecoplan d.o.o. Mostar	mirela.sp@eco-plan.ba
8	Meri Rogošić	Divina Natura	divina-natura@hi.t-com.hr
9	Jaroslav Vego	Ministarstvo graditeljstva HNŽ	
10	Tihomir Perić	Općina Stolac	
11	Tomislav Prkaćin	Općina Stolac	
12	Antonela Marić	EU Eko-Most Mostar	antonela.marico@gmail.com
13	Andrea Rogić	EU Eko-Most Mostar	andrea.rajico@gmail.com
14	Željko Marić	EKO-MOST	eko-most@mocable.ba
15	Pero Zekušić	Lovačko društvo „Galeb“ Čapljina	
16	Miše Maslać	Općina Čapljina	mise.maslac@capljina.ba
17	Irena Bakalar-Bulum	Općina Čapljina	irena.bakalar@capljina.ba
18	Mirko Šarac	AVP Jadranskog mora	msarac@jadran.ba
19	Zoran Mateljak	WWF	zmateljak@wwf.panda.org
20	Mario Krmek	Udruga korisnika voda „CVRKE“ - Stolac	mario.krmek@opstolac.ba
21	Josip Marinčić	JP Elektroprivreda HZHB	josip.marincic@ephzhb.ba
22	Nilda Penavić	JP Elektroprivreda HZHB	nilda.penavic@ephzhb.ba
23	Nikola Zovko	JP „Park Prirode Hutovo blato“	nzovko.g@gmail.com
24	Višnja Bukvić	Fakultet – Međugorje „Lijepa Naša“	visnjabukvic@net.hr
25	Katja Stojić	Udruga „Tur. Org. Čapljinka“ Čapljina	tur.org.capljina@tel.net.ba
26	Stanko Zlopaša	Udruga „Tajne Prirode“ Čapljina	stanko.zlopasa@hotmail.com

6.3 GRAPHICAL PART