



Mountain Tea

Conservation Action Plan for the Prespa Lakes' Watershed

Landscape Scale Conservation in the Prespa Lake Basin
Transboundary Species and Habitat Conservation Action Plans

The present Conservation Action Plan is the product of data analysis carried out into the framework of the project “Landscape Scale Conservation in the Prespa Lake Basin – Transboundary Species and Habitat Conservation Action Plans.

The study was funded by UNDP/GEF project “Integrated ecosystem management within the Prespa lake watershed”

Suggested bibliographical reference:

Bojadzi, A., Brajanoska, R., Stefkov, Gj., Fotiadis, G., Shumka, S. And Avukatov, V. (2012). Conservation Action Plan for Mountain tea in the Prespa Lakes Watershed (Final Report). UNDP/GEF project “Integrated ecosystem management in the Prespa lakes basin”, pp 65.

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Acknowledgments

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Abbreviations

ALB: Albania

AP: Action Plan

CAP: Conservation Action Plan

EU: European Union

GRC: Greece

IPA: Important Plant Areas

MAPs: Medicinal and Aromatic Plants

MCWG: Monitoring and Conservation Working Group

MKD: FYR of Macedonia

MoEPP: Ministry of Environment and Physical Planning

NGO: Non Governmental Organisation

NP: National Park

NTFP: non-timber forest products

PA: Protected Areas

PPCC: Prespa Park Coordination Committee

SAP: Strategic Action Plan

SPP: Society for the Protection of Prespa

TTT: Technical Task Team

TDA: Transboundary Diagnostic Analysis

TPP: Transboundary Prespa Park

UNDP: United Nations Development Program

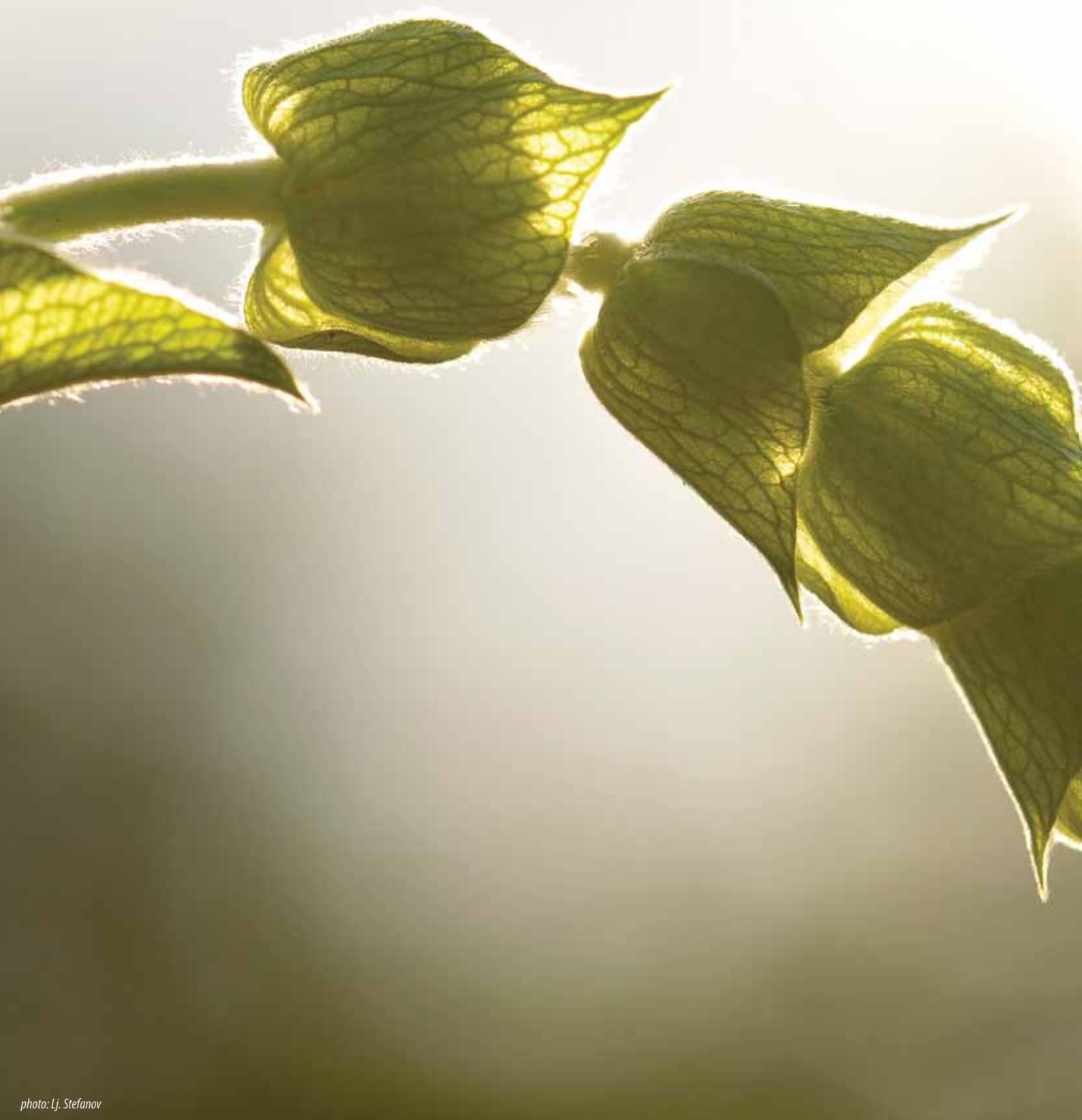



photo: Lj. Stefanov

Executive Summary



Mountain tea (*Sideritis raeseri*) is one of more than 70 medicinal and aromatic plants that are collected and traded in Prespa Region. It has great economic importance for local communities. Known since ancient Greek times, it has remained one of the most popular tea types used in Albania, Greece and the former Yugoslav Republic of Macedonia for curing respiratory and digestion problems, and boosting the immune system due to its antioxidant potential.

Mountain tea is a sub-endemic perennial species with limited distribution in Albania, Greece and the former Yugoslav Republic of Macedonia. In Prespa region it is distributed on the rocky limestone areas with shallow soils from 1000 m up to 2000 m a.s.l, especially on Galichica Mt. (in the MKD part), the mountains Sfika and Vrontero (in GRC part) and Mali e Thate (in AL part).

It was selected as priority species in need of urgent conservation management interventions due to its threatened status, triggered by high human pressure. In fact, the main identified threats of mountain tea are: overexploitation and uncontrolled and inappropriate collection due to insufficient/inappropriate legislation; lack of enforcement of legislation; overlapping of the responsibilities of different institutions; lack of knowledge and low awareness among key stakeholders and the general public; and lack of capacities among relevant institutions to establish a system of control. In Albania, overgrazing in the early stage of vegetation succession is also identified as one of the threats to the Mountain tea population. Additionally, climate change phenomena such as a decrease in snow cover and redistribution of precipitation might shorten the vegetation period of plant species that include Mountain tea.

This conservation action plan (CAP) has been prepared with the aim of ensuring the long-term favourable conservation status, sustainable management, restoration and protection of the populations of mountain tea in the Prespa watershed, including across trans-national boundaries.

In order to reach the overarching goal of the Mountain tea CAP, based on the known threats to mountain tea populations in the Prespa Region, four main aims were identified; to: 1) eliminate overharvesting and inappropriate harvesting; 2) prevent degradation of mountain tea habitats; 3) improve knowledge; and 4) improve awareness about mountain tea. To fulfill these aims 11 objectives and 32 recommended actions were elaborated through a participatory process involving mountain tea experts and relevant stakeholders from all three countries sharing the Prespa lakes watershed.

The actions proposed are mainly directed towards harmonization and enforcement of legislation, establishing a licensing system, implementation of management plans for national parks (NP) in the Prespa Region, establishing sustainable commercial and ad hoc collection, development of fair and modern marketing that could provide an additional income for local people and revitalisation of the most affected sites for the mountain tea populations ('hot spots') aiming to eliminate overharvesting and improper collection of mountain tea.

Efficient conservation of mountain tea in the Transboundary Prespa Park (TPP) requires knowledge based management related to sustainable use of mountain tea, based on accurate data on the area of distribution, biomass production and harvested amounts. Only then can possible conflicts between sustainable harvesting and conservation aims be detected and avoided. A comprehensive monitoring system should be established in order to collect all the necessary data for proper management of mountain tea.

Due to the low economic status of people living in Prespa Region, mountain tea is an important plant species with high economic value for local communities. In order to reduce wild collection, cultivation of mountain tea was recommended as one of the conservation actions.

Low awareness about the importance of mountain tea and the conservation needs of the species, as well as lack of information about the sustainable wild collection and possibilities for its cultivation seriously endangers mountain tea populations and impedes proper management planning. Production of different promotion and education materials and organization of training, workshops and events is envisaged as a means for the dissemination of information among key stakeholders, local communities and the general public.

The enhancement of opportunities for sustainable economic and social development of local societies and wise use of the natural resources for the benefit of nature, local economies and future generations is one of the objectives of the Prespa Park, mentioned in the Strategic Action Plan (SAP) for the sustainable development of the Transboundary Prespa Park (prepared in 2002) – the first trilateral strategic document for the transboundary protected area.

Implementation of the proposed conservation measures in the mountain tea CAP will help to achieve favorable conservation status of the species and its sustainable management; and therefore contribute to reaching the objective of wise use of the natural resources in the TPP.





photo: Lj. Stefanov



Part I Background Information



1.1 Introduction

1.1.1 The process of action planning for priority species and habitats

Mainstreaming of ecosystem management objectives and priorities into productive sector practices and policies in the Prespa watershed is the main aim of the UNDP/GEF project “Integrated ecosystem management in the Prespa Lakes Basin”. The project is designed to strengthen capacity for restoring ecosystem health and conserving biodiversity at the local, national and trans-boundary level in the three riparian countries in the Prespa region by piloting ecosystem-oriented approaches into spatial planning, water management, agriculture, forestry, fisheries and protected areas management.

On the basis of the i) Technical Assessment Report for the Prespa Park Coordination Committee in transboundary ecosystem management (2007), ii) Technical Task Team (TTT) assessment and evaluation of national information in support of the Transboundary Diagnostic Analysis (TDA), iii) development of a Strategic Action Programme (SAP) in the Prespa Lakes Basin-National Report, as well as iv) the Assessment Report prepared in the frame of the Project-Consulting Services of training on Conservation and Action Planning for Priority Transboundary Habitats and Species in the Prespa Lakes basin-Preparatory Phase (2009), and v) based on proposed selection criteria (DEKONS-EMA 2009), three priority habitats and three priority species have been proposed for protection. Findings and proposals for protection of these priority habitats and species were presented on the session of the Monitoring and Conservation Working Group (MCWG) for Prespa Park on 26 November 2009. The following species and habitats were adopted as priority and relevant status papers (DEKONS-EMA 2010) were prepared for them, namely:

- Species: Mountain tea (*Sideritis raeseri*); Prespa barbel (*Barbus presepsensis*) as key species enforcing the protection of other endemic fish species and Brown bear (*Ursus arctos*).
- Habitats: Grecian Juniper woods; Reedbeds and Caves not open to public.

Herein proposed Conservation Action Plan (CAP) presents the overall conservation goal and strategy, institutional setup, threats and efficient conservation actions for mountain tea.

1.1.2 General information on the Prespa Lakes Watershed

The Prespa lakes watershed is located in the central-western part of Balkan Peninsula and it is shared between three countries - the former Yugoslav Republic of Macedonia, Albania and Greece (Fig. 1). Geographically, it is divided into two sub-watersheds: the Greater Prespa Lake (synonyms: Macro Prespa Lake, Liqeni i Prespes, Limni Megali Prespa, Golemo Prespansko Ezero) and the Lesser Prespa Lake (synonyms: Micro Prespa Lake, Liqeni i Prespes, Limni Mikri Prespa or Malo Prespansko Ezero). The largest part of the Greater Prespa Lake watershed is situated in the former Yugoslav Republic of Macedonia, while Albania and Greece share smaller parts. The Lesser Prespa Lake watershed is shared between Greece (approx. 80% of the watershed) and Albania (Fig. 2). The total area of the combined sub-watersheds and lakes is 1218.1 km² (Perennou et al. 2009). According to Chavkalovski (1997) the total area of the hydrological basin is 1349.2 km², out of which 1095.3 km² belong to Greater Prespa Lake and 254.0 km² to Lesser Prespa Lake.



Prespa watershed territory belongs to three local administrative units, each in one country: the Municipality of Resen - the former Yugoslav Republic of Macedonia, the Korçë Prefecture (Greater Prespa area belongs to Liqenas Commune and Lesser Prespa area to Proger Commune) - Republic of Albania and the Municipality of Prespa - Republic of Greece. About 24,000 inhabitants live in the 69 rural areas in the whole Prespa region - 12 villages in ALB territory (17% of the total inhabitants), 13 villages in the GRC part (only 8% of the total inhabitants) and 44 small and large villages and settlements in MKD territory where 75% of the total number of inhabitants in the Prespa Region live (Perennou et al. 2009). The main occupation of the

local population is agriculture, as a main source of income, estimated to employ about 75% of the work-force. However, the unemployment rate is high ranging from about ??% in Albania, 22% in Greece (for the prefecture of Florina) to over 30% in the former Yugoslav Republic of Macedonia.

1.1.3 The Transboundary Prespa Park

The most prominent characteristic of the Prespa lakes watershed is its transboundary nature, which is manifested in various ways e.g. through the similarities and links between the three sides of Prespa related to its geography, geology, hydrology, climate, biological features, nature conservation aspects, but also when studying human-related issues in historical times or in relation to contemporary history. This important element of the Prespa watershed has been the basis for the commitment of the three states to support sustainable development in the area, officially expressed through the “Declaration on the creation of the Prespa Park and the Environmental Protection and Sustainable Development of the Prespa Lakes and their surroundings”, signed by the Prime Ministers of Albania, Greece and the the former Yugoslav Republic of Macedonia on 2 February 2000.

Thus, the first transboundary protected area in the Balkans - Transboundary Prespa Park (TPP) was established, covering the entire Prespa Lakes watershed (Fig. 2). The TPP includes: the two Prespa National Parks (in Greece and Albania), Prespa Lake Natural Monument, Ezerani Nature Park, parts of the Galichica and Pelister National Parks and Leskodol landscape protected area (the former Yugoslav Republic of Macedonia), as well as the remaining territories in the Prespa watershed which are not protected by other conventions or national legislations. In addition, both Prespa lakes are designated as Ramsar sites (wetlands of International Importance, Ramsar Convention), and two Special Areas of Conservation (under Habitat Directive) and one Special Protection Area important for birds (under Birds Directive) are designated and included in the Greek Natura 2000 National list.

Based on that declaration, the Prespa Park Coordination Committee (PPCC) and its Secretariat were established, and forwarded important actions to support transboundary cooperation in Prespa Region.

A significant step for consolidation of the conservation, revitalization and proper management of habitats and biodiversity on transboundary level was achieved by the two latest agreements between the three states concerning the conservation of the Prespa Region, namely:

- “Joint Statement of the Prime Ministers of the three States sharing the Prespa Lakes watershed”, signed on 27 November 2009 (Pyli, Greece) – aiming at the preservation of extraordinary natural and cultural values of the region, as well as the promotion of peace, friendship and cooperation between citizens of the three countries.

- “Agreement on the Protection and Sustainable Development of the Prespa Park Area”, signed on 2 February 2010 by the Ministers of the Environment of three countries and the European Commissioner for the Environment - aiming at further support of transboundary conservation issues through specific principles and mechanisms of cooperation, such as the establishment of the Prespa Park Management Committee (with its Secretariat) and the Working Group on Water Management.

Transboundary cooperation between the three countries in Prespa Region has been achieved at high and low (e.g. PPCC, Municipalities) political levels, but also at the level of nature conservation mainly through small-scale projects involving protected area management authorities, local NGOs and scientists active in Prespa Region. Of course, a lot more needs to be done, but it is very important to know that the basis of such cooperation has been created, and specific organizations and people have the will to further promote it.

Strategic Action Plan for the sustainable development of the Prespa Park was the first building block of trilateral cooperation – a key document informing the countries on the priority issues to protect the important ecosystem of the Prespa Lakes Basin was prepared in 2002 by four NGOs: SPP-Society for the Protection of Prespa, WWF-Greece, PPNEA-Protection and Preservation of Natural Environment in Albania and MAP-Macedonian Alliance for Prespa (SPP et al. 2005).

Prespa Lakes Basin Strategic Action Programme developed in 2010 (UNDP 2010) updates the 2002 Strategic Action Plan and builds on the prepared TDA (UNDP 2009) identifying the main transboundary concerns impacting the biodiversity in the Prespa Region. In fact, it updates the 2002 Strategic Action Plan vision as following: ‘By 2025, the Prespa Lakes Basin will represent a healthy ecosystem that supports a sustainable economy’. The four identified Environmental Quality Objectives (EQO) that would address the problems through series of proposed management actions were defined in the SAP: to preserve and restore the ecological status and values of surface and ground water resources; strengthening land-use management and planning; conservation of Prespa Lakes Basin’s biodiversity and habitats and to improve the livelihoods of the local communities by ensuring sustainable forestry, agriculture and fisheries. These EQOs address both the vision for the Prespa Lake Basin by

2025 and the Joint Agreement issued by the three countries in 2010.

The necessity for establishing a transboundary environmental monitoring system for the whole Prespa lakes basin, as a prerequisite for sound and informed decision-making for the protection, management or development of the TPP, was identified in the 2002 Strategic Action Plan. Monitoring and Conservation working Group (MCWG) composed of representatives of the primary relevant stakeholder institutions of the three countries was established in October 2007, acting as a steering body for developing a Transboundary monitoring system (TMS) for the Prespa Park area (Perennou et al. 2009).

1.1.4 Area of interest for mountain tea (study area)

Due to the broader distribution area of mountain tea in Prespa Region, which covers areas outside the “artificial” boundaries of Prespa Lake watershed (see chapter 1.4 Spatial distribution), the study area for this species was enlarged. Thus, the area of interest for elaboration of the mountain tea CAP includes: the whole territory of Galichica Mt. in the boundaries of the NP in the MKD side; planned expansion of the boundaries of Prespa NP in the ALB part and Sfika Mt. (Prespa Municipality) in the GRC part, but in relation to the broader planned expansion of the boundaries of Greek Prespa NP (Fig. 2).





1.2 General description of Prespa lakes watershed

1.2.1 Physical features and hydrology

The two Prespa lakes are situated in a plane on the elevation about 850-900 m a.s.l, surrounded by high mountain ranges: Baba Mountain Range (Pelister, 2601 m) and Mt. Varnountas (2330 m) to the east of the lakes, Plakenska Planina (Stalev Kamen, 1998 m) and Bigla (1656 m) to the north, Galichica (Vir, 2287 m) and Mali e Thate / Suva Gora (2284 m) to the west, Mt Ivan (1770 m) and Triklario / Sfika (1750 m) to the south-southeast.

The Greater Prespa Lake has a surface area of 253.6 km² (Perennou et al., 2009) or 273.2 km² at water level of 851.83 m a.s.l. (Chavkalovski 1997). The maximum depth of Greater Prespa is 54 m, its average depth 18.8 m and the length of its shoreline 100.1 km. Because water goes downward through the limestone into Ohrid Lake near the locality of Zavir (Vragodupka), the water level and the surface of the lake fluctuate annually and through the years. The annual oscillations vary between 0.5 m and 1.75 m, while periodical oscillations are up to 4.5 m (Chavkalovski, 1997). However, only for nine years (from 1987 to 1995) the Greater Prespa Lake level dropped by 6.05 m which exceeds the natural variation by 1.55 m (Chavkalovski 1997). Based on hydrological analysis, Chavkalovski (1997; 2000) ascribes the decrease of the water level of 3.29 m to artificial outflow (water for irrigation purposes in the three countries). Currently, the water level is approx. 843-845 m a.s.l. Due to the constant fluctuations of the lake's level throughout time, the absolute elevation, the surface area and the maximum depth is somewhat arbitrary. Additionally, the three countries that share the lake use different system for elevation measurement which also contributes to variation of figures in the existing literature. The Greater Prespa Lake watershed is characterized by a developed hydrographical network in its eastern and northern part and a less developed hydrographical network in its western and the southern part.

The surface area of the Lesser Prespa Lake is 47.4 km² (Perennou et al., 2009). It has a maximum depth of 8.4 m, a maximum length of 13 km and the water level has been approx. 853-854 m a.s.l. over the last years.

Since 1975, the water level of Lesser Prespa has remained higher than that of Greater Prespa (Hollis and Stevenson 1997). An alluvial isthmus 4 km long and 100-500 m wide separates the two lakes. The lakes are linked by a small channel located at the westernmost part of the isthmus. Water outflows from the former to the latter are controlled by a sluice gate – road bridge system originally built in 1969 (first gate positioned in 1987) on the channel connecting the two lakes. This system was restored in 2004 to allow for control of the water level of the Lesser Prespa Lake (Kazoglou et al. 2010).

1.2.2 Geology

The rock masses belong to the West-Macedonian geotectonic unit (Klinčarov 1997) which is separated into five segments. The Prespa lake watershed belongs to the Pelister - Shar Planina Mountain segment (Arsovski 1997). Mountains to the east are composed of silicate rocks (schist, magmatic and volcanic rocks), while mountains to the north, south and west, are mainly carbonaceous (limestone complex). The lowland part of the watershed is composed of clastic complex of sediments (clay sediments, fluvio-glacial residues, alluvial sediments, lake-swamp sediments and proluvial deposits). Due to the porous limestone rocks to the west there is an underground water flow from the Prespa Lakes to the lower Ohrid Lake, where water appears as numerous sub-lacustrine and vigorous surface springs, such as Drilon in Albania and St. Naum in the the former Yugoslav Republic of Macedonia.



The most important rocks for the formation of the karst forms are the massive limestone rocks of the Triassic period. They are between 500 to 550 m thick and are located over the clastic layers of the conglomerates and the sandstones. They are formed by carbonate masses with occasional occurrence of separate grains of calcite (Dumurzanov and Ivanovski 1978). The limestone rocks are usually grey or light grey with distinguishable cracks. They form the west and south parts of the Prespa Lakes watershed. There are also other factors that have an influence on the formation of the underwater karst forms (the caves) beside the lithological content of the rocks, such as: the tectonics (fault lines and cracks) and climate change (especially changes in humidity - rainfall).

1.2.3 Climate

The climate of the area is under Mediterranean and continental influences and could be characterized as Continental-Central European. The main climatic modifier is the water mass of the Greater Prespa Lake with its thermodynamic inertia which influences the entire Prespa watershed area. The average annual air temperature was 10.2°C in 1931 - 1960 and 9.6°C in 1961-1987. According to the more recent data (for the period 1991-1995) average air temperature in northern part of the lower part of the watershed is 9.5°C (Resen meteorological station) and 10.8°C in eastern part (Pretor meteorological station) (Ristevski et al. 1997). The warmest month is July, with an average monthly temperature of 19.2°C and the coldest is January, with an average temperature of 0.2°C (Lazarevski 1993). The earliest freezing temperatures occur in October and the latest in May. The average freezing period is 167 days. Rainfalls are under the influence of the Mediterranean pluviometric regime. Rains mainly occur in late autumn and winter, while the least amount of rainfall is recorded in July and August. Average rainfall in 1961-1991 was 730 mm/m². In the lower parts of Prespa, precipitation ranges between 600 and 700 mm, in the mountain belt it increases up to 800-900 mm, and in the high-mountain belt it is 1000 mm (it can reach 1400 mm in the most humid years) (Ristevski 2000).

Prespa is characterized by a unique regime of local winds conditioned mainly by the Greater Prespa Lake's water mass and by the unequal warming of the air over the lake surface and above the ground.



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According to the thermal and pluviometric regime in the Prespa Lake region, the following climate zones exist in the area (Ristevski 2000):

- hot sub-mediterranean climate zone (600-900 m), which is more characteristic for the southern part of the watershed and especially for Lesser Prespa Lake watershed and Albanian part of the Greater Prespa Lake
- cold sub-mediterranean climate zone (900-1100 m)
- submontane climate zone (1100-1300 m)
- mountain sub-mediterranean climate zone (1300-1650 m)
- subalpine climate zone (1650-2250 m)
- alpine climate zone (above 2250 m).

1.2.4 Biodiversity



The most striking feature of the biodiversity in the Prespa lakes watershed is its enormous richness and heterogeneity, thus the Prespa Region has been recognized as a European Hotspot, not only because of the high number of species and habitats present, but also due to their qualities, that include rarity and conservation significance.

Due to altitudinal difference (from the lake level to the mountain peaks) as well as diversity of relief, geological composition, soil types and subtypes and the climate, the territory of the Prespa lakes watershed is characterized by great diversity of both communities and wild plants, a considerable part of which consists of a variety of aromatic and medicinal herbs.

According to the Assessment report (DEKONS-EMA 2009), significant diversity of habitats is present in the Prespa Region which belong to eight vegetational belts: 1) water and swampy vegetation; 2) lowland meadows; 3) hill pastures; 4) oak forest; 5) beech forest; 6) sub-alpine mountain; 7) alpine mountain; 8) and azonal communities. According to Vrahnakis et al. (2011) many of the habitats are considered as threatened and seven of them are priority habitat types for conservation according to the EU Habitat Directive 92/43/EEC. The diversity of the vegetation is so high that, in the GRC part of Prespa alone, more than 70 vegetation units have been distinguished. Still, there is no comprehensive list of habitats for the whole Prespa lakes watershed.

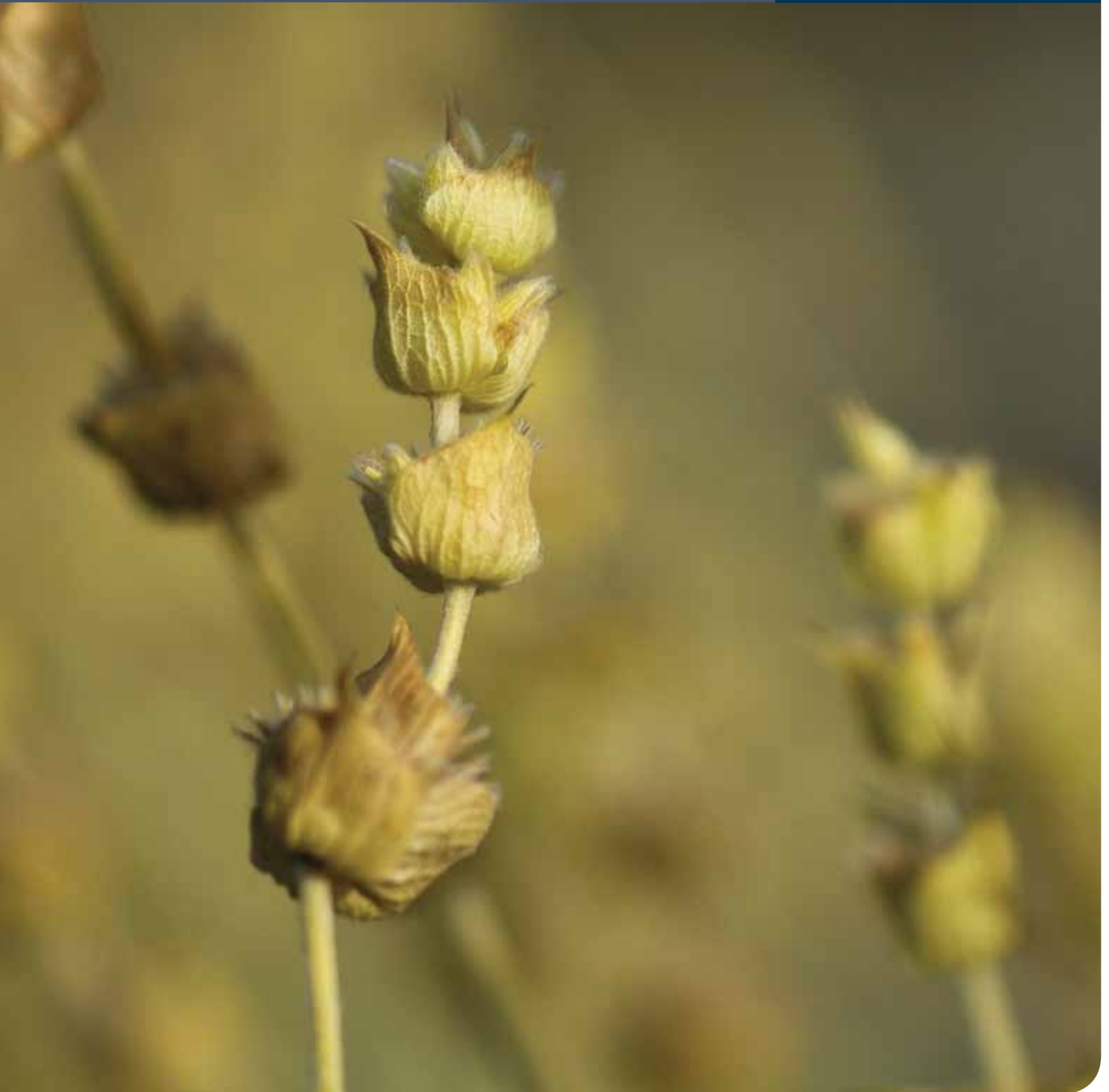
Furthermore, there is no figure for the number of plant species in the Prespa lake watershed. In the Greek part Pavlides (1997) had recorded 1326 taxa and Papapavlou & Maragou (2004) reported 1249 taxa, 17 Pteridophytes and 1232 Spermatophytes. However the number of plant taxa, recorded in the GRC part of Prespa watershed (256 km²) is more than 1600, (Giannakis et al. 2010). In the MKD part of the Prespa watershed it is estimated that there are more than 1000 plant species on Pelister Mt. and more than 1000 on Galichica Mt. More than 1000 plants species are also reported for the ALB side, where the Dry Mountain is thought to be the richest in the Korcha area (Buzo 2000; Mersinllari 2000 & 2004; Shuka et al. 2008). Thus, it is likely that the total number of plant species in the Prespa Region is around 2000.

The rich plant diversity in the Prespa watershed can be illustrated by the number of endemic and described species from the mountain regions. About 20 plant species were described from Pelister Mt. of which 13 have “good species” status (Matevski & Kostadinovski 1996). There are 19 species with locus classicus on Galichica Mt.; 13 of them have “good species” status and 11 are local endemics (distributed on Galichica Mt. exclusively). Galichica Mt., as well as Varnous and Triklario Mts, represents the frontier of different floristic elements: some species reach their northern and some their southern borders of distribution. The percentage of endemic species in the flora of Prespa NP in Greece amounts to 15.4%, that is 204 species (Pavlides 1997).

There are 44 important plant species identified in the Prespa lakes watershed according to the provisions and lists of species of different international conventions (Bern convention, Appendix I), IUCN Global Red list, EU Habitat Directive (Annexes IIb and IVb) and IPA criteria. Giannakis et al. (2010) had recorded more than 190 taxa considered as important, for the management plan of Prespa NP in Greece.

The total number of animal species, recorded in the MKD part of Prespa lakes watershed is over 2.500 of which 375 are vertebrates. So far, 23 species of fish (including 2 hybrids and 9 non-native alien species), 21 reptiles, 11 amphibians (3 newts and salamanders and 8 frogs and toads), 280 bird species and more than 60 species of mammals are identified in the whole Prespa lakes watershed.





1.3 Species information

1.3.1 Description of mountain tea

Sideritis raeseri Boiss.& Heldr (mountain tea, планински чай, Çaj mali, Τσάι του βουνού) is a perennial plant that belongs to the Lamiaceae (=Labiatae) family of the genus *Sideritis* L., which includes ca. 100 taxa, having a distribution centre in the south and west part of the Balkan Peninsula.

The genus *Sideritis* is a taxonomically complex group. According to Hayek (1929) in “Prodromus Florae Peninsulae Balcanicae”, ten taxa were accepted for Greece and four taxa for Albania and the former Yugoslav Republic of Macedonia. Heywood (1972) in “Flora Europaea” reduced the number of taxa occurring in Greece to four. Taxonomic revision of *Sideritis* L. section *Empedoclia*, carried out by Papanikolaou and Kokkini (1982) increased the number to seven taxa for Greece.

Sideritis raeseri has a slightly woody base whereas stalks and leaves are densely covered with long unicellular or multicellular hairs. The stem is 30-70 cm tall, usually simple, greyish-lanate. The leaves are opposite, sessile or with short petiole, linear-oval to spatulate. The flowers are pale yellow distributed in spike-like distant verticillasters situated in the bracts. Based on field observation, mountain tea plants are growing in tufts (diameter about 70 cm) with more than 30 stems. These plants are hardy flowering perennials that have adapted to survive with little water and little soil. They reach optimum growth in higher altitude, in subalpine and alpine regions. The flowering time depends on the altitude but is usually in the period June-July.

Chromosome numbers of *Sideritis raeseri* in different populations varies from 16 to 32 on different areas of its distribution range. So, Baltisberger (1995) has reported 32 chromosomes for the population on Mali e Thate whereas Goliaris (1995) reported 16 chromosomes from several Greek populations of the mountain tea and Zeka et al. (2008) 16 and 24 chromosomes for Albanian populations.



Sideritis raeseri Boiss. & Heldr. In Boiss., *Diagn. Ser 2,4: 30* (1859)

Described from Parnasos. Lectotype (designated here): “In reg. media et sup. Parnassi, 4000-5000 ped.”; leg. HELDREICH no.490, Aug. 1856 (G!; K!, WU!, isotypes).

Syn.: *S. syriaca* Fraas in *Syn. Pl. Fl. Class.:* 175 (1845), non L.

Stems 10-50 cm, simple, greyish-lanate. Basal leaves spatulate; petiole 5-20 mm; blade 12-60 x 5-8 mm, oblong to obovate, whitish-lanate, crenate to subentire at obtuse apex, attenuate at base. Cauline leaves 10-50 x 5-8 mm, sessile, narrowly elliptic to oblong, acute. Verticillasters 3-15, all distant, rarely upper ones crowded. Middle bracts 5-20 x 8-19 mm, shorter or longer than flowers, ovate to orbicular or reniform, glandular-pubescent; acumen 0.5-4 mm. Calyx 6-13 mm, patent-velutinous and glandular-pubescent; teeth 2-4 mm. Corolla 8-15 mm, pale yellow; upper lip without brown stripes.

Description of the species as given in Mountain Flora of Greece (Strid & Tan 1991)

⁵ In the area of Prespa the *Sideritis raeseri* ssp. *raeseri* occurs, while the *S. raeseri* ssp. *attica* occurs in the prefecture of Attiki (central Greece).

1.3.2 Ecology and habitat requirements

Mountain tea (*S. raeseri*) occurs in the subalpine zone in the southern Balkan Peninsula within relatively limited areas in Greece, Albania and the former Yugoslav Republic of Macedonia only on limestone and in a few cases on serpentine or flych substrate. It grows on rocky areas or alpine and subalpine grasslands at altitudes between 800 and 1900 and is very rare up to 2100 m.a.s.l. The floristic composition of these pastures is characterized by the dominance of thermophilous and xerophilous vegetation with sub-Mediterranean plant species adapted to very unfavorable conditions for growth. Participation of mesophyllous and acidophilus species is quite small as it is completely adapted to the character of this particular substrate (Menkovic 2010).

In the region of the Prespa lakes watershed *Sideritis raeseri* is found on limestone rocky areas with shallow soils, on the mountain Galichica in the former Yugoslav Republic of Macedonia, Mali i Thatë and Ivani Mt in Albania, Sfika and Vrontero in Greece. In appearance they are very similar, but the phytosociological analysis show differentiation of a large number of associations of different alliances.

Typical habitat of Sideritis raeseri on Galichica



According to the Management plan of Galichica NP for the period 2010-2020 and the Management plan of GRC Prespa NP for the period 2010-2015, within the zone of the subalpine grasslands the following the EU habitat directive 92/43 EEC (1992) alpine and subalpine calcareous grasslands habitat types of Annex 1 are present:

1. Closed calciphile alpine grasslands with: ass. *Seslerietum wetsteini* Ht. 1937, ass. *Stipo-Festucetum* Mic. 1994 and ass. *Onobrychido-Festucetum* (Horv.) Micev. 1994, where *Sideritis raeseri* is diagnostic species;
2. Calciphilous stepped and garland grasslands with: ass. *Cariceto-Helianthemetum balcanici* Ht. 1935 and ass. *Helianthemo-Seslerietum* Horvat 1949, where *Sideritis raeseri* is permanently present;
3. Endemic oro-Mediterranean heaths with gorse, where *Sideritis raeseri* is permanently present.

Beside in these habitats *Sideritis raeseri* persists in *Juniperus communis* formations on heaths or calcareous grasslands.

1.3.3 Spatial distribution of the mountain tea

Sideritis raeseri (the typical subspecies) is a sub endemic perennial species distributed in South Albania, northern-western Greece and the the former Yugoslav Republic of Macedonia.

In Albania, it occurs in Mts Mali i Gjerë, Mali i Stugarës, Mali i Murganë, Nemerçka, Çajupi and Dhembeli in the lower part of Vjosa valley. In the upper part of Vjosa valley up to Shkumbini River, it grows in Mts Tomorri, Rrungaja, Ostrovica and Polisi, whereas in the south-east part of the country it occurs on Mali e Thate where the most persistent populations are found.

In Greece, it is distributed in central, north-central and northern parts of the country (typically in the range of Pindos) or in neighboring areas with Albania and the FYR of Macedonia according to Strid & Kit Tan (1991).

In FYR of Macedonia it is found on Galichica mountain (Vandas, 1909; Bornmüller, 1928; Cernjavski, 1943; Weber, 1951), and Prilep-Mariovo region (Matevski, et al. 1995).

The species exhibits morphological differences from its close relatives (*S. syriaca*) which implies long isolation from them (Trigas & Iatrou, 2006). According to Pavlides (1985) the range of the species extends well beyond to the south on the mountain Sfika at least down to Smardesi (Krystallopi-gi), as well as on the mountain to its south (Mt Mal i Made). It also occurs

on Triklario Mt. at altitudes ranging from 1400 to 1600 m and in Devas Mt. in the Agios Georgios-Psarades site.

Sideritis raeseri occurs as a native in a wide range of Prespa region. According to the combined assessment based on Braun-Blanquet classification, *Sideritis raeseri* in TPP is present with „+“; that is to say its presence has very low coverage (less than 1%).

Within the borders of the NP Galichica, *Sideritis raeseri* is present across an area of 9301,8 ha, of which 1699,6 ha are distributed in the zone of sustainable use and 7602,2 ha in the strictly protected zone. The zones of the NP were defined in the Management Plan, which permits species collection only in the zone of sustainable use.

Presence of the mountain tea in the GRC part of the Prespa lakes watershed is lower compared to the rest of Prespa Park (NP Galichica and ALB NP Prespa). This is due to the absence of carbonates. In the Mt. Sfika, distribution of *Sideritis raeseri* is similar to Galichica Mt. Unfortunately, the larger part of the *Sideritis raeseri* habitat, which is rich in biodiversity is outside the border of the Prespa NP in Greece (Fig. 3).

The area of Vrontero Mt. is almost completely covered by *Buxus sempervirens* shrublands, *Juniperus* forests (*J. excelsa* and *foetidissima*), oaks or mixed forest which in sections are open enough to create viable conditions for mountain tea. Up to now, mountain tea is present on area of about 13 ha. This area has favourable ecological conditions for the growth of *Sideritis raeseri*, but probably due to antropogenic influences the area is shrinking. Human intervention by local people has negatively influenced: (a) mountain tea production; and (b) distributional range; this is largely because of the application of improper collection practices by pulling up the plant together with its roots. In Greece, *Sideritis raeseri* covers an area of 102,8 ha (89,9 ha on Sfika and 12,9 ha on Vrontero). On Triklario Mt., outside the NP Prespa borders, mountain tea is found across an area of 1640,9 ha.

In the ALB part of Prespa Park, mountain tea occurs in open areas on limestone substrates from 1000 m up to 2000 m a.s.l. covered by herbaceous plants of Festuco-Brometea Br.-Bl. et R. Tx. class dominated by *Festucetum bosniacae*; *Stipetum pennatae* or *Astragaletum angustifoliae*. The total area of distribution in Mali e Thate is approximately 362 ha (Mali i Zonjës 9.5 ha; Pikina Voda 50 ha; Pllaja e Pusit 158 ha and Buza e Koritës Mt. 145 ha) whereas typical populations, which were found in a restricted area of about 27 ha, occur in Ivani Mt.

A more detailed assesment of *Sideritis raeseri* distribution in the NP Gali-

chica was carried out in 2010, based on transects of 100 meters in width and of various length, depending on the slope and habitat condition. The results were used for the preparation of a GIS map of the distribution of mountain tea in the Prespa Region (Fig. 3).

Visual interpretation of the site has shown differences in the number of plants and their size, mostly dependent on the exposure of the habitat to fire. Consequently, two transects were set: transect 1 “Sreden Vrv” in the area which was burnt in 2007 and transect 2 “Mazon” on an area which has not been burnt in recent past.

Species density in Mazon is between 18 and 54 ind./ha, or on average of 36.8 ind./ha (Table 1). In the habitats affected by the wildfire of 2007, species density varies between 3 and 143 ind./ha, or on average 68,6 ind./ha (Table 2). During field research the stems were not counted; however, it was quite noticeable that the plants in fire-unaaffected habitats were better developed and the number of stems was significantly larger (Menkovic 2010).

Another important observation was the relation of distributional range of *S. raeseri* to soil depth; in cases where soil depth was high, the number of individuals decreased, while in the valleys where the soil was deeper, the species became absent. In relation to the specific needs of the Action Plan (AP), accurate mapping is very difficult to perform in restricted areas, where rapid changes of the soil depth are evident. Nevertheless, the size of the area covered by the transects provides accurate data for reliable assessments of the distributional range of *Sideritis raeseri*.

1.3.4 Population status

Assessment of the status of the mountain tea population was performed in 2010, in parallel with the assessment of the distributional range. On previously chosen transects, described in the previous chapter “Spatial distribution of the species”, a total count of the plants was conducted. In addition, stem weight (weight of raw stems) was measured from plant samples obtained from sampling sites (Menkovic 2010). The results of the analysis are given in Tables 1 and 2.

The total area of transect 1 (Sreden Vrv) is 10 ha and transect 2 (Mazon) is 5 ha. The total number of plants calculated on transect 1 is 686 and the average number of plants is 68.6 plants/ha, whereas the total number of plants calculated on transect 2 is 184 and the average number of plants is 36.8 plants/ha.

Trasect section	Number of plants	Yield of raw stems (g/ha)	Average yield by plant (g)
H1	117	296	2.53
H2	120	584	4.87
H3	28	324	11.57
H4	59	624	10.58
H5	88	1424	16.18
H6	60	1978	32.97
H7	48	393	8.19
H8	143	1356	9.48
H9	20	268	13.40
H10	3	42	14.00
Total	686	7.289 kg	
Average	68.6 ind./ha	0.7289 kg/ha	

Table 1. Transect 1 „Sreden Vrv“

Trasect section	Number of plants	Yield of raw stems (g/ha)	Average yield by plant (g)
H1	18	490	27.22
H2	54	1030	19.07
H3	52	1128	21.69
H4	20	740	37.00
H5	40	906	22.65
Total	184	4.294 kg	
Average	36.8 ind./ha	0.8588 kg/ha	

Table 2. Transect 2 „Mazon“

The total weight of stems collected from transect 1 is 7.289 kg and from transect 2 is 4.294 kg and average yield is 0.7289 kg/ha and 0.8588 kg/ha respectively.

Because there are no precise historical data on areas affected by fire, for the calculation it is therefore better to use mean value for average yield; which in this case is 0,7917 kg/ha. It was used to calculate sweated resource potential and possible annual production of mountain tea collected from the zone of sustainable use.

Sweated resource potential is the size of a phyto mass which is obtained during the collection of raw mercantile resource from areas which are suitable for this type of collection. Mercantile samples are based on generic or vegetative adults, which can include senile stems not attacked by pests. The calculation was carried out based on: the area allowed for collection of the species multiplied by the mean value of average yield in both transects.

In accordance with the principles of good practice collection, the possible annual quantity of mountain tea which can be collected without causing damage to the natural population is 70% of the sweated resource potential.

In the former Yugoslav Republic of Macedonia, the total area in the belt between 1200 and 1900 m a.s.l. where mountain tea is growing is 9301.8 ha, of which 1699.6 ha are in the zone for sustainable use that is allowed for collection of wild plants. In Greece, the total area in the belt between 1200 and 1900 m.a.s.l. where mountain tea is growing is 1743.7 ha, while in Albania it covers an area of 5094.7 ha.

Sweated resource potential in the MKD side of Prespa Park is 1345.6 kg, in the GRC side of Prespa Park is 1380,5 kg and 4033,5 kg in the ALB side of; whereas the possible annual quantity of mountain tea that can be collected is 807,4 kg (in MKD part), 966,4 kg (in GRC part) and 2823,4 kg (in ALB part). The results from these analyses are given in Table 3.

Country	Area allowed for collection (ha)	Average yield (kg/ha)	Sweated resource potential (kg)	Possible annual quantity (kg)
the former Yugoslav Republic of Macedonia	1699,6	0,7917	1345,6	807,4
Greece	1743,7	0,7917	1380,5	966,4
Albania	5094,7	0,7917	4033,5	2823,4

Table 3. Sweated resource potential and possible annual quantity of mountain tea in Prespa Region



1.4 Review of relevant research projects for mountain tea

So far, all the projects and research activities realized for mountain tea are related to chemical characterization of the species, establishing sustainable use and, recently, assessment of the distribution range and population status.

During recent years, the phytochemistry of the genus *Sideritis* (Lamiaceae) has been studied and various terpenoids, sterols, coumarins, and especially flavonoides and glycosides have been identified. The *Sideritis raeseri* population grows in the Balkans where it is expected to be rich in phenolic compounds, especially flavonoids, which have been proven to possess a valuable antioxidant activity (Gabrieli et al., 2005; Janeska et al., 2007). In the period 2005-2006, many research studies were realized in the framework of the MKD-BGR bilateral project “Chemical characterization of overground, medicinal and aromatic plants from Fam. Lamiaceae, *Sideritis* spp.”, implemented by the Faculty of Pharmacy, Skopje in cooperation with Bulgarian Academy of Sciences, Sofija. As a result, information was published about the chemical constituents of the essential oils of *Sideritis scardica* and *Sideritis raeseri* (Kostadinova et al. 2007) and the antioxidant potential of the mountain tea extracts; i.e. phenolic compounds of mountain tea from the Balkans (Petreska et al. 2011-a) and potential bioactive phenols of *Sideritis* species found in the former Yugoslav Republic of Macedonia used for medicinal purposes (Petreska et al. 2011-b).

Since 2003, in the former Yugoslav Republic of Macedonia, there has been an attempt by the Ministry of Agriculture Forestry and Water economy (MAFWE) to establish a system of organic production and use of natural recourses. The project activity “Sustainable use of medicinal and aromatic plants in RM” was implemented in cooperation with the Ministry of Environment and Physical Planning (MoEPP) in the period 2004-2005, as part of the GTZ project Modernization of the Macedonian agro food sector and its approximation to the EU and Swiss Import Promotion Programme (SIPPO). Activities were related to: training of trainers and collectors in good wild collecting practice; training of companies in good manufacturing practice and staff of the Public Enterprise Macedonian Forests and NPs management authorities; raising awareness for sustainability aspects; and promotion of bio-certification process.

A short manual on sustainable collection of *Sideritis raeseri* (as part of the publication “Medicinal and Aromatic Plants – Manual and monograph for collectors according to the principles of organic production”) was prepared by Kulevanova & Stefkov (2004), to provide information to collectors for proper exploitation.

Conservation and sustainable use of *Sideritis* spp. has been chosen as a model approach for research as part of the on-going project for conservation and sustainable exploitation of indigenous medicinal and aromatic

plants (MAPs) traditionally used in the South-East Europe, West Balkan countries (project SEE-ERA.NET.PLUS 135) that will be implemented in the period 2010-2012.

The potential for the sustainable use of medicinal plants was assessed in different surveys concerning the region of the ALB Prespa NP (Fremuth et al. 1999). Possibilities of trade to Germany, Europe's largest importer and Albania's most important export destination have been considered in particular.

The ALB 'Private Forest Development Project' has completed a number of studies on the sustainable wild-harvesting of MAPs and has tried to establish and control the collection licence system; in addition, efforts have been undertaken to promote the cultivation of endangered MAP species like Yellow Gentian (*Gentiana lutea*) and orchids used for salep production. MAP collection and trade are controlled on a daily basis by the Forest Inspectorate. The Directorate of Forest and Pastures (part of the Ministry of Environment) in cooperation with the World Bank (Forest Project) is also developing initiatives to establish a system of certification for non-timber forest products (NTFPs) (DeCoursey 1999).

More detailed assesment of *Sideritis raeseri* distribution in the NP Galichica (see chapter 1.4) and assessment of its population status (see chapters 1.3.3 and 1.3.4) was carried out in 2010 (Menkovic 2010), as part of the project for preparation of the Management plan of Galichica NP.

Most of the studies about *Sideritis raeseri* in Greece are about the phytochemistry (eg. Papageorgiou et al. 1982), but also for the antioxidant and other properties of the mountain tea (eg. Gabrieli et al. 2005). In the NP of Prespa, the research programme, financed by SPP, about the mapping of habitat types "Registration, Assessment and Geographical Representation of the Rangeland and Forest Habitat Types of the Natura 2000 Sites: «Ethnikos Drymos Prespon (GR 1340001)» and «Ori Varnounta (GR 1340003)» was completed in 2011. It defines the distribution of the mountain tea habitat for the first time. The reports of the project (Fotiadis et al. 2010) provided some instructions for the sustainable use of mountain tea. The same instructions are also included in the management plan for the NP of Prespa (Giannakis et al. 2010).



1.5 Conservation and protection status

1.5.1 International and national conservation status

Sideritis raeseri is an important plant species with high economic importance, at least in Albania and the former Yugoslav Republic of Macedonia (mainly Galichica Mt.) and it is the species that is most endangered from overexploitation and uncontrolled collection. In spite of its threatened status in the three countries, it was not included in the red list of the globally or European threatened species; however, considering the present and potential risk to *S. raeseri* it was included in the Red List of flora species of Albania.

There is no Red Data List of threatened plants in the former Yugoslav Republic of Macedonia. Mountain tea fulfills criterion A(iv) for the designation of IPA and it is one of the conservation targets of the Important Plant Area “Galichica Mt.” in the former Yugoslav Republic of Macedonia.

The mountain tea was included in the list of CORINE species for its ecological and economic importance. The species fulfils criterion A(iv) of Important Plant Areas (IPA) (Xhulaj & Shuka, 2007). Conservation of rare and endangered species in Albania is provided by Decision 146/08-05-2007, for the “Approved Red List of Flora and Fauna” (MoEFWA, 2007) where the mountain tea is classified as an endangered species with status EN A1c.

Sideritis raeseri is not included in the Red Data Book plant species of Greece, but its conservation status is included under the umbrella of European Union since it is included in the catalogue of “other important species” of the Directive 92/43/EEC.

1.5.2 National protection status

Medicinal plants in general (and *Sideritis raeseri* in particular) are protected according to respective national legislations in all three countries. There are many laws and by-laws, especially in the former Yugoslav Republic of Macedonia and Albania, of relevance for regulating the sustainable use of medicinal and aromatic plants. However, unclear procedures and responsibilities due to the lack of secondary legislation and the overlapping of competences between institutions are the major obstacles for its enforcement.

The former Yugoslav Republic of Macedonia

A legal basis for the protection of biodiversity and rational and sustainable use of natural resources exists in the Law on Environment, article 4 (Official Gazette of RM No. 53/05, 81/05, 24/07, 159/08, 83/09, 48/10, 124/10 and 51/11) as a framework environmental protection law. It prescribes that the level of charges payable by legal entities and individuals using natural resources shall be determined on the basis of the type and quantity of collected or exported plants and parts of plants, branches and other parts of plants (article 164). Particularly, export of *Sideritis raeseri* is controlled by the national export license D4, issued by the MoEPP and the level of charge payable for export permit for this endangered or strictly protected plant is 1 MKD/kg (article 179).

License based collection and protection of *Siderities raeseri* is regulated by the Law on Nature Protection (Official Gazette of RM No. 67/04, 14/06, 84/07, 35/10, 47/11). The license for collection of threatened and protected wild species (based on article 23) is issued by the MoEPP; so far for the species listed in the Decision for arranging goods for export and import (Customs tariff) requiring export D4 license (where *Siderities raeseri* is listed). In 2011, it was proclaimed as a protected species

(Lists for designation of strictly protected and protected species, Official Gazette of RM No. 139/2011) and its use shall be carried out in a manner and to an extent that will not put in danger their favourable conservation status (Article 42, LNP). Still, the measures and activities for protection as well as the manner and extent of use of protected wild species should be prescribed by the Minister of Environment and the Minister responsible for forestry, hunting and fishery.

The recently adopted Management Plan of Galcica NP prescribes the management of this species on the park's territory. According to this document collection of *Siderites raeseri* is allowed only in the zone for sustainable use.

Non-timber forest products (NTFP) and their use are regulated by the Law on Forests (Official Gazette of RM No. 64/09, 24/11 and 53/11), article 72, or more precisely with the Rulebook for NTFP and the methods of collection and the way of use (Official Gazette of RM No. 155/2011); but it does not include a list of species. Public enterprise Macedonian Forests is the responsible institution for issuing collection licenses and controls the use of NTFP.

Both laws (Law on Nature Protection, article 14 and Law on Forests, article 72) prescribe the legal base to both ministers (responsible for the affairs of nature protection and forestry) to limit or fully prohibit the use of the natural resource, in cases where the favourable conservation status of certain species or habitat types is endangered due to unreasonable use of the natural resource.

Both, State Environmental and Forestry Inspectorates have "some responsibility" to control the use of mountain tea.

Albania

The Law on Environmental Protection (No. 8934/05-09-2002), as a framework law, defines the requirement for the sustainable development of society (which is regarded as a priority national concern), the conservation of the biological diversity of the country and the rational management of natural resources (Article 1). It prescribes the procedure for issuing licenses for collection of MAP and other non-timber forest products (NTFP). The Environmental Inspectorate and Licensing Authorities control the implementation of harvesting (requirements and conditions). However the effectiveness of this licensing system is questionable because today Albania faces the highest rate of biodiversity loss in Europe (DeCoursey 1999). Conservation of this species is also regulated by the Law on Biodiversity Protection (No. 9587/20-07-2006).

The List of Protected Species of Flora in Albania, adopted by the Parliament in 1997 and amended in 2007, defines the status of endangered plant species in Albania. *Sideritis raeseri* is part of the list and considered as endangered species (status EN A1c) due to rapid decrease in 50% in the period of 20 years.

The Law on the Protection of Medicinal, Tannic Acid and Oil Bearing Plants (No. 7722/1993) specifies that the medicinal plants on pastures and meadows may be harvested by legally authorized people on the basis of a license that is issued by the competent authority.

Further environment-related laws that also directly or indirectly affect the harvesting and trade of medicinal and aromatic plants (MAPs) and other non-timber forest products (NTFPs) are:

- Law on Protected Areas (No. 8906; approved 06.06.2002).
- Law on Forest and forest service (Nr. 9385, datë 4.5.2005)
- Law on the Forests and the Forest Service Police (No. 7623; 13.10.1992)
- Law on Pastures and Meadows (No. 7917; 1995)
- Law on the Land and its Distribution (Nos. 7491 and 7501; 1991; amended Nos. 7715 and 7763; 1993, No. 7855; 1994)
- Law on Plant Protection Service (No. 7662; 1993; amended No. 8529; 1999)
- Law On Urban Planning and Territorial Adjustment (No. 7693, approved 06.04.1993)
- Penal Code of the Republic of Albania (No.7895, 27.01.1995)
- Law on the Protection of Fruit Trees (No. 7929; 1995)
- Law on Water Resources (No. 8093; 1996)
- Decision 236/06-06-1994, on “levies for animal grazing in the pasture stock of forests and pastures under administration of directorates of forest and pasture services and the commune authorities”
- Decision 80/18-02-1999 on designation of Prespa as “National Park” and Pogradeci as “Protected Landscape and Water Scape”.

National protection status - Greece

In Greece, since July 2009, according to the Joint Ministerial Decision No. 28651 of Greece, collection of plants is prohibited for those not bearing permission in the zones of the NP Prespa where *S. raeseri* is found. The Management Plan of the NP of Prespa (Giannakis et al. 2010) gives specific instructions for the collection of mountain tea (for example, tea must be collected without roots and each individual must bear at least 2 flowering stems after collection).



1.6 Socio-economic role and importance of the species

Since ancient times, wild collected medicinal and aromatic plants have always been an integral part of the local traditional medical treatment and are still very common. The demand for these products is constantly increasing, not only in relation to the domestic market but also the export market. Wild harvesting of medicinal and aromatic plants is still widely common and increasingly important for the rural population, because it creates additional income especially for underprivileged social groups; it is mainly children, women and older people who are occupied with wild-collecting MAPs throughout the vegetation period from early spring to late autumn. For example, in Albania, the wild-harvesting and sale of MAPs is the second most important source of income for poor rural households (Kupke et al. 2000).

Based on different studies, more than 70 medicinal plant species have been identified for the wider area of Ohrid and Prespa region. Having in mind that the surveys were conducted in limited areas, it can be expected that additional species can be recorded. Most of the species are traded or available on the German drug market. About half of them are listed in the German Pharmacopoeia DAB or Drug Formulary DAC and are thus of interest to the pharmaceutical market. Most of the others are non-official drugs in Germany. A few species only seem to be used as medicinal or tea plants in Albania, the former Yugoslav Republic of Macedonia and Greece. Apart from mountain tea (*Sideritis raeseri*), local collectors are collecting and trading a variety of plants, including: Chamomile (*Matricaria recutita*), Cornflower (*Centaurea cyanus*), St. John's Wort (*Hypericum perforatum*), Thyme (*Thymus spp.*), Meadow Saffron (*Colchicum autumnale*), Common Juniper (*Juniperus communis*), Red Berried Juniper (*Juniperus oxycedrus*), burning bush (*Dictamnus albus*), etc (Fremuth et al. 1999).

The name of the mountain tea originates from the old greek name “σίδηρος” (sideros, i.e. iron), due to the high iron content of its stalks and leaves. It is mentioned in the book of Dioscorides “Materia Medica” written in the 1st Century (Malo, 2004). In Greek Mythology it is described as the herb/food of Titans that boost the immune system and cure colds, respiratory problems and stomach aches. Since then to the present, *Sideritis raeseri* has remained one of the most popular tea types used in Albania, Greece and the former Yugoslav Republic of Macedonia especially during winter. It is known for its positive effects and used for colds, respiratory problems, digestion, the immune system, mild anxiety and as an anti-oxidant. It is also known to possess anti-inflammatory characteristics and is used to reduce fever. *S. raeseri* infusion is made from dried leaves and flowers of *Sideritis* plants (ironwort).

Wild harvesting of mountain tea is a major issue in the Prespa park and

has significant economic importance for local communities. If harvesting and trade are sustainable and controlled, they may be beneficial both for the local economy and for habitat conservation. Sustainable wild-collection of *S. raeseri* may thus increase awareness among local people for the need to conserve the species and their habitats (Marshall 1998, Schippmann 1999). In the long run, it may be even more effective for biodiversity and nature conservation than the prohibition of wild collection. Selling of the dried herbal drug of *Sideritis raeseri* (as well as other medicinal and aromatic plants) gives a major contribution to the income of the families living around and within Prespa Park (except the Greek part). For example, in Albania, just during 2001, it was traded throughout Europe and south-western Asia and 75 tonnes were exported, out of which 5-15 tonnes were collected in the NP (Fremuth et al., 1999).

Due to the poor economic situation and the lack of diversification of income generating sources, collection pressure on the wild populations of MAPs is beyond the limit that these ecosystems can sustain. As a result of habitat destruction and over-collection the resources of MAPs are becoming increasingly scarce (DEKONS-EMA 2010).

Mountain tea is collected in considerable amounts in the area, but it might also be a potential target species for cultivation. In fact, plant cultivation of rare and threatened species is often recommended as an alternative to wild-collection. Cultivation is even preferred by pharmaceutical companies because supply can be handled more easily and quality control is facilitated (Betti 1999). There is “an opinion” among the local population that the quality of cultivated mountain tea is lower than wild collected. Recently, the influence of cultivation on the chemical composition and antimicrobial activity of *Sideritis spp* was investigated and the results showed that the extract of the cultivated plants used as tea has the same quality as the extract of mountain tea collected in the wild (Kostadinova et al. 2008).

Some experiments for cultivation of the mountain tea on small plots within the Prespa Region have been undertaken in the past 10-years in ALB and in MKD part of Prespa Park as well (see sub-chapter 1.6.2 Cultivation).

Sustainable wild collection of medicinal plants as well as cultivation can thus provide an additional income to the local population. Modern marketing of labeled products with geographical origin (e.g. the Prespa Park logo) might gain a better price on the international market. Based on our knowledge, the assessment of economic values of mountain tea as a specific product is presently missing.

1.6.1 Assessment of collected quantities and number of collectors



Apart from the data for distribution and natural biomass production of mountain tea, accurate information about the number of collectors and collected quantities is a prerequisite in order to establish knowledge-based sustainable management of mountain tea.

In the MKD part of the Prespa Park (that is to say the territory of the Galichica NP) there is no control over the collection of mountain tea from its wild populations. This is the main reason for the lack of accurate information for the number of collectors. The NP Galichica authorities have registered approximately 30 collectors of mountain tea for selling it at the local bazaars. On the other hand, the number of the collectors that collect for household usage is much higher - they are identified as the main threat to *Sideritis* populations, according to the Galichica NP management authorities. It is estimated that 7500 kg of dry herb are collected every year. This is way above the sustainable quota (see Table 3 above) and it shows that mountain tea is collected throughout its distribution range in the whole national park territory, including the zone for active management and the strict protection zone. The system of registered and trained collectors with determined harvesting zones and annual quotas has not been established yet.



In the ALB part of the Park the number of collectors that collect for selling in Albania is around 50, consisting mostly of women. According to the albanian local expert the number of so called “accidental” collectors can be aproximated at around 1500. Besides them, who are mainly local inhabitants, there are 20 more collectors coming form the city of Korcha. There are no accurate data about the annual amount of collected herb. Currently, there is no control of the wild harvesting of mountain tea; neither determined quotas, nor registered collectors, nor an established system.

Each year within the Greek part of Prespa Park approximately 1000 kg (dry weight) of mountain tea is collected at Mt. Triklario by Greek inhabitants of the area, while it is estimated that a similar quantity (1000 kg) is collected by people from the neighboring villages of Albania. Alltogether

this makes up 2000 kg per year (in “good” years) which is thought to be a good quantity (i.e. with rains in late spring which promotes growth and productivity). As in the case of Galichica National Park, this is above the sustainable use quota. In dry years the overall quantity is smaller. Mountain tea in Krystallopigi is collected in small bundles (“ματσάκια, matsakia” in Greek); 16 bundles make up for 1kg of dry weight. In 2008 or 2009 (a good year for mountain tea), 30,000 such bundles were collected, i.e. approximately 1875 kg, by Greek inhabitants only. Spring rains were probably the driving factor for increased production that year, but it has to be noted that in 2007 the whole site was burnt and it is very probable that the minerals produced by this fire promoted mountain tea growth. At the area of Vrondero, Sideritis is collected in small quantities mainly for household consumption. An estimated quantity of approximately 150-200 kg is collected each year (from the area of interest shown on the map in Fig. 2). Additional small quantities are collected in oakforest openings on the borders with Albania, but, most probably, Sideritis in that area is gathered by Albanians rather than Greek inhabitants. In general, the local people know the proper way of collecting mountain tea (however, it is difficult to assess if they apply it in practice) and are eager to obtain detailed information on its cultivation. Moreover, some local farmers with suitable plots are willing to cultivate Sideritis and it has been found that at least one person in the area of Florina collects and sells Sideritis seeds for cultivation.

A comprehensive monitoring system should be established at a transboundary level in Prespa Region in order to control and monitor the wild collection of mountain tea. Only then can possible conflicts between sustainable harvesting and conservation aims be detected and avoided (Fremuth et al. 1999).



Typical habitat of Sideritis raeseri on Galichica



1.6.2 Cultivation

Mountain tea has great potential for cultivation, but it must be performed using the best techniques and best practices as well as the experience with cultivation within the Prespa Region that has been established in the course of the past 10-years. The expansion of this action should be balanced with market demand and marketing of products.



In the MKD part of Prespa Park, in the vicinity of village Kojnsko, an area of c.a. 3000 m² is cultivated for mountain tea. In the near past, the cultivated area used to cover more than 12000 m² but, due to out-migration of the inhabitants, this area has been reduced significantly. It is very important to stress that the planted seed material for this cultivation originated from Galichica Mt. The total annual yield varies from 500 kg to 600 kg dry plant material.

In the Prespa Park territory in Albania, the cultivation of mountain tea occupies an area of 3000 m², of which 400 m² is in Dolna Gorica village, 2000 m² is in Globoceni village, 200 m² is in Tuminec village, 80 m² is in Gorna Gorica, 100 m² is in Shuac village and 100 m² is in Zgradec village. Outside the Park's borders, in the near surroundings, 200

m² are cultivated in Peshkopea village and 120 m² more in Bratomira village. The average annual yield is 25kg/100m² dry herb. Twenty two households are involved in the mountain tea cultivation (v. Dolna Gorica-8; v. Globoceni-6; v. Tuminec-3; v. Gorna Gorica-2; v. Shuec-2 and v. Zgradec-1). Two of these households are capable of producing seeds and seedlings.

In the GRC part the cultivation of mountain tea (as well as other aromatic herbs and medicinal shrubs) is an issue of commercial interest for the local people, who presently cultivate alfalfa and a few other crops for fodder (rye and barley) in their non-irrigated fields located to the west-northwest of the village of Vrontero; (50 ha are fields with good soils while another 150 ha have poor soils). An attempt to cultivate *Sideritis* was undertaken in the recent past by a small number of farmers, but without success.

A comprehensive assessment of the economic values of mountain tea has not yet been prepared. However an example of a simple assessment of the income in the village of Gollomboc has been made as follows: in 2008 a farmer owning a farm of 400 m² planted with mountain tea benefited some 700 Euro, and this amount was higher compared to the profit from a land of 800 m² cultivated with crops (DEKONS-EMA 2010).





photo: Lj. Stefanov

Part II Action Plan

2.1 Threats analysis

According to the majority of experts' opinion, the population of mountain tea in the transboundary area of interest in Prespa Region is endangered, due to several reasons mainly generated by human pressure. The most often identified threats are the following: insufficient/inappropriate legislation; lack of enforcement of legislation and overlapping of the responsibilities of different institutions; lack of knowledge and low awareness among key stakeholders and public; and a lack of capacity of the relevant institutions to establish a control system that allows uncontrolled and inappropriate collection and overharvesting. In Albania, overgrazing in the early stage of vegetation is also identified as one of the threats to the mountain tea population. Additionally, climate change phenomena (decrease of the snow cover and redistribution of precipitation) might shorten the vegetation period of plants including mountain tea (DEKONS-EMA 2010).

2.1.1 Overharvesting and inappropriate harvesting

Overharvesting and inappropriate harvesting (collection with the roots, cutting all the stems from every individual, harvesting before flowering, etc) is certainly the major threat to natural mountain tea populations. Apart from Greece, where some kind of control is put in place through collecting permissions for the zones allowed for collection in the NP Prespa, in the other two countries collection of mountain tea is uncontrolled and unlicensed. Several factors contribute to this threat: existing legislation is inappropriate and not implemented; a system of control through licensing is not established; management plans of protected areas are not implemented; and collection is unsustainable. In addition, low awareness about mountain tea conservation needs and lack of knowledge about sustainable collection also threatens the *S. raeseri* natural populations.

Lack of enforcement of the legislation – There are sufficient legal mechanisms to protect or at least significantly reduce the excessive and improper collection of mountain tea, but they are not enforced (see chapter 1.5.2 National protection status). Failure to properly implement the existing regulations are mainly caused by socio-economic circumstances, the long collecting tradition, inaccurate and vague

regulations, secondary legislation not being adopted and overlapping of competences of key actors such as ministries, NPs administrations and public enterprises that have certain responsibilities in the region.

Lack of a system for regulating collection (licensing system) – So far the relevant institutions in the area of interest did not recognize the benefits of a system that will control mountain tea collection. None of the key institutions is trying to establish procedures for collection or a system of collector's permits (this leads to a competition among the collectors to be able to collect the desired amount of mountain tea). All this results in excessive, inadequate and untimely collection that endangers the natural population of *S. raeseri*.

Lack of implementation of management plans – In recent years, management plans for Galichica NP and Greek Prespa NP have been developed, while the management plan for Prespa NP in Albania is in the process of development. One of the programmes of management plans regulates the use of natural resources including *S. raeseri* for parts of the area of interest. Insufficient capacity of the management authorities as well a lack of safeguarding/ranger services slow the achievement of planned objectives within the management plans. It is evident that NPs staff has low experience and lack of human capacities for conservation of the mountain tea i.e. to establish proper monitoring and control over the collection process

Unsustainable collection – Two groups of collectors are identified: the first group collects for their own use (in small quantities) but the number of collectors is quite large, and the second group (smaller number of collectors) harvests for commercial purposes in much bigger quantities - due to low standards of living and unfavorable socio-economic conditions (some estimations of the number of collectors and collected quantities are given in chapter 1.6.1). Most of them are lacking knowledge about the conservation needs and sustainable wild collection.

Overexploitation of some easily accessible locations represents a special type of unsustainable collection. The areas that are easily accessible (close to the main roads) are exposed to the highest pressure from the collectors; i.e. mountain tea has been continuously harvested for many years by large number of collectors; they are the most degraded and could be identified as 'hot spots' for action.

2.1.2 Mountain tea habitat degradation

Overgrazing in the early stage of vegetation by sheep and goats and, partly, destruction by fires have affected the ecosystem functions and caused a decrease in the vegetation cover, especially in Albania. The mountain tea populations are often mixed with other fodder plants on pastures in their natural habitat and it is therefore endangered by overgrazing. In addition, overexploitation has contributed to the threatened status of this plant in Albania (Malo, 2004; Zeka, et al., 2008).

Degradation of habitats due to fires is still to be investigated since there are observations that show an increase of mountain tea populations after fire.

2.1.3 Lack of knowledge

The status of the mountain tea population within the zone of sustainable use in Galichica NP was followed (monitored) only accidentally until 2010 when the first estimate of the mountain tea population was made. A monitoring system for mountain tea in all three countries in the Prespa region has not yet been established. The lack of scientific data in relation to mountain tea distribution and biomass production is delaying the process of making the right decisions for maintaining the population in a favorable status and establishing a good system for the sustainable use of the species. Collection and/or cultivation of mountain tea must be done based on the best practices of management.

2.1.4 Low awareness about mountain tea

Mountain tea is the most favoured and collected tea within the Prespa Park area of interest. The low awareness about mountain tea importance and the need for conservation of the species and their habitats as well as lack of information on sustainable wild collection and possibilities for cultivation among key stakeholders, local communities and the public (in general) seriously endangers mountain tea populations and disables proper management planning.

2.2 Action plan

2.2.1 Overview of overarching goal, aims and objectives

The mountain tea CAP is the first comprehensive document that systematically offers fundamental guidelines for the sustainable management and protection of mountain tea populations in the broader Prespa Region. This plan is based on the recent scientific knowledge on mountain tea from all three countries sharing the Prespa lakes watershed. It is also based on the accepted and ratified international conventions, plans and recommendations related to mountain tea conservation and protection worldwide.

The overarching goal of this AP is to ensure the long-term favourable conservation status, sustainable management, restoration and protection of the populations of mountain tea (*Sideritis raeseri*) in the Prespa watershed, including across trans-national boundaries.

In order to achieve this overarching goal, aims and objectives were defined and specific actions were recommended for the three countries in the Prespa Region. All aims, objectives and recommended actions defined for reaching the overarching goal are presented below. This AP is not a fixed document but is intended to be adaptive and flexible and can be changed after a revision is made at specific points in time.

2.2.2 Detailed action plan

The mountain tea AP is prepared for a 5 year period of implementation. In order to reach the overarching goal of the mountain tea CAP, based on the known threats to mountain tea populations in the Prespa Region, four main aims were identified; to: 1) eliminate overharvesting and inappropriate harvesting; 2) prevent degradation of mountain tea habitats; 3) improve knowledge; and 4) improve awareness about mountain tea.

To fulfill these aims 11 objectives and 32 recommended actions were elaborated through a participative process involving mountain tea experts from all three countries and external consultants. With very few exceptions, all the objectives and the recommended actions concern all three countries that share the Prespa lakes watershed. Some of the identified actions are

cross-cutting and are therefore relevant to other objectives as well as the one where the action is recommended.

The main identified aims, objectives and actions of the mountain tea CAP are the following:

Aim 1: Eliminate overharvesting and inappropriate harvesting

Enforcement of the legislation (objective 1.1) and establishing a licensing system (objective 1.2) are important tasks that can eliminate the over- and improper collection of mountain tea. In order to fulfill these objectives it is important to work with the responsible governmental institutions/organizations (ministries, NPs management authorities etc) in order to improve, streamline and harmonize existing legislation and to prevent overlapping of responsibilities. Information about new legislation should be disseminated to the public (action 4.1.1). A workable procedure for a licensing system needs to be developed together with key stakeholders (action 1.2.1) and then introduced on the ground (action 1.2.2). Information material about new protocols for the target audience will be developed in order to ensure its acceptance and wide use (action 4.1.2).

Apart from the legislation, management plans already prepared for NPs in the Prespa Region should be enforced (objective 1.3). In order to reach this objective it is necessary to increase the capacities of management authorities (action 1.3.1) as well as to increase effectiveness of the existing ranger services (action 1.3.2) in protected areas. For that purpose education material for sustainable collection of mountain tea should be produced (action 4.1.3). Training and strengthening of the capacities of the NPs staff (rangers) is equally important to establish sustainable management of mountain tea (action 4.1.4).

In order to establish sustainable and controlled harvesting for commercial purposes (objective 1.4) several actions are proposed: to identify the commercial collectors (action 1.4.1), to identify annual quotas for sustainable collection (action 1.4.2) and areas for wild collection as well as to introduce daily and seasonal collectors cards as part of the licensing system (action 1.4.3). A training programme about sustainable wild collection for commercial collectors is envisaged (action 4.1.5). Finding other ways to generate income for economically disadvantaged families and/or the promotion of ex-situ cultivation, could overcome in-situ collection of mountain tea.

The fifth objective for eliminating over and inappropriate harvesting is to attain sustainable ad hoc collection. For that purpose it is important to determine and announce the harvesting period (dates) of mountain tea in certain locations (action 1.5.1). Not only commercial collectors but also ad-hoc collectors should be a part of the licensing system (action 1.5.2). On farm conservation of mountain tea; i.e. cultivation (objective 1.6) is recommended in order to reduce pressure from wild collection. For that purpose, promotion of cultivation of mountain tea (action 1.6.1), training and education about

cultivation (action 1.6.2) and pilot projects for cultivation (action 1.6.3) should be conducted. For the reintroduction to the wild through seeding or of seedlings an appropriate protocol (criteria, etc) should be formulated (action 1.6.4).

Development of fair and modern marketing will provide an additional income for local people (objective 1.7). Labeled products might gain a better price on the international market. Thus structuring production in local farms through a contracting system (action 1.7.2) in cooperation with Chamber(s) of Commerce can guarantee harvest and trade. It is important to strive towards a direct producer-consumer link (avoiding the dealers as much as possible). In order to reach this objective it is necessary to fix levels of control for harvest and trade and for monitoring the mountain tea populations, depending on the abundance, harvested plant parts and harvesting methods.

Areas that are exposed to constant/regular harvesting by a large number of collectors are the most threatened. Revitalisation of sites ('hot spots') with the most affected mountain tea populations is identified as the eighth objective to eliminate over and inappropriate harvesting. Some rough estimation and delineation of those "hot spots" was carried out in the frame of this project and they are shown on the map of distribution (Fig. 3). To improve mountain tea populations at the identified "hot spots", it is important to prioritize the sites for reintroduction (action 1.8.1), to reintroduce mountain tea to selected priority sites (action 1.8.2) and to ensure proper protection of reintroduction sites (action 1.8.3).

Aim 2: Prevent degradation of mountain tea habitats

In Albania, it was recognized that overgrazing in the early stage of vegetation and partly fires have negative impact on mountain tea habitats. Still, the impact of fires on mountain tea populations should be investigated/assessed (action 2.1.1).

Aim 3: Improve knowledge

Scientific information about the current status of mountain tea population is needed in order to establish the sustainable management of mountain tea. For that purpose, a common monitoring procedure/protocol should be developed (action 3.1.2) and regular monitoring of mountain tea populations should be established (action 3.1.3), a study of the distribution and biomass production of mountain tea should be prepared (action 3.1.1) as well as to prepare a study of best management practices (for collection and/or cultivation) for economic use of mountain tea (action 3.1.4).

Aim 3: Improve awareness for the mountain tea

Most of the actions that are identified to reach objective 4.1 to establish effective communication to target audiences are relevant for previous objectives and have already been discussed above. Efforts for education and spreading information among key stakeholders should be initiated early in the process. A public awareness campaign is also necessary in order to spread information to the people living within or outside NPs, for the need to conserve the species and their habitats and to promote the benefits of conservation and sustainable wild-collection of the mountain tea. Organisation of different events (e.g. mountain tea festival, etc) is one of the tools to spread the information (action 4.1.7) and promotion of branded local products.

All identified conservation measures i.e. actions to confront threats to mountain tea in the Prespa region are mentioned in Table 4. The actions are elaborated based on their priority for implementation, timeframe and responsible institution for their implementation.

Prioritization has been carried out at 3 levels:

- I (first priority) means that immediate action is required,
- II (second priority) means that the action should be implemented in the frame of this AP, and
- III (third priority) is given to the actions for which implementation should start in the frame of this AP.

The proposed actions are divided in 3 groups based on the timeframe needed for their implementation:

- ST (short term) – the action can be implemented in the period of one year,
- MT (medium term) – the period of implementation of certain action is between 1-3 years,
- LT (long term) - the period of implementation of certain action is between 3-5 years.

Actions should ideally be implemented on a transboundary level through cooperation between all relevant stakeholders. The active management of mountain tea requires involvement of the relevant ministries, local governments, management bodies and staff of the NPs, scientists, harvesters and farmers associations, local NGOs and other stakeholders that share the interest in this issue under the umbrella (coordination) of the TPP.

Threats	Aims	Objectives	Actions	Time frame	Priority	Implementation
Overharvesting and inappropriate harvesting	1. Eliminate overharvesting and inappropriate harvesting	1.1 Enforcement of legislation	1.1.1 Work with ministries to improve, streamline and/or harmonise existing legislation related to sustainable use of natural resources	MT	I	relevant ministries, experts
			1.1.2 Prevent overlapping of responsibilities of key actors (ministries, NPs, etc)	MT	I	relevant ministries, experts PA's management bodies, Forestry authorities, PPCC
		1.2 Establish licensing system	1.2.1 Work with key stakeholders (ie: ministries, NPs) to develop a workable procedure	MT	I	relevant ministries, experts, PA's management bodies, Forestry authorities, PPCC
			1.2.2 Introduce newly developed procedures for licensing system	ST	I	relevant ministries, PA's management bodies, Forestry authorities, PPCC export companies
		1.3 Management plan enforcement	1.3.1 Increase capacity of management authorities for conservation of mountain tea	LT	II	Experts, NGOs, PA's management bodies, Forestry authorities
			1.3.2 Increase effectiveness of the existing ranger services to control over the collection process	LT	I	PA's management bodies
		1.4 Sustainable commercial collection	1.4.1 Identify commercial collectors of mountain tea	ST	I	PA's management bodies Forestry authorities
			1.4.2 Identify annual quotas for wild collection of mountain tea	MT	I	scientific experts, PA's management bodies
			1.4.3 Introducing daily and seasonal commercial collectors card*	ST	I	PA's management bodies, Forestry authorities, commercial collectors
		1.5 Sustainable ad hoc collection	1.5.1 Determining and announcing of tea harvesting period (dates) and locations	MT	I	PA's management bodies, experts
			1.5.2 Introducing daily (or seasonal) collectors card for ad hoc collectors*	ST	I	PA's management bodies, Forestry authorities, collectors
		1.6 On-farm conservation	1.6.1 Promotion of cultivation of mountain tea*	ST	I	experts, PA's management bodies, local NGOs, local collectors
			1.6.2 Training and education about cultivation	ST	I	experts, experienced local people

Threats	Aims	Objectives	Actions	Time frame	Priority	Implementation
Overharvesting and inappropriate harvesting	1. Eliminate overharvesting and inappropriate harvesting	1.6 On-farm conservation	1.6.3 Conduct pilot projects for cultivation*	MT	I	experts, experienced local people, NGOs, local collectors
			1.6.4 Formulate protocol (criteria, etc) for reintroduction to wild by seeding/of seedlings if appropriate	LT	III	experts, PA's, MCWG
		1.7 Development of fair and modern marketing for labeled products	1.7.1 Initiating a cooperation mechanism with Chamber(s) of Commerce	MT	II	PA's management bodies, PPCC
			1.7.2 Structuring production in local farms through contracting system and production of labeled products	LT	I	local people, PA's, PPCC
		1.8 Revitalization of the most affected Mountain tea populations ('hot spots')	1.8.1 Agree and prioritize the sites for reintroduction	MT	II	scientific experts, PA's management bodies, MCWG
			1.8.2 Reintroduce mountain tea to priority sites	LT	III	experts, PA's management bodies
1.8.3 Ensure protection of reintroduction sites	LT		III	PA's staff (rangers), local NGOs		
Degradation of mountain tea habitats	2. Prevent degradation of mountain tea habitats	2.1 Study the possible causes for mountain tea habitats degradation	2.1.1 Prepare study of impact of overgrazing and fires on Mountain tea population status	LT	III	relevant experts, PA's management bodies, Forestry authorities
Lack of knowledge	3. Knowledge improvement	3.1 Study the current status of mountain tea population	3.1.1 Assessment of distribution and biomass production of mountain tea	MT	I	scientific experts, PA's management bodies
			3.1.2 Develop common monitoring methodology and protocol*	ST	I	scientific experts
			3.1.3 Establish monitoring of mountain tea population*	LT	I	PA's staff, experts, NGOs
			3.1.4 Prepare study of best management practices for economic use of mountain tea*	MT	I	relevant experts
Low awareness among key stakeholders, local communities and the public about mountain tea	4. Improve awareness for the mountain tea	4.1 Effective communication to target audiences	4.1.1 Disseminate information about new legislation (related to objective 1.1)	ST	II	relevant ministries, municipalities, experts PA's management bodies, Forestry authorities, NGOs, PPCC

Threats	Aims	Objectives	Actions	Time frame	Priority	Implementation
Low awareness among key stakeholders, local communities and the public about mountain tea	4. Improve awareness for the mountain tea	4.1 Effective communication to target audiences	4.1.2 Develop public information to ensure acceptance and use of new protocols about licencing system (related to objective 1.2)	ST	II	relevant ministries, PPCC, PA's management bodies, Forestry authorities, NGOs
			4.1.3 Production of educational material for sustainable collection and cultivation (related to objective 1.4)	ST	I	experts, PPCC, PA's management bodies, NGOs
			4.1.4 Develop and implement training programme for rangers (related to objective 1.3)	MT	I	relevant experts, PA's staff (rangers)
			4.1.5 Develop and implement training programme for commercial and ad hoc collectors (related to objectives 1.4 and 1.5)	LT	I	relevant experts, PA's management bodies, NGOs, collectors
			4.1.6 Develop and implement training programme about monitoring of mountain tea (related to objective 3.1)	MT	I	scientific experts, PA's management bodies, NGOs, students
			4.1.7 Organise promotion events (e.g. mountain tea festival, etc) for spreading information and promotion of local products*	LT	I	PPCC, municipalities, PA's management bodies, NGOs, collectors/producers

Table 4. Recommended Action plan for Mountain tea

2.3 Recommended priority actions

From the AP given in Table 4, several priority conservation actions, that need to be applied immediately by the responsible management authorities, were selected by the expert team. In the following text they are elaborated in more detail.

Actions 1.4.3 and 1.5.2 - Introducing daily and seasonal collector's cards for commercial and ad-hoc collectors

Due to the low economic status of people living in the Prespa Region, mountain tea is an important plant species with high economic value for local communities. Thus, many of the collectors are harvesting mountain tea for commercial purposes. The best way to control the collection process is to establish a system of licenses for all collectors (not only commercial but ad-hoc collectors, as well). This activity is very much related to/dependent on activities for developing a procedure for a licensing system together with the relevant ministries (activities 1.2.1 and 1.2.2). Harmonization of the legislation might be a long-term process especially if some amendments or secondary legislation need to be adopted. However, based on the existing legislation NPs management authorities should start introducing collector's cards for commercial and ad-hoc collectors. A proper licensing system requires trained collectors in sustainable wild collection. For that purpose, action 4.1.5 - training program for collectors should be developed and implemented at the same time.

Only sustainable and controlled harvesting will contribute to maintaining the population of mountain tea in a favorable condition and may be beneficial both for the local economy and for habitat conservation.

Time scale: Short term

Prioritization: Immediate action

Approximate costs: 6.000 €

Priority action(s)	Short description	Budget	Stakeholders	Leader(s) / potential performers	Indicators
Introducing daily and seasonal collectors card	Important part of establishing licensing system in Prespa Region, aiming to prevent over and inappropriate harvesting, is introduction of daily and seasonal commercial collectors' card.	6.000 €	NPs, collectors, municipalities	NPs management authorities	Introduced daily and seasonal commercial collectors card

Actions 1.6.1 and 1.6.3 - Promotion of cultivation of mountain tea and conducting pilot projects for cultivation

Cultivation is considered as an alternative for the conservation of medicinal plant species. Thus, one of the recommended conservation actions of mountain tea is cultivation. Mountain tea can be cultivated well on soils of low productivity in areas within Prespa Park. There is limited experience with cultivation and farming of mountain tea in the Prespa Region. Low awareness and a lack of knowledge among local people are also identified as a main obstacle for cultivation. Best practices and experiences of local people should be promoted to the people in all three countries in the

Prespa Region through different meetings and training workshops. Pilot activities for different cultivation techniques should be conducted with interested local people (at least 3 per country) in order to find the most appropriate means of cultivation. Financial support for cultivation and scientific advice should be provided for those people.

The expansion of cultivation of mountain tea should be balanced with market demand and marketing of products.

Time scale: Short term and medium term

Prioritization: Immediate actions

Approximate costs: 17.500 €

Priority action(s)	Short description	Budget	Stakeholders	Leader(s) / potential performers	Indicators
Promotion of cultivation of mountain tea	Cultivation, as one of the recommended conservation actions of mountain tea, should be promoted to the local people through different meetings, workshops and events in all three countries in the Prespa Region.	10.000 €	Relevant experts, NPs, NGOs, local collectors, collectors' organisation	NGOs, NPs	Cultivation of mountain tea promoted on at least 3 local traditional events (or meetings/workshops) in Prespa Region. Several interested people for cultivation identified.
Conduct pilot projects for cultivation	Cultivation of mountain tea is recommended conservation action in order to reduce pressure from wild collection.	7.500 €	interested local people, experts, NPs, NGOs,	NPs, interested local people	3 pilot projects for cultivation per country conducted.

Actions 3.1.2 and 3.1.3 – Develop common monitoring protocol and establish monitoring of mountain tea population

Efficient conservation of mountain tea in TPP requires proper knowledge based management related to the sustainable use of mountain tea based on accurate data on its distribution and area, biomass production and harvested amounts. Only then can possible conflicts between sustainable harvesting and conservation aims be detected and avoided.

Some assesment of the distribution and population status of *Sideritis raeseri* was carried out in the NP Galichica in 2010. Additional research on its population status based on regular monitoring needs to be conducted in all three countries in TPP in order to get more accurate data of the sweated resource potential and to identify annual quotas.

The proper management and conservation of mountain tea requires systematic monitoring of the mountain tea populations and its habitats. Thus, there is a need for the establishment of a transboundary monitoring system for mountain tea. A common monitoring programme/ protocol for all three countries in Prespa region should be developed. A monitoring system will continuously provide data on the distribution, population status, biomass production and condition of its habitats. Control and monitoring of wild collection of the mountain tea should also be embeded in a comprehensive monitoring system. An established monitoring system requires trained stuff and a supply of a technical infrastructure for data management, analysis and reporting. In order to build capacities, a training programme about monitoring of mountain tea should be developed and implemented, i.e. action 4.1.6 should be implemented at the same time. Data collected and analysed as part of the monitoring system should be made regularly available to the site managers, decision-makers and environmental policy makers.

Time scale: short term and continuously

Prioritization: Immediate action

Approximate costs: 10.000 € (for developing monitoring protocol)

4.500 € per year for monitoring

Priority action(s)	Short description	Budget	Stakeholders	Leader(s) / potential performers	Indicators
Develop common monitoring protocol for mountain tea	Sustainable management of mountain tea should be knowledge based. Monitoring programme/ protocol for all three countries in Prespa Region should be developed.	10.000 €	scientific experts	PPCC, NPs	Common monitoring protocol for mountain tea developed.
Establish monitoring of mountain tea population	Proper management and conservation of mountain tea in Prespa Region can be assured only by establishment of monitoring system that will provide reliable data on the status of mountain tea population and its habitats.	4.500 €	NPs, environmental and forestry agencies, NGOs, scientists, relevant ministries from all three countries	PPCC, NPs	Monitoring of mountain tea population established.

Action 3.1.4 - Prepare study of best management practices for economic use of mountain tea

As previously said, efficient conservation of mountain tea in the Prespa Region requires proper knowledge based management. Collection or cultivation of mountain tea must be performed based on the best practices of management. Wild collection of *S. raeseri* can be prohibited periodically (year by year) in some zones in order to regenerate the populations. Determination of harvested zones and harvested amounts must be done in accordance with scientific assessments (based on the data from conducted monitoring). Cultivation of *S. raeseri* should be done using the best techniques along with assistance for the agro-technical requirements and recent experience gained from cultivation in Prespa Region. A study of best management practices for mountain tea needs to be prepared in order to establish its proper sustainable management.

Time scale: medium term

Prioritization: Immediate action

Approximate costs: 15.000 €

Priority action(s)	Short description	Budget	Stakeholders	Leader(s) / potential performers	Indicators
Prepare study of best management practices for economic use of mountain tea	Proper management of mountain tea in Prespa Region should be based on best practices and knowledge.	15.000 €	Scientists, NPs, NGOs,	Scientists, NGOs	Study of best management practices for economic use of mountain tea prepared.

Action 4.1.7 - Organise promotion events

Raising public awareness about mountain tea is one of the tools for effective conservation of the species. Information about the needs to conserve the species and their habitats and benefits of conservation and sustainable wild-collection of the mountain tea should be disseminated to the people living within or outside NPs, through different events, workshops etc. The mountain tea festival is one of the events proposed to be organized annually in Ohrid.

Time scale: Medium term

Prioritization: Immediate action

Approximate costs: 10.000 €

Priority action(s)	Short description	Budget	Stakeholders	Leader(s) / potential performers	Indicators
Organise events (e.g. mountain tea festival, etc) for spreading information and promotion of local products	Mountain tea festival and other events should be organized to disseminate information about conservation needs and sustainable use of mountain tea. Information and education efforts should be initiated early in the process for establishing sustainable management.	10.000 €	NPs, municipalities, local environmental NGOs, local associations for cultural heritage	NPs	Mountain tea festival organized annually. Other promotion events/ meetings organized

Conclusions

This plan has been assembled using the experience and knowledge of experts from the three countries involved in the process. It therefore has joint ownership for the priority actions and their delivery and represents an extremely powerful document for the long term sustainable management and use of mountain tea.

This is a critical species for the region. It provides economic and social benefits as well as being a key and emblematic species for biodiversity conservation. The plan, if implemented, therefore has a high chance of delivering its aims and aspirations and can provide inspiration and an example of best practice for similar threatened species and habitats.

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