MANAGEMENT PLAN
of the
PRESPA NATIONAL PARK
IN
ALBANIA
2014-2024

ABBREVIATIONS

ALL	Albanian Lek
a.s.l.	Above Sea Level
BCA	Biodiversity Conservation Advisor
BMZ	Federal Ministry for Economic Cooperation and Development, Germany
CDM	Clean Development Mechanism
Corg	Organic Carbon
DCM	Decision of Council of Ministers
DFS	Directorate for Forestry Service, Korca
DGFP	Directorate General for Forestry and Pastures
DTL	Deputy Team Leader
EUNIS	European Union Nature Information System
GEF	Global Environment Facility
GFA	GFA Consulting Group, Germany
GNP	Galicica National Park
GO	Governmental Organisation
GTZ/GIZ	German Agency for Technical Cooperation, Deutsche Gesellschaft für Technische Zusammenarbeit (Name changed to GIZ Deutsche Gesellschaft für Internationale Zusammenarbeit)
FAO	Food and Agriculture Organisation of the United Nations
IUCN	International Union for Conservation of Nature The World Conservation Union
FUA	Forest User Association Prespa
KfW	Kreditanstalt für Wiederaufbau - Entwicklungsbank/German Development Bank
LMS	Long Term Monitoring Sites
LSU	Livestock Unit
MC	Management Committee of the Prespa National Parkin Albania
METT	Management Effectiveness Tracking Tool
MoE	Ministry of Environment of Albania
MP	Management Plan
NGO	Non-Governmental Organisation
NP	National Park
NPA	National Park Administration
NPD	National Park Director (currently Chief of Sector of Directorate for Forestry Service, Korca)
PNP	National Park Prespa
ÖBF AG	Österreichische Bundesforste AG/ Austrian Federal Forest Enterprise
PEEN	Pan-European Ecological Network
PPCC	Prespa National ParkCoordination Committee
PPMC	Prespa National ParkManagement Committee (replaces PPCC)
PPNEA	Preservation and Protection of Nature and Environment of Albania
REDD	Reducing Emissions from Deforestation and Forest Degradation
PEBLDS	Pan-European Biological and Landscape Diversity Strategy
SAP	Strategic Action Plan for the Prespa National Park(Watershed of the Prespa Lakes)
SOM	Soil Organic Matters
SPP	Society for Protection of Prespa
TL	Team Leader
UNDP	United Nations Development Programme
WFD	Water Framework Directive
ZGF	Zoologische Gesellschaft Frankfurt/Frankfurt Zoological Society

Picture Front page:: W.Fremuth 2011/2013

Version 07.03.2014

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Content

PREFACE

The Prespa National Park was one of the first National Parks created in Albania after the change of the system in 1992. Already in 1996 visionary environmentalists such as Prof. Dr. Lekë Gjiknuri had the idea to create a system of protected areas around the Albanian shores of both the Prespa lakes and the Ohrid Lake. With the help of the German NGO EuroNatur and the German Development Agency GTZ (nowadays GIZ) efforts have been undertaken to create the National Park incorporating both Prespa Lakes. Along the western slopes of the shore of the Ohrid Lake a landscape protected area was established. These protected areas were legally established in 1999 and the Prespa National Park was officially inaugurated by the then President of Albania in February 2000.

At that time it was one of the largest protected areas in Albania with more than 27,000 ha. Since then the country has implemented substantial efforts to create more National Parks of this size and structure.

The most prevalent threat in the beginning stages of the National Park was the severe overuse of forests and pastures by livestock, especially sheep and goats from people in- and around the National Park. The need of firewood deteriorated the forests and created shrub like forest formations.
Due to the establishment of the National Park thirteen years ago, some of the threatening factors deteriorating the ecosystems have been reduced and forests got the chance to recover, which is well visible now.

However, all threats are not yet eliminated. The people inside the NP remain to need firewood to survive the hard winter conditions in the lakes area. Sustainable solutions such as better insulation of the houses and the use of alternative energy resources will help overcome such threats to the NP.

At the moment, fishing is well controlled and still provides a source of income for licensed local fishermen.

Hunting is strictly prohibitied in the NP. Illegal hunting and poaching is an issue that has been overlooked for many years. Pictures from camera traps reveal that hunters have been entering the Park to take advantage of the recovering wildlife – including brown bears, wolves, roe and red deer, wild boar, Balkan chamois, badger, martens and otter. A stricter control of hunting is required to enhance and encourage such growth in the wildlife population. This will also result in animals such as the Balkan Lynx migrating into the Park as soon as their prey is sufficient in numbers – further enriching the Park's wildlife and diversity

The importance of the lakes areas stretches beyond their endemic fish species. During the winter season, the lakes attract thousands of water birds coming from their Palearctic breeding sites to spend the winter months in the area, whereas colonial breeding birds, such as the both European Pelican species, spent their winter time in more southern areas. It has been recorded that more than 1000 breeding pairs of both the Pelican species breed on the Greek side of the Prespa region. With strict protection measures, it can be expected that sooner or later the Pelicans will breed in the reed belts of the Lesser Prespa Lake. This gives Albania a special responsibility and creates the need for closer cooperation with the neighboring countries.

Transboundary cooperation is of highest importance for conservation of biodiversity within the National Park. A trilateral Prespa Park was agreed among the Ministers for Environment and the Prime Ministers of the three littoral states of the lakes' area. A Transboundary Biosphere Reserve, according the UNESCO Program 'Man and Biosphere', will enhance the conservation efforts by harmonizing the needs for conservation with the possibilities of sustainable development. The formal recognition by UNESCO will allow promoting sustainable development for the benefit of the local population. In Albania alone, there are 12 villages with about 6,000 people living inside the boundaries of the National Park.

This Management Plan addresses these different and sometimes apparently diametric oriented requirements to nature. The Management Plan strives to protect ecosystems and their functioning to provide their services for current and future generations of human beings.

This management plan addresses these different and sometimes diametric requirements between nature and man. It is based on a vision and mission statement, which will give guidance to the National Park and its managers to provide their best performance in the future. Most importantly, it strives to protect ecosystems and their function to provide for current and future generations of human beings.

Ministry for Environment
of the Republic of Albania

INTRODUCTION

The isolation of Albania during the communist era forced the country to use every square meter of land for agricultural production. As a result, the Prespa National Park was created in the years 1996 – 1999, and officially inaugurated in the year 2000. Its aim was to reduce the overuse of the natural terrestrial and aquatic resources, and by this conserve and rehabilitate the biological diversity of species and habitats.

A high number of goat and sheep herds were driven into the park's area for grazing, which led to shrubby forest in almost all parts of the current park's boundaries. Tree lopping for winter fodder for livestock contributed to the disastrous condition of most of the forest cover. The forests also had to provide the local population with an energy resource to heat their homes during winter and to provide wood for cooking.

Illegal hunting and overfishing, even with strictly forbidden fishing methods as dynamite use or lamplights in the night, have been practiced and reduced the fish stock over many years until the National Park was established. The thirteen years of existence of the National Park has reduced certain threats, but brought new threats in the form of uncontrolled urbanization.

The thirteen years of existence of the National Park has reduced certain threats but brought new threats in form of uncontrolled urbanization of the Park.

This management plan describes the threats and provides the solutions to mitigate them. It strives to convert the National Park administration from a pure law enforcement institution to a service unit for the conservation of biodiversity A N D improvement of the livelihood of the human inhabitants of the National Park. The plan acknowledges the need for firewood as the main energy resource for the human population inside the boundaries of the Park. It provides solutions to supply the people with sufficient firewood in the longterm.

The ultimate goal is to reduce the firewood consumption to a sustainable level, while still providing the people with energy Present assessments have shown that the average consumption of firewood is about 10 m³ per household per year. During the implementation of this plan, it is foreseen to reduce the firewood consumption from 10 m³ to 5 m³ per household. There are four methods to achieve this reduction:

1. More efficient burning and heating systems in the houses
2. More efficient insulation of the houses
3. Substitution of firewood by other biomass sources derived from the reed management, the use of wood debris, fast growing wood such as salix and popular from special plantations as well as the residues from pruned fruit trees and grapes or the simple us of sun energy.
4. Stop illegal logging and trade of firewood to outside of the National Park.

The National Park Administration will have to execute these changes by supplying the local population with their basic need of firewood from the source of the park. More than 4,000 ha of woodland are already converted into communal forests for local firewood supply. These woodlands are still in recovery and will only supply the local population if allowed 30 to 50 years as the necessary recovery period. This means that firewood supply has to be provided partly by the state forests until the above mentioned measures No 1 to 3 become effective.

It will be the task of the NP Administration to coordinate and control the firewood production in the entire area of the NP. This can be done by obtaining licenses which will enable harvests of firewood for the local population. Such an organization could be the local Forest User Association (FUA). This means that ultimately only the members or employees of this organization are allowed to cut wood. The local inhabitants will then receive the wood from the organization, delivered to their homes. This cannot be done free of cost, therefore a firewood fee has to be collected to serve the Forest User Association for the service provided.

There is still a large amount of illegally cut firewood sold to people outside of the park. These amounts will put at risk all efforts to recover the forests of the state and communal property. Necessary action must be taken to stop these criminal activities. . Cooperation between forest, road, state and border police are required to reduce and

fight against such acts, and shall be coordinated by the NPA. The park infrastructure is developed in the way to allow easy control of the outgoing traffic at the only two exit points at Zvezda pass at the Macro Prespa, and at the Treni exit at the Micro Prespa Lake. Only sufficient staff is necessary to man the control posts in 24 hour shifts, seven days a week!

On mid to long term the Park Administration will have to focus their work more on visitor management, education, awareness raising, scientific research and especially monitoring as well as supporting the local economy by providing infrastructure for visitors.

These tasks of a modern National Park Administration will need additional staff with specific training and expertise in the mentioned fields. As minimum requirement the Administration has to coordinate and motorize these tasks, which could be implemented by third parties, like universities, NGOs, consultants etc.
Nevertheless, staff with the relevant professional background is essential to perform an administration of the park according the state of the art and which is standard in many parks of the world.

SUMMARY

The biodiversity within the National Park is still prevalent in spite of the heavy deterioration of the terrestrial ecosystems by over grazing, overusing of wood and illegal hunting. This was always accompanied by the mismanagement of the fish resources by introducing fish species, inappropriate restocking, overfishing with non-adequate fishing methods and loss of traditional fishing technologies.

The Prespa National Parkin Albania was officially gazetted in 1999 and inaugurated by the then President of Albania in February 2nd of the year 2000.

Looking at the park today, one is able to observe improvement of the forests and land due to the Parks existence over the last 13 years. The need of wood for the local people is a non-deniable basic need. Unfortunately, progress has not yest been made in reducing the firewood consumption and illegal cutting of wood for commercial purpose by the local population. The innovation of communal forests has not solved the problem of sufficient firewood supply for heating and cooking. Large quantities of firewood are transported away and illegally sold by individuals.

Conservation and protection measures of the ecosystems are in the foremost interest of the local population, as they are the basis of survival for the park's inhabitants. Therefore, the National Park was created to conserve the essential ecosystem functions as there are:

- Habitat quality for species;
- Providing enough spaces to allow undisturbed ecological processes. (e.g. cycles of live and material flow of anorganic substances);
- Improve resilience and stability of ecosystems;
- Maintaining **ecosystem services:**
  - Resources for local population by supplying of firewood and non-timber products, fish, clean air and water.
  - Production of food for the local population
  - Water regime and regeneration
  - Climate protection
  - Erosion protection
  - Recreation and nature experience areas

The park's area can be characterized as a biodiversity hotspot. The EUNIS classification of habitats has shown the existence of 73 macro habitats. 23 are enlisted in the Annexes of the Fauna, Flora and Habitat Directive (79/43/EEC) of the European Union. Six of these habitats are of European conservation concern, such as the semi-dry grasslands (6210), the Pseudo-steppes (6220), species rich Nardu Grassland (6230), the alluvial forests (91E0) and the Grecian juniper woods (9562).
The vegetation and plant communities are still inadequately studied, but experts found up to now 1 130 plant species (*SHUKA, L. PERS COMMUNICATION, 2013*). Recent studies revealed about 60 nationally threatened and endangered plant species from which eleven have a globally threatened or endangered status.

In total, 60 mammal species have been recorded from which 34 are enlisted in the annexes of the European Fauna, Flora and Habitats Directive. This requires special efforts of the member countries (or those in process of accession) to conserve these species.

A recent study revealed 132 breeding birds inside the park's boundaries. One bird species is categorized as vulnerable two are near threatened and 129 are subject of least concern by the IUCN system. 28 bird species are subject of Annex 1 of the EU Birds Directive, 6 are enlisted in Annex II/1, 17 in Annex II/2, 3 in Annex III/2 and finally 1 in Annex III/2 of the Directive.

At present 23 reptile species are described and 11 amphibian species are recorded in the park's boundaries.

Both Prespa Lakes host 23 fish species, from which nine are endemic to the lakes and 15, are considered to be endangered.

The realm of invertebrates is almost not studied yet. A first glance of the group of dragonflies has shown 32 species already. A basic study on Longhorned beetles revealed 42 species of this beetles group, from which are four new to the Albanian Fauna. Two Longhorned beetles species are enlisted in Albania's Red Book of endangered Species (*SIERING, G*. 2013). Butterflies, Diptera, Saltatoria are groups with a high, but still unknown diversity.

Consequently, the status of a biodiversity 'hotspot' has been confirmed by the recent studies. The actual finding and determination of the EUNIS classification and the review on the species listed in the habitat and birds directive of the European Union qualify the National Park with parts of the aquatic and terrestrial ecosystems as a Natura 2000 site.

The creation of the National Park 13 years ago was very well justified by these recent figures. Unfortunately, trends in the population dynamics of the various species cannot be given. There are visible positive trends in larger mammals during the last 13 years, which gives hope that these are also present in the rest of the ecosystem.

Regrettably, the threats which have deteriorated the habitats in the park have not been stopped.
The intensity of encroachment by human activities however was reduced.

The misuse of present resources has led to such deterioration and threat to habitats and ecosystems within the Park.

There are four primary factors threatening the qualities of the habitat and ecosystem:

1. Overgrazing
2. Overexploitation of firewood
3. Overuse of fish stock of the lakes
4. Uncontrolled urbanism

An increasing population is demanding more and more resources to their own disadvantage.

In 12 villages (belonging to three communes) about 1,500 households with about 5,600 inhabitants are registered at present.
The current demand of firewood per household is about 10 m^3 per year which makes a total demand of about 15,000 m^3 per year.

Additionally, a substantial amount of firewood is taken from the forest fund and sold illegally by individuals outside of the park area.

The park administration is in charge of stopping these illegal uses of firewood from the park's area. This management plan describes the necessary actions and provides the necessary infrastructure to fulfil this task. Only a minimum of staff as described in this document is required to bring the illegal loss of firewood to an end.

Stopping the illegal trade is the precondition to serve the actual inhabitants with their demand of firewood. The Management Plan also provides the necessary measures and has identified the relevant parcels of the state forest and communal forest fund to harvest the required firewood.
In order to allow for the recovery of the forests, the firewood consumption has to be reduced during the time frame of this Management Plan and the average consumption per household should meet the target of about 5 m³ per year until the year 2024.
The measures to achieve this are described in this MP. The main elements to achieve this are:

1. More efficient firing systems in each household
2. Better insulation of the houses
3. Substitution of firewood by biomass sources (reed and wood debris briquettes, wood of fast growing plantations)
4. Stop illegal wood cutting for commercial purposes outside of the National Park.

Human threat on biodiversity and functioning ecosystems serving the local population with their services (clean air, fertile soils, pure water, fish from the lake and firewood from the forests, pastures for livestock) are still caused by:

- overgrazing with the high number of livestock,
- uncontrolled hunting and
- a new wave of uncontrolled constructions of buildings in the last few years.

The more the National Park grows in reputation and possibilities, the more visitors it will attract. This is welcome, but certain limits to maintain sustainability have to be established. and measures of precaution have to be taken not to endanger the actual and future biodiversity as the main attractive capital of the region. The relevant actions are described in this MP. At the same time, the park administration provides the opportunity for visitors to experience the nature by a carefully created visitor programme. Visitor centres will inform the interested guests about the surrounding area, and the manner in which it may be explored. Hiking trails are established and described in the MP, as well as biking or riding trails which allow local people to start up small scale tourism business.
A boating and navigation plan is created with landing platforms on various natural or cultural points of interest.

The park administration will have to deal with these factors through their law enforcement activities. The management of visitors, distribution of awareness and nature education is equally important among the different target groups in the parks region. Such awareness, among both local and foreign groups, will encourage and support the sustainability of the park, resulting in reduced law enforcement by the administration.

This MP provides the framework in form of administration structure and detailed job descriptions for the park staff to allow the conversion from a pure law enforcement institution to a more service oriented entity. Subsequently, this would create benefits from the positive achievements from the work in the region.

PART 1: DESCRIPTION OF THE AREA

The Prespa National Park is 27,750.47531 ha large. The National Park was gazetted 18.2.1999 and officially inaugurated in February 2000.

The protected area is located at the south east of Albania, at the border triangle with Greece and Macedonia. The Prespa National Park comprises both terrestrial and aquatic components and its boundaries are corresponding with the watershed of both Prespa Lakes. The terrestrial ecosystem is dominated by the calcareous mountain massif of Mali i Thate (Dry Mountain). The mountain ridge of Mali i Thate continues form the Albanian - Macedonian border to the south extending the Galicica Mountain range (Galicica National Park area). In the south-east the NP has joint borders with the National Park in Greece. The aquatic component includes all Albanian waters of the Lakes Greater Prespa and Lesser Prespa and the Island Maligrad.

The territory of the Prespa National includes on the terrestrial part agricultural lands, dedicated for the subsistence production of field crops, vineyards and orchards (approx. 1,575 ha), forests (approx. 14,800 ha), pastures and meadows (approx. 4,341 ha), settlements, roads, rocky and otherwise unproductive areas (approx. 1,796 ha), and the entire Albanian aquatic component of the two Prespa Lakes (approx. 5,238 ha). (Compare tables 5-9 Compendium)

The borders of the Park are (see *Figure 1)* are defined by the DCM No. 80/1999 in 1999 with geographical co-ordinates λ=20° 50'west to 21°3'37"east and *=40°40'south to 41°56'28"north:

a) North: State border with Galicica National Park in Macedonia.
b) East: State border with Macedonia and Greece, i.e. the state boundaries in the water of the Greater Prespa Lake.
c) South: State border with Greece; the water boundary at Lesser Prespa Lake at the Wolfe Gorge (Gryka e Ujkut), Golina mountain Peak (1,456 m), Ivan Mountain (1,768 m) and Zvezda Pass (1,099 m).
d) West: Zvezda Pass (1,099 m), at elevation of 1,912 m following the boundary with the designated area "Landscape Protected area of Pogradec", Zonja Peak (2,288 m), continuing to the state border with Macedonia.

Table 1: Main morphometric features of Lakes Prespa 2012 (adapted from *HOLLIS & STEVENSON, 1997)*

	Lake Lesser Prespa	Lake Greater Prespa	Catchment Basin
Lake surface (total)	47.8 km^2	261.8 km^2	306.8 km^2
Lake surface in Albania	4.3 km^2	47.9 km^2	
Lake surface in Greece	43.5 km^2	37.6 km^2	
Lake surface in Macedonia		176.3 km^2	
Maximum Depth	8.4 m	55 m	
Mean Depth	4.1 m	18 m	
Altitude	852 m	843 m	843-2,420 m a.s.l.
Catchment terrestrial – all countries	189 km^2	1,029.1 km^2	1,218.1 km^2
Catchment in Albania	51 km^2	162.0 km^2	213.0 km^2
Catchment in Greece	138 km^2	71.6 km^2	209.6 km^2
Catchment in Macedonia		795.5 km^2	795.5 km^2

The National Park includes the whole aquatic area of the two Prespa Lakes on the Albanian side, which have to be considered as a connected biological, hydrological and geological unit with a total surface area of 277.5 km². The geographical co-ordinates are λ =20° 50'west to 21°3'37"east and * =40°40'south to 41°56'28"north.

At present the administration of Prespa National Park is based in Korça Prefecture, and the territory belongs to the Korça District within the Pustec Commune (Greater Prespa) and to the Devolli District within the Progri Commune (Lesser Prespa) and the Bilisht Qender Commune (Lesser Prespa).

To the northeast, the National Park is bordering with the Macedonia, municipality of Resen, to the east with Prespa National Park in Greece (Municipality of Prespa) and to the west and southwest with the territory of other Communes of Korça and Devolli districts.
The Prespa National Park is part of Korça prefecture and physical connected only with the cities of Korça by the Zvezda pass and Bilishti through the national road with direction Greece. To the north crosses the national road through the park coming from Korca via the Zvezda pass to Stenje (Macedonia) leading to the border station in Gorica.

The road starting from the Zvezda pass until the border with Macedonia is 25 km long. This axis joins the national road Bilisht - Korçe, after 9 km road from the Zvezda pass to Zemblak. The villages of Lesser Prespa are connected by the national road network through a 3.5 km long asphalted road (third category). A gravel road connects the village of Cerje at the border (Greece) with the inner road network of the National Park.

The commune of Pustec with its seat at Pustec village, includes 9 villages: Gorna Gorica (Gorica e Madhe), Tuminec (Kallamas), Dolna Gorica (Gorica e Vogël), Gllobocen (Gollomboç), Shulin (Djellas), Pustec (Liqenas), Leska (Lajthizë), Zornosko (Zaroshkë) and Cerje. The commune of Progër includes 2 villages: Rakickë and Shuec and village Zagradec belongs to Commune Bilisht-Qender.

1.1. THE NATIONAL PARK

The Prespa National Park on the Albanian side was created because it is an integral part of a wider conservation effort around both the Prespa Lakes and the Ohrid Lake. The discussion for creation of the park began in the mid nineties. The opening of the country provided the possibility to conserve the remnants of earlier pristine areas and to start close cooperation with neighbouring countries.

Table 2: The composition of the Prespa National Park in the year 2000 (*DATA FROM DCM NO 80, DATE 18.2.1999***)**

Item	Area in ha	Area (ha) by Ownership		
		State	Communal	Private
Agricultural land (arable land, vineyards, orchards, etc.)	2,100	0	0	2,100
Forest and open forest (forest land)	13,500	8,440	4,360	700
Pastures and Meadows	1,828	1,828	0	0
Water body	4,950	4,950	0	0
Unproductive land, urban area, etc.	5,372	5,372	No data	No data
Total Area	27,750	20,590	4,360	2,800
Percent	100 %	74.2 %	15.70 %	10.10 %

At present, instruments such as the Geographical Information System (GIS) allow a more accurate calculation of the considered areas. Since the establishment of the NP, changes in land ownership have occurred. In the year 2000, even the communal forests of the area had not been restituted. Now, the agricultural areas as well as forests and some urban land plots have been restituted to their former owners. Therefore, a more accurate recalculation of the entire PNP area has been necessary (Table 3).

Table 3: The Revised Composition of the Prespa National Parkin the Year 2012 (*DATA FROM GIS ASSESSMENT AND REVISED ZONATION MAP, 2012***)**

Zonation	Surface in ha	In Percent
ZONA I/Core Zone	6,098.58895 ha	21.98 %
ZONA II/ Sustainable Landuse	9,856.40166 ha	35.52 %

ZONA III/ Traditional Zone/Urban Zone	6,556.89336 ha	23.62 %
Lakes surface	5,238.59134 ha	18.88 %
TOTAL	27,750.47531 ha	100.00 %

Table 4: Composition of the Park's Zonation by different vegetation and Habitat Types

Zones	Inproduktive/ Unproductive in ha	Kullote/ Pastures in ha	Pyll/Forests in ha	Shkurre / Shrubs in ha	Toke buke/ Agricultural land in ha	Ujore /Water in ha	Grand Total In ha
Buffer Zone	63.94013	1,879.19218	7,508.64533	227.31138	177.31264		9,856.40166
Core Zone	26.87093	2,190.17006	3,698.516743	112.91449	70.11673		6,098.58895
Development Zone	15.78063	272.53763	3,592.90214	1,347.61321	1,328.05975	5,238.59134	11,795.4847
Grand Total	106.59169	4,341.89987	14,800.06421	1,687.83908	1,575.48912	5,238.59134	27,750.47531

Table 5: Land Ownership According GIS Analysis and Revised Zonation Map 2012

Land ownership	Surface in ha	In Per cent
State owned /Shtetore	15,174.91739ha	54.68 %
Communal/ Komunale	4,171.86588 ha	15.03 %
Private	2,034.13798 ha	7.33 %
Private acc Law 7501	1,130.96272 ha	4.08 %
Water of the both lakes/Ujore	5,238.59134 ha	18.88 %
Greater Prespa Lake Lesser Prespa Lake	(4,802.58034 ha 436.011 ha)	
TOTAL	27,750.4731 ha	100.00 %

Table 6: Land Cover According GIS Analysis and Revised Zonation Map 2012

Land Cover	Surface in ha	In Per cent
Forest/Pyll	14,800.06421 ha	53.33 %
Pastures/ Kullote	4,341.89987 ha	15.65 %
Unproductive Abandoned Land/Inproduktive	106.59469 ha	0.38 %
Agricultural Land/ Toke Buke	1,575.48912 ha	5.68 %
Deteriorated Shrubland/Shkurre	1,687.83908 ha	6.08 %
Water/ Ujore	5,238.59134 ha	18.88 %
TOTAL	27,750.47531 ha[1]	100.00 %

[1] The difference between the total area of the National Park in the DCM of 1999 (27,750 ha) and the actual calculation can be explained by the higher precision of the outer boundary definition on the mountain ridge of Mali I Thate.

Table 7: Land Cover and land ownership in the National Park Prespa

	Komunale in ha	Private in ha	Private 7501 in ha	Shteterore in ha	Ujore in ha	Grand Total in ha
Unproductive Inproduktive/ abandoned				106.59169 ha		106.59169 ha
Kullote/Pastures				4,341.89987 ha		4,341.89987 ha
Pyll/Forests	3,911.90695 ha	1,589.61158 ha		9,298.54568 ha		14,800.06421 ha
Shkurre/ Deteriorated Shrubland	259.95893 ha			1,427.88015 ha		1,687.83908 ha
Toke buke		444.5264 ha	1,130.96272 ha			1,575.48912 ha
Ujore					5,238.59134 ha	5,238.59134 ha
Grand Total	**4,171.86588 ha**	**2,034.13798 ha**	**1,130.96272 ha**	**15,175.91739 ha**	5,238.59134 **ha**	**27,750.47531 ha**

The National Park's boundaries have been based on the watershed concept. This has led to demarcation of the western boundaries on the mountain ridge of theGalicica- Male I Thate (Suva Gora) massif. Due to this decision the mountain ecosystem has been cut into two parts. One part remained inside the National Park and the western slopes of the mountain outside of the park's boundaries.

The creation of a comprehensive management plan allows now to correct the ecological inadequacy.

Considering the inadequate use of natural resources and the linked deterioration of the conditions of ecosystems, and taking into account the need of energy supply for the local population, a zonation concept for the park has been applied. Three zones have been classified: **a core zone** of the National Park which requires strict protection measures. The core zone shall be extended by **a buffer zone** in which a certain use of natural resources by the local population is allowed. The buffer zone shall enhance the protection regime of the core zone; therefore the use of natural resources is controlled and limited to the point that land use shall have no negative impact to the core zone. There is **a development zone** in which the ecosystems shall be developed in a way that they equally can provide their natural functions as habitats for species, but also could serve as a resource for the future generation of the local population. And the **urban zones as part of the development zone** are dedicated for the local people and their need for supply of natural resources.

Table 8: Main Features of Zoning in Area of Prespa NP

Zone	Natural Asset	Human Activity	Level of Protection
Core	Main natural habitat of Prespa, High natural and biodiversity values offering an undisturbed territory. Primarily forests with specific values (old trees, Greek Juniper stands etc)	Scientific research allowed	I
Sustainable Use	The main habitats of the sustainable use zone are forests and pastures. Sustainable use zone is serving also as a buffer area for the core zone. The entire Lakes area excluding the Fishery prohibited areas.	Seasonal economic activities, grazing, medicinal plants and mushrooms collection, secondary forest production is permitted; activities that does not affect ecological integrity of ecosystem and can be applied only when environmental permit is issued.Sustainable and controlled fishing activities continued.	II
Traditional Use	Traditional use zone includes agriculture, aquatic territories, forestry land and territories close and inhabited centers.	Continuity of traditional and economic activities is enabled including agriculture, horticulture,	

Zone	Natural Asset	Human Activity	Level of Protection
		forestry, grazing, medicinal and aromatic plants collection, mushrooms collection and sustainable agribusiness with balanced use of habitats and landscape.	IV
Prohibited fishing	Prohibited fishing zones include areas of vital importance for reproduction, and securing stable fish stock in entire lakes area.	Prohibited fishing areas, while move of fishermen's to other areas and other soft activities continued.	II
Recreational	Recreational zone includes areas of recreation possibilities. Main habitat include littoral belts of the Lake (Zaroshka, Liqenas close to Military station, Liqenas close to the churches area, Gollomboc east area, Belli hill and Kallamas southeast.	Social, eco touristic, pilgrimage activities and infrastructure construction that do not affect the ecological integrity of ecosystem are allowed.	III

The Prespa National Park in Albania is to be considered a development park. It will take several decades until the park has reached a status which is comparable with international standards,. Nevertheless, it is important to introduce these standards (see Chapter 'Monitoring') in order to lead the park's management in the right direction. The originallyapplied zonation concept also contributes to the intention to integrate the Albanian part of the Prespa and Ohrid area in a wider protection system by a transboundary biosphere reserve. This would incorporate the entire Ohrid and Prespa watershed and following the principles of the UNESCO programme 'Men and Biosphere'.

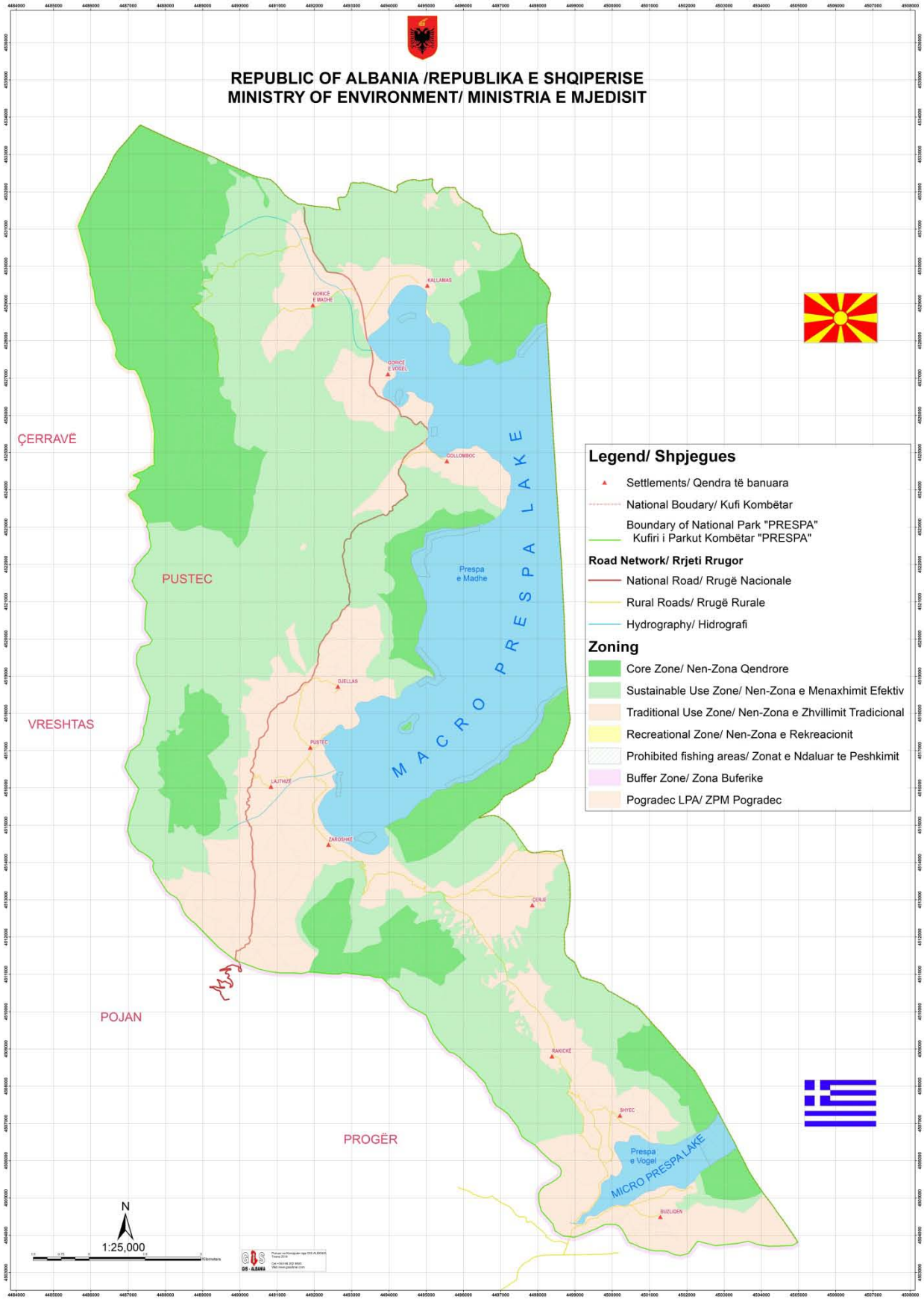

Figure 1: Revised zonation of the Prespa National Park (Status 2014)

The National Park was created to conserve the essential ecosystem functions, , as they willhave to serve for the survival of the local population. This means that the conservation and protection measures are in the foremost interest of the people. . The following ecosystem functions **have to be maintained**:

- Habitat quality for species;
- Providing enough spaces to allow undisturbed ecological processes. (e.g. life cycles and of substances);
- Resilience of stability of ecosystems;
- Maintaining **ecosystem services:**
  - Resources for local population by supplying of firewood and non-timber products
  - Water regime and regeneration
  - Climate protection
  - Erosion protection
    Recreation and nature areas

The Prespa National Parkin Albania is to be considered as a development park. It will take several decades until the park has reached a status which is comparable with international standards and can be considered as near to nature condition. Nevertheless, it is important to introduce these standards (see Chapter 'Monitoring') in order to lead the park's management into the right direction. The originally applied zonation concept also contributes to the intention to integrate the Albanian part of the Prespa and Ohrid area in a wider protection system by a transboundary biosphere reserve incorporating the entire Ohrid and Prespa watershed and following the principles of the UNESCO programme 'Man and Biosphere'

1.1.1 OBJECTIVES FOR CREATION OF THE NATIONAL PARK

The Prespa National Park is established to conserve the biological diversity and to protect the incorporated ecosystems in order to maintain their functions and services.
The National Park will provide the sources for sustainable living conditions for the local population of current and future generations.
The National Park will be integrated into a wider conservation system in cooperation with both neighbouring countries. Through this, the PNP will be a part of a transboundary biosphere reserve according the UNESCO Programme 'Men and Biosphere'. It will contribute to the trilateral conservation concept 'Prespa Park' and was nominated as Wetland of International Importance under the Convention for Conservation of Wetlands of International Importance (Ramsar, 1971) in March 2013.

1.1.2 LEGAL AND REGULATORY FRAMEWORK ON PROTECTED AREAS IN ALBANIA

The law No. 9806 dated 06.06.2002 *"On protected areas"* provides the legal bases for the management of protected areas in Albania. It is the framework for the declaration, conservation, administration, management and sustainable use of protected areas and their natural and biological resources. Among others an important purpose of the law is informing and educating local communities on direct and indirect economic benefits and promoting eco-tourism development.

In accordance with the nature protection criteria established by the International Union for Conservation of Nature (IUCN), the Law 8906 identifies six categories of 'protected areas' providing different levels of protection. In the Annex I (compendium version) more details are provided and an overview of different levels of protection in relation to protected areas.

Based on the law the following categories of protected areas are stipulated:

- Category I Strict natural reserve / scientific reserve
- Category II National Park
- Category III Nature Monument
- Category IV Nature Managed Reserve/natural park
- Category V Protected Landscape
- Category VI Protected areas of managed resources/protected areas with multiple uses

Article 4/2 of the Law no. 8906 stipulates that the territory of any protected area shall be divided into subzones,

according to the importance of habitats and ecosystems present in the specific areas. The law distinguishes internal zoning as follows: core zone, sustainable use zone, recreational zone, traditional use zone and other sub-zones that suits to the specific territory.

The zoning shall determine the level of protection of the zone in accordance to the particularities of the zone, taking into account the nature of the zone and human activities that take part.

The law itself devotes special attention to the management of forest, excluding their utilization for economic purposes, to water areas and other natural resources within the protected area. It also provides the legal base for the designation of administrative structures and management committees for certain categories of protected areas. Further to that the procedures for setting up and functioning of management committees are defined as well.

The Albanian Parliament approved on 04.02.2008 the Law no. 9868, "*On some amendments to the Law no. 8906*", which determines the criteria for proclaiming of protected areas and the designation of Special Areas of Conservation (SAC) of European Community interest. The Law also defines the concept of internal zoning within a protected area and follows the original definitions of the law 8906. The designation of protected area is done through a Decision of Council of Ministers (DCM) following the proposal of the Minister responsible for environment protection (currently Minister of Environment).

The implementation of the Law "***On protected areas***" as amended was followed be several by-laws approved by Council of Ministers including:

- Decision of Council of Ministers (DCM) No. 676, date 20.12. 2002 "***On the declaration as protected areas of the Albanian monuments of nature***", which declare Albanian monuments of nature listed in Annex to this decree as protected area the;
- DCM No.267, dated 24.04.2003 "**On proposal and designation procedures for protected areas and buffer zone**";
- DCM Nr 266, dated 24.04.2003 "***On the administration of protected areas***";
- DCM No. 86, date 11.02.2005 "***On establishment of management committees on protected areas";***
- DCM No. 519, dated 30.06.2010 "***On proposal and approval procedures and rules on administration of regional natural parks***";
- DCM No. 897 dated 21.12.2011 "***On approval of rules on designation of Special Conservation Areas".***

Please refer to the Compendium volume of the Management Plan for more detailes.

1.2 Related National Legislation

Please refer to the Compendium volume of the Management Plan

1.2.1 INSTITUTIONAL SETUP

Please refer to the Compendium volume of the Management Plan for more details.

The Prespa National Park is governed by a Management Committee composed of the relevant stakeholders of the region. The National Park is administered by an administration which shall become independent from the forestry sector according the proposed DCM. The Administration shall be line managed by the the Ministry for Environment with its responsible departments.

Currently, the Fishery Inspectorate is responsible for monitoring of the fish stock in the lakes. The forests and pastures in the ownership of the state are subject of manegment of the National Park Administration, whereas the forests and pastures defined as communal property are subject of the management of the communes. Urban areas are as well subject of the autonomous organization of the communes in the territory of the National Park.

Police functions are currently divided among the state police, the border police and the forestry police forces. The National Park administration shall take on a coordinative function to secure best law enforcement practices.

1.2.2. STAKEHOLDER ANALYSIS

Table 9: Stakeholder analysis (adapted according **KfW Feasibility Study, Transboundary Prespa Park Project 2005)**

Stakeholders according consumptive resource use	**Description of Resource**	**Use/Extent Conflicting Interests**
Livestock breeder	Browsing and grazing in forestlands Generation of additional winter fodder by lopping of branches	A considerable area of the Park is severely affected by livestock practices, grazing in strictly protected zones, overgrazing, access of livestock to shoreline
Fisher	Given that fish was subject to extreme pressure in the past, changes in the fish population and fish community structure were the result. Low number of species, usually endemic species, are threatened to further decrease.	Fishing is controlled by a licensing system and a fishing ban
Firewood collectors/consumers	Tree cutting for firewood supply. Firewood needs of about 10 m³ stere[2]1 per family for heating and cooking, to a lesser degree some sale of firewood to the market	Lack of alternative heating resources sets high pressure on forests that are used for firewood production for communities living within and around the PNP
Collectors ofmedicinal herbs, teas	Alternative contribution to household income.	The quantities collected and the way of collection can presently be regarded as sustainable, but no control & monitoring in place
Hunters/poachers	~50 hunters inside the PNP Poaching practiced mainly by people outside the Park	Seven of the 27 mammal species are considered as globally endangered or threatened
Non-consumptive resource use	**Description of Resource**	**Use/Extent Conflicting Interests**
Tourists/Visitors Tour operators	Users of NP resources such as landscape beauty, biodiversity, water, roads etc.	Management of solid waste and uncontrolled wastewater discharge.
Honey producers	~20 people in PNP commercially produce honey, ~ 5-10% of all people produce honey for home consumption	No conflicts
Garden Owners/ users of gardens alongside lake	Use of gardens/agric. land along the shoreline, proximity to the lake for irrigation of gardens	People partly use the 100m buffer zone directly at the lake which is part of the Park, loss of control over the shoreline
Private landowners	3,364 ha are private. This includes agricultural land and forestland.	Danger of additional development of houses, limited control over the management of private land, threat to biodiversity.
Inhabitants of Settlements	Around 5,000 people live inside the PNP in 12 villages, population density of 20	Management of solid waste and uncontrolled wastewater.

[2] 1 m³ stere = 0.7 m³ solid wood.

	people/km² in the protected areas	Uncontrolled urbanisation

1.2.2.2 Fishery

Please refer to the Compendium volume of the Management Plan fore more details

The fishery is the most important source to gain extra income by selling to outsiders of the park. However, in the last few years more visitors come to the region to enjoy a fish meal in one of the existing restaurants. This means the fish stock is an important economic asset of the region. At the same time, the fish are important assets to the biodiversity of the reason, as nine of the species are autochthonous to the lakes.

There are currently 50 licensed fishermen in the areawhereas about 100 persons still catch regularly without a license.

1.3 Description of Ecosystems of the National Park Prespa

1.3.1. Aquatic Ecosystems

1.3.1.1 Lakes and Still Waters

The Prespa Lakes are typical lakes with three distinct zones of biological communities linked to its physical structure (littoral, limnetic, and the benthic zone). The littoral zone is the near the shore area where sunlight penetrates all the way to the sediment and allows aquatic plants (Macrophytes) to grow. The 1 % light level defines the euphotic zone of the lake, which is the layer from the surface to the depth where light levels become too low for photosynthesis. In the case of Prespa Lakes, sunlit euphotic zones occur within epilimnion in the Greater Prespa, while in major part of Lesser Prespa it penetrates until the bottom of the lake. In transparent lakes, like the Greater Prespa, photosynthesis may occur well below the thermocline, into the perennially cold hypolimnion. The higher plants in the littoral zone, in addition to being a food source and a substrate for algae and invertebrates, provide habitat for fish and other organisms different from the open water zones.

The main morphometric features are presented in Table 1, according to *Hollis and Stevenson*, 1997 and *Naumoski et al.* (2010).

Among other characteristic, it is worth to mention that the Greater and the Lesser Prespa Lakes have variable surface area and depth through the lakes evolution. This depends on climate oscillations and more recently, from human impact as well.

According *Naumoski, et al(2010)* the lake basin falls under the mesotrophic and eutrophic state on its major part of physical and chemical parameters.

The Prespa lakes are a combination of three systems: ***pelagial***, covering the deep vegetation-free parts of both lakes , ***littoral***, covering the vegetated (with emergent, tree or shrub vegetation) parts of the lakes and ***riverine***, covering the streams and channels, defined here as areas containing moving water or form a connecting link between two bodies of standing water.
See a detailed deciption of these habitat types of the aquatic ecosystems in the Compendium Version of the Management Plan. Only the Reed Beds are described here in more details since a special focus of the Reed management will be put on these habitat types.

1.3.1.2 Reed Beds

Reed beds of the Greater and Lesser Prespa lakes are of exceptional value in many aspects. The area at the Albanian side covered by reeds is approximately about 500 ha (433.5 ha Lesser Prespa and the rest at Greater Prespa). Here we can find many, if not all, typical species that inhabit wetlands covered by reed. Some of the

species present are quite easily detectable such as *Acrocephalus arundinaceus, Panurus biarmicus, Rallus aquaticus, Gallinula chloropus* and many more. Others may be elusive and very hard to detect without entering the reed bed, such as *Podiceps grisegena, Porzana parva, Acrocephalus melanopogon, Locustela luscinoides* and others. Luckily, these species have strong, unmistakable calls that give away their locations, and they usually award patience with a sighting in the end, even if brief. There are two rare and interesting species that should be specially mentioned, *Botaurus stellaris* and *Aythya nyroca*, that inhabit this site.

On the lake shore, new types of habitats have been formed. Not so long ago, the water's edge was limited with cliffs on most of the shore. Now, the water has drawn back from the cliffs, opening a coastal rocky region to terrestrial inhabitants between water and cliffs. This area now represents an important habitat type where several bird species appear, two of which (*Hippolais olivetorum, Emberiza caesia*) dwell exclusively there. Other species present on the coastline are typical for cliffs and are rather common (*Monticola solitarius, Sitta neumayer, Ptyonoprogne rupestris, Phoenicurus ochruros* and, though rarely, *Apus melba*).

1.3.2 TERRESTRIAL ECOSYSTEMS

The terrestrial areas of the Prespa National Park are composed of different habitats. The most important are the forests, shrubs, meadows and pastures, distinguished mainly from the vegetation of herbaceous and woody formations.

The vegetation structure corresponds fully to Continental-Central European character with a slight influence of Mediterranean elements (*MERSINLLARI, 1997 & 2000; PAVLIDES, 1997*). Climatic and soil conditions favour the growth of a rich and interesting flora and vegetation. Up to now 1,130 plant species of higher plants have been recorded in this area, where most of them (ca. 65 %) are hemicryptophytes and geophytes, typical to continental climate. In lower parts of the region Mediterranean species may be encountered, but only ca. 8 % of the total species; ca. 12 % of species are of Balkan origin, growing up mainly in mountainous areas, mostly in Mali-Thate. Some rare or sub endemic elements increase further the values of the vegetation, such as *Juniperus foetidissima, Cerastium tomentosum, Alyssum bertoloni, Hypericum spruneri, Silene sendtneri, Gypsophylla spergulifolia, Alyssum margrafii, Geranium dalmaticum, Buplerum kargli, Siderits syriaca, Orchis sp*. diverse etc.

1.3.2.1 VEGETATION TYPES

The main natural vegetation of the Prespa National Park are forests. Forests once covered the entire terrestrial part of the actual National Park's area. On the higher altitudes, there are open spaces covered by grass. Recent studies revealed that in the past even at these altitudes trees covered the soil and forests existed. Big trees above the current tree border line may prove that in the past forests grew here.

The alpine meadows as they can be seen today have been cleared in the past from trees, most probably to provide grassland for livestock and wildlife. This means all grassland vegetation inside of the PNP is secondary and of man-made origin.

1.3.2.1.1 FORESTS

All forests inside the current PNP boundaries have been subject to anthropogenic interventions. There is no virgin forest remaining anymore. Nevertheless, forest with a high stand of old trees still exist in the park which are subject to strict protection in order to allow recovery of high stands of trees. These autochthonous tree species have been subject to overuse in the last 40 to 50 years. The recovery of forests is important in order to recover the essential forest functions. Only forest with intact ecosystems can provide the requested services in the longterm.

1.3.2.1.1.1 FOREST FUNCTIONS

Being the main natural vegetation cover of the NP, forests offer a wide scope of functions which shall enable them to provide their service in the long term.

Sustainability means to protect or retain these functions which will be of benefit for the current and future generations living with and from these services.

1. Conservation/Protection Function

1.1 Habitat/Biodiversity-conservation function
1.2 Climate protection (Greater- and Lesser Climate)
Carbon Sequestration
1.3 Immission protection
1.4 Noise protection

1.5 Soil protection (erosion prevention and soil creation/recovery)
1.6 Water protection
2 Use function (resource function)
2.1 Timber products (fire wood)
2.2 Non-timber products (berries, mushrooms, fodder, grazing ground)
3 Recreation function (human beings)

The total forest land inside PNP is 14 748.38 ha. State property comprises in total 15 148.224 ha. There are three factors which impact the condition of forest inside PNP: lopping of fodder (branches and leaves) for livestock, grazing of animals (goats, sheep, and cows) inside the forest land, and firewood extraction.

1.3.2.1.2 VEGETATION FORMATIONS: DECIDUOUS OAK FORESTS THE OAK FOREST ZONE

The deciduous oak forests of Prespa can be classified in the Balkan thermophile zone (Quercion frainetto) and some portions in the Balkan as a psychrophilic zone (Quercion petraea-cerris). The oak zone at the Albanian part ranges from 600m to ca. 1 300m a.s.l. and is dominated by deciduous oak (Querco – Carpinetum Wrb 54) with Quercus petraea, Q. frainetto, Q. pubescens and Q. cerris (Quercetum frainetto-cerris Oberd.48 et Horvat. 1959; sin. Quercetum frainetto Dafis 1966). Oak woods with Ostrya carpinifolia and Carpinus orientalis, and Ostryo-Carpinion orientalis of the lower elevations, are also included in this zone. On dry and stony sites, Quercus trojana (Quercetum trojanae macedonicum Horv. 1946) dominates. Also confined to dry and stony sites are the juniper woods (Excelsio–Prunetum webbi Fuk et fab 1962 Juniperus excelsa) of the Tuminec/Kallamas peninsula.

The woods and forests of the oak zone in the Albanian area are, unfortunately, rarely in good condition. Woodcutting and severe grazing have left mostly heavily degraded woods and a predominant shrub land in large parts of the area. The shrub lands are enriched with Crataegus monogyna, Cornus mas, Corylus avellana or Rosa canina. At a severe degradation stage, Buxus sempervirens shrub lands occur. Ass. Querco frainetto-cerris Oberd. 48 Ht.59 and Ass. Quercetum petraea also constitute the dominant vegetation type in the Greek Prespa National Forest. They form a zone extending up to an elevation of 900 – 1,200m on the slopes of the hills and mountains surrounding the lakes. Finally, in Macedonia, oak forests (Ass. Quercetum frainetto Cerris and ass. Orno-Quercetum Cerris) are widespread at Baba, Bigla, Plakenska and Petrino Mountain. Large number of forest phytocenoses such as: Ass. Quercetum troianae, Juniperitosum excelse-foetodissimae, Ass. Ostryo-Quercetum Cerris, Ass. Querco-Ostrietum carpinifolae, Ass. Aceri obtusati-Fagetum, and Ass. Abieti-Fagetum forest, are found on the slopes of the Galicica Mountain.
It includes a large part of the PNP between heights of 850 to 1,200 m a.s.l. certain species of oak are typically dominant in this area, such as Quercus trojana, Q. pubescens, Q. frainetto, Q. cerris and others. They are accompanied by bushes such as hornbeam (Carpinus betulus, Ostrya carpinifolia), ash (Fraxinus ornus), hawthorn (Crataegus monogyna), cornel (Cornus mas), hazel (Corylus avellana, C. columnar, etc.).
The oak forests in parts of PNP are heavily degraded by human interference. Their degradation is due to (illegal) logging and continued (over) grazing. The final degradation stage of the oak forests are Buxus sempervirens formations, which are resistant against grazing by livestock and can suffer severe humus loss of the soils. This formation can be found from Podgoria, saddle Zvezda up to Rakicka and Cerje in Greece.

1.3.2.1.3 DECIDUOUS BEECH FORESTS OF FAGETUM MOESIACUM: THE BEECH FOREST ZONE

The beech zone at the Albanian part of Prespa (Fagin moesiacum) extends to elevations from 1,200 to 1,900m. Beech woods and their degradation stage are restricted to the eastern slopes of Mali i Thate. Additionally, the beech trees (Fagus sylvatica), Acer obtusatum, A. pseudoplatanus and Corylus columnar are present. In Greece, the beech forests are classified in the Ass. Fagion moesiacum, except the regions of the north-eastern side of the study area, where the floristic composition of the forests coincides with the association Fagion illyricum with the participation of Abies alba. On the Pelister Mountain the Ass. Calamintho grandiflorae-Fagetum can be found, while on the coldest places Fago-Abietetum meredionale might be found at an altitude of 1,700 – 2,000m, some remnants of Fagetum subalpinum are found.

The beech forest reaches up to 1,900m a.s.l., but only in the eastern slopes of Mali-Thate (*MERSINLLARI*, 1997). Beech tree, Fagus sylvatica is dominant, associated by Acer obtusatum, A. pseudoplatanus, Daphnie mezereum etc. The wild hazel tree, Corylus colurna is a rare species for Albanian flora; also, Lilium spp., Orchys spp. etc., which further increases the value of the beech forest. Associations encountered most commonly in beech forest belong to a degraded forest with Rubus idaeus or Urtica dioica. Some lower parts of beech belt have also been

transformed into fruit yards, with apples, plums etc. The upper part of forest passes directly through limited pastures and mountainous meadows, and in this case not mixed with coniferous trees.

This zone is dominated by Fagus sylvatica, and among all the vegetation zones is currently the most natural, as human influence was mainly kept to firewood production. Less pasture use occurred due to altitude and needs of fire wood. Beech forest does resemble the natural climax vegetation in this zone. Unlike the oak forest, beech forest is most productive with selective cutting, but big clear cuts are bringing down the productivity of the forests. Therefore, open areas in this forest zone are recovering slowly via juniper succession stage, as beech is not able to germinate in sunlight and needs shadow to start growing. In the upper parts of the current beech zone, the forest is quite patchy. Generally, beech forest seems to only withstand the grazing pressure of livestock in its optimum zone between 1,200 and 1,650m a.s.l. In the fighting zone above this altitude, the grazing pressure has been pushing the forest downwards. The forests are still heavily under pressure by illegal fire wood cutting and thus degrading in parts of PNP.

1.3.2.1.4 Mixed Beech –Fir Tree Forests

The mixed beech and fir tree forests are restricted at the NE part of the NP area and they cover regions at an altitude of 1,500-1,800m. The species *Abies alba* (relict forest stands?), *Abies borisii-regis* (also on the northern slope of the Stara Galicica), *Fagus sylvatica* and *Fagus moesiaca* dominate the upper part of these forests with the fir trees surpassing the beech trees that reach 25m in height. These forests belong to the *Ass. Abieti-Fagetum moesiacum*.

1.3.2.1.5 Greek Juniper Forests

A special formation in this forest zone is the Greek juniper forest which grow (Juniperus excelsa) on dry and mostly south exposed slopes. The formation can be found on the hills near the villages Tuminec/Kallamas and Gllobocen/Gollomboç. It should also be found on the island Mali Grad, due to similar climax, but is currently extinct there.

Oak and juniper species germinate well in sunlight, and thus natural succession taking place will lead to natural climax forest vegetation within 3-4 decades if grazing is abandoned completely. In addition, the oak forests have been used as coppice fire wood forests. These old coppice forests are still quite vital and recover fast if grazing and firewood cutting is abandoned. On the Macedonian side in the NP Galicica, the succession of lowland meadows to oak forests is already progressing, as the presence of livestock has started to decrease earlier than in Albania (both Ohrid and Prespa Lake sides).).

1.3.2.1.6 Sub-alpine Vegetation of Dwarf Shrubs

The subalpine vegetation extends higher than the upper boundaries of beech in altitude of 1,800 to 2,000 m a.s.l. It consists of cold resisting shrubs, chamaephytes and perennial herbs forming a dense and compact layer just 0.30m to 0.50m high. The most frequent elements are the dwarfish semi-shrubs *Vaccinium myrtillus, Chamaecytisus polytrichus, Ch. eriocarpus, Juniperus communis ssp nana, Bruckenthalia spiculifera, Genista spp*, etc.

1.3.2.1.7 Forest and Shrub Formations

These forest formations are composed mainly by broad-leaved tree varieties: oak and beech are dominant. Oak forest and shrubs extend between 600 -1,200 m a.s.l., from the western slopes of Mali-Thate in Tushemisht and Alaric hills (in Pogradec), alongside to Zvezda pass and then to Bitincka and Rakicka hills, until the Greek border. Distinctive species for this vegetation belt are oak species of Quercus petreae, Q. pubescentis, Q. frainetto, Q. cerris; some of them are mixed with shrubs of Carpinus betulus, Ostrya carpinifolia, Fraxinus ornus etc. The eastern slopes of Mali-Thate are more densely covered with forests or shrubs than westsern ones. Duringrecent years, the oak belt has been under enormous pressure from human activity, and is under severe degradation. The oak forests in the Bitincka-Rakicka hills along the foot slopes of Mali-Thate are the most affected, where the shrubs have been degraded almost to a 'phrygana' type. Only some oak forests in Gorica, with mixed species of Quercus pubescentis, Q. frainetto, Q. cerris associated with shrubs, display minimal signs of human disturbance. . The transformation in reduced and mixed shrubs such as Crataegus, Cornus, Rosa, and Corylus are distinguishing features of a degraded oak forest Evidence of deep degradation is the evergreen shrub of Buxus sempervirens, which grows up over limestone evident from Zvezda to Ujku. Pine forests have occassionally been established in the oak zone, often in the vicinity of settlements.

In the Tuminec/Kallamas area, 45 ha of ancient forest holds special ecological and scientific value, which needs more detailed studies in the future. Juniperus foetidissima can be found here an endangered and rare tree species, considered threatened by extinction. It is an East-Mediterranean species, and its western borders reach up to Prespa region. This forest is proposed to be a Monument of Nature, strictly protected within the National Park (QIRIAZI ET AL., 2000). Another oak forest which shows little evidence of damage is situated near the Djellas/Shulin monastry and village, displaying healthy and dense oak forests. With such vegetation, in addition to very old plane trees in the Pustec/Liqenas and Gorica villages, the status of Nature Monument should be attained.

High plane trees (Platanus spec.) growing up along the lakeshores are considered interesting, due to heavy impact of the vegetation from the very intense karst (*QIRIAZI ET AL.,* 2000).

Along the stony belt of the shore of the Prespa Lake 'Caraca' (Celtis tournerfortii) grows a rare species of oak forest, which should be kept under protection (*MERSINLLARI*, 1997). Due to soil and micro climate conditions, some important Orchis species and other medical plants grow in this vegetation belt. Crops and cultivable land also belong to this belt. Attractive varieties of fruit trees, like apples, pears, cherries, plums etc. have been cultivated here by the local people of Prespa.

1.3.2.1.8 FORESTS IN THE OWNERSHIP OF THE COMMUNES

According to recent GIS studies, the size of communal forests in the Prespa National Park is 3,301.345 ha. Communal forests are intended to provide the necessary firewood for the local population. However, an increasing number of inhabitants have taken more than the forests have been able to provide in terms of energy resources. According to the latest review of income generated from selling licenses for firewood collection, only 895 m³ has been harvested and paid to the communes. This amount of firewood generated a total income to the 12 communes of 278,000 ALL (˜1,997 €). The communal forests served only between 5.96% and 6.88 % of the firewood demand for the local population. They are are at the forefront of disastrous conditions and for the next 30 years will not be able to supply the necessary firewood demand of the local population. The main objective for the management of these forests is to recover their productivity in order to supply the next generation with their energy demand.

1.3.2.1.9 FORESTS IN THE OWNERSHIP OF THE STATE

According to a KFW study in 2005 (GFA, 2005): In AL-Prespa, the main source of stress on the forest ecosystem function is much more practical and immediate - at least 5,000 people are dependent on fuel wood and fodder from an already degraded forest. Management capacity within the new PNP is low. The resource base has not been accurately inventoried or monitored, and there are few financial and technical resources, especially for biodiversity and integrated ecosystem management. The underlying issues include: destructive firewood and fodder harvesting; poor grazing practices; low capacity of forest and Park staff to work with local people to develop joint solutions to meet fuel and fodder needs while restoring forest health.
The NP Galicica and the NP Pelister have approved integrated management plans, as well as the Greek Prespa NP. In the framework of the implementation of a Transboundary Biosphere Reserve, the management will have to be harmonized, especially along common borders.

1.3.2.2 GRASSLAND

1.3.2.2.1 MEADOWS AND PASTURES

Alpine meadows extend over beech belt, along Mali-Thate crests, steeper and narrower in eastern slopes, and broader and milder in western ones (*MERSINLLARI, 1997; BUZO, 2000*). The physic-geographical conditions, climate and soil, the karst and the lack of surface waters are the reasons for the poorly developed vegetation. This is enhanced by overgrazing and the lack of recovery measures. Xerophytes grassy plants, growing up over stony habitats with scarce soils, characterize the vegetation. In summer, such pastures have frequently experienced Festuca spp, which cover a large amount of the surface. Bellardiocloa violacea is found in dry and cold areas such as alpine forests. Sesleria coerulans, and Stipa pennata have been found in slopes and rocks in Southern expositions.These only occur in limited areas, inconsistent in growth, giving the pastures a grey-brown colour.
The meso- and mesoxerophytic vegetation is represented by Agrostis capillaris, which belong to semi-arid meadows (mesoxerophyte). In the deeper soils of the mesophytic meadows, Phleum alpinumis dominates together with Trisetum flavescens, Cynosiris cristatu and Alopecurus gerardii. In the limited rocky areas, succulent

species of genus such as Sedum, Saxifraga together with Draba, Minuartia and Thymusare dominate. In some parts, remnants of former cultivation such as potatoes, together with transition vegetation such as Lolium perenne and Pteridium aquilinumcan, can be observed. Nitrophilous vegetation is found in areas rich with manure; associations with Urtica dioica, Chenopodium bonus-henricus and Marrubium peregrinum grow in these spots as well.
The plant species of pastures and meadows have polyvalent values, such as medical, aromatic, apiculture, decorative etc. *BUZO* (2000) confers that 218 species, belonging to 16 associations, have been observed in Mali-Thate meadows; also, *MERSINLLARI* (1997) report a checklist of 170 species from the same region. The species with high coverage are *Bellardioclea violacea, Festuca* sp. *diverse, Agrostis capillaries, Alopecuris gerardii, Brachypodium sylvaticum, B. pinnatum, Bromus erectus, Sesleria coerulans, Trisetum, flavescens, Genista tinctoria, Trifolium repens, Thymus* sp. *diverse, Hieracium pilosella, Achillea coarctata, Acinos alpinus, Cerastium tomentosum, Dianthus carthusianorum, Edralathus graminifolius, Geranium cinereum* etc.

This zone is considered to be important for the presence of endemic Balkan plants, such as the species *Asyneuma limonifolium, Alyssum corymbosum, Astragalus depressus, Anthemis pindicola, Dianthus minutifolius, Carlina acaulis, Arabis caucasica. The following plant species Carex curvula, Juncus trifidus, Carex foetida, Plygonum bistorta, Elyna bellardii, Gnaphalium supinum, Vaccinium uligunosum, and Trolius europaeus*, display the southernmost limit of their distribution on Pelister Mounatain (Macedonia). In Albania, the alpine meadows extend over the beech belt, along the Mali i Thate crests, steeper and narrower in eastern slopes, and broader and milder in western ones (*MERSINLLARI 1997, BUZO 2000).*

Depending on the exposure, water content and soil properties, the plant communities of the meadows vary from *Arrhenatheretea* types to communities of *Festuco-Brometea*.

Within the region, transgressions between Sub-Mediterranean types (*Meso- or Xerobrometum*) and Continental types, with dominating *Stipa* species (*Festucetum*), occur. These transgressions at the border of the European beech zone seem to be most interesting from a phytogeographical point of view and for the conservation of the region's biodiversity as a whole.

Most grassland in the PNP is from secondary origin. The park has been affected over centuries by agricultural land use namely vertical transhumance of livestock and field agriculture in the lowlands. The current vegetation zoning of the park along a schematic altitude transect is given in the Compendium version of the MP. There are three major geo-botanical zones to be distinguished in PNP (*PARISTO ET AL., 1988 & 1992; QOSJA ET AL., 1996, VANGELI ET AL 2000; QIRIAZI ET AL, 1985).*

The potential natural vegetation in the lowland areas are oak and Greek juniper forests, which are currently in remission as pasture pressure is gradually decreasing in the park.

1.3.2.2.2. SUB-ALPINE MOUNTAIN MEADOWS

Most areas above 1,650 m a.s.l. are nowadays covered with sub-alpine mountain meadows. Only a few spots of beech forest and some single immature White-bark pine trees (*Pinus heldreichii*) are currently eminent in this zone in altitudes up to 1,990 m in the PNP. Due to the absence of mature pine trees and the generally slow succession of cleared beech forest stands; the sub-alpine mountain meadows resemble sub-climax vegetation. White-bark pine forest fragments are only to be found on the north flank of Peak Magaro in the PNP on the Macedonian side. This forest type is recovering very slowly. This means that even without further human influence it is expected that the grasslands in this zone will endure over substantial period of time.

In this context, natural and anthropogenic occurring wildfires in the grasslands play a crucial role. Around Peak Magaro, on both sides of the Albanian-Macedonian border, a large wildfire broke out in the summer of 2007. It eliminated almost all juniper bushes and left behind only grass and herbal species.

The burned juniper bushes were up to 40+ years old, which suggests that even rare fire events play an important role in keeping the sub-alpine grasslands open from forest vegetation. The herbal and grass vegetation, unlike the the juniper bushes, are not affected by fire and are appropriating the freed space.
A detailed description of the different grassland vegetation forms is provided in the Compendium of the management plan.

1.3.2.3 HABITAT TYPES OF PRESPA NATIONAL PARK

For a complete analysis of the EUNIS Classification, please refer to the Compendium Volume of the management plan

Important habitats, according to Annex I of the EU Habitats Directive, are only the Pseudo-steppes with grasses and annuals, which are found in contact with the Grecian juniper woods (EU Habitat Code: 9562), which are also to be protected with high priority. Thus, the protection of the Grecian juniper will consequently result in the protection of the pseudo-steppes. However, the habitat is partly dependent on livestock breeding, which is in decline in the park.

Table 10: Table showing the grassland habitats protected under the EU Habitat Directive (92/43/EEC Directive, Version 2007)

Habitat Code	Priority *	EU Habitat Directive Classification
4060		Alpine and Boreal heaths
4090		Endemic Oro-Mediterranean heaths with gorse
6170		Alpine and subalpine calcareous grasslands
6520		Mountain hay meadows
6210		Semi-natural dry grasslands and scrubland areas on calcareous substrates (Festuco-Brometalia)
6220	*	Pseudo-steppe with grasses and annuals (Thero-Brachypodietea Br.-Bl. 1947)

* Priority Habitats in 92/43/EEC Directive, Version from 2007

The EU Habitat Directive does not generally conflict with the non-intervention objective of a modern national park (75% of the territory, IUCN). In its natural stage, the vegetation cover of NPP would very much be dominated by forests. Aiming for non-intervention on the majority of the parks territory will lead to a significant shrinking of the open land area and thus the grasslands. The non-intervention policy needs to be applied in the sub-alpine meadows, and also partly in the lowlands. A shrinking of the grasslands is acceptable, but needs to go hand in hand with the enforcement of protection of wild ungulates (chamois, roe deer, red deer, fallow deer). Only then the integrity of the ecosystems and its habitats in NPP can be conserved in the long run. A close monitoring of the grasslands is necessary in order to track changes and schedule interventions if developments start to jeopardize the conservation objectives.
According to the EUNIS Habitat Classification (revised 2004), we can classify seven habitat types for the grasslands. The high number is due to the fact that agricultural land with no specific conservation value is also classified under EUNIS. In total, 76 macro habitats can be classified in the area of the Prespa National Park. Of these 76, 33 macro habitats are enlisted in the Habitats Directive of the European Union.

Special conservation measures are required for 6 of these habitats, which is a priority for a member state of the European Union.In total 76 macro habitats can be classified according the EUNIS classification system in the area of the National Park Prespa. Of which 33 macro habitats are enlisted in the Habitats Directive of the European Union and six have a priority status for which a member state of the European Union is required to apply special conservation measures to maintain a favourable status.

1.3.3 SPECIES

1.3.3.1 FUNGI/MUSHROOMS

Edible mushrooms are a source of income for some of the local population. Several collectors are in the park to harvest every year, yet there remains anunknown amount of edible mushrooms.

Fungi in general play a very important role in ecosystems as decomposers of organic material, consequently providing nutrients to other surrounding flora elements. Fungi are, in many cases, linked to higher vegetation such as Mycorrhiza, in which they are symbiontic to their host plants and providing optimum growth conditions.

This means more attention has to be given to the realm of fungi in the future. An initialsurvey revealed 174 mushroom species (*IVANCIC B & KARADELEV M*, 2012) (Complete List see Annex). Among these, there were 10 species which are inlcuded in the European Red List of Fungi (*ING* 1993). Only the healthy forest stands around Gorica Madhe (Gorna Gorica), Gorica e Vogel (Dolna Gorica) and Kallamas (Tuminec), have been investigated up to now. More detailed studies have to be done.

The first surevey has shown that among the recorded 174 Fungi species there are 10 species which are inlcuded in the European Red List of Fungi (*ING*, 1993).

Two species found in the National Park are enlisted in the Atlas of 50 Threatened European Species (ECCF, European Red List of the Fungi prelimenrary proposal, (*IVANCIC, B ET AL* 2012) These species are *Amanita caesarea* and *Panaeolus semiovatus*.

Seven Fungi species are enlisted in the European Red List of Threatened Macromycetes of the European Council for Conservation of Fungi , (According *IVANCIC, B ET AL* 2012). These species can be considered globally significant, and therefore the National Park carries a special responsibility for the conservation of a favorable status of the population. Theses seven fungi species are Amanita caserea, Antrodia juniperina, Bletus aereus, Boletus impolitus, Boletus regius, Hygrophorus lindtneri and pyrofomes demidoffi.
More detailed research especially on Mycorrhiza is necessary and
training of local collectors as well as a monitoring program by a special license system for commercial collectors is required.

1.3.3.2 FLORA

The Prespa National Park represents an ecosystem which provides favourable conditions for a large number of ancient, endemic or near endemic species. Various reports have calculated that the number of plant species currently sits between 400 and 500. (*BUZO, 2000; MERSINLLARI, 2000 & 2004; SHUKA ET AL., 2008*). In the preparation of the necessary baseline study, the list of recorded plant species could be extended to 1,130 species (*SHUKA, L. PERS. COMMUNICATION, 20*13). This high number of plant species is also reported in the adjacent Greek and Macedonian National Parks. The landscape diversity in NPP has promoted the existence of different habitat types with large number of plant communities and vegetation associations.

Global warming, human impact to environment by overgrazing and overuse of ecosystems, as well as uncontrolled development, has influenced habitats and increased the threatened status of numerous plant species. Several rare and endangered plant species that are growing in the park are important at a national or global level.

1.3.3.2.1 RARE, ENDEMIC AND INDICATOR SPECIES OF THE NATIONAL PARK PRESPA

The implementation of a more systematic recording of species has found good indicator species which exhibit the richness of the park.

Field trips carried out in July 2011 discovered six new important species for the NPP and Albanian flora. They are: Astragalus mayeri, Centaurea galicicae, Centaurea prespana, Edraianthus horvatii, FestucaGalicicae and Lessermeria kosaninii, known so far only in Macedonian and Geek parts of the Prespa Region. These results include several other new species, four of which species had not been reported before within Albanian flora and adjacent parts of the Park in Macedonia and Greece. The plant species list of the park was increased to 1,130 different species.

1.3.3.2.2 LOCAL ENDEMIC SPECIES OF PNP

Despite the high number of plant species in NPP, there are no endemics to grow only in the Albanian side of the Prespa region. Nevertheless, there are seven local endemic species which have been recorded for the three National Parks in Macedonia, Greece and/or Albania in past years (*UNDP,* 2010). From the seven plant species

described below, only Sempervivum galicicum (Syn. S. ciliosum) was previously reported in Albanian floristic literature for NPP. The six other plant species were recorded during our field trip this summer. All species share their habitats with adjacent parts of Macedonia, except Centaurea prespana, occurring only in the Albanian and Greek National Parks (*SHUKA,* 2011). In this context, the following species are local endemics of the Prespa National Park, or sub endemics for the Albanian part of the park.

1.3.3.2.3 RARE AND ENDANGERED SPECIES OF PNP

Based on the existing publications of the Red List of IUCN (*WALTER & GILLET*, 1997), Bern Convention, Habitat Directive, Annex II (b) and IV (b) and the Red List of Flora of Albania order Nr. 146, of MoEFWA (2007), about 60 plant species of the Prespa National Park are classified as rare or endangered on a global, European and/or national level.

The number of rare and endangered species in on a global or European level is relatively low compared with the high number of existing plant species of the park (*PAVLIDES*, 1997; *UNDP* 2010). Nine species occurring in the park are rare on global level and part of the Red List of IUCN. Two other plant species are protected by the Bern Convention (*Fritillaria graeca*) and Habitat directive (*Buxbaumia viridis*), which means they are endangered on a European level (Table 35). The low number might be a result of still incomplete floristic data for Albania and especially PNP.

Despite the international protection status of the plant specie, the National Red List of rare and endangered plants of the park lists 60 species with LR, VU, EN and CR protection status (Order Nr. 146, dt. 8. 5. 2007 of the MoEFWA). Several of these threatened plant species of Albania occur in alpine and sub-alpine pastures and meadows of the PNP that cover an important part of the upland areas. This part of the park has been under the pressure of overgrazing and other human intervention, especially during the years 1970-1992.

Some of the rare and endangered species found during the field surveys are to some extent in favour of grazing in the mountains. As cattle grazing is restricted to the areas close to the villages a decreasing grazing pressure can be considered as a threatening factor for some of the rare plants in the park.

On the other hand, in some areas overgrazing is still prominent, which does in return also pose a negative impact on plant species. The field surveys carried out for the preparation of this management plan, conclude that Acer heldreichii, Alkanna pindicola, Viola eximia, Centaurea prespana, Goniolimon dalmaticum, Paeonia mascula, Phlomis tuberosa, Crocus cvijicii, Ptilotrichum cyclocarpum and several Orchid species, have decreased their areal distribution and worsened their status.

On top of this, the presence of small spots of beech forest (Fagus sylvatica) in the alpine region of eastern parts of Oçai ridge and several individual small pine trees (Pinus heldreichii) in the southern ridge of Dry Mountain, show that the upper tree line of Dry Mountain has been dramatically decreased. In the grasslands section of the management plan, possible solutions for flora management are discussed in order to keep a maximum of species, with a minimum of human impact.

It is of great importance to the NPP to install permanent observation plots and transects related to the dynamics and real protection status of rare and indicator plant species. Such longterm monitoring of habitats and selected species can give an overview on changes of the habitats in the NPP.

1.3.3.2.4. LIST OF PLANT SPECIES OF PNP (COMPLETE LIST IN COMPENDIUM OF MP)

The floristic survey and data of literature for the PNP, comprise 1130 plant taxa that are grouped in 430 genus part of 99 family. The species belong to different floristic regions, such as the Mediterranean, *Scardo-Pindian*, Euro-Mediterranean, Central-European or species originated from the glacial period. The Mediterranean floristic elements of PNP were represented by typical species such as : *Acantholimon androsaceum*, *Biarum tenuifolium*, *Edraianthus horvatii*, *Fritillaria graeca, Salvia officinalis*, *Hyssopus officinalis*, *Convolvulus elegantissimus* or *Prunus prostrata*. The *Scardo-Pindian*species are represented by *Acer obtusatum, Eryngium amethistinum, Genista subcapitata, Geranium aristatum, Sideritis raeseri, Ostrya carpinifolia, Quercus trojana*as as well as relict species of *Morina persica, Oxytropis dinarica, Poa alpine* or *Rumex nivalis*, which are distributed in several parts of the PNP.

The floristic composition of the PNP flora is dominated by species of *Compositae* family at 12 %, the *Leguminosae* family at 9 %, *Graminaceae* 8.5 % and *Labiatae* with 8% of the total number of species that are growing in the park.

The high diversity of recorded plant species and floristic elements of flora shows that the Prespa ecosystem is well connected with ecosystems from the neighbouring countries. The recorded species in the Prespa NP which belong to flora elements of the adjacent areas support this thesis.

The plant species list reported in this MP is mostly based on summer investigations and historical data from various sources, since there is no inventory or frequently monitoring of species and ecosystems for Albanian parts of the Prespa area.

1.3.3.2.4.1 NEW TAXA FOR THE PRESPA INTERNATIONAL PARK OR ALBANIAN FLORA

In the past five years new plant species have been recorded for PNP, from which the most important are *Centaurea prespana* and *Viola eximia* (*BARINA & PIFKO, 2008; SHUKA, 2010; SHUKA ET AL, 2011*). These findings support the results of invesitigations of *BALTISBERGER & LEHNERR* (1984) about Labiates, recorded in the Dry Mt in July 1982. During recent field work in the park, more than five hundred species have been recorded which had not been previously registered for the Prespa National Park(see list of species of PNP). The list contains several new species for the Flora of Albania and four of which are new for the entire transboundary Prespa Park region. These new plant species for the PNP include: *Monotropa hypophegea, Orobanche purpurea, Phlomis tuberose* and *Teophroseris integrifolia* subsp. *aucheri*.

1.3.3.3 FAUNA ELEMENTS

The best studied fauna groups are wintering water birds. There are regularly trilateral mid-winter counts during the wintering period of Palearctic waterfowl. The breeding birds have not been systematically studied at the Albanian side. The first systematic breeding bird survey was carried out in 2011. Additionally, special attention was given to the mammalian group of bats, since the karstic rocks and mountain provide excellent habitat condition of several bat species.

Less studied, but important for the entire ecosystem, are the groups of reptiles and amphibians. It is expected that among the lizard group endemic species could be found, if studies were executed. Systematic investigations on the reptile population have been carried out on the Macedonian side alone. This shall become subject of a science program of the Prespa National Park.

1.3.3.3.1 MAMMALS

The Albanian side. The Balkan chamois (*Rupicapra r. balcanica*) was recently photographed in the core zone of the NPP.

Several brown bears are constantly in the park's area. It is important to ascertain whether the bears are reproducing within the boundaries, as well as the location of their winter dens, as they would then require special protection and conservation measures.

Wolves are present in the park, but a clear representation on their population size is currently not available. Hair and photo traps will hopefully expose such information in the near future.

Neither the Balkan Lynx (*Lynx l. martinoi (balcanica)*), nor the Euroasian Lynx (*Lynx lynx*) have been recorded inside the park in the last ten years. Anticipation of the Lynx return remains, but this could take several years since their main prey the roe deer, chamois and hare are becoming rare due to illegal hunting. The Lynx is observed in Pelister NP and the the NP Shebenic, north of the Ohrid Lake. This could mean that the Albanian Prespa NP serves also as an important biocorridor for this species. The presence of predators such as the Lynx and the wolf are dependent on the increase of the ungulate population. Therefore, it is vital to manage the poaching and enforce the legislation and the hunting prohibition inside the park's boundaries. There is currently a high rate of poaching in the park, indicated by the siginifcant drop in the numbers of wild boar.
There are presently no red deer (*Cervus elephas*) in the park. The enforcement of the hunting ban promotes optimism in the migration of the red deer from the Macedonian side.

Up to now, there has been no evidence of wild cat (*Felis silvestris*),. Most likely due to the altitude of the park's location (850 m a.s.l.). Nevertheless, there are reports from local people of current sightings. The elevation of the lakes area restricts the presence of wild cats.

The red fox (*Vulpes vulpes*) appears to be relatively common, with evidencein several of the 20 camera traps and even can be seen during the day.

Badgers (*Meles meles*) have also been frequently caught on several cameras, and badger tracks are found quite often.

Reports of local fishermen claim that the otter (*Lutra lutra*) makes a regular appearence. It is highly likely that the otter population is substantial, with fish being their main food source, and is of sufficient supply. A detailed study is still necessary.

1.3.3.3.2 BIRDS

An initial survey of breeding birds on the Albanian side of both the Prespa lakes was conducted in June-July 2011, and revealed a first list of breeding birds of the Prespa National Park. An estimation of the breeding population was undertaken in order to have baseline data for future monitoring activities and assessment of the management activities of the park administration. For monitoring purposes, transects have been defined and documented in order to make the recent data comparable with future census activities.

1.3.3.3.3. AMPHIBIA AND REPTILES

(see table in the annex)

1.3.3.3.4 FISH

Fish in Prespa Lakes: Based on various data (*CRIVELLI, 2007; PERENNEAU ET.ALT, 2007; SHUMKA ET AL., 2008*) eight species of fish are endemic to Lakes Prespa catchment and one is endemic to the Balkans. Seven of them are considered vulnerable or threatened (endangered or critically endangered). The following table are presents the data on fish and various indications related to them.
In summary, 18 species of fish can be found, among them 8 are endemic to the Prespa Lakes catchment, 1 endemic to the Adriatic basin, 1 European species and 8 introduced species.

A more detailed description can be found in the Compendium version of the MP.

1.3.3.3.5 INVERTEBRATES

The entire group of invertebrates shall become the subject of a science program to produce more detailed data about the entire biodiversity of the Prespa area, and particularly of the PNP itself, as information and knowledge on invertabrates is practically unknown.

1.3.3.3.5.1 CRUSTACEA

No data exists about this animal group. Since some crustaceas are economically interesting like Astacus astacus, a population baseline survey is necessary and continuous control required.

1.3.3.3.5.2 INSECTS

Odonata

This group is important for the lake's area since all species are bound to aquatic ecosystems. An initial survey was undertaken by Despina Kitanova, from the Macedonian Ecological Society (MES) in 2011.A primary list of Odonata needs to be compiled.

Lepidoptera

The entire group of butterflies has not been studied as yet. Among butterflies there are species of European concern listed in the Annex I of the Fauna, Flora and Habitat Directive, which might be present in the PNP. There

have been a few observations of *Apatura iris, Iphiclides podalirius, Parnassius mnemosyne, Vanessa atalanta, Vanessa cardui, Artica caja*, which give reason to study the entire group more systematically and completely..

Hymenoptera

Despite the importance of insects for the socio economic development of human inhabitants and the park ecosystems, the entire group has not been studied.
Honey bees are the third most important cultivating species worldwide. Apis m.mellifera contribute not only by supplying the human beings with honey and other bee–products (propolis, wax, gelee-royal, pollen), but they also with their pollination function to a wide range of products used by human beings Other organisms also depend on their special services. According to *RUTTNER*, (1988) the Prespa region may still be inhabited by the autochthonous honey bee Apis mellifera macedonica as a ponto-mediterranean fauna element. However, it is more likely that the Macedonia- race of *A. m. mellifera* was replaced by the carneolian subspecies (*Apis. m. carnica*) as most places in Europe. Nevertheless, it would be worthwile to recover the autochthonous subspecies by a special breeding programm in the hands of the Prespa National Park.
More research is necessary to study other groups of Hymenoptera since the entire group is of highest importance for ecological and economic development of the region.

Coleoptera

The most abundant group in terms of species diversity among the insect realm are the beetles with their various orders, families and species.
The Prespa region harbors a large number of this insect group, ready to be discovered and registered. Only a few random observations have been made, but already reveal a high number of species.

Diptera

No records up to now. This group shall become also an element of the science program.

Saltatoria

No records up to now. This group shall become also an element of the science program.

Heteroptera

No records up to now. This group shall become also an element of the science program.

Planipennia

No records up to now. This group shall become also an element of the science program.

MOLLUSCS

Carstic soils are unusually rich of specialized snails.
No data exists currently. Another subject of a science program.

LOWER INVERTEBRATES

Lower invertebrates are yet to be studied. This group has to be included in a wider science program to inventory all fauna elements of the PNP.

ARACHNIDS AND ANNELIDS

Both groups are not studied yet and no literature is available. These fauna groups shall become subject of the science program as well.

1.4 DESCRIPTION OF EXISITING PROTECTED AREA FACILITIES AND CURRENT VISITOR USE.

At present the Park has a headquarters builfdng in Dolna Gorica/ Gorica e Vogel.
The actual exisiting infrastructure of the NP is insufficient for informing properly visitors to the parks area.
An Infopoint for visitors of the NP is planned to be constructed at the entry gate, between the Zvezda Pass and the Village Leska/Laijthiza.

At present the headquarters building is serving also a visitor info point. The facilities to convene larger visitor groups there are insufficient. More information can be obtained in chapter 3.4.

1.5 DESCIPTION OF CULTURAL LANDSCAPE AND HERITAGE

See chapter 2.1.2.

PART: 2 EVALUATION OF THE PROTECTED AREA

2.1 ASSESSMENT OF VALUES

2.1.1. BIODIVERSITY OF THE PRESPA REGION AND THE NATIONAL PARK

The Prespa National Parkand the entire region are dominated by the aquatic ecosystem of the lakes and the mountainous terrestrial ecosystems surrounding the lakes, and comprising the watershed basin of the entire area.

Table 11: Overview of species composition and their endemic and endangerment status.

	No of Species	No of Endemic Species	Endangerment According Red List of AL	Endangerment IUCN Red List	Status EU-Habitat /Bird Directive
Plant species	1130		60	9	1
Mushrooms/Fungi	174	0	10	2	not listed
Mammals[3]	60	6 *Balkan endemic*	4 En 4 R 6 VU	3 VU 9 NT	14 Annex II 23 Annex IV
Birds in total Breeding Birds	270 132		1 En 1 T 4 VU 6 R 7 K 3 I	1 VU 2 NT 129 LC	28 Annex I 6 Annex II/1 17 Annex II/2 4 Annex III/1 1 Annex III/2
Reptiles[4]	23	5 *Balkan endemic*	1T 7R 7K	1 NT	5 Annex II 14 Annex IV
Amphibia	11	4 *Balkan endemic*	3K	0	2 Annex II 6 Annex IV
Fish	23	6	1 VU 3 LR	1 CR 2 EN 6 VU 4 LC 2 DD	0

The vegetation of the terrestrial ecosystem is composed by forests and anthropogenic formed grasslands.
Detailed vegetation studies, providing fairly comprehensive reviews, have been undertaken in all countries sharing the Prespa region. (*PAVLIDIS, 1997*) The studies indicate that the entire Prespa region hosts unique biotopes that are important from a European conservation perspective. Extensive deciduous evergreen forests of *Ostryo-Carpinion orientalis*, evergreen box-juniper shrub lands, and beech and beech-fir forests are found on the eastern and southern slopes of the catchment basin. The evergreen conifer forests along the Albanian and Greek part of Prespa are significant for conservation and consist of tall 12m high and straight trees of *Juniperus foetidissima* and *J. excelsa*. The extensive beech and beech–fir forests of the FYR of Macedonia are also considered important for conservation. As far as the wetland ecosystems are concerned, the littoral zone of Lesser Prespa is covered with extensive reed beds (*Ass. Phragmitetum predominates*) with several open water areas covered by aquatic

[3] *According the Management Plan of the Galicica National Park, (2011)*
[4] *According the Management Plan of the Galicica National Park, (2011)*

vegetation. The morphology and structure of wetland ecosystems favour breeding and feeding of rare water bird species.

The aquatic ecosystems of the region are rich in endemic species such as the Prespa barbel (*Barbus prespensis*), the Prespa nose (*Chondrostoma nasus prespensis*) and others. In total 23 fish species are recorded of which 13 are non-native actively or passively introduced species. Of the 10 indigenous fish taxa identified, 4 species (*Barbus prespensis, Chondrostoma prespensis, Chalcaburnus belvica, and Gobitis meridionalis*) and 6 sub-species are endemic to the Prespa Lakes or to the Balkans.

With about 270 bird species, the avifauna of the Prespa lakes basin is highly diverse. Recent surveys revealed 132 breeding birds within the boundaries of the Prespa National Park. Additionally, during the winter season more than 20 bird species are spending the cold season on the lake. During the summer season the lakes are inhabited by the globally endangered Dalmatian Pelican (*Pelecanus crispus*). With about 700 breeding pairs, the colony belongs to the biggest breeding colony in the world. They are associated with White Pelicans (*Pelecanus onocrotalus*) and are currently breeding only on the Greek side but forage on all parts of the lakes. The latest census of breeding birds revealed more than 1,100 breeding pairs of the both Pelican species (*MALAKOU, 2011 pers. communication*). Also the Pygmy Cormorant (*Phalacrocorax pygmaeus*) now categorized as least concerned, but at its western boundaries of distribution, is breeding and wintering in the Prespa region. The globally endangered Ferruginous Duck (*Aythya nyroca*) breeds in the Ezerani lagoon on the Macedonian side of Greater Prespa and on Lesser Prespa in Greece. All these and many other bird species use the whole surface of the two lakes in all countries as feeding grounds.

The water surfaces of the lakes are important wintering sites for waterfowl of the palaearctic realm. The importance of the Prespa lakes and the corresponding wetlands for birds has been widely documented during the last thirty years and has recently been aptly summarised by *HEARTH AND EVANS*. A summary of simultaneous counts of wintering birds has been published by *CATSADORAKIS ET AL (*2012 in press). Based on the richness of waterfowl the the Albanian, Macedonian and Greek sides of the lake system are recognised as Transboundary wetlands of international importance by the Convention on Protection of Wetlands of International Importance (*RAMSAR, 1971*). The Ramsar designation in Greece is based primarily on breeding and wintering populations, whereas in Macedonia the designation is based on feeding species. Recently, also Albania parts of Prespa have been recognized as Wetland of International Importance under the Ramsar Convention (June/2013).

Furthermore, the Greek side of the wetland system is considered a Special Protection Area (SPA) under the Birds Directive of the European Union (79/409/EEC) and is part of the Greek contribution to the NATURA 2000 network of protected sites according to the Directive for the Conservation of Natural Habitats of Wild Flora and Fauna (92/43 EEC).

A complete list of the currently recorded breeding birds is given in the annex of the Compendium Volume

The lakes area hosts endangered mammal species, such as bears (*Ursus arctos*), wolves (*Canis lupus*), and most probably the Balkan lynx (*Lynx lynx*). However up to now no record of the Euroasian nor the Balkan Lynx could be found on the Albanian side of the lakes areas.
There are also 25 recorded species of bats in the region. Among these are nine species that are either threatened with extinction or are classified as vulnerable (*Myotis natter*, *Nyctalus leisleri*, *N. noctula*, *Rhinolophus ferrum-equinum*, *R. euryale, R. hipposideros, R. blasii, Tadarida tenoites and Vespertilio murinus*). Furthermore the otter (Lutra lutra) is reported to be common in the lakes area, whereas detailed population studies are still nont exisitent.

2.1.2 SOCIO-ECONOMIC VALUES : CULTURAL HERITAGE

The Prespa region is rich in cultural values, which date back to the Neolithic and the Bronze Age. The Roman, Byzantine and Ottoman empires have also left significant monuments. The most outstanding elements are perhaps the various Byzantine hermitages and of course the stonebuilt houses, characteristic of the local architecture. Traditional practices, ranging from fishing methods to local festivals, still survive in the area.

2.1.2.1 Natural and Cultural Monuments

The area hosts many prehistoric dwellings, churches and hermit chapels. The hermit chapels, apart from constructional value, contain many square meters of mural Byzantine and post-Byzantine paintings. The monuments of Prespa are numerous but here we shall only consider those situated in Albanian territory, as, for many reasons, these are the least well-known (declared by the Decision no 4827/1971 as National Monument).

Table 12: List of Natural Monuments in the Prespa National Park

Ishulli i Malligradit	**Island of Mali Grad**
Zgavra e Zaverit (Prespë)	**Cavity of Zaver (Prespa)**
Dushqet e Manastirit (Djellas Prespë)	**Oaks of the Monastery (Djellas Prespë)**
Venjat e Kallamasit	**Shrubs (stink juniper) of Kallamasi**
Shpella e Trenit	**Cave of Tren**
Gurët Mumjet e Trenit	**Stones Mummies of Tren**

In the National Park there are several monuments which have natural and cultural values; such as the Treni cave.

2.1.2.2 Archeological Sites

Neolithic settlement of Tuminec/Kallamas

It is believed that the Neolithic settlement of Tuminec/Kallamas is the larger in the wider area of the Balkans. This was discovered by an Albanian-French archaeological mission working there in past years. Following the excavations, it has been proven that the area has been inhabited since the Neolithic era (7000 B.C.).

2.1.3 SOCIO-ECONOMIC CONTEXT

In addition to its natural values, the lake region is considered to be of great cultural and historic importance with high potential for tourism. The region has been inhabited for several thousand years since the Neolithic times. Numerous archaeological sites prove that in ancient times an important trade route of the Western Roman Empire – the Via Egnatia – passed close to the region. The Byzantine and meta-Byzantine monuments of the Prespa basin are numerous and an evidence of the rich cultural and historic heritage of the wider region.

The distribution of villages and people located around the two Prespa lakes shows that the latest census has counted 5,634 persons living in 12 villages on the Albanian side, 1,569 from 13 villages on the Greek side and around 17,000 persons in one town and 40 villages in the FYR of Macedonia. In the past decades, there have been limited interactions among the people living in this region, due to the fact that it was dissected by state border zones, which formed part of the so-called “Iron Curtain”.

2.1.3.1 Agricultural Landuse

The inhabitants of Prespa are mainly occupied in the primary sector of production, with agriculture as the main source of subsistence income: Livestock raising and fishing also contribute to the production of the area in varying degrees, depending on the country. The secondary sector is only fairly developed in the Resen area (the FYR of Macedonia), while the tertiary sector is largely confined to tourism, which represents an important economic activity at least in Macedonia and Greece.

Large parts of the ecosystems of the Prespa Lakes region have been converted or transformed into agricultural systems of various kinds, or have been replaced by towns, villages and other man-made infrastructures. More specifically, water abstraction from the lakes for irrigation purposes, use of fertiliser and pesticides, disposal of urban wastewater, and of solid household wastes increase eutrophication, enhance vegetation growth at the littoral zone, and increase growth of organic substances in shallow waters. This leads to a reduction of the spawning grounds of endemic fish species and feeding grounds of rare water birds.

Along the Albanian side extensive wood and forest cutting, along with the diversion of the Devolli River into Lesser Prespa, resulted in the deposition of about 40,000 m^3 of solid materials into the Lesser Prespa Lake and lead to the destruction of the wetland. In the last decade of the last century the water level of the Greater Prespa Lake decreased by 6 m. The reasons for this phenomenon have not yet been investigated; however, the resulting

increased lake water eutrophication has been pinpointed in many scientific studies in the three countries. As a result, habitat diversity has decreased and many types of 'natural ecosystem' are now confined to relatively restricted areas. Recognition of the restricted and threatened nature of the remaining extents of representative natural ecosystems has been an important stimulus for reinforcing conservation action in the region. This is indicated by the creation of numerous protected areas in the lakes region.

However, in areas such as Prespa, as in many other mountain areas in Europe, natural conditions have been disturbed through human interventions for hundreds of years. Despite these changes, the natural character of the landscape has been retained, but is far from pristine. On the other hand, it should be noted that extensive land use practices have often created conditions favouring a higher biodiversity. Examples of biodiversity-enhancing practices in Prespa have been: *grazing, mowing and collection/use of reed each year, cultivation of small woodland openings, cultivation practices with inter-cropping, crop rotations, small and intermingling fields with a variety of crops, maintaining natural hedges and trees, the non-use of chemicals, and the combination of arable farming and livestock rearing in a system of high spatial and temporal entropy* (*CATSADORAKIS & MALAKOU, 1997*).

2.1.3.2 Fishery

Important part of local income generation is provided by the fishery sector.
About 50 licensed fishermen gain their income from fish from the lake. An additional 100 non-licensed people are catching fish from the lake for their own consumption or for selling it.

In the past the fishery practice was subject to overexploitation and introduction of alien species which produced a lot of ecological problems to the endemic and autochthonous fish population of the lake.

2.2 ASSESSMENT OF THE INSITUTIONAL FRAMEWORK

Table 13: Institutional Assessment and Related Responsibilities

No.	INSTITUTIONS	RESPONSIBILITIES/INTERESTS
CENTRAL GOVERNMENT		
1.	Council of Ministers	- Approve relevant legislation for Protected Areas, environment, biodiversity, fauna and flora, medicinal plants, forestry, fisheries, mining, renewable resources etc.; - Design Protected Areas and management regime concept.
2.	National Territorial Council	- Check and approve the compliance of local instruments with national planning instruments in force.
3.	National Territorial Planning Agency	- Support the coordination among different planning authorities at both national and local level.
4.	Ministry of Environment	- Draft and approve relevant legislation for environmental protection, environmental permitting, EIA; - Draft and approve relevant legislation for Protected Areas; - Prepare and present necessary documents to the Council of Ministers for issuing the protection status of a certain area; - Draft and approve relevant legislation for forestry and forestry services, management and preserve of fishery resources, water resources, wild fauna and flora including medicinal plants.
	Management Committee	- Administrate and preserve the protected areas through the supervision of management plans implementation, the enforcement of legislation by protected areas administration and enterprises performing activities in the area, the maintenance of environmental quality, the promotion of ecological (sustainable) development and the implementation of requirements for sustainable use of natural resources.
	Administration of Protected Area/Directory of Forestry Service	- Administrate and preserve the National Park of Prespa; - Follow the implementation of management plan of the area; - Follow the implementation of annual programs on monitoring and bio monitoring of the area; - Putt fines in case of violations and collecting fines;

No.	INSTITUTIONS	RESPONSIBILITIES/INTERESTS
		- Manage forest and pastures in surrounding areas; - Control enforcement of legislation in relation to forestry, pastures, protected areas, wild flora, fauna and hunting.
	National Environmental Agency	- Issue environmental permits of Type A and B, through NLC. - Advice the local government unit for implementation of environmental policy; - Enforce provisions of environmental legislation on EIA, environmental permitting, coordination of monitoring activities.
	Regional Environmental Agency	- Issue environmental permits of Type C, through NLC.
	State Inspectorate of Environment, Forestry, Water and Fishery	- Ensure the enforcement of legislation on environmental protection, forest, water and fishery.
5.	Ministry of Transport and Infrastructure	- Invest in waste management facilities, water supply and sewerage
	National inspectorate of Construction	- Control the compliance of development and construction with the approved planning instruments for the area.
6.	Ministry of Agriculture, Rural Development and Water Administration	- Administrate of Agricultural Program and Rural development; - Define the national policy of drainage and irrigation systems; - Administrate of drainage and irrigation systems.
7.	Ministry of Energy and Industry	- Draft the relevant legislation for energy and mining; - Issue permits for energy supply and mining activities through NLC; - Take administrative measures.
8.	Ministry of Urban Development and Tourism	- Promote tourism development; - Drafting policy in sustainable tourism development; - Ensure and protect sustainable use of touristic resources.
9.	Ministry of Culture	- Preservation of cultural elements; - Drafting policy in conservation of cultural elements.
10.	Ministry of Health	- Monitor the quality of drinking water; - Monitor the quality of curative waters.
LOCAL GOVERNMENT		
11.	Local Government Unites (Communes of Pustec, Proger and Bilisht Qender)	- Approve planning instruments; - Issue development and construction permits, through NLC; - Approve planning and construction regulations at local level; - Provide and maintain public services including water supply and sewerage, integrated waste management, etc.
12.	Prefecture of Korça	- Control the legal compliance of decisions taken by Local Government Unites.
NON-GOVERNMENTAL ORGANIZATIONS		
13.	Non-Governmental Organizations (National and International)	- Support initiatives in the interest of the local communities including sustainable development of agriculture and other local economic activities, preservation of biodiversity and awareness rising among local community.
LOCAL USERS		
14.	Local owners	- Claim land ownership - Benefit from tourism and infrastructure development; - Increase the economic profits from different activities.
15.	Fishermen's (through FMO Prespa)	- Control the implementation of legal requirements in terms of timing, equipment, seasons, etc.; - Ensure implementation of legal provisions in terms of licensing and fisherman's data delivery. - Implement restocking through national responsible authorities (MoE).
16.	Shepherds	- stabilize the number of livestock in line with MP; - Implement grazing quality and resources utilization; - Stabilize grazing areas.

No.	INSTITUTIONS	RESPONSIBILITIES/INTERESTS
17.	Livestock keepers	- Conserve the domestic cattle breed (Prespa Short Horn - Stabilize pastoralism
18.	Beekeepers	- Stabilize the number of bee hives; - Guarantee pollination of wild and cultivated flowers
19.	Private business (bars, restaurants and hotels)	- Increase number of tourists and visitors in the area; - Pay taxes for community services including waste management - Expand their business activity.

2.3 ASSESSMENT OF THREATS TO THE ECOSYSTEMS

2.3.1 OVERGRAZING

Most of the problems the area of the Prespa National Park is facing, are man-made.
The anthropogenic impact on the terrestrial ecosystems is well visible, especially in the forest ecosystems, and follows a gradient from the entrance of the National Park at the Zvezda Pass towards the border crossing to Macedonia above Gorica. These range from worse to better concerning the conditions of the forests.

The forest ecosystems can be characterized as shrubby bush-land close to the Zvezda pass and around Laijtiza, Pustec/Liqenasi, Zornosko/Zornosko/Zaroshka, Cerje, Rakicka, Shuec and Zagradec. On the higher altitudes above Dolna Gorica/Gorica e Vogel and Gorna Gorica/Gorica e Madhe, the forest looks like mature old forests. Unfortunately, deep encroachments have also been made and most of valuable timber has been cut and extracted.

Surrounding the villages at the Lesser Prespa Lake (Zagradec, Shuec), the former forest ecosystems have been almost completely converted into shrub land composed exclusively by *Buxus sempervirens*. This shrub dominates the deteriorated forest ecosystems at the entrance part around the Zvezda Pass. Buxus is resistant against browsing by livestock. In areas dominated by buxus, the vegetation indicates that over-grazing by domestic animals occurred in the past to a level which most probably makes the recovery of intact forest ecosystems very unlikely. This means, that even for very long periods, these buxus shrubs remain unchanged and can be considered as a temporary climax stadium of succession of severely overgrazed forests.

Due to the creation of the National Park 13 years ago, the intensive grazing with larger flocks of sheep and goats coming from the Korca lowlands up to the mountains has been reduced. This has already led to a visible recovery of the forest ecosystems, in those parts where the impact was not so severe, by fast growing offshoots especially by the oak (*Quercus spec*), beech (*Fagus sylvatica*) and hornbeam trees (*Carpinus orientalis*). But in the last 12 years, the composition of livestock inside the NPP in the ownership of the local inhabitants has changed. Locals tend to possess more cows and donkeys. Currently, the inhabitants of the NPP are officially keeping registered 3 891 livestock units (lsu) composed of 2,574 cows, 4,824 sheep, 2,379 goats and 842 horses (donkeys and mules). There are only theoretically 3,922 ha of grassland available to feed them. This means that 1 livestock unit per hectare is above the carrying capacity of the region, which could be considered under the poor soil conditions of the calcareous grasslands to be at maximum 0.5 lsu per hectare. The excess of livestock explains the heavily deteriorated areas around the existing villages by over grazing. The high number of livestock also needs fodder during the winter season. This was collected in the past by tree lopping. The leaves of the broad leaved trees was stored and provided to goats and sheep as foodstuff during the winter season. In spite of these facts, the Prespa Short Horn Cattle deserves special attention in terms of conservation of its genetic fond, and its appropriateness and adaptation to the local conditions.

2.3.2 FIREWOOD CONSUMPTION

The deteriorated condition of the forest ecosystems in the direct vicinity is further aggravated by the fact that those forested areas serve as firewood resource for the inhabitants. The restitution of communal forests into the ownership of the local communities has not solved this problem, since the need for firewood remained unchanged in the last twelve years. The fuel wood need of the local population is estimated of about 15,000 m³ for the approx. 1,500 households inside of the park, provided that the average consumption of firewood per household is approximately 10.0 m³. Only 895 m³ is collected from the restituted communal forests. That means that only just 6

% of the firewood need of the local population is supplied by the communal resource. The majority (94 %) is collected from the state forests (14,115 m³). According to the information provided by the local authorities, the local population paid the 12 communes for supplying them with 895 m³ 278,000 ALL (1,997 €). This is about 185.2 ALL (1.33€) per household a year. However, the majority of the firewood was taken from the state forests. If assumed that the firewood had to be paid with the same price as the communes have taken (between 210.0 ALL until 310.6 ALL per m³ = 1.50 € until 2.23 € per m³), a financial value to this amount of firewood can be calculated as a total of 3,121,248.00 ALL up to 4,384,119.00 ALL (23,141.10 € until 31,495.10 €).

It is questionable if this amount, or a share of it, has been collected by the Forestry Directorate in Korca as the governing administration of the National Park and its forest assets.

Due to the fact that the communal forests in the vicinity of the villages have been overused for many years, local people had no other choice than supplying their firewood need from the state forests. The communal forests will not be able to recover as needed for the purpose because these areas still serve as grazing area for livestock and provide broad leave fodder by tree lopping. Strict management action is required in close cooperation with the communal administration in order to allow their forests to recooperate.

2.3.3 POACHING

A severe and up to now underestimated problem is illegal hunting in the entire PNP. Illegal hunting in the terrestrial ecosystem is accompanied by illegal fishing and inappropriate fishing methods. Additionally, fishermen and local inhabitants have been observed to kill waterfowl.

Camera traps applied in the core zone of the National Park revealed a high number of 'hunters' in these areas, in spite of the fact, that hunting is completely forbidden in the National Park.

2.3.4 GROWING HUMAN POPULATION

The population has grown in last decades compared with the population size at the beginning of the 19th century (see table 21 Annex). In the year 1900, the total population of the park's areas consisted of 2,320 persons. In the year 2006, the park had a population of 4,607 individuals in 1,330 families. In 2012, the official data was 1,485 households (families) with 5,634 individuals. The most recent data provided by the communes of the Prespa Park area shows doubling of the population which has also increased the demand for resources and the negative impact by increasing use of water, production of sewerage, production of solid waste, energy consumption and use of otherresources..

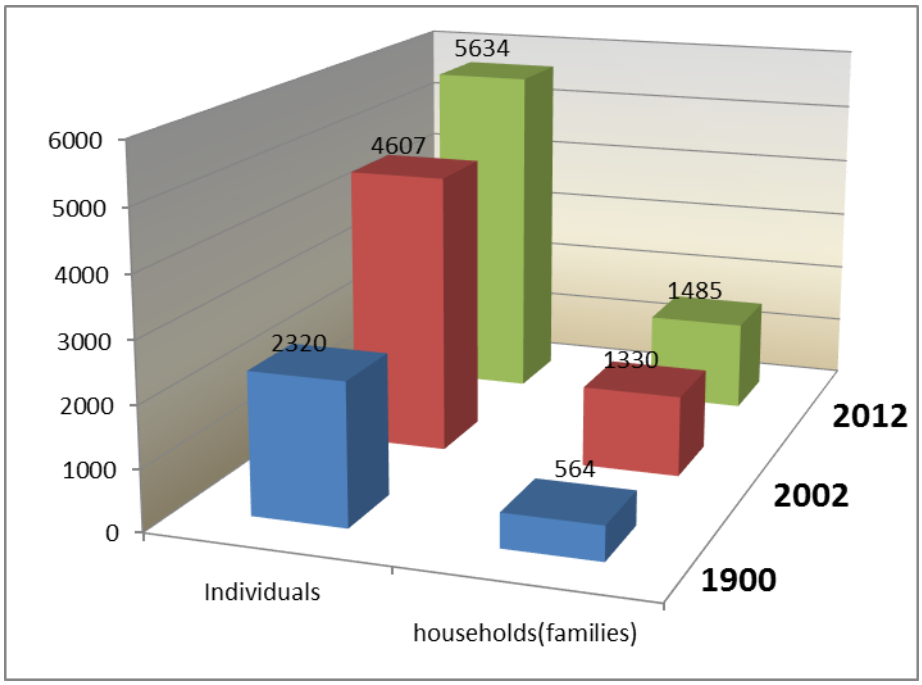

*Figure 2: Population growth in the 12 Prespa villages 1900-**2012***

2.3.5 TRAFFIC INTO AND THROUGH THE NATIONAL PARK PRESPA

The recently renewed and improved road from Korca over the Zvezda pass to the Macedonian border has improved the transport situation for the local people. But new and improved roads are attracting more traffic. The road through the park serves as short cut from Korca to Macedonians cities such as Resen or Bitola. The traffic through the park has significantly increased without any positive impact for the parks people since the travellers are passing through the park and stop only randomly. More severe is the increasing traffic of heavy load trucks with the capacity of 40

tons. This could be stopped by a clear restriction of heavy load-lorries to a maximum of 8 tons. The increasing traffic deteriorates an important quality of the PNP area, the relative silence. This quality will be one of the unique selling points of the region to attract tourists to spend holidays in the region, by the increasing traffic through the park along the main road, the quality of the PNP will be spoiled and the chance for development of a special tourism attraction destroyed.

2.3.6 FURTHER THREATS

2.3.6.1 Oscillation of water level of the lakes

The water level of the Greater Prespa Lake shows significant fluctuations. It reached its last maximum during the flood of 1963 with 853 m a.s.l., a level that corresponds to a lake surface of approx. 280 km². Since then, the water level has decreased to approx. 845.3 m a.s.l., with the sharpest decline being between 1986 and 1991. The lowest recent water levels were observed in summer 2002, with approx. 844.5 m a.s.l. Since then the water level seems to have recovered. Between 1962 and 1975, the two Lakes were connected and water levels communicated (*ANOVSKI, 2007*).

After that the Greater Prespa fell and the levels separated. The Lesser Prespa was subject to extensive human interference, mainly related to Greek and Albanian irrigation. The outflows of the Lesser Prespa Lake towards the Greater Prespa are controlled by a sluice gate. Until 2000, a canal fed the Lesser Prespa with water from the Albanian Devolli River during winter, which was abstracted during summer. Water supply from the Devolli balanced the extraction by the Albanian irrigation scheme of Korca, and the water level was kept at an average of approx. 851 m a.s.l. (*KARAVOKYRIS, 2004*). The Devolli inflows carried an estimated volume of 1.2 Mio m³/s of solid matter, which resulted in significant sedimentation. The feeding and extraction stopped in 2001 with the result that the natural water level had been running nearly parallel to that of the Greater Prespa since 2003.

The average water level between January 2002 and December 2004 of the Greater Prespa Lake was approx. 844.77 m a.s.l. Compared to the average value between 1951 and 1963 (850.65 m a.s.l.) this signifies a drop of approx. 5.9 meters. The Greater Prespa lake suffered especially from three sharp water level drops, which took place during the following periods: 1975/77 (1.2 m), 1987/90 (3.7 m) and 2000/02 (2.2 m). Between these periods the water level either recovered, as during the early 80s, or basically stagnated, as prior to the year 2000. The three periods of sharp water losses were relatively short. During these periods even the normal seasonal fluctuation vanished.

Long-term water level fluctuations of Prespa Lake observed at Albanian, Greek and Macedonian Observation Stations (*GFA, 2005*)

Water Level Fluctuations of the Lesser Prespa Lake

The shallow Lesser Prespa Lake and the Greater Prespa Lake are separated by a natural, mostly sandy barrier. At the western edge of this "dyke" a channel connects the two Lakes near Koula. Since 1969 this link has been controlled by a weir, but was destroyed in the early nineties by flooding. Since 2003 a new gate had been in

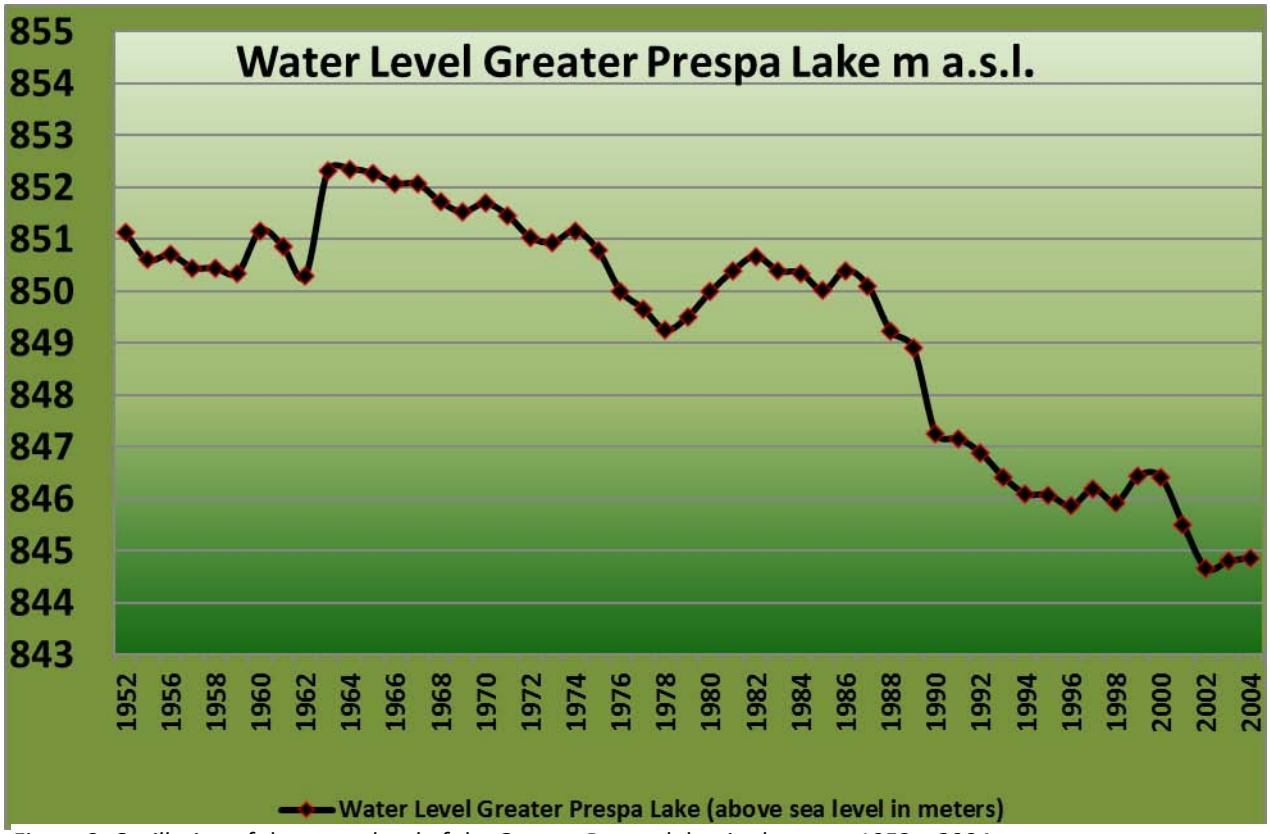

Figure 3: Oscillation of the water level of the Greater Prespa lakes in the years 1952 – 2004

planning and construction. It was finished in December 2004 and has since then been in operation. The main purpose of the weir is to keep the Lesser Prespa water level within certain limits which serve:
a) agricultural requirements (reduce pump height and ensure free drainage of lower areas) and
b) environmental requirements e.g. of wet meadows that form an ecologically important buffer along the shallow shoreline.

Up till October 1962, the water levels of the two Lakes differed, as that of the Lesser Prespa Lake was generally higher by approx. 0.5 m. After that date, the water levels converged up until June 1963 when both lakes had the same peak level. According to the available water level data from Albania (refer to Figure 6), the two lakes then had almost identical water levels up until December 1975. Data even suggests that the two lakes were connected, due to the high water levels to form one single water body, at least between August 1963 and July 1965. At the beginning of January 1976, the water levels of the Lesser and Greater Prespa diverged. While the Greater Prespa's level continues to drop, that of the Lesser Prespa remains on its higher level or even rises. Until the year 2000, the maximum water level of approx. 852 m a.s.l. was reached several times. In addition, from Figure 7 it can be taken that the amplitude of seasonal variation significantly increased to approx. 1 m after the water level separation of January 1976. This indicates the degree and effectiveness of human intervention that took place at the Lesser Prespa after that date. The Lesser Prespa reached its last peak in May 2002, with approx. 851.90 m a.s.l. In 2001, the Albanian management of feeding and extraction of water from the Lesser Prespa Lake stopped, altering the natural water level which has been running almost parallel to that of the Greater Prespa since 2003

In April 2004, the water level of the Lesser Prespa Lake was approx. 6.5 meters above that of the Greater Prespa Lake. Under these conditions, the Lesser Prespa would have dried out if the regulating structure to control the connection between the two Lakes did not exist. If this had happened, then the water level of the Greater Prespa would have climbed as a one-time effect by approx. 65 cm and the Lesser Prespa would have no longer existed.

According to Study of *GFA (2005*), the key results of the water balance are:

1) The dramatic drop of the Greater Prespa's water level is not necessarily caused by significant changes in the karstic system;
2) Human interferences on the Greater and Lesser Prespa Lakes probably do not contribute as main factors to the steep water level declines of the Greater Prespa Lake;
3) With its relatively small storage capacity the Lesser Prespa Lake rapidly reacts to overexploitation;
4) The water level decrease of the Greater Prespa Lake is probably caused by natural variations in rainfall, rather than being attributed to human extractions and variations in the "karstic outflow" regime;
5) In the past the outflows of the Ohrid Lake dropped even steeper, as compared to the inflows into the Greater Prespa Lake; and
6) Regional and urban planning should take the possibility of significant water level fluctuations into account; certain uses should be restricted in the water level fluctuations zone.

2.3.6.2 Climate change

According to the assessment of the water level oscillation and its causes, it can be assumed that the change of the global climate is already visible by the negative water balance of the Greater Prespa Lake. Only recently (2010/2011 and 2011/2012) an increase of the water level during the spring snow melting period has been observed which might be caused by higher precipitation during the winter season.

If the average annual precipitation will be reduced again, the water balance of the lake might become negative again in the longterm.

Due to the anthropogenic change of the global climate, it can be expected that special weather occurrences such as stark storms with heavy rain fall, long droughts, longer and colder winters with more snow or several years with mild winters without enough snow fall, may occur more frequently than before.

Longer droughts will increase the danger of forest fires. Strong rainfalls will increase the erosion of soils and lead to higher organic and inorganic burden to the lakes, with the possibility of that fertile soil being washed into the lake.

Loss of crops by storms, fires or droughts will result in uncertainty in harvests and might increase the poverty of the local people. Humans and their livestock will need more water from the lake and aquifers to irrigate the field and suitably supply the farm animals.

Hotter summers will increase the blooming of algae in the lake as it was observed in summer 2011. This will destroy the possibility of attracting summer holiday guests for the tourism sector in the park. The more serious concern is the decrease of oxygen in the lake ecosystem by the blooming algae, which might kill the fish, especially the young hatched in spring time.

2.3.6.3 Forest fires

Forest fires occur frequently in the region. Most of them are man-made. Lightning also causes forest fires during the dry season.
The more people out in the forests, the higher is the risk of anthropogenic induced fires.

Wood debris left over from fellings and illegal cuttings can provide good source for forest fires. Therefore, it would be an important management task to remove unused wood debris from forest. This biomass can be used for production of briquettes to supply the local population with their firewood need.

PART 3: MANAGEMENT OF THE PROTECTED AREA

3. MANAGEMENT

3.1.1. THE VISION AND THE MISSION OF THE PRESPA NATIONAL PARK

3.1.1.1 THE VISION

SPECIES AND HUMANS LIVE TOGETHER IN HARMONY IN THE PRESPA NATIONAL PARK FOR THE BENEFIT AND THE WELL-BEING OF ALL INHABITANTS. THE EXISTING ECOSYSTEMS ARE ENABLED TO PROVIDE THEIR SERVICES FOR CURRENT AND FUTURE GENERATIONS.

3.1.1.2 THE MISSION

CONSERVE BIODIVERSITY AND FOSTER SUSTAINABLE DEVELOPMENT FOR AND WITH THE PEOPLE OF THE PRESPA NATIONAL PARK AND STRENGTHEN TRANSBOUNDARY CO-OPERATION.

The Vision and Mission statements have been elaborated in workshops with the local stakeholders of the region. It was presented to the Management Committee of the National Park in which the representatives of the local population have a seat and vote. It was unanimously appreciated.

3.2 DEFINITION OF MANAGEMENT ZONES

The Prespa National Park is composed by semi-natural or near natural forests and grassland habitats. Furthermore, it encompasses a wide range of cultural landscapes which have been managed by human beings for many centuries. Special compartments of the park's area are the urban zones composed by settlements and traffic infrastructure. Only small parts of the area have been converted into industrial and military space.

As it is one of the objectives of the establishment of the NPP to provide sufficient habitats for wild flora and fauna, a zonation concept was applied 13 years ago as a concession to the recognized needs of the local population of the NP.
There are **Core Zones (ZONA I**) defined in which no human activity shall occur. These areas are surrounded by **Sustainable Use Zones (ZONA II)** which are subject to traditional and extensive land use. The land use shall become subject to a sustainable management which will not have any negative impact to the core zone, and which shall avoid any deterioration of the quality of identified habitats for wild living animals and plants. Also, the composition of species and their population sizes shall be stabilized.
The third compartment of the zonation concept is the **Traditional Use Zone (ZONA III)**, which includes the urban zones. In this area, recreation, tourism and economic development can take place. These activities shall become subject to sustainability. It could also be referred to as the Recreation Zone or Sustainable Development Zone.

In order to help the management institution of the National Park to decide on individual management actions related to the given objectives of the NP, a decision making matrix has been prepared (Table 13 and Figure 7). This will aid decisions on the management objectives of different compartments in the Prespa National Park.

Historically, the entire area was a natural ecosystem, not extensively influenced by human beings. Recent excavation in Kallamas revealed that the area has been inhabited by humans for more than 7,000 years. This means there has been an impact of human encroachment for several thousand years.

Nevertheless, a massive deterioration of the environment and the biodiversity has manifested only in the last 50 to 60 years. This is partly as a result of the increasing number of inhabitants, and partly due to the fact that there was the need of agricultural escalation in the years after Wold War II. The urban areas have grown in the last 50 years, incomparably more than in decades or centuries before.

This led to negative impacts to the ecosystems and endangered the services provided. This is clearly visible in the deteriorated forest ecosystems which cannot supply the local population with sufficient fire wood anymore, and therefore it is also a massive loss of economic values of the forests and pastures.

Erosion on agricultural cultivated land is another sign of overuse, which is evident in many parts of the National Park.

Both the Prespa lakes have become subject to massive violations in the last decades by introduction of alien fish species, other alien species and pests have been introduced into the lake ecosystem. Moreover, the Lesser Prespa Lake has become subject of a water management which burdens the Lake with massive siltation of sediments. Many of the original spawning grounds of the autochthonous fish population were destroyed by this massive negative impact.

In order to recover and conserve ecosystem functions and services, reparation of the damages done in the past have to be rectified. We hardly know the functions and roles of the various species within the ecosystems. Therefore, it is most important to keep the known composition of species in their habitats stable and restore, recover and rehabilitate ecosystems in a way that the typical set of species is constantly occurring in relevant population sizes.

Taking this into account, it is necessary to keep negative impact off from concerned ecosystems. We either to allow them to recover undisturbed or – where necessary – actively recover ecosystems and their functions by appropriate actions.

Considering the long history of human intervention in the region, one can assume that a lot of species have adapted themselves or are even bound to human settlements, and the anthropogenic use of natural resources. Therefore, one has to decide which status of the considered compartment is favourable for the biodiversity and related ecosystems. It means that cultural landscapes of traditional landuse can be as valuable as the natural undisturbed sites. The management objective would than mean to conserve the traditional and ecological sound methods of landuse. Even in settlements you can find a lot of specified habitats for animals which are valuable for certain species, such as the clay brick walls of many farm houses in the park which provide breeding and nesting space for wild bees and wasps. Sparrows like to breed in urban areas, as do house martins and swifts. Taking the habitat quality of the urban settlements into account, a holistic approach to conservation has to be applied, which strives to stop negative impact of human activities and enhance the positive aspects of landuse by the human inhabitants of the Prespa National Park.

A traditional fishery-method was applied on the Albanian side until the mid nineties, but this traditional way of fishing is not practiced anymore. This method is a very sensible way of catching fish and shall be recovered.

Another interesting finding of the breeding bird survey in 2011, is, that there are no breeding places for White Storks (*Ciconia ciconia*). This is simply due to the fact that in the settlements there are no suitable breeding places and even the forests do not provide suitable tall old trees which can be used for breeding. Food sources would be more than sufficiently available for the White Stork. This bird is definitely well adapted to human beings and their traditional way of land use and it could serve as an indicator for the cultural traditional land use and appropriate breeding places in villages. White storks are susceptible to artificial nesting sites and they easily can be helped by placing such artificial nesting platforms on roofs of houses and other places.

3.2.1.1 THE ZONATION OF THE PARK

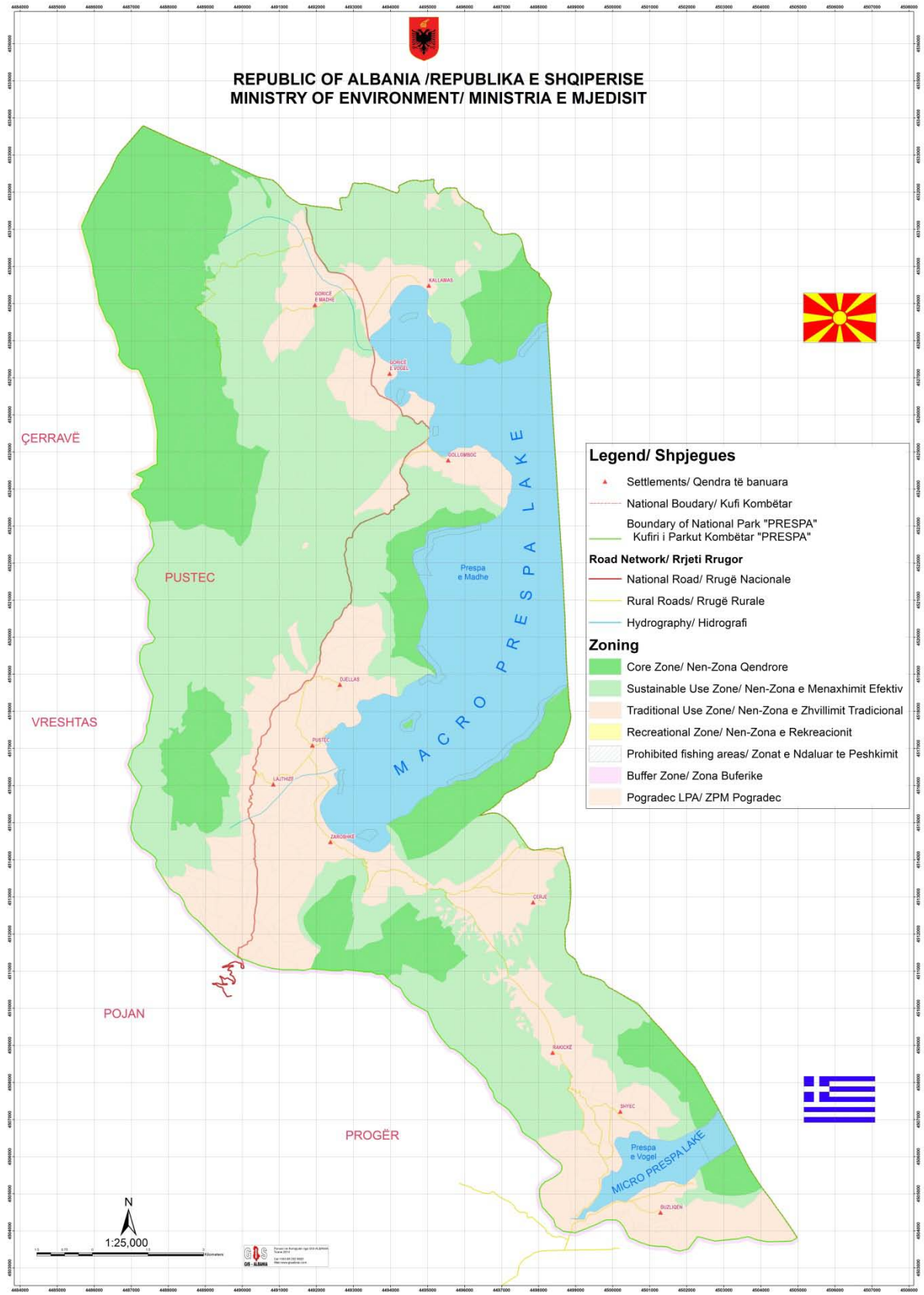

Figure 4: Revised zonation of the National Park Prespa

Prohibited Fishing Zones in the Lake (spatial and temporal)

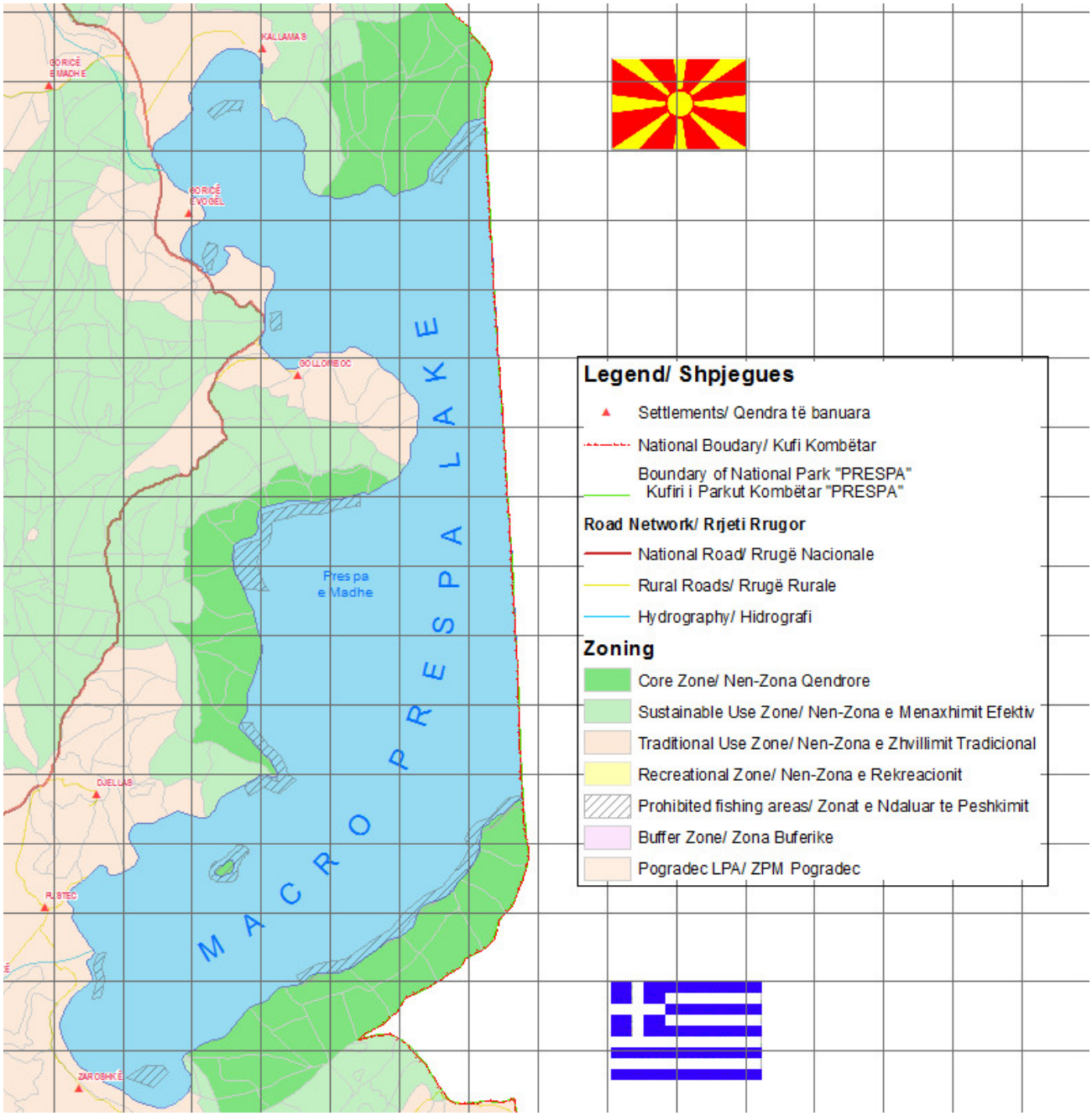

Figure 5: New Zonation of the National Park Prespa showing the fishing areas with restrictions (spatial and temporal) in the Greater Prespa Lake and Lesser Prespa Lake Details see Table 16

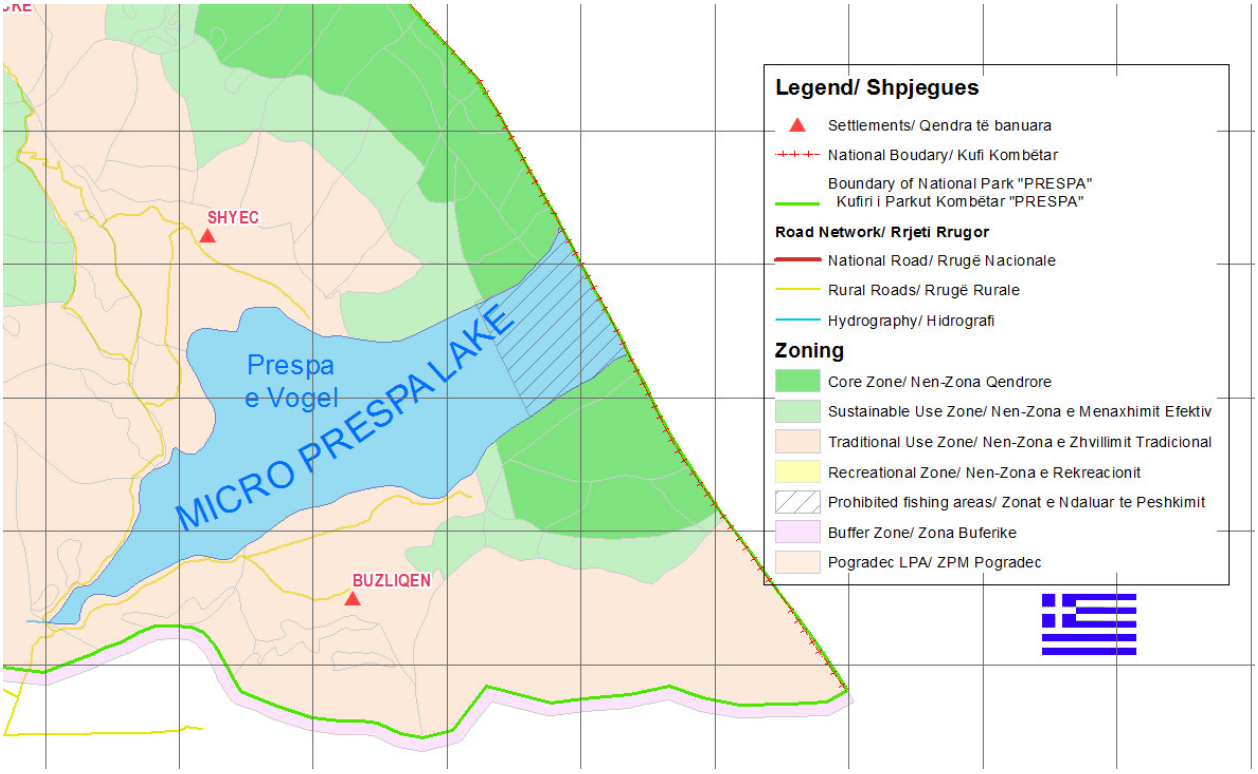

Figure 6: Prohibited Fishing Zones at Lesser Prespa Lake (hatched area)

The zonation of the National Park was applied during the creation of the PNP in 1999 to harmonize the requirements for conservation with the need of the local population. After 12 years of existence it turned out that there is a need for revision of the internal zones. Reasons have been some permanent conflicts with land owners, especially after restitution of private land titles and the communal areas. The multitude of field surveys for preparation of this management plan revealed good conditions of habitats in areas which haven't been subject of strict conservation measures. Therefore, a general revision was necessary.

3.2.1 General Guidelines for the Management of the PNP

The different zones of the park are comprised of the terrestrial and the aquatic ecosystems of the entire area. There are some common rules for protection which shall guide any human intervention in the park's area and which shall give guidance for the conservation actions in the different zones of the PNP:

Guiding Principles:

- **Biodiversity in its expression by habitats, the species living in these areas and their genetical basis, shall be protected by all necessary means.**
- **No individual species shall become subject of tantalization or cruelty and shall be respected as a part of creation.**
- **The use of natural resources shall become subject of sustainability.**
- **Ecosystems shall be enabled to provide their services for all inhabitants and future generations.**

Besides of the zonation of the National Park, there are **generally prohibited activities** or actions concerning all zones, respectively the entire park's area.
These activities are:

- **Hunting;**
- **Collection of eggs of wild living birds or reptiles;**
- **Disturbance of nesting sites of wild living animals and removing nestlings of breeding birds or the youngs of any mammal reproducing in the PNP;**

- **Tantalization or any kind of cruelty to wild living animals;**
- **Tantalization or cruelty to domestic animals;**
- **Introduction of non-native plants or animals into the wild;**
- **Commercial collection of timber and non-timber products without the permission of the National Park authority.**

3.2.2 CORE ZONE

A Core Zone is an area where the influence of human beings shall be reduced to a minimum of almost non-existence. Human activities which have led to massive deterioration shall be stopped immediately and permanently. Therefore, strict protection areas are defined and marked on the map and in the field. In these areas neither human intervention nor any kind of use of natural resources shall be allowed. These areas are habitats of rare or endangered or endemic species for which the country and the park will have a special responsibility for conservation. The zones of strict protection are marked in the map (see***Fehler! Verweisquelle konnte nicht gefunden werden.*** *Figure 5 and* ***Fehler! Verweisquelle konnte nicht gefunden werden.***) in dark green.

The following actions are strictly prohibited in these zones:

- **The construction of buildings or any kind of infrastructure which includes hiking, biking or riding trails;**
- **No technical infrastructure like telephone transmitters or similar constructions;**
- **Collection of plants, fruits, mushrooms, eggs of bird's nest or their nestlings;**
- **Hunting;**
- **Grazing of livestock;**
- **Collection of firewood (in case of terrestrial ecosystems);**
- **Fishing (in case of aquatic ecosystems);**
- **Harvesting of wood for commercial and non-commercial purposes (in case of terrestrial ecosystems);**
- **Fishing (in case of aquatic ecosystems);**
- **Introduction of non-native species (plants, animals or mushrooms**);
- **Scientific research can be allowed exceptionally according the permission of the National Park Administration.**

3.2.3 SUSTAINABLE USE ZONE

The strictly protected areas will be enhanced by surrounding buffer zones. Their main purpose is to buffer the human influence from the strict protection zones. Therefore, in general all human activities which could have a negative impact on the quality of the strict protection zones shall are prohibited. The **Sustainable Use Zones** are marked in the map (see***Fehler! Verweisquelle konnte nicht gefunden werden.*** *Figure 5 and* ***Fehler! Verweisquelle konnte nicht gefunden werden.*****Fehler! Verweisquelle konnte nicht gefunden werden.**). Human interventions which have no effect on the conservation status of the core zones are allowed, but shall become subject of strict control.

The following activities are prohibited:

- **Disturbing reproduction sites of species;**
- **Killing and removing of rare, endangered or endemic species as well as the destruction of reproduction sites;**
- **For aquatic ecosystems: fishing during the fishery banned season;**
- **For terrestrial ecosystem: grazing of livestock outside of determined areas;**
- **Tree lopping and fodder production;**
- **Collection of medicinal plants, berries andmushrooms for commercial use;**
- **The collection of medicinal plants, berries and mushrooms maybe allowed by the PNP administration for personal use of the inhabitants only;**
- **Hunting is restricted and strict controlled by the PNP administration;**
- **Wildlife management inside of the park – if ever necessary - is carried out by staff of the park or assigned to professional hunters under supervision and control of the park administration;**
- **Scientific research according the permission of the National Park Administration;**

3.2.4 TRADITIONAL USE ZONE (ZONA III)

The **Traditional Use Zones** of the National Park are explicitly designed for the use of natural resources by the inhabitants exclusively. This zones are given in the map (see***Fehler! Verweisquelle konnte nicht gefunden werden.*** *Figure 5 and* ***Fehler! Verweisquelle konnte nicht gefunden werden.*****Fehler! Verweisquelle konnte nicht gefunden werden.**) and

covering the main portion of the entire surface of the National Park. (*See At present, instruments such as the Geographical Information System (GIS)* allow a more accurate calculation of the considered areas. Since the establishment of the NP, changes in land ownership have occurred. In the year 2000, even the communal forests of the area had not been restituted. Now, the agricultural areas as well as forests and some urban land plots have been restituted to their former owners. Therefore, a more accurate recalculation of the entire PNP area has been necessary (Table 3).

Table 3). The Traditional Use Zones will be part of the so called Transition Zone of the future Transboundary Biosphere Reserve Ohrid-Prespa Watershed.
Nevertheless, all human activities carried out in this particular area shall envisage the conservation of the entire ecosystem and the protection of the service function of the ecosystem, enabling future generations to benefit from these service performances of the actual ecosystems.
The following human activities are allowed in these areas:.

- **Fishing exclusive of the banned season by licensed fishermen, but no sports fishing;**
- **Grazing of livestock on identified meadows and pastures;**
- **Harvesting of firewood in the marked forests according to the licencing system of the communities;**
- **Fruit production in existing orchards;**
- **Beekeeping;**
- **Ploughing traditionally used arable land for crop production, but with strict control of pesticides and fertilizers;**
- **Bathing and swimming in marked zones in the lake;**
- **Harvesting of reed according the management scheme, stipulated by this management plan and adapted to the local conditions;**
- **Hiking, biking and riding along marked trails;**
- **Scientific research according the permission of the National Park Administration.**

3.2.5 URBAN ZONES OF THE TRADITIONAL USE ZONE (ZONA III)

The Prespa National Park is comprised of 12 villages which belong to 3 communes. Currently, these villages are inhabited by 5,634 people. The urban areas are defined by the current boundaries (*see map Figure 4*). New houses shall be built only on the identified urban development zones and indicated in the general urban development master plan.
The urban zones are presently the origin of the biggest pressure on the ecosystems of the park. In the urban zones people are using water and pouring their untreated waste water into the aquifers belonging to the aquatic ecosystem. The drinking water supply is taken from the same aquifers in most cases from wells in direct vicinity of the pollution source. Therefore, it must be in the highest interest of the inhabitants themselves to avoid any pollution of groundwater aquifers. A new and increasing threat is created by the growing amount of solid waste disposed around the villages and the wider area to which the inhabitants have access. Solid waste is ubiquitous present in the National Park and needs to be addressed by the inhabitants themselves for direct and immediate actions for solution.
In the **Urban Areas** it shall be prohibited to pollute the drinking ground water.
Extraction of drinking water shall be controlled and the irrigation of agricultural land shall be restricted and controlled.
The construction of houses shall follow the common local architectural design and only a maximum of three floors per building shall be allowed. Business enterprises and their operation shall be restricted to urban areas, and no pollution in terms of solid waste, water pollution, noise and air pollution shall be allowed.

3.2.6 DECISION MAKING PROCESS FR ADAEQUATE MANAGEMENT ACTIONS

Table 14: Decision Making Matrix to Develop Appropriate Management Objectives for Compartments of the Prespa National Park

	Decision Making Matrix for Appropriate Management of Compartments of the Prespa National Park			
	Natural - ----------historical development---increasing degree of ----------→Degeneration			
Ecosystem	**Natural and Semi natural areas**	**Cultural Landscapes**	**Urban Areas**	**Industrialized areas**
Aquatic	Lakes Reed belts Littoral Benthos Rivers/Brooks/ ditches	Lakes Ponds and waterholes	Water basins for irrigation	
Terrestrial	Alpine Meadows	Deteriorated Forests Communal Forests Coppice Forests Pastures Meadows	Villages and Settlements	Bunkers Military constructions Economic areas Abandoned Factory Buildings
Terrestrial	Forests	Orchards	Sewage Systems	
Terrestrial	Caves	Wine Yards	Waste Dump Sites	
Terrestrial	Island Maligrad	Arable land	Roads and paths	
	Conserve and Protect	**Develop and Improve Natural Conditions**		

The Prespa National Park gives refuge to many different habitat types which are belonging either to aquatic or terrestrial ecosystems.

This matrix attempts to streamline the different approaches of nature conservation. These can be referred to as the segregation and integration approach. The applied zonation concept segregates strict conservation areas, where nature can take its course from the rest of the area, where sustainable schemes for the use of natural resources shall be applied for the sake of the biodiversity values of the identified core areas, but also for the susutainble use zones and traditional use zones. The decision making matrix in Table 14 shows the different habitat types which can be summarized in three categories:

1. natural or near natural conditions;
2. cultural landscape used for exploitation of the natural resources;
3. urban areas, settlements and the related infrastructure

The long history of human presence in the lakes' region has converted almost all terrestrial and also aquatic ecosystems into more or less used cultural landscapes.
The percentage of natural or semi- natural habitats without any human impact in the last 100 years is 0 %.

Historically, the human inhabitants of the NPP have converted parts of the area intosettlement. They settled down at places which deemed them best for their living in the past. During the long history, a lot of originally forested area has been cleared. This was either to gain space for agricultural production, such as arable land or pastures, but also for construction of houses and stables for livestock. Some small scale factories have been constructed, and due to the border area military installations changed the landscape from natural to even more or less industrialized conditions.

Taking this historical development into account, it is now the main objective of the park management to recover natural and semi natural habitats as much as possible, and to improve habitat conditions and ecosystem qualities.

The decision making matrix (Table 14) will allow assessing what has to be done to convert for instance a coppice forest into a typical natural autochthonous forest ecosystem.

Usually, you have simply to reduce the human impact and the forests start to regrow again. In some rare cases non-autochthonous plants or trees shall be removed.

There are actually 3,908.740 ha communal forests identified in the PNP. These forested areas would qualify to be used for firewood supply of the local people or as grazing area for their livestock. However, at present, these 'forests' have been so heavily overused in the past that they are not productive anymore. They have to be set aside for 30 years to recover in order to become productive again to supply local people with their main energy resource.

Due to the establishment of the National Park in the year 2000, the last remnants of high wood stands of forests have been conserved.

Historically, the human inhabitants of the PNP have converted parts of the area into settlements. They settled down at places which deemed them best for their living in the past. During the long history, a lot of originally forested area has been cleared. This was either to gain space for agricultural production, such as arable land or pastures, but also for construction of houses and stables for livestock. Some small scale factories have been constructed, and due to the border area military installations changed the landscape from natural to even more or less industrialized conditions.

Taking this historical development into account, it is now the main objective of the park management to recover natural and semi natural habitats as much as possible, and to improve habitat conditions and ecosystem qualities.

Abandoned agricultural areas could become subject to succession or the traditional extensive way of land use could be recovered. The decision making matrix will help such decisions. The decision can be based on various factors or arguments. The most important point of consideration for conservation of cultural landscape is always: "*Are there people being able and ready to carry out the traditional way of land-use, and is the income generated by this traditional land-use sufficient enough so that the farmers can make their living out of it*?" Often this question has to be denied and then the decision shall be taken to let succession run on these particular areas. Natural succession of the terrestrial ecosystems of the Prespa National Park will lead to forests as climax stadium with beech or oak as dominant tree species on calciferous soils. It was always thought that the highest altitudes of the mountain peaks of Mali I Thate are natural grasslands or so called alpine meadows. Recent investigations in these particular areas have shown that even on the mountain under favourable conditions trees would grow. This justifies the assumption that the climax vegetation of this actual grassland vegetation will be a forest. However, the succession will be very slow caused by the actual climate and harsh growing conditions for trees. Nevertheless, this finding justifies the redesign of the cores zone incorporating larger areas of the actual alpine meadows and keeping off livestock grazing in these particular areas. In the long run, it will allow certain areas with favourable micro climates and sufficient water supply for trees to regrow. The actual grassland shall remain subject of grazing of wild living ungulate species (Balkan Chamois *Rupicapra r. balcanica*, Roe Deer *Capreolus capreolus*, and Red Deer *Cervus elephas*). By effective reduction of illegal hunting, the already existing population will grow and also allow predators to occupy the National Park. As an important indicator, the Lynx (*Lynx l. martinoi*) can provide evidence through their presence and numbers on how sizeable the population of their main prey (chamois, roe deer, rabbits, hare). All of this prey depend on combined forests and open grassland communities.

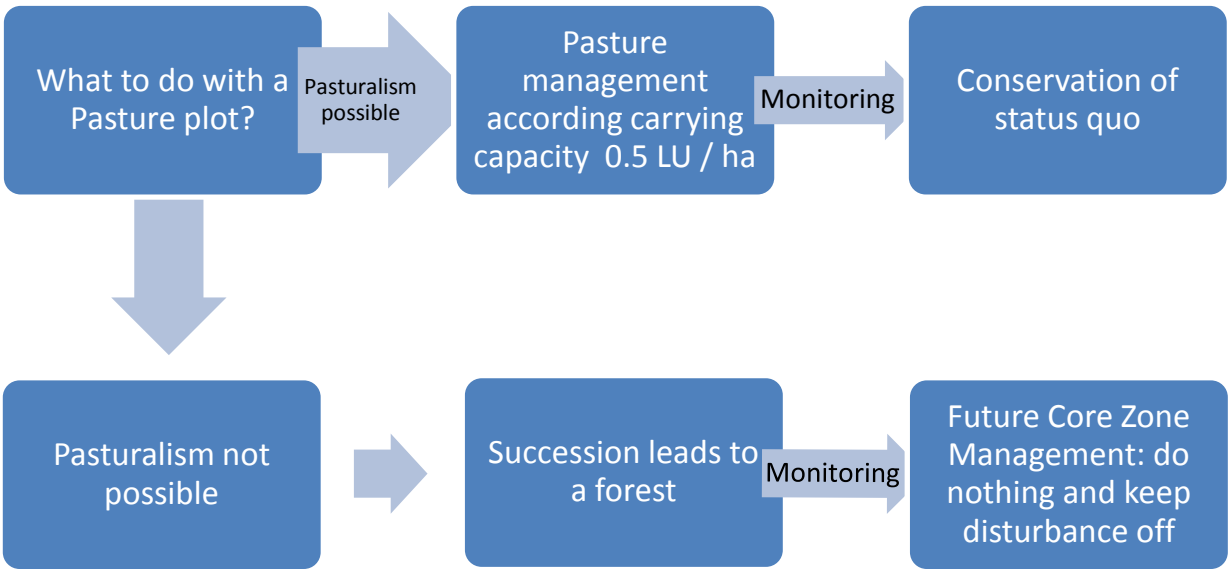

Figure 7: Example for the application of the decision making matrix by the potentials of the management of a grassland plot..

3.2.7 ACTION PLAN FOR APPROPRIATE MANAGEMENT OF THE ZONES RELATED TO THE INDIVIDUAL LAND PARCELS DEFINED BY THE FOREST INVENTORY 2012

The actions provided in the following tables have been the result of a detailed participation process and jointly elaborated in several workshops.

Objective: The stipulated Cores Zones as provided in***Fehler! Verweisquelle konnte nicht gefunden werden.*** *Figure 5 and* ***Fehler! Verweisquelle konnte nicht gefunden werden.*** (see more detailed map in the chapter about maps) are to be conserved as priority areas of undisturbed ecological processes and refuges for endangered, rare and endemic species for the their undisturbed development.

Indicator species shall show a stable or increasing population size.

Deteriorated forests and grasslands at present characterized as sustainable use ton can be developed to core zones, being strictly protected and succession shall be allowed to take its course and no further human intervention should disturbe these processes. This may enable the park to enlarge its valuable core zone by abandoned and overused forests, grassland and where possible by abandoned agricultural areas.

3.2.7.1 Action Plan for Core Zone

Table 15: Agreed Objectives and Actions for the Core Zone

	CORE ZONE		
Name of the Zone and included parcels of the forest economies	**The main threats/pressures**	**Conservation objectives**	**Actions/Measures**
Core zone Gorica e Madhe /Gorna Gorica Parcels: 105a+b, 40a, 40c, 39a, 39d, 38, 37a-c, 36a-c, 35a-e, 34a-c,33a+b,32a+b, 31a-c, 30a 30b, 30c (west), 29, 28a,	• Wood cutting; • Overgrazing; • Under grazing; • Medicinal plant collection;	• Protect the specific areas considered as habitat for wildlife and rare plant species • Keep negative human impact off • Protect natural processes	• Implement the revised zoning concept; mark the zones with demarcation sign boards • Block access roads • Built a control post at the access to Mali I Thate at the former military road coming up from Vreshtas/Pojan

	CORE ZONE		
Name of the Zone and included parcels of the forest economies	**The main threats/pressures**	**Conservation objectives**	**Actions/Measures**
27 a+b, 26a+b, 25,a+b, 24a+b, 23, 22a+b, 21a+b, 20a+b, 19 a+b, 18 a+b, 17 a-d, 16 a+b, 15 a+b, 14 a-c, 13, 13a+b, 11a+b, 10a+b, 9a+b, 8 a+b, 9a+b, 6a-c			• Stop illegal hunting • Control collection of mushrooms and medicinal plants • Only allow access for research purposes
Core zone Kallamas/Tuminec Parcels: 152, 153, 154, 155, 156, 157, 160, 161, 162, 163, 164, 165, 166	• Wood cutting; • Overgrazing;	• Protect the specific areas considered as habitat for wildlife and rare plant species • Keep negative human impact off • Protect natural processes	• Block access roads and paths • Prevent/stop grazing • Stop illegal hunting • Control collection of mushrooms and medicinal plants • Only allow access for research purposes
Core Zone Gollomboc/Gllobocen i Liqenas/Pustec East Coast of the Lake Parcels: 12, 13, 14, 15a+b, 16,17,18,19 20 a+b, 21	• Wood cutting; • Illegal hunting	• Protect the specific areas considered as habitat for wildlife and rare plant species • Keep negative human impact off • Protect natural processes	• Stop illegal hunting • Control collection of mushrooms and medicinal plants • Only allow access for research purposes • Control use of observation platform above Gllobocen i/Gollomboc • Only allow access for research purposes
Core Zone Island Mali Grad Complete Island except landing place and Chapel 'St Mary '	• Wood cutting; • Illegal hunting • Grazing of animals • Visitors trampling nesting sites	• Protect the specific areas considered as habitat for wildlife and rare plant species • Keep negative human impact off • Protect natural processes	• Stop illegal hunting • Control collection of mushrooms and medicinal plants • Place info tables for visitors on proper behavior. • Create paths from the landing platform to the chapel. • Control the use by tour guides. • Issue licenses for tour guides allowing them to visit the island with visitors • Apply a proactive visitor management • Only allow access for research purposes • Provide a space for Beekeepers for controlled mating procedures
Cores Zone West of Lajthizë/Leska Parcels: 74,77, 78,79a+b, 80 a+b 85, 86, 87, 84a+b,	• Wood cutting; • Illegal hunting	• Protect the specific areas considered as habitat for wildlife and rare plant species	• Stop illegal hunting • Control collection of mushrooms and medicinal plants

	CORE ZONE		
Name of the Zone and included parcels of the forest economies	**The main threats/pressures**	**Conservation objectives**	**Actions/Measures**
86, 87, 88, 89		• Keep negative human impact off • Protect natural processes	• Only allow access for research purposes
Core Zone Ivanit Parcels partly following contour line 1,200 m a sl. 34 40, 39, 38, 37, 36, 35, complete 33, 32, 21,13a, 15a+b, 16a+b, 17 a+b, 18 a+b, 88a, 87a, 89, 91a+b, 92,	• Wood cutting; • Illegal hunting	• Protect the specific areas considered as habitat for wildlife and rare plant species • Keep negative human impact off • Protect natural processes	• Stop illegal hunting • Block access roads and paths • Control collection of mushrooms and medicinal plants • Only allow access for research purposes
Core zone West Slopes below Cerje Parcels: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17	• Wood cutting; • Illegal hunting	• Protect the specific areas considered as habitat for wildlife and rare plant species • Keep negative human impact off • Protect natural processes	• Stop illegal hunting • Block access roads and paths • Control coast line • Control collection of mushrooms and medicinal plants • Only allow access for research purposes
Core Zone East of Cerje and East of Rakicka AL/GR border Parcels: 42a+b, 48, 49, 50, 53a+b, 54a+b+c, 55a+b, 56a,	• Wood cutting; • Illegal hunting	• Protect the specific areas considered as habitat for wildlife and rare plant species • Keep negative human impact off • Protect natural processes	• Stop illegal hunting • Control collection of mushrooms and medicinal plants • Only allow access for research purposes
Core Zone Zagradec AL/Gr border Parcels:131, 132, 133a+b, 134b	• Wood cutting; • Overgrazing;	• Protect the specific areas considered as habitat for wildlife and rare plant species • Keep negative human impact off • Protect natural processes	• Prevent/stop grazing • Stop illegal hunting Control collection of mushrooms and medicinal plants Only allow access for research purposes
Core zone Reed and water body Lesser Prespa along GR /AL Border Water body between the Parcels half 57+ 54c at the northern coast and parcel 131 at the southern coast	• Fishing • Illegal hunting	• Protect the specific areas considered as habitat for wildlife and rare plant species • Keep negative human impact off • Protect natural processes • Recovery of pelican and heron colonies	• Strict access control • Prepare floating islands to allow colonial birds to breed. • Only allow access for research purposes

In terms of management objectives, it means blocking access roads to the core areas, stopping illegal wood cutting, stopping illegal hunting and controlling the inner and outer boundaries regularly.

3.2.7.2 PROHIBITED FISHING ZONES (SPATIAL AND TEMPORAL RESTRICTED (CORE) ZONES IN THE LAKES)

Table 16: Objectives and Actions for the restricted areas in the Lake for fishery

Name of the Zone	Threat	Objective	Actions/ Measure to be taken
Greater Prespa Lake			
St. Marena Monastery	Overfishing. Global climate changes. Lack of management.	Preserve native fish stock. Protect native species and stop increase of alien species presence.	Ban fishing activities. Implement modified fishing regulations.
Ollnishte-Nakoll	Overfishing. Altered or destroyed riparian forest. Global climate changes. Lack of management.	Preserve native fish stock. Protect native species and stop increase of alien species presence.	Ban fishing activities. Improve riverine littoral habitats. Implement modified fishing regulations.
Maligrad Island	Overfishing. Disturbance.	Preserve native fish stock. Protect native species and stop increase of alien species presence.	Ban fishing activities. Implement modified fishing regulations.
Osoja - Zaroshka	Overfishing. Altered or destroyed riparian forest. Global climate changes. Lack of management.	Preserve native fish stock. Protect native species and stop increase of alien species presence.	Ban fishing activities. Improve riverine littoral habitats. Implement modified fishing regulations.
Zaver	Overfishing. Global climate changes. Lack of management.	Preserve native fish stock. Protect native species and stop increase of alien species presence.	Extend fishing ban period in two months. Implement modified fishing regulations.
Kallamas bay	Overfishing. Increase in the amount of fine sediment in streams. Altered or destroyed riparian forest. Global climate changes. Lack of management.	Preserve native fish stock. Protect native species and stop increase of alien species presence.	Extend fishing ban period in two months. Implement modified fishing regulations.
Zimorkite	Overfishing. Global climate changes . Lack of management.	Preserve native fish stock. Protect native species and stop increase of alien	Extend fishing ban period in two months. Implement modified fishing regulations.

		species presence.	
Pustec-Mil. station	Overfishing. Pollution/ Degraded water quality. Increase in the amount of fine sediment in streams. Altered or destroyed riparian forest. Global climate changes. Lack of management.	Preserve native fish stock. Protect native species and stop increase of alien species presence.	Extend fishing ban period in two months. Improve riverine littoral habitats. Implement modified fishing regulations.
Lesser Prespa			
Border area Al-Gr	Overfishing. Global climate changes. Lack of management.	Preserve native fish stock. Protect native species and stop increase of alien species presence.	Ban fishing activities. Implement modified fishing regulations.
Littoral areas	Overfishing. Pollution/ Degraded water quality. Increase in the amount of fine sediment in streams. Global climatic changes. Lack of management.	Preserve native fish stock. Protect native species and stop increase of alien species presence.	Extend fishing ban period in two months. Implement modified fishing regulations.

3.2.7.3 Actions plan for the Susutainable Use Zone

The following parcels are designed as buffer zones of the National Park Prespa:
Buzliqen (Zagradec) 133a above the Contour Line xx m.a.s.l., 134a, 135,
Shuec-Rakicka :57,56b, 52a, 51a, 47 a+c, 43b, 43a, 41, 40a+b, 39, 38, 37,36a+b, 35a+b, 34a+b, 33a+b, 31a+b, 30,a+b, 29a+b, 28a+b , 63, 64, 65, 66, 67, 68a+b, 69a+b, 70, 71, 72 a+b, 73a+b, 74a+b, 75a+b, 76a+b, 77a+b, 78a, 80a+c, 81a, 82a, 83a, 85 a, 86a+b, 87a+b, 88 a, 93, 94a+b, 95a+b, , 96a+b, 97a, 98,
Mount Ivanit: 13b, 14a+b, 18b, 19a, 20, 25, 27, 28, 29, 30, partly 35, 36, 37, 38, 39 and 40) , below Contour Line xx a.s.l,
West of Cerje: partly 15 and 16, 18, 19, 20, 21a+b, 22a+b, 23a+b, 24a+b

Mountain forests west of Lajthizë/Leska: 70a+b, 71, 73, 75, 76, 81, 82b, 83, 90, 91 94, 95, 96, 97, 98, 99, 100, 103, 104, 105, 107, 108 a+b, 109, 111, 112, 113a+b, 115, 116, 117, 143,

Gollomboc/Gllobocen- Liqenas/Pustec coast of the Lake: 127, 126, 22, 23, 24, 25, 26, 27a+b, 28a+b, 29, 30, 31, 32, 13, 3, 4, 11, 10, 2a, 3, 4, 11, 10

Around Core Zone Gorica e Madhe/Gorna Gorica:1a+b, 2a+b, 3b,4b, 5a+b, 7a+b, 28b, 27c, 30a+c, 34c, 39b+c, 40, 40a 41, 42a+b, 43, 43a+b, 44a, 44b, 45, 45a, 45b, 46, 46a+b, 47a+b, 47, 48, 49, 50, 51, 52, 53, 54, 58a+b, 59a+b,60a, 61a+b, 62a , 63a+b, 64, 65, 66, 67a+b, 68a+b, 69, 70, 71, 72, 73a+b,74 75, 82a+b,83, 85, 86, 87, 88a+b, 89, 90, 91, 92a+b, 93, 94, 95a+b, 96, 97, 98, 99, 100a+b, 101,102a+b,

East and North of Kallamas/Tuminec: 126a+b, 127a+b, 128a+b, 129, 130, 131a+b, 132a+b, 133, 134, 135, 136, 137, 138a, 139, 140, 141, 142, 143b, 144, 145, 146, 147a, 148, 149a, 150, 151, 158a+b, 159.

Table 17: Agreed Objectives and Actions for the Sustainable Use Zone

Sustainable Use Zone			
Key Features/ Characteristics Species/habitats…	**The main threats/pressures**	**Conservation objectives**	**Measures**
Lakes / wetlands **Wet meadows**	• Oscillation of water level; • Climate changes; • Illegal fishing • Inappropriate fishing methods	• Conserve permanent and temporary wetlands as habitats for Amphibian and rare bird species • Include coastal areas of the lakes to a core zone • Develop with fishermen Association sustainable fishing schemes	• Develop special management guidelines for the wet meadows; • Apply a permanent monitoring of the habitat and its key species • Apply the conservation measures for the restricted fishery areas in the Lake according *Table 16* • Help the licensed fishermen in marketing of their products
Forest/ alpine grassland **Bird species** **Mammals** **Plant species**	• Overgrazing; • Under grazing; • Tree lopping; • Logging; • Hunting/wildlife management; • Alien species; • Traffic/ disturbance; • Oscillation of water level; • Water pollution; • Illegal collection of herbs;	• Reduce overgrazing in the forest; • Support grazing in abandoned pastures; • Cooperate with experts from hydrology, climate change and meteorology; • Conserve the medicinal plants as commercial value	• Enforce law against illegal, hunting, and tree lopping; • Study the impact and ways of reduction of alien species; • Control and stop of the heavy traffic (over 8 tons); • Awareness rising/education; • Support marketing of local products; • Prepare a monitoring scheme for medicinal plants. • License herbs -; mushroom- and berry collectors • Apply forest management plan for the selected parcels for harvesting of firewood. • Entrust the harvesting work to a local entity licensed by the NPA.
Landscape	• Oscillation of water	• Identify geological	• Address issue of pollution

Sustainable Use Zone			
Key Features/ Characteristics Species/habitats…	**The main threats/pressures**	**Conservation objectives**	**Measures**
Geological formations Sink/holes Caves	level; • Garbage; • Quarries, • wind parks;	formations subject to protection; • Maintain integrity of landscape;	and garbage; • Support the communes in removal of wild disposed garbage • Stop windmills in the boundaries of the National Park. Find construction areas outside
Silence	• Increasing traffic	• Preserve this unique selling proposition to allow recreation tourism and health care tourism	• Stop heavy load traffic through the PNP (bigger than 8 tons)
Coastal zones	• Oscillation of water level;	• Reduce human water consumption	• Monitor the water consumption especially in the agricultural sector.
Eremitic churches/ Island Mali Grad and its chapel	• Too big number of visitors	Conserve and protect the cultural heritage	• Control number of tourists and guided tours by issuing a license to recognized tour guides

3.2.7.4 Action Plan Traditional Use Zone

Table 18: Agreed Objectives for the Traditional Use Zone

Traditional Use ZONE			
Key Features/Characteristics Species/habitats…	**The main threats/pressures**	**Conservation objectives**	**Measures**
Caves	• Lack of control / management	• Conserve the caves as habitats for bats and other cave dwelling organisms	• Close entries of caves (Treni) which are sensitive due to species living in them. Apply closing devices which allow species (e.g. bats) to enter and leave the cave without disturbance,
Churches		• Protect natural values of valuable churches on the coastal zones of the lakes; integrate in the management concept and tourist development.	• Apply a landing Kay at Mali Grad to allow visitors to access the chapel but restrict the access of the rest of the island
Biodiversity Fauna elements	• Illegal construction on the lake sites at littoral zones; • Activities on the coastal lakes area; • Agriculture practices; • Pollution from the solid waste depositions and waste water; • Fences in the lake (old and new); • Manures;	• Improve the land use planning, administration of land and forest; • Integrate in the administration all stakeholders and users; • Resolve the issue solid waste depositions and waste water;	• Study of relationship among fishes and birds; • Respecting the ban of fishing during spawning time. • Establish artificial breeding platforms for White Stork • Protected reed belt in the Lesser Prespa Area to allow birds to settle and breed during spring and summer months. • Apply the reed management scheme of this MP for production of Biomass
Biodiversity medicinal plants flora elements/ dendroflora species	• Harvesting practices/damages/illegal collection; • Wood cutting; tree lopping;	• Protect important medicinal plants and control the harvesting;	• Develop capacities of the NP for control of medical plants, harvesting, etc.

3.2.7.5 URBAN ZONE

3.2.7.5.1 SETTLEMENTS

The National Park incorporates 12 settlements with about 5,634 inhabitants in 1,485 households. Infrastructure such as roads, energy supply, drinking water and communication are required. The cleaning of sewage water and disposing of solid waste need to be treated in consideration of avoiding pollution of the environment. The settlements are where tourists and guests will stay, and therefore are prominent in regional development . The settlements will have to improve their appearance. The disposal of solid waste is currently uncontrolled, with higher volumes in the direct vicinity of villages. Waste water is not treated, and contaminated waste water trickles into the soils where it spoils the groundwater aquifers. This leads to

contamination of the lake's ecosystem, as well as the drinking water resources. Most of the villages are extracting their drinking water from personal wells from the groundwater aquifers. Therefore, a high risk of disease and lack of water exists for the inhabitants of the village without an appropriate water treatment system. . The villages themselves need to become more attractive in order for visitors to want spend their holidays inside of the NPP settlements. For this purpose, villages have to improve their appearance by a clean and neat infrastructure. This will contribute to the improvement of the NPP's image as a whole. The most urgent action to be taken is the implementation of a water treatment system, as well as a solution for solid waste disposal. An objective of the National Park administration is to assist the communities in finding support for such needs.

3.2.7.5.2 AGRICULTURE AREAS

Subsistence based agriculture serves the needs of the local population. The production of wheat and corn is therefore limited to those areas which allow their production. In the past, pastoralism was organised in a way that it caused the main deterioration of forests and pastures, especially around the villages. A botanical survey in 2011 revealed that the majority of pastures are overgrazed, but there are still areas which are definitely undergrazed. A special pastoralism regime is necessary to balance the grazing on the grassland to a favourable level for the ecosystem and the interest of the land users.

This regime shall be tied in with a marketing program for products from the agricultural sector. Unmanaged sectors such as fruit production shall be developed, and over productive sectors such as livestock shall be reduced. Bee keeping is a possible option for local producers, providing an income which does no harm to nature. Local products could be marketed in Albania and even abroad, by advertising with labels created specifically for the National Park.

A set of criteria will depict labelling of certain products. The criteria shall outline the standards of goods A quality control system has to be introduced to achieve the goal of internationally recognized ecological standards. The NPP will provide its logo in a license system to label special products for their origin from the park's area..

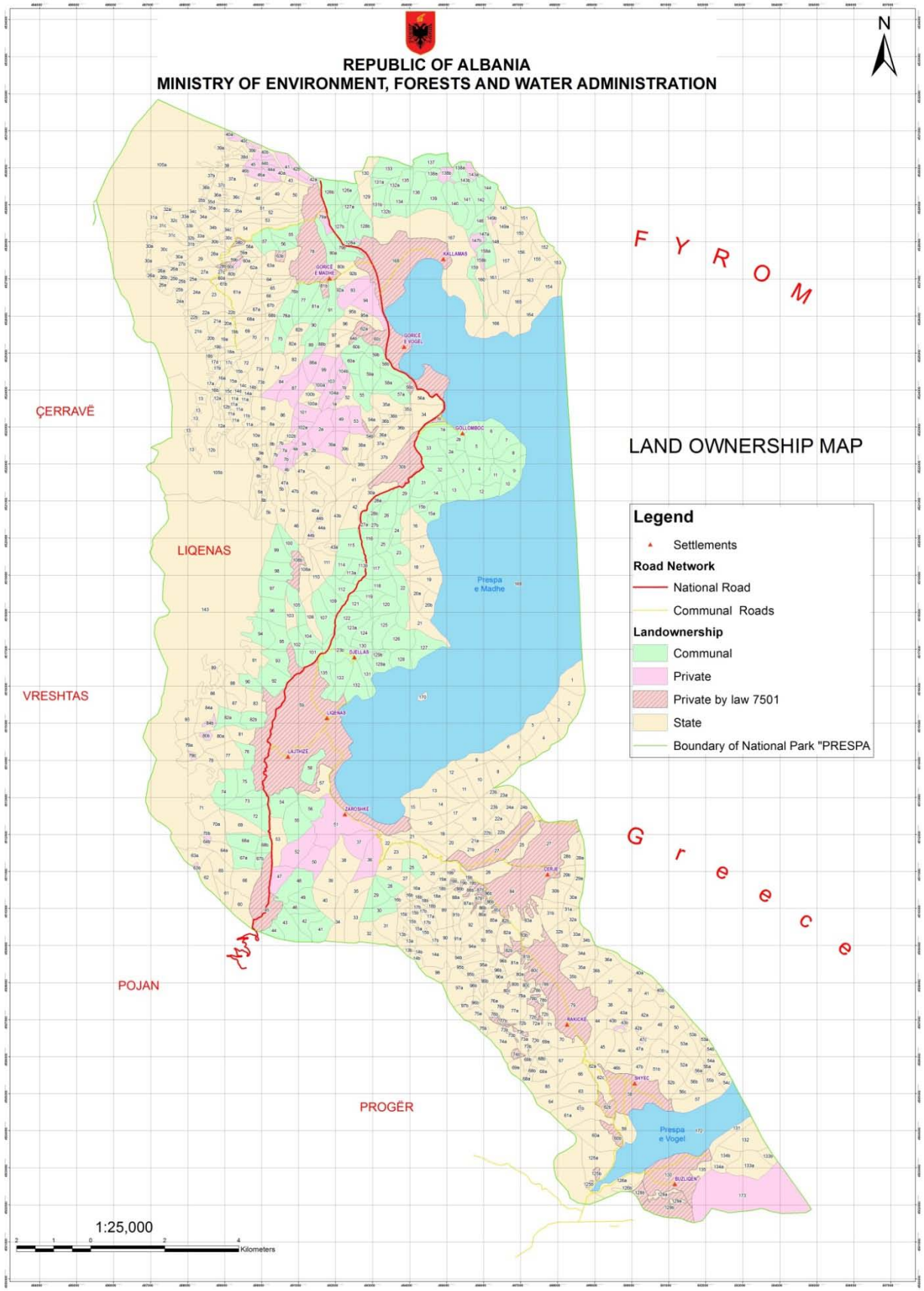

Figure 8: Land ownership map of the Prespa National Park2012. Green = communal forests, pink hatched areas = private land restituted by legal act 7501 used for agricultural purpose, pink areas = claimed private land used for agricultural purpose, beige = state owned land (including the water bodies)

3.2.7.5.3 COMMUNAL FORESTS

Most of the forest areas in the ownership of the communes are overused. Therefore, they need to be set aside for a period of approximately 30 years.
See communal forest management plan.

3.2.7.5.4 TRAFFIC INFRASTRUCTURE

The main road into the area of Greater Prespa Lake, over the Zvezda pass, improves the livelihood of local people by improving transport conditions for themselves and their products. It also allows for guest access in the park. This also refers to the improved road to the Lesser Prespa Lake, which ends in Rakicka. The paths to Cerje are still in a rough condition and need improvement, as well as the road to Zagradec.
Nevertheless, the improved road through the PNP attracts more traffic from the Korca region passing through the NPP as a short cut to Macedonia, especially to Resen and Bitola. It has been observed that heavy load trucks are more frequently passing through the PNP, which will increase noise pollution and devalue the natural beauty of the NPP. Therefore, a restriction of the road traffic to Lorries up to 8 tons shall be implemented and a road toll for all trespassing traffic from Korca to Macedonia and vice versa. The road toll shall be collected by the NPA and invested in improvements of the PNP and its villages.

Table 19: Cross cutting Actions to Mitigate Threats and to Achieve Objectives for the Urban and Agricultural Land-Use Areas including Wetlands of the Lake

Cross Cutting Issues (Urban Areas, Agricultural Land Use, Safeguarding of the Aquatic Ecosystem)			
Key Features/Characteristics Species/habitats…	**The main threats/pressures**	**Conservation objectives**	**Measures**
Lakes ecosystem itself	• Various • Eutrophication (Agriculture, livestock, waste water, solid waste…); • Lake level oscillation; • Erosion by 'historical deforestation' • Future Navigation with leisure boats on Greater Prespa	• Sustainable management of lake ecosystems, habitats and species; • Build knowledge on lake ecosystem and water level oscillation;	• Support the development of waste water treatment facilities for the main settlements in the watershed of the lakes; • Develop special regulation for boat traffic on the lake • Identify landing areas for boats • Allow only leisure boats with electric engines (solar powered boats)…
Water flora Reeds / Lesser Prespa Breeding birds Wet meadows	• Uncontrolled expansion of settlements… • Agriculture • Lack of management; • Disturbance • Fishery	• Maintain a level of reeds that allows balance in between feeding and reproduction; • Stop illegal urbanization	• Prepare management guidelines/or adapting already developed in Greek side • Apply the reed management scheme of this MP. • Support the Communes in stopping illegal constructions
Water flora	• Lake level oscillation;	• Ensure that reed habits are	• Law enforcement;

Cross Cutting Issues (Urban Areas, Agricultural Land Use, Safeguarding of the Aquatic Ecosystem)			
Key Features/Characteristics Species/habitats…	**The main threats/pressures**	**Conservation objectives**	**Measures**
Reeds / Lesser Prespa	• Agriculture practices/fertilizers/change of land use; • -Fishery • -lack of habitat mapping •	maintained; • Incorporate in management planning the climate change adaptation	• Controlled harvest of reed by issuing licenses to the reed managers. • Train reed managers and control their work • Allow reed harvest only in the period 1st of January until 15th of March
Fauna	• Illegal hunting • Confrontation bear and wolf with livestock keepers	• Stop illegal hunting • Provide favorable conditions for wildlife	• Control at the exit posts the outgoing traffic on illegal hunted wildlife • Provide beekeepers and livestock keepers with electric fences against wolves and bears. • Provide shepherds with guarding dogs
Fauna / Fish Endemic species (*Prespa barbel, Chondrostoma spec., Prespa bleak*)	• Natural water level oscillation; • Disturbance of spawning ground; • Overfishing; • Alien species; • Agriculture practices/national and transboundary level; • Lack of waste water treatment facilities; • Not appropriate fishery methods/techniques; • Lack of law enforcement; • Lack of data; • Stocking 'implications…' • Low level awareness among the fishermen; • -Lack of trilateral	• Assess the fish stock and develop joint fishery statistics. • Preserve endemics… • Integrate fishery activities into the PA law.	• Develop specific study on the influence of fishing activities during winter time… • Develop study on relationship native/aliens; • Develop species control measures during the stocking...track selection…/or stop it; • Legal enforcement; • increase of awareness among fishermen and local population on ecosystem functions and services;
Other species/groups	Insufficient knowledge	• Improve the knowledge about fauna composition	• Create a science program for the PNP and invite national and international scientist to work on the gaps of knowledge
Caves for bats	• -Uncontrolled visitors/ • -Using by locals for other	• Maintain caves as god habitats for livings, bats,	• Block entrances by iron gates or brick

Cross Cutting Issues (Urban Areas, Agricultural Land Use, Safeguarding of the Aquatic Ecosystem)			
Key Features/Characteristics Species/habitats…	**The main threats/pressures**	**Conservation objectives**	**Measures**
Special bays, lakesides	purposes/fishermen's/livestock keeping	invertebrates, etc.;	walls. • develop cave and bat conservation AP
Mali grad Birds Landscape Bats	• -Visitors overuse; • -not controlled archaeological excavations/not coordinated; • -'gold mining"…. • -Hunting…	• Reduce human impacts	• Develop and implement action plan including visitors guidance system;

Table 20: Logical Framework for Actions according the Management Plan for the Prespa Prespa National Parkin Albania (see Compendium of the Management Plan, 2013, pp 192ff)

	Management Objective	Action / Measure	Immediate/ Urgent 2014-2015	Mid term 2015-2018	Long term 2018-2023	Means of verification/ Indicator	Monitoring method	Result
Core Zones	Rehabilitate natural condition of forest ecosystems	Keep human activities out	X	X	X	Old beech and oak tree stands untouched, natural revitalization by offshoots	Trees marked and registered, control every three years	Natural regeneration of forest ecosystem
	Stabilize the woodpecker population	Keep human activities out	X			Amount of breeding pairs of Black woodpecker (Drycopus martius)	Counting the breeding pairs annually	Stable population or increasing
	Improve habitat quality for wildlife by stopping hunting	Block Access Road/Paths	X			No hunting	Wildlife cameras	No poachers pictured
	Conserve the mushrooms populations for the future generations	Provide licenses to mushroom collectors	X	X	X	Number of registered mushroom collectors	Registration of collectors	Disturbance by mushroom collector is low
	Conserve the medicinal plants future generations	Provide licenses to medicinal plant collectors	X	X	X	Number of registered medicinal plant collectors	Registration of collectors	Disturbance by medicinal plant collectors is low
	Research on natural regeneration of forest and grassland ecosystems without human alteration	Encourage national and international researchers to observe the rehabilitation of the ecosystems	X		X	Scientific publications	Published results	Increased knowledge of ecosystems and their recovery
	No grazing in the core zones	Stop grazing	X	X	X	No livestock in the core zone	Wildlife cameras	No livestock in the core zones
	Inform Inhabitants and visitors about the park, its restrictions and possibilities	Place info-tables and sign post to mark the boundaries of the core zone	X		X	Number of placed Info-tables and sign posts	Counting and controlling	Everybody respects the core zones
Island Mali Grad	Protect the cultural and natural assets of the island by restriction of the access on the island only to the chapel of St Mary.	Place and maintain a floating landing pontoon. Prepare and maintain a walking path from the landing platform to the chapel	X	X	X	Landing platform in place and in proper shape	Annual control	Natural regeneration on the island is enhanced and widely undisturbed
	Avoid disturbance to the rest of the island	Place info-tables and sign boards to keep visitors on the marked path	X					

	Management Objective	Action / Measure	Immediate/ Urgent 2014-2015	Mid term 2015-2018	Long term 2018-2023	Means of verification/ Indicator	Monitoring method	Result
Restricted Fishery Zones[5]	Restrict catching of fish to allow undisturbed reproduction and spawning of the fish population	Ban fishing activities temporal (April - May) and spatial according to the restricted zones (**Fehler! Verweisquelle konnte nicht gefunden werden.**), except the border area at the Lesser Prespa, where the fishing ban shall pertain all the year around.	X	X	X	No fishing during the fishing ban period and the designated areas	Direct control and patrolling on the lake during the banned fishing season	Native fish population reproduce successfully and the population in the lake is stabilized or even increasing
Sustainable Use Zone	Improve habitat quality by stopping hunting	Control in and outgoing traffic at the entry/exit points of the NP	X	X	X	No hunting detectable	Wildlife cameras	No records of poachers
	Recover overused coppice forests to forests of full grown trees Reduce firewood consumption	Reduce the use for firewood by substitution of biomass, supply more efficient heating systems in the houses Better insulation of houses	X	X	X	Phasing out of the firewood harvest within five to ten years from the state forest parcels of the PNP. No firewood cut anymore in the buffer zones after ten years	Substitution of firewood by biomass Support to install better heating systems Consultation of house-owners to insulate the houses properly	Average consumption of firewood reduced to 5 m^3 per household per year
	Recover forests of buffer zone	Reduce the use of grazing ground for livestock Reduce the lopping of trees for production of winter fodder for livestock	X	X	X	Phasing out the use of forests of the buffer zone as grazing ground for livestock. No grazing of livestock in the state forests of the buffer zone after ten years	Number of livestock grazing in state forest parcels of the buffer zone Annual registration	Recovering of forest ecosystems by re-growing trees
	Provide ecologically balanced pastures for the livestock	Balance the number of livestock with the given surface of pastures	X	X	X	The number of livestock units in the National Park is	Registration of livestock per	Balanced number of livestock units with

[5] *Compare Table 45 in the Compendium of the management plan of the Prespa National Park pp 194ff and compare Figure 122*

	Management Objective	Action / Measure	Immediate/ Urgent 2014-2015	Mid term 2015-2018	Long term 2018-2023	Means of verification/ Indicator	Monitoring method	Result
		by applying the thresholds for the carrying capacity of grassland (0.5 to 0.7 livestock units per hectare)				balanced with the available surface of pastures (about 4000 ha)	household annually	available pastures. No more overgrazing.
Traditional Use Zone	Improve habitat quality by stopping hunting	Control in and outgoing traffic at the entry/exit points of the NP	X	X	X	No hunting detectable	Improve habitat quality by stopping hunting	Control in- and outgoing traffic at the entry/exit points of the NP
	Recover overused coppice forests to forests of full grown trees Reduce firewood consumption	Reduce the use for firewood by substitution of biomass, supply more efficient firing systems in the houses Better insulation of houses	X	X	X	Phasing out of the firewood harvest within five to ten years from the state forest parcels of the PNP. No firewood cut anymore in the buffer zones after ten years	Reduce firewood consumption	Reduce the use for firewood by substitution of biomass,
	Recover forests of sustainable use zone	Reduce the use of grazing ground for livestock Reduce the lopping of trees for production of winter fodder for livestock	X	X	X	Phasing out the use of forests of the buffer zone as grazing ground for livestock. No grazing of livestock in the state forests of the buffer zone after ten years	supply more efficient firing systems in the houses	Improved forests to provide firewood for future generations
	Plant fast growing woods to provide firewood as substitute for reduced harvesting from state forests.	Plant Salix and Popular tree species in identified areas in significant amounts (8 ha and more)	X	X		At least 8 ha are planted and are ready made to be harvested in three to five years intervals	Plantation is present and growing	The more fast growing woods can be planted the higher is the relief for the state forests and the improvements.
	Provide ecological balanced pastures for the livestock	Balance the number of livestock with the given surface of pastures by applying the thresholds for the carrying capacity of grassland	X	X	X	The number of livestock units in the National Park is balanced with the available surface of pastures (about	Register livestock	Conservation of grassland ecosystems as pastures for the local population

	Management Objective	Action / Measure	Immediate/ Urgent 2014-2015	Mid term 2015-2018	Long term 2018-2023	Means of verification/ Indicator	Monitoring method	Result
		(0.5 to 0.7 livestock units per hectare)				4000 ha)		
Agricultural Areas	Provide food supply for the local population	Apply ecological standards for production by avoiding harmful pesticides and artificial fertilizers	X	X	X	Surface of arable land is stable	GIS analysis	Protection on soils as agricultural production sites for the current and future generations
Support measures for local population	Stabilize and improve the living conditions for the human inhabitants of the park	Provide a marketing organization to bring products form local producers to the markets. Support beekeeping Support the fishermen Support the collectors of medicinal plants, mushrooms and berries. Prepare a special label for products of the National Park	X	X	X	The turnover in production of goods is stabilized and prices for individual goods have been increased	Market research	Improved income for local producers with support from the PNP administration. Improved support from local population to the Park.
	Increase attractiveness for visitors	Create infrastructure in the PNP to allow visitors to experience nature. Identify and mark hiking trails, biking and riding trails. Provide information for visitors in a visitor center Implement info points in the park where visitors get information about recreation possibilities	X	X	X	Hiking, riding, biking trails and related maps are produced Visitor center set up increasing number of visitors The number of guests staying overnight in the PNP is increasing	Maps and info-material Registration	Increasing numbers of visitors are improving the livelihood of the local population.
	Train local people to become a nature guide	Select appropriate people from the PNP's area and train them as nature guides. Provide a certificate as recognized nature guide of the Prespa PNP	X	X	X	Several people are trained and have received a certificate 'Prespa Nature Guide'	Registration of trained guides	Guides are offering services to visitors and are able to inform about the biodiversity of the park and the culture
Special								

	Management Objective	Action / Measure	Immediate/ Urgent 2014-2015	Mid term 2015-2018	Long term 2018-2023	Means of verification/ Indicator	Monitoring method	Result
elements for conservation								
CAVES	Protect habitat quality of caves for cave dwelling fauna and flora and conserve the cultural heritage of caves	Block access to main caves especially the Treni cave	X			Access effectively blocked not visitors without permit of the NPA is visiting the caves	Control annually the construction to block the caves	Caves are protected and the habitat quality for cave dwelling fauna and flora is secured Cultural heritage is protected
Reed bed Micro Prespa	Protect the reed belt of the Micro Prespa lake along the border of Greece to improve habitat quality for breeding birds	Keep any disturbance off especially during the breeding season	X	X	X	No disturbance Breeding birds start to breed	Pelecanus crispus and P. onocrotalus start to breed Herons start to breed	Improved habitat quality for fauna and flora of reed beds.
	Improve the Micro Prespa for fishing	Remove parts of the reed in summer to open water surface	X	X	X	Open water space increased for fishing activities	GIS analysis	Increased open water space for better habitat quality for fish stock
		Open corridors in the reed to allow fishermen to access the open water surface	X		X	Open corridors exist and allow fishermen to access the open waters of the lake	GIS analysis	Better access of fishermen to their fishing grounds
Harvesting Reed	Harvest reed as substitute for firewood	Follow the prepared management plan for harvesting reed during the winter season (January to March), restrict the harvest to about 180 tons per year and follow a rotation system for the harvesting	X	X	X	Amount of annually harvested reed. Application of rotation harvest pattern	Mapping of harvested reed plots, GIS analysis	Reed as biomass resource. Improvement of habitat quality for the reed. Carbon sequestration and by this contribute to climate change mitigation
Aquatic ecosystems (lakes, rivers,	Protection from contamination with harmful substances	Awareness raising and education of the local population	X	X	X	No pollution	Abiotic parameters of the aquatic	Clean waters

	Management Objective	Action / Measure	Immediate/ Urgent 2014-2015	Mid term 2015-2018	Long term 2018-2023	Means of verification/ Indicator	Monitoring method	Result
ponds)							ecosystems	
	Protection of the lakes from organic pollution from the households and agricultural production	Education and awareness raising Construction of collection systems and sewage water treatment plants for selected villages. Construction of isolated septic tanks for individual houses	X		X	No organic pollution of aquatic ecosystems	Measuring of organic parameters	Clean waters
	Inform and educate about the Fauna and Flora of the lakes	Place underwater cameras in the lake and transmit the pictures to the visitor center		X	X	Awareness improved	Underwater cameras are in place	School classes are using the information to inform about aquatic ecosystems their services and fauna and flora
Species conservation and rehabilitation programme	Stabilize and increase populations of rare and endangered species living in the PNP	Raise awareness and educate local population and visitors about the special values of species	X	X	X	Awareness improved	Support by local population to actions of the PNP Increasing number of visitors	Improved conditions for species increases the attractiveness of the PNP for visitors
	Stabilize the population of songbirds	Place nest boxes around the urban areas. Place observation cameras in the nest boxes and transmit the picture to the visitor center	X		X	Nest boxes for birds are placed	Boxes are controlled and cleaned every year	Boxes are occupied and some bird species benefit from it. Awareness about breeding birds in the park is increased
	White Stork recovery	Place artificial platforms in villages around both lakes in order to provide breeding conditions for White storks	X		X	Breeding platforms are placed	Observation cameras close to the nest. Transmit the pictures to the visitor center	White storks are breeding again the PNP. Awareness about species living close with people is increased. Education and information of

	Management Objective	Action / Measure	Immediate/ Urgent 2014-2015	Mid term 2015-2018	Long term 2018-2023	Means of verification/ Indicator	Monitoring method	Result
								visitors is increased.
CULTURAL ASSETS	Protect the cultural heritage	Provide an exhibition in the visitor center for the excavated artefacts		X	X	Exhibition is in place	Exhibition is available for inhabitants ad visitors	The understanding of traditional land use and culture is improved
	Protect hermitages and Christian Assets	Support to the conservation of these cultural assets		X	X	Hermitages, chapels are protected and attractive for visitors	No vandalism is occurring	The cultural assets are attractive for visitors and well maintained.
ALIEN INVASIVE SPECIES	Remove species from the park's territory. Ailanthus altissima	Eradicate the species everywhere where it grows immediately	X	X		Removed plants	Five years registration of successful removal	No Ailanthus altissima growing in the Park

3.3 MANAGEMENT ACTIONS

3.3.1 GRASSLAND

The PNP remains, in large parts, a typical cultural landscape of combined agricultural, forested areas and vertical transhumance of livestock. Agriculture was and is generally set up around the villages in the valleys close to the lake shores of the Greater Prespa Lake (850-1,000 m a.s.l). The livestock in these areas were kept in winter and fed with hay produced in the valleys or leaves lopped from the surrounding broad-leaved trees and on suitable places in the higher parts of the mountains (gullies gathering a lot of snow in winter are preferred hay grounds above 1,800 m a.s.l.).

Forests for firewood production are predominant on the middle slopes (1,100-1,600 m a.s.l.). Oak forest is predominant up to 1,250m a.s.l. and above that level beech forest is starting, which is then mixed with conifers above 1,800 m a.s.l. The latter forests are only found these days in larger areas in NP Galicica below Peak Magaro on the Macedonian part of the Galicica mountain range. The mountains above 1,800 m a.s.l. are covered with sub-alpine meadows, which form the summer pastures for the livestock. The above described land use patterns have been applied to the region for centuries.

Taking into account the distribution of rudimental coniferous-beech forest on the mountains, most of the mountains would be forested. Only some natural cliffs and rock formations would have no or little tree vegetation. Only the forest belt in the middle reaches of the mountain remained in a semi-natural state and carry the natural climax vegetation in different degradation stages. Those areas were also overused by people for firewood production and forest pasture. All meadows in the valleys and most in the mountains are of secondary origin. Due to different environmental factors, the mountain meadows seem to form sub-climax grassland formations, which may stay stable even without further human influence over many decades or even centuries. This is due to the following environmental factors:

Water erosion: The soil conditions on the mountain meadows are currently favouring grasses, as a lot of soil and humus was washed down to the valleys. These days, accumulated biomass is easily burned off (see next point).
Wild fires: Herders have been burning the mountain meadows in order to suppress tree growth. This does not happen so often any more, but a wild fire in 2007 displayed that beginning forest succession with Juniper bushes is thrown back for decades. Due to high biomass accumulation on only sporadic used mountain pastures, the wild fires are very hot and even raw humus below ground is burning, making fire fighting extremely difficult.

Taking the current status quo of the NP into account, the protected area would qualify for a protected landscape, which is category V in the IUCN guidelines (IUCN, 2008). As the legal framework of the National Park does foresee to abandon forestry and livestock breeding in the high mountain areas, a slow transformation towards a natural landscape and a true National Park (IUCN category II) is possible. This would mean that all of the above mentioned vegetation associations would shrink significantly, some even go extinct within the park. Due to the regional frequency of this cultural landscape, there would be no threat to the overall biodiversity. A significant amount of wild ungulates would be important for the rare mountain meadow species i.e. Chamois (Rupicapra r. balcanica). The animals would keep enough space open in order to give endemic and rare species a chance to survive on the sub-alpine meadows e.g.: Festuca galicicea, Festuca hercegovincia, Edraianthus horvatii, Astragalus mayeri, Sempervivum galicicum and others. In a natural landscape, sub-alpine meadows would be less distributed. Unfortunately, chamois are under intense poaching pressure and numbers are currently much too low to guarantee the reliability of the sub-alpine meadows in NPG and NPP (numbers can be as low as 20-30 animals on both sides of the border).

In order to gather more understanding on succession processes, it would be useful to make some pilot plantations of beech and conifer forest above 1 800 m a.s.l. This is necessary as indigenous conifer species have become very rare, and beech is germinating only in the shadows. Even with abundant seed production in the lower reaches, it will take very long to recover in the higher altitudes with virtually no forest left.
No direct interventions are necessary in the oak zone of the NPP. The regeneration potential of oak forests is high, and grasslands which are eminent in this altitude zone will close up by indigenous oak forest in due time. The key management is to keep off livestock, which is damaging the young trees.

Areas with south exposition up to 1100 m a.s.l. are forested with Greek juniper (Juniperus excelsa) and Foetid juniper (Juniperus foetidissima). Mali Grad Island is a natural habitat for this juniper forest, but due to historic grazing pressure, juniper trees became extinct.Comparing the vegetation of Golem Grad and Mali Grad, we observe a very similar composition with annual herbs and grasses on the plateau of the island. The most noticeable difference between the islands is that on Golem Grad, the juniper forest is still well established. Thus, especially for Mali Grad, it seems possible to introduce autochthonous juniper species, which should over time establish well on the plateau of the island.

3.3.1.1 MANAGEMENT OBJECTIVES FOR GRASSLAND

Unused pasture shall be harvested once a year for hay production. These pastures are generally a significant distance from the settlements. In order to make use of these pastures for hay production, adequate equipment and transport means are necessary. Locals are now in possession of more cows and donkeysthan before.. The inhabitants of the NPP currently own 3,891 animals However, there are only 3,933 ha of pasture to feed them.This results in 1 livestock unit per hectare, which is above the carrying capacity of the region. This could be considered to be at maximum 0.5 LSU per hectare under the poor soil conditions of the calcareous grasslands.
This explains the heavily deteriorated areas around the existing villages by over grazing. The current number of livestock needs additional fodder during the winter season, which will be lopped down from the trees.

Anthropogenic created grassland is wide spread in the NPP. State forests are used for grazing animals and supply ofwinter fodder between 20 % and 30 %.The winter fodder is composed of 82 % of leaves lopped from trees, and 18 % of hay. The broad leave winter fodder is taken up to 32 % from state forests.

The objective is to reduce the proportion of broad leave fodder from tree lopping by increasing the hay production.

- Develop special management guidelines for the wet meadows;
- Reduce overgrazing in the forest;
- Support grazing in abandoned pastures;
- Cooperate with exerts from hydrology, climate change ad meteorology;
- Invert coastal lakes area to a core zone;

The alpine meadows are only sparsely used at the moment. Summer pastoralism (May until September) could provide extra food for cattle and sheep. Alternatively, the pastures could be used for hay production to substitute winter fodder by broad leave trees. This wouldallow the communal forests a recovery time of about 30 years to support locals in the future with lopped fodder.

The alpine pastures could also become subject of succession and can be reserved for wildlife such as Balkan chamois, Roe and Red Deer. This requires the declaration of the alpine pastures as core zone of the National Park.

The meadows on the plateau between Cerje and Rakicka are, according to the results of the vegetation experts, under grazed and could allow for more livestock grazing. However, limits have to be fixed according to the carrying capacity of the grassland. Additionally, the availability of water is a natural limiting factor which will constrain the pastoralism to the spring and early summer season, when sufficient water is available.

3.3.1.2 Alien Plant Species

In parts of the Prespa National Park, the alien tree like shrub *Ailanthus altissima* (Mill.) Swingle was found. According to *STEŠEVIĆ, D., PETROVIĆ*,, (2010) this tree like shrub must be considered as an alien species with high invasive potentials such as suppressing native plant species. It is described to be aggressive in its spreading behaviour. “Ailanthus produces an allopathic chemical called ailanthone, which inhibits the growth of other plants. The inhibitors are strongest in the bark and roots, but are also present in the leaves, wood and seeds of the plant”. (WIKIPEDIA 2013). It is therefore strongly recommended to start an eradication campaign.

3.3.2 Forests

The dominant vegetation formation of the terrestrial ecosystems have been mixed beech and oak forests on the calciferous soils. These are primarily found on the mountain ridge of Mali I Thate along the Ivanit mountain, and the southbound ridge towards the Greek border. There are only a few areas with silicate soils in the area of the Lesser Prespa Lake bordering with Greece, which allow for other forest formations.

The challenge in managing the forests is reducing the pressure which led to the deterioration in the past. As described earlier, the main factors are overuse of firewood harvest and overgrazing. This means both direct and indirect measures have to be applied to reduce these anthropogenic threats.
The following management measures are based on the forest inventory carried out in 2012, and the related forest function plan.

3.3.2.1 Basic Elements for Forestry Management

Within the National Park's area, the protection of nature has priority over any economic exploitation of the forest. This is clearly stated in applicable law.

According to article 12 of the law for protected areas, No. 8906, dated 6.6.2002, those forests located in protected areas shall be excluded from classification as forests for utilization. Consequently, forest harvesting in Prespa National Park is limited to firewood support for households of the twelve villages located within the national park only.

The forests of the Albanian Prespa National Park represent an important component of this park. They grow at an altitude from 850 m to 2,200 m , which are nowadays converted into alpine pastures. The forest are classified as, *Castanetum* and *Fagetum*. As land properties, they belong to three groups: public-owned, state-owned respectively communal properties and privately owned properties. Based on the way they are governed, these forests could be further classified in two forms: high forest, for a part of beech forests and coppice forest for the rest of beech forests and all of oak forests. Moreover, a classification based on the forest type reveals beech forests and some types of oak.

From the management perspective, an important phase has already been reached: three management plans based on the three forest economies (See Table 21: Size of Forest Economies (**Source: GIS Analysis 2012**) have been prepared for state and private forests and one for the communal forests, which altogether comprise the forest fund of the Prespa National Park. In addition, the forest function plan exists and the zonation of the PNP is defined.

The actual situation of the forests of the Prespa National Park is defined by their damaged condition. Apparent characteristics consist of deviations from the normal structure of the forest due to their overuse and abuse during the last 30 – 40 years. There are, however, some parcels of communal forests which in the recent years have been subject to interventions with improvement works, such as cleaning, coppicing, etc.

In the management plans of state – and communal forests, an annual allowable cut of 2,070 m³ (20,702 m³ / 10 years) is calculated. The table below presents the interventions and respective volumes. However, to serve the local firewood demand an annual cut of 7,056 m³ would be necessary.

The consented cut (Table 25) is much smaller than the actual firewood demand. This frame aim to provide solutions and recommendations to achieve sustainability in the use of wood as energy resource. For the annual production of approximately 2,000 m³ firewood about 1,900 ha of forests are necessary. In order to satisfy the annual need of the local population 15,200 ha would be necessary. The entire forested area inside the NP boundaries are only 14,748.38 ha and a about 3,600 ha of forests are set aside as core zone of the National Park where no intervention should happen. In total only 11,052.857 ha forests are available to produce firewood, whereas 7,462.863 ha are in the sustainable use zone where only a reduced intervention should be performed.

Consequently, the average consumption of firewood per household per year has to be reduced from 10 m³ per year/hhld to 5 m³ per year/hhld!

This can be only achieved with the support of the local population and by application of flanking measures allowing wood consumption reduction and serving the needs of the local population without causing disadvantages. As a

strategic goal, a 50% reduction in the firewood consumption is proposed within the period of the 10 year framework of this MP.

3.3.2.1.1 HIGH FOREST

In the Prespa National Park, high forest constitutes only a small part of the total forest area and can be found exclusively in state forest areas. A large part of these forests originate from natural reproduction via seeds, with the exception of the plantation of conifer trees behind the national park headquarters building.

3.3.2.1.2 COPPICE FOREST

Coppice forest management allows for a sustainable supply of the local population with firewood which is essential whenever there are no alternative sources of energy available.

One of the characteristics of coppice forest is the fact that across large forest areas reproduction happens only as vegetative reproduction, due to human interventions. Cuttings are carried out several times within a few years. Trees are unable to produce seeds because they are cut down at too young an age. Forests maintain themselves by way of asexual propagation only. This undermines genetic evolution, adaption and progress and in the long term it reduces the stability of tree crop.

The longer this harvesting method of tree cutting at a young age continues, the more tree stumps will lose their vitality. Saplings will find it more and more difficult to grow in height and width, until finally the stump has become too old and dies. Gaps in stand are one of the results.

The formation of gaps is further intensified through partially intense grazing of cattle, sheep and goats. Trees are often significantly weakened because of browsing by grazing animals.

The final degradation stage of oak forests is Buxus sempervirens formations, which are resistant against grazing by livestock. Juniperus is also spared by grazing livestock, due to its stingy needles.

For a very long time, the local inhabitants have been accustomed to collect firewood themselves and to take care of the transport it to their home themselves.

Pack animals have limited carrying capacity for wood, therefore they have to cover the transport distance several times. The animals are thus needed in such a high number that only the local population is equipped to supply enough pack animals for transport. It is mostly donkeys that are used for this task, sometimes horses.

Firewood stacked near the households shows the average diameter of the wood that is cut. In most cases the average lies below 10 cm.

Successfully reducing the illegal cuttings is of crucial importance to secure a sustainable and positive evolution of the forests of the National Park. This can be achieved if National Park staff and local authorities join forces in this effort and transmit the message to local inhabitants that a stable and vital forest is of much higher benefit to them than the current forest.
It is imperative to stop the illegal commercial trade with firewood from the parks area. Selling firewood to consumers outside of the NPP is stealing the source form the local population.

3.3.3 FIREWOOD SUPPLY PLANNING FOR INHABITANTS OF PRESPA NATIONAL PARK

Due to the rules laid out for the National Park, only forests of the buffer zone and forests of the development zone may be exploited for wood. In core zones, forestry use is not allowed. This concerns 24 % of the total forest areas of the National Park, where it is no longer legal to extract firewood.

In order to reach feasible solutions that will be accepted by the resident population, the collaboration of local experts was indispensable and especially valuable.

The actual average need of 10 m³ per household is assumed in order to calculate the total yearly need of firewood. Following the table below, these results total a yearly need of 14,390 m³.

3.3.3.1 CALCULATION OF THE CAPACITIES OF THE FORESTS TO SUPPLY FIREWOOD TO THE LOCAL POPULATION

During the year 2012 the KfW project ""Trans-boundary Biosphere Reserve Prespa" – Support to Prespa National Park in Albania" conducted the forest inventory and forest management as well as the forest function plan for the forest area inside the Prespa NP.

The actual forest area of Prespa NP is 15,430.21 ha. Based on the forest function plan, this area is proposed to be divided in three categories:

1. Conservation
2. Forest recovery
3. Forest use

Table 21: Size of Forest Economies (Source: GIS Analysis 2012**)**

Forest Economies according Forest Inventory (2012) Surface in ha including core, buffer and development zones of the NP							
Total Area in ha		Pyll/ Forest in ha	Kullote/Pastures in ha	Shkurre/ Shrubs in ha	Toke Buke/ Agricultural Land in ha	Ujore/ Water In ha	Unproduktive in ha
Gorica 1	10,505.740	7,732.469	2,260.02		411.877		101.374
Gorica 2[6]	9,104.375	3,446.694	381.059		477.865		
Zvezda-Trestenik[7]	3,300.576	810.906		1,399.005	649.940		5.131
Liqenas	4,802.911	2,758.311	1,722.600	287.468	34.532		
TOTAL	27,713,602	14,748.38	4.363.68	1,686.473	1,574.214	5,231.351	106.505

The high forests are concentrated in the Gorica 1 Forest Economy. The area and volume distribution according to age class of high forest is presented in the Table 22:

Table 22 High Forest – (Production Function) (Source: Forest Inventory 2012**)**

Forest Economy	Age Class	Area Ha	V m³/ha	V total m³
Gorica 1	1 – 20 years	173.00	20.73	3,586
	21 – 40 years	390.90	31.11	12,162
	41 – 60 years	251.10	165.37	41,525
	61 – 80 years	43.80	149.12	6,531
	81 – 100 years	0.00	0.00	0
	101 – 120 years	0.00	0.00	0
	121 – 140 years	7.70	7.70	545
TOTAL		929.50		64,350

The coppice forests cover the majority area of Prespa NP. The area and volume distribution according to age class and forest management units forest are presented in the Table 23.

Table 23 Coppice Forest – (Production + Buffer Function) (Source: Forest Inventory 2012)

Forest Economy	Age Class	Area Ha	V m³/ha	V total m³
Gorica 1	1 – 10 years	0.00	0.00	0
Gorica 2	1 – 10 years	0.00	0.00	0
Liqenas	1 – 10 years	0.00	0.00	0

[6] Including 4,798.756 ha water surface of Macro Prespa Lake

7 Including 435.594 ha watersurface of Micro Prespa Lake

Q. Zvezdes-Trestenik	1 – 10 years	1172.10	0.88	1,031
Communal	1 – 10 years	1142.17	0.72	822
TOTAL	1 – 10 years	2314.27	0.80	1,853
Gorica 1	11 – 20 years	593.40	0.00	0
Gorica 2	11 – 20 years	519.60	51.76	26,892
Liqenas	11 – 20 years	1216.20	32.47	39,485
Q. Zvezdes-Trestenik	11 – 20 years	548.00	6.29	3,450
Communal	11 – 20 years	318.50	37.10	11,816
TOTAL	11 – 20 years	3195.70	25.55	81,643
Gorica 1	21 – 30 years	181.00	0.11	20
Gorica 2	21 – 30 years	510.20	42.87	21,873
Liqenas	21 – 30 years	906.20	22.84	20,695
Q. Zvezdes-Trestenik	21 – 30 years	0.00	0.00	0
Communal	21 – 30 years	0.00	0.00	0
TOTAL	21 – 30 years	1597.40	26.66	42,588
Gorica 1	31 – 40 years	130.30	1.09	142
Gorica 2	31 – 40 years	0.00	0.00	0
Liqenas	31 – 40 years	348.80	17.21	6,002
Q. Zvezdes-Trestenik	31 – 40 years	0.00	0.00	0
Communal	31 – 40 years	0.00	0.00	0
TOTAL	31 – 40 years	479.10	12.82	6,144
GRAND TOTAL		7586.47	17.43	132,228

This management plan proposes a ten year forest improvement plan (coppicing, pre-commercial thinning, cleaning, etc) based on the status of forest stands. The summary of these operations is presented in the Table 24 and Table 25. The average annual volume coming from these operations is 2,070 m³, (20,702/10 years).

Table 24: Volume of proposed forest operation for a ten year period

Forest Economy	Forest operation	Area Ha	V total m³
Gorica 1	Thinning	47.30	2,365
Gorica 2	Cleaning	445.10	5,896
Liqenas	Cleaning	931.50	7,921
Liqenas	Thinning	138.90	978
Q. Zvezdes-Trestenik	Cleaning	62.36	0
Communal	Coppicing	30.10	450
Communal	Thinning	257.70	3,092
TOTAL		1,913.96	20,702

The **Annual Allowable Cut**, including the volume of implemented forest operations, proposed by the elaborated management plans is presented in the Table 25.

Table 25: Allowable Annual Cut in the forest economies of the forested area of the National Park Prespa

Forest Economy	Annual Allowable Cut (m³/year)
Gorica 1	1,826
Gorica 2 + Liqenas	700
Q. Zvezdes-Trestenik	530
Communal	4,000

TOTAL	7,056

3.3.3.2 ESTIMATION OF ACTUAL ANNUAL GROWTH OF WOOD

As the following table shows, the average age of trees at high forest is 41,8 years, and their actual annual growth is 1,66 m³.

Table 26: High forest - Calculation of average annual growth (Source: Forst Inventory 2012)

Average age (years)	Area (ha)	Share of total area	Average age x share of total area	Stand volume (m³)
10	173.00	18%	1.80	3,586
30	390.90	42%	12.60	12,162
50	251.10	27%	13.50	41,525
70	43.80	5%	3.50	6,531
90	0.00	0%	0.00	0
110	0.00	0%	0.00	0
130	70.70	8%	10.40	545
TOTAL	**929.50**	**100%**	**41.80**	**64,349**
			Total average age (years)	

Total stand volume 64,349 m³ divided by total average age 41.80 years is 1,539.45.
1,539,45 divided by total area 929.50 ha is **1.66 m³ average annual growth**.

As the following table shows, the average age of trees at coppice forest is 15.32 years, and their actual annual growth is 1.14 m³.

Table 27: Coppice forest - Calculation of average annual growth(*Source: Forst Inventory* 2012)

Average age (years)	Area (ha)	Share of total area	Average age x share of total area	Stand volume (m³)
5	2,314.27	31%	1.53	1,853
15	3,195.70	42%	6.32	81,643
25	1,597.40	21%	5.26	42,588
35	479.10	6%	2.21	6,144
TOTAL	**7,586.47**	**100%**	**15.32**	**132,228**
			Total average age (years)	

Total stand volume 132,228 m³ divided by total average age 15,32 years is 8,632.14.
8,632.14 divided by total area 7,586.47 ha is **1.14 m³ average annual growth**.

The actual annual growth of the overall forest area is 1,539.45 m³ at high forest and 8,632.14 m³ at coppice forest, which sums up to 10,171.59 m³ both together.

3.3.3.3 RECOMMENDATION

In order to enable the heavily overused forest to recover in a sustainable way, it is vital that wood cutting is reduced A number of constructive measures are proposed to achieve the reduction of firewood consumption and the necessity to harvest the current amount of firewood.

All the proposed measure will only be successful, if the illegal commercial wood cutting can effectively be stopped!

Moreover, the energy source of firewood can no longer be supplied free of cost. Only by a fee will this management plan be effective and successful in recovering the forests.

The detailed planning is structured according to villages and parcels. It is based on necessary measures in case no significant reduction in firewood demand can be attained, in spite of all the efforts. In order to cover firewood requirements, in addition to communal forests, state forests are also used.

The calculation given in Table 25 results in an annual allowable cut of 7,056 m³ and an estimation of an actual annual growth of 10,172 m³. To be in line with efforts for sustainable development, the yearly cuttings should be in between these two values.

The yearly demand in firewood however is considerably higher at 14,390 m³.

This is why in the following years a continuation of overuse cannot be avoided for the timespan until the proposed countermeasures which are described thereunder have yielded full results. It is estimated that this transition period is likely to last for three years.

In the calculations made above the illegal commcercial extraction of firewood is not considered. There are no reliable estimations on the amount of transportation of firewood to consumers outside of the park.

BUT EVERY m³ TAKEN FROM THE FOREST FUND TO BE SOLD OUTSIDE OF THE PARK'S BOUNDARIES EXTENDS THE RECOVERY PERIOD AND WILL ENDANGER THE ACHIEVEMENT OF THE GOAL OF THIS MANAGEMENT PLAN!
It is a loss to all inhabitants of the National Park.

3.3.4 Action Plan for the Forests of Prespa National Park for the Supply of Firewood To Serve the Demand of the Local Population and for the Sustainable Development of these Forests

Please refer to the Compendium Volume of the management plan

The data material and cartographic material available to the experts is of good quality and in line with international standards. What follows are examples, two maps of Forest Economy Gorice1:

3.3.4.1 Description of silvicultural interventions in forests that aim the supply of firewood and, moreover, the sustainable development of the forests

Please refer to the Compendium Volume of the management plan

3.3.4.2 Planning of Harvests for the production of firewood for each year from 2013 to 2022

Please refer to the Compendium Volume of the management plan

At the end of this chapter, some guidelines and rules are proposed for each intervention.
Interventions with 100% cutting of saplings (trees) with a diameter of 4cm and greater do not need further explanations.
Interventions with other intensities could be practically explained based on the stump. In one stump there can be up to six or more saplings. Explanations are made for the interventions in one stump, as follows:

- Interventions with 30% - 35% intensity. One out of three saplings is cut.
- Interventions with 40% - 45% intensity. Cuttings are made in each stump; if they are two one is cut, if they are three one is cut; if they are four two are cut; if they are five two are cut
- Interventions with 50% intensity.
- Interventions with 60% - 70% intensity. Cuttings are made in each stump, if they are two saplings one is cut; if they are three saplings two are cut; if they are four saplings two are cut; where are five saplings three are cut.

3.3.5 CONCLUSIONS AND RECOMMENDATIONS FOR THE FORM OF USE OF COMMUNAL FORESTS AT VILLAGE LEVEL (THE CASE OF 'GORNA GORICA')

Testing the 42 users of the familiar forest in Gorna Gorica (Gorica e Madhe), with an area of about 2 ha per family (84 ha), revealed the following results:

- The cutting of the supply of a family's firewood demand ought to be 5 m³/ha/year, if the family fulfils its firewood needs of 2 hectares. This cutting is higher than the average growth of the forests with the best actual development.
- As a result of the estimation, and the 10 –year plan, the 2 ha used by families during the first year of this cutting plan aims to have an average age of 20 – 22 years, and a volume of 30 m³/ ha. After the interventions, at the end of the decade this forest will have an age of 1 – 10 years and a volume 2 – 3 times smaller. This leads to destruction and is considered unsustainable.
- In order to meet the needs of each family for firewood, and the sustainablitiy criteria, it is necessary that a family takes 3 – 3.5 ha of the communal forest. In such cases, interventions to the forest can be made annually by cutting 3 -3.3 m³/ha. Considering a rotation to be 20 years, there's continuous use even if all the communal forests are classified as coppices of class V production for the species Chestnut oak, Macedonian oak, and Turkey oak. At the age of 20 they attain an average annual growth of 3 m³/ha or more.
- There is quantitative potential to apply this form of use throughout all the villages of the commune (except for Cerje which has no communal forests). There are 3 908.74 ha of communal forests in total, and 1 485 families which use them. There is therefore a need of 5 197.5 ha (= 15 592.5 m³) for application of the above mentioned sustainable scheme to supply them with the given 10m³ wood per year. It means there is a deficit of 1 288.76 ha, which will have to be used from the state forest fund. This represents the amount of firewood (1 288.76 ha* 3 m³ = 3 866.28 m³) which has to be substituted mid to long term by biomass substitutes, efficient burners and better insulation.
- A correct use of communal forests does not dictate the need for interventions in the state forests for the 8 villages of the Liqenas commune. They can be managed successfully as part of the Prespa National Park and foster quick improvement of the actual situation after the first 10-year period (since for this period mandatory interventions in state forests are already planned).

3.3.6 RECOMMENDATIONS FOR THE STRUCTURE OF SILVICULTURAL INTERVENTIONS IN THE STATE FORESTS OF THE PRESPA NATIONAL PARK

There are two specifications for the case of interventions in state forests. In the villages of Cerje, Rakickë, Shuec and Zagradec, 100% of the needs for firewood are covered from the interventions in state forests. In the villages of Pustec and Zrnosko, the intervention in state forests is made in order to fulfil the rest of the necessity which cannot be covered by interventions in communal forests.

1. Interventions in the part of 'Qafa e Zvezdes – Trestenik' for the Firewood Supply to villages Cerje, Rakicke, Shuec and Zagradec.

In the first scenario, the forests of this region of the park, with production being their main function, should pass to the community for use as communal forests.

In the second scenario, these forests would still remain state-owned. This scenario will be analysed below**.**

- *Technical Interventions.*

In the first years interventions will be made according to the proposed plan and 100% of the trees and bushes (hornbeam) with diameter over 4 cm, will be removed. After this intervention, a forest stand of oak coppice with an age of 1 – 10 years old will be the result.

In the second half of the 10-year period, these coppice stands approach the age of 15 – 18 years and will have cutting interventions for cleaning, with an intensity that is case-based (also conditioned partially from the fulfilment of needs for firewood for the respective village, in the respective year) but peaks at 30% (the cutting plan specifies each individual case).

- *Organizational aspects.*

The administration of the park draws the annual plan of cuttings for each village, based on the cutting plan that this study denotes. The plan is then presented to the elder of the village and the forest commission of the village, which in turn organize the work in cooperation with and under the continuous control of the technical personnel of the park. Based on what the plan specifies, a number of families intervene on each parcel. The explanation of the technical interventions is done through practical advices and tips which are contained in the fourth chapter of this study. The interventions in this part of the park shall be conducted in a similar pattern with those in the communal forests, since these four villages do not have such forests available for usage and eventually make regular use of state forests.

- *Financial aspects.*

The income generation interventions in state-owned forests are taxed based on the produced assortment. The firewood product is taxed with 700 ALL/m³. The subject that produces it launches it on the market and profits.

In the case which the users intervene in communal forests for the fulfilment of own firewood needs, it is the decision-making part of the local authorities (the counsel of commune) which decides the tariff to be paid. Currently, each family pays a tariff of 500 ALL/ 10 m³ of firewood (or, differently put, each family pays 500 ALL for the firewood it consumes within a year). This price is far beyond the market prices for firewood in the region which are about 30 Euro (4,200 ALL) to 35 Euro (4,900 ALL) per m³ (1,6 steer meter). This totals up to an annual engery bill for a household of 42,000 to 49,000 ALL.

Regarding the case of the four villages mentioned above, it is suggest to be treated in a similar way with interventions in communal forests, but the tariff should be paid to the administration of the park Administration.

The harvesting/cutting activities will be transferred to the Forest User Association (FUA) which is licensed to produce the necessary firewood to serve the demand of the local population. This makes the control of the harvested amount of firewood easier for the NPA. Only the members of the FUA are allowed to cut the wood and will receive special clothing to be well recognized in the field. Every member of the FUA will receive a special license card which he has to present to the NPA for controlling the manner of the management activity. Even if the paid price for firewood will not reach the market price in the region a moderate increase for the service to be supplied with firewood at the gate can be expected to be paid by the local population. There can be exemptions foreseen for handicapped or elderly people.

2. The interventions in state forests for the fulfilment of needs for firewood – for unfulfilled needs caused by the planned interventions in the communal forests of Pustec and Zrnosko.

The analysis of the previous case applies here as well. But, additionally, two other possibilities are presented below.

- The Forest user Association (FUA) can also be licensed and contracted by the NPA to accomplish these interventions and sell the produced firewood to the inhabitants of the villages based on the needs of each family. In this case, the production cost for the business would be higher than the cost of intervening with exploitative cuttings andharvesting in the forest. In this case, the contract would have two parts; one which treats the case as an ordinary one, thus for each m³ that is produced the FUA would pay the tax of 700 ALL, gained from the selling of firewood to the local population. The other part of the contract considers the interventions as improvement interventions to the forest, for which the company gets paid. The payment is assigned such that the cost of firewood production is covered. When selling this product to the community, a ceiling price should be assigned which would be equal to the amount paid for taxes for 1 m³ firewood and an extra amount that accounts for transport costs and profit. A reasonable price in this case would be 1 500 ALL / mst.

- The Communal Forest and Pasture Users Association of Liqenas Commune can be contracted to complete this job. The association creates a work team and completes this job in the same way as the private company would.

3.3.6.1 Silvicultural Measures For Quality Improvement and Stabilisation of Coppice forest

The measures described below have the drawback that their beneficial effects will be visible only in the long term, and that without support by local population and land owners, these measures cannot yield results. Nonetheless, due to their high potential impact on improving the forest these measures should be put into practice without delay, by way of pilot projects.

As important as these measures are for the future, the timespan of 10 years is certainly too short to put them into practice everywhere in the National Park.

3.3.6.2 CONSOLIDATION OF CROWN COVERAGE

The crown coverage of trees is defined as projection of crowns on the ground. It will be evaluated separately for each store in tenth of total size with an accuracy of 0.1. The crown coverage is especially low in communal forests, it is only 0.6 in the communal forest of the Pustec village for example. Full crown coverage is reached at a value of 1.0. The situation of the other communal forests is not much better. In comparison, state forests show a better crown coverage.
If the current crown coverage was increased by two tenths (from 0.6 to 0.8), it would result in considerably higher wood production on the same surface. This in turn would take away pressure on other forest areas in the national park and relieve them from too intense wood cutting in the future. The understanding and collaboration of the local inhabitants have to be secured first, so that this long term project can have success.

As a result, it is recommended to start this project by creating not too large areas where gaps in the stand are closed by way of afforestation close to every of the 12 villages. The young trees planted for afforestation have to be actively protected against damage caused by grazing animals. Since these animals are usually accompanied by shepherds, they can be stopped from grazing at the project areas. The support of the project by shepherds is obviously a prerequisite.

The organisation of the afforestation, the training of workers, the supervision and quality checks for the whole duration of the afforestation have to be carried out by the forestry personnel of the National Park. They should also carry out the purchase of trees at the tree nurseries.

In order to have more chancesof success, , it is beneficial to start with smaller project areas Given a current crown coverage of 0,6 it is necessary per ha to plant 250 oak trees with a minimum height of 1m each into the gaps, in order to reach full crown coverage.

For each project area the cost of 1,000 € is calculated, which gives a total cost of 12 000 €, if project areas are created near every national park village. Those villages which displayed good results of afforestation would qualify for further follow-up projects.

3.3.6.3 HARVESTING OF OLDER WOOD

At present, in the large majority of cases, wood is harvested at a much too young age, namely at an age in which the highest possible timber harvest has not been reached. The stand table in the compendium version shows that the best harvest age to maximise yield results for oak coppice forests and beech coppice forests is approximately 30 years. The stand table has been developed for Central Europe. At Prespa National Park, soil and climate conditions are more advantageous, therefore it is possible that, if good general circumstances apply, there is even more wood growth.

This shows that coppice forests at the national park have a high potential to increase their timber yield production. At full crown coverage (see chapter 3.3.6.2 Consolidation of crown coverage) and with yield at a higher age, assuming a medium soil quality class, the yearly wood yield quantity can be increased from currently 1.14 m^3/ha to 3 m^3/ha or more.

The firewood needs of the local population could then be satisfied by a much smaller total forest surface.

3.3.6.4 ENABLING OF FRUCTIFICATION

The most important tree species of coppice forests need to reach at least the age of 40 years in order to be able to bear seed. Since they are cut much earlier, forest regeneration happens exclusively in a vegetative way, by stump sprouting. Due to the aging process of these stumps, they lose more and more of their vitality and sooner or later they will have to be replaced altogether.

It is of utmost importance to enable generative reproduction by way of seeds, in order to secure a stable forest stand and to allow the forest to regenerate itself and close the tree gaps a natural way.

It has been proposed that 10 well developed trees from each forest parcel are marked and protected from felling in order to produce seeds laster on.

In case there is a lack of suitable trees in any parcel, trees from the nursery have to be planted there. If these trees have to be protected from browsing by grazing animals, sufficiently secure protection measures have to be applied to them.

In a protected area such as a national park, natural processes involving plants and wild animals should be carried out without hindrance or influence by humans as much as possible. This is an additional reason for enabling the trees to blossom and to produce seed again.

3.3.6.5 MEASURES TO PREVENT ILLEGAL CUTTING

Even though the exact magnitude of illegal cutting is unknown, a scale which seriously threatens all efforts to improve the situation of the forests has to be assumed.

In order to prevent illegal cutting, first of all, it has to become possible to cover the wood demand in a legal way without much difficulty and at a reasonable cost.

This constitutes the most efficient measure to combat illegal cutting, and to give National Park personnel and local authorities the highest chances of success in their efforts.

3.3.6.6 MEASURES TO REDUCE FIREWOOD DEMAND

Within the next 10 years, the total amount of firewood produced at the national park should be reduced by 50% for reasons of nature protection, without putting the energy supply of local inhabitants at risk.

The potential for reducing the amount of firewood needed does exist. It is indeed realistic to assume that this goal can be reached, provided that the measures proposed below are carried out carefully.

3.3.6.7 DRYING FIREWOOD

A high percentage of water in wood dramatically reduces its heating value per weight unit. Directly after cutting, wood contains 60% water. After good storage outdoors, it is called “air dry” and contains only 18% water. This percentage can be further reduced if wood is dried via the oven drying technique.

Firewood should not be burned if it contains more than 25% water, to benefit from the best heating value.

However, at present, local population usually burns firewood shortly after cutting, when it still contains approximately 60% water.
As the graph shows, if wood is perfectly dry before it is burned, the current firewood demand can be reduced by 50% or more, without reducing the heat output for households. To this purpose, freshly cut wood has to be air dried for two years before it is burned

3.3.7 DEVELOPMENT OF FLANKING MEASURES FOR REDUCING 50% OF THE FIREWOOD CONSUMPTION OF THE COMMUNITY

The objective of reducing the current firewood consumption being used by the locals for heating, cooking, by 50% can be achieved if, above all, there exist a common will within the community and local authorities. Then, there are several ideals to follow in order to achieve the desired result.

1. **Thermal rehabilitation of houses and improvements of heating systems.**
   The following measures can decrease the firewood requirements for each individual house by 30%. This perspective of a significant economic gain and cost savings should convince house owners of the fact that, especially concerning newly built houses, good thermal insulation should be an indispensable part of the overall planning of house construction.
2. **Prepare a consulting programme for individual house owners explaining how more energy efficiency can be achieved and how it could be financed.**
   Several villages in the National Park show a significant number of construction sites and newly built houses. Thermal insulation has not been applied so far.
   There will be improvements in this respect as soon as targeted counselling and attractive options for financing thermal insulation in houses are offered. In older houses there are good opportunities to reduce their excessive energy needs, through thermal insulation of external parts of the building or through modernisation of the heating system.

   It is to be expected that it takes time to introduce these new technologies, which means that a reduction of firewood demand by thermal rehabilitation of houses and improvements in heating systems can only gradually show results.
   Such a measure reduces the heat loss of a house by at least 30%, hence there's a 30% smaller demand for thermal energy produced by the burning of firewood. Consequently, the need for firewood is reduced by 30%.
3. **Support to the purchase and use in domestic conditions of energy efficient stoves**
   Such stoves will allow the complete combustion of the gases that derive from the firewood combustion 10 – 15% higher efficiency can be expected in comparison of the combustion of the same quantity of firewood in the traditional stoves. Hence, 10 % less firewood is needed.
4. **The natural firewood drying for a time period of two seasons.**
   It is recommended that the firewood should be used after having gone through the process of natural drying of two summer seasons (2 years). Since this process increases the calorific value of firewood, throughout its combustion firewood releases a greater amount of thermal energy which serves for the heating of the house (this equals exactly to the amount of energy that would be needed for the evaporation of water from the wet firewood). This gained energy is estimated to also be around 10 %, hence there's an additional 10% reduce in the total need for firewood.

   Up to this point, if these actions are completed successfully, the objective of reducing up to 50% of the required firewood quantity of the local population will be achieved.

   Additional alternatives that support the completion of this objective are explained in the following.

5. The use of **biomass from different sources** to produce briquettes as a substitute for the actual used firewood. Different kinds of raw material is needed for the production of wood chips and briquettes and is available within the territory of the park, such as:

   - The wood biomass which is left unutilized, lying in the forest after the cutting interventions. Only woods with a diameter of 3cm and above can be utilized from this biomass.
   - Collaboration with partner companies and organisations which possess the necessary knowledge and experience in these fields is a prerequisite to solve the technical and logistic challenges that need to be addressed when installing such energy systems.
   - The wood biomass that results from the pruning of fruit trees.
   - The reed biomass developed in Small Prespa Lake.

   It seems obvious to use also the abundant reed from Lesser Prespa Lake as biomass. There is no need to create a plantation as it already exists, and there is an attractive potential yield of approximately 8t dry matter per ha per year.

In a National Park, whenever utilisation areas have to be chosen, it is clear that special care has to be taken to not destroy any breeding places for birds and spawning grounds of fish which require reed for spawning, for example Cyprinid fish.

A special management plan has been developed for this purpose.

- For biomass energy systems, the required wood chips can be produced from the mostly weak wood (wood debris) that is often left behind in the forest. The production and use of wood chips and briquettes for heating can be adopted and developed as a private business initiative with the additional support of the commune and park administration. The final products can be used in both public and private buildings.

- Fast growing tree plantations as from dedicated new willow (Salix) plantations. A variety of currently unproductive surfaces can be possible locations for the creation of plantations. One example is an area of 2 ha which at present mainly serves as rubbish dump, near the village of Zaroshke. This location is not far away from the lake and offers good growth conditions especially for willow trees. This can be seen from the trees which are planted nearby a few years ago. The yearly growth rate of a willow plantation can be assumed to be 10 m^3/ha. In comparison, oaks in a typical coppice forest are only able to grow by 3 m^3/ha. It is important to mention however that the dry substance proportion and therefore the heating value per m^3 of oak trees are almost twice as high as with willows.

  Willow plantations are created using the technique of propagation by cuttings. Cuttings are obtained from well grown, local willow trees. They need to be 20 cm long and possess at least 2 buds. They should be placed 15 cm deep into the earth as otherwise there is the risk of dehydration.

  Cuttings are planted in double rows of 70 cm distance. Within these rows, cuttings are planted at a distance of 50 cm. The distance of one double row to another double row is 3 m. In total, 10,000 cuttings per ha are planted. The total cost of a willow plantation with the initial planting of cuttings included, is estimated to be 1,000 € per ha.

  Further management is carried out the same way as for coppice forest. Approximately every 4 years there can be yield following the clear cutting technique.

  The abovementioned pilot project in Zaroshke can serve as a model to create additional willow plantations, which help to obtain the overall goal of contributing to the energy supply.

6. Creation of avenues

Even though avenue trees do not primarily service for firewood production, roads and paths should be lined with trees under all circumstances.
First of all, it is clear that at a certain moment, due to their high age, avenue trees will have to be replaced by younger avenue trees, which makes them an additional source of firewood in the future.
Concerning the tree type, linden trees (Tilia cordata) would be a good choice. They grow very well in isolated stand and their blossom is especially suitable as nourishment for bees. Lime trees often start to blossom at 20 to 30 years, which is a rather fast time frame in broad-leafed trees.
Bee keeping is a widespread activity in the National Park. There is an opportunity for a meaningful cooperation between the National Park, which could provide the linden trees, and the bee keepers, which could take care of planting these trees.
Lime trees need to be planted keeping a distance of 10 m between each tree. This means to create an avenue with trees on the left and the right side of the street, 200 trees are required per 100 m of road. Local nurseries should be able to provide them at a height of at least 150 cm for the price of approximately 1.50€ per tree, delivery included, which results in total material cost of 300€ per 100 m avenue length.

This cooperation project offers the excellent opportunity to deliver fast success and clearly visible results.

7. **Alternative Sources of Energy**

Solar Power

The usage of alternative sources of energy such as solar energy are suitable not only for producing warm water but also to heat the houses during spring and autumn months. As a new tendency at its initial development stage, but with a secure future, this includes alternatives such as the use of solar power, the use of natural gas in a near future – after the completion of the TAP project, the use of geothermal resources, etc. Making use of solar power should be encouraged as much as possible because households would obtain a source of energy which is nearly for free, once it has been installed. The Mediterranean climate and the high number of sunny days, allows a bright future in solar energy.

The main question that households will pose is whether the value of the energy obtained through such an installation can cover the cost of its installation within a reasonable timespan.

The National Park team can make a substantial contribution to decision-making in favour of solar energy, if in collaboration with qualified companies they develop concepts which take into account the special environment and situation of the region and the financial possibilities of its inhabitants

Wind power

The Prespa National Park climate is also favourable to wind energy systems. Large-scale systems and wind farms are not within the scope of work of the National Park, therefore it makes sense to look at smaller windmills, which could create enough electricity for individual households to operate light, TV and the other electrical household appliances. Such windmills, all necessary parts included, are available at a price between 2,500 € (1 kW output) and 27,000 € (10 kW output).

Again, the expected cost-effectiveness will be convincing for potential windmill owners to decide in favour of a purchase and installation.

8. **Requirements for the realization of this objective**:

Human will and financial funds are the two key factors in the success of such objectives. As previously mentioned, it is essential for the community and local authorities to possess and manifest the will.

9. **Support funds from the local and central authorities**

Financing from donators that support the development of environmental projects, such as GEF, European Commission, governments of countries such as Germany, Sweden, etc. Regarding the third action, the natural firewood drying / seasoning for two seasons, there's no funding required – it has no cost. However it requires an increase in the awareness of the community.

10. **Measures to promote collaboration and support by local population**

The success of all described forestry-related projects depends on the understanding and the approval of those people who have been living in this region for generations and who are now confronted with new ideas and concepts. It should not be assumed that they immediately see the benefits of these ideas.

It is essential that the staff of the National Park create appreciation and willingness, encouraging the local population through showing good examples. It is absolutely necessary that the staff of the National Park appreciate and support these necessary changes, so that they send credible messages and display support to the population.

The overall goal of all these proposed measures is the long-term stability of the forests. Saving the forests means also saving an essential part of living environment and source of energy for humans. If such measures are

implemented, the current system of overuse can be stopped within a few years, while preserving the firewood production for households.

The major challenge consists in making the resulting benefits visible to the local population. If this is a success, it means that the projects will be approved and supported, even though individually the positive results may show themselves only after years.

Natural life cycles of forest vegetation require planning timeframes of years and decades. Putting into practice forest-related projects takes more time than putting into practice other types of projects. It is therefore desirable to extend the on-going development program for Prespa National Park beyond the current end date.

3.3.8 WETLANDS

The Prespa lakes are the most important wetlands in the NP. In both lakes there are sensitive sites where no human activity shall happen, at least temporarily. This is significant for spawning grounds of fish species. Their spawning grounds shall be untouched and unused during the sensitive season. The map (***Figure 6***) shows the known spawning grounds, which shall be off limits during the indicated period.

In the PNP area there are some temperate brooks supplying surface water to the lake in the spring season. These brooks are, in most cases, in bad condition and need re-naturalisation by recovering of accompanying vegetation and eliminating pollution.

3.3.8.1 REED BEDS

The reed beds are important habitats for breeding birds. The flagship species of the entire area the both pelican species are breeding in the reed beds, but only on the Greek side and not on the Albanian side. The reason is clear and simple. It's the constant disturbance during the breeding season which stops the pelicans breeding on the Albanian side. Therefore, during the breeding season, the potential breeding spots for pelicans or other waterfowl have to be off limits for fishermen, visitors or people who want to harvest reed.

Reed is an interesting source which could quickly become a partial substitute for firewood. Reed additionally, could serve as material to thatch roofs or to insulate houses, which could contribute to the reductionof firewood consumption in the park area. Using the biomass of reed for energy supply could even be considered as climate sound.

A more detailed action plan for reed management is provided in the compendium of the MP.

For more information consult the manual on reed management in the annexes of this management plan..

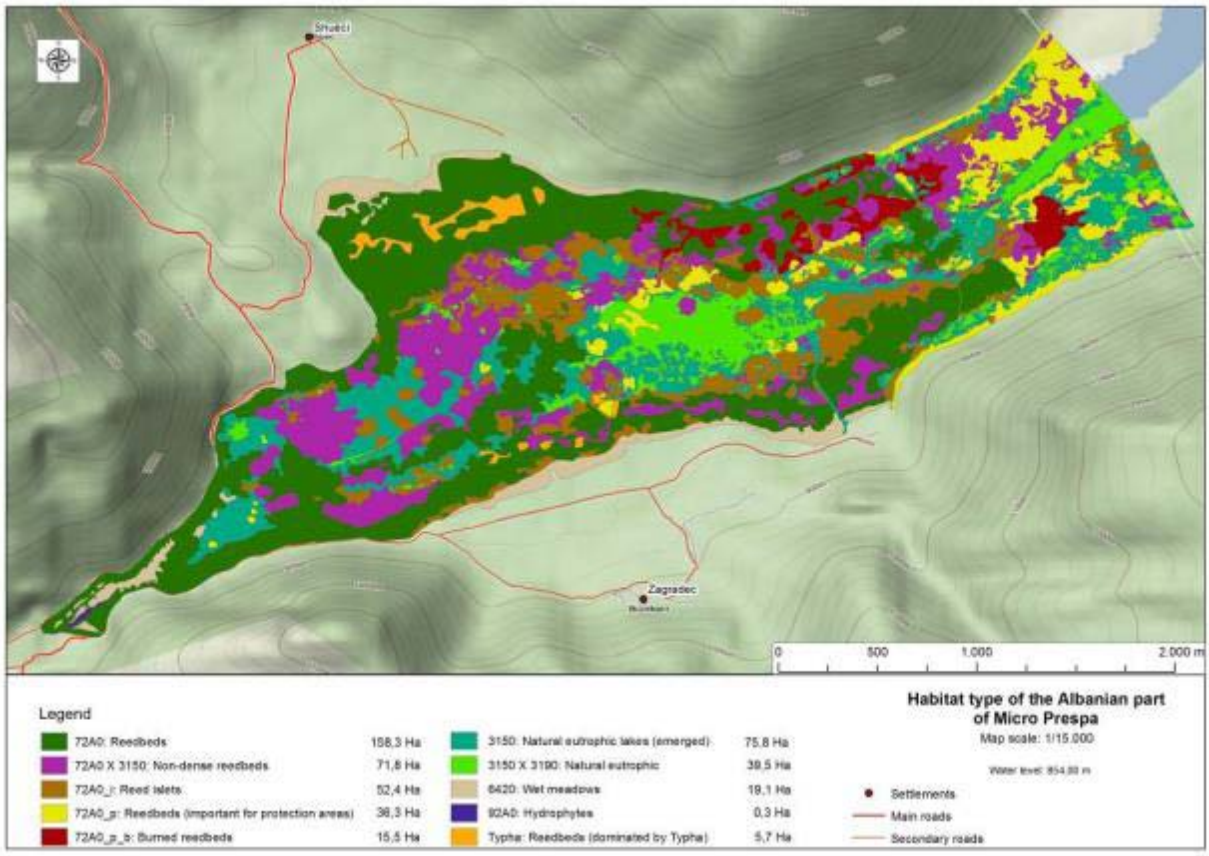

Figure 9: Composition of the Reed vegetation on the Lesser Prespa Lake

Additionally, a strict regulation for reed harvesting in the months January to March has to be created for the reed bed in the lesser Prespa region. In the Lesser Prespa lake, potential areas for future pelican or herons breeding places have been implemented and markedon the map as a core zone which shall be off limits during the breeding season of waterfowl (March until July).

Table 28: Structure of the reed bed at Lesser Prespa (2012)

Reed Composition Lesser Prespa	
Habitat Type	**Size ha**
Reed bed (EU Cat 72A0)	**340 ha**
Reed Islets	**52.40 ha**
Non dense reed bed	**123.60 ha**
Dense reed bed	**158.30 ha**
Reed bed dominated by Typha spec.	**5.7 ha**
Natural eutrophic lakes (emerged)	**75.80 ha**
Natural eutrophic lakes (3150 x 3190)	**39.50 ha**
Wet Meadows (EU Cat 6420)	**19.10 ha**

Furthermore, artificial floating nests to attract colonial breeding waterfowl shall be placed at appropriate places. Artificial nesting sites could be placed at both the Lesser Prespa Lake and the Greater Prespa

The results of the monitoring surveys reflect the current conditions of the site's biodiversity, in respect to flora and habitats, birds, fish and invertebrates. There is still a lack of systematic data on these issues, which prevents a more thorough assessment in respect to the trends of the sites and their biodiversity over the past few decades.

However, it is obvious that the ecological status of the Albanian Micro Prespa lake ecosystem has suffered severe deterioration in previous decades, due to mismanagement, but has shown signs of stability eversince the Devolli diversion has stopped working.

Reed bed ecosystems include all stages of succession and are characterized by mesotrophic waters. The reeds show a high variety of species including dry reeds, wet reeds, reed islets and Typha stands. Despite the small populations of certain bird species, which can be directly attributed to specific threats such as poaching and other human disturbance, habitat heterogeneity and species diversity in various taxa indicate the function of a healthy wetland ecosystem that can be further restored through carefully planned conservation measures, such as reed bed management. Carefully planned moderate reed harvesting activities are expected not to affect negatively the flora and fauna of the area, especially if its results and impacts are regularly monitored and assessed in respect to local biodiversity..

3.3.8.1.1 Reed Bed Management Action Plan

For the management of the reed beds the above mentioned spatio-temporal limitations should be taken into account, namely

(a) The avoidance of management on the floating reed-islets, which are refuge for many plant species.

(b) The conservation of a 3m wide belt of reed beds around the pools of "Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation", that act as protective "fences" for the water lily stands.

(c) The exclusion of the management area close the borders of Greece, which should be preserved as a sanctuary for biodiversity.

(d) The management of the wetland eutrophication problem, including removal of nutrient loads, but also improvement of water circulation and oxygenation.

(e) The addressing of the reed bed homogenization problem. High structural diversity benefits birds, invertebrates and vegetation.

(f) The enhancement of fish spawning habitat and other shallow water habitats. A number of open water corridors should be created, as well as water pools.

(g) The water lilies stand disturbance problem should be addressed, through the creation of a no intervention zone.

(h) The identification of the less sensitive zone with respect to biodiversity limitation that will be most appropriate for normal scale reed bed management. This will enable biodiversity enhancement but also commercial use of cut reed bed, energy production from biomass, or recreation.

(i) The identification of reed bed management zones to facilitate the implementation of specific management practices. Cutting of reeds can be applied either from land or from inside the lake and consequently the management zones for applying each practice should be identified.

The temporal biodiversity aspects are

(a) The breeding period for birds, fish and other wildlife. During the breeding period of the wildlife the disturbance should be minimal and management activities avoided. This period is from early March, while for some species the period extends up to August due to successive breeding attempts,

(b) Water level fluctuations. Taking into consideration the seasonal fluctuations, the lake water level will facilitate and define whether management practices are applied from land or lake.

For the implementation of an effective reed bed management programme at the study area, a number of complementary research and management activities are needed. These include:

(a) The planning and implementation of a biodiversity monitoring project directly linked with the reed bed management.

(b) The application of an effective public awareness and site gardening – patrolling project to inform the local community for the benefits of a reed bed management project and for the sustainable use of resources.

3.3.8.1.2 PROPOSED MANAGEMENT ZONES LESSER PRESPA LAKE

Four management zones have been identified:

1. Sensitive areas and habitats excluded from reed management – Zone X. Areas excluded from management for biodiversity protection and other reasons mentioned above. They include all the important areas and habitats that have been identified, namely part of the "Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation", the reed islets and the buffer zone at the borders.
2. Multiple-objective reed bed management zone – Zone A (total area of 106.5 ha during low water level – 95.10 ha covered by reed). Reed bed management zone for upgrading of the reed bed and extraction of biomass that also includes the wet meadows.
3. Management zone for biodiversity conservation – Zone B (total area of 198 ha during low water level – 119.4 ha covered by reed). Management zone for conservation of important habitats. It is the deepest zone of dense reeds, which in many places is mixed with "Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation" and their peripheral zones (10 m).
4. Management zone for the creation – restoration of open water habitats – Zone C (total area of 21.5 ha). Open surface water zone. It is a zone that is restricted to a small area of the central part of the study area.

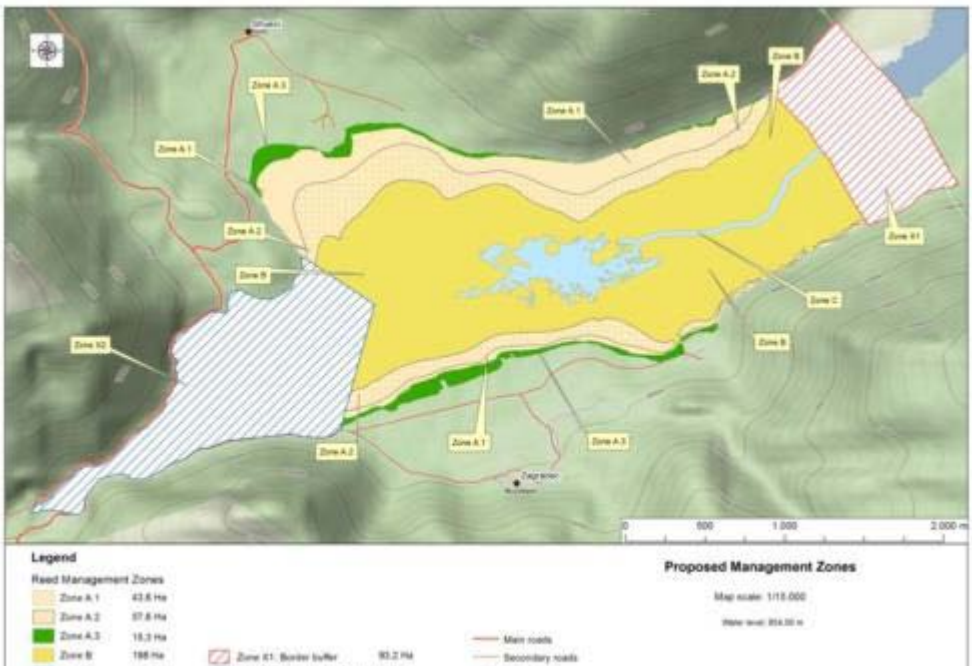

Figure 10: Zonation of the reed bed for the purpose of harvesting reed but also to define areas reserved for conservation purpose

Zone X: *Sensitive areas and habitats excluded from reed management (hatched areas)*
Zone A: *Multiple objective reed bed management zone*
Zone B: Management zone for Biodiversity conservation
Zone C :*Management zone for the creation – restoration of open water habitats*

A total of ~34.80 ha of reed bed can be harvested annually at the wetland which will benefit biodiversity. A dry biomass of ~ 180 tones is estimated to be produced each year, of which 103 tones during winter (20.50 ha) can be used for pelletizing, corresponding to a total of 360.5MWh in energy (4.2MWh/TN of oven dry reed - corresponding to 83% of the weight of raw weight). Also, through the summer cutting of 14.40 ha, an approximate removal of nutrients of 720kg N, 65kg P and 330kg K will take place, while the biomass can be used for composting.

3.3.8.1.3 OPERATIONAL PLANNING REED HARVESTING

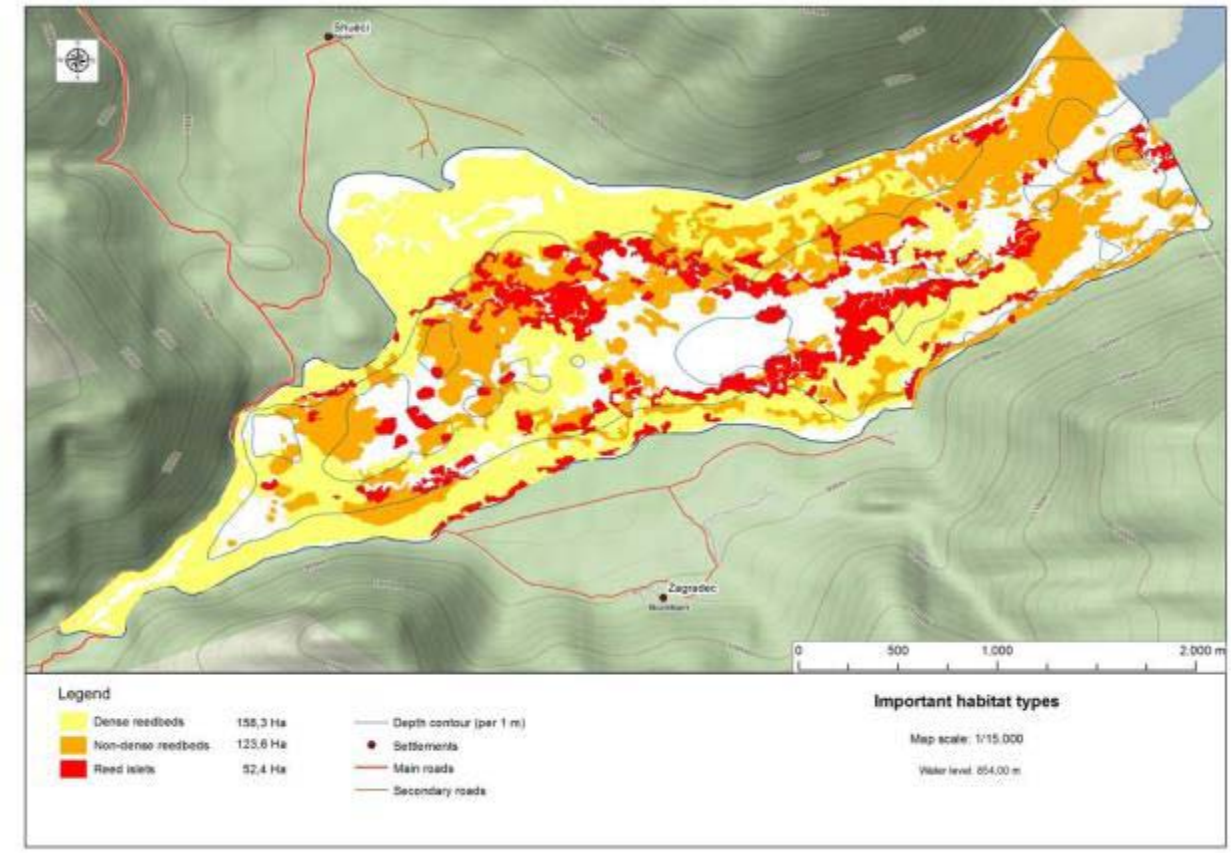

Figure 11: Density of the reed bed at the Lesser Prespa lake in the year 2012

The reed bed management plan is proposed to be implemented within a 5 year period, where 3 phases will be applied. These will enable the selection of the most appropriate harvesting rotation and extension. The 3 phases will compose an integrated reed bed management, with growing intensity after the implementation of monitoring assessment for the impacts of each phase's harvesting practices and intensity. This scheme is proposed as there is little information concerning the growth and recovery rate of the reed in the project area concerning its cutting. It is crucial to specify the behavior of the particular ecosystem, as the regeneration of reed varies greatly between wetlands and parts of a wetland. In order to estimate the rotation intensity of the reed cutting, it is essential to start the management of the reed bed with some pilot interventions in the different parts of the reed bed..

The three proposed phases are (a) Phase 1 that will concern implementation of interventions in 50% of the final proposed managed reed bed (17.40 ha), (b) Phase 2 in 75% (26.00 ha) and (c) Phase 3 in 100% (34.80 ha).

In more details:

- Phase 1. Pilot interventions- the first phase of the reed bed management will include the pilot implementation of part of the proposed management practices in each management zone. This will enable the monitoring of the reed bed growth, behaviour of the ecosystem and the determination of appropriate cutting rotation for the particular part of the Micro Prespa Lake.
- Phase 2. Intermediate interventions- Depending on the results of Phase 1, the extension of the managed reed bed will be decided as well as the appropriate rotation. If the monitoring of the indicators for fauna and flora indicate that a more intensive harvesting pattern could be applied, the reed bed management will move to Phase 2, where a total of 26 ha of reed will be annually harvested.

- Phase 3. Main interventions- As with Phase 2, if the indicators imply that the harvesting pattern could be further intensified without negatively affecting the biodiversity, a further increase of the reed cutting will take place, namely reaching its annual threshold of 38.40 ha. Following the implementation of Phase 3, there has to be an evaluation in order to assess impacts of large scale interventions and set the ground for updating the management plan.

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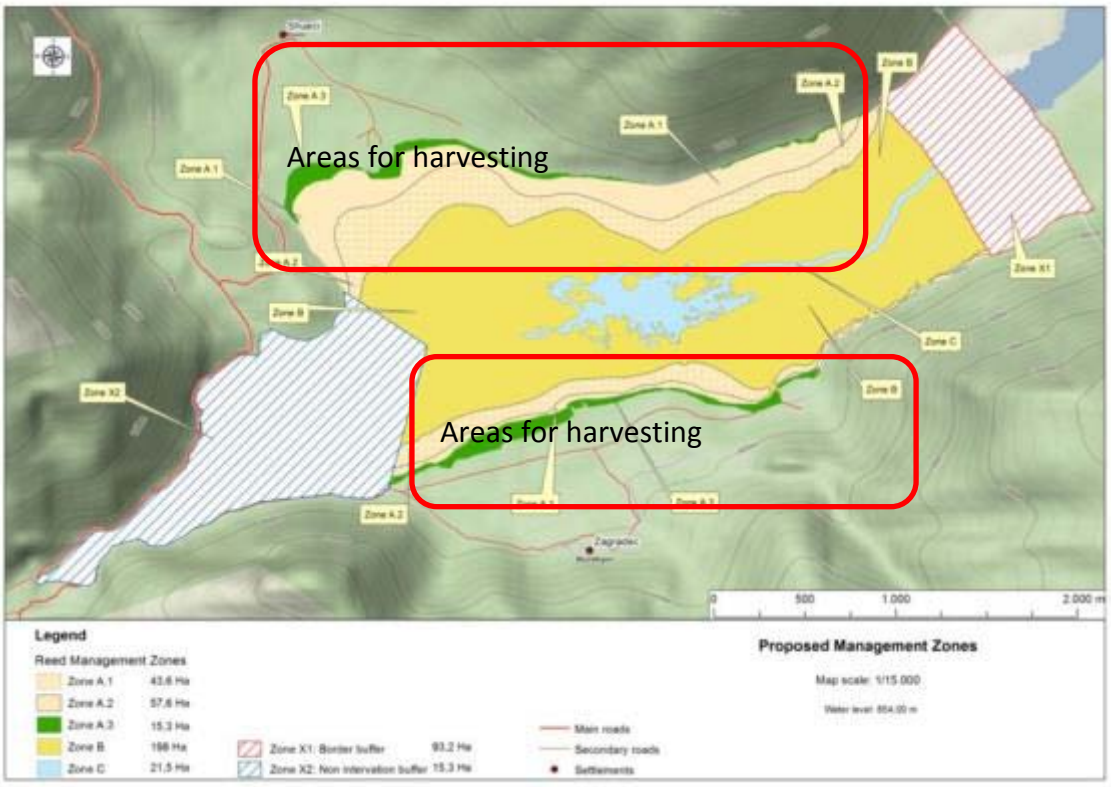

Figure 12: Areas foreseen for the winter harest of reed at the Lesser Prespa Lake

brush cutters, (b) 1 mower binder and 1 walk behind mower, (c) 1 amphibious machine, equipped with cutter, rakes and root knife, (d) 1 trailer to transport the amphibious machine, (e) 1 grapple truck and (f) 1 floating platform.

The total cost of the equipment is expected to reach 160,000 Euro.

Concerning labour, for the implementation of the management plan the necessary staff includes specially trained workers, as well as scientific staff. Trained workers are needed for the operation of mechanical equipment, the definition of the harvesting plots and the monitoring of the grazing intensity. Other workers are needed for the removal of the reed from the wetland and reed cutting with brush cutters. Most importantly, scientific staff have to be involved in the operational implementation of reed bed management. They are needed to supervise the operation, to undertake the monitoring activities and to prepare, in collaboration with the management authority, the operational plan for each year. The estimated labour effort for the execution of the management plan is at least 290 per sondays (?) per year.

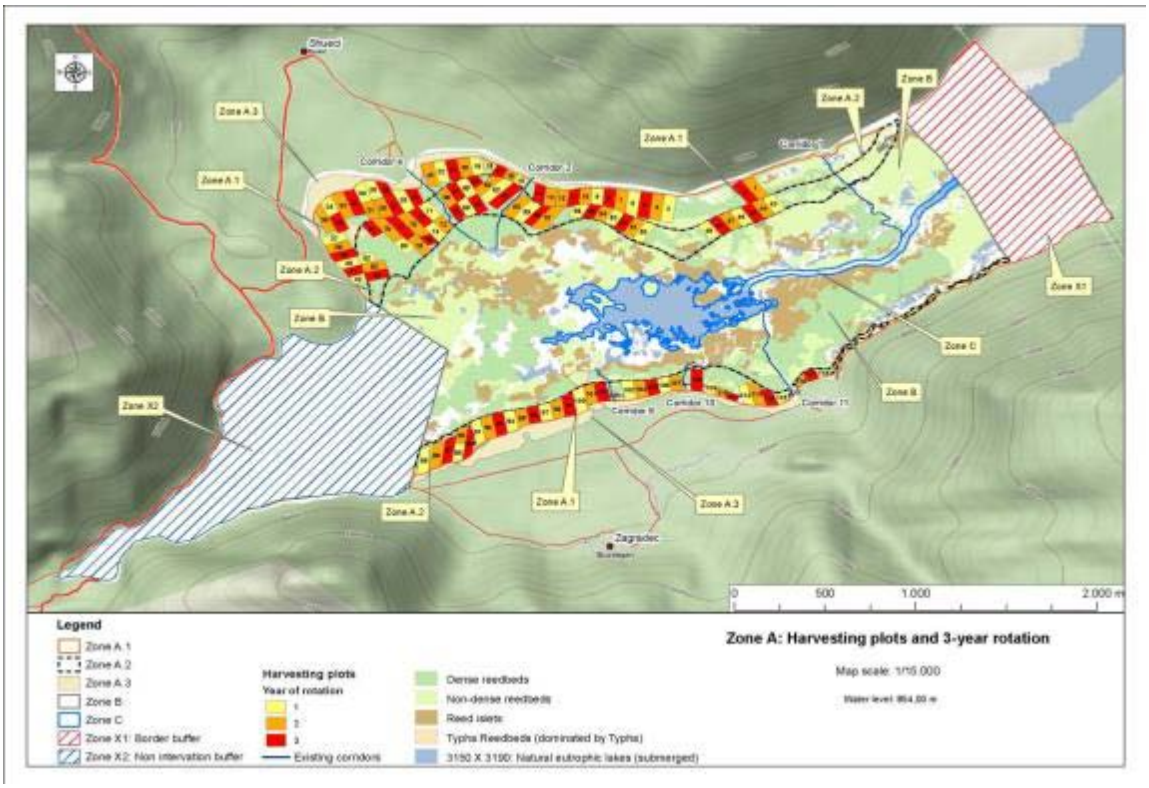

Figure 13: Harvest scheme with 3 years rotation patterns for harvesting of reed: yellow Year 1; orange Year 2; red Year 3.

Table 29: Timetable for Management Interventions in the Reed Bed of the Lesser Prespa Lake

Management Practice	Year											
	J	F	M	A	M	J	J	A	S	O	N	D
Zone A												
A.1. Zone A.1.												
A.1. Zone A.2.												
A.2. Zone A.1.												
A.2. Zone A.2.												
A.3.												
Zone B												
B.1.												
B.2.												
B.3.												
Zone C												
C.1												

Table 31: Proportion between size of exisiting zones and size of proposed interventions.

Zone	Total area (ha)	Reedbed (ha)		Proposed for management	
A	102.60	95.10	30.7%	24.70	71.0%
A.1.	45.30	39	12.6%	8.40	24.2%
A.2.	57.30	56.10	18.1%	16.30	46.8%
B	198.00	119.40	38.6%	10.10	29.0%
C	21.50	-			
Total		**309.60**	100%	**34.80**	100%

Table 30: Assessment of harvest potentials from the Reed Bed of the Lesser Prespa Lake

Zone		Management Practice	Size of harvested area (ha)
A	A.1.	A.1.1. Creation of corridors	0.50
		A.1.2. Creation of open water pools	0.60
		A.1.3. Summer cutting for nutrient removal	1.50
		A.2. Winter cutting for biomass removal	5.80
		A.3. Grazing	(15.30)
	A.2.	A.1.1. Creation of corridors	1.90
		A.1.2. Creation of open water pools	1.90
		A.1.3. Summer cutting for nutrient removal	2.50
		A.2. Winter cutting for biomass removal	10.0
		Total Area of Zone A	24.70
B		B.1. Summer underwater cutting	5.50
		B.2. Winter cutting for biomass removal	4.60
		B.3. Rootstalk removal	
		Total Area of Zone B	10.10
C		C.1. Rootstalk and litter removal	
		Total Area of Zone C	
		Total Area	34.80

3.3.8.2 BIOMASS PRODUCTION WITH THE REED AS RESOURCE

The reed management shall become part of a wider use of existing biomass in the National Park in order to produce briquettes. This will help support the firewood demand of the local population by reducing the cut wood from the forests.

A realistic option is production of thatching and insulation material. Reed can be used for thatched rooves, production of boards for insulation or soundproofing in walls and floors. If harvesting is done in a sustainable way reed can be seen as an ecological building material. To use reed as building material it has to be harvested during winter time when the moisture content is near to 20%. This is the basis for good insulation properties as well as properties for withstanding moisture, temperature changes, UV radiation snow and ice. It decays slowly because of the high mineral content and has a good mechanical resistance. The tightly compressed reed is highly advantageous as it does not burn easily. This is dueto the high silicic acid content.

Briquette production is more beneficial than pellet production due to less investment costs and a bigger variety of raw material that can be used without reducing quality of the end product.
It is always important for potential processing and production sites to secure a stable supply of raw material in short-term, midterm and long-term perspectives. Availability of raw material is an essential criterion for successful investment decisions.
For pelletizing reed as a stand alone solution in a production site, approximately 1,000 tons of raw materials would be necessary for a reasonable investment. As the amount of reed as raw material is limited to 100 ton, the production of briquettes combined with additional materials and products is suggested. These additional materials and products should be thatching and insulation material, briquettes (besides reed briquettes) from material coming from new short rotation forestry and pruning material from the big fruit tree plantations outside the park boundaries.
For such a production line, the establishment of a central biomass centre supported by several storage places is needed.
This supply and production chain will be described in the following

Harvesting
Please refer to the Compendium Volume of the management plan

3.3.8.3 Reed Management to Improve Biodiversity
Birds and Mammals: Please refer to the Compendium Volume of the Management Plan

3.3.9 Wetland vegetation management in Micro Prespa
Please refer to the Compendium Volume of the management plan

In the past, the local cooperatives were cutting the reed in winter, in order to use it for thatching. This activity

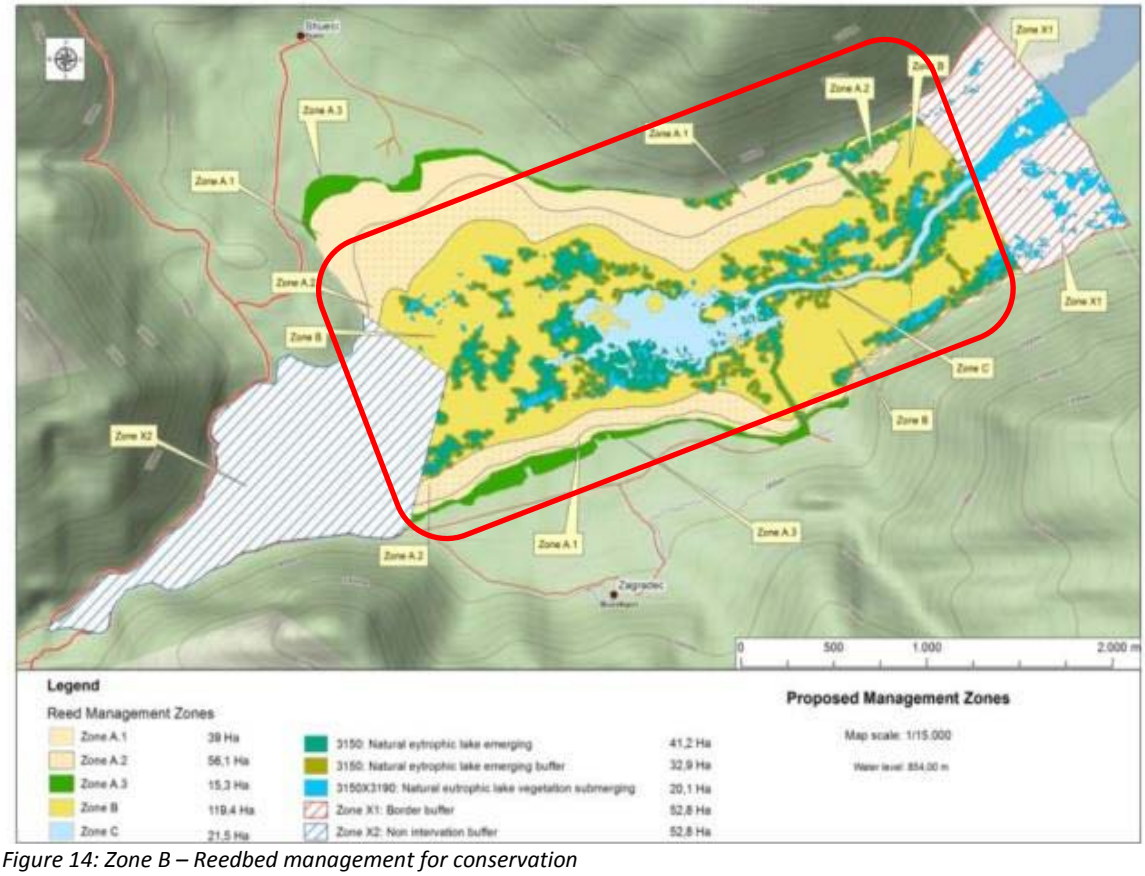

Figure 14: Zone B – Reedbed management for conservation
This zone is characterized by extensive natural eutrophic lake habitats, large number of scattered reed islets. The depth of this zone is over 80 cm. (198 ha) A buffer zone of 10m width is applied at reedbed around the Magnopotamion or Hydrocharition-type vegetation is proposed, as the reedbed functions as a protecting fence for this sensitive ecosystem

took place every winter for 17 years up until 1992, but then was abandoned due to low demand and difficult access in the market. Nowadays, the vegetation management is taking place in the littoral zone through cutting and light grazing by domestic herbivores (*KAZOGLOU ET AL*., 2010), as well as inside the wetland on a small scale.

Summer cutting takes place on a very small scale and includes collection of wet meadow vegetation mowed under-water or cutting of reed tops as fodder for domestic animals in winter.

Winter cutting is the most common practice and is done using boats. For the collection of reed for thatching above water cutting is used on reed islets, while under water cutting is used for the collection of stronger reeds to be used for fences or as construction material for rooves. Under water cutting is also done in order to maintain corridors within dense reed beds, for the fishermen to use.

As in many other wetlands in the Balkans with water level fluctuations, the farmers expand their fields in expense of the littoral meadows when low water level occurs. When lake water levels are high, they draw back to the original boundaries of their plots. Reed bed burning is also practiced occasionally in winter, by fishermen, farmers or stockmen for a number of reasons. These are to clear the reed bed from litter, create temporarily open areas for fish spawning and fishing over the coming spring season, and create the conditions for growth of better quality stems of more fodder in summer (*KAZOGLOU*, 2010).

In 2009, four experimental plots where cut at the lake of Micro Prespa. Two plots in particular of 350 m², each in Zagradec and Shuec in winter, and two plots of 1,500 m² each in summer. The summer cutting turned out to be the most effective in controlling high emergent helophytes and promoting the growth of other less competitive plants. The two openings created in summer 2010 were immediately used by thousands of small fish and amphibians, while an otter was observed at the Shuec plot (*KAZOGLOU ET AL.,* 2010).

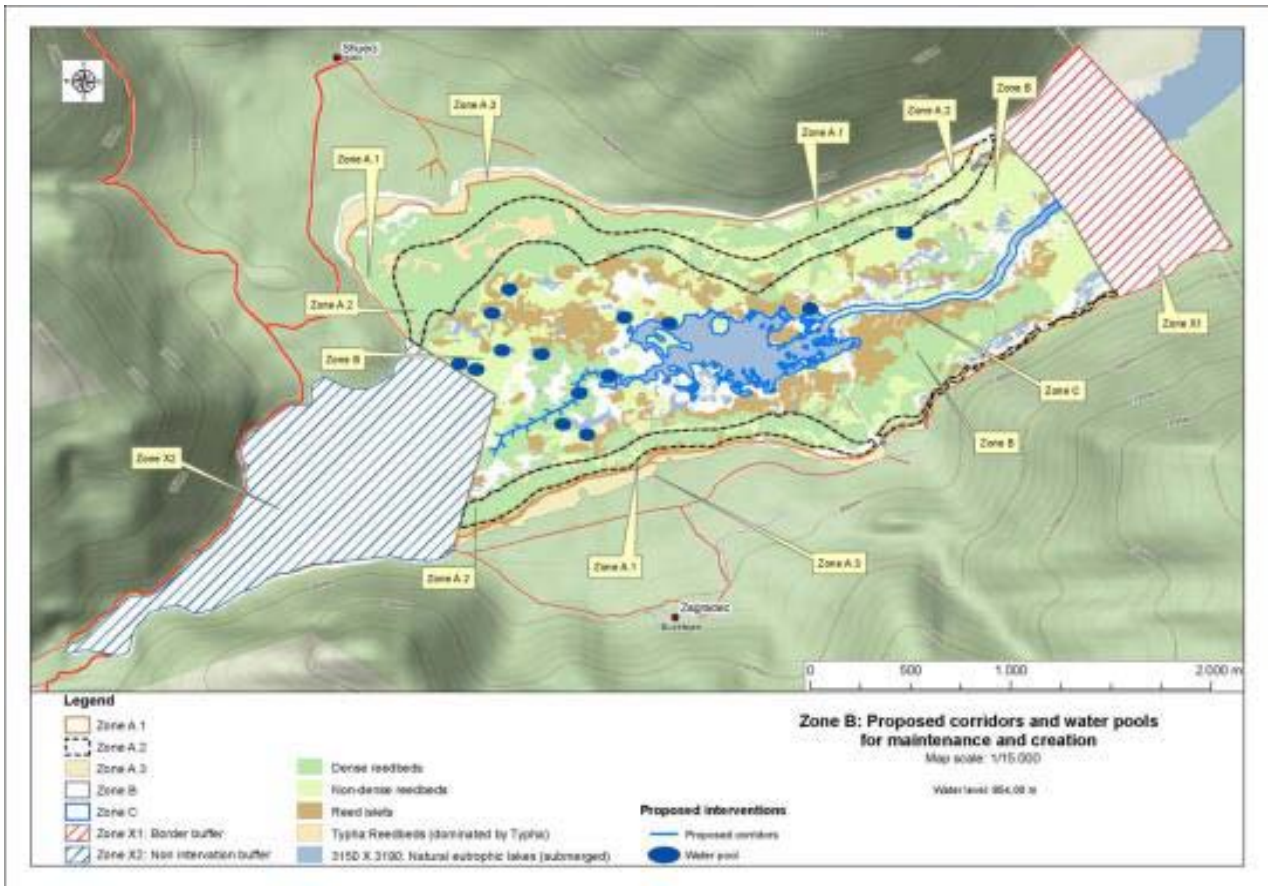

Figure 15: Management of Reed for Conservation in Zone B

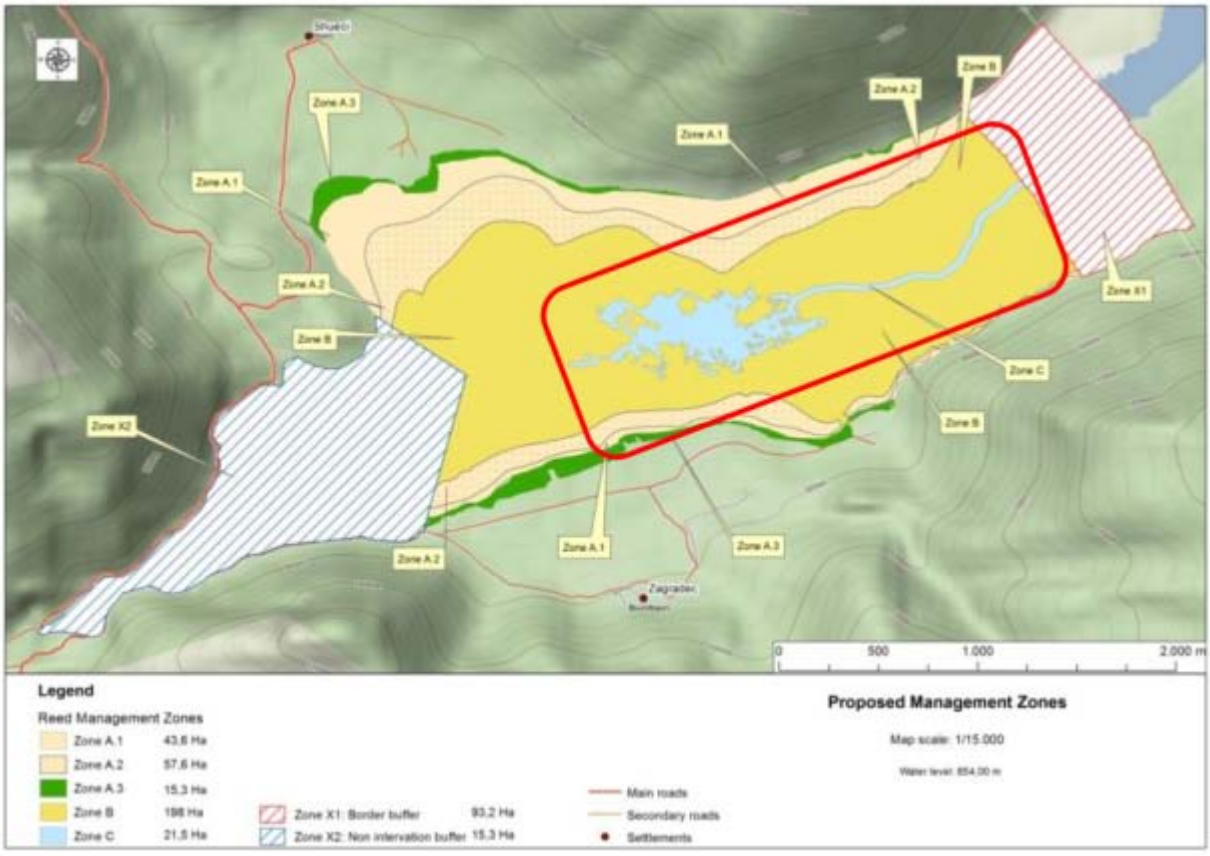

Figure 16: Zone C – Management zone for the creation – restoration of open water habitats
This zone is characterized by open water in the central part of the wetland. (21.50 ha)

3.4 VISITOR MANAGEMENT AND VISITOR CARE

Visitors are welcome in a National Park, but can also be burdensome if not well managed and organised. Visitors are an important target group for the NPA to achieve its objectives for environmental education and awareness raising. They are an equally important target group to improve the economic situation and condition of inhabitants inside of the NPP and the surrounding villages. Therefore, the local population and the NPA must have the same interests to attract visitors.

Day trip visitors are welcome, but for the local economy overnight guests in the guest houses are much more important., It is therefore essential to create opportunities for visitors to experience nature, the cultural assets of the National Park and the hospitality of the local people.

By creating and maintaining appropriate visitor infrastructure, the NPP will become more attractive to tourists and in turn support the local economy.

As basic principles in a National Park, there should be areas identified which are most susceptible to disturbances by human beings and therefore will have to be off limits for visitors. For instance, the breeding sites of sensitive bird species would qualify as such areas or spawning grounds for fish species should be kept free from boating or swimming.

On the other hand, areas will have to be identified where visitors can experience the beauty of nature, the attractiveness of observation of biodiversity and other relevant features of the NPP. This guiding principle forces the NPA to create special visitor infrastructures which are so attractive and will keep themaway from the sensitive areas.

Visitor management is usually based on points of interests (PoI) of the Park area.

In the case of the NPP, the following attractions can be identified:

- Cultural elements
- There are several historical buildings and cultural monuments in the park
- Consumption of specific resources like fish (in restaurants) and local produced food.
- Natural elements
- Species
- Landscapes
- Ecosystems

To enable visitors to enjoy those attractions a special infrastructure is necessary.

The following elements of visitor infrastructure shall be established:

3.4.1 VISITOR INFO POINTS

Visitor Info Points (VIP) are important to guide the visitors safely through the park and to provide relevant information. The park is geographically divided in two parts: Greater Prespa Area and Lesser Prespa Area. There is a rough path connecting both areas starting in Zaroshka/Zornosko via Cerje, and Rakicka ending in Shuec. This path qualifies as a hiking trail, riding trail and even as a biking trail.

Visitor Info Points shall lead guests in the NP along such trails. First hand information is necessary to receive at the entry points to the National Park. There are, in principle, three entry points: one at the Zvezad saddle, one at the border crossing to Macedonia and a third one behind the village Tren at the former exit/entry of the Devol channel to the Micro Prespa Lake. These points also qualify as control posts for the park administration to check for illegal cut wood or other restricted natural reources form the Park's area.

An additional attraction of the park's biodiversity and cultural assets can be generated by creation of a visitor centre.

3.4.1.1 Visitor Centre

The visitor center is a central information point, where guests and visitors can receive first hand information. The visitor centre shall have an impressive exhibition showing special features of the NPP, and should be staffed with persons able to give appropriate information to incoming guests. In the visitor centre, all necessary information for guests in the region shall be maintained, such as a register of guest rooms, hotels, restaurants. There will also be information on shops, medical service, and a church schedule. An important element is the entry gate to the National Park at the Zvezda Pass, and at the entry to the Lesser Prespa Lakes close to Treni. Both entries show the visitor that he enters a special area in which he has to obey specific rules, but in which he also can experience extraordinary wildlife and nature. The entry gates are important points to inform visitors about the specialities of the entire area, to inform them about points of interest, and to provide the visitors with necessary printed information material. Here, local products from the park region can be offered to guests as well as addresses for accommodation, restaurants and shops.

3.4.1.2 Nature Guides

Guided tours are a usually well frequented offer to guests who want to experience nature in a protected area. This requires a trained driving guide.

It is an important task of the National Park administration to recruit people from the park area to train them as nature guides. They shall be equipped with the relevant equipment (uniform, telescope, binoculars, telephone, GPS camera, first aid kit, back pack etc,) and receive a special training to provide information and support to guests willing to experience the biodiversity of the National Park.

A remuneration and fee scheme shall be elaborated and approved by the Management Committee of the NPP. The visitor shall pay the costs for the guided tours by themselves, whereas the NPP carries the investment for the training courses.

Trainers shall be the park staff and external national and international experts.

The persons ready to be trained as nature guides should have a profound knowledge of the Park's area already.

Language skills are essential. A good command of English is a prerequisit.

The readiness to learn and the ability to transmit the acquired knowledge to the visitors are also basic requirements.

3.5 Concept on Nature Experience and Leisure Activities

Please refer to the Compendium Volume of the management plan

3.6 Concept on Environmental Education

Please refer to the Compendium Volume of the management plan

3.7 National and Transnational Action Plans (See Annex of Compendium)

3.7.1 Strategic Action Plan for the Prespa Park region (see Annex of Compendium)

3.8 Management Administration of the PNP

3.8.1 The Management Committee of the Prespa National Park

Please refer to the Compendium Volume of the management plan

3.8.1.2 The Administration of the Prespa National Park

The current institution of the Prespa National Park administration visualises a traditional forest service. In its present structure, it is unable to fulfil (today's) main functions, and needs to be adjusted for future tasks and challenges.

The organisational structure of the administration of the NPP over the last 12 years was not adequate to the tasks and objectives of the NP. This structure does not sufficiently reflect the main objectives of a modern National Park Administration. Therefore, a revised and adapted structure is proposed. During the last 12 years, the head of the PNP-Administration as chief of sector had to report to the director of the Korca Forest Directorate. The chief of sector is secretary of the Management Committee of the National Park. At present, the park administration has no decisive rights in terms of staffing and budgeting. The park receives staff according to the intentions of the forestry directorate in Korca. Trained staff is removed from the team of the national park and new staff members are allocated without the necessary qualifications. It can be questioned if a forest directorate is capable to cope with the objectives, tasks and actions of a modern service oriented National Park administration, which incorporates only to 30 % forested area but an equal share of an aquatic ecosystem.

The forest service is structured by subdepartments (regions). In the NPP we have three subdepartments :(Gorica1/Gorica 2 incl Pustec and Trestenik-Zvezda). Ideally, each region should have one park specialist, up to three foresters and one person responsible for fire prevention. (4 persons x 3 = 12 Persons).However, some of these functions are not assigned.

Additionally, there is a need for a director and an administrator. The park administration shall further be enhanced bya science officer and a community outreach and communication officer. At least 16 staff members are necessary to operate the park to a minimum standard. Many tasks, especially control and patrol work in shifts and during the weekend, cannot be carried out at present since the actual number of staff is only 9 persons. The basic law enforcement work is not satisfactorily performed.

3.8.1.3 Structure

The ideal structure of the National Park Prespa

Recommendations for Improvement of the current administration

- ***Head of business administration:*** The main function is to oversee all administrative work of the park administration including maintenance of all equipment.

- ***Officer for science, planning, research and conservation*****:** This new role should be connected with an international training programme ("Management of protected areas", Klagenfurt).

- ***Officer for community outreach and regional development***: This completely new function should be connected with an international training program ("Management of protected areas", Klagenfurt). English language skills: Knowledge of the English language is important. But also fundamental knowledge of Greek and Macedonian language is required.

  Regional staff: In general, regional staff shall be given a chance to connect to the park wherever possible (qualification, profile).

- **Chief Warden:**

  The chief warden is responsible for the law enforcement in the field. His wardens should all have the police rights of a forest police officer.

  The park needs sufficient staff, especially wardens, to provide sufficient control on the critical points like the entry/exit gates to the NP at the Zvezda pass for the Greater Prespa and at Treni (cave) for the Lesser Prespa. 14 Wardens are recommended to be able to perform law enforcement in 24 h shifts seven days a week.

3.8.1.4 IMPROVEMENT OF LAW ENFORCEMENT

The law enforcement can be improved by manning the control posts at the Zvezda Pass (Greater Prespa) and the Treni exit/entry to Lesser Prespa.
The posts shall be manned at least 18 hours a day seven days a week. This will allow for effective control the illegal traffic transporting illegal locked wood from the park's area. The wardens need to have police rights, allowing them to stop vehicles, control documents and the vehicles' load.

Diversity of staff: The diversity of staff (age, gender, education, etc.) shall be increased. Gender mainstreaming shall be an integral part of the human resource management.

In the future the staff will to deal with the following new tasks:

3.8.1.5 VISITOR MANAGEMENT

An increasing number of visitors will need special trained staff to deal with their demand of information and leisure activities.

3.8.1.6 SERVICE PROVIDED FOR THE LOCAL POPULATION

The conversion of the administration from a pure law enforcement unit to a service oriented unit needs additional and special trained staff. These staff members need to have the skill to deal with the local communities and their need. The park administration shall service the needs of the inhabitants by supporting the local economy (tourism sector, biomass production, marketing of local products etc.)

3.8.1.7 EDUCATION AND AWARENESS RAISING

Modern National Parks will focus their work more and more on awareness raising and education. It is a given fact that in those countries where the level of awareness and education is high, the need of law enforcement is low. Therefore, it is an essential task of the present administration already now to contribute to this conversion process. It is a long lastingterm effort and might need at least one generations time to reap benefits. But Bbecause of this time frame, it is essential to target the future generation with with education and awareness to the future generation. Therefore, at least one specialist staff member is necessary to deal with this challenging task to build the future of the pPark right nowat present.
Takingen these points into account, an improved structure with increased and well trained staff is the precondition to work effectively on the mitigation of the actual threats.

3.9 THE NEW STRUCTURE OF THE NATIONAL PARK PRESPA

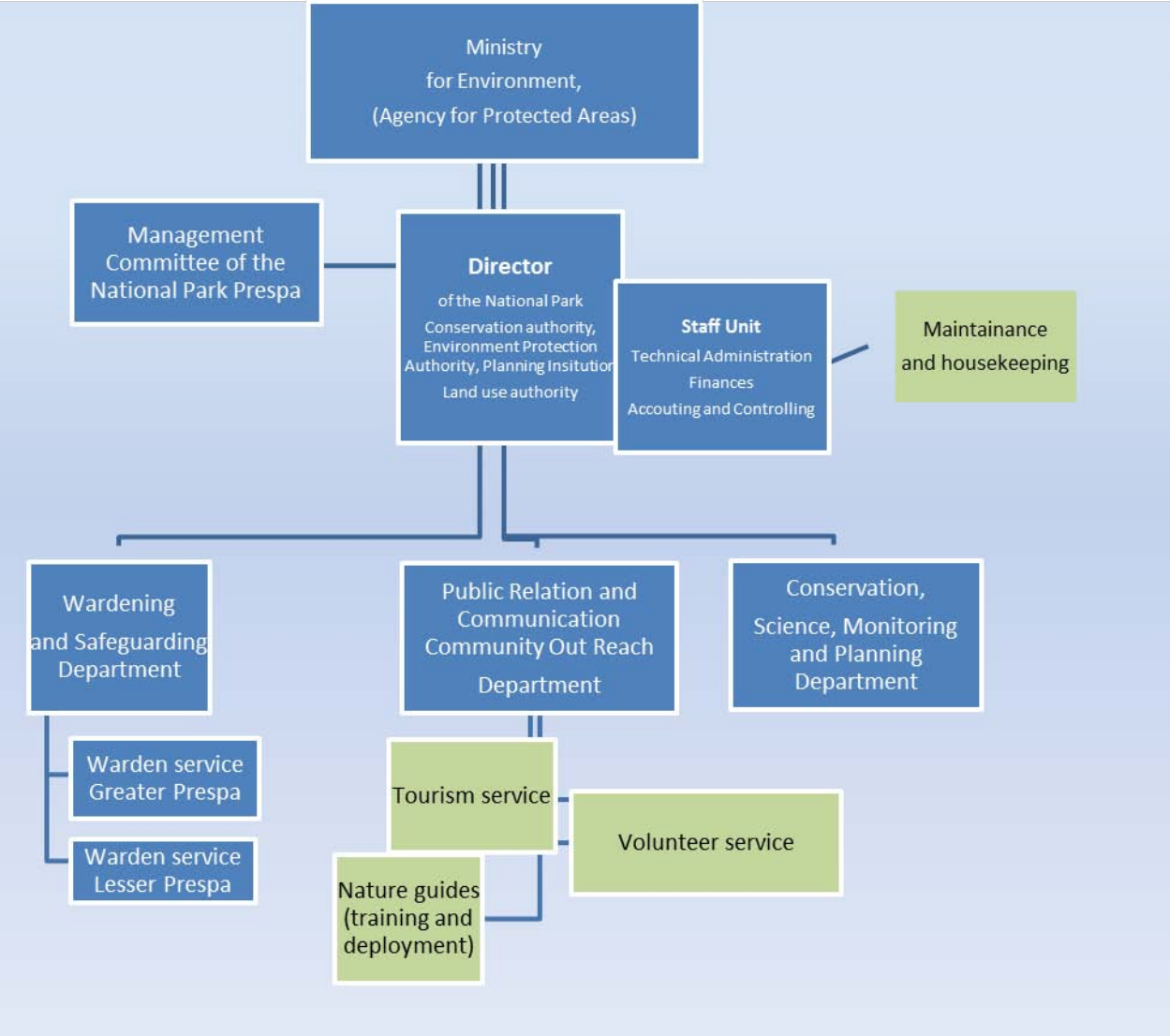

Figure 17: New structure of the administration of the Prespa National Park adequaete to the exisiting and new tasks of the Adminisration of the Prespa National Park (green blocks could be outsourced) (

The new structure of the administration of the National Park is directly linked to the Ministry for Environment and its department, responsible for the administration of protected areas. The National Park should be governed by a director and its Management Board or Committee. The National Park Director will be responsible for the successful performance of the park. He will serve as secretary for the Management committee and organize its function and operation.

The **director** will be empowered to represent the nature conservation authority, the environmental protection authority, the hunting, the fishing and the agricultural and forestry land use authority as well as the local planning institution for the expanse of the PNP.

The director will be assisted by an **administration department** which will be directly linked to the directors department as a staff unit. This means that the staff unit has a coordinative supportive and direction function to the subordinate department. The administration department will be directly headed by the director himself.
In this department, assistants will work on the technical administration of the PNP and its infrastructure. The administrator will be responsible that the parks equipment and infrastructure will be maintained by continuous reparation and maintenance work. In the staff unit all personnel affairs will be organized as well as the accounting of all expenditures of the PNP and the organization of the bank account. In this Unit the financial planning and controlling will be organized. The park director will be authorized to present in due time the requested financial reports and the budget plans to MOE and the Management Committee.

The important functions of the PNP administration will be divided among **three departments**. The **Safeguarding - Warding department** will enforce the legislation to improve the conservation by direct mitigation of current threats. Wardens of the park will also function as contact persons for visitors and local inhabitants. The Safeguarding-Warding department will have two subunits: one for the Greater Prespa Lake, and another one for the Lesser Prespa Lake.

The Wardens working in this department have to be equipped with police rights, enabling the staff with proper law enforcement. The staff will have to have the permission to carry weapons and will be trained to perform proper wildlife management activities, if necessary according to ecological criteria.

A central department is the communication and public relations department. Here, the management of visitors and the coordination of all public relations work will have to be coordinated and organized. The head of the department will be also responsible for the socio economic support work of the NPP. Public events with participation of the NPA will be coordinated and organized in this department. The production of information material and the organization and maintenance of the electronic media of the NPP falls in the obligation of this department. The department has to organize the small grant program by preparation of the decision making process by the Management Committee and the director.

An equally important department is the conservation, science and monitoring department. This department will be responsible for monitoring all conservation measures, but also resourcing activities in the park and adapting to the management plan.. The department prepares a science program and coordinates research work in the park areas. It also registers tourism development and the impact the NPP has on the local economy. The department creates criteria for eco-labels produced in the park. Criteria for the recognitions of official partners of the NPP by local business enterprises will be developed, and the compliance by the awarded partners will be monitored.

3.9.1 DESCRIPTION OF THE STAFF POSITIONS

3.9.1.1 DIRECTOR OF PARK

Description: As head of organization, the director has the overall responsibility for all functions, processes, resources and all decisions in the daily work of the park. All decisions of strategic dimension are made by the management board. The director is obliged to implement these decisions and to report regularly on their progress. The director has to represent the park to public, to the region, and in particular to the political decision makers.
Competencies and skills:, He requires strong communication skills. He should have a solid and comprehensive understanding of a national park and its integrated management; as well as a thorough understanding of the legal and administrative framework of the park. He should display overall understanding of business administration and organizational development (in particular: human resource management, project management, financial management, public relation and communication); user knowledge in IT (MS-office, email). The knowledge of fluent Albanian language and a profound knowledge of Macedonian language is necessary. (English and Greek language skills are an advantage). Driving license, Class B (Class A, C1, BE are an advantage).
Equipment: Mobile phone, car, desk-top computer, internet connection.

3.9.1.2 ADMINISTRATOR

Description: The head of business administration supports the director in running all basic functions.. He is responsible for procurements, preparing contracts, budgeting, accounting, administration of projects, technical aspects of reporting, maintenance of infrastructures and keeping the inventory.
Competencies and skills: High level of reliability, sound qualification and experience in running an office; excellent knowledge in financial and legal issues related to work (e.g. procurement procedures; appropriate accounting program; e office logistics); very good user and administrator knowledge in IT (MS-office, in particular: MS-Word, MS-Excel, MS-Power point; internet and e-mail; data safety and backup-mechanisms). Fluent in Albanian language and a profound knowledge of Macedonian language. English language skills are an advantage. Driving license, Class B (Class A, C1, BE are an advantage)
Equipment: Phone, desk-top computer, internet connection.

3.9.1.3 OFFICER FOR RANGER SERVICE / CHIEF WARDEN

Description: The officer develops, organizes and controls the ranger services of the park. The service ensures that regional stakeholders and visitors observe the rules in the park. In addition, the rangers give technical support to research, monitoring, maintenance of infrastructure and visitor information. The rangers report to the officer, and the officer reports directly to the director.

Competencies and skills: Very well oriented within the region; familiar with the legal framework (laws, directives, bylaws); outdoor competencies; good understanding of nature conservation and forest protection; driving license; fundamentals in IT (MS-office, email). Fluent in Albanian language and a profound knowledge of Macedonian language. (English and Greek language skills are an advantage). Driving license, Class B (Class A, C1, BE are an advantage). Boat Driving and navigation license are required.

Equipment: Mobile phone, lap-top, car, boat, optic instruments (still- camera, video camera, binoculars, tripod, telescope, night view devices), rifle, narcotic rifle, camera traps, GPS devices.

3.9.1.4 RANGER / WARDEN

Description: The ranger ensures that regional stakeholders and visitors observe the rules in the park. In addition the ranger gives technical support to research, monitoring, maintenance of infrastructures and visitors' information. The ranger reports to the officer for ranger service. At least 14 wardens are necessary in order to provide the necessary law enforcement work

Competencies and skills: Sound orientation within the region, familiar with the legal framework; outdoor competencies; fluent in Albanian language and a profound knowledge of Macedonian language. (English and Greek language skills are an advantage). Driving license, Class B (Class A, C1, BE are an advantage). (Boat Driving and navigation license are an advantage).

Equipment: Mobile phone, lap-top, car or motorbike or boat, optic instruments (still- camera, video camera, binoculars, tripod, telescope, night view devices), weapon for self-defense, GPS devices.

3.9.1.5 OFFICER FOR COMMUNITY OUTREACH AND REGIONAL DEVELOPMENT

Description: The officer works intensively with communities, NGOs and regional enterprises to foster a good understanding of the park itself and its intentions (environmental education). The officer is in charge of initiating, stimulating and supporting regional development, in economic, cultural and social aspects. This role particularly involves the connection to touristic activities and the park's contribution to visitor's education and enjoyment. The officer reports directly to the director.

Competencies and skills: Very good communication skills; good understanding of the region and the people in the region; good experiences in project development and project management; understanding of entrepreneurial and touristic principles. Perfect Albanian language and a profound knowledge of Macedonian language. (English and Greek language skills are an advantage). Driving license, Class B (Class A, C1, BE are an advantage).

Equipment: Mobile phone, lap-top, internet connection

3.9.1.6 OFFICER FOR PLANNING, RESEARCH AND CONSERVATION

Description: The officer is responsible for designing, implementing, monitoring and controlling research activities. This role develops and keeps contact with relevant scientific institutions. The findings of the research are to be integrated into park activities, in particular conservation activities and management planning. If necessary, the officer provides expert opinion on infringements and environmental impacts of activities. The officer reports directly to the director.

Competencies and skills: A sound background in natural and environmental sciences is required (e.g. biology or/and ecology); very good understanding of methods and tools of outdoor sciences (e.g. vegetation, e.g. monitoring instruments; e.g. bird counts, etc.); excellent knowledge in IT (besides MS-office in particular data-bases, GIS and remote sensing); a strong command of English. Fluent in Albanian language and a profound knowledge of Macedonian language. (Greek language skills are an advantage). Driving license, Class B (Class A, C1, BE are an advantage)., BE are an advantage).

Equipment: Phone, lap-top, technical equipment following the needs (GIS, GPS, monitoring equipment, satellite imagery, etc.) technical skills as required.

3.9.2 TASK AND DUTIES OF NPA

The tasks and duties of the NPA are laid down in the Decision of Council of Ministers No. 80 from 18.2.1999.
The staff is responsible for ensuring the restrictions of the different Zones of the NPP will be followed by the inhabitants and visitors.
For this purpose, the staff will receive police roles and rights same as those of the forest police.. A special DCM will be issued to award these police rights to the wardens of the NPA and the director.
Moreover, the NPA administration will be equipped with the authority over the fishery inspectorate in order to control fishing on both Prespa lakes and to provide licenses to the fishermen. The NPA will be enabled to collect fishery fees and will collaborate on a regular basis with the relevant fishery authority. One staff member will oversee the work of the fishery inspection on both lakes.

All tasks and duties of the forestry service in the park in the state owned land will be handed over to the NPA. The NPA administration will provide the local population with firewood from state forests based on the stipulated procedures of this management plan and based on an appropriate fee. The fee and other charges for licenses will be fixed by the management committee of the NPP on an annual basis, and will serve the NPA to cover the operational costs for the firewood production.

The NPA administration will be in charge of all law enforcements related to the management of the NPP. For this purpose, the NPA will receive police rights in order to control and stop illegal hunting. The NPA Administration will receive the police rights by a special DCM, which allows to confiscate weapons used for illegal hunting, issuing protocols against the culprits and if necessary, to take the person into custody respectively handing the person over to regular police forces.

3.9.2.1 Fire prevention and mitigation.

The Park Administration is responsible for the prevention and fighting of forest fires. A special monitoring system will be applied in order to detect the fires at an early stage. The NPA will receive the necessary equipment for effective fire fighting.

3.9.2.2 Visitor care and information

The NPA will take care on the visitors of the NPP, provide information, train nature guides, maintain the network of hiking trails and the relevant infrastructure (Info tables, path marks, picnic places, observation points, bathing places, etc.). The NPA produces and provides information material for visitors. This material can be provided to visitors as a financial contribution to the NPA.

3.9.2.3 Community support

The NPA will support the inhabitants by providing fire wood or adequate substitutes from the resources of the PNP (reed pellets or briquettes). The inhabitants will be charged for this service by a fee fixed by the Management Committee of the PNP on an annual basis.

The NPA will support the local population in improvement of their livelihood by providing support through a marketing organisation and by a special label created for the products of the PNP.
The NPA will enhance the livelihood by employment initiatives and support of tourism. The visitor infrastructure will contribute to this aspect.

The NPA will start species conservation actions and will implement the designed action plans of this management plan.

The NPA will be responsible for the appropriate monitoring. The NPA will decide which monitoring action the park staff can carry out by its own means and which are to be outsourced to experts in the given timeframe set out by this MP:

The NPA will be held responsible for ensuring that all provided equipment and infrastructure will be maintained to the highest standard. The NPA will equip the MoE with an investment plan covering a five years period to refurbish infrastructure and to replace outdated equipment.

The NPA will provide an annual narrative report to the MC and the MoE.

The NPA will provide an annual budget plan to be approved by the MC and MoE not later than 15th of October for the subsequent year.

The NPA will provide an annual financial report to be approved by the MC and the MoE no later than the 1st of March of the subsequent year.

The NPA will be responsible for bi-annual meetings of the MC arrange special meetings if circumstances require it. The NPA will take the minutes of the meeting, share it with its members, provides the agenda for meetings and will inform the members on a regular basis.

3.9.3 Corporate Design and Corporate Identity of the PNP

Please refer to the Compendium Volume of the management plan

3.9.4 Infrastructure of the Park Administration

3.9.4.1 Headquarters Building

Please refer to the Compendium Volume of the management plan

3.9.4.2 Entry Gate at the Zvezda Pass

Please refer to the Compendium Volume of the management plan

A gate at the main entry point into the park area close to the Zvezda pass indicates the entry to a special area where environmental friendly behaviouris required. These ideals will be clearly understood at the entrance to the NP.

A further station shall be established at the Lesser Prespa Lake serving as a control station for this particular area of the NPP, but also the function as a visitor centre.

Visitors need to have observation platform/towers from which they either can observe wildlife (birds) or the landscape's beauty.
An appropriate place for such an observation platform is the hill in front of the village Shuec at the Lesser Prespa Lake. The observation platform allows for studying of the breeding birds in the reed bed of the Lesser Prespa Lake.
The NPA will provide visitor information systems at each important point in the park's area, especially at the entrance to each village. There will be an info-table which will inform about the park and the respective village, and important contact data for each of the village.

3.9.4.3 Ranger station Lesser Prespa

Please refer to the Compendium Volume of the management plan

There is presently no ranger station at the Lesser Prespa Lake. This lack of presence contributes to the occurrence of illegal activity. . To improve this, a ranger station is necessary which will be permanently manned in 18 hours shifts seven days a week.

3.9.4.4 Infotabels and Demaracation Sign Posts

Please refer to the Compendium Volume of the management plan

Info tables informing visitor about permitted activities will be placed in the parks area to inform guests about appropriate behaviour in the park.

The outer and inner boundaries of the NPP will be marked with signs, informing about the zone and the appropriate behaviour within.

3.9.5 Communication and Public relation

Please refer to the Compendium Volume of the management plan

Information sign boards as well as demarcation sign boards are important for public relation. They need constant care in case of destruction and vandalism. It is most important that these sign boards are kept in a good condition. It reflects the ability of the NPA to take care of the park and its features. Through this, the image of the NPA will be improved demonstrating their abilities and effectiveness. This is an indirect but most important method of communication and public relation. The classic elements of public relation and communication are direct distribution of information in form of printed materials and exhibitions. Events such as press releases will spread information indirectly via mass media to a larger audience.
A special template will have to be produced to display through the various media based on the developed corporate design.

3.9.5.1 ANNUAL REPORT OF THE PRESPA NATIONAL PARK

The annual report of the NPA is an important as it reflects the abilities of the NPA to conserve the biodiversity and to improve the livelihood of the park inhabitants.
The annual report has to be presented by the park administration to the Management Committee and the Ministry for Environment, Forests and Water Administration for approval every year.

3.9.5.2 HOMEPAGE OF THE NATIONAL PARK PRESPA

Please refer to the Compendium Volume of the management plan
The PNP needs a central information and communication platform, which offers service to potential visitors but also to the inhabitants of the PNP region.

PART 4 FINANCIAL PLAN

Please refer to the Compendium Volume of the management plan
The Financial Plan or Business Plan calculates the annual staff costs during the next ten years based on the current staffing. It is suggested to increase the number of personnel from currently nine to minimum 16 rangers. This shall be successively achieved within five years. Otherwise the actual tasks, especially the necessary law enforcement cannot be achieved.
The Financial plan calculates also the annual operational costs and takes the need of replacement of outdated equipment into account.
Additional tasks like service to the communes, visitor management and education and awareness raising activities are subject of extra funding which need to be raised by means proposed in the chapter of the business plan.
The existing infrastructure like the HQ building, the new constructed entry gate and info-point at the Zvezda pass and the planned new Ranger station at the Lesser Prespa Lake need a constant maintenance, which needs not only money but also s staff person being made responsible for it.

This is also valid for the info tables, the observation plat form at Greater and Lesser Prespa, the hiking trails and the planned educational trails. Furthermore, the demarcation sign posts and the behaviour tables for visitors need permanent maintenance and due to high degree of vandalism in the PNP a replacement from time to time.

It is not easy to calculate these costs, but an amount of about 50.000 Euro per year should allow the NPA to keep the infrastructure in a proper shape (see Table 32).

4.1 BUDGET PLAN

Please refer to the Compendium Volume of the management plan

Under the assumption that the prices are increasing year by year by 3% the following forecast for the operational costs can be made:

Table 32: Forecast Operational Costs 2014-2024

Year	Amount in ALL	Amount in Euro
2014	5.081.400,00Lek	36.295,71 €
2015	5.233.842,00Lek	37.384,58 €

2016	5.390.857,26Lek	38.506,12 €
2017	5.552.582,98Lek	39.661,30 €
2018	5.719.160,47Lek	40.851,14 €
2019	5.890.735,28Lek	42.076,68 €
2020	6.067.457,34Lek	43.338,98 €
2021	6.249.481,06Lek	44.639,15 €
2022	6.436.965,49Lek	45.978,32 €
2023	6.630.074,46Lek	47.357,67 €
2024	6.828.976,69Lek	48.778,40 €

PART 5: MONITORING AND EVALUATION OF MANAGEMENT

5. MONITORING

For more details please see Table 20.

Monitoring is the instrument to assess the effectiveness of the management of the Park. It shall be carried out in regular intervals. In the practice it could be shown that ten years intervals are sufficient. The water monitoring program is essential to assess the main sources of pollution and eutrophication altering and changing the current and potential ecological status of the lake ecosystem. Further to that following *NAUMOSKI ET AL* (2010), there is a need to quantify as much as possible fluxes (nutrients, pollutants) in the lakes. The discharges of the corresponding tributaries are important now.

5.1 ABIOTIC ELEMENTS

Basic parameters shall be measured by the NP Staff. A meteorological station shall provide the necessary climate data for assessment of various effects of the present climate change. This might have severe impacts on the biodiversity but also on all aspects of land use by local people. Therefore a meteorological station operated and managed by the Park administration is essential. Other important parameters such as of water quality can be found in the compendium of the MP.

Soil conditions shall be measured in recommended intervals along the identified transects of the baseline survey (see Compendium).

5.1.1 Monitoring of physical and chemical parameters

A detailed monitoring plan for physical and chemical parameters is elaborated in the framework of the Transboundary Monitoring system for the both Prespa Lakes. Please refer to the Compendium version for more details.

5.1.2. EXISTING MONITORING PROGRAMS AND STATE OF WATER QUALITY

Based on the archival data of Institute of Hydrometeorology Tirana there is a monitoring program (the water gauges are to be read up to 2 or 3 days interval) of lake water levels in both lakes (since 1951 in Albania).

The monitoring of water quality and ecological status of water bodies on the Albanian side are considered as part of former Hydro meteorological Institute Tirana.

In the transboundary monitoring system (TMS) (*PERENEOU ET AL*. 2009), hydrological balance and water quality issues on the lakes are also monitored. In fact, Macro Prespa is a very vulnerable system (TMS: *MATZINGER ET AL. 2006*) because any additional consumption of water has a direct effect on its water level, which in turn affects not only the lake hydraulics but the entire lake ecosystem. The water extraction by the littoral communities has to measures in a transboundary approach.

5.1.3 NATIONAL AND INTERNATIONAL LEGAL FRAME FOR MONITORING

The purpose of monitoring physical and chemical parameters can be derived from the international requirements of WFD and according to that (*TMS*) "the monitoring programmes must be defined as:

- ✓ a coherent and comprehensive overview of ecological and chemical status of lakes and other standing waters;

✓ permit classification of standing waters into five classes of ecological status: high, good, moderate, poor and bad;
✓ be based on characterization and impact assessment carried out for each river basin district;
✓ cover parameters which are indicative of the status of each relevant quality element".
Further to that based on national obligations by the EU integration process and *THE MONITORING PROGRAM OF MOE AND LAW ON ENVIRONMENT* (2002) the monitoring of surface water bodies is a commitment.

5.1.4 MONITORING AND INDICATORS
Please refer to the Compendium Volume of the Management Plan and see Table 20.

5.2 BIOTIC ELEMENTS
Please refer to the Compendium Volume of the Management Plan and see Table 20.

5.2.1 TARGET SPECIES
Target species and their populations represent a reproducible, specific, and control system for landscapes. Within these, the multiple interrelations between species, their habitats with vegetation and structures usually cannot be measured. By this the functional relation of detailed special habitats in their ecosystems can be controlled, observed and management activities been measured.
Furthermore, attractive charismatic target species will serve as excellent elements for public interest and educational objectives.This relevance will help to create a higher acceptance of protection measures.

Target species serve as indicators for different landscape levels. They should have key functions in ecosystems and shall indicate the favourable condition of its habitat and the related biocoenosis. Target species are relatively rare, endangered but attractive. Therefore, according *ALTMOOS* (1997) target species shall have the following qualities:
- Representative for different spatial compartments of an ecosystem and its biocoenosis;
- Lock-in phenomenon for a multitude of species;
- Easy to detect and observe;
- Charismatic.

A meaningful regional representative target species concept allows optimizing landscapes in a way that other protection objectives will profit from the measures taken. This will be caused by a lock-in phenomenon of measures which are beneficiary for a multitude of species of the biocoenosis of an ecosystem *(ALTMOOS, 1997*).

By the above mentioned criteria a target species concept will allow to assess the impact and the effect of management measures and anthropogenic caused encroachments in ecosystems by simply registering Table 43: Target Species for monitoring the population changes of the chosen target species.

5.2.2 TARGET (INDICATOR) SPECIES ACTION PLAN.
Please refer to the Compendium Volume of the Management Plan

5.2.3 FURTHER FAUNA ELEMENTS
Among the mammals as appropriate target species the following fauna elements have been selected:
a) Brown bear (Ursus arctos)
b) Wolf (Canis lupus)
c) Lynx (to be expected) (Lynx lynx (martinoi?))
d) Balkan Chamois (Rupicapra r. balcanica)
e) Bats: Myotis capaccinii (Long-fingered Bat) since classified as vulnerable

Appropriate monitoring methods for the mammals given above, except the bat species, are so called hair traps and camera traps. These allow for observation of the presence of certain mammal species, and to gain information on their populations sizes and changes.

The camera traps will also allow an insight on other terrestrial species in the park, such as mustelides and wild boars. These seem to remain extinct in the park, but also on some ground breeding birds like Alectoris graeca and others.

As well as this, the camera traps will reveal illegal actions such as hunting, grazing of livestock in the core zones and fire wood collection in restricted areas.
20 camera traps are placed in the parks areas and shall reveal more information about the wildlife of the PNP.

5.2.3.1 FISH MONITORING

The future monitoring scheme will be applied with the support of the GIZ financed project according to European standards for fish sampling in lakes (CEN 2005a; 2005b). These standards determin the sampling protocols and methodology to be developed in the course of fish and fishery monitoring for the Prespa Lakes. The sampling procedure is based on stratified random sampling.

The sampling area is divided in strata (3 strata for the Greater Prespa Lake and two strata for the Lesser Prespa Lake) and random sampling is performed within each depth stratum. The specially designed multi mesh size gillnets are 30 m long and 1.5 m deep. The gillnets are composed of 12 different mesh size nets varying from 5 – 55 mm.
The sampling should be performed during the period between 1st August until 15th of September, when there are no fish to spawn and the temperature of the epilimnion usually exceeds 15° C.

The sampling shall be repeated every three years.

5.2.3.2 FLORA ELEMENTS

5.2.3.2.1 INDICATOR SPECIES OF THE PNP

Please refer to the Compendium Volume of the management plan and see Table 20

5.3 EVALUATION AND MONITORING CONCEPT FOR EFFECTIVE PARK MANAGEMENT

5.3.1 METT

The Management Effectiveness Tracking Tool is applied now for the Prespa National Parkand its administration since 2007.

To assess the management effectiveness of both protected areas and protected area systems and to give guidance to managers and others, etc., the World Commission on Protected Areas has provided an overarching framework, the Management Effectiveness Tracking Tool (METT or Tracking Tool)[8].

The Management Effectiveness Tracking Tool forms part of a series of management effectiveness assessment tools. These range from the WWF Rapid Assessment and Prioritization Methodology used to identify key protected areas at threat within a protected area system to detailed monitoring systems.

The Management Effectiveness Tracking Tool is composed of two sections (see Annex 1 and Annex 2):

1. Datasheet: which details key information on the site, its characteristics and management objectives, and
2. Assessment Form: the assessment form includes three distinct sections, all of which should be completed.

Results

The yearly assessment of METT aims to estimate the main impact and process indicators as part of the project tasks in monitoring activities and related changes, evaluating project progress and project implementation. This assessment was based in the methodology provided by the ***"Management Effectiveness Tracking Tool: Reporting Progress at Protected Area Sites", second edition*** (Revised Edition published by WWF International, July 2007). The preliminary data on METT assessment are given in the Annexes 1 and 2. The 4th METT assessment (July 2011) shows a score of 37 (**Table 33**) whereas the assessment for the year 2012 shows already an enormous increase to 58 score points.

Table 33: Scores of Yearly METT Assessment 2007-2012 Item

[8] *Management Effectiveness Tracking Tool: Reporting Progress at Protected Area Sites. Second Edition, Revised Edition published by WWF International, July 2007*

	Year 2007	Year 2008	Year 2009	Year 2010	Year 2011	Year 2012
Final scores of METT Yearly Assessment	31	34	37	36	52	58

5.3.2 EVALUATION AND MONITORING CONCEPT BY EUROPARCS

The monitoring program for the National Park and its management will be based on the Management Effectiveness Tracking Tool which was applied by several accompanying and supporting projects enhancing the management of the park. Additionally, international standards have been applied in a comprehensive evaluation effort of all National Parks in Germany. The criteria for the evaluation process have been elaborated by an expert group of Europarcs with support by the German Agency for Nature Conservation (BfN). (*EUROPARCS,* 2008). The evaluation criteria have been intensively tested in some German National Parks and been applied in a three years lasting evaluation process in which all German National Parks have been assessed. The criteria have been proven to be reliable and appropriate. The standards for the German Parks have been adapted to the Albanian condition and can serve as a general evaluation and monitoring instrument for all Albanian National Parks.

Please refer to the Compendium Volume of the management plan

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Part 7: ANNEXES

7.1 Incentives for Regional Ecological Development

Please refer to the Compendium Volume of the Management Plan

7.2 Transboundary Cooperation

7.2.1 Biosphere Reserves by Unesco

Please refer to the Compendium Volume of the Management Plan

7.2.2 Wetlands of International Importance by the Ramsar Convention

Please refer to the Compendium Volume of the Management Plan

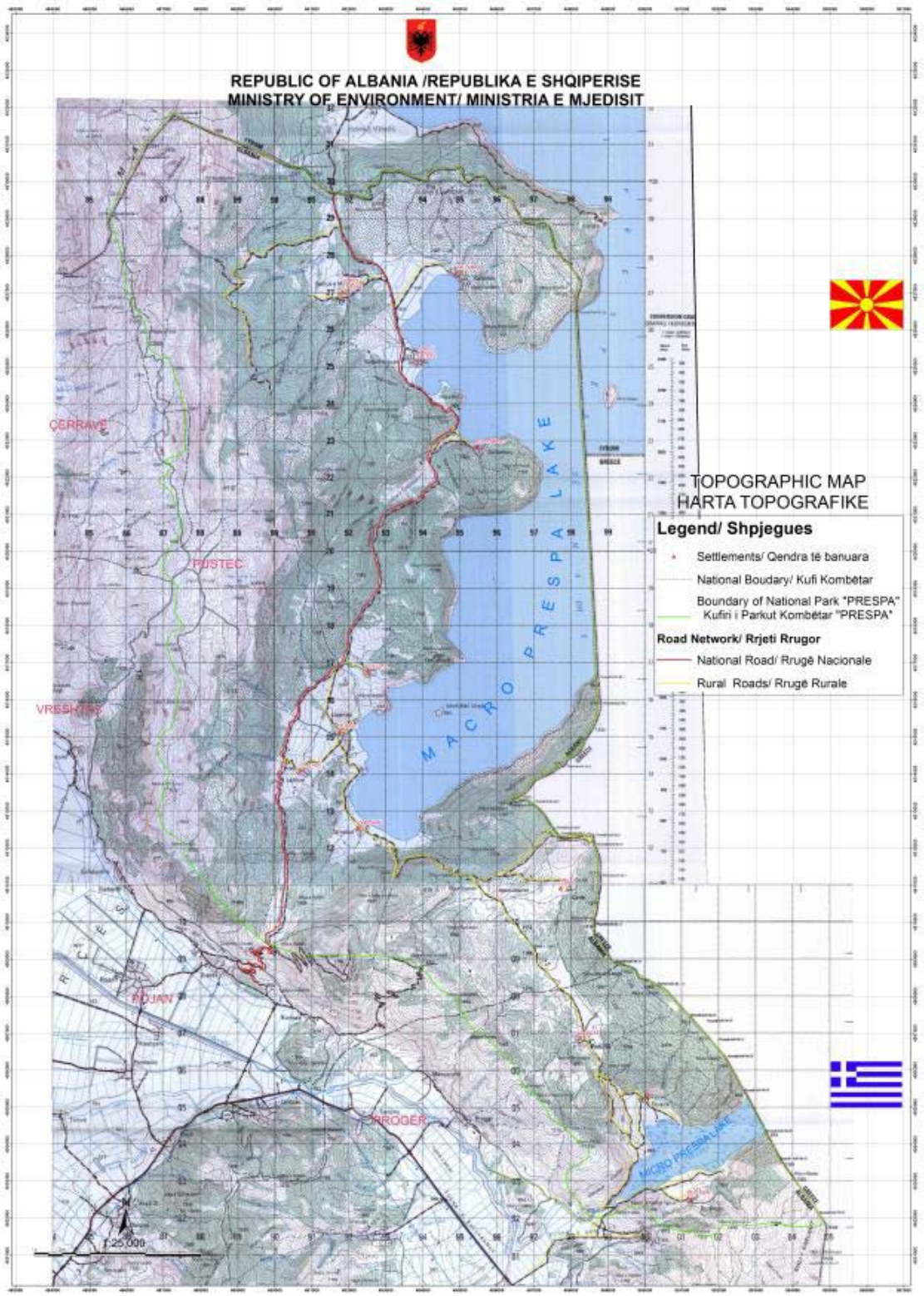
7.2.3 Prespa Park

Please refer to the Compendium Volume of the Management Plan

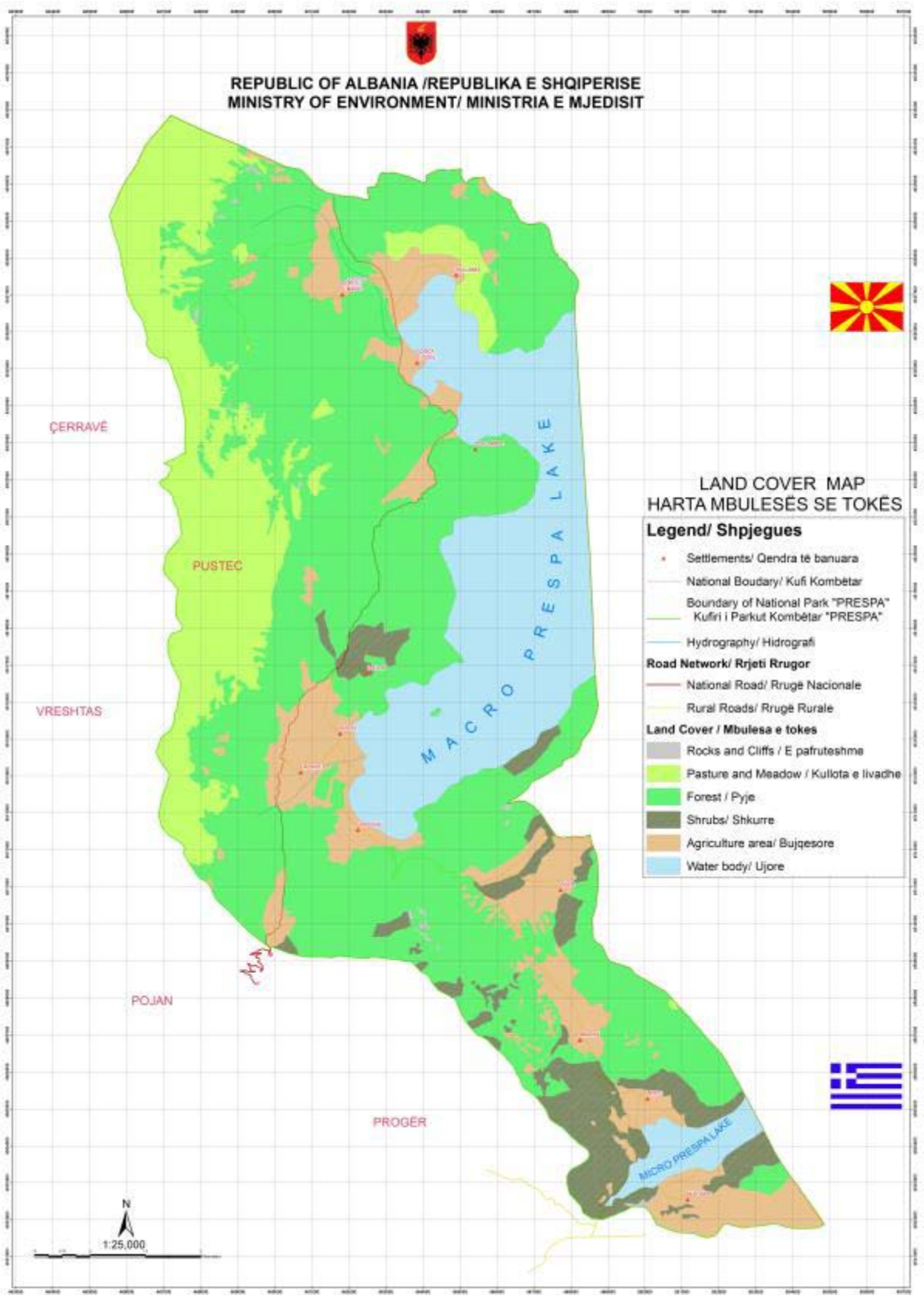
7.3 Maps

For better understanding of the summary version and the most important maps are collected in this part of the annex.

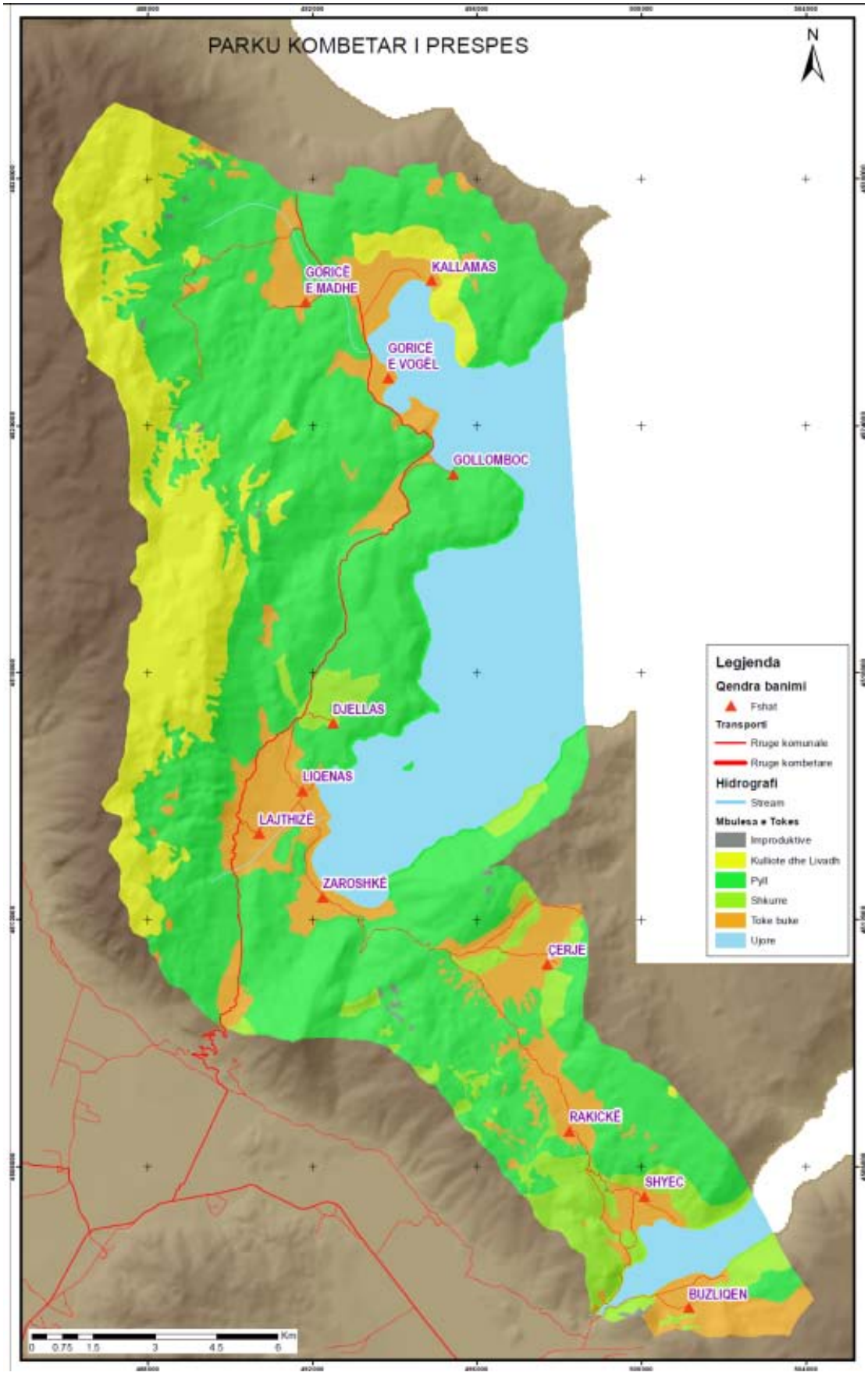
TOPOGRAPHIC MAP OF THE PRESPA REGION



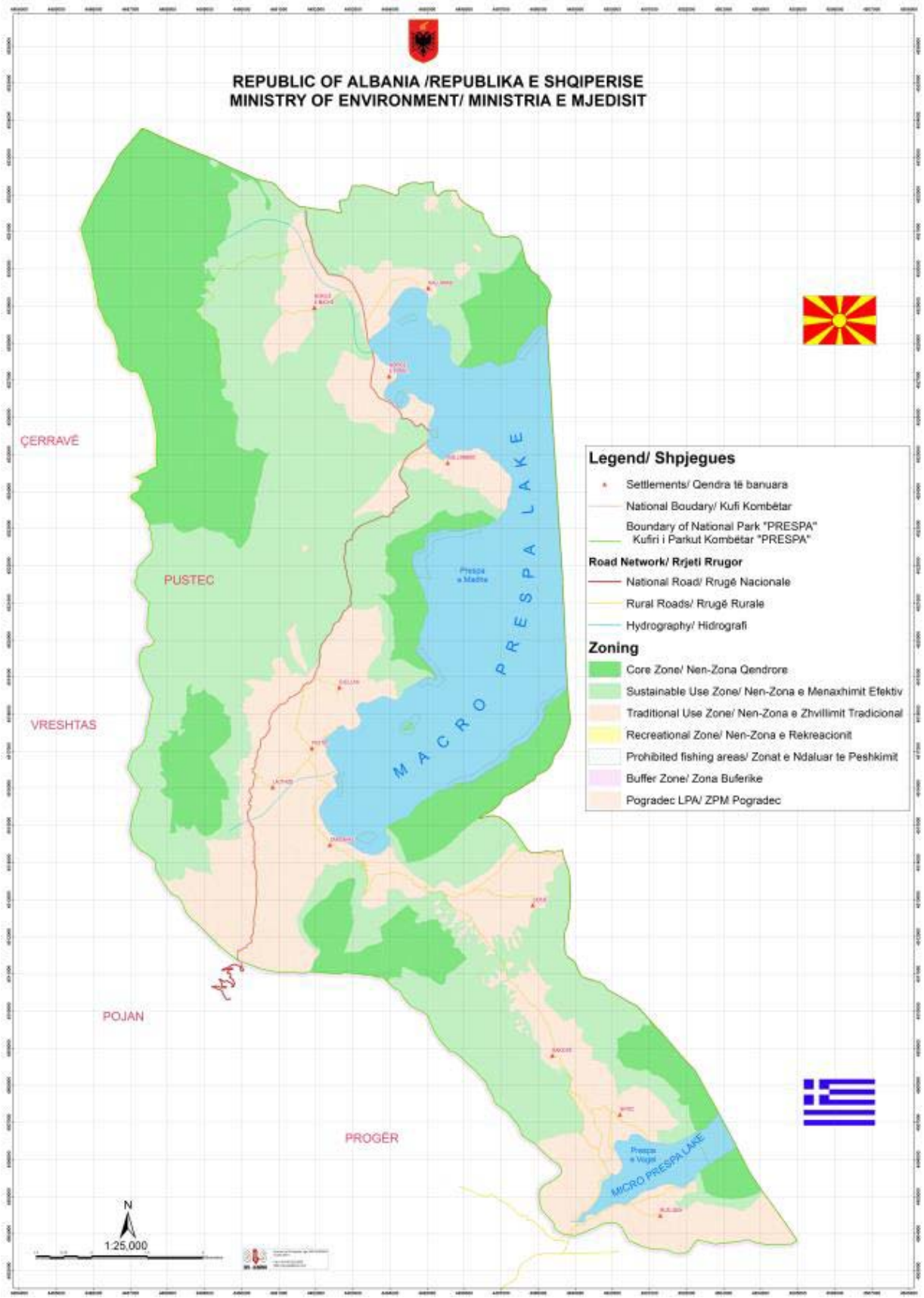
MAP OF LAND COVER IN THE PNP



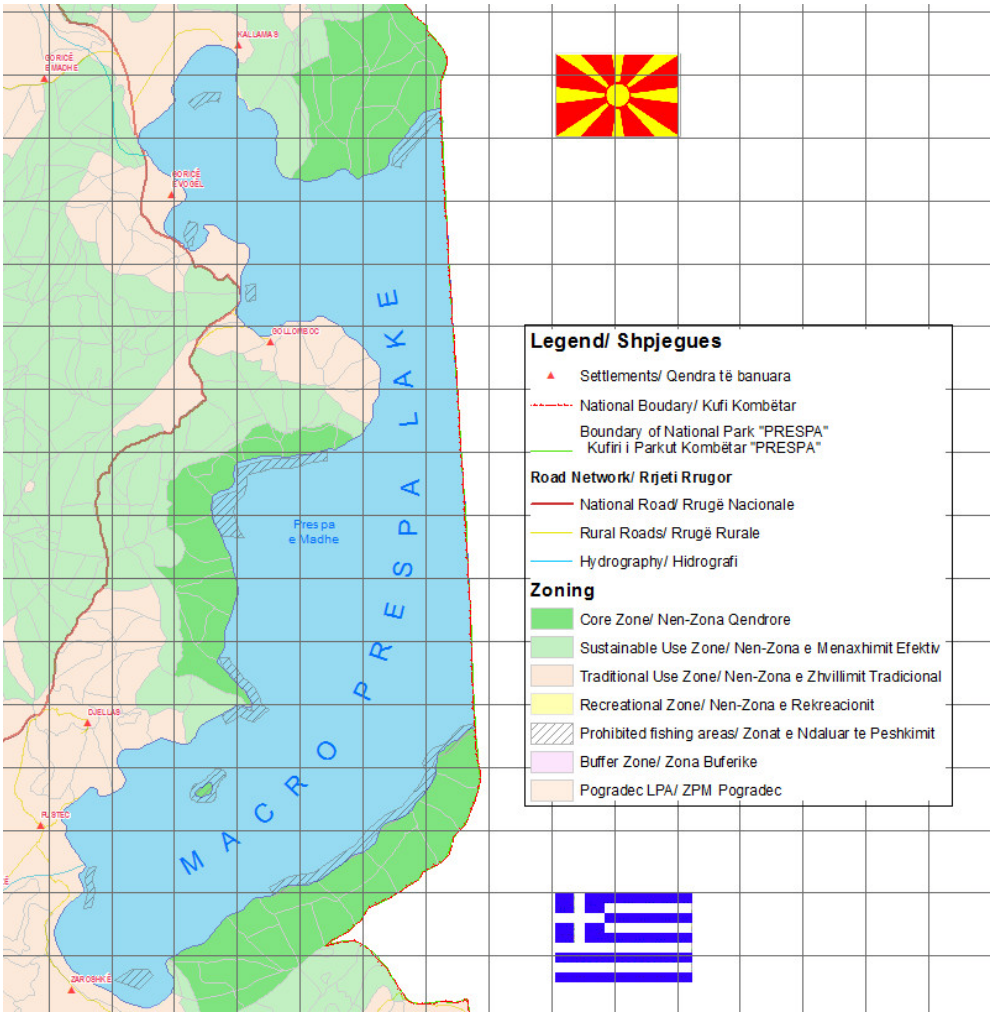
BOUNDARIES OF THE PRESPA NATIONAL PARKAS GAZETTED IN THE YEARS 1999/2000

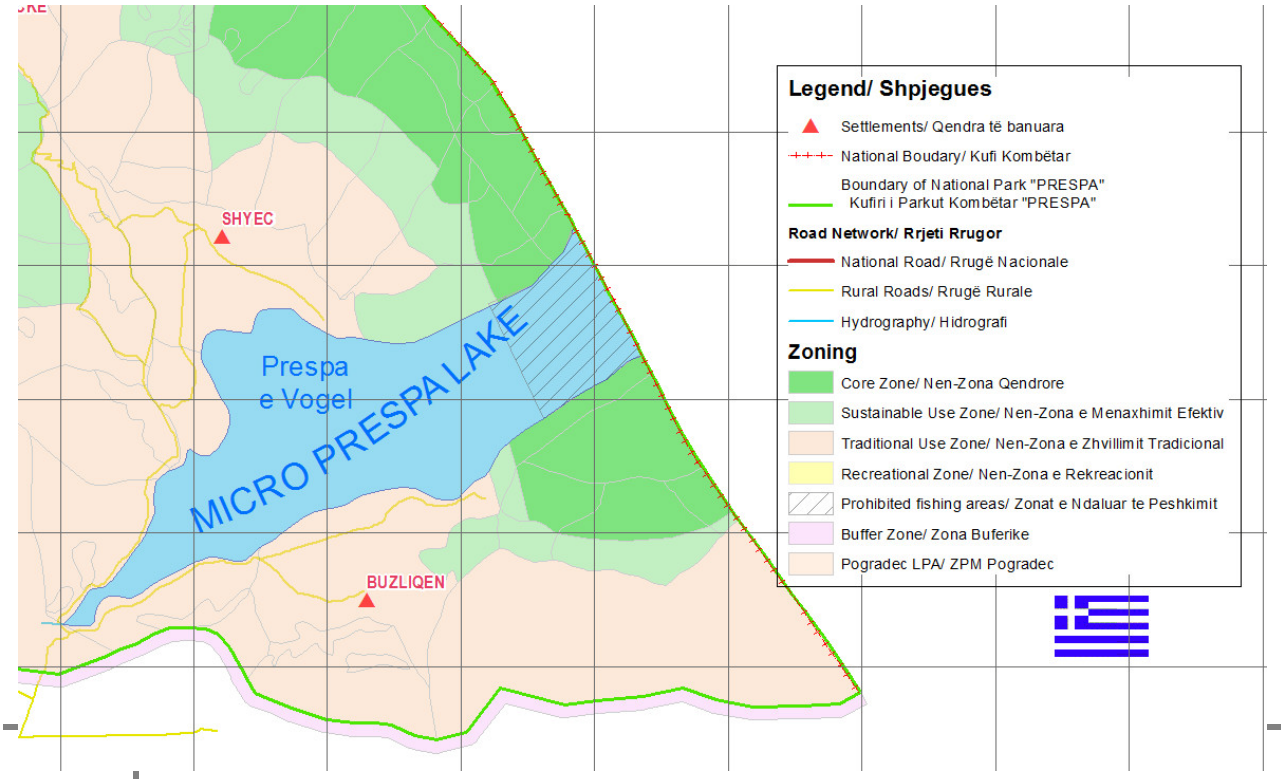


REVISED ZONATION OF THE NATIONAL PARK PRESPA

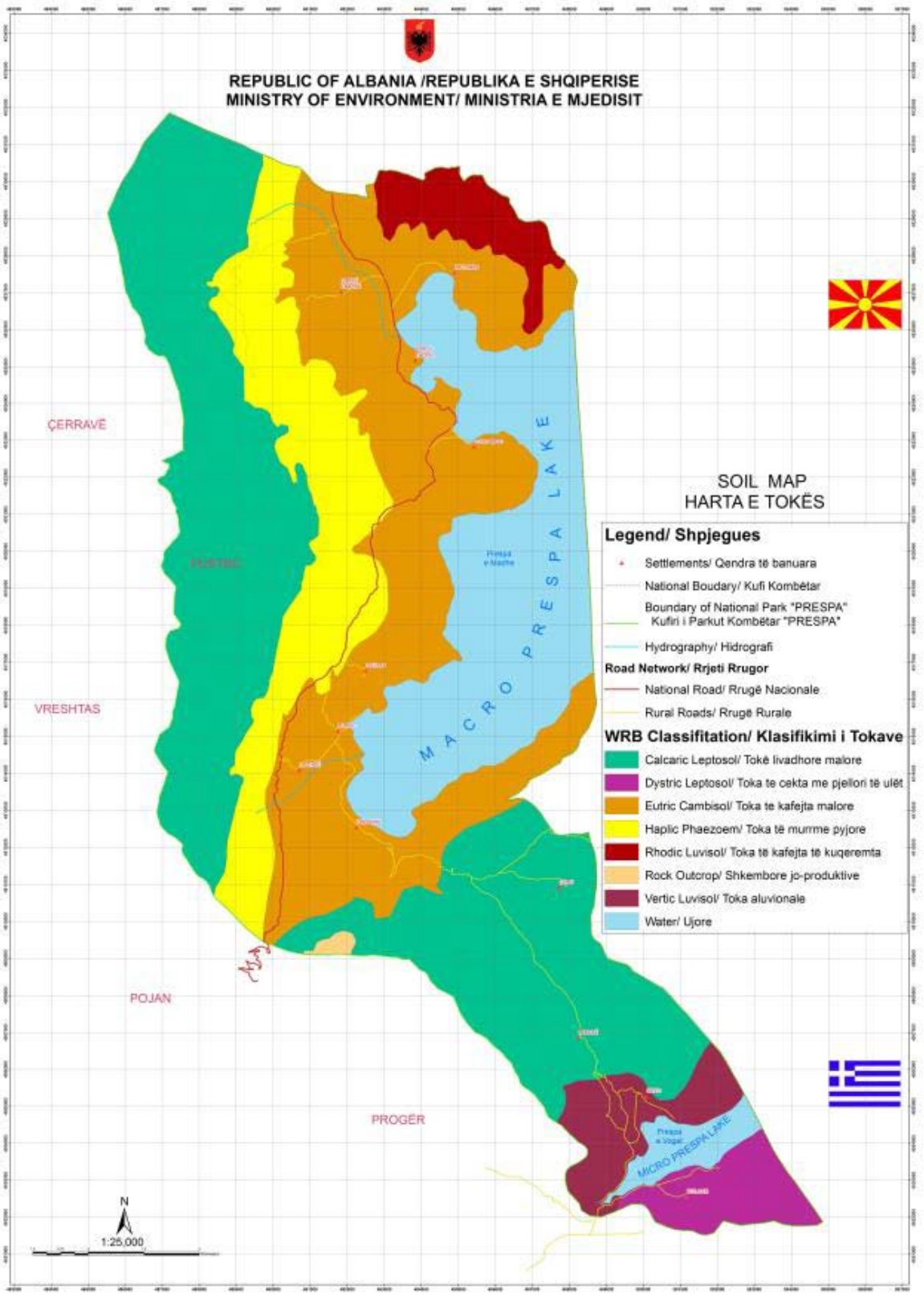


PROHIBITED FISHING ZONES

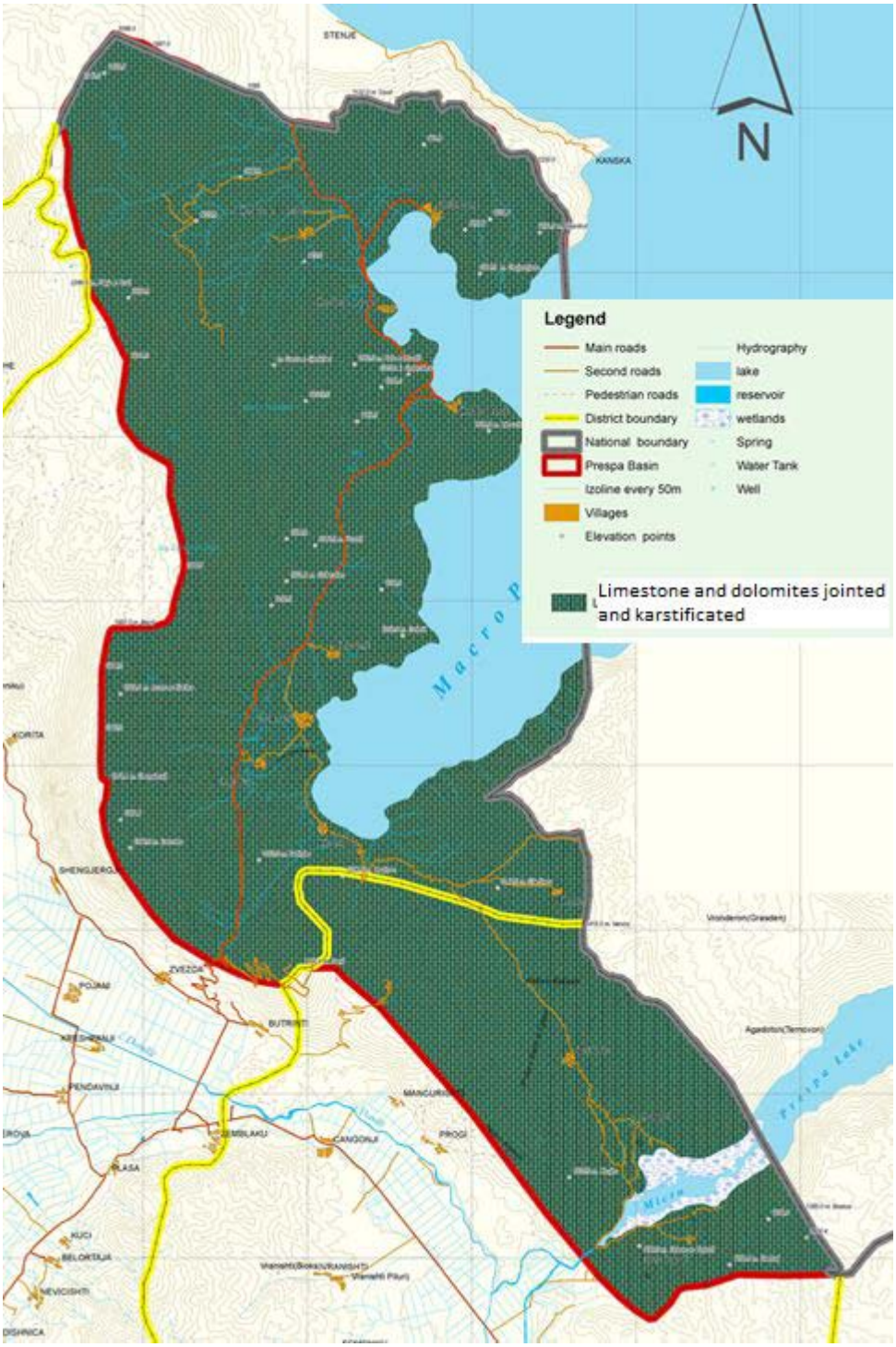




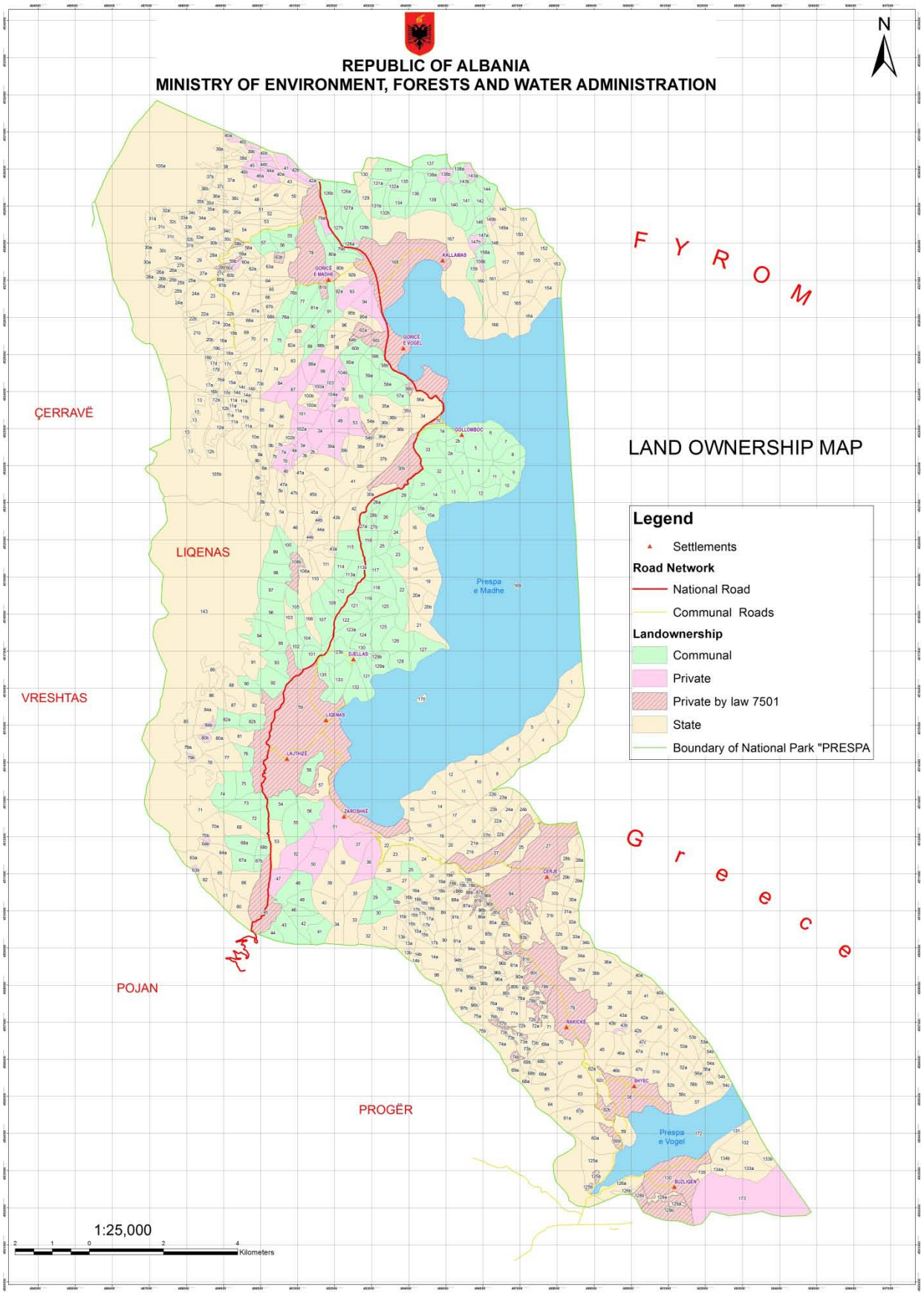
SOIL MAP OF THE PRESPA NATIONAL PARK



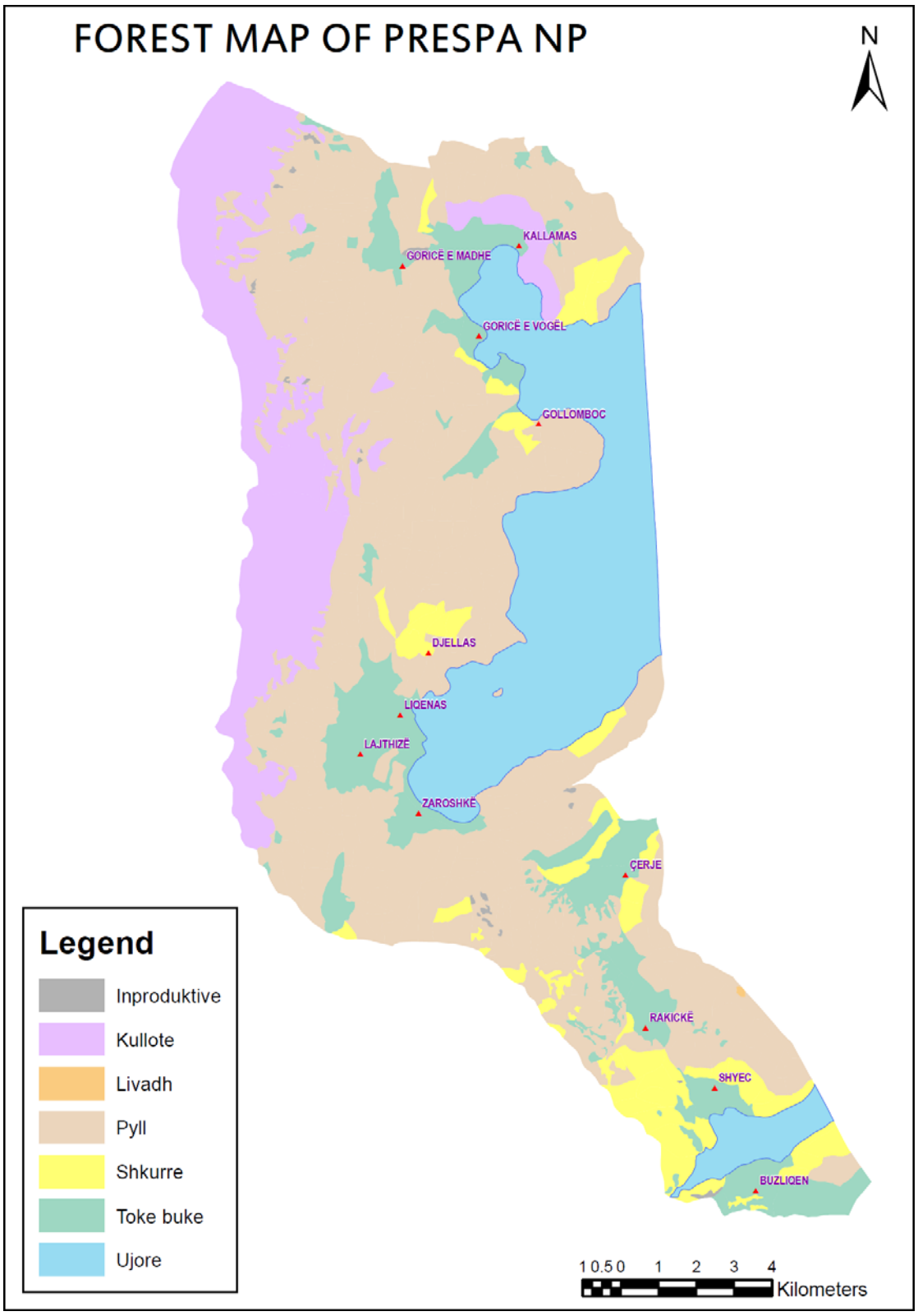
HYDROGEOLOGICAL MAP OF THE PRESPA NATIONAL PARK



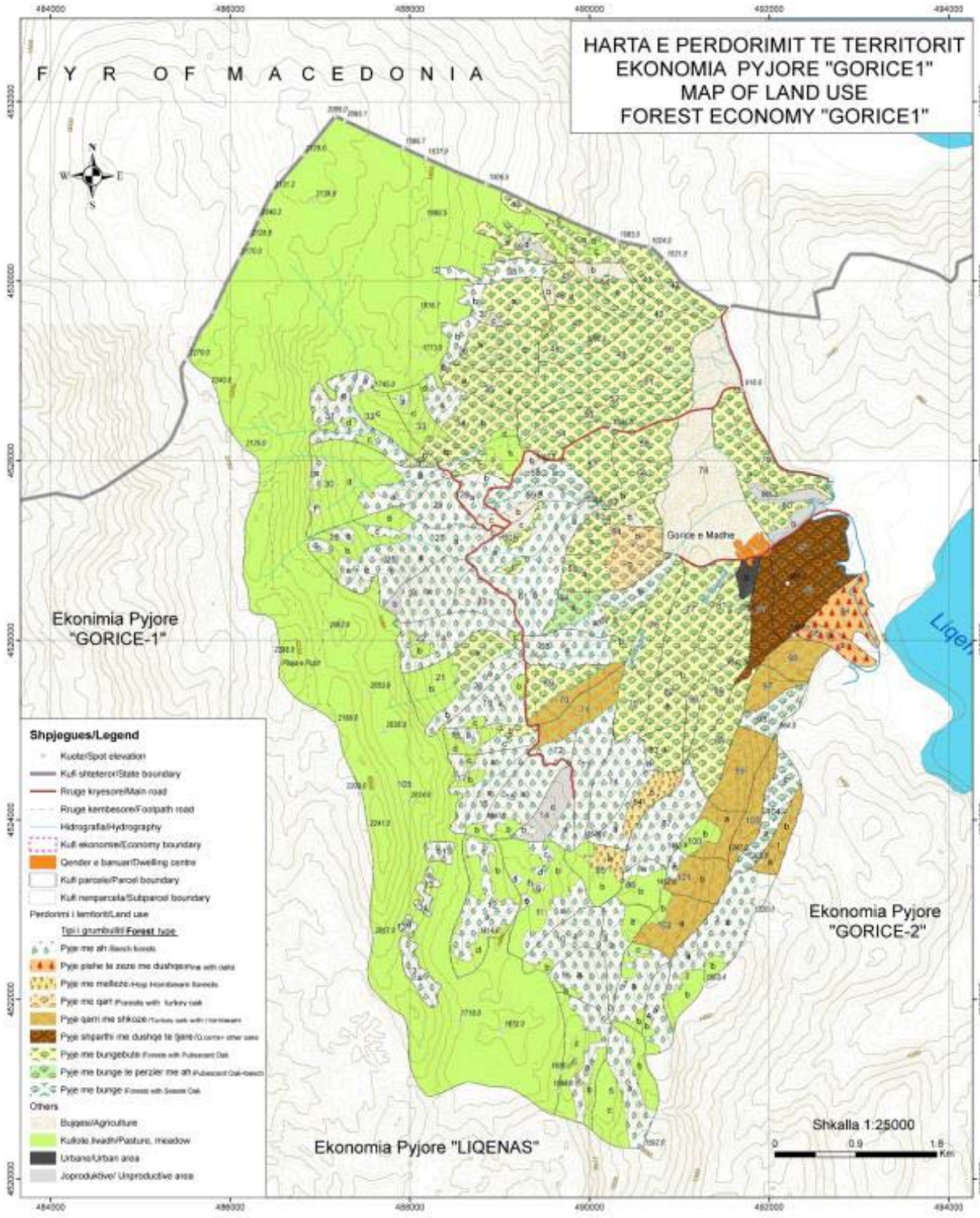
Map of Land Ownership in the PNP

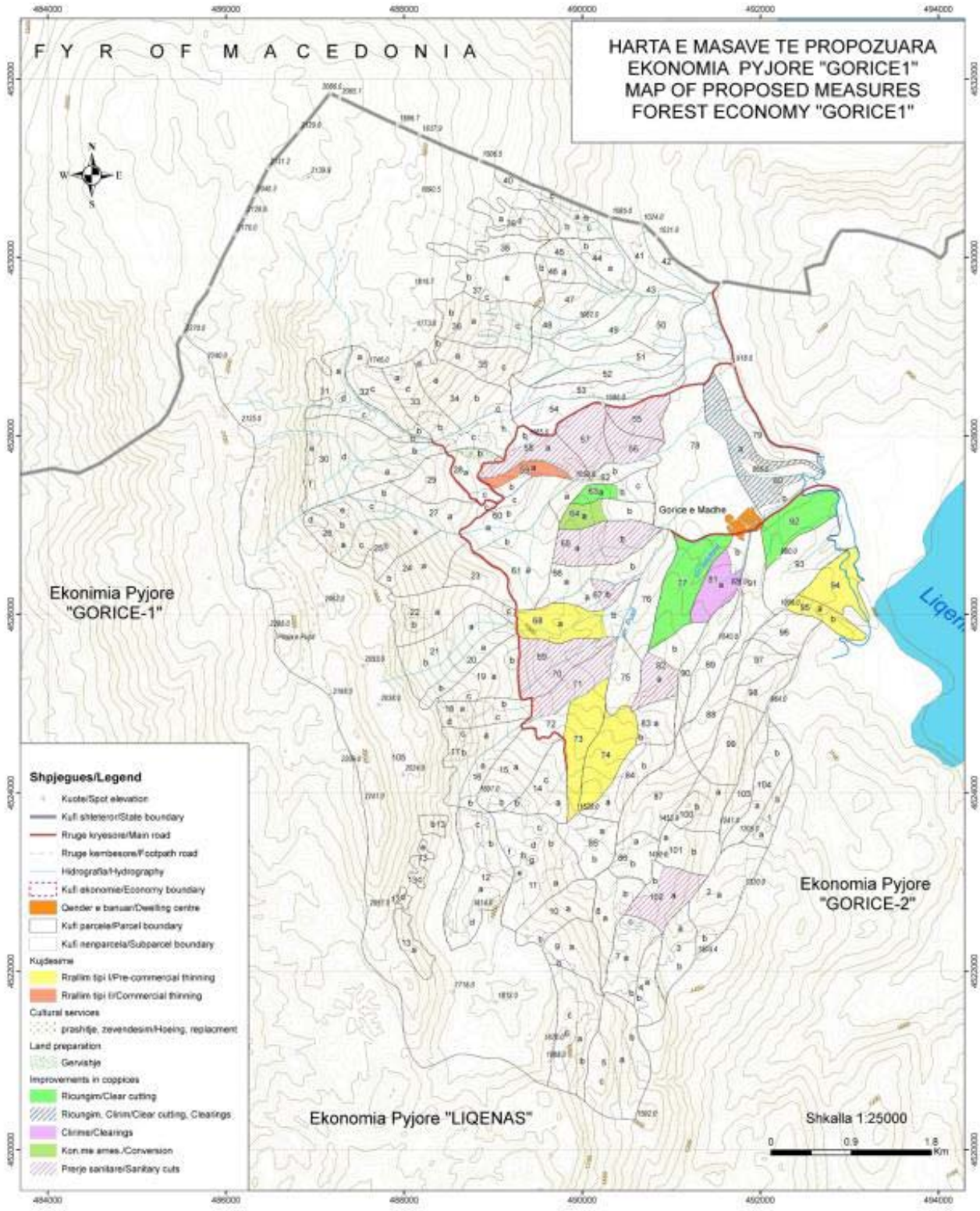


MAP ON TERRESTRIAL ECOSYSTEMS OF THE PNP

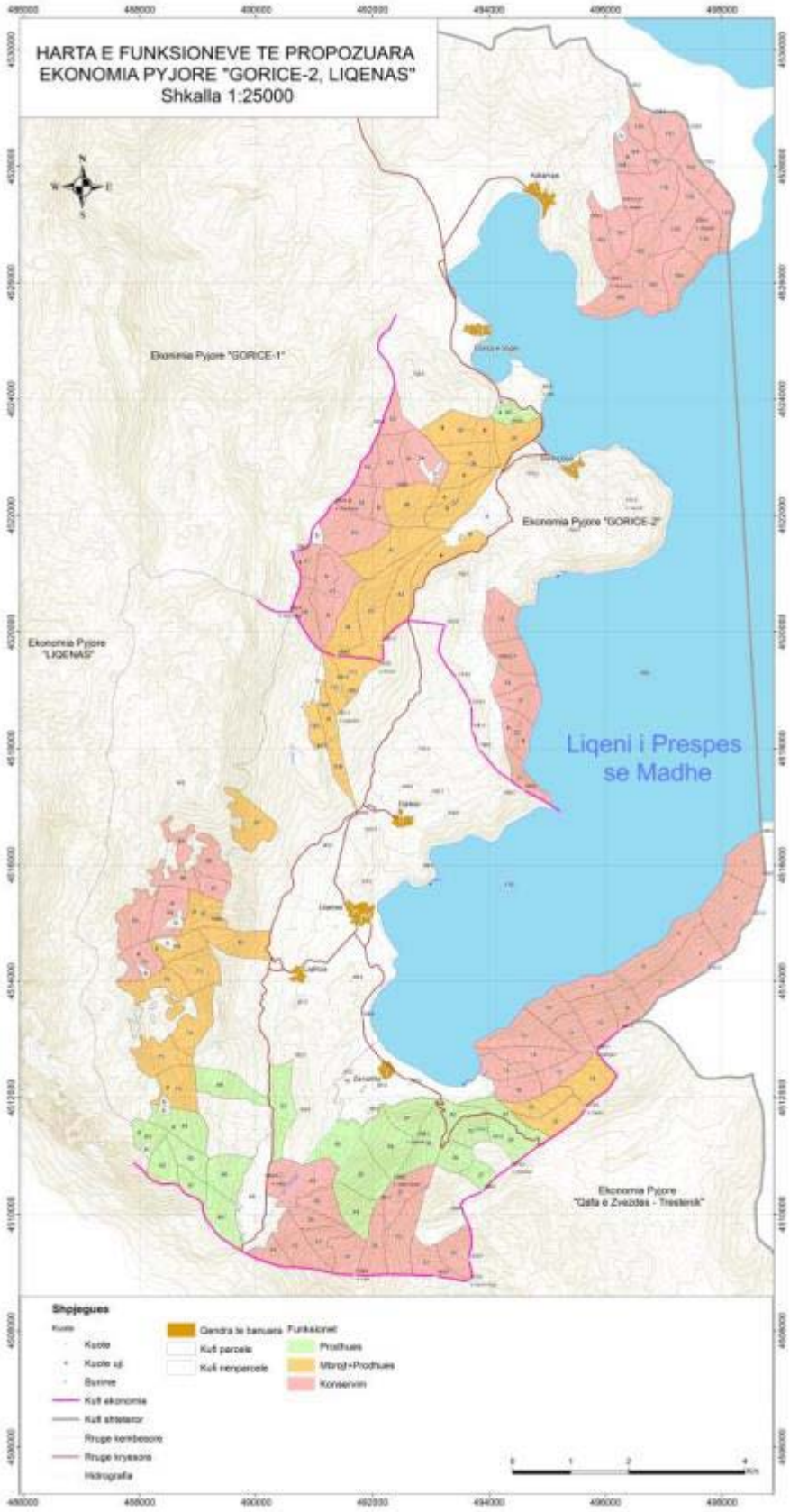


Map of the Forest sector Gorica 1

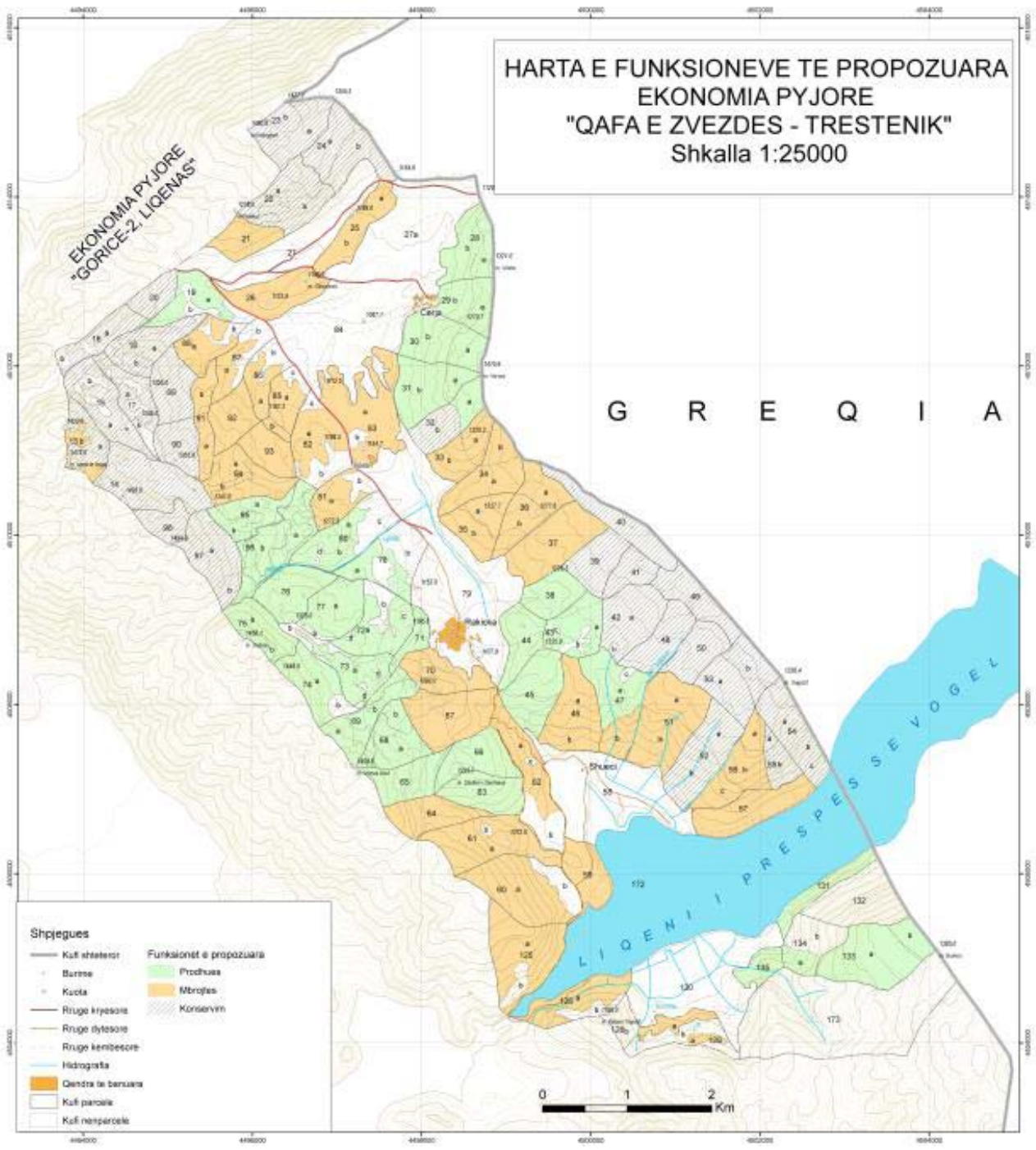



F Y R O F M A C E D O N I A
HARTA E MASAVE TE PROPOZUARA
EKONOMIA PYJORE "GORICE1"
MAP OF PROPOSED MEASURES
FOREST ECONOMY "GORICE1"
Ekonimia Pyjore
"GORICE-1"
Gorice e Madhe
Ekonomia Pyjore
"GORICE-2"
Ekonomia Pyjore "LIQENAS"
Shkalla 1:25000
0 0.9 1.8 Km
Shpjegues/Legend
Kuote/Spot elevation
Kufi shtetenor/State boundary
Rruge kryesore/Main road
Rruge kembesore/Footpath road
Hidrografia/Hydrography
Kufi ekonomise/Economy boundary
Qender e banuar/Dwelling centre
Kufi parcele/Parcel boundary
Kufi nenparcela/Subparcel boundary
Kujdesime
Rrallim tipi I/Pre-commercial thinning
Rrallim tipi II/Commercial thinning
Cultural services
prashtje, zevendesim/Hoeing, replacment
Land preparation
Gervishje
Improvements in coppices
Riougim/Clear cutting
Riougim, Clirim/Clear cutting, Clearings
Clirime/Clearings
Kon.me arnes./Conversion
Prerje sanitare/Sanitary cuts

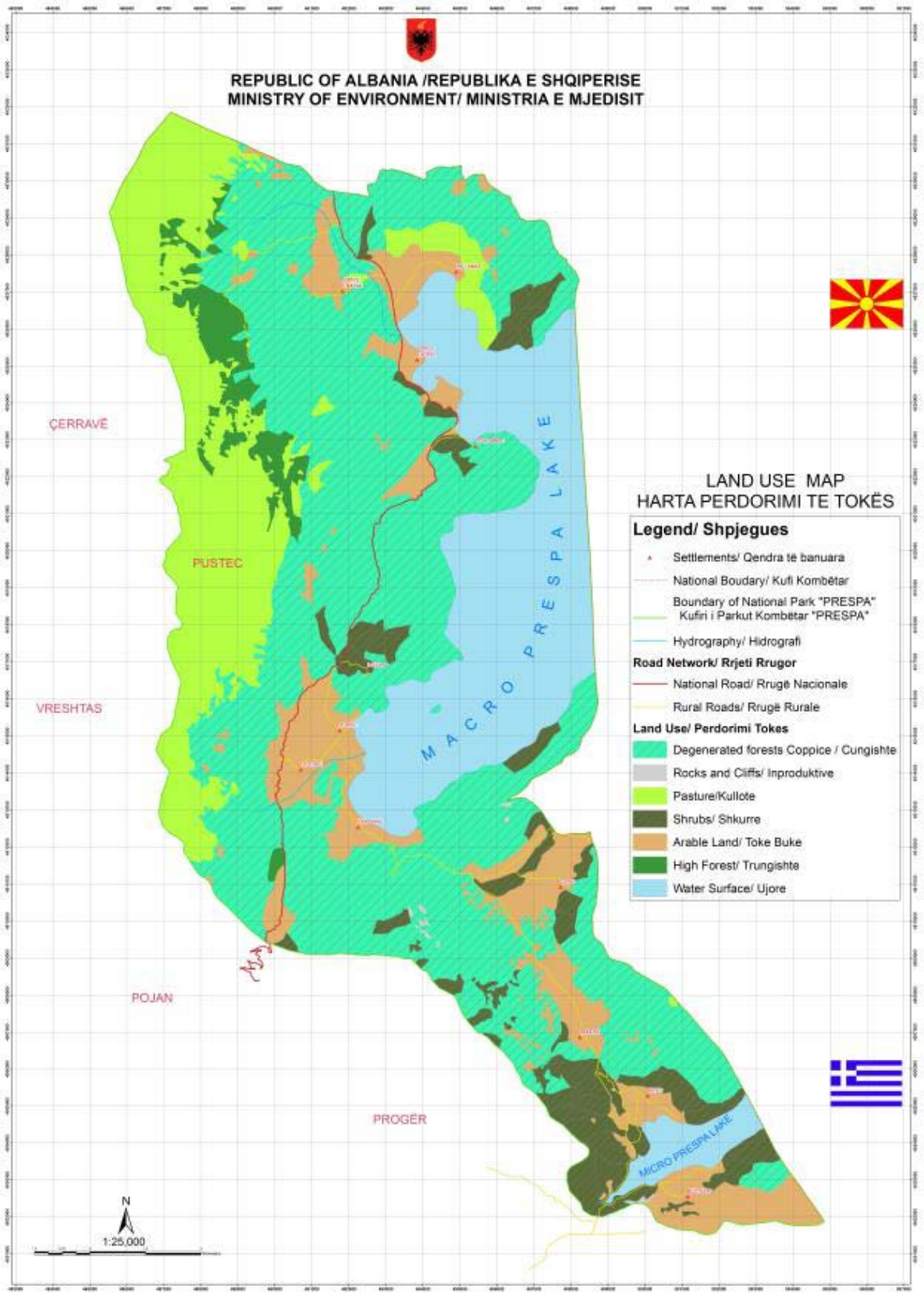
Map of the Forest Sector Gorica 2



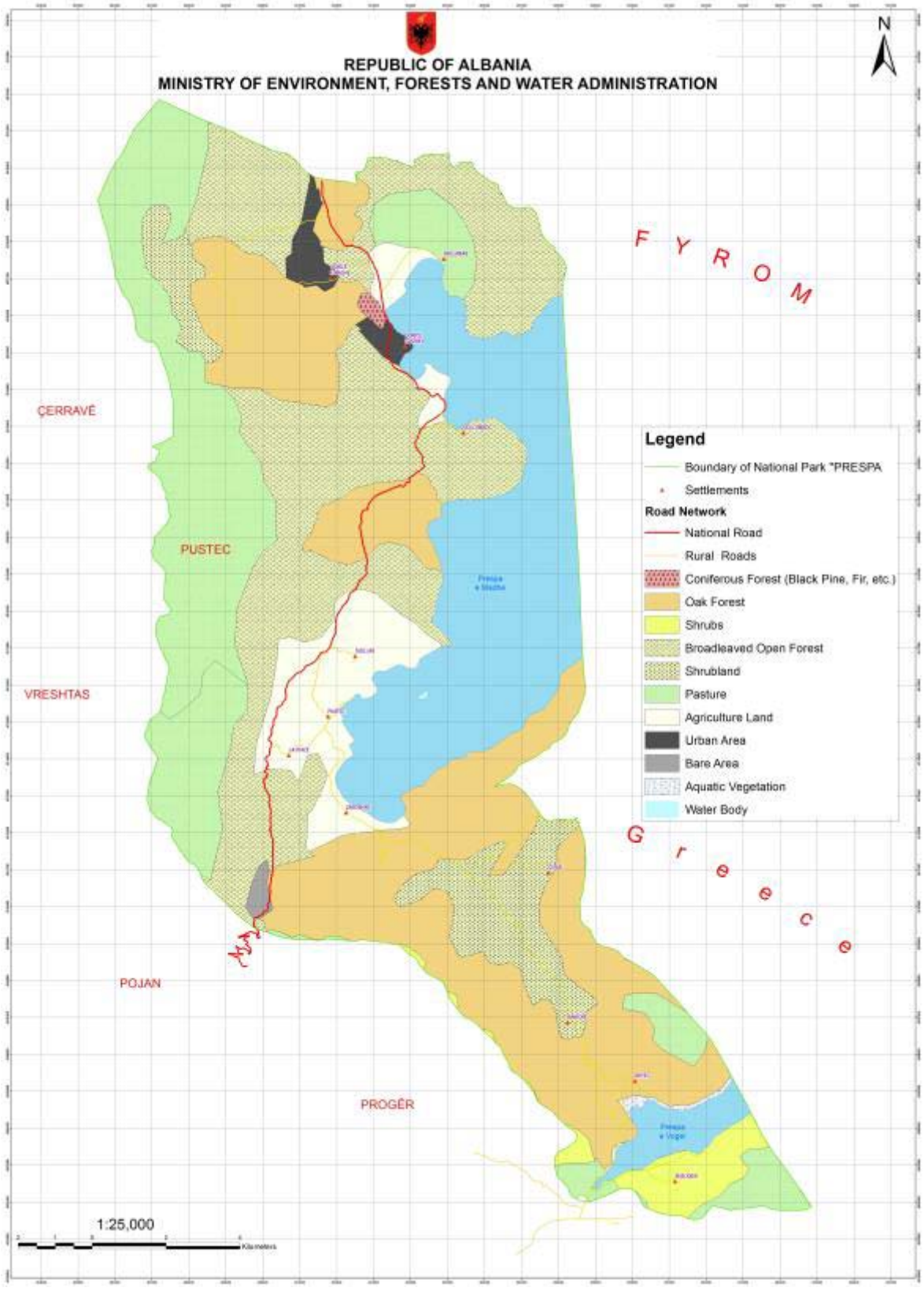
Map of the Forest Sector Zvezda



Map of Land use



Vegetation Map of the Prespa National Park, 2013



7.4 TABLES

7.4.1 TABLE OF FIGURES

7.5 ELECTRONIC ANNEXES OF THE COMPENDIUM OF THE MANAGEMENT PLAN

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- Annex 0: Legislation
- Annex 1: Maps
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- Annex 4: Forest Management
- Annex 5: Reed Management
- Annex 6: Corporate Design
- Annex 7: Construction Plans for Infrastructure
- Annex 8: Visitor Management
- Annex 9: Education Concept
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  - ACTION PLAN BROWN BEAR
  - ACTION PLAN GREEK JUNIPER
  - ACTION PLAN SIDERITIS RAESERI (MOUNTAIN TEA)
  - ACTION PLAN REED MANAGEMENT
  - ACTION PLAN CAVES AND BATS
- Annex 11: Action against Ailanthus altissima
- Annex 12: Management Plans NP Greek Prespa and Galicica
- Annex 13: METT Management Efficiency Tracking Tool
- Annex 14: Monitoring Manual Galicica NP
  - MONITORING MANUAL GALICICA NP
  - OPERATING MANUAL GALICICA NP
- Annex 15: Strategic Transboundary Action Plan

7.6 LISTS OF SPECIES

Table 34: List of endangered Fungi Species in the Prespa National Park (*IVANCIC B. ET AL 2012*)

	Species	Category of Endangerment
1	Amanita caesarea	D
2	Boletus aereus	C
3	Boletus impolitus	B
4	Boletus queletti	B
5	Boletus regius	A
6	Boletus rhodoxanthus	A
7	Lycoperdon marginaturm	C
8	Mutinus caninus	C
9	Mycenastrum corium	C
10	Tricholoma acerbum	B

A= widespread losses, rapidly declining populations, many national extinctions, high level concern
B= widespread losses, evicdence of steady decline, some national extinctions, medium level concern
C= widespread, but scattered populations, fewer extinctions, lower level of concern
D= local losses, some extinctions, but mainly at the edge of geographical range.

Table 35: Global and regional threatened plant species of PNP

	Name of species	IUCN Status	Bern Conv.	Hab. Dir. II (b); IV (b)
1	*Acer heldreichii Orph. ex Boiss.*	R		
2	*Astragalus baldaccii* Degen	R		
3	*Centaurea prespana* Rech. fil	R		
4	*Buxbaumia viridis* (Moug. ex Lam. & DC.) Brid			+
5	*Centaurea soskae* Hayek ex Kosanin	R		
6	*Cynoglottis barrelieri* (All.)Vur.& Tan ssp. *Serpentinicola*	R		
7	*Erodium guicciardii* Heldr. ex Boiss.	R		
8	*Fritillaria graeca* Boiss.		+	
9	*Oxytropis purpurea* (Baldacci) Markgraf	R		
10	*Solenanthus scardicus* Bornm.	R		
11	***Viola eximia Form***	R		

Table 36: Nationally threatened and endangered plants of the PNP

	Latin name and Family	Albanian name	End. Status
	Adianthaceae		
1.	*Adianthum capillus-veneris*	Adiantë	VU A1b
	Family Aspidiaceae		
2.	*Dryopteris filix-mas*	Fiermashkull	LR cd
	Family Berberidaceae		
3.	*Berberis vulgaris*	Mylqinë	CR C2a

	Latin name and Family	Albanian name	End. Status
	Family Boraginaceae		
4.	*Solenanthus scardicus*	Solenantëe Sharrit	VU A1b
	Family Butomaceae		
5.	*Butomus umbellatus*	Bliqën	VU A1b
	Family Caprifoliaceae		
6.	*Sambucus nigra*	Shtog i zi	VU A1b
	Family Caryophyllaceae		
7.	*Cerastium grandiflorum*	Cerast lulemadhe	EN A1b
	Family Compositae		
8.	*Helichrysum plicatum*	Akës i palosur, trëndelinë	EN A1b
9.	*Achillea frasii*	Barpezmi i Frazit	CR B3c
10.	*Centaurea graeca*	Kokoçel i Greqisë	EN A1b
11.	*Centaurea soskae*	Kokoçel i Soskut	VU A1b
	Family Corylaceae		
12.	*Corylus colurna*	Llajthi e egër,lejthi stambolleshë	EN A1b
	Family Crassulaceae		
13.	*Sempervivum ciliosum*	Burgull qerpikor	EN A1b
	Family Cruciferae		
14.	*Arabis bryoides*	Arabëz myshkngjashëm	CR A1b
15.	*Alyssoides utriculata*	Alisoid qeskor	LR cd
16.	*Ptilotrichum cyclocarpum*	Ptilotrik frytrrotullar	LR nt
	Family Cupressaceae		
17.	*Juniperus communis*	Dëllinjë e zezë	VU A1b
18.	*Juniperus oxycedrus*	Dëllinjë e kuqe	VU A1b
19.	*Juniperus foetidissima*	Bërshen, venjë e bardhë	EN A1b
20.	*Juniperus excelsa*	Foje, venjë	CR 1b
	Family Ephedraceae		
21.	*Ephedra distachya*	Gjunjëz	EN A1b
	Family Gentianaceae		
22.	*Gentiana lutea*	Sanëz, bar zemre, ksanë, rahaven, veshsute	EN A1b
	Family Geraniaceae		
23.	*Erodium guicciardii*	Erodë e Gicardit	EN A1b
	Family Guttiferae		
24.	*Hypericum perforatum*	Lulebasani, balc, lulegjaku, bar i të premit	EN A1b
	Family Hippuridaceae		
25.	*Hippuris vulgaris*	Hipur i rendomte	VU A1b

	Latin name and Family	Albanian name	End. Status
	Family Iridaceae		
26.	*Crocus cvijicii*	Shafran i Cvijicit	DD
	Family Juglandaceae		
27.	*Juglans regia*	Arrë, kaçkë	EN A1b
	Family Labiatae		
28.	*Sideritis raeseri*	Çaj mali	EN A1c
29.	*Phlomis herba-venti*	Bezgë bar-ere	LR nt
30.	*Nepeta parnassica*	Nepetë e Parnasit	LR nt
31.	*Satureja montana*	Trumzë, shtërmen	VU A1c
32.	*Origanum vulgare*	Rigon i rëndomtë, çaj i egër	EN A1b
33.	*Salvia officinalis*	Sherbelë, dunicë mali	VU A1b
	Family Leguminosae		
34.	*Astragalus baldaccii*	Arithe e Baldacit	CR A1b
35.	*Chamaecytisus tommasinii*	Kamecitizë e Tomazinit	EN B2c
36.	*Oxytropis purpurea*	Oksitropë e purpurt	EN A1b
37.	*Trifolium pilczii*	Trifil i Pilcit	LR nt
	Family Liliaceae		
38.	*Colchicum autumnale*	Xhërokull vjeshtor, luleshlline	EN A1b
39.	*Tulipa silvestris*	Tulipan pyjesh	EN A1b
40.	*Lilium albanicum*	Zambak shqiptar	EN A1b
41.	*Lilium chalcedonicum*	Zambak kalcedon	DD
42.	*Convollaria majalis*	Lot zoje, parlotë, lule Shëngjergji, drekëz	CR B2c
	Family Menyanthaceae		
43.	*Nymphoides peltata*	Nimfoidë shqytake	VU A1b
	Family Nymphaeaceae		
44.	*Nymphaea alba*	Lëkue i bardhë, lëkon i bardhë,lulebllate	VU A1b
45.	*Nuphar lutea*	Lëkue i verdhë, bar i pezmës, bar'i xhumit	VU A1b
	Family Oleaceae		
46.	*Fraxinus excelsior*	Frashër i zi, frashnjë, frasht	CR A1b
	Family Ophioglossaceae		
47.	*Botrychium lunaria*	Sefir, sefir si hënë	EN A1b
	Family Orchidaceae		
	Family Paeoniaceae		
48.	*Paeonia mascula*	Bozhure mashkull	LR cd
	Family Papaveraceae		
49.	*Chelidonium majus*	Tamlagjak,latrapec, bar jodi	VU A1b

	Latin name and Family	Albanian name	End. Status
	Family Plumbaginaceae		
50.	*Goniolimon dalmaticum*	Goniolimon i Dalmacisë	LR nt
	Family Ranunculaceae		
51.	*Caltha palustris*	Lepushter	VU A1b
	Family Rosaceae		
52.	*Agrimonia eupatoria*	Rodhëz, kallar, podigë e egër	LR cd
53.	*Crataegus heldreichii*	Murriz i Heldraihit	LR cd
54.	*Prunus webbii*	Bajame e egër	VU A1b
55.	*Prunus avium*	Qershi, qershi e butë, bjli, qurshi e butë	VU A1b
	Family Rutaceae		
56.	*Haplophyllum boissieranum*	Haplofil i Buasierit	EN A1b
57.	*Dictamus albus*	Dishëll, lulemastikë, bar uzo, ndryshkull	VU A1b
	Family Saxifragaceae		
58.	*Saxifraga scardica*	Iriqëz e Sharrit	VU A1b
	Family Ulmaceae		
59.	*Celtis tourneforti*	Carac i Turnefortit	VU
	Family Graminae		
60.	*Sesleria robusta* Shott, Nyman & Kotschyi subsp. *skanderbegii (Ujhelyi) Deyl*	Pirë e Skenderbeut	EN A1c

Table 37: Mammals of the Prespa Region (According *CATSADORAKIS ET AL* 2011**)**

Mammals		
Latin name	**Albanian Name**	**English Name**
Erinaceus concolor	Irriqi	Eastern European hedgehog
Talpa caeca	Urithi i verber	Mediterranean Mole
Talpa romana	Urithi i verber romak	Roman Mole
Crocidura leucodon	Hundgjati dhembebardhe i livadheve	Bicolored shrew
Crocidura suaveolens	Hundgjati dhembebardhe i kopshteve	Lesser white-toothed shrew
Neomys anomalus	Hundgjati dhembekuq i Miler-it	Southern Water Shrew
Tadarida teniotis	Lakuriqnate bishtlire	Long-tailed Bat
Rhinolophus ferrumequinum	Lakuriqnate hundepatkua i madh	Greater Horseshoe Bat
Rhinolophus hipposideros	Lakuriqnate hundepatkua i vogel	Lesser Horseshoe Bat
Rhinolophus blasii	Lakuriqnate hundepatkua i Blasit	Blasius' horshoe bat
Rhinolophus euryale	Lakuriqnate hundepatkua i Mesdheut	Mediterranean Horseshoe Bat

Mammals		
Latin name	**Albanian Name**	**English Name**
Eptesicus serotinus	Lakuriqnate serotine	Serotine
Miniopterus schreibersii	Lakuriqnate i Schreibersit	Bent-winged Bat
Myotis brandtii	Lakuriqnate i Brandti	Brandt's Myotis
Myotis bechsteinii	Lakuriqnate i Bechsteinit	Bechstein's Myotis
Myotis blythii (oxygnathus)	Lakuriqnate veshmiu i vogel	Lesser mouse-eared bat
Myotis capaccinii	Lakuriqnate veshmiu gishtgjate	Long-fingered Bat
Myotis daubentonii	Lakuriqnate veshmiu i Daubentonit	Daubenton's bat
Myotis emarginatus	Lakuriqnate veshmiu i Xhefrit	Geoffroy's Bat
Myotis myotis	Lakuriqnate veshmiu i madh	Greater Mouse-eared Bat
Myotis mystacinus	Lakuqnate veshmiu mistacin	Whiskered Myotis
Myotis nattereri	Lakuriqnate veshmiu i Naterерit	Natterer's Bat
Nyctalus leisleri	Noktule e Leislerit	Lesser Noctule
Nyctalus noctula	Noktule	Noctule
Pipistrellus kuhlii	Pipistreli i Kuhlit	Kuhl's Pipistrelle
Pipistrellus nathusii	Pipistreli i Nathusit	Nathusius' Pipistrelle
Pipistrellus pipistrellus	Pipistreli i zakonshem	Common Pipistrelle
Pipistrellus pygmaeus	Pipistreli sopran	Soprano Pipistrelle
Hypsugo savii	Pipistreli i Savit	Savi's Pipistrelle
Plecotus macrobullaris	Lakuriqnate Alpine veshegjate	Alpine Long-eared Bat
Plecotus auritus	Lakuriqnate veshegjate gri	Grey Long-eared Bat
Plecotus austriacus	Lakuriqnate veshegjate	Grey Long-eared Bat
Lepus europaeus	Lepuri eger	European Hare
Sciurus vulgaris	Ketri	Eurasian Red Squirrel
Dryomys nitedula	Gjumashi i pyllit	Forest dormouse
Glis glis	Gjeri	Edible Dormouse,
Muscardinus avellanarius	Gjumashi i lajthise	Hazel Dormouse
*Myocastor coypus**	Kastori Coyp	Coypu
Spalax leucodon	Miu i vogel ujit	Lesser Mole Rat
Lessertus levis	Miu i fishes i Evropes Lindore	East European Vole
Lessertus savii	Miu i pishes se Saves	Savi's Pine Vole
Arvicola amphibius	Miu evropian i ujit	European water vole
Lessermys minutus	Miu euroaziat i te korave	Eurasian Harvest Mouse
Apodemus flavicollis	Miu i gusheverdhe	Yellow-necked Mouse
Apodemus mystacinus	Miu i shkembit	Broad-toothed field Mouse
Apodemus sylvaticus	Miu i pyllit	Wood mouse
Rattus rattus	Miu i zi i kanaleve	House Rat
Mus domesticus	Miu i shtepise	House Mouse
Canis lupus	Ujku	Grey Wolf
Vulpes vulpes	Dhelpra	Red Fox

Mammals		
Latin name	**Albanian Name**	**English Name**
Ursus arctos	Ariu i murrem	Brown Bear
Mustela nivalis	Nuselalja	Least Weasel
*Mustela vison**	Nuselalja amerikane	American Mink
Martes foina	Kunadhja	Stone Marten
Meles meles	Baldosa	Eurasian Badger
Lutra lutra	Lunderza	Eurasian Otter
Felis silvestris	Macja e eger	Wildcat
Sus scrofa	Derri i eger	Wild Boar
Capreolus capreolus	Kaprolli	Roe deer
Rupicapra rupicapra balcanica	Dhia e eger	Balkan chamois
Total 60 species		

Table 38: Breeding Birds of the Prespa National Parkaccording the survey 2011 by M. JANKOVIĆ

Names		**Breeding population estimates (pairs, unless stated otherwise)**		**Comments about habitat requirements and abundance and**
In Latin	**In English**	**min**	**max.**	
Tachibaptus ruficollis	Little Grebe	20	55	breeds on lakes Prespa and Lesser Prespa in reeds vegetated margins where the water is shallow, relatively common
Podiceps cristatus	Crested Grebe	10	13	breeds on lakes Prespa and Lesser Prespa in reeds vegetated margins, common
Pelecanus onocrotalus	White Pelican			numerous on both Prespa and Lesser Prespa, but without proofs of breeding. If there were no disturbance on Lesser Prespa, it would breed there for sure
Phalacrocorax carbo	Cormorant			numerous on Prespa and Lesser Prespa, breeding probably on Golem Grad
Phalacrocorax pygmaeus	Pygmy Cormorant			common on Prespa and Lesser Prespa, breeding probably on Golem Grad
Ixobrychus minutus	Little Bittern	12	20	common on Lesser Prespa, breeds in reeds
Nycticorax nycticorax	Night Heron	3	8	breeds in small colony on Mali grad
Ardeola ralloides	Squacco Heron			solitarily occurring on passage on Prespa lake
Egretta garzetta	Little Egret			numerous on both Prespa and Lesser Prespa, but without proofs of breeding
Egretta alba	Great Egret			numerous on both Prespa and Lesser Prespa, but without proofs of breeding
Ardea cinerea	Grey Heron			numerous on both Prespa and Lesser Prespa, but without proofs of breeding
Ciconia ciconia	White Stork	1?	1?	individuals observed near Prespa Lake, but nest hasn't been found
Anas platyrhynchos	Mallard	3	5	breeds in small inland shallow ponds, rare
Mergus merganser	Goosander	5	9	breeding on cliffs near water, common
Circaetus gallicus	Short-toed Eagle	2	3	often observed hunting above arid open fields, nest in conifer

Names		Breeding population estimates (pairs, unless stated otherwise)		Comments about habitat requirements and abundance and
In Latin	In English	min	max.	
Circus pygargus	Montagu's Harrier	2	3	observed hunting over mountain plateaus, nest in taller grass
Buteo buteo	Common Buzzard	6	9	commonly seen but not very numerous, hunt over open fields on lower altitudes
Pernis apivorus	Honey Buzzard	1	3	rare breeder in the NP, seen hunting over open country, regardless of altitude
Accipiter nisus	Sparrowhawk	17	23	very common, usually seen hunting over young and degraded forests, but also over open country
Accipiter gentilis	Goshawk	2	4	rare, seen only a couple of times hunting on the coast or over degraded forests
Falco tinnunculus	Kestrel	22	30	numerous in the coastal region and above tree line, hunts for insects and rodents over open country
Falco naumanni	Lesser Kestrel	1	2	rare, only one pair recorded near Lesser Prespa
Falco subbuteo	Hobby	1	3	rare, hunting for small passerines just above tree line
Falco peregrinus	Peregrine Falcon	1?	2?	possible breeder, just one observation flying over Lesser Prespa lake
Alectoris greaca	Rock Partridge	70	80	where present, very numerous. Most important habitat are rocky meadows with taller grass and small bushes
Bonasa bonasia	Hazel Grouse	20	25	rare, breeds in beech and mixed beech/oak forests
Coturnix coturnix	Quail	130	150	not very common, but when present, numerous
Perdix perdix	Grey Partridge	20	30	rare, seen and heard on open fields with scattered bushes and taller grass
Crex crex	Corncrake	4	10	very rare, found on grassland with bushes at just two localities
Gallinula chloropus	Moorhen	40	60	common in reed beds near lakes
Fulica atra	Coot	55	70	common in reed beds near lakes
Larus cachinnans	Yellow-legged Gull	12	20	nesting on Maligrad, numerous and common on the lake
Columba livia	Rock Dove	15	25	rare, just a dozen of pairs nesting on the cliffs on Maligrad
Columba palumbus	Wood Pigeon	90	120	common in mature oak and beech forests
Streptopelia decaocto	Collared Dove	270	350	common, but distribution restricted to villages
Streptopelia turtur	Turtle Dove	600	750	common everywhere under 1300m of altitude
Cuculus canorus	Cuckoo	200	300	common in all habitat types except open grassland
Bubo bubo	Eagle Owl	2	5	rare, only one individual recorded on Maligrad
Strix aluco	Tawny Owl	15	20	common in mature oak and beech forests
Athene noctua	Little Owl	12	20	moderately common, restricted to villages
Caprimulgus europaeus	Nightjar	30	50	common at upper tree line, rare in degraded and young forests with clearings. Can often be seen hunting over roads at night
Apus melba	Alpine Swift	300	500	very common, several colonies wherever there are cliffs with caves and crevices
Upupa epops	Hoopoe	170	230	very common bird in the oak zone, wherever there are clearings

Names		Breeding population estimates (pairs, unless stated otherwise)		Comments about habitat requirements and abundance and
In Latin	In English	min	max.	
Merops apiaster	Bee-eater	7	15	rare, only a couple of pairs, nesting in a man-made soil cliff
Dryocopus martius	Black Woodpecker	2	5	rare, breeding in old beech forests
Picus viridis	Green Woodpecker	30	35	commonest woodpecker, nests wherever there are older trees near clearings
Dendrocopos major	Great Spotted Woodpecker	25	35	rare, found in middle-age to mature oak and beech forests
Dendrocopos syriacus	Syrian Woodpecker	20	35	common near villages in fruit yards
Jynx torquilla	Wryneck	30	50	rare to common in oak forests with clearings and scattered bigger trees, also in fruit yards
Alauda arvensis	Skylark	500	700	common over open country, grassland and cultivated fields
Galerida cristata	Crested Lark	70	90	usually found by dirt roads, common
Lullula arborea	Wood Lark	350	400	very common on the forest edge, density is higher if the forests are better quality
Calandrella brachydactyla	Short-toed Lark	5	25	rare, found on just one locality, requires open grassland with bare soil, dependent on cattle to maintain habitat
Eremophila alpestris	Shore Lark	20	45	found on just one locality but probably more common on the plateau where gravel size rocks dominate the grassland
Riparia riparia	Sand Martin	150	200	dependent on landslides or sand exploitation, where nesting, colonial breeder, usually common
Ptyonoprogne rupestris	Crag Martin	350	400	very common wherever there are small cliffs
Hirundo rustica	Barn Swallow	750	1000	common, mostly restricted to man-made structures for nesting
Hirundo daurica	Red-rumped Swallow	60	90	rare, mostly restricted to man-made structures for nesting
Delichon urbica	House Martin	250	350	nests on cliffs, as well as in villages, common
Anthus campestris	Tawny Pipit	25	35	sparse breeder on barren mountain slopes
Anthus spinoletta	Water Pipit	90	130	common breeder on bare mountain slopes and upland plains
Anthus trivialis	Tree Pipit	200	250	very common on forest edge on higher altitudes, usually upper tree limit
Motacilla alba	Pied Wagtail	250	300	commonest near the lakes, but present near small water reservoirs inland, also in villages
Motacilla flava	Yellow Wagtail	40	70	breed on open country wherever there is cattle, common
Troglodytes troglodytes	Wren	30	45	very rare, found in middle-aged and old oak and beech forests
Prunella modularis	Dunnock	50	70	rare, breeding on open country with numerous bushes and rock outcrops on high planes
Prunella collaris	Alpine Accentor	15	20	rare, breeding on cliffs and rock outcrops on the highest ridges and peaks of the mountain
Erithacus rubecula	Robin	900	1200	very common in all types of forests

Names		Breeding population estimates (pairs, unless stated otherwise)		Comments about habitat requirements and abundance and
In Latin	In English	min	max.	
Luscinia megarhynchos	Nightingale	1100	1500	one of the commonest birds in the NP, present in all types of forests except beech, commonest in degraded forests
Phoenicurus ochruros	Black Redstart	180	200	common wherever there are cliffs and larger rock outcrops, from the coast to mountain tops
Oenanthe oenanthe	Wheatear	85	100	common on open country with scattered rocks, usually on higher altitudes than O. hispanica, but sharing habitat on many places
Oenanthe hispanica	Black-eared Wheatear	90	120	common on open country with scattered rocks, usually on lower altitudes
Saxicola rubetra	Whinchat	50	70	common on open country with bushes and scattered rocks above upper tree line
Saxicola torquata	Stonechat	35	55	common on open, warm, south exposed slopes with rocks and bushes up to 1100m above sea level
Monticola solitarius	Blue Rock Thrush	16	22	common, but restricted to coastal regions
Monticola saxatilis	Rock Thrush	25	35	rare to common on cliffs and larger rock outcrops from 1000 m of altitude to highest ridges
Turdus philomelos	Song Thrush	70	100	rare to common in middle-aged and old forests
Turdus viscivorus	Mistle Thrush	110	130	breeding mostly in beech forest, but not restricted to it, after breeding season, can be found in all forests, often in groups
Turdus merula	Blackbird	700	1000	common in all forest types
Sylvia atricapilla	Blackcap	130	160	widely distributed in all types of forests, but most numerous on the beech forest edge
Sylvia crassirostris	Orphean Warbler	5	15	rare, usually found in taller shrub on south exposed slopes
Sylvia curruca	Lesser Whitethroat	100	130	common, breeds in park-like forests and taller shrub with larger single trees
Sylvia melanocephala	Sardinian Warbler	15	25	breeds in open woodland with dense undergrowth, very rare
Sylvia communis	Whitethroat	80	110	breeds in scrubby areas, common
Sylvia cantillans	Subalpine Warbler	1300	1500	breeds in shrubbery and bushes on dry slopes. Maybe the commonest bird in the Prespa National Park
Locustela luscinoides	Savi's Warbler	3	5	rare, only couple of individuals listened in reed bed at Lesser Prespa
Cettia cetti	Cetti's Warbler	12	17	breeds in dense vegetation near water, coastal, rare
Acrocephalus scirpaceus	Reed Warbler	10	15	rare, breeds in reeds at Lesser Prespa
Acrocephalus arundinaceus	Great Reed Warbler	45	60	very common wherever there are reeds
Phylloscopus bonelli	Bonelli's Warbler	15	35	rare, found in oak and beech forests on various altitudes
Phylloscopus collybita	Chiffchaff	200	220	very common in and above beech forests, but rare on lower altitudes
Phylloscopus sibilatrix	Wood Warbler	25	40	rare, found in beech forests with rich undergrowth

Names		Breeding population estimates (pairs, unless stated otherwise)		Comments about habitat requirements and abundance and
In Latin	In English	min	max.	
Muscicapa striata	Spotted Flycatcher	25	40	rare, on places where there are clearings between older forest, preferably oak
Ficedula semitorquata	Semi-collared Flycatcher	5	20	found on just one locality in a middle-aged oak forest
Parus major	Great Tit	300	500	breeds in all kinds of forests and fruit yards, common
Parus caeruleus	Blue Tit	270	350	common to rare in all kinds of woodland, preferably oak
Parus montanus	Willow Tit	120	140	breeds in beech forests at higher altitudes, common
Parus palustris	Marsh Tit	300	500	breeds in mature forests or in middle-aged forest with dead trees, also fruit yards
Parus lugubris	Sombre Tit	90	120	breeds in open forests and bushy slopes with fruit trees, common
Aegithalos caudatus	Long-tailed Tit	170	220	in forests with rich undergrowth, preferably oak, common
Panurus biarmicus	Bearded Reedling	10	25	rare breeder in reeds, found only at Lesser Prespa
Remiz pendulinus	Penduline Tit	2	5	rare breeder, nests on willow branches that hang over water, found only at Lesser Prespa
Sitta europaea	Nuthatch	120	180	common in all older forests and fruit yards, common
Sitta neumayer	Rock Nuthatch	100	150	common end even numerous wherever there are larger rock outcrops or smaller cliffs, up to 2000m of altitude
Lanius collurio	Red-backed Shrike	240	280	very common, breeds in different habitat types. Commonest on heats and pastures with bushes, but also present on juniper slopes and cultivated country. Rarely appearing on open meadows inside forests or on forest edge
Lanius senator	Woodchat Shrike	10	18	rare, breeds on open areas with scattered trees, usually on south exposed slopes
Lanius minor	Lesser Grey Shrike	5	10	on south exposed slopes or open terrain with cultivations, preferably with scattered trees and groves, very rare
Pica pica	Magpie	30	70	numerous, around farms and villages
Garrulus glandarius	Jay	100	120	very common; breeds in all types of woodland except young and degraded forests, even in park-like woodland with old trees
Corvus monedula	Jackdaw	35	40	breeds in villages and cliffs, common
Pyrrhocorax graculus	Alpine Chough	4?	10?	if breeding, not numerous, usually in caves or crevices on cliffs
Corvus cornix	Hooded Crow	35	40	commonest around villages, but also nesting in beech forests. Regularly seen feeding on meadows above tree line
Corvus corax	Raven	7	10	not very common, breeds on cliffs and trees
Sturnus vulgaris	Starling	100	120	common breeder on cultivated country and villages, rare in the oak zone
Oriolus oriolus	Golden Oriole	20	30	rare breeder in the oak zone
Passer domesticus	House Sparrow	900	1400	common, restricted to villages, cultivated country and coastal zone, rarely present elsewhere

Names		Breeding population estimates (pairs, unless stated otherwise)		Comments about habitat requirements and abundance and
In Latin	In English	min	max.	
Passer montanus	Tree Sparrow	300	500	common, restricted to villages, cultivated country and coastal zone, rarely present elsewhere
Passer hispaniolensis !!!	Spanish Sparrow			colonial breeder, if there are any within NP borders, they would probably nest inside the nest of a stork
Fringilla coelebs	Chaffinch	500	700	common in all kinds of woodland and shrubbery
Carduelis cannabina	Linnet	350	400	common on open country from coastal region near the lake to the mountain tops
Carduelis carduelis	Goldfinch	700	1000	very common in and around villages, but still, present on cultivated country and around clearings in the oak zone
Carduelis chloris	Greenfinch	200	300	common around all kinds of open country, numerous around villages and cultivated country
Serinus serinus	Serin	8	15	rare, only in villages where there are conifers
Coccothraustes coccothraustes	Hawfinch	30	60	rare breeder of the oak zone
Emberiza schoeniclus	Reed Bunting	5	15	only in reeds at Lesser Prespa, not common
Emberiza hortulana	Ortolan Bunting	90	110	in all kinds of open habitats, especially in open wooded pastures and in clearings, also above tree line, wherever there are bushes for nesting
Emberiza caesia	Cretzschmar's Bunting	35	50	predominantly coastal, not so common
Emberiza citrinella	Yellowhammer	150	200	commonest on woodland edge and wooded pastures, but also above tree line, as well as in farmland with bushy areas
Emberiza cirlus	Cirl Bunting	130	180	usually on dry, sunny slopes with larger bushes or trees and with some rocks
Miliaria calandra	Corn Bunting	300	500	Very common in open terrain in lower altitudes, especially agricultural land, but present even high above tree line, where nests in bushes and perches from rocks
Emberiza melanocephala	Black-headed Bunting	10	30	breeds in open dry country, farmland, wine yards, prefers south exposed slopes, very rare
Emberiza cia	Rock Bunting	120	150	breeds on steep slopes with rock outcrops, usually above upper tree line, but also lower where suitable, usually on rocky clearings
TOTAL	**132 Species**			

Table 39: Reptiles of the Prespa Region (According *CATSADORAKIS ET AL* 2011) *REV. W. FREMUTH 2012*

Reptiles		
Latin name	**Albanian name**	**English name**
Emys orbicularis	Breshkeujze	European pond turtle
(Euro)Testudo hermanni	Breshka e zakonshme	Hermann's tortoise
Testudo graeca	Breshka greke	Greek tortoise
Anguis fragilis	Vjeshtull Kakzogeza	Slow worm

Reptiles		
Latin name	**Albanian name**	**English name**
Algyroides nigropunctatus	Zhapi dalmatin	Dalmatian Algyroides
Lacerta agilis	Zhapiu i reres	Sand lizard
Lacerta trilineata	Zhapiu me tre vija	Three-lined lizard
Lacerta viridis	Zhapiu i gjelber	Green lizard
Podarcis erhardii	Hardhuce e Erhardit	Erhard's wall lizard
Podarcis muralis	Hardhuca e mureve	Common wall lizard
Podarcis taurica	Hardhuce bari	Balkan wall lizard
Ablepharus kitaibelii	Gjarper me sy kermilli	Snake-eyed skink
Coronella austriaca	Gjarpri i zi	Smooth snake
Dolichophis caspius	Gjarpri me kamxhik i Kaspikut	Caspian whip snake
Elaphe quatuorlineata	Bolla me kater vija	Four-lined snake
Hierophis gemonensis	Gjarpri me kamxhik i Ballkanit	Balkan whip snake
Malpolon monspessulanus	Biroja	Montpellier snake
Natrix natrix	Gjarpri i madh i ujit	Grass snake
Natrix tessellata	Gjarpri i vogel i ujit	Dice snake
Zamenis longissimus	Gjarper aeskulapian	Aesculapian snake
Zamenis situlus	Gjarpri leopard	Leopard snake
Vipera ammodytes	Neperka	Nose-horned viper
Vipera berus	Neperka e malit me njolla te nderprera	Adder
Total	**23 Species**	

Table 40: Amphibians of the Prespa region (according *CATSADORAKIS ET AL* 2011**)**

Amphibians		
Latin name	**Albanian Name**	**English Name**
Salamandra salamandra	E bukura e dheut ose picrrak	Fire salamander
Lissotriton vulgaris	Tritoni I zakonshem	Smooth newt
Triturus carnifex macedonicus	Tritoni me kreshte	Alpine crested newt
Bufo bufo	Thithlopa	Common toad
Pseudepidalea viridis	Thithlopa e gjeber	Green toad
Bombina variegata	Bretkosa barkverdhe	Yellow bellied toad
Hyla arborea	Bretkosa e drureve	Common tree frog
Pelophylax ridibundus	Bretkoca e mocalve	Marsh frog
Rana dalmatina	Bretkosa kercimtare	Agile frog
Rana graeca	Bretkosa e perrenjve	Greek brown frog or Stream frog
Pelobates syriacus	Kembelopata e lidjes	Eastern spade foot
Total	**11 Species**	

Table 41: List of Fish Species and Conservation Status

No.	Species	Origin	IUCN red List	Berne Convention Annex	Albanian Red List 2007	Observed in Albanian part of Lakes first time
1	Anguilla anguilla*	Native	VU			Last 1996
2	Alburnoides prespensis	Native	VU			
3	Alburnus belvica	Native	CR			
4	Barbus prespensis	Native	VU		LRcd	
5	Carassius gibelio	Nonnative				1973
6	Chondrostoma prespense	Native	VU			
7	Cobitis meridionalis	Native	VU	&	LRlc	
8	Cyprinus carpio	Nonnative	DD			
9	Ctenopharyngodon idella	Nonnative				1979
10	Gambusia holbrooki	Nonnative			LRlc	2006
11	Hypophthalmichthys militrix	Nonnative				1979
12	Lepomis gibbous	Nonnative				1996
13	Pelasgus prespensis	Native	EN			
14	Pseudorasbora parva	Nonnative				1998
15	Rhodeus amarus	Nonnative	VU			1992
16	Rutilus prespensis	Native	LC			
17	Salmo letnica	Nonnative	DD		VU	1982
18	Salmo peristericus	Native	EN			
19	Silurus glanis	Nonnative	LC	&		1996
20	Squalius prespensis	Native	LC			
21	Tinca tinca	Nonnative	LC			1998
22	Prabramis pekinensis	Nonnative				1979
23	Onchorynchus mykiss	Nonnative				1979
	TOTAL 23 Species					

Table 42: List of Odonata Species *(according KITANOVA, D. 2011 unpublished)*

Species	Number of individuals		Localities	X Longitude	Y Latitude
	male	female			
Ischnura elegans	3		Prespansko Ezero, Globocani	0495192	4522938
Enallagma viridulum	2		Prespansko Ezero, Globocani	0495192	4522938
Orthetrum cancellatum	1		Prespansko Ezero,	0497788	5423476
Orthetrum cancellatum	3		Prespansko Ezero, Globocani, srt	0496475	4523099
Orthetrum bruneum	1		Prespansko Ezero, Globocani, srt	0496475	4523099
Onychogomphus forcipatus	4		Prespansko Ezero, Zrnovsko, Ralnik	0493823	4513065
Orthetrum cancellatum	4	2	Prespansko Ezero, Zrnovsko, Ralnik	0493823	4513065
Onychogomphus forcipatus	3		Prespansko Ezero, Zrnovsko, Ralnik	0493825	4513073

Species	Number of individuals		Localities	X Longitude	Y Latitude
Orthetrum cancellatum	5	1	Prespansko Ezero, Zrnovsko, Ralnik	0493825	4513073
Aeschna affinis	3		Cerovska Lokva	0489343	4528060
Sympetrum fonscolombii	6	3	Cerovska Lokva	0489343	4528060
Sympetrum fonscolombii	4	3	near Cerovska Lokva	0489544	4528049
Sympetrum fonscolombii	7	4	Prespansko Ezero, Zrnovsko Blato	0492310	4512824
Ischnura elegans	1		Prespansko Ezero, Zrnovsko Blato	0492310	4512824
Ischnura elegans	1	1	Prespansko Ezero, Globocani	0495192	4522938
Sympetrum fonscolombii	1	1	Prespansko Ezero, Dolna Gorica	0535238	4626739
Ischnura elegans	3	2	Ralnik Blato	0493452	4512683
Ischnura elegans	2	2	Ralnik Blato	0493492	4512683
Ischnura elegans		2	Ralnik Blato	0493506	4512682
Cordulia aenea		1	Ralnik Blato	0493506	4512682
Lestes virens	2		Ralnik Blato	0493506	4512682
Orthetrum cancellatum	2		Ralnik Blato	0493506	4512682
Crocotemis erythraea	3		Prespansko Ezero, Pustec	0492062	4515296
Orthetrum cancellatum	5	1	Prespansko Ezero, Pustec	0492062	4515296
Onychogomphus forcipatus	2	1	Prespansko Ezero, Pustec	0492062	4515296
Anax imperator	2		Prespansko Ezero, Pustec	0492062	4515296
Orthetrum cancellatum	3		Prespansko Ezero, Pustec	0493149	4515899
Onychogomphus forcipatus	1		Prespansko Ezero, Pustec	0493149	4515899
Crocotemis erythraea	1		Mala Prespa	0499015	4506325
Anax imperator	1		Mala Prespa	0499015	4506325
Sympetrum sanguineum	2	1	Mala Prespa	0499015	4506325
Ischnura elegans	4	2	Mala Prespa	0499015	4506325

Table 43: List of Target (Indicator) Species for Monitoring and Specific Actions (Fauna)

	IUCN Red List	Hab/ Birds Directive *	Presence in PNP	*Conservation actions*
Mammals				
Myotis capaccinii	VU	II/ IV	X	*Protect Treni cave and caves close to Gollomboc*
Capreolus capreolus	LC		x	*Stop illegal hunting*
Rupicapra rupicapra balcanica	LC/Vu	II/IV/V	Close to extinction	*Stop illegal hunting, cosnider reintrduction*
Ursus arctos	LC	II/ IV	X	*Stop illegal hunting*
Canis lupus	LC		X	*Stop illegal hunting*
Lutra lutra	NT	II/ IV	X	*Stop illegal hunting*
Lynx lynx (martinoi)	LC		extinct	*Stop illegal hunting*
Cervus elaphus	LC		extinct	*Stop illegal hunting, consider reintroduction*
Birds				
Alectoris graeca	LC		X	*Protect breeding habitat stopp illegal hunting*
Phalacrocorax pygmaeus	LC	I	X	*Protect breeding habitat during breeding season*
Mergus merganser	LC		X	
Pelecanus onocrotalus	LC	I	X	*Protect breeding habitat during breeding season consider artificial nests/rafts*
Pelecanus crispus	VU	I	X	*Protect breeding habitat during breeding season consider artificial nests/rafts*
Platalea leucorodia	LC	I	-	*Improve habitat*
Ciconia ciconia	LC	I	-	*Offer artificial nesting platforms*
Heron group Night Heron, Grey Heron, Great and little Bittern, Great and little Egret Glossy Ibis	LC			*Conserve and protect nesting sites*

	IUCN Red List	Hab/ Birds Directive *	Presence in PNP	*Conservation actions*
Reptiles				
Zamenis (Elaphe) longissima	LC	IV	X	*Protect the habitats (clear forests and scrub) as well as food resources (mice, lizards etc)*
Coronella austriaca	DD	IV	X	*Protect habitats (edge of woods, hedges, heaps of stones etc.) as well as food resources (lizards, snakes, small mammals, birds and insects)*
Natrix tessellata	LC	IV	X	*Protect Mali Grad and the breeding sites*
Igyroides nigropunctatus	LC	IV	X	*Conserve open rocky places along the shore of the lake*
Podarcis erhardii/ Podarcis erchardii liveti	LC	IV	X	*Protect mating, breeding and wintering sites*
Testudo hermanni/ Testudo hermanni boettgeri	NT	II, IV	X	*Protect mating, breeding and wintering sites*
Testudo graeca	VU	II, IV	X	*Protect mating, breeding and wintering sites*
Emys orbicularis/ Emys orbicularis hellenica	NT	II, IV	X	*Protect mating, breeding and wintering sites*
Amphibians				
Triturus vulgaris /Triturus vulgaris graecus	LC		X	*Conserve ponds*
Bombina variegate/ Bombina variegate scarba	LC	II, IV	X	*Conserve temporary ephemere ponds*
Rana graeca	LC	IV	X	*Conserve ponds and waterholes*
Rana balcanica (Pelophylax kurtmuelleri)	LC		X	*Conserve ponds and waterholes*
Rana dalmatina	LC	IV	X	*Conserve ponds and waterholes*
Bufo viridis (Pseudepidalea viridis)	LC	IV	X	*Conserve ponds and waterholes*
Hyla arborea	LC	IV	X	*Conserve ponds and waterholes*

	IUCN Red List	Hab/ Birds Directive *	Presence in PNP	*Conservation actions*
Triturus carnifex (ex T. cristatus)	LC	IV	X	*Conserve ponds and waterholes*
Pelobates syriacus/ Pelobates syriacus balcanicus	LC	IV		*Conserve ponds and waterholes*

	IUCN Red List	Hab/ Birds Directive *	Presence in PNP	*Conservation actions*
Fish				
Barbus prespensis	VU	II, V	X	***Protect habitats of the reproduction sites. Improve habitat sureveillance and implement modified fishery regulations***
Salmo peristericus	EN		X	***Improve habitat sureveillance and implement modified fishery regulations***
Pseudophoxinus prespensis	EN	II	X	***Protect habitats of the reproduction sites. Improve habitat sureveillance and implement modified fishery regulations***
Cobitis meridionalis	VU	II	X	***Improve habitat sureveillance and implement modified fishery regulations***
Chondrostoma prespensis	VU		X	***Protect habitats of the reproduction sites. Improve habitat sureveillance and implement modified fishery regulations***
Alburnoides bipunctatus prespensis	VU	II	X	***Protect habitats of the reproduction sites. Improve habitat sureveillance and implement modified fishery regulations***
Rutilus (ohridanus) prespensis	VU	II	X	***Protect habitats of the reproduction sites. Improve habitat sureveillance and implement modified fishery regulations***
Invertebrates				
Lucanus cervus		II	X	***Protect old oak trees trees and decaying wood***
Calosoma sycophanta			X	***Protect Corydalis spec as feeding plant for larvae***
Parnassius mnemosyne		IV	X	***Protect Corydalis spec as feeding plant for larvae***
Thersamolycaena dispar	endangered	I/IV		***The butterfly needs Mentha and Senecio species,whereas the larvae (caterpillar) prefers Rumex species. They are linked with semiaquatic***

	IUCN Red List	Hab/ Birds Directive *	Presence in PNP	*Conservation actions*
				habitats such as reed
Maculinea arion	Near threatend	IV	X	*Conserve nests of the ant Lasius flavus as host organism for the butterfly larvae*
Plants				
Phelypaea boissieri			X	*Protect the habitats*
Sedum serpentini			X	*Protect the habitats*
Centaurea prespana			X	*Protect the habitats*
Dianthus myrtinervius				*Protect the habitats*
Viola eximi				*Protect the habitats*
Juniperus foetidissima			X	*Protect the habitats*

* Only species on Annexes II and/ or IV of the habitats Directive, and Annex I of the Bird Directive, are considered here (species with highest protection level)

7.6.1 INDICATOR SPECIES FOR MONITORING

Table 44: Bats of the Prespa National Parkand action for conservation (according *PAPADATOU ET AL* 2011)

	IUCN Red List	Hab/ Birds Directive *	Presence in PNP	*Conservation actions*
Mammals				
Eptesicus serotinus	LC	IV	X	***Protect Treni cave and other caves***
Hyposugo(Pipistrellus) savii	LC	IV	X	***Rock crevices and fissures***
Myotis capaccinii	VU	II/ IV	X	***Protect Treni cave and caves close to Gollomboc***
Myotis daubentonii	LC	II/IV	X	***Protect Treni cave and Caves close to Gollomboc***
Myotis myotis	LC	II/IV	X	***Protect Treni cave and Golema Dupka, Kalamas, 'Badger Cave', Gollomboc, Zornosko/Zaroshka cave***
Miniopterus schreibersii	NT	II/IV	X	***Protect cave on Mali Grad***
Pipistrellus kuhlii	LC	IV	X	***unclear***
Plecotus spec				***unclear***
Rhinolophus blasii	LC	II/IV	X	***Protect Treni cave and other caves***
Rhinolophus euryale	NT	II/ IV	X	***Protect Treni cave and other caves***
Rhinolophus ferrumequinum	LC	II/IV	X	***Protect Treni cave and other caves***
Rhinolophus hipposideros	LC	II/ IV	X	***Protect Treni cave and Golema Dupka, Kalamas, 'Badger Cave', Gollomboc, Zornosko/Zaroshka cave***
Tadardia tenoitis	LC	?	X	***Protect Treni cave and other crevices***

Table 45: Target (Indicator) bird species for different habitats

Monitoring of species that indicate the status of reed beds			
English name	**Latin name**	**Breeding ecology**	**monitoring time**
Bittern	*Botaurus stellaris*	they utilise large, wet reed beds with areas of open water	15.04-15.06
Little Bittern	*Ixobrychus minutus*	in the Balkans predominantly appears in reed beds and Typha sp. thickets	15.04-15.06
Reed Bunting	*Emberiza schoeniclus*	typical reed bed species	15.04-15.06
Great Reed Warbler	*Acrocephalus arundinaceus*	tall reeds with thick stems situated close to open water in which to build its nest	15.04-15.06
Eurasian	*Acrocephalus*	primarily breeds in mature reed beds	15.04-15.06

reed Warbler	*scirpaceus*		
Moustached Warbler	*Acrocephalus melanopogon*	inhabits only old inundated reed beds	15.04-15.06
Bearded Tit	*Panurus biarmicus*	restricted to large reed beds	15.04-15.06
Cetti's Warbler	*Cettia cetti*	proximity of reeds	15.04-15.06
Monitoring of species that indicate the status of forests			
English name	**Latin name**	**Breeding ecology**	**monitoring time**
Green Woodpecker	*Picus viridis*	requires big dacaying upright trees for nesting, deep forest or forest edge, feeds on open ground and dacaying wood	15.04-15.06
Great Spotted Woodpecker	*Dendrocopos major*	abundance defines forest quality, present in all types of forest with an average age more than 30 years	15.04-15.06
Middle Spotted Woodpecker	*Dendrocopos medius*	oak forest specialist	15.04-15.06
Black Woodpecker	*Dryocopus martius*	Beech forest specialist	15.04-15.06
Lesser Spotted Woodpecker	*Dendrocopos minor*	old beech or oak forests or flooded poplar forests	15.04-15.06
Wood Lark	*Lullula arborea*	forest edge	15.04-15.06
Tree Pipit	*Anthus trivialis*	forest edge	01.05-30.05.
Short-toed Tree-creeper	*Certhia brachydactyla*	beech and oak forest, nests usually under bark	15.04-15.06
Monitoring of species that indicate the status of low intensity grazed alpine meadows			
English name	**Latin name**	**Breeding ecology**	**monitoring time**
Whinchat	*Saxicola rubetra*	alpine meadows	01.05.-30.06.
Wheatear	*Oenanthe oenanthe*	rocky meadows in alpine or subalpine zone	01.05.-30.06.
Skylark	*Alauda arvensis*	open grasslands	15.04-15.06
Linnet	Carduelis cannabina	open areas with scattered bushes, also heats and moorland	15.04-15.06
Monitoring of species that indicate the status of high intensity grazed or mown meadows, farmland (with scattered bushes)			
English name	Latin name	Breeding ecology	monitoring time
Skylark	*Alauda*	open grasslands	15.04-15.06

	arvensis		
Crested Lark	*Galerida cristata*	partially open grassland, with rocks or roads	15.04-15.06
Turtle Dove	*Streptopelia turtur*	open areas with small patches of bushes or forests	15.04-15.06
Red-backed Shrike	*Lanius collurio*	open areas with scattered bushes	15.04-15.06
Black-eared Wheatear	*Oenanthe hispanica*	rocky meadows in mediterranean zone	15.04-15.06
Corn Bunting	*Miliaria calandra*	primarily open grassland	15.04-15.06
Woodchat Shrike	*Lanius senator*	south exposed meadows with bushes	01.05-15.06
Whitethroat	*Sylvia communis*	open areas with scattered bushes	15.04-15.06
Sardinian Warbler	*Sylvia melanocephala*	south exposed meadows with bushes	01.05-15.06
Hoopoe	*Upupa epops*	open areas with small patches of bushes or forests	01.05-15.06
Black-headed Bunting	*Emberiza melanocephala*	farmland, vineyards, open dry meadows with bushes	01.05-15.06
Ortolan Bunting	*Emberiza hortulana*	farmland, vineyards, open dry meadows with bushes	15.04-15.06
Quail	*Coturnix coturnix*	open areas	01.05-15.06
Monitoring of species that indicate the status of dry, low intensity grazed or mown meadows (with scattered bushes)			
English name	Latin name	Breeding ecology	monitoring time
Linnet	*Carduelis cannabina*	open areas with scattered bushes, also heats and moorland	15.04-15.06
Rock Partridge	*Alectoris greaca*	open areas with rock outcrops, low intensity use	15.04-15.06
Woodchat Shrike	*Lanius senator*	south exposed meadows with bushes	01.05-15.06
Black-headed Bunting	*Emberiza melanocephala*	farmland, vineyards, open dry meadows with bushes	01.05-15.06
Quail	*Coturnix coturnix*	open areas	01.05-15.06
Grey Partridge	*Perdix perdix*	open areas, low intensity use	15.04-15.06
Corn Bunting	*Miliaria calandra*	primarily open grassland	15.04-15.06
Skylark	*Alauda arvensis*	open grasslands	15.04-15.06

Table 46: Target (Indicator) Plant Species

Target (Indicator) Plant Species of PNP			
No	Species	Indicator	Method of Monitoring
1	*Acer heldreichii*	Climate change	Counting of trees in observation plots/transects
2	*CentaureaGalicicae*	Habitat integrity	Counting individual in observation plots
3	*Crocus cvijici*	Climate change	Counting individual in observation plots
4	*Centaurea prespana*	Habitat integrity	Counting individual in observation plots
5	*Centaurea soskae*	Habitat integrity	Counting individual in observation plots
6	*Crataegus heldreichi*	Land use intensity	Counting shrubs in observation plots/transects and monitor collecting damage
7	*Lessermeria kosaninii*	Habitat integrity	Counting individuals in observation plots
8	*SempervivumGalicicae*	Habitat integrity	Counting individuals in observation plots
9	*Sideritis raeseri*	Land use intensity	Counting individuals in observation plots and along transects
10	*Viola eximia*	Climate change	Counting individuals in observation plots
11	*Juniperus communis*	Wildfire frequency	Counting individuals in observation plots
12	*Juniperus nana*	Wildfire frequency	Counting individuals in observation plots
13	*Astragalus meieri*	Land use intensity	Counting individuals in observation plots
14	*Potentilla speciosa*	Habitat integrity	Counting individuals in observation plots
15	*Morinia persica*	Habitat integrity	Counting individuals in observation plots
16	*Helianthemum canum*	Habitat integrity	Counting individuals in observation plots