



SUMMARY

GUIDELINE DOCUMENT OF THE RESTORATION AND MANAGEMENT OF WET MEADOWS IN THE LAKE MIKRI PRESPA

Description of the study area

Wet meadows are defined as meadows covered by low herbaceous vegetation on soils periodically flooded or waterlogged during some periods of the year. At Lake Mikri Prespa, these meadows are found on littoral sites with gentle slopes and, usually, between the reedbeds and the drier habitats or farmland.

The study area belongs to the geographical territory of the Municipality of Prespa, situated in the north-western edge of the Florina Prefecture (Region of Western Macedonia). More specifically, the study area (area of restoration and management of wet meadows) is defined as the littoral zone of Lake Mikri Prespa, which is situated within the core of Prespa National Park and/ or within the "Nature Protection Area" (according to Common Ministerial Decision due to be issued on the delimitation of protection zones, according to the criteria of Law 1650/1986) and/ or which is considered unsuitable for cultivation when the water level is at the highest altitude of 854.80m (851.0m according to measurements taken after 2001). The total surface of the study area is 3,615 ha.

The study area falls under the jurisdiction of the Ministry of Rural Development and Food (MRDF) and particularly the Directorate of Aesthetic Forests, National Parks and Hunting. At the local level, the relevant competent authority for the management of the National Park/ Forest is the Florina Forestry Department, which falls under the Forestry Department of the Regional Administration of Western Macedonia. Furthermore, as a wetland of the Ramsar Convention, Lake Mikri Prespa falls under the jurisdiction of the Ministry of Environment, Physical Planning and Public Works. (MEPPPW). Both the study area and the wider study area (which encompasses all the catchment basin of Prespa within Greece including the watershed of Aghios Germanos torrent) fall under the jurisdiction of the Management Body of the Prespa National Forest (MBPNF) that was established in 2003.

The wider study area includes three areas of community interest, which have been incorporated in the European list of the NATURA Network, according to the Habitats Directive (92/43/EC): a) GR 1340001 (Prespa National Forest), which includes the study area, b) GR 1340002 (Lake Mikri Prespa), and c) GR 1340003 (Varnous Mountains). Within the study area nine habitat types of the ANNEX I of the 92/43/EC Directive are found, of which two are priority habitats (3170* and 6220*). Wet meadows (6420 "Mediterranean tall humid grasslands of the *Molinio-Holoschoenion*") cover about 100 ha of the littoral zone, most of which are under systematic vegetation management.

The catchment basin of Lake Mikri Prespa covers 208,687 km² and forms the upper part of the wider Prespa basin, which includes also Lake Megali Prespa and coincides with the boundaries of the Prespa Transboundary Park. This fact, in conjunction with the international protection status of the area, underlines the importance of Lake Mikri Prespa on a global scale, regardless of the fact that the larger part of the lake (90%) is found within Greek territory. The two lakes collect all surface water from streams, underground water that flows into them and water coming directly from rainfall on their surface. The Prespa lakes do not flow directly into the sea, but outflow through underground karstic channels into Lake Ohrid. The last few years the water level difference between the two lakes has stabilized and during the present study the difference was 5.93m (29.5.2007).

The wider study area is characterised by high biodiversity, owing to natural factors and anthropogenic influences beneficial for the environment. The geomorphological character of the area is shaped by the Lakes Mikri and Megali Prespa, along with the mountainous massifs that expand close and around the lake shores and particularly those of Vrontero in the west, Triklario in the south and Varnous in the east and northeast.

The climate of the area is characterized as Mid-European with smoother distribution of rainfall than the rest of the country. The average annual values of precipitation (rainfall + snowfall) at the meteorological stations of Koula and Aghios Germanos amount to 575mm and 607mm respectively. Snowfall usually occurs between December and March.

The geology of the wider Prespa area is characterised by the presence of metamorphic rocks and granites in the eastern side, while the western boundaries are dominated by limestone and dolomites with a high degree of karstic layers. The soils of the littoral areas and the cultivated land around the lakes have been studied in detail and can be grouped into the following major units: a) Entisols, b) Inceptisols, c) Alfisols, d) Histosols, and e) Soils of the uplands.

The flora of the wider Prespa area includes more than 1,500 indigenous plant species. The littoral zone of Lake Mikri Prespa, which is included in the study area, is surrounded by extensive reedbeds (550 ha in the study area), which expand along most of the perimeter of the lake. The dominant plant species in the reedbeds are the reed (*Phragmites australis*) and the reedmace (*Typha angustifolia*). These reedbeds host a substantial number of threatened bird species, while the fauna that resides within them consists of many fish, mammal, amphibian and invertebrate species. Many of these species depend on the existence of wet meadows at the landward edge of the reedbeds. Apart from the reedbeds and the wet meadows, other vegetation types that are found in the area include formations with water lilies

and other aquatic plants and the littoral willow forest located at the eastern lakeshore.

The Prespa area hosts many protected and endemic fauna species. In brief, in the wider study area there have been recorded: a) 23 fish species, among which at least five depend on the wet meadows for their successful reproduction, b) 11 amphibian species, c) 22 reptile species, d) 54 mammal species and e) more than 261 bird species, of which 164 are breeding.

Especially regarding the bird species of the area, it is worth mentioning that Prespa is globally known for the populations of rare waterbirds, as it is host to the few mixed colonies of Dalmatian Pelicans (*Pelecanus crispus*) and White Pelicans (*P. onocrotalus*) in the world, the highest concentration of Dalmatian Pelican breeding pairs in the world and one of the largest colonies of Pygmy Cormorants (*Phalacrocorax pygmeus*) in the European Union. Furthermore, several species of waterbird species nest in the area, among which Cormorants (*Phalacrocorax carbo*), Greylag geese of the eastern race (*Anser anser rubrirostris*) and eight species of herons. It is considered that the restoration and management of wet meadows within the LIFE-Nature Project(2002-2007) has contributed to the re-nesting of 2-4 pairs of Glossy Ibis (*Plegadis falcinellus*) in 2005 (SPP, 2005), after 35 years of breeding absence in the area, while the species bred again in spring 2007.

The wider study area is part of the Municipality of Prespa, which consists of 13 Municipal Departments (M.D.) seated in the M.D. of Laimos. The Municipality of Prespa belongs to the purely "mountainous" regions of Greece and the 13 M.D.s are considered agricultural areas. During the last decades there have been changes in size and characteristics of the Municipality population, which amounts to 1,851 inhabitants according to the 2001 population census. It is one of the most sparsely inhabited areas of the country with a density index of 4.5 inhabitants/ km² in 2001, in contrast to the 28.5 inhabitants/ km² of the Florina Prefecture and 32 inhabitants/ km² of the Region of Western Macedonia. The financially active population (FAP) of the Municipality of Prespa amounts to 903 people (4.3% of the FAP of Florina Prefecture), of which 598 are men and 305 women. The majority of the FAP (60%) is engaged with the primary sector. Second in importance is the tertiary sector, which although much lower than the primary amounts to 24%. Finally, the secondary sector absorbs a mere 7% of the working population. Agricultural activity is practiced in 401 rural enterprises with beans as the main produce. Regarding animal-husbandry, the area specialises in sheep, goats and cattle, and less on pigs, while other activities within the primary sector include forestry (with two active local forestry cooperatives), small-scale primary processing of certain agricultural products, the trade of all agricultural products and fishing (about 130 fishermen with 65 fishing boats in both lakes). In the tertiary sector, tourism and recreation services have been developing dynamically during the last decade.

Within the study area several activities are practiced, which are related to agriculture, animal-husbandry (grazing and harvesting of vegetation in summer), fishing (fishing in Lake Mikri Prespa and burning of the reedbed vegetation), management of the water level, tourism, as well as to the permanent presence of people (villages). Among these, grazing of the littoral zone, hay collection and the management of the sluice gate in the Koula area play a vital role in the maintenance and function of the wet meadow areas, which appears to have greatly benefited fishing during the last few years.

Of particular interest are also the historical and cultural elements of the wider study area, as well as the traditional management methods of wet meadows and reedbeds in Lake Mikri Prespa. At the whole of the Prespa basin there are positions and habitation indications from the Neolithic Age (from traces of pile-dwelling in the FYROM littoral zone of Lake Megali Prespa) and the Age of Copper. Findings of the Hellenistic and Roman periods on the island of Aghios Achilleios, the settlement of Pili and in-between the settlements of Laimos and Miliona, underline the importance of the littoral zone for these inhabitants of the area. During the Byzantine and meta-Byzantine era, several monuments were created, including temples, monasteries, hermitages and religious rock-paintings, as well as churches of the 19th and 20th century. More settlements were situated in the littoral zone of Lake Mikri Prespa, which were abandoned due to the Civil war or due to malaria (Kranies, Opagia, Old Pili, Daseri, Agathoto), while some other locations were occasionally inhabited. Fishing was the main activity for the inhabitants of the littoral settlements and the use of traditional fishing methods persisted until recent decades, especially in Lake Mikri Prespa.

Until the 1980s, the local economy was comprised of a variety of activities; almost every family was involved with fisheries, agriculture and animal-husbandry. Many of the activities of the inhabitants of Prespa were connected to the wet meadows and the reedbeds, contributing to their management. The management practices included: a) cutting of reeds at different seasons of the year and its use as construction and insulating material and as winter fodder, b) the maintenance of the shallow littoral areas, in order to keep them free of high helophytes and thus apply fishing methods (e.g. wicker traps), c) the burning of large areas of reedbeds every winter for the creation of suitable breeding areas for Carp the following spring, d) the grazing of large cattle and buffalo herds, which maintained the low vegetation structure of wet meadows and restrained the landward expansion of reedbeds.

This situation changed from the mid 1980s, following the turn of the inhabitants towards intensive agriculture, which caused a great reduction in the grazing of the littoral zone and the abandonment of traditional methods of vegetation management. Furthermore, fishing in shallow waters was abandoned, only to be substituted by fishing in deeper waters with motor boats and modern tools, such as nets and long-lines. Finally, a ban on burning of reedbeds for the protection of waterbird nests within them has resulted in preventing the use of controlled burning as a means of management for the restriction of reedbed expansion. In total, these changes contributed to the reduction of wet meadow surface areas from 129 ha in 1945 to 89 ha in 1984 and finally to about 32.5 ha in 2000.

The threats to the study area today can be distinguished to general (which refer to the whole area) and specific ones (when particular actions/ processes downgrade certain habitats and/or threat fauna species). "General" threats include: a) effects of anthropogenic phenomena, such as global warming, b) activities, which are not in line with the conservation of biodiversity within the study area, c) the absence of a transboundary water resources management plan, d) the imminent and increasingly frequent possibility of prolonged drought, as in 1988-1990, due to global climate change, e) the possible discontinuation or degradation of the current management of littoral vegetation which contributes to the conservation and improvement of wet meadows in Lake Mikri Prespa, f) the possible decrease in lake water quality and g) the continued sedimentation of the lake, due to the soil types of the fields and the

irrigation of a large part of the cultivations with surface flow and flooding of the fields. "Specific" threats include: a) the expansion of cultivations towards littoral sites during periods of low water level, threatening wetland habitats, b) the deterioration of wetland habitats due to excavation works, c) the excessive and uncontrolled burning of reedbed vegetation (in winter and even in spring), which negatively influence invertebrate and bird populations (possibly other wildlife species as well), d) sudden drops of the water level of the lake, following the accomplishment of the highest spring values, which may influence negatively the reproduction of fish and amphibians due to the exposition of the eggs on surfaces with inadequate flooding, e) the possible uncontrolled tourist development of the area, and f) the possibility of extensive spread of epidemics (e.g. avian flu).

From the above it is obvious that the presence of man within the protected area of Prespa in all three countries (Greece, Albania and FYROM) had and continues to play a vital role on issues related to biodiversity conservation, part of which is the restoration and management of wet meadows in Lake Mikri Prespa.

The Prespa Park, which was established in 2000 with the common declaration of the Prime Ministers of Greece, Albania and the FYROM constitutes the first transboundary protected area in South-Eastern Europe. In 2001 the trilateral Prespa Park Coordination Committee (PPCC) was established, which is comprised of ten members with three representatives from each country from the relevant environmental authority at ministerial level, the local Self Government, the local environmental Non-Governmental Organizations (NGOs) and a permanent observer – representative of the Ramsar Convention for the protection of Wetlands and the MedWet Initiative for the Mediterranean Wetlands. The PPCC is supported by the Secretariat, which is made up by the NGO-members of the PPCC with temporary seat in Aghios Germanos. From 2000 until today, the PPCC has promoted the planning and accomplishment of common projects, which are necessary for the political commitment to obtain a practical meaning for the environment and the inhabitants of Prespa. Specifically, the following actions have been achieved: a) Accomplishment of a Strategic Action Plan (SAP) for the Sustainable Development of the Prespa Park (2001-2002), b) Promotion of the accomplishment of a hydro-geological study for the Prespa catchment basin and the trilateral collaboration on water management, c) Accomplishment of a study on the interaction between Lake Mikri Prespa – Rivel Devol (Greece – Albania) and formation of best practice water management principles, and d) Preparation, submission and approval of a common project for the Prespa Park area towards GEF, aiming at the accomplishment of the SAP results.

Evaluation

Based on the particularly high biodiversity of the wider study area and on the precondition that the anthropogenic environment will not impede the future conservation status of the protected elements, the study area is positively evaluated. The necessary actions related to the future intervention of man in the study area, with the aim of sustainable development of natural resources within the area, concentrate on: a) the continuation of management of the lake water level and the littoral vegetation in selected sites aiming at the conservation of wet meadows and the reedbeds of Lake Mikri Prespa, b) the continuation and strengthening of environmental monitoring activities and communication – public awareness activities, c) the minimization of negative effects from agricultural practices in the wider study area, d) the prevention of certain illegal actions, such as the expansion of

cultivations to the expense of the wetland, illegal fishing and the uncontrolled burning of reedbeds, e) the solution of legal issues regarding the protected area of Prespa, f) the unraveling of the property and land-use issues in the zones of "absolute nature protection" and "nature protection", and g) ensuring the continuation of the present favourable disposition of the collaborating stakeholders within the framework of the MBPNF towards water level and littoral vegetation management.

The aim of the restoration and management of wet meadows in Lake Mikri Prespa

The aim of this guideline document is the restoration and management of wet meadows in Lake Mikri Prespa for the period 2007-2012, targeting: a) the conservation of the ecological values of the lake, b) the conservation of biodiversity and habitats, c) the protection of rare and/or endemic fauna and flora species, while taking into account human activities in general and more specifically the current irrigation needs of the area, and d) the creation and/or increase of social and financial benefits, directly or indirectly related to the sustainable management of specific sites.

The policy for the achievement of the objectives set was based on four axes:

- a. Protection and conservation of the wetland functions, species and habitats in Lake Mikri Prespa through restoration and/or management activities.
- b. Integrity, social and economic sustainability of the plan, as well as of the particular activities and measures.
- c. Promotion and assurance of partnerships, cooperation, synergy and participation in decision making procedures; planning and implementation of the plan with the functional and interactive participation of the stakeholders.
- d. Inclusion of the transboundary perspective in the management plan and practices.

Objectives and operational objectives of the wet meadow management

Objective I: Management of the water level of Lake Mikri Prespa so as to secure ecological functions and conserve habitats, wildlife and biodiversity, while serving existing irrigation needs and other current socioeconomic activities (e.g. fishing, tourism).

This objective will be attained through the achievement of the following operational objectives:

Operational Objective I.I: Regulation of the fluctuation of the water level of Lake Mikri Prespa on a yearly basis, giving emphasis to the annual maximum value.

Operational Objective I.II: Prevention of a sudden drop of the water level of Lake Mikri Prespa, especially during the spring period.

Operational Objective I.III: Securing minimum flow at the Koula stream, especially during the spring and summer periods from sluice outflow.

Operational Objective I.IV: Monitoring and prevention of activities that might influence significantly the water balance (in quality and quantity) in Lake Mikri Prespa on a transboundary level.

Operational Objective I.V: Organization of a decision making system on the water level management of Lake Mikri Prespa on a yearly basis.

Operational Objective I.VI: Promotion of the organization of a monitoring system of the qualitative parameters related to water level management of Lake Mikri Prespa ¹.

Objective II: Helophyte vegetation management at the littoral zone of Lake Mikri Prespa in a way that will ensure the conservation of biodiversity and habitats, and more specifically the creation of breeding and feeding habitats of rare waterbirds, the creation of fish spawning grounds, as well as the implementation of activities in the area, such as animal husbandry, fishing and tourism, as they are practiced today.

This objective will be attained through the achievement of the following operational objectives:

Operational Objective II.I: Continuation of vegetation management: a) at the 11 littoral sites (with a total surface of 68 ha) where management practices were applied during the LIFE project "Conservation of Priority birds species in Lake Mikri Prespa" (2002-2007), and b) in other littoral sites of a total surface area of approx. 32 ha where management has been undertaken continuously by the local people, resulting in the conservation of important wet meadows surfaces.

Operational Objective II.II: Organization and application of a monitoring system for the evolution of quantitative, qualitative and structural characteristic of the vegetation during the application of management measures in the managed sites of Operational Objective II.I.

Operational Objective II.III: Organization and application of a decision making system for the vegetation management and monitoring in the littoral zone of Lake Mikri Prespa on an annual basis.

Operational Objective II.IV: Conservation of the reedbeds in the littoral zone, in order to secure adequate areas for the nesting of rare fauna species and especially birds (e.g. pelicans) ¹.

Operational Objective II.V: Transboundary cooperation on vegetation management and monitoring of the whole Prespa catchment basin (both lakes) ¹.

Objective III: Conservation of rare water birds, such as the globally threatened Dalmatian pelican (*Pelecanus crispus*), the White Pelican (*P. onocrotalus*), the Pygmy

¹ This particular objective is not addressed within the present Guideline document because it requires planning that was not undertaken during the LIFE Project and/or it requires a wider approach on the transboundary level of the Prespa Park catchment basin and/or is addressed by the GEF Transboundary Programme. It is mentioned here only for reasons of coherence.

Cormorant (*Phalacrocorax pygmeus*), heron species and other bird species and their habitats, so as to increase or at least stabilize their population.

This objective will be attained through the achievement of the following operational objectives:

Operational Objective III.I: Conservation of target bird species breeding areas.

Operational Objective III.II: Conservation of and/or creation of new feeding areas of the waterbird species.

Operational Objective III.III: Organization of a monitoring system for the protection and management of target bird species in Lake Mikri Prespa on an annual basis.

Operational Objective III.IV: Organization of a decision making system for the protection of target bird species on an annual basis.

Operational Objective III.V: Promotion of collaboration between the management authorities of the three countries aiming at the conservation of rare and/or threatened bird species and their habitats ¹.

Objective IV: Determination of land uses in order to ensure the protection of the wetland and the biodiversity of the littoral zone of Lake Mikri Prespa as well as to serve current human activities as they are practiced today.

This objective will be attained through the achievement of the following operational objectives:

Operational Objective IV.I: Plotting and presentation of the current land uses, as well as the legislative and the ownership status of the study area.

Operational Objective IV.II: Pinpointing the affected/inundated land and activities affected by management practices within the study area.

Operational Objective IV.III: Organization of a land use management proposal (setting criteria, options, decision making system), aiming at solving the problem of the affected areas and activities.

Objective V: Promotion of information, participation and cooperation of stakeholders and users of the area in the decision making procedures for the management and restoration of wet meadows.

This objective will be attained through the achievement of the following operational objective:

Operational Objective V.I: Organize a public awareness and information campaign for users, visitors and other stakeholders, regarding wet meadow management.

Brief review of wet meadow management in Lake Mikri Prespa

Restoration and management of wet meadows in Lake Mikri Prespa has been a research priority for the Society for the Protection of Prespa (SPP), since its establishment. During the years of 1997-2001, the SPP carried out a pilot project on the restoration of wet meadows on reed-dominated areas at the western shore of Lake Mikri Prespa. The main results of this research underline the effectiveness of buffalo grazing in restraining high emergent helophytes (especially reed) and in the establishment of wet meadow plant species. The grazed areas were used by at least 14 waterbird species (among which Dalmatian Pelicans, Pygmy Cormorants and herons) and by spawning Carp during the spring of 1999 and 2000.

Since March 2001, pilot management of littoral vegetation was continued on the eastern shore of Lake Mikri Prespa near the village of Karyes. This was a reed-dominated site, where grazing pressures of 2.0 Large Animal Unit per hectare (LAU/ha) to 4.5 LAU/ha were implemented with similar positive results on the vegetation. According to the research results, it is recommended that a grazing pressure of 4.5 LAU/ha/year is applied in order to create wet meadows on reed-dominated areas, while a 2.2 LAU/ha/year grazing pressure is necessary for their maintenance.

During the 2002-2007 period, management of wet meadows was continued within the framework of the LIFE-Nature Project "Conservation of Priority Bird Species in Lake Mikri Prespa". The project aim was to ensure and improve the conservation status of the Dalmatian Pelican and the Pygmy Cormorant, priority species on a European level, and other waterbirds species that depend directly on the proper management of the lake water level and the existence of wet meadows in the littoral zone. Accordingly, project actions were concentrated on: a) the reconstruction of the sluice system from which the water of Lake Mikri Prespa outflows to Lake Megali Prespa, b) the restoration of wet meadows in a total surface area of 70 ha, c) the monitoring of vegetation and bird fauna in the managed areas, and d) the dissemination of results and public awareness. The results of the project underlined the benefits of the management activities for wildlife and habitats, as well as for the local inhabitants and users of the littoral sites, while the continuation of conservation-based management of the wetland was set as a priority for all local stakeholders.

Management of the water level of Lake Mikri Prespa

The water level of Lake Mikri Prespa and its fluctuations throughout the year affect determinatively the ecosystem functions, biodiversity and especially specific habitats as well as rare fauna and flora species. The water system of the lake forms the upper part of a wider water system that also includes Lake Megali Prespa and occasionally the watershed of the River Devolli in Albania. The major component of this complex system is Lake Mikri Prespa and due to its small depth and important ecological functions, particular attention in its management is demanded.

The sluice-gate system at location Koula that was reconstructed in December 2004 consists of: a) one gate of 1.00m width, b) one gate of 2.00m width, and c) two gates of 3.00m width each. For the determination of the gates functioning in real operational time, an analysis of basic hydrologic data is needed. This analysis provides the current trend of the water balance of the lake and finally the trend of the level's variation. In periods of high surplus water balance with level increase rate

greater than the outflow capacity of the sluice at the specific water level, the opening of the gates reduces the level increase rate. When the increase rate of the surplus of the water balance is smaller than the outflow capacity of the sluice, then depending on the handling of the gates it is possible to adjust the sign (\pm) of the water balance. The first criterion of the successful operation of the sluice system refers to the fluctuation of the water level of the lake in the period from the 1st of March to the 30th of June each year, which is targeted to vary within the 854.40-854.20m boundaries. The second criterion deals with the demand (of the water level management committee of the MBPNF) to maintain the water level as close as possible to the maximum level-target without fluctuations. The third criterion of the successful operation of the sluice system is relevant to the requirement for a slow water level decreasing rate during the period of fish spawning and egg incubation. The evaluation of the state of the whole sluice-bridge-road structure and its surroundings, as well as the potentially necessary maintenance works should be done once a year. The annual management of the water level and the actual operations of the sluice should be based on scientific analysis and real time reliable and sufficient data, while the handling of the gates should be decided and executed following a clear and sound procedure.

Management and monitoring of vegetation

Further restoration and conservation of wet meadows in the littoral zone of Lake Mikri Prespa through the application of a five year (2007-2012) management and monitoring program is a basic component of the conservation of biodiversity in the study area. The present guideline document includes detailed proposals for the achievement of the above mentioned operational objectives. Vegetation management should continue with the following main practices: a) rotational buffalo and cattle grazing on specific sites (with average annual grazing pressure of 1.9-2.2 LAU/ ha/ year), b) summer cutting of vegetation by mechanical means (preferably during June and July), and c) the collection of mown biomass, or its burning in winter for biomass that cannot be collected. These practices aim at the improvement and conservation of qualitative and quantitative characteristics of wet meadows vegetation, while spring flooding of the managed sites depends on the proper water management of the lake.

Regarding the vegetation monitoring actions during 2007-2012, it is suggested to continue the annual summer measurements in the three management sites, which were monitored during 2002-2006 (Karyes North, Vromolimni-Koula, Klepista). The methodology includes measurements of qualitative and structural parameters by means of fixed transects and quadrats. After the middle of the five-year plan (i.e. July 2009 or 2010), it is suggested that these measurements are also carried out in seven more areas that were monitored during 2002-2005. The results of the monitoring activities should be published in annual reports, with the data analysis being presented in a way that it addresses the wider public, but also the more specialized audience aiming at scientific documentation and evaluation of the management practices.

The above issues should be discussed and evaluated within the operation of the decision making system for the management and monitoring of the littoral zone on an annual basis (e.g. determination of implementation plans for grazing and summer cutting, taking into consideration the characteristics of each management site and the interest of local people for participation in specific management practices). The

assessment of management should be based on the results of data analysis of the vegetation monitoring and the evaluation of indices, described in this guideline document, such as the indices of successful implementation of annual grazing and cutting plans.

Management and monitoring of bird populations

The aim of the management and monitoring of bird populations is the conservation of important bird species, such as the Dalmatian Pelican (*Pelecanus crispus*), the White Pelican (*P. onocrotalus*) and the Pygmy Cormorant (*Phalacrocorax pygmeus*) in Prespa. The management is concerned with their breeding and feeding habitats and includes the evaluation of the effects of management on these specific species. At the same time, several other bird species are expected to benefit and specifically herons, such as the Great White Egret (*Egretta alba*), the Grey Heron (*Ardea cinerea*), the Little Egret (*Egretta garzetta*), the Purple Heron (*Ardea purpurea*) and the Squacco Heron (*Ardeola ralloides*). Positive results are also expected for two more heron species: Littern Bittern (*Ixobrychus minutus*) and Bittern (*Botaurus stellaris*), but their cryptic nature does not allow for monitoring of their populations and consequently the effects of management on these bird species are not evaluated.

Prespa, as the breeding habitat of many important and rare bird species has already been the focal point of studies and interventions for the benefit of waterbird populations. For the important on a national, European and global level colonies of pelicans (*Pelecanus crispus*, *P. onocrotalus*), Pygmy Cormorants and herons, the following management actions are considered necessary:

1. The fluctuation and maintenance of the water level of Lake Mikri Prespa at levels, which allow the adequate flooding of the breeding habitats (i.e. the reedbeds) for the avoidance of disturbance of the colonies by predators.
2. The creation of artificial breeding islands (rafts) for the two species of pelicans, so that a minimum breeding population is secured at critical periods (e.g. period of prolonged drought).
3. The marking of the outer boundaries of the main colonies of Dalmatian and Great White Pelicans with buoys, and if necessary of the colonies of herons and Pygmy cormorants so that disturbance by visitors and fishing boats is avoided.

The integrated management of the Mikri Prespa wetlands cannot be confined to the protection of colonies, but it ought to involve the management of feeding habitats for bird species, especially during the breeding period, when energy demands are high. Wet meadows at the littoral zone of Lake Mikri Prespa, the mouth of Koula stream and the mouth of Aghios Germanos River in Lake Megali Prespa are all important habitats for the waterbird species of the area during the breeding season. Taking into consideration the experience of and the management presently undertaken by the SPP in the littoral zone, priority actions for the conservation of feeding habitats are summarized into:

1. Management of wet meadows vegetation.
2. Management of the water level, so that managed sites are adequately flooded and suitable wet meadow areas are created in terms of quality and

quantity. These areas are important for a variety of amphibians and other organisms and for important fish species.

3. Maintenance of adequate water flow at the Koula stream during the breeding season of Dalmatian Pelicans, ensuring their feeding.
4. Sustainable water management of the Aghios Germanos River would greatly contribute to the maintenance of adequate water flow during the critical periods of spring and summer.

Management of the above mentioned habitats (breeding and feeding) relies on the yearly monitoring of bird populations, so that the effects of management actions on these populations are recorded. Simultaneously, monitoring can provide important data on a daily basis to the wetland manager, and promote emergency measures promptly when necessary. The monitoring activities are distinguished into:

1. Annual and long-term monitoring of the main colonies of the two species of pelicans, the Pygmy Cormorants and heron species, and
2. Annual monitoring of the managed sites (wet meadows), the Koula stream and the mouth of Aghios Germanos River, particularly related to feeding activity of waterbird species in these areas during spring.

Management of breeding and feeding habitats for the benefit of bird species is influenced by various factors on an annual basis and as a result the annual workplan should be carried out on the existing information. For example, the re-evaluation of the hydrological data at the beginning of the breeding season is particularly useful for decision making regarding emergency management measures. Consequently, the existence of a relevant committee (Wetland Management Committee) within the MBPNF is considered necessary. This committee will be capable of analyzing the current situation in the beginning of the year, deciding on the necessity of emergency measures and evaluate the management actions, based on the relevant annual reports. The Wetland Management Committee will be empowered to take decisions on daily practical issues, based on the yearly "operational objectives" without the intervention of the Board of the MBPNF.

Determination of land uses

The target of the determination of land uses in the study area is to ensure the protection of natural values (biodiversity, rare species, biotopes) of the wetland, but at the same time to safeguard human activities – particularly agriculture – in the way and surface they are practiced today. In 1999, the Municipality of Prespa assigned to the SPP the production of the "Study for the determination of the fluctuation of the water level of Lake Mikri Prespa" in order to resolve the issue of farmland affected by relatively high seasonal lake water levels. After the completion of that study in 2001, the issue of proper water management in Lake Mikri Prespa in order to resolve potential drought periods and to maintain the ecological equilibrium in the area became more pressing. In this study, the littoral zone was plotted with contour lines of 0.20m precision at three water level scenarios while the agricultural land of the study area was separated in three categories: a) Plots located inside the irrigation network at the eastern part of the lakeshore or inside the irrigation network of Pyli (at the western part), b) Plots occasionally or systematically cultivated located outside the two above-mentioned irrigation networks, and c) Plots found outside the irrigation networks and not cultivated. The property status of land located inside the

study area is also distinguished in three categories: a) State properties of communal use, b) Municipal land, and c) Private land.

In the framework of the recent compilation of the National Cadastre, new cadastral tables and maps were produced for all Municipal Departments of the Prespa basin with the exclusion of the M.D.s of Aghios Germanos, Mikrolimni, Karyes and Vrondero. The verification and registration of all the properties and specifically to which individuals or legal entities they belong was carried out by the SPP after a long study of the records of: a) the Sector of Topographic Services of the Directorate of Land Reclamation of the Prefecture of Florina, and b) the National Cadastre. "Affected" lands are determined as those that cannot be cultivated because of their low elevation and the high water table in spring caused by the increased lake level. After on-site verifications of the maps of the "Study for the determination of the fluctuation of the water level of Lake Mikri Prespa", these lands are distinguished in two groups. The first group includes all properties of the study area having their whole surface or part of it laying 0.60m or lower than the maximum annual water level. The second group includes the properties of locations "Slatina" and "Gioula" of the M.D. of Laimos, "Mikros Kampos" and "Megalos Kampos" of the M.D. of Aghios Achillios where the fields' surfaces are laying 0.40m or lower than the maximum annual lake water level. The three water level scenarios were examined in order to obtain as many as possible well-flooded wet meadow surfaces, but at the same time to reduce the number of affected surfaces. They include: a) The scenario of maximum annual water level of Lake Mikri Prespa at 854.40m (850.60m based on the after-2001 measurements), b) The scenario of maximum annual water level of the lake at 854.60m (850.80m), and c) The scenario of maximum annual water level at 854.80m (851.00m).

The legal framework on buying and selling land in Greece would make the procedure of the realization of gradual compensation, replacement or purchase schemes concerning the affected lands highly time- and fund-demanding. Therefore, in the present guideline document it is proposed to exchange (swap), compensate or, in case these two solutions are not feasible, to purchase the lands affected at the maximum agreed scenario of 854.80m (851.00m).

Public Awareness

Public awareness aims primarily at the prevention and avoidance of incidents of disturbance or even destruction of important species and habitats. Secondly, through frequent dissemination of information the importance of wet meadows is underlined and the positive results are better understood and accepted by the wider public. Dealing with illegal activities, should be undertaken in the form of awareness raising-sensitization, as very often the offenders are not aware of the negative impacts of their actions. Activities that should be recorded are related to the disturbance of the bird breeding habitats, the fires occurring in reedbeds, illegal fishing and hunting and sand extraction. For the efficient control of such interventions, specific wardening routes should be undertaken regularly by trained people, the wardens of the Prespa National Forest. All illegal/disturbance incidents and prevention/awareness actions should be noted on special forms and also transferred in electronic form, while the most important of these should be mentioned in a yearly report.

Administration, implementation, budget and evaluation of the guideline

document on the restoration and management of wet meadows at Lake Mikri Prespa

The responsible body for the management and conservation of the Prespa National Forest is the MBPNF, the Board of which is comprised of representative of the MEPPPW, the MRDF, the Ministry of Development, the Ministry of External Affairs, the Prefecture of Florina, the Municipality of Prespa, the Agricultural and Fishing Association, the SPP and a Specialized Scientist. The most important issue on the implementation of the present Guideline Document on the restoration and management of wet meadows is the designation of the body that will undertake the completion, supervision, coordination, application and evaluation of the whole project. The operation of the new sluice at location Koula was handed over to the MBPNF by the Regional Administration of Western Macedonia and in 2005, the MBPNF established a three-member committee for the management of the water of Lake Mikri Prespa. The latter consists of the Prespa Municipality, the Local Land Reclamation Service (LLRS) and the SPP. SPP has undertaken the scientific, organizational and functional support of that committee whose aim is to determine, monitor, supervise and evaluate the sluice functioning. During the first three years of its operation (2005-2007), the water management committee functioned very satisfactorily as it achieved all targets set at the beginning of each hydrological year. Because of the often occurrence of urgent incidents (e.g. sudden rise of the water level of the lake), as well as in order to continue all management interventions (not only water level management) after the end of the LIFE-Nature project (2002-2007), it is proposed to establish a committee with a small number of members and with the capacity to meet promptly. The aim of this "Wetland Management Committee" will be to follow the management interventions and report to the MBPNF Board on the implementation, coordination, supervision and evaluation of the guideline document for the restoration and management of wet meadows. To achieve flexibility and effective functioning, this committee should be flexible and supported by adequate scientific staff and have the necessary resources and technical infrastructure. The "Wetland Management Committee" is proposed to be composed by the following agents:

- MEPPPW, Directorate of Environmental Planning, Department of Natural Resources Management,
- Regional Administration of Western Macedonia, Department of Environmental Planning,
- Municipality of Prespa,
- LLRS, and
- SPP

The budget for the implementation of the present guideline document for the restoration and management of wet meadows for the period 2007-2012, has been calculated on the assumption that the MBPNF will undertake this responsibility the Operational Program for the Environment – Phase 3 (EPPER III). The total management cost for the above period amounts to €345,449.70, which does not include land purchase and buffalo herd management.

In the sections of the present document describing the specific management interventions (chapter 5), there is a detailed quotation of indices that should be elaborated to evaluate each management practice separately. The total evaluation of actions proposed by the the guideline document for the restoration and management of wet meadows should be based on a series of indices that will connect each

separate operational objective with the others, as well as with institutional indices and indices of social and economic viability, result and sustainability. At the present phase, it is considered that a further analysis of such specific evaluation method in this guideline document is not advisable. That is because a common methodology will be elaborated in the near future for all the management plans of protected areas in Greece.