



Report on Grassland Habitat Types of the “Prespa” NP

Project Title:

**Support the management of “Prespa” NP through
contribution to habitat vegetation mapping and
species monitoring**



December, 2023



Report on Grassland Habitat Types of the “Prespa” NP

In the frame of the Project:

“Support the management of “Prespa” NP through contribution to habitat vegetation mapping and species monitoring.”

Draft Version

REGIONAL AGENCY OF PROTECTED AREAS, Korçë

Prespa National Park – 2023

Table of Contents

1. Introduction
2. Study area
3. Methodology
4. Grassland Habitat Types of the "Prespa" NP
 - 4.1. 6110 Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albis
 - 4.2. 6170 Alpine and subalpine calcareous grasslands
 - 4.3.1. 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)
 - 4.3.2. 6220 *Pseudosteppe with grasses and annuals Thero-Brachypodietea
 - 4.3.3. 6520 Mountain hay meadows
 - 4.3.4. 8120 Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*)
 - 4.3.5. 8210 Calcareous rocky slopes with chasmophytic vegetation
- 5.1. Current Conservation, Pressures and Threats to the Habitats of "Prespa" NP
- 5.2. Restoration possibilities and Management actions recommended for the grassland Habitats of "Prespa" NP

List of Tables

Table 1.1. The composition of Prespa National Park in the year 2023 (Source: DCM no. 59, date 26.1.2022).

Table 1.2. Prespa National Park and its sub-zones (Source: DCM no. 59, date 26.1.2022).

Table 1.3. Identified habitat types in the Prespa National Park based on literature review and expert judgment.

Table 4.1. Identified habitat types in the Prespa National Park based on field observations and data analyses.

Table 4.2. Conservation degree for habitat types.

Table 4.3. Evaluation matrix for the overall assessment of conservation status for habitat types, through the combination of the assessments of the four parameters: range, area, structures and functions and future prospects.

Table 5.1. List of Pressures and Threats observed in the Habitat types of the Prespa NP.

Table 5.2. Restoration possibilities and Habitat types with localities where they were observed in the Prespa NP.

Table 5.3. Management actions recommended to reduce or prevent Pressure and Threats.

List of Figures

Figure 1.1 Prespa National Park.

Figure 1.2. Geological map of Prespa National Park [Source; Management Plan Prespa National Park in Albania (2014-2024)].

Figure 1.3. Vegetation map of Prespa National Park [Source: Management Plan Prespa National Park in Albania (2014-2024)].

Figure 1.4. Zonation of Prespa National Park (Source: DCM no. 59, date 26.1.2022).

Figure 1.5 Zonation of Prespa National Park (Source: Management Plan Prespa National Park in Albania (2014-2024)).

Image 4.1. The habitat type 6110 - * Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albis (*Sempervivum ciliatum*) in Ivani Mt

Image 4.2. The habitat type 6110 - * Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albis in the south of Pllaja e Pusit peak.

Image 4.3. *Cattania (Cattaniella) thateensis* (endemic) and *Satyrium spini*, two important invertebrate species of the habitat type, Alpine and subalpine calcareous grasslands in the central part of Dry Mt.

Image 4.4. The habitat type 6170 - Alpine and subalpine calcareous grasslands in the central part of Dry Mt.

Image 4.5. The habitat type 6170 - Alpine and subalpine calcareous grasslands in the central part of Dry Mt.

Image 4.6. The habitat type 6210 is quite important for the Butterflies fauna.

Image 4.7. The habitat type 6210 - Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) in Kallamas peninsula.

Image 4.8. The habitat type 6210 -Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) above Gorrica e Madhe village.

Image 4.9. The habitat type 6220 - *Pseudosteppe with grasses and annuals Thero-Brachypodietea between Cerja and Rakicka villages.

Image 4.10. The habitat type 6220 - *Pseudosteppe with grasses and annuals Thero-Brachypodietea on the north-west of Cerja Village.

Image 4.11. The habitat type 6520 - Mountain hay meadows in the southern part of the Dry Mt.

Image 4.12. The habitat type 6520 - Mountain hay meadows in the central part of the Dry Mt.

Image 4.13. The habitat type 8120 - Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietia rotundifolia*) in the north-eastern part of the PNP.

Image 4.14. Stabilised scree of the habitat type 8120 - Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietia rotundifolia*) in the eastern part of the PNP.

Image 4.15. The habitat type 8210 - Calcareous rocky slopes with chasmophytic vegetation below Ballmaqi Peak.

Image 4.16. The habitat type 8210 - Calcareous rocky slopes with chasmophytic vegetation in Lesser Prespa.

Image 5.1. Impact of humans (bunkers and trenches), climate, erosion and drought in the alpine zone of Dry Mountain.

Image 5.2. The woody vegetation is a great impact to the herbaceous vegetation in the habitat 8210, due to the Habitat shifting and alteration threats.

Map 4.1. Distribution and conservation degree of the habitat type 6110 in the Prespa National Park.

Map 4.2. Distribution and conservation degree of the habitat type 6170 In the Prespa National Park.

Map 4.3. Distribution and conservation degree of the habitat type 6210 In the Prespa National Park.

Map 4.4. Distribution and conservation degree of the habitat type 6220 In the Prespa National Park.

Map 4.5. Distribution and conservation degree of the habitat type 6520 in the central part of the "Prespa" NP.

Map 4.6. Distribution and conservation degree of the habitat type 8120 In the Prespa National Park.

Map 4.7. Distribution and conservation degree of the habitat type 9180 In the Prespa National Park.

Abbreviations

Acronyms	Definition
IUCN	International Union for Conservation of Nature
MP	Management Plan
Mt/ Mts	Mountain/ Mountains
NAPA	National Agency for Protected Areas
NP	National Park
NTC	National Territory Council
PIU	Project Implementation Unit
PNP	Prespa National Park
RAPA	Regional Agency for Protected Areas

Project and Contractors details

Project Name	Support the management of "Prespa" NP through contribution to habitat vegetation mapping and species monitoring.
Funding Programme	Grant no. EA_025
Deliverable	Output 1. A new step toward the N2000 approach in managing Prespa NP is achieved. The capacity of RAPA (Korça) and other stakeholders in monitoring species and mapping their habitats in grassland areas is enhanced regarding Natura2000 through habitat mapping and description.
Work Package	1: Habitat map for grassland area in Prespa NP
Project Area	Prespa National Park (PNP)
Contact details of Client	Daniela Ruçi Grants Coordinator Prespa Ohrid Nature Trust (PONT) Abdi Toptani Str., Torre Drin Tower nr. 35/2, Tirana, Albania Tel/Cell: +355 69 221 8999 / Skype: daniela_tola / www.pont.org
Contractor	ILIRIA-Protection and Social & Environmental Development Association, Albania Q. Stafa Stret., No. 122, Tirana, Albania adiku@hotmail.com
Experts	- Lulëzim Shuka - Team Leader - Abdulla Diku
Project Team	- Donald Shuka - Elson Salihaj - Aldo Diku - Sadik Malo - Xhulio Adillari - Florenc Muçollari

Summary

The deliverable will include the description of:

- The methodology for the preliminary mapping the habitat types and their distribution.
- The methodology for the field surveys and identifying the different habitat types.
- The work plan for the field surveys.

For each habitat, sampling will be documented and organised so that:

- 1) All the necessary data will be obtained to map the habitat and evaluate its conservation status.
- 2) All typical species of habitat type and species with conservation interest, as well as unidentified ones so far
- 3) All ecological and flora differences of habitats will be represented.
- 4) Habitats and locations of potential importance will be targeted.

The number of plots (relevés) for habitat types will depend on the following factors:

- 1) The spatial distribution of the plots (relevés).
- 2) The distribution of habitat types.
- 3) The spatial distribution of habitat types.
- 4) The ecological differentiation of habitat types, as shown by the literature data.
- 5) It has been estimated that up to 10 plots (relevés) can be taken at each habitat type (or less if the habitat type has a limited distribution) to confirm its distribution and degree of conservation.

Final Map of Habitat Types with

- 1) Map of grassland Habitats
- 2) Map of shrub and forested Habitats
- 3) Map of Freshwater Habitats

1. Introduction

1.1. Objectives

The project aims to observe and identify the current situation and borders of the different plant communities and their habitat types of the Prespa NP grasslands based on Annex I of the Habitats Directive (92/43/EEC) and this data preparation of the map of Habitat types. The main objectives of the project are:

- to collect all the available information from the study area regarding vegetation classification and mapping of forests and shrublands,
- to conduct an extensive fieldwork survey based on the quadratic and linear transect methods for the collection of primary data and
- to assess the current ecological factors and threats to the species of conservation interest and the habitat types
- to map the distribution of each grassland vegetation unit in the Prespa National Park as they are described in the Interpretation Manual (European Commission 2013) and the Habitats Directive (92/43/EEC).

This deliverable analyses the methodology implemented for the habitat survey within the Prespa National Park. More specifically,

- The fieldwork protocols will be defined.
- The number of plots (relevés) per habitat type will be defined.
- The field survey work plan will be defined.

The plan for the visits and the location of the field visits will be agreed upon with The Project Implementation Unit (PIU), the Regional Agency for Protected Areas (RAPA) in Korça.

2. Study area

General description of the Prespa National Park

2.1.1. Geographical position

The Prespa National Park (PNP) in Albania was officially declared on the 18th of February 1999 and officially inaugurated in February 2000. The terrestrial Albanian part of the PNP comprises a total landscape surface of 22800 ha. With the decision of the Ministers Council, nr.59, date 26. 1. 2022, the PNP has increased its surface to 27,613.05 ha.

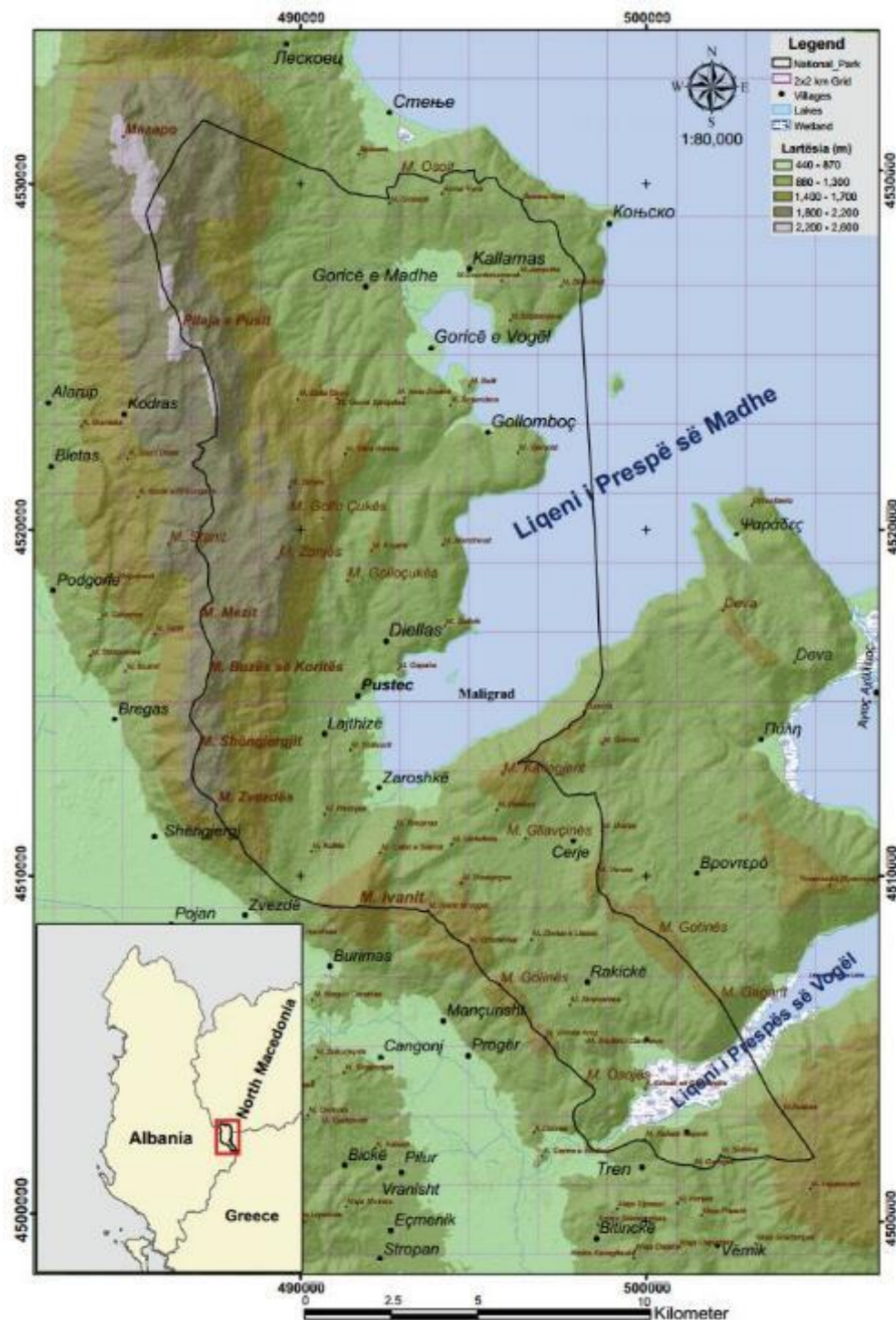


Figure 1.1 Prespa National Park

The PNP is located on the border with Greece, North Macedonia and is a continuous part of the NP Prespa in Greece and NP Galicica in North Macedonia.

The PNP includes the Great and Lesser Prespa Lakes and all their watersheds. Both lakes are in the eastern side of the Galicica, Dry and Ivani Mountain ranges which are characterized by a high degree of landscape heterogeneity. The Albanian part of the Prespa watershed includes the depressions of Great and Lesser Prespa lakes, Dry Mountain (upper part and its eastern slopes), and Rakicka highland including the Cerja depression. The depression of Great Prespa Lake, to the east of Dry Mountain, lies partly in Albanian territory. The Albanian part of Lesser Prespa Lake depression is located on the park's south edge, with a length of 5 km and a width of approximately 3.7 km (between Zogradec and Shkuc villages). It connects with the Devolli River valley across the "Wolf George".

Dry and Ivani mountains represent the largest terrestrial part of the PNP. Mt Ivani separates the mountain ranges from Rakicka highlands. Mts Dry and Ivani and Rakicka highland, are composed geomorphologically mainly of Triassic-Jurassic limestones and a few cretaceous limestones and terrigenous depositions of Paleogene. All these geomorphological compositions form an asymmetric complex surrounded by high and steep slopes. The highest peaks on the Albanian side began in the north of Mt Dry with Pllaja e Pusit (2,288 m) and then more in the south-east with Buza e Koritës (2,028 m), the peak of Shengjergji (1,911 m), the peak of Zvezda (1,833 m), Qafa e Zvezdës, Ivan Mt (1,768 m) and the last one, Boline, (1,456 m) (Kabo, 1991; Shumka et al., 2007; Fremuth & Shumka, 2013).

2.1.2. Geomorphology

Geomorphologically, the terrestrial part is constituted by the upper Cretaceous limestone and several small terrigenous parts originated from Eocene, Pliocene, and Quaternary. The soil substrate is dominated mainly by Calcaric Leptosols, Eutric Cambisols, and Haplic Phaezoem (URB classification) and less the Dystric Leptosols, Rhodic and Vertic Luvisols. The slopes of the Lesser and Great Prespa watershed have steep inclinations of 50–85%, and the elevation rises from 848 m at the lake surface to 2,288 m at Pllaja e Pusit, the highest peak of Mt Dry.

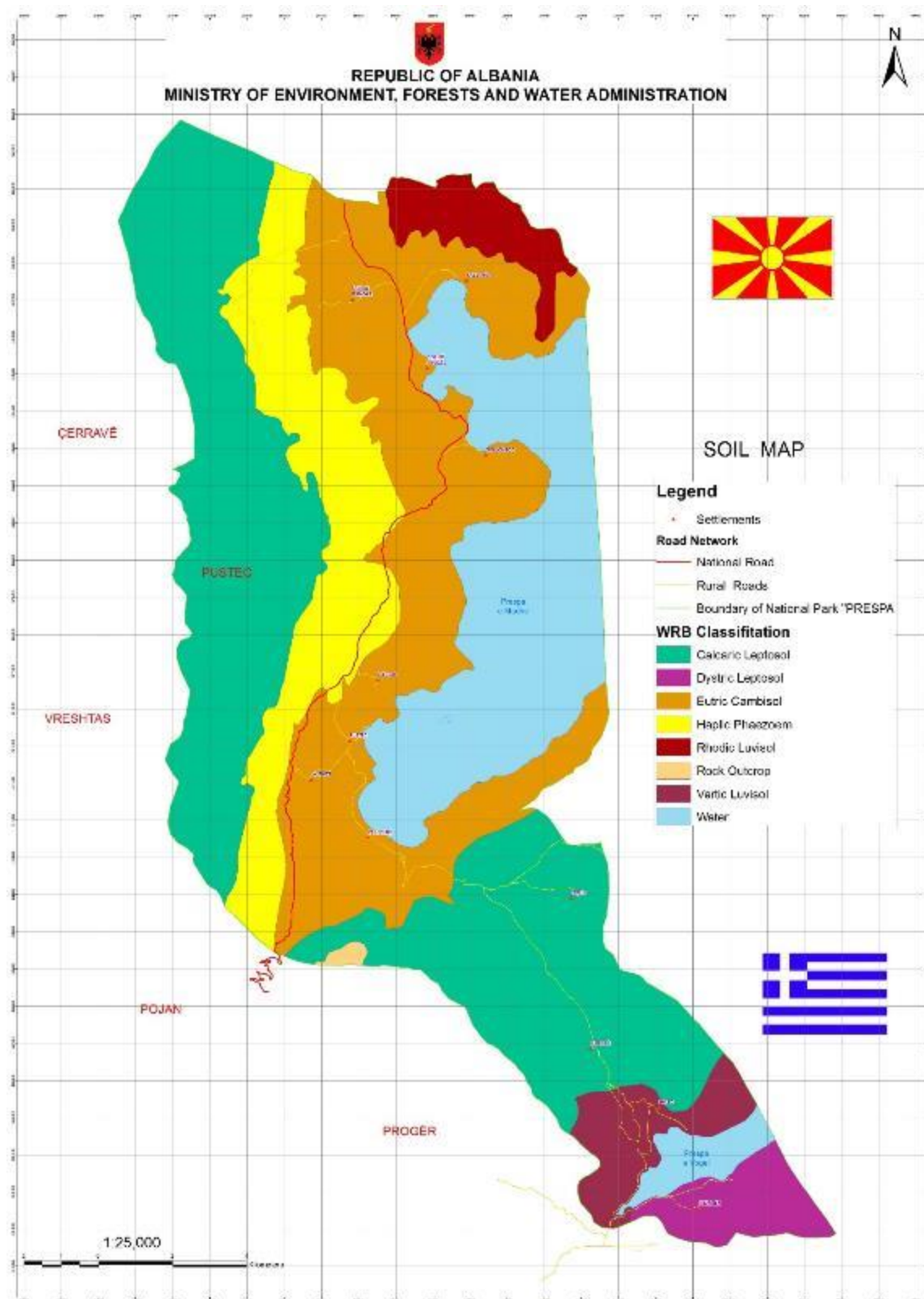


Figure 1.2. Geological map of Prespa National Park [Source; Management Plan Prespa National Park in Albania (2014-2024)]

2.1.3. Climate

The climate of PNP is mostly continental moderate, originating from central Europe. The vegetation is influenced by the Mediterranean climate, causing an alternation of warm and

dry periods with very cold and wet ones. The lakes, the altitude, and the western exposition of the slopes of Dry Mountain play an important role in the sub-Mediterranean-continental character of climate in the Albanian part. The average annual precipitation attains from 700 to 900 mm, mainly from the end of October to the end of May, and mostly in the mountains. Average temperatures oscillate from a minimum of 2.4°C (December to March) to a maximum of 19°C (from June to August), with an annual average of 11°C (Kabo, 1991).

2.1.4. Description of the park

The territory of the PNP includes the terrestrial part of agricultural lands, dedicated to the subsistence production of field crops, vineyards and orchards (approx. 543.1 ha), forests (approx. 6497.3ha), pastures and meadows (approx. 831.44 ha), Heterogenous agriculture areas (795.63 ha), Water bodies (4625.73 ha), wetland areas (466.12 ha) shrubland areas (13640.82 ha) and urban areas (212.92 ha). The entire Albanian aquatic component of the two Prespa Lakes (approx. 5238 ha).

Based on Albanian Law on 'Protected areas" no. 81/2017, Prespa National Park belongs to the second protected area category (National Park, II category of IUCN). Since 2013, Prespa National Park has been declared a Ramsar site (site no. 2151) with an area of 151.19 km².

Table 1.1. The composition of Prespa National Park in the year 2023 (Source: DCM no. 59, date 26.1.2022)

Land use	Area in ha	%
Agricultural land	543.1	1.97
Forest	6497.3	23.53
Heterogenous agriculture areas	795.63	2.88
Waterbody	4625.73	16.75
Wetlands	466.12	1.69
Pastures	831.44	3.01
Shrublands	13640.82	49.4
Urban areas	212.92	0.77
Total	27613.06	100

The borders of the PNP were initially defined by DCM No. 80/1999 in 1999 and later, with DCM no. 59, (dated 26.01.2022) - with geographical coordinates E=20° 50' West to 21°3'37" East and =40°40'South to 41°56'28" North:

- ✓ North: State border with Galicica National Park in the Republic of North Macedonia.
- ✓ East: State border with the Republic of North Macedonia and Greece, i.e., the state boundaries in the water of the Greater Prespa Lake.
- ✓ 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).
- ✓ West: Zvezda Pass (1,099 m), at an elevation of 1,912 m following the boundary with the designated area.

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.

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

To the northeast, the PNP borders the Republic of North Macedonia, the municipality of Resen; to the east, 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 the Korça Regional Administration of Protected Areas (RAPA). It is physically connected only with the cities of Korça by the Zvezda pass and Bilishti through the national road in the direction of Greece. To the north crosses the national road through the park from Korça via the Zvezda pass to Stenje (Republic of North Macedonia) leading to the border station in Gorica.

The municipality of Pustec with its center at Pustec village includes 9 villages: Gorna Gorica (Gorica e Madhe), Tuminec (Kallamas), Dolna Gorica (Gorica e Vogël), Glloboceni (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.

2.1.5. Description of Flora and Fauna

The Prespa region has been recognised as a biodiversity hotspot due to the high number of species of different taxonomic groups as well as by its unique habitat types and landscape heterogeneity, while characterised by a high percentage of endemism and the presence of significant species – in term of conservation (Matevski, 2010; Strid et al., 2020; Shuka et al., 2021).

According to Dieterich et al., (2011), the PNP is the home of **54 endemic animal species** (47 invertebrates and 7 vertebrates). Nevertheless, invertebrates remain poorly studied in the area, and new species to science will be sure to be described in the near future. A first glance at the group of Odonata has shown 32 species already (Dieterich et al., 2011). A basic study on Long-horned beetles (Coleoptera, Cerambycidae) revealed 42 species of this group, of which four were new to the Albanian Fauna (Siering, G. 2013). Two Long-horned beetle species are enlisted in Albania's Red Book of Endangered Species (Siering, G. 2013). Lepidoptera, Diptera, and Orthoptera are groups with a high, but still unknown, diversity in the PNP.

Regarding mammals, the most studied animal group after birds and fish in the Prespa Basin, 60 species have been recorded, from which **34 are enlisted in the annexes of the Habitats Directive** (92/43/EEC).

According to the Management Plan of the Prespa National Park in Albania (2014-2024), a study revealed 132 breeding bird species inside the park's boundaries. One bird species is categorised as Vulnerable, two are Near Threatened, and 129 are subject to Least Concern according to the criteria of the International Union for the Conservation of Nature. In

addition, 28 bird species are subject of Annex I of the 2009/147/EC, 6 are enlisted in Annex II, 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**, of which **nine are endemic** to the lakes and 15, are considered to be endangered.

Regarding floristics, in the PNP **1,135 plant taxa**¹ have been recorded up to date (Shuka & Malo, 2010; Shuka et al., 2011; Shuka & Tan, 2013; Shuka, 2014). It has to be noted, that in the Greek part of the Prespa basin, where significant floristics studies have taken place since the early '80 (Pavlidis, 1997), more than 1815 species are known (Strid et al., 2017, Bergmeier et al., 2020, Strid et al., 2020) out of which 13 (*Astragalus mayeri*, *Centaurea soskiae* subsp. *soskiae*, *Crocus cvijicii*, *Sempervivum ciliosum*, *Centaurea galicicae*, *C. devasiana*, *C. triniifolia* subsp. *campylacme*, *Dianthus galicicae*, *Micromeria cristata* subsp. *kosaninii*, *Festuca galicicae*, *Siler zernyi* subsp. *ochridanum*, *Heliosperma pusillum* subsp. *chromodontum*, *Oxytropis dinarica* subsp. *weberi*) are Balkan endemics (Euro+Med 2006+) and four other taxa (*Chamaecytisus pseudojankae*, *Odontarrhena albiflora*, *Centaurea shumkana* and *C. soskiae* subsp. *albida*) are Albanian steno endemics (Wagenitz et al., 2018; Shuka, et al., 2021) with very restricted distribution range.

According to the IUCN Criteria, two species of the PNP classified as threatened; *Festuca galicicae* and *Galanthus reginae-olgae* have been assessed as Vulnerable (based on the Criteria B1ab(ii,iii)+2ab(ii,iii) and B2ab(iii,v) respectively). In respect to habitat types, the richest in terms of restricted endemics in the PNP are the **8210** - Calcareous rocky slopes with chasmophytic vegetation and **6210** - Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (*important orchid sites).

The calcareous cliffs and crevices of rocky slopes on Shengjergji, Gollomboci Peninsula and Lesser Prespa Lake are the richest in terms of endemics within the PNP, often creating unique vegetation for the fauna of beetles, terrestrial and molluscs, with high conservation interest. Thus, conserving this habitat type is very important for invertebrates and birds. As a result, climate change and forest fires have caused the decline of the population of these low-resilience species and their expansion.

The second group of restricted endemics inhabited the Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (*important orchid sites) and Alpine and subalpine calcareous grasslands habitat types. These habitat types and their species are under the pressure of overgrazing, fires and mismanagement. They are also impacted by the increased temperatures, decreased precipitation and loss of the snow cover early in spring, making it much more dried than it has been so far.

However, the number of plant species recorded in the Greek and the Republic of North Macedonian parts is much higher than in the Albanian part of the Prespa basin. Based on the above, the total number of plant species in the PNP is estimated to be more than 1,135 taxa.

¹ Taxa, plural of taxon, namely the species and subspecies.

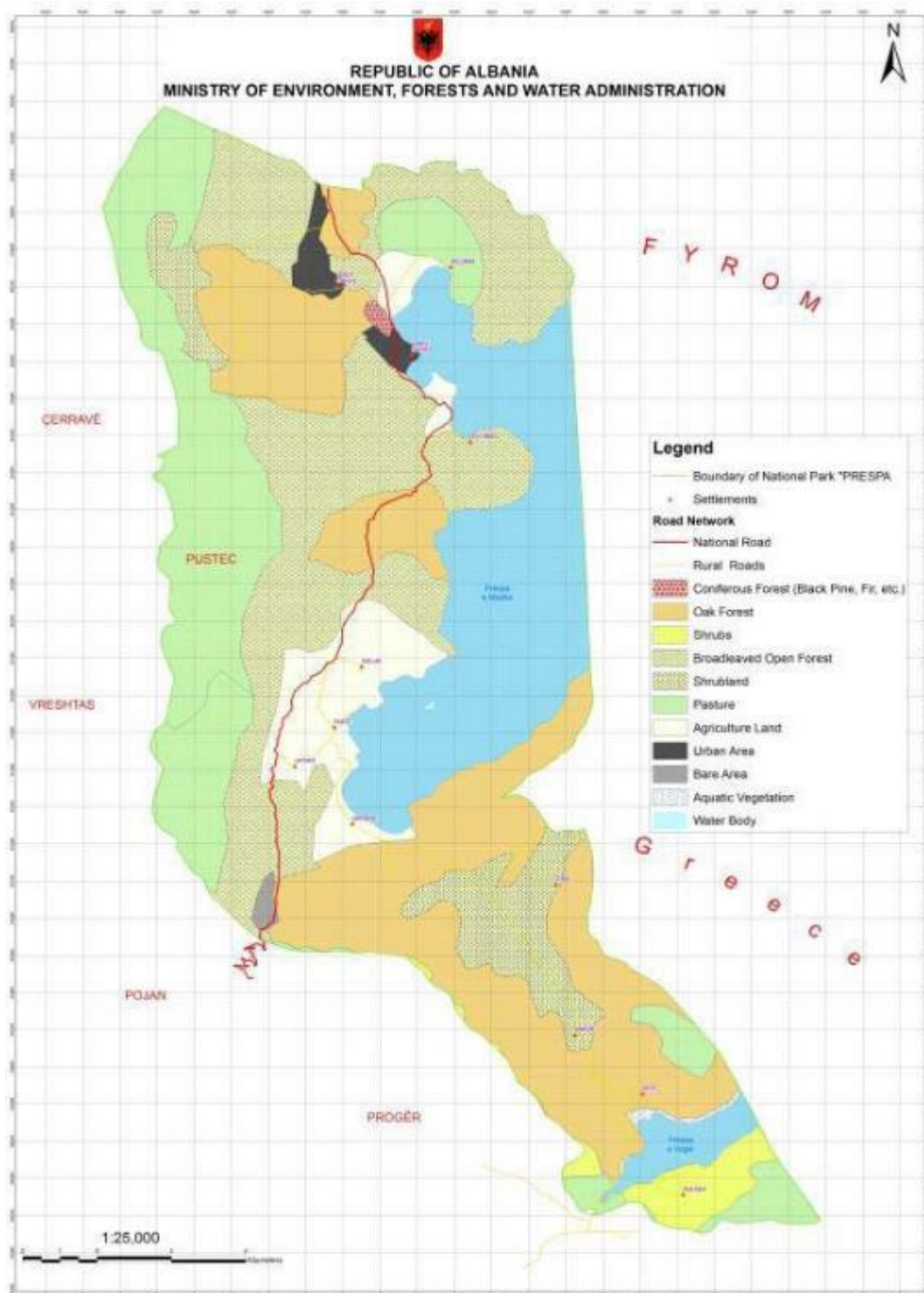


Figure 1.3. Vegetation map of Prespa National Park [Source: Management Plan Prespa National Park in Albania (2014-2024)]

2.2. Zonation of Prespa National Park

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 the Galicica- Mali 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.

Table 1.2. Prespa National Park and its sub-zones (Source: DCM no. 59, date 26.1.2022)

Zones	Surface in ha	In Percent
Core Zone	8055.02	29.17 %
Traditional use zone and Sustainable development	19,558.03	70.83 %
Total	27613.05	100%

Considering the inadequate use of natural resources and the linked deterioration of the conditions of ecosystems and considering the need of energy supply for the local population, a zonation concept for the park has been applied.

Referring DCM no.59 date 26.01.2022 (annex 11), two zones have been classified:

- **Core zone** of the National Park which requires strict protection measures. The core zone includes mainly forest habitats (high forests, coppices and shrubs) and is determined as an area of unique values and important for conservation of the natural heritage. It represents an area where the first level of protection is applied, which ensures a non-disturbed area. In this subzone, scientific research, the development of free ecotourism activities in nature are allowed.
- **Subzone** of Traditional Use and Sustainable Development, with an area of 19558.03 (Nineteen thousand five hundred and fifty-eight point zero three) ha.

This sub-zone includes forest, agricultural and pasture lands, and water territories where it is possible to continue traditional activities such as forest health work, agricultural activities, artisanal fishing activity, grazing, collection and cultivation of medicinal and aromatic plants, with balanced use of and constructions and activities that cause a change in the natural state of the natural ecosystem are not allowed. In the sub-zone of traditional use and sustainable development, the second degree of protection is applied, which ensures a territory with low impact and control of economic, social, agribusiness, entertainment, sports and ecotourism activities, infrastructure construction according to urban development plans and tourism approved by the National Territory Council (NTC), which do not harm the ecological integrity of the natural ecosystem and respect the functions of the protected area, the ecological values and those of the natural and cultural landscape.

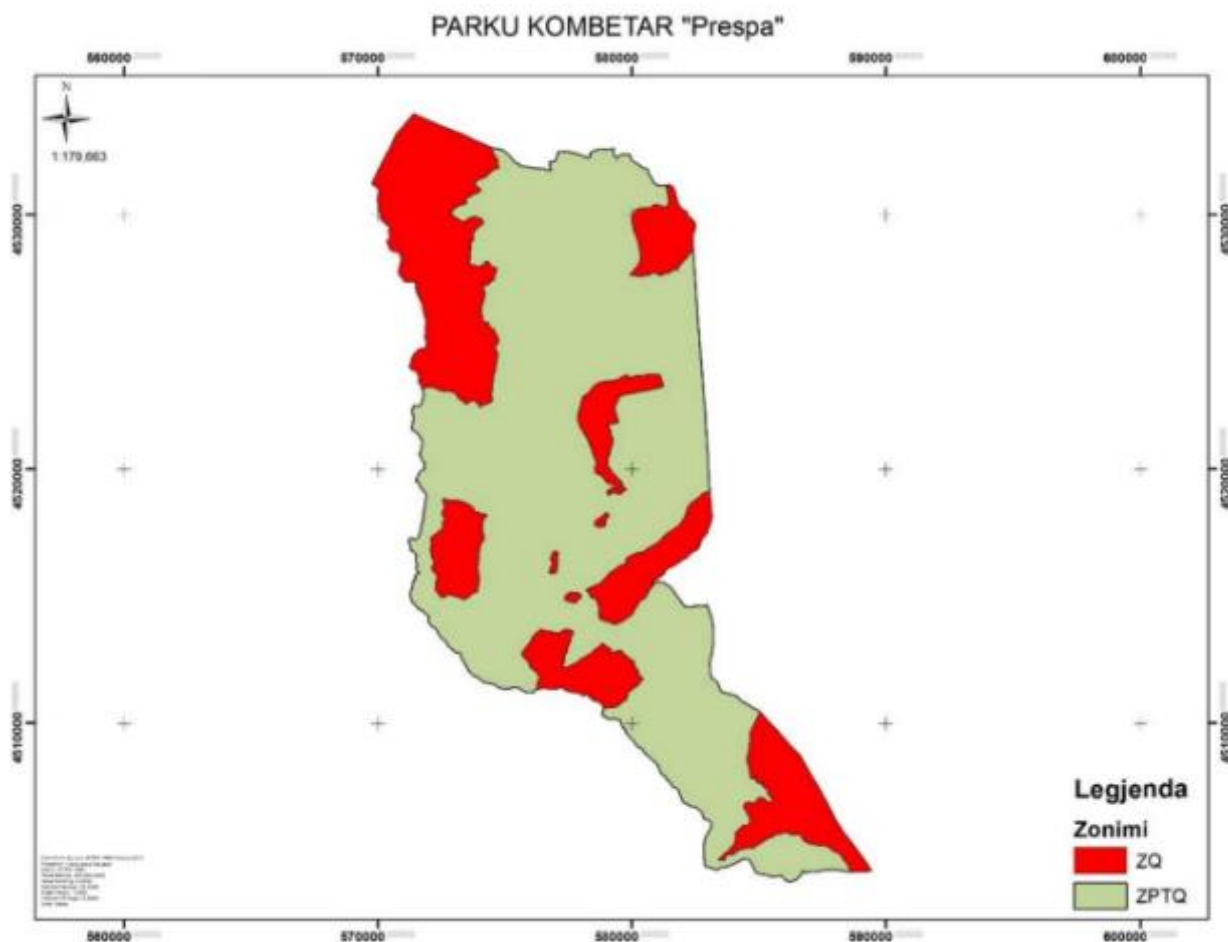


Figure 1.4 Zonation of Prespa National Park (Source: DCM no. 59, date 26.1.2022)

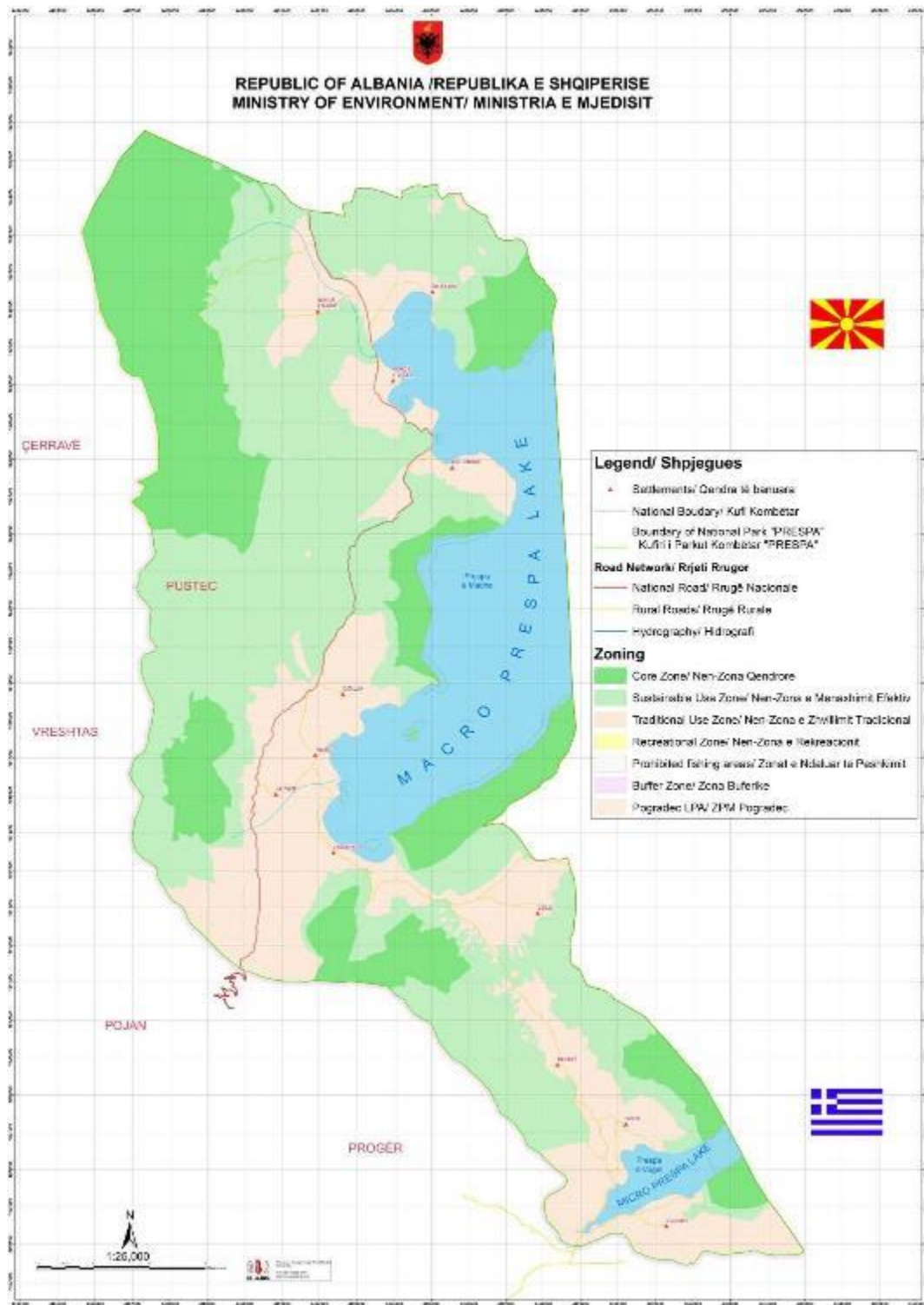


Figure 1.5 Zonation of Prespa National Park (Source: Management Plan Prespa National Park in Albania (2014-2024).

2.3. Description of vegetation types of Prespa National Park with focus on herbaceous plants

The Prespa watershed is characterized for its diverse vegetation units and habitat types (Vrahnakis et al., 2011, Fotiadis et al., 2020, Strid et al., 2020). Shuka et al. (2021) listed more

than 20 habitat types in the Prespa National Park², including five of European concern, viz. *Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)*; *Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albi*; ** Tilio-Acerion forests of slopes, screes and ravines*; ** Endemic forests with Juniperus spp.*

The flora and vegetation of Prespa watershed represent a crossing of the Illyric, Greek-Asian, Siberian, Eoro-mediterranean, and Alpino-Nordic elements (Rizovski et al., 1997; Mersinllari, 1997). Forests of the Park belong to the *Querco-Fagetea* Br.Bl. et Vlieger in Vlieger 1937 class, and following orders: *Quercetalia pubescentis* Br. Bl. 1932 and *Fagetalia sylvaticae* Pawl. 1928. The vegetation in the elevation 853-900 m is composed mainly of oak associations: *Quercetum frainetto-cerris* Horvat 1959; *Ostrio-Quercetum pubescentis* Trin. 1974 and *Ostrio-Carpinetum orientalis* Markgraf 1932; above those occurred forests of sessile oak: ass. *Orno-Quercetum petraeae* Em. 1968 and *Querco-Ostryetum carpinifolia* Ht. 1954, Em. 1958. These plant communities can be found up to 1200 m, and in some cases up to 1300 m., where they mix with beech forests (*Fagus sylvatica*). In the lower elevation zone, the oak communities are mixed with the Greek juniper (*Juniperus excelsa*). This belt is dominated by the following species: *Quercus frainetto*, *Q. petraeae*, *Q. cerris*, *Q. pubescentis*, *Carpinus betulus*, *Ostria carpinifolia* and *Fraxinus ornus*. Communities of the Turkey oaks (ass. *Ostrio-Quercetum cerris*) are dominating in Biglla and above the village of Gorica. In many places, this community has regenerated from the degraded state that characterized oak forests in PNP prior to 2000.

In the Prespa National Park three major geo-botanical zones can be found:

- **Oak forest zone** includes a large part of the PNP between elevation 850 to 1200 m. Typical species that dominate this zone are *Quercus trojana*, *Q. pubescens*, *Q. frainetto*, and *Q. cerris*. They are accompanied by bushes as hornbeam (*Carpinus betulus*, *Ostrya carpinifolia*), ash (*Fraxinus ornus*), hawthorn (*Crataegus monogyna*), cornel (*Cornus mass*), and hazel (*Corylus avellana*, *C. colurna*, etc.).

The oak forests of the park are heavily degraded by human intervention during years 1970-2000. Their degradation is a result of (illegal) logging and continuous over-grazing. The final degradation stage of the oak forests is *Buxus sempervirens* formations, which are resistant to grazing by livestock and can sustain a severe loss of soil organic matter (Dieterich et al., 2011). Formation of **Greek Juniper forests** (*Juniperus excelsa*) can be found on dry slopes of mostly south exposition. The formation can be found on the hills near the village Kallamas and Gollomboç. It should also be the climax association on the Maly Grad Island (Great Prespa), but is currently extinct there (Mersinllari, 1997; Shuka et al., 2008; Fotiadis, 2013).

- According to Mersinllari (1997, 2000) and Dieterich et al. (2011), **the beech belt** is dominated by *Fagus sylvatica*. It is currently the most natural one from all vegetation zones recorded in the PNP, as human influence was mainly kept exclusively for firewood production. Less pasture use was applied due to elevation. Beech forest does resemble the natural climax vegetation in this zone. Unlike the oak forests, beech forests are mostly still productive, with selective cutting management applied

² Since Prespa National Park is used both in Greece and Albania, in the text the abbreviation PNP is referring to Albania.

as big clear cuts are known to decrease the productivity of the forests. Nevertheless, 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. Interestingly, and despite the high elevation, above beech's tree line, *Buxus* shrublands can be found. Generally, beech forest seems have to withstand the grazing pressure of livestock only in its optimum zone between 1200 and 1650 m.

- Above the tree line, and at an elevation of 1650-2200 m. **sub-alpine and alpine mountain meadows and pastures** can be found. Natural and semi-natural grassland formations were extended in the dry mountain on the subalpine and alpine zone. According to Buzo (1991), the grassland vegetation belongs to two classes: *Festuco-Brometea* and *Juncetea trifidi*; the main communities growing up in it are: ass. *Festucetum bosniacae*; ass. *Stipetum pennatae*; *Astragaletum angustifoliae*; *Alopecuretum gerardi*; ass. *Genisto-Nardetum* (Syn.: *Deltoideo-Nardetum*); ass. *Centaureo-Festucetum varie* and ass. *Festucetum paniculatae* (Syn. *Peucedano-Festucetum paniculatae*) etc.

Only a few localities of beech forest and some single immature Bosnian pine trees (*Pinus heldreichii*) are currently eminent in this zone in altitudes above 1,700 m. in the PNP. Due to the absence of mature pine trees and the generally slow succession processes cleared beech forest stands, the sub-alpine mountain meadows resemble a sub-climax vegetation. Bosnian pine forest fragments are only to be found on the north of the Magaro Peak within the PNP on the North 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 be persistent over a very long time (Matevski, 2010; Dieterich et al., 2013; Shuka, 2014).

Regardless of the above-mentioned dates, there are still important knowledge gaps about the plant communities and habitat types of the PNP, except for the aquatic habitat types that were well described by Fotiadis et al., (2020).

Tailored conservation guidelines as well as applied protection measures for the vegetation units and habitat types of the Prespa National Park are in the foremost interest of the local population, as they are the basis of survival for the local communities. 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 life and material flow of organic substances).
- ✓ Improve resilience and stability of ecosystems.
- ✓ Maintaining ecosystem services:
 - Resources for the local population by supplying 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

Thus, these recent figures justified the creation of the National Park thirteen years ago. Unfortunately, trends in the population dynamics of the various species cannot be given. There have been visible positive trends in larger mammals during the last few years, which gives hope that these are also present in the rest of the ecosystem.

Regrettably, the threats that have deteriorated the habitats in the PNP have not been stopped. However, the intensity of human encroachment has been reduced.

2.4. Management issues in “Prespa” National Park

According to the Management Plan of the Prespa National Park in Albania (2014-2024), to allow the recovery of the forests in the PNP, firewood consumption must be reduced during the time frame of the 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 the Management Plan of the Prespa National Park in Albania (2014-2024). The main elements to achieve this are:

- 1) More efficient heating 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.

The main threats related to human activities on biodiversity and ecosystem services (clean air, fertile soils, pure water, fish from the lake and firewood from the forests, and pastures for livestock) are still caused by:

- ✓ overgrazing,
- ✓ uncontrolled hunting and
- ✓ a new wave of uncontrolled construction of buildings in the last few years.

Other human activities occurring at PNP are alternative tourism. The Park administration provides the opportunity for visitors to experience nature through a carefully created visitor program. The visitor centre is used to inform interested guests about the surrounding area and how 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 businesses. A boating and navigation plan is created with landing platforms on various natural or cultural points of interest. The management of visitors, distribution of awareness and nature education are equally important among the different target groups in the park's region.

The Management Plan of the Prespa National Park in Albania (2014-2024) provides the framework in the form of an 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.

3. Methodology

The project aims to observe and identify typical habitat species and dominant grassland plant communities and assess ecological factors, especially the impact of climate change and habitat fragmentation on plant and habitat conservation.

The working methodology is based on the filled transects and data collection for the grasslands on Calcareous substrates, mainly on rocky slopes with Chasmophytic vegetation, natural/semi-natural dry grasslands of the class Festuco-Brometalia and pastures or meadows within the current border of the "Prespa" NP. The Conservation of priority plant species and Conservation of Landscape & priority Habitats (grasslands and landscapes) is one of the PONT 5-year strategic objectives for the EA program.

The methodology includes analysing previous and existing data and literature information on flora and vegetation (as linear plots, relevés, or general information) collected during the fieldwork on years 2022 and 2022 as well as to navigate early mapping. Since several papers have been published for the grasslands of Prespa NP in Greece (Vrahnakis et al. 2011; Fotiadis et al., 2014; 2020) and preliminary data also exist for the Galicica NP (Mucina et al., 2009; Matevski et al. 2015; Čušterevska 2016), every vegetation plot will be assigned to a corresponding habitat type following the Interpretation Manual of European Union Habitats (version EUR 28). Based on a first analysis of the existing literature's data coupled with expert judgment, a first table of existing habitat types in the study area has been produced (Table 1). Accordingly, a preliminary map of their distribution will be created to identify the size of the survey area and facilitate the planning of the fieldwork. During the surveys, fieldwork teams will be guided firstly by the early map but in addition they will identify any possible vegetation unit that might correspond to a new habitat type, not known so far based on the literature review. Fieldwork protocols will first assess the plant communities in each plot, and then, following Europeanly accepted standards (Tsiripidis et al. 2018), will assess the conservation status of each plot.

Table 1.3. Identified habitat types in the Prespa National Park based on literature review and expert judgment

Code	Name	Source	Recorded
4060	Alpine and boreal heaths	Matevski et al. (2011); Vrahnakis et al. (2011); Strid et al., (2020)	GR, NMK
5210	Arborescent matorral with <i>Juniperus</i> spp.	Matevski et al. (2011); Vrahnakis et al. (2011); Strid et al., (2020)	GR, NMK
6110	* Rupicolous calcareous or basophilic grasslands of the Alyso-Sedion albis	Matevski et al. (2011); Vrahnakis, (2010); Čušterevska, R. 2016 Strid et al., (2020)	GR, NMK?
6170	Alpine and subalpine calcareous grasslands	Matevski et al. (2011); Vrahnakis et al. (2011); Čušterevska, R. 2016 Strid et al., (2020)	GR, NMK
6210	Semi-natural dry grasslands and scrubland facies on	Matevski et al. (2011); Vrahnakis, (2010); Fotiadis, et al. (2014);	GR, NMK

Code	Name	Source	Recorded
	calcareous substrates (Festuco-Brometalia) (* important orchid sites)	Strid et al., (2020)	
6220	*Pseudosteppe with grasses and annuals Thero-Brachypodietea	Matevski et al. (2011); Vrahnakis, (2011); Strid et al., (2020)	GR, NMK
6520	Mountain hay meadows	Matevski et al. (2011); Vrahnakis et al. (2011); Strid et al., (2020)	GR, NMK?
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	Matevski et al. (2011); Vrahnakis et al. (2011); Strid et al., (2020)	GR, NMK
8210	Calcareous rocky slopes with chasmophytic vegetation	Matevski et al. (2011); Vrahnakis et al. (2011); Strid et al., (2020)	GR, NMK

3.1. Sampling plots

In order to identify habitat types, their extension, the species composition and structure of habitats, field surveys will be conducted covering all the different forest and shrubland vegetation types known in the study area. In addition, during the field surveys, information regarding both the conservation degree as well as the pressures and threats of each habitat will be gathered.

For the study of the vegetation ecology and syntaxonomy of the plots as well as for the final classification of each vegetation unit into a habitat type according to the Interpretation Manual of the Habitats Directive, vegetation plots (relevés) of varying size will be conducted using the Braun-Blanquet method (Braun-Blanquet 1951, 1964; Dengler et al. 2008). If a vegetation unit cannot be classified into a habitat type, EUNIS coding will be used (Schaminée et al. 2013). Relevés will be carried out during June and July 2023 as this time of the year is characterized by presence of the majority of the characteristic plant species allowing a secure identification of the plant material but on the same time, their inclusion in the fieldwork protocols.

The number of plots (relevés) for habitat types will depend on the following factors:

- 1) The spatial distribution of the plots (relevés).
- 2) The distribution of habitat types.
- 3) The spatial distribution of habitat types.
- 4) The ecological differentiation of habitat types, as shown by the literature data.
- 5) It has been estimated that up to 10 plots (relevés) can be taken at each habitat type (or less if the habitat type has a limited distribution) to confirm its distribution and degree of conservation.

Areas characterized by distinct physiognomic characteristics and ecological homogeneity will be selected for the vegetation sampling. Two criteria will be taken into account for the selection of the position of the relevés, viz.:

- ✓ to be large enough to include all plant taxa that are part of the specific vegetation unit, and

- ✓ to be homogenous, both floristically and ecologically.

Based on the European standards (Chytrý & Otýpková 2003) the plot size for forests and shrublands is 200 m² and 50 m² respectively.

Coordinates of each relevé will be taken on the WGS84 projection system assisting on the mapping as well as on the possible relocation of each plot for future assessment of the conservation degree of each habitat type.

In each relevé, the following data will be recorded in a specially designed fieldwork protocol (Figure 3-1):

- ✓ General data: Number of relevé, date of assessment, locality and plot size, elevation, relief, exposition, inclination, cover of vegetation for each layer (tree, shrub, herb), height of each layer, geological substratum and soil type.
- ✓ Data for the evaluation of conservation degree: structure and functions, positive impacts, pressures and threats, and restoration possibility.
- ✓ Data for the plant taxa: Every taxon that participate in the vegetation community will be recorded and its abundance will be evaluated according to the modified Braun-Blanquet nine-part scale (Dengler *et al.* 2008) where: (1) r = 1 individual with 0-5% cover, (2) + = 2-5 individuals with 0-5% cover, (3) 1 = 6-50 individuals with 0-5% cover, (4) 2m = more than 50 individuals with 0-5% cover, (5) 2a = any amount of individuals with 5-12.5% cover, (6) 2b = any amount of individuals with 15-25% cover, (7) 3 = any amount of individuals with 26-50% cover, (8) 4 = any amount of individuals with 50-75% cover, (9) 5 = any amount of individuals with 75-100% cover.

If it is needed, plant specimens will be collected to be identified. For the plant identification relevant bibliography will be used such as: "Flora Europaea" (Tutin *et al.* 1968-1980, 1993), "Bimët Endemike dhe ato me Përhapje të Kufizuar, Parku Kombëtar "Prespa" (Shuka *et al.* 2021), "Flora of Albania" (Paparisto *et al.* 1988; Qosja *et al.*, 1992 & 1996), "Excursionist Flora of Albania" (Demiri 1983), as well as the most recent and comprehensive Flora of the Prespa area, namely the "Flora and Vegetation of the Prespa National Park" (Strid *et al.* 2020) etc. For the nomenclature of plant taxa, the online Euro-Med database (2006) will be followed.

3.2. Data analyses

After the collection of the field data and the identification of plant samples, the data were compiled in Microsoft Excel 2010 and were exported to JUICE 7.0 software (Tichý 2002) for further analysis. The TWINSpan (Two-Way Indicator Specification Analysis) method (Hill 1979) was used for the numerical classification of relevés, with three pseudo species cut levels (0%, 5%, 25%) and six levels of division, with a minimum of two relevés for each cluster. In addition, plots were classified using Ward's method of clustering with relative Euclidean distance. In both methods, species occurring in only one plot and which had a cover value of less than 2a (any amount of individuals with 5-12.5% cover, see 2.1 above) were omitted. All species recorded in different layers were merged into one layer. For the cluster analysis all species cover values were square-root transformed before the analysis. Cluster analysis was carried out using PAST 3.0 software (Hammer *et al.* 2001).

3.3. Syntaxonomy

Vegetation units were classified according to the Braun-Blanquet (1951, 1964) method into: class (suffix: -etea), order (suffix: -etalia), union (suffix: -ion) and sub-union (suffix: -etum). Wherever it was not possible to reclassify the vegetation unit to an association it was ranked as a community in the next highest syntaxon that could be distinguished.

For the determination of the differential species (positive, positive-negative, negative and nondifferentiated) among the groups derived from the TWINSpan method, the algorithm used was that proposed by Tsiripidis et al. (2009a), as amended by Tsiripidis et al. (2009b).

For the inclusion of taxa1, as syntaxa2 diagnostic species, the articles and research papers of Micevski (1963, 1964, 1969), Quezel (1964, 1967, 1969), Horvat et al. (1974), Raus (1980), Bergmeier (1990), Oberdorfer (1990), Papastegiadou (1990), Mucina (1997), Petermann (1999), Tzonev (2009), Fotiadis et al. (2014), and Mucina et al. (2016) were used. It should be noted that, in comparison with Fotiadis et al. (2018; 2019), a few modifications have occurred in the final syntaxonomic table as a result of the first comprehensive phytosociological survey of aquatic vegetation in the main freshwater lakes of Greece published by Zervas et al. (2020) in which Lesser Prespa was also included, the publication of Pladias database (Chytrý et al., 2021), and the publication of the first syntaxonomic overview of the PhragmitoMagnocaricetea class at association level by Landucci et al. (2020). The nomenclature of the vegetation units was determined, where possible, according to the codes of Barkman et al. (1986), Weber et al. (2000), and Theurillat et al. (2020).

3.4. Mapping methodology

For the mapping of the respective habitat types, modern digitization techniques will be applied based on a combination of fieldwork data, vegetation classification analysis and visual interpretation. As a base map, Google Earth very high-resolution satellite images will be used as they provide an easy and cost-effective way for monitoring changes in the near future. During digitization, all the fieldwork data gathered in the field surveys (e.g., coordinates, vegetation sampling plots etc.) will be exploited. Maps will be produced in GIS environment, whereas the final deliverable will be both in shapefile and map format.

As in the case of the vegetation classification, the respective codes from "The Interpretation Manual of European Union Habitats" (2013) will be applied in the final maps. Same as in the case of vegetation classification, if a vegetation unit cannot be classified in a habitat type, EUNIS coding will be used (Schaminée et al., 2013).

3.4.1. Preliminary mapping

Based on the determination of the extent of the area to be covered in the field survey and considering the collected data regarding the habitat types occurring within the Prespa National Park, expert's judgement and visual interpretation of very high-resolution satellite images a preliminary habitat map will be created. This preliminary habitat map will be used in the field to guide survey efforts. In addition, land accessibility will be taken into consideration.

3.5. Evaluation of habitat types conservation degree

The conservation degree per relevé and grid cell (10 x 10 km) was estimated using three categories of criteria (European Commission 2011, Kotzageorgis et al. 2015, Chrysopolitos et al., 2015):

- Conservation degree of structure: The current state of habitat type structures and functions, including the completeness of typical species.
- Conservation degree of functions: An assessment of the prospects for maintaining the structures and functions of the habitat type.
- Restoration possibility: The possibility of the restoration of structures and functions and typical species of the habitat type, from a scientific and technocratic point of view. The conservation degree was calculated by combining the methodology proposed by Evans & Arvela (2011) and that followed for completing the SDF (European Commission 2011), based on the following eight criteria in particular:
 - Criterion 1. Conservation degree of typical species
 - Criterion 2. Conservation degree of specific structure and functions
 - Criterion 3. Future trend of structure and functions
 - Criterion 4. Future status of structure and functions
 - Criterion 5. Area cover by the habitat type compared to reference value
 - Criterion 6. Future trend of area cover by the habitat type
 - Criterion 7. Future trend of area cover by the habitat type compared to reference value
 - Criterion 8. Restoration possibility

For each of these criteria the degree of conservation (based on field protocols, see header data in Annex I) was calculated to be:

- A: Excellent conservation degree (A)
- B: Good conservation degree (B)
- C: Moderate or limited conservation degree (C) = all other combinations.

Based on the combination of the above criteria, three main groups of criteria results: (Group A) 'Existing conservation degree of structures and functions' (Final evaluation of structures and functions), resulting from the combination of criteria 1, 2 and 5:

- Excellent Conservation Degree (A): when both the Typical Types parameter and the Structure and Functions parameter are at Extremely Good Conservation degree
- Good Conservation Degree (B): when at least one of the two parameters (Typical species or Structure and Functions) are of Good Conservation Degree and no parameter are at Moderate Conservation Level,
- Moderate or Limited Conservation Degree (C): when at least one of the two parameters (Typical species or Structure and Functions) are at Moderate Conservation Level, or
- Unknown Conservation Degree (X): when one of the two parameters (Typical Species or Structure and Functions) are of Good Conservation Degree and the other is at an unknown Preservation Degree, or both are at an unknown Conservation Degree. (Group B) 'Prospects

for maintaining structures-functions and extent' (Final evaluation of structure and functions perspectives), resulting from the combination of the existing conservation degree calculated above, and criteria 3 and 4 as well as criteria 5, 6 and 7:

Area cover (Criterion 5, 6, 7)	Future trend (Criterion 3)	Future status (Criterion 4)	Conservation prospects
A	A	A	A
A	B	A	A
A	B	B	B
A	B	X	B
A	C	B	C
A	C	C	C
A	C	X	C
A	X	A	A
A	X	B	B
A	X	C	C
A	X	X	X
B	A	A	A
B	A	B	B
B	A	X	B
B	B	B	B
B	B	C	C
B	B	X	B
B	C	B	B
B	C	C	C
B	C	X	C
B	X	B	B
B	X	C	C
B	X	X	X
C	A	A	A
C	A	B	B
C	A	C	C
C	A	X	C
C	B	B	B
C	B	C	C
C	B	X	C
C	C	C	C
C	C	X	C
C	X	A	B
C	X	B	B
C	X	C	C
C	X	X	X
X	A	A	A
X	A	B	B
X	A	C	C
X	A	X	X
X	B	A	B
X	B	B	B
X	B	C	C
X	B	X	X
X	C	A	B
X	C	B	B
X	C	C	C
X	C	X	X
X	X	A	X
X	X	B	X
X	X	C	X
X	X	X	X

The above results give the following combination:

- Excellent (A)
- Good (B)

- Moderate or limited (C)
- Unknown (X)

(Group C) Possibility for rehabilitation, which was estimated per sampling plot by the person conducting the sampling (criterion 8).

The final calculation of the conservation degree per relevé is shown as follows:

Final degree of structure-function conservation (Group A)	Conservation prospects (Group B)	Restoration possibility (Group C)	Conservation degree
A	A	Easy	A
A	A	Possible with an average effort	A
A	A	Difficult or impossible	A
A	A	Unable to assess	A
A	B	Easy	A
A	B	Possible with an average effort	A
A	B	Difficult or impossible	A
A	B	Unable to assess	A
A	C	Easy	A
A	C	Possible with an average effort	A
A	C	Difficult or impossible	A
A	C	Unable to assess	A
A	X	Easy	A
A	X	Possible with an average effort	A
A	X	Difficult or impossible	A
A	X	Unable to assess	A
B	A	Easy	A
B	A	Possible with an average effort	A
B	A	Difficult or impossible	A
B	A	Unable to assess	A
B	B	Easy	B
B	B	Possible with an average effort	B
B	B	Difficult or impossible	B
B	B	Unable to assess	B
B	C	Easy	B
B	C	Possible with an average effort	B
B	C	Difficult or impossible	C
B	C	Unable to assess	C
B	X	Easy	X
B	X	Possible with an average effort	X
B	X	Difficult or impossible	X
B	X	Unable to assess	X
C	A	Easy	B
C	A	Possible with an average effort	B
C	A	Difficult or impossible	C
C	A	Unable to assess	X
C	B	Easy	B
C	B	Possible with an average effort	C
C	B	Difficult or impossible	C
C	B	Unable to assess	C
C	C	Easy	C
C	C	Possible with an average effort	C

Final degree of structure-function conservation (Group A)	Conservation prospects (Group B)	Restoration possibility (Group C)	Conservation degree
C	C	Difficult or impossible	C
C	C	Unable to assess	C
C	X	Easy	X
C	X	Possible with an average effort	X
C	X	Difficult or impossible	C
C	X	Unable to assess	X
X	A	Easy	B
X	A	Possible with an average effort	B
X	A	Difficult or impossible	X
X	A	Unable to assess	X
X	B	Easy	B
X	B	Possible with an average effort	X
X	B	Difficult or impossible	X
X	B	Unable to assess	X
X	C	Easy	X
X	C	Possible with an average effort	X
X	C	Difficult or impossible	X
X	C	Unable to assess	X
X	X	Easy	X
X	X	Possible with an average effort	X
X	X	Difficult or impossible	X
X	X	Unable to assess	X

Based on the conservation degree of the sampling plots falling in each cell, the conservation degree of the habitat type for each cell (as well as for the whole research area) was calculated as follows:

Conservation degree = A (good conservation)	Conservation degree = B (moderate conservation)	Conservation degree = C (bad or limited conservation)
If a percentage greater than, or equal to, 75% of the sampling plot (SP) within a cell has an excellent conservation status	If the percentage of the SP in a cell having an excellent degree of conservation is less than 75% and the percentage of SP having a moderate conservation degree is less than 25%	If a percentage greater than, or equal to, 25% of the SP within a cell has moderate degree of conservation

For those cells that have not been sampled, the assessment of their conservation degree has been evaluated based on estimation and fieldwork experience. Identification of important biodiversity areas

4. Grassland Habitat types of the “Prespa” National Park

The analyses of the ecological and phytosociological data collected on relevés and linear transects observed during the year 2022 and 2023 result in identification of seven habitat types in the herbaceous vegetations (see Table 2). Two other habitat types (4060: Alpine and Boreal heaths and 5210: Arborescent matorral with *Juniperus* spp.) are listed in described in the forested habitat types of the park (see the report: Habitats survey in Prespa National Park (PNP), D6), despite of their mixed compositions with high presence of herbaceous species but with dominance of arborescent and boreal heaths species.

Table 4.1. Identified habitat types in the Prespa National Park based on field observations and data analyses.

Habitat Code	Habitat Name
4060	Alpine and Boreal heaths
5210	Arborescent matorral with <i>Juniperus</i> spp.
6110	* Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albis
6170	Alpine and subalpine calcareous grasslands
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates(<i>Festuco-Brometalia</i>) (* important orchid sites)
6220	*Pseudosteppe with grasses and annuals Thero-Brachypodietea
6520	Mountain hay meadows
8120	Calcareous and calcshist screes of the montane to alpine levels (<i>Thlaspietea rotundifolii</i>)
8210	Calcareous rocky slopes with chasmophytic vegetation

The group of experts decided to classify the herbaceous habitat type that lie in the Cerja-Rakicka depression under the code 6220 due to presence of some species characteristic of it, such as *Acanthus caroli-alexandri*, *Erodium guicciardii*, *Phlomis tuberosa*, *Tremastelma palaestinu*, *Brachypodium distachyon*, *Bromus hordeaceus* or *Tuberaria guttata* in contrast to the habitat type 6210 that lie around Makro Prespa Lake. Despite the fact that several species of orchids occur in this habitat type, none of them have the largest population in Albania, the observation of two years (2022-2023) showing the populations of these species are increasing compared to 15 years ago. So, for the management reasons, we decide that the grasslands around Makro Prespa Lakes to include within the Habitat type: Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) with code 6210 and not in habitat type: *Pseudosteppe with grasses and annuals *Thero-Brachypodietea* with code 6220 like in Cerja-Rakicka depression. All habitat types recorded in the grasslands of “Prespa” NP are described below in details.

4.1. 6110 * Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albis

Mapped area: 224.1835427 ha | **Conservation degree:** Favorable (FV)

Number of relevés: 7 | **Average species richness:** 24.7 +/-3 taxa per plot

Description: Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albis occurs in xerothermophile areas on superficial calcareous or base-rich soils, inhabited mostly by succulent plants such as that of genus *Alyssum*, *Sedum*, *Sempervivum* or *Saxifraga*. This habitat types cover small surface in the PNP above 1700 m altitude in the limestone ridges of the Dry Mt and Ivani Mt too.

Value: The plants that dominate Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albis are with high conservation interest due to adaption to the harsh or stressed environment. Being under the high risk of high intensity of light, winds and drought stress, the plants of this habitat are morphologically adapted and still vegetated the limestone ridges of northern, eastern or south-eastern slopes of Dry and Ivani Mts. Most of the plants on this habitat type are Balkan endemics or local endemics e.g., *Sedum atrorubens*, *Sempervivum ciliosum*, *Edraianthus horvatii*, *Arabis bryoides*, *Astragalus mayeri*, *Cerastium decalvans*, *Iris aphulla*, *Thymus ciliatopubescens*, *Paronychia macedonica* etc.



Image 4.1. The habitat type 6110 - * Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albis (*Sempervivum ciliosum*) in Ivani Mt.

Conservation and P. & T.: The significant pressures and threats for this habitat type, recorded during filled observation, is climate change and animals. Wild Boars, eating rhizomes of

some plants (e. g. *Sempervivum* and *Iris aphylla*), have dug and destroyed large areas of habitat type in the ridges of Ivani Mt and above Djellas village. Climate change can have also in the future a negative impact on the habitat conservation.

Floristic composition: The dominant species of the habitat type are *Jovibarba hirta*, *Alyssum alyssoides*, *Asplenium trichomanes*, *Sedum atrorubens*, *S. album*, *S. acre*, *Sempervivum ciliatum* with additional species such are: *Leontodon crispus*, *Acinos alpinus*, *Anthyllis vulneraria*, *Draba athoa*, *Minuartia verna*, *Myosotis alpestris*, *Sesleria rigida*, *Achillea coarctata* or *Daphne oleoides*.

Syntaxonomy:

Class: *Asplenetea trichomanis* Br.-Bl. 1934 cor Oberd. 1977

Order: *Potentilletalia Caulescentis* Br.-Bl. 1926

Alliance: *Satyrejo-Thymion* Micev. 1970

Management proposals: The overall conservation degree of the habitat type is not good, so a temporary and directed permission to hunt the wild Boars is needed.



Image 4.2. The habitat type 6110 - * Rupicolous calcareous or basophilic grasslands of the Alyso-Sedion albis in the south of Pllaja e Pusit peak.

Map 4.1. Distribution and conservation degree of the habitat type 6110 in the Prespa National Park.

4.2. 6170 Alpine and subalpine calcareous grasslands

Mapped area: 3076.225182 ha | **Conservation degree:** Favorable (FV)

Number of relevés: 9 | **Average species richness:** 36.8 +/- 1.5 taxa per plot

Description: Alpine and subalpine calcareous grasslands habitat in Prespa NP lie in both subalpine and alpine belt of Dry and Ivani Mts and represented by meso-xerophile and xero-thermophile grasslands on limestone substrate or base-rich soils. The largest surface of this habitat is dominated from stable xerothermophilous formations on well-drained, warm, dry and sunny slopes of the upper part of Dry Mt.

Value: Alpine and subalpine calcareous grasslands habitat represent the largest grassland habitat in the PNP and is considered with high conservation significance because it is a specialized habitats adapted to a specific stressed environment. It is also important because its cover vegetation is a very good barrier that prevent erosion and host rare and endangered plant species such as *Alkanna noneiformis*, *Chamaecytisus pseudojankae*, *Crocus cvijicii*, *Cynoglossis barrelieri* subsp. *serpentinicola*, *Oxytropis dinarica* subsp. *weberii*, *Sideritis raeseri*, *Siler zernyi* subsp. *ochridanum*, *Viola aetolica*, *V. eximia* subs. *tringiana*. This habitat types are important also for some animals and threatened invertebrates as well as terrestrial gastropods.



Image 4.3. *Cattania (Cattaniella) thateensis* (endemic) and *Satyrium spini*, two important invertebrate species of the habitat type, Alpine and subalpine calcareous grasslands in the central part of Dry Mt.

Conservation and P. & T.: From current point of view the habitat is well conserved but being in the border of two biogeographic regions it is under the influence of climate change. The habitat faces also severe adverse impacts from extreme droughts and low precipitation

rate, significantly jeopardizing its overall conservation. However, the conservation degree of habitat Alpine and subalpine calcareous grasslands is assessed as Favorable (FV).

Floristic composition: The dominant species of the habitat type are: *Acinus alpinus*, *Achillea ageratifolia*, *Anthyllis aurea*, *Astragalus sirinicus*, *Brachypodium pinnatum*, *Cynoglossis barrelieri* subsp. *serpentinicola*, *Dianthus minutiflorus*, *Dianthus cruentus*, *Festuca heterophylla*, *Fritillaria montana*, *Galanthus reginae-olgae*, *Gentiana verna*, *Hieracium cymosum* agr, *Helianthemum nummularium*, *H. canum*, *Iberis sempervirens*, *Koeleria splendens*, *Onobrychis alba*, *Oxytropis dinarica* subsp. *weberii*, *Poa alpina*, *Polygala alpestris*, *Primula veris*, *Sesleria coerulans*, *Silene italica*, *Thymus boissieri*, *Thymus ciliatopubescens*, *Trifolium alpestris*, *Teucrium montanum*, *Trinia dalechampii*, *Viola aetolica* etc.



Image 4.4. The habitat type 6170 - Alpine and subalpine calcareous grasslands in the central part of Dry Mt.

Syntaxonomy:

Class: *Elyno-Seslerietea* Br. Bl. 1948

Order: *Onobrychido-Festucetum* (Horv.) Mic.1994

Alliance: *Onobrychido-Festucion* Ht. 1960

Management proposals: To safeguard some parts of habitat, it is necessary to implement a grazing management plan, most urgent action should be carried out in the north-east edge of the park, above Pikina Voda and on the south of the highest peak of Dry Mt. Regular monitoring of the pastures in order to prevent fires during period July-September is also advisable.



Image 4.5. The habitat type 6170 - Alpine and subalpine calcareous grasslands in the central part of Dry Mt.

Map 4.2. Distribution and conservation degree of the habitat type 6170 In the Prespa National Park.

4.3. 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)

Mapped area: 208. 0191159 ha | **Conservation degree:** Inadequate (U1)

Number of relevés: 7 | **Average species richness:** 51 +/- 18 taxa per plot

Description: Habitat type, Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) is distributed in low altitudes of Prespa NP (Around Kallamas Village, Biglla and on the nE of Zvezda pass) and it is represented by dry to semi-dry calcareous grasslands of the Festuco-Brometea class. Moreover, this habitat type is home of several orchid species (Orchidaceae), most of which are legal protected species from the international convention and directives, like Bern convention, Habitat Directive Convention on International Trade in Endangered Species of Wild Fauna and Flora. This habitat often is mixed with floristic elements of steppic or subcontinental grasslands or the

grasslands of more oceanic and sub-Mediterranean regions (NATURA 2000, 2013), overall favored by geographic position, the Lakes and climate of the park. Habitat occurs around Makro Prespa Lake and Zvezda Pass.

Value: The habitat type is of high conservation interest because it is a characteristic and specialized feature of the transition zone between Mediterranean and continental climate. The habitat is important due to supporting high biodiversity values and threatened species such as *Morina persica*, *Goniolimon tataricum*, *Anacamptis morio*, *A. papilionaceae*, *A. pyramidalis*, *Orcis ustulata*, *O. purpurea*, *Ophris scolopax*, *O. sphegodes* as well as important plant communities for ecosystem services and Butterflies and Birds.



Image 4.6. The habitat type 6210 is quite important for the Butterflies fauna.

Conservation and P. & T.: No significant pressures and threats were recorded for this habitat type during last 10-years, excluding same parts of the habitat above Gorrica e Madhe village and above Kallamas. The overgrazing that was frequent before years 2000, now does not exist anymore and the nature is self-regenerated.

Floristic composition: The dominant species of the habitat: Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) are *Anthyllis vulneraria*, *Achillea millefolium*, *Arabis hirsuta*, *Brachypodium pinnatum*, *Campanula glomerata*, *Carex caryophylla*, *Carlina vulgaris*, *Centaurea salonitana*, *Convolvulus althaeoides* subsp. *tenuissimus*, *Cynoglossis barrelieri* subsp. *serpentinicola*, *Dianthus carthusianorum*, *Eryngium campestre*, *Koeleria pyramidata*, *Leontodon crispus*, *Medicago sativa* subsp. *falcata*, *O. ustulata*, *O. purpurea*, *Anacamptis morio*, *A. papilionaceae*, *A. pyramidalis*, *Polygala nicaeensis*, *Sanguisorba minor*, *Scabiosa columbaria*, *Veronica chamedrys*, *Bromus erectus*, *Adonis flammea*, *Euphorbia myrsinites*, *Silene conica* etc.

Syntaxonomy:

Class: *Asplenetea trichomanis* Br.-Bl. 1934 cor Oberd. 1977

Order: Potentilletalia Caulescentis Br.-Bl. 1926 Astragalo - Potentilletalia

Alliance: Satyrejo-Thymion Micev. 1970

Management proposals: Due to high biomass accumulation in some parts of the habitat (e.g., Biglla area and the Maligradi Island) can be cause of the fires, so regular monitoring and early detection can prevent it or reduce the damages. Applying of a periodical grazing regime in the core zone and in some other meadows out of it is recommended too. Establishment a pasture regime is needed to apply also in the pastures on the north-east of Gorrica e Madhe village in order to reduce the high impact of overgrazing in this part of habitat type.



Image 4.7. The habitat type 6210 - Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (*important orchid sites) in Kallamas peninsula.



Image 4.8. The habitat type 6210 -Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) above Gorrica e Madhe village.

Map 4.3. Distribution and conservation degree of the habitat type 6210 In the Prespa National Park.

4.4. 6220 *Pseudosteppe with grasses and annuals Thero-Brachypodietea

Mapped area: 153.953011 ha | **Conservation degree:** Inadequate (U1)

Number of relevés: 7 | **Average species richness:** 60.3 +/- 9 taxa per plot

Description: Habitat type Pseudosteppe with grasses and annuals Thero-Brachypodietea within Prespa NP where localized in the depressions of the south-east part of the Prespa NP, only in dry limestone grasslands. This habitat type is characteristic for the park because it is distinguished for the presence of steppic or subcontinental floristic elements or the grasslands of more oceanic and sub-Mediterranean regions. Habitat is also distinguished for the occurrence of some orchid species typical for the habitat type, *Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)*, overall

favorited by geographic position, the Lakes and climate of the park. Habitat occurs along the depression of Cerja-Rakicka area, and around Mikro Prespa Lake. In this habitat there are found also some interesting species of the Albanian flora with narrow distribution range only in the Prespa NP.

Value: Despite of its small cover surfaces in the south-east edge of Prespa NP, floristically it is rich with species and some extremely rare species for the flora of Albania and Balkan too. The habitat is important because it is home of *Erodium guicciardii*, *Phlomis tuberosa*, *Salvia ringens*, *Morina persica*, *Acanthus caroli-alexandri* as well as important plant communities for ecosystem services and the inhabitants of local communities.

Conservation and P. & T.: No significant pressures and threats were recorded for this habitat type, excluding same parts on the north-east of Rakicka village. The migration of the inhabitants of the villages Cerje, Rakicka and Shuec, has reduced their impact on the environment, so currently the habitat is under the effect of biomass accumulation and the risk of fires.

Floristic composition: Despite of its small cover in the south-east edge of Prespa NP, floristically it is rich with species, some of that extremely rare for the flora of Albania and Balkan too. Dominant species of the habitat are *Aira elegantissima*, *Brachypodium distachyon*, *Bromus hordeaceus*, *Tuberaria guttata*, *Filago germanica*, *Bellis annua*, or other species of dry grasslands and Mediterranean steppes such as *Trifolium campestre*, *Asphodeline lutea*, *Convolvulus althaeoides*, *Hyparrhenia hirta*, *Convolvulus cantabrica*, *Centaurea grisebachii*, *Dictamnus albus*, *Fritillaria thesala*, *Stipa capillata*, *Erodium guicciardii*, *Hypericum olympicum*, *Jurinea mollis*, *Medicago sativa* subsp. *falcata*, *Scandix australis*, *Silene conica*, *Allium nigrum*. Within the territory of the habitat often can be found also several synanthropics or early-successive annuals like *Echinops sphaerocephalus*, *Papaver rhoeas*, *Geranium molle*, *Anthemis arvensis*. Plant communities are dominated by *Carlina corymbosa*, *Centaureum erythraea*, *Trifolium stellatum*, *Anthemis chia*, *Arenaria leptoclados*, *Galium verum*, *Parentucellia latifolia*, *Scandix australis*, *Sherardia arvensis*, *Echium italicum*, *Cynosurus echinatus*, etc.

Syntaxonomy:

Class: Class: *Festuco-Brometea* Br.-Bl. et R. Tx. 1943

Order: *Astragalo – Potentilletalia* Micev. 1970

Alliance: *Satyrejo-Thymion* Micev. 1970

Management proposals: Habitat type Pseudosteppe with grasses and annuals Thero-Brachypodietea is well conserved so far, but in order to avoid further biomass accumulation in upper part of Kallogjeri peak and around Cerja village a grazing regime is needed aimed to reduce the accumulated biomass. As in other habitat types of Prespa NP, the coordination efforts between local communities and park administration should be increased in order to minimize the risk of wildfire. Regular monitoring should be established during the summer period around Cerja village because the forests around the villages have been burned during last 10-years, this is helped by the lack of local residents and the lack of real-time information.



Image 4.9. The habitat type 6220 - *Pseudosteppe with grasses and annuals Thero-Brachypodietea between Cerja and Rakicka villages.



Image 4.10. The habitat type 6220 - *Pseudosteppe with grasses and annuals Thero-Brachypodietea on the north-west of Cerja Village.

Map 4.4. Distribution and conservation degree of the habitat type 6220 In the Prespa National Park.

4.5. 6520 Mountain hay meadows

Mapped area: 350.420595 ha | **Conservation degree:** Favorable (FV)

Number of relevés: 6 | **Average species richness:** 35 +/- 3 taxa per plot

Description: Mountain hay meadows refer to the mesophile pastures of the alpine region of the Dry Mt, distributed in the alluvial montane depressions or small valleys above tree line with deep soil. This habitat type is typically grown exclusively on limestone substrates at the northeast edge of the park or so called Gropat e Palates and in the Central part of Dry Mt, above beech forest in the eastern exposition of the Dry Mt.

Value: Despite the fact that the habitat covers a small surface, from the point of view of Flora and plant communities, it is with quite community and conservation interest as well as for the future of Prespa ecosystem. The habitat is important for mammals, birds and invertebrate of Prespa NP and home of several local plant endemics like *Festuca galicicae* and *Crocus cvijicii* or other plant species such as *Dianthus carthusinorum*, *Fritillaria montana*, *Primula veris*, *Tulipa sylvestris* or *Viola aetolica*.

Conservation and P. & T.: Generally, the current state of the habitat type is assessed as Favorable (FV) compared with years 1980-2000, time during which the grazing and mowing of the herbaceous species has been annually, resulting in suboptimal conservation levels of the plants. The reduction of precipitation and their irregularity, especially outside of vegetation period accompanied with the increase of temperatures and drought, may have an increased negative impact in the future.

Floristic composition: The dominant species of the habitat type are *Festuca galicicae*, *Festuca paniculata*, *Festuca hirtovaginata*, *Festuca hercegovinica*, *Bromus squarrosus*, *Koeleria splendens*, *Nardus stricta*, *Poa alpina*, *Trisetum flavescens*, *Cynosurus echinatus*, *Galium verum*, *Phleum alpinum*, *Achillea millefolium*, *Thymus longicaulus*, *Trifolium alpestre*, *T. repens*, *T. scabrum*, *Carex laevis*, *Carex nigra*, *Crocus cvijicii*, *Dianthus degenii*, *D. carthusinorum*, *Fritillaria montana*, *Primula veris*, *Stachys germanica*, *Taraxacum officinale*, *Tulipa sylvestris* or *Viola aetolica*.

Syntaxonomy:

Class: *Caricetea Curvulae* Br.-Bl. 1948

Order: *Onobrychido-Seslerietalia* Ht. 1949

Onobrychido-Festucion Ht. 1960

Alliance: *Poion Violaceae*

Management proposals: To address the imminent challenges posed by climate change, proactive steps should be taken to mitigate the risk of wildfires, supporting also from the high

dried biomass accumulated in several parts of habitat type. This includes the implementation of pastoralism regime every 3-years in this habitat type or others. The establishment of a grazing regime is urgent for Core Zone (Gropat e Palates) of PNP where the accumulated dry biomass during the years is high and can cause accidental fires.



Image 4.11. The habitat type 6520 - Mountain hay meadows in the southern part of the Dry Mt.



Image 4.12. The habitat type 6520 - Mountain hay meadows in the central part of the Dry Mt.

Map 4.5. Distribution and conservation degree of the habitat type 6520 in the central part of the “Prespa” NP.

4.6. 8120 Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*)

Mapped area: 21.13426782 ha | **Conservation degree:** Bad (U2)

Number of relevés: 6 | **Average species richness:** 19 +/- 2.5 taxa per plot

Description: The habitat type: Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*) cover very small surfaces in the eastern, south-eastern and north-eastern ridges of Dry Ivani Mt below the Buncer, as well as in the north-east of Pllaja e Pusit peak and above Gropat e Palates. Compared with high limestone screes on the other parts of Albania they possess some differences in the floristic composition where the typical species of the scree such as *Thlaspi rotundifolia*, *Doronicum columnae*, *Senecio thapsoides* or *Drypis spinosa* are accompanied with some others, resulting from the specific ecological indicators in Dry Mt. The screes of Dry Mt have lost typical species like *Campanula hawkinsoniana*, *Arenaria serpentini*, *Cardamine glauca* or *Viola magellensis*. Generally, the calcshist screes of Dry Mt are stabilized, excluding two relevés in the north-east part of the park, above the Gropat e Palates.

Value: Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*) are ecologically significant because they provide a favorable environment for

a group of plants and animal species adapted to the dried and sonny exposition. Some of them (e.g., *Oxytropis purpurea*, *Sempervivum ciliosum*, *Viola eximia*) are subendemics and indicator of the ecosystem future. This habitat type is important also for maintaining biodiversity and supporting various ecosystem services, despite of the small area that they cover within the Prespa NP.

Conservation and P. & T.: The principal challenges faced to the most parts of this habitat types are the current state of stabilized screes in which the competition with species of other habitats (such as the species of habitat types 6170) is in high degree. The opening of protective tranches before years 1990 has destroyed parts of this habitat around two main peaks of Dry Mt. The repercussions of this historical intervention still evident today, manifested through both the floristic composition and loss of landscape values.

Floristic composition: The dominant species of the habitat type are *Arenaria serpyllifolia*, *Aethionema saxatile*, *Draba athoa*, *Drypis spinosa*, *Doronicum columnae*, *Leontodon crispus*, *Oxytropis purpurea*, *Senecio thapsoides*, *Thlaspi rotundifolium*, *Arabis alpina*; *Acinos alpinus*, *Minuartia verna*, *Rumex scutatus*, *Sideritis raeseri*, *Thymus ciliatopubescens*, *Valeriana montana*, *Viola eximia*.

Syntaxonomy: Class: *Thlaspietea rotundifolii* Br.-Bl. 1948
Order: *Drypidetalia spinosae* Quezel 1964
Alliance: *Drypion spinosae*
Campanulion versicoloris Quezel 1964



Image 4.13. The habitat type 8120 - Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*) in the north-eastern part of the PNP.



Image 4.14. Stabilised scree of the habitat type 8120 - Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*) in the eastern part of the PNP.

Management proposals: Priority actions to this habitat types should be regeneration practices through intervention and rehabilitation of the habitat parts destroyed by the opening of military protective trenches before years 1990. The intervention practices should guarantee the protection of the dominant and indicator species of this habitat.

Map 4.6. Distribution and conservation degree of the habitat type 8120 In the Prespa National Park.

4.7. 8210 Calcareous rocky slopes with chasmophytic vegetation

Mapped area: 16.5486197 ha | **Conservation degree:** Inadequate (U1)

Number of relevés: 7 | **Average species richness:** 19.6 +/- 3.5 taxa per plot

Description: Calcareous rocky slopes with chasmophytic vegetation are specialized habitats for species that are adapted to the rocky slopes, exposed to the sun using the water and soil that is deposited in its crevices. Since the habitat extends along the shore of the lakes, its flora and vegetation are influenced by the high air humidity, favoring the cover of shrubs on the fissures and rocky slope crevices, which is more obviously in the slopes exposed to the north and north-east faces. Calcareous rocky slopes along lake shores of Prespa often are vegetated by shrubby species like Wild Almond (*Prunus webbii*), Greek Juniper (*Juniperus excelsa*) and Oriental hornbeam (*Carpinus orientalis*). The different

geographical exposition of the limestone rocky slopes in PNP have differentiated to types of vegetation cover on that, thermo- and meso-Mediterranean and montane and oroMediterranean chasmophytic vegetation, depending from the altitude and distance from the lakes.

Value: Habitat type, Calcareous rocky slopes with chasmophytic vegetation in the Prespa NP is distinguished for its great species diversity, with several local endemic plant (*Centaurea shumkana*, *C. galicicae*, *C. graeca*, *C. soskae* subsp. *albida*, *C. triniifolia* subsp. *campylacme*, *Heliosperma chromodonta*, *Micromeria cristata* subsp. *kosaninii*). Calcareous rocky slopes with chasmophytic vegetation in the PNP are ecologically significant also because they provide a unique and important habitat for fauna of invertebrates (*Cattania thateensis*, *Helix philibiniensis*) and serve as nesting sites for the birds of lakes.

Conservation and P. & T.: Habitat type, Calcareous rocky slopes with chasmophytic vegetation represent the richest habitat with endemic and subendemic species in the Prespa NP. However, due to mismanagement actions, the current conservation degree of the habitat is assessed as Inadequate (U1) and Bad (U2), because the pressures and threats on Habitat (e.g., Shifting and alteration, reduced fecundity/ genetic depression in plants and Climate change) are in medium or high level. The main pressure and threats are habitat Shifting and alteration, that means occupation of the herbaceous layer in the rocky slopes along Gollomboci peninsula and along Osoja Lake shore by shrubby and woody species.

Floristic composition: The dominant species of the habitat type are *Arabis bryoides*, *Asperula doerfleri*, *Asplenium trichomanes*, *Campanula versicolor*, *Centaurea graeca*, *Edraianthus horvatii*, *Heliosperma chromodonta*, *Potentilla speciosa*, *Silene parnassica*, *Saxifraga marginata*, *Saxifraga paniculate*, *Saxifraga tridactylites*, *Scrophularia heterophylla*, *Sedum magellense* etc.

Syntaxonomy:

Class: *Asplenetea Trichomanis* Br.-Bl. 1934 cor Oberd. 1977

Order: *Astragalo - Potentilletalia*

Alliance: *Campanulion versicoloris*

Management proposals: Since the Calcareous rocky slopes with chasmophytic vegetation in Gollombocii penninsua and Osoja are important sites for several *Centaurea* species and other local endemics (listed above), we propose as the emergent management action intervention through clearing of shrub and woody species only in the sites where there are endemic/subendemic species.



Image 4.15. The habitat type 8210 - Calcareous rocky slopes with chasmophytic vegetation below Ballmaqi Peak.



Image 4.16. The habitat type 8210 - Calcareous rocky slopes with chasmophytic vegetation in Lesser Prespa.

Map 4.7. Distribution and conservation degree of the habitat type 9180 In the Prespa National Park.

The above results on **Habitat Types and Conservation degree** are summarized and presented in the table 4.2. The table shows the conservation degree of habitat types, resulted from the analyses of 49 relevés (quadratic plots) (see annex 1) and linear plots estimated in the field during summer of the year 2022 and spring to September 2023.

Table 4.2. Conservation degree for habitat types

Habitat Code	Name of Habitat Types	The conservation degree of Habitats	Nr. of relevés
6110	* Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albis	Favorable (FV)	7
6170	Alpine and subalpine calcareous grasslands	Favorable (FV)	10
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	Inadequate (U1)	7
6220	*Pseudosteppe with grasses and annuals Thero-Brachypodietea	Inadequate (U1)	6
6520	Mountain hay meadows	Favorable (FV)	6
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	Bad (U2)	6
8210	Calcareous rocky slopes with chasmophytic vegetation	Inadequate (U1)	7

Regardless of the fact that the cover surface of some habitat types is very small and the number of relevéd plots (49) is low, as well as relying on the previous experience gathered on periodic field observations during last 17-year below (Dieterich et al. 2011, Shumka et al. 2014, Shuka et al. 2022 & 2023) we have assessed the **Conservation Status** of grassland habitats in "Prespa" NP.

According to the Directive 92/43/EEC, the overall Conservation Status of the grassland Habitat Types of the "Prespa" NP were calculated based on the future values of the **parameters Area** (the total surface area in a given biogeographical region considered as the minimum area necessary to ensure the longterm viability of the habitat type the total surface area in a given biogeographical region considered as the minimum area necessary to ensure the longterm viability of the habitat type) **and Range** (range within which all significant ecological variations of the habitat type is included for a given biogeographical region and which is sufficiently large to allow the long term survival of the habitat) as well as **Structures and Functions** and **Future prospects**.

Table 4.3. Evaluation matrix for the overall assessment of conservation status for habitat types, through the combination of the assessments of the four parameters: range, area, structures and functions and future prospects.

Parameter	Habitat Type						
	6110	6170	6210	6220	6520	8120	8210
Range	FV	FV	U1	FV	FV	FV	FV
Area	FV		FV	U1	FV	U1	FV
Structures and Functions (including typical species)	FV	FV	FV	FV	FV	U1/U2	U1
Future prospects (range, area and specific structures and functions)	FV/U1	FV	U1	U1	FV	X	U1
Overall conservation status	FV	FV	U1	U1	FV	U2/X	U1
Favourable (FV), Unfavourable - Inadequate (U1), Unfavourable - Bad (U2), Unknown (insufficient information to assess)							

From the table 4.2, result that habitat type 8120: Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*), will decline its cover surface on its southern part of Dry Mt due to continuing process of scree stabilization and change of floristic structure, processes that can change this part of habitat towards habitat types 6170: Alpine and subalpine calcareous grasslands. However, more ecological data are needed to have a clear prospect on it. Next 10-20 years is also foreseen that habitat type 6110: * Rupicolous calcareous or basophilic grasslands of the *Alyso-Sedion albis*, can go towards the status Unfavourable-Inadequate (U1) due to the deterioration of ecological indicators, mainly abiotic ones.

5. Conservation of the Grassland Habitat types in the "Prespa" NP and Management Recommendations

5.1) Current conservation, Pressures and Threats to the Habitats of "Prespa" NP

From observations in the field during linear and relevés, all human impacts and pressures, presence or not of invasive species, presence or not of the infections or the impact of ecological/abiotic indicators were also recorded and assessed in order to estimate their impact on species/habitat conservation. All pressures and threats to the species/habitats that have been recorded in the Prespa ecosystem are presented in the table 5.1.

Table 5.1. List of Pressures and Threats observed in the Habitat types of the Prespa NP								
Code of								
PT	Pressure and Threats of Habitat types		Habitat types under the Pressure and threats					
A04.01.01	Intensive cattle grazing		6210	6220				
A04.03	Abandonment of pastoral systems, lack of							
	Grazing		6170	6210	6220	6520		
A10.02	Removal of stone walls and embankments		6170					
F04	Taking / Removal of terrestrial plants, general		6170					
I01	"Invasive non native species" (animal species,							
	=wild Boars disturbance)		6110	6220				
J01	Fire and fire suppression		6170	6520	8210			
J01.03	Reduction or loss of specific habitat features		6170	6210	6220	6520	8120	
K01	Abiotic (slow) natural processes		6110	6170				
K01.01	Erosion		6110	6170	6210	6220		
K05	Reduced fecundity/ genetic depression in							
	plants (incl. endogamy)		8120	8210				
M01.02	Droughts and less precipitations		6110	6170	6210	6220	6520	8120 8210
M02.01	Habitat shifting and alteration		6170	6220	8120	8120		

According to the threats and pressures list of IUCN (2009), in the field have been recorded 12-in threats and pressures that belong to the six main groups: Agriculture, Biological resource use other than agriculture & forestry; Invasive, other problematic species and genes; Natural System modifications; Natural biotic and abiotic processes (without catastrophes) and Climate change. Six of them can be grouped within influence of abiotic indicators and the other half from the biotic ones such as human impact or impacts those results from the relationships/behaviors between plant species or plants species and communities with other animal species in their habitat. Droughts and less precipitations, reduction or loss specific habitat futures; Erosion and Abandonment of pastoral systems, lack of Grazing are the most frequent threats and pressures recorded in more than four habitat types. In the Image 5.1, is shown the influence of more than four threats and pressures.



Image 5.1. Impact of humans (bunkers and trenches), climate, erosion and drought in the alpine zone of Dry Mountain.

5.2) Restoration possibilities and Management actions recommended to the grassland Habitats of “Prespa” NP

The current conservation status of the terrestrial ecosystem of the Prespa NP show that the management measures implemented during last 10-years have significantly improved all indicators of its flora and fauna compared to 20-years ago. Despite of this, the analyses of the data collected in the field shows that some threats and pressures continue to impact the current status of Prespa natural ecosystem. Some measures implemented during this period have caused to appear the new threats in different parts of it, such was the prohibit of the grazing, in the habitat types 6170, 6520 or 6220 have enabled the occurrence of the risk of fires from the accumulation of dry biomass or the alteration of the floristic structure or function in some other habitat types (8210, Image 5.2). Furthermore, the climate change seems to be the main threat to some other subalpine and alpine habitat types.

From the current assessment, we have identified four restoration possibilities: Easy, Possible with an average effort, Difficult or impossible and Unable to assess (for more details see the Table 5.2). Some threats and pressures to the habitat types have been put under the last restoration possibilities, **Unable to assess**, because currently we cannot find any restoration possibilities or in some other cases, they are impossible.

Table 5.2. Restoration possibilities and Habitat types with localities where they were observed in the Prespa NP.

Code of Pressure and threats	Restoration possibilities	Habitat type and localities							
A04.01.01	Possible with an average effort	6210	6220	Arond villages Kallamas, Gorrica e Madhe, Djellas, Liqenas and Rakickë					
A04.03	Possible with an average effort	6170	6210	Arond Cerja village, Kallogjeri peak and alpine pastures and meadows of Dry Mt					
A10.02	Unable to assess	6170		Alpine pastures of Dry and Ivani Mt					
F04	Easy	6170	6210	Mostly in the subalpine and					
		6220	6520	alpine pastures of the Park					
I01	Easy	6110	6220	Mostly in the plant communities of <i>Alyso-Sedion albis</i> of Dry and Ivani Mt					
J01	Easy	6170	6520	8210	Within the NP				
J01.03	Difficult or impossible	6170	6210	6220	6520	8120	Almost in all Habitat types		
K01	Unable to assess	6110	6170	Generaly in the subalpine and alpine grasslands					
K01.01	Unable to assess	6110	6170	6210	6220	Almost in all Habitat types			
K05	Unable to assess	8120	8210	Generaly in the dried areas and rocky slopes					
M01.02	Unable to assess	6110	6170	6210	6220	6520	8120	8210	
				Mostly in the upper part of the Dry and Ivani Mt					
M02.01	Possible with an average effort	6170	6220	Generaly in the subalpine and alpinegrasslands					
		8120	8210	and rocky slope facies					

In order to enable and facilitate the restoration possibilities, in the table 5.2 next to the identified threat and pressure, the restoration possibility together with the locality where it should be intervened are given.



Image 5.2. The woody vegetation is a great impact to the herbaceous vegetation in the habitat 8210, due to the Habitat shifting and alteration threats.

Based on the restoration possibilities for each habitat type and each threat and pressures, the working group recommends some management activities aimed to preventing and reducing risk of threats and pressures in the respective habitat types (see Table 5.3).

Some of threats and pressures can be prevented by the actions of NP administration, while others require additional costs to ensure the structure and function of the habitat and to provide the conservation of endemic/subendemic or flag species.

Table 5.3. Management actions recommended to reduce or prevent Pressure and Threats.

Code of PT	Pressure and Threats to the Habitat types	Management actions
A04.01.01	Intensive cattle grazing	Implement a grazing management plan
A04.03	Abandonment of pastoral systems, lack of Grazing	Establishment a grazing regime (each 3-years) in the habitats with high biomass accumulation
A10.02	Removal of stone walls and embankments	No action are needed
F04	Taking / Removal of terrestrial plants, general	Licensing and monitoring of medical plants collection
I01	"Invasive non native species" (animal species, =wild Boars disturbance)	Fast and controlled licensing of wild boar hunting
J01	Fire and fire suppression	Monitoring and detection and quick intervention in extinguishing fires
J01.03	Reduction or loss of specific habitat features	a) Intervention action through clearing of shrub and woods
J01.03	Reduction or loss of specific habitat features	b) No action can be taken
K01	Abiotic (slow) natural processes	b) No action can be taken
K01.01	Erosion	No action can be taken
K05	Reduced fecundity/ genetic depression in plants (incl. endogamy)	No action can be taken
K05	Reduced fecundity/ genetic depression in plants (incl. endogamy)	Ex-situ conservation of endemic and subendemic species with narrow distribution range
M01.02	Droughts and less precipitations	No action can be taken
M02.01	Habitat shifting and alteration	a) Intervention action through clearing of shrub and woody species only in the sites where there are endemic/subendemic species
M02.01	Habitat shifting and alteration	b) No action can be taken

The recommended activities listed in the table 5.3 should be implemented next 10-years and some of them should be implemented as sun as possible such can be

- Establishment a grazing regime (each 3-years) in the habitats with high biomass accumulation
- Licensing and permitting the controlled hunting of wild boars
- Intervention action through clearing of shrub and woods in order to prevent the forest succession to the herbaceous pastures
- Intervention action through clearing of shrub and woody species in some parts of habitat type 8210 in order to conserve the endemic/subendemic species of it from habitat alteration (see image 5.2) etc.



Image 5.3. Large surface of the habitat 6110 - (*Rupicolous calcareous or basophilic grasslands of the Alyso-Sedion albis), have been destroyed by the wild Boars disturbance

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7. Annex I: Plots information

8. Annex II: Information table of Conservation degree
