



WORLD WIDE FUND FOR NATURE - WWF GREECE  
HELLENIC ORNITHOLOGICAL SOCIETY  
SOCIETY FOR THE PROTECTION OF PRESPA

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**NATIONAL ACTION PLAN FOR THE PYGMY CORMORANT**  
*(Phalacrocorax pygmaeus Pallas, 1773)*



SAVAS KAZANTZIDIS AND THEODOROS NAZIRIDES  
*(Compilers)*



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THESSALONIKI 1999

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**PREAMBLE**

Out of today's number of bird species, estimated to be around 10,000, the populations of 1,111 species (a percentage of approximately 11%) are threatened with extinction. If the species whose populations are characterised as "nearly threatened" are added on top of them (9% of the avifauna) together with the species for which there are not sufficient data (1% of the avifauna), then one fifth of the global number of the avifauna may be considered as threatened with extinction. Most of these species are endemic and distributed in remote areas, particularly in the tropics. The majority of the threatened species are forest dwellers (65%), whereas wetland species constitute 8.8% of all threatened species. Nevertheless, even out of the remaining 80% of species, which are currently registered as safe, several have lost up to one third of their populations during the last 20 years. It should be noted that from 1988 up to 1994, 81 more species have joined the list of threatened species (from 1,030 species in 1988 to 1,111 in 1994) (Collar et al. 1994). In accordance with the criteria established by Collar et al. (1994), in case no immediate management and conservation measures are taken, in the coming 5 – 10 years, it is possible that 100 more species become extinct, whereas 200 species may become extinct in the coming 20 years. Besides this very pessimistic scenario, however, it is also a fact that, in recent years, at least three species worldwide have improved their status from the threatened category to a "safer" grade, thanks to the adopted management and conservation measures (Collar et al. 1994).

Among the most important reasons for the decrease of populations is the destruction or degradation of their habitats (culprit for 52% of cases). Hunting, accidental capture and egg removal account for 7.6% approximately (Collar et al. 1994).

In Greece, a total number of 422 species have been recorded, out of which, a minimum of 100 (percentage 23.7%), are included in the category of threatened species (Handrinos 1992, Handrinos & Akriotis 1997). From them, 30 are waterfowl species, 30 are waders and 21 are raptors. The conclusion derived here is the particularly high percentage of the wetland species under threat. The principal causes for their population decrease in Greece are the destruction or degradation of their habitats (threatening the populations of 43 species), the direct human influence (hunting, etc) which threatens 33 species, as well as pollution, which is a threat to the

populations of at least 10 species.

In order to tackle this very serious problem, urgent but also very specific measures must be undertaken for their conservation.

In the framework of the effort by Birdlife International (whose associate in Greece is the Hellenic Ornithological Society) for the conservation of threatened bird species in Europe, International Actions Plans for 23 species were produced, among which is the one for the Pygmy Cormorant (Heredia et al. 1996). These plans include the actions that will have to be implemented in almost every country where the species lives, in order to be efficiently protected and excluded from the category of threatened species. One of the proposals included in the International Action Plans was the preparation and promotion of National Action Plans in every country where the species breeds or winters. Moreover, this type of initiative was attributed high priority. Therefore, the National Action Plan for the Pygmy Cormorant, constitutes part of the International Action Plan for the species and it is worth-mentioning that it is the first Action Plan produced in Greece for a bird species.

The National Action Plan should not be seen as an end product but rather as a starting point towards the conservation of the species. The implementation of the proposals possibly constitutes the most decisive and maybe the hardest stage to the protection of the species. For this reason, special emphasis was given to the consideration of the proposals' implementation feasibility. In other words, there was a joint estimation of the ecological features as these arise through scientific findings and research, the national and European Community legislation, international documents as well as of the social factor. The latter has proved to be very important in the planning of nature conservation in Greece. Until today, the implementation of several sound conservation or management proposals has met tremendous impediments, precisely because the social factor was not sufficiently considered.

We hope that the present publication, a product of collective work by the most competent Greek scientists in ornithological affairs, will constitute a useful tool, which will be utilised effectively for the conservation of the Pygmy Cormorant in Greece. The editors bare the responsibility for any omissions or required amendments. We nevertheless wish that, at the time of a possible review of the present edition, apart from the omissions that will have been discovered, certain actions will have already been implemented, so as they will not have to be reincluded in the Action

Plan.

## **Acknowledgements**

The present publication is a collective effort and a product of co-operation among several people from the World Wide Fund for Nature WWF Greece, the Hellenic Ornithological Society and the Society for the Protection of Prespa, who have worked in the LIFE NATURE II Project (Ref.# B4-3200/96/499) “Conservation of the Pygmy Cormorant and the Lesser White-fronted Goose in Greece”. This publication is therefore an output of the said project.

Special thanks are owed to the European Commission (Directorate General XI) for the financial support of the project (in the framework of the funding protocol LIFE NATURE II). We also thank the Ministries of Environment and of Agriculture, as well as the regional services, and even more so the staff of the Forest agencies in all project areas, for their valuable advice, supply of information, moral support and the spirit of creative collaboration shown by most of them.

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The preparation of the Action Plan was performed by the participation and collaboration of all participants in the LIFE NATURE II (Ref.# B4-3200/96/499) Project “Conservation of the Pygmy Cormorant and the Lesser White-fronted Goose in Greece”, cited below in alphabetical order.

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## SUMMARY

The geographical distribution of the Pygmy Cormorant is restricted to the Western Palearctic and it spreads from the Balkan Peninsula and the coasts of the Black Sea up to the Caspian and souther down to the Persian Gulf. Its global population is estimated from 22,345 to 27,055 pairs whereas the European breeding population is estimated from 6,341 to 10,531 pairs (percentage 28.4% - 38.9% of the global population).

In Greece, the Pygmy Cormorant breeds at three wetlands (lakes Mikri Prespa, Kerkini and Petron). At earlier times, until late 80's, it bred at more wetlands in northern Greece. The breeding population in Greece in 1997 was 1,250 – 1,310 pairs (percentage 12,4% - 19,7% of the European population and 4.8% - 5.6% of the global population).

The largest portion of the population, which breeds in Europe, winters in the Greek wetlands. The highest number recorded in Greece during the winter period 1997-1998 was 38,917 individuals, while the most significant area for their wintering was the Evros delta (where maximum concentration was recorded).

The Pygmy Cormorant nests in reedbeds or on dense trees in riparian forests, in exclusive or mixed colonies together with other species (Cormorants, herons, Glossy ibises, Spoonbills). It lays 2 - 8 eggs, hatching success ranges from 74% to 78.7% and breeding success from 3.5 to 5 nestlings per nest. It feeds on coarse fish, amphibians and more rarely with water insects and crustaceans in areas surrounding reedbeds, freshwater marshes, drainage and irrigation canals, wet meadows, river beds, coastal areas and lagoons.

The major problems faced by the Pygmy Cormorant in Greece are the destruction or degradation of the riparian forests (both riverine and lakeside), disturbance by visitors or illegal activities (such as illegal fishing and hunting), the diminishing of feeding sites, disturbance of the hydrological regime, burning of reeds and water pollution.

The Pygmy Cormorant is included in the Red Data Book of Threatened Vertebrates of Greece, wherein it is listed as endangered species of the E2 category. It is considered a specially protected species according to the Greek and international legislation.

The objective of the Action Plan is the preservation of the population of the

Pygmy Cormorant at today's level in Greece, and in the long run, its augmentation. Its aim is the intervention in four main directions, which refer to a) the policy and legislation that has to be applied, b) the conservation of the species and its habitats, c) monitoring and research and d) information and awareness of the wetland users and the competent bodies.

The proposed actions and activities are related to the needs and particularities of each site and follow the above four directions.

## INTRODUCTION

Worldwide, the Pygmy Cormorant is characterised as “Nearly Threatened” species, in accordance with the IUCN criteria (Collar et al. 1994). At European level, it is characterised as “Vulnerable” (Tucker & Heath 1994). It is included in the Annex I of the Directive 79/409/EEC (for the conservation of birds and their habitats), in Annex II of the Bern Convention (for the conservation of wildlife and the natural environment in Europe), in Annex II of the Bonn Convention as well as in the African Eurasian Migratory Waterbirds Agreement which was developed within the framework of the Bonn Convention.

The National Action Plan was based on existing data about the species from former research, but mainly upon the findings of a specific research which was carried out for the species at ten wetlands (where almost the total of its Greek population breeds and winters) in the framework of the project “Conservation of the Pygmy Cormorant and the Lesser White-fronted Goose in Greece”. This research included the determination of its distribution, population counts (breeding or wintering), as well as the identification of the problems faced by the species. It was funded by the European Union and implemented by three NGOs. On the basis of the above, the project concluded with regard to the orientations, as well as the activities or the specific measures and actions that have to be undertaken at the areas where the species breeds or winters, in order for the Pygmy Cormorant population at least to become stable at today’s level, or to increase in the longer term.

It is worth highlighting the significance of the research conducted for the species in the framework of the above project. The experience gained along its duration was valuable, not only in the research field, but even more so for the formulation of proposals and the estimation of their implementation feasibility. A number of the proposed actions have been tested at certain sites, but most of them was exploratory and were implemented in experimental manner

The National Action Plan for the Pygmy Cormorant, having described the status of the species providing in brief all the up-to-date information available in Greece, aims at setting the general and specific strategic objectives and orientations and at describing the specific actions required for the conservation of the species at each of the wetlands where it dwells. It consists of four different parts. In the first part there is a description

of the species, its population, certain aspects of its biology and ecology, the problems it faces, its protection status as well as the status of the species at the breeding and wintering sites (where there is also a reference to previous conservation actions or research about the species). The problems faced by the species were classified with regard to their significance into three categories: a) **High**: estimated to be capable of leading to a population decrease in Greece by 20% in the next 20 years b) **Medium**: estimated to be capable of causing population decrease in Greece to a percentage lower than 20% in the next 20 years, c) **Low**: estimated to be capable of causing population decrease locally and d) **Unknown**: when the impact of the problem on the species could not be estimated.

In the second part, the general orientations for the conservation of the species are described. In every general orientation, it was thought useful to include:

a) **The priority of the action**. This was classified into three categories with regard to its influence on the Greek population: i) High: action required to prevent population decline more than 20% approximately during the next 20 years, ii) Medium: action required to prevent population decline lower than 20% during the next 20 years and iii) Low: action required to prevent local population decline.

b) **The timetable for implementation** was also classified into three categories with regard to the exact period when the action should be implemented. i) short-term: the action must be implemented in the next 1-3 years, ii) medium-term: the action must be implemented in the next 1-5 years and iii) long-term: the action must be implemented in the next 1-10 years. In case certain actions are already being implemented, this is quoted in the document.

c) **The implementation feasibility**, which mostly refers to the response by social bodies and local authorities to each proposal, and

d) **The management body**, which refers to the body suggested as most competent or most appropriate to implement that particular action.

It should be clarified that certain of the above categories (such as the implementation feasibility) were not constructed upon concrete measurable data and therefore are to some degree subjective, though not arbitrary. The feasibility for the implementation of proposals was estimated with regard to the reactions and the views of the different bodies and civil services, when these proposals were presented to them

(during the meetings of the project's collaborators and during daily sessions where the results of the research and the proposals were presented).

In the third part, the specific actions that have to be implemented in each site are described. Each action corresponds to one (or more) general orientations, as the latter were defined in the second part.

The fourth part deals with the method of dissemination and promotion of the National Action Plan, the body responsible for the review or the supervision of its implementation and progress, as well as its timetable.

Finally, the maps of the areas where the Pygmy Cormorants live, are attached.

The structure of the National Action Plan for the Pygmy Cormorant is similar to the one of the International Action Plans published by Heredia et al. (1996). Nevertheless, at certain points, adaptations were made and more information was added in order, to the judgement of the authors, to improve the overall depiction of the Action Plan.

## **PART I**

### **GEOGRAPHICAL DISTRIBUTION AND POPULATION OF THE PYGMY CORMORANT**

The geographical distribution of the Pygmy Cormorant is restricted in the Western Palearctic. It spreads from the Balkan Peninsula, the coasts of the Black Sea and the Azov Sea up to the Caspian and souther down to Iran and the Persian Gulf (Cramp & Simmons 1977).

The states where the Pygmy Cormorant breeds today are Greece, Serbia, Bulgaria, Turkey, Romania, Moldavia, Ukraine, Russia, Azerbaijan, Turkmenistan, and Iran (Table 1). Until 1996, 100 – 300 pairs bred in Albania (Heredia et al. 1996, Willems & de Vries 1998).

Occasionally, particularly during winter, Pygmy Cormorant have been observed in countries of central Europe (Hungary, Austria, Czech Republic), in northern Europe (Belgium, France, Germany and Poland) but also in the Middle East, such as in Israel (where it bred until 1940) as well as in Italy (Cramp & Simmons 1977, Straka 1990, Heredia et al. 1996, Hagemeyer & Blair 1997).

At earlier times, in the Middle Ages, the distribution of the species was wider and it reached Britain (Cowles 1981). Until the 70's it bred at Lake Aral (souther limit of its distribution) and in Algeria (western limit of its distribution). Following a sudden decline of its population as well as the decrease of its breeding sites during the 50's, its population seems to be rather increasing in certain areas. It gradually starts to breed in a larger number of sites, such as in Hungary (where few pairs were reported to have nested in 1988), in Italy (where the breeding of two pairs was also recorded in 1981), in Slovakia and Israel, but also in Asia (Uzbekistan) (Fasola & Barbieri 1981, Benussi 1986, Hagemeyer & Blair 1997, Crivelli et al. in press).

The global population, according to recent data, is estimated from 22,345 to 27,055 pairs (Table 1). The total breeding population in Europe is estimated from 6,341 to 10,531 pairs (percentage 28.4% - 38.9% of the global population). The largest breeding colony of the species in Europe is found in the Danube delta where there is an estimated breeding population of about 4,000 – 7,000 pairs (Cramp & Simmons 1977,

Tucker & Heath 1994, Crivelli et al. in press.) (Table 1). Nevertheless, there is a shortage of data with regard to the global population of the species, particularly concerning the areas in the Black Sea and the Caspian.

The breeding populations of the northern Balkan Peninsula are migratory and winter in the coastal or inland wetlands of the southern part of the Balkans (mainly in Greece and Bulgaria). Ringed individuals from the Danube delta were traced in Greece (Handrinos & Akriotis 1997). The populations breeding in the Black Sea possibly winter in Turkey, whereas the Caspian population moves to its southern coasts during winter (Cramp & Simmons 1977).

Table 1. Countries where the Pygmy Cormorant breeds and respective populations.

	Country	Number of pairs	Period of census	Bibliographic reference
1	Greece	1,250 – 1,310	1997	Kazantzidis & Nazirides in press)
2	Serbia	1,000-1,200	90's	Vizi 1995 (from Crivelli et al. in press)
3	Bulgaria	20-180	90's	Nankinov 1989, Stoskaya & Krivenko 1988 (from Crivelli et al. in press)
4	Turkey	1,000-1,500	90's	Crivelli et al. in press
5	Romania	4,000-7,000	90's	Crivelli et al. in press
6	Moldavia	30-500	80's	Kunichenko 1991 (from Crivelli et al. in press)
7	Ukraine	20-320	90's	Crivelli et al. in press
8	Russia	191	80's-90's	Stoskaya & Krivenko 1988 (from Crivelli et al. in press)
9	Turkmenistan	65	80's	Bukreev 1997 (from Crivelli et al. in press)
10	Azerbaijan	14749	80's	Crivelli et al. in press
11	Iran	20-30	90's	Crivelli et al. in press
	<b>TOTAL</b>	<b>22,345 – 27,055</b>		

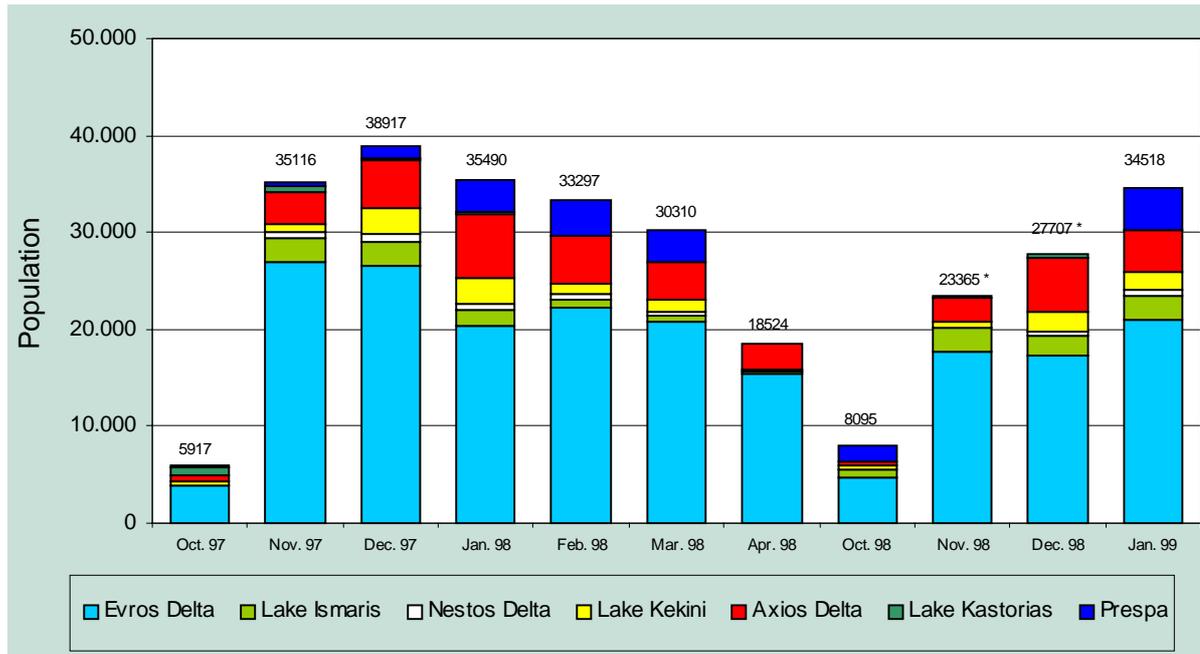
### **The Pygmy Cormorant in Greece**

In Greece the Pygmy Cormorant breeds in three wetlands: lake Kerkini, lake Petron and lake Mikri Prespa. In earlier years it bred at the Axios delta (Kazantzidis 1998) at the Evros delta (Miller 1968), at lake Ismaris, at Porto Lagos, at Nestos delta, and at lake Kastoria (Jerrentrup et al. 1988, Handrinos & Akriotis 1997, Nazirides & Papageorgiou 1996).

The breeding population in Greece, in 1997 varied from 1,250 to 1,310 pairs (percentage 12.4% - 19.7% of the population breeding in Europe and 4.8% - 5.6% of the global population). In 1998 1,170 – 1,230 pairs bred in Greece. The largest portion of this population breeds in Mikri Prespa (730 - 780 pairs in 1997, 650 - 700 in 1998). Lake Kerkini hosts about 500 pairs (1997, 1998) whereas Lake Petron 15 - 30 pairs (1997 and 1998) (Kazantzidis & Nazirides in press).

The greatest part of the population that breeds in Europe winters in Greek wetlands. The highest number recorded in Greece during the wintering period 1997-1998 was 38,917 individuals (December 1997, Figure 1). The Pygmy Cormorants gradually come to Greece for wintering in October and they begin to depart in March.

The most significant wintering sites in Greece are at least all the large wetlands of Thrace and Macedonia. From the counts performed at the species' roosting sites, the greatest number was recorded at the Evros delta (27,000 individuals in November 1997) followed by the Axios delta (6,632 individuals in January 1998), lake Mikri Prespa (4,364 individuals in January 1999), lake Kerkini (2,633 individuals in December 1997) and the complex of lake Vistonis – Porto Lagos – lake Ismaris (2,545 individuals in January 1999) (Kazantzidis & Naziridis, in press). At lake Kastoria and the Nestos delta the wintering populations are smaller than 1,000 individuals. Occasionally, during winter, Pygmy Cormorants are observed at lake Petron and the Kalamas delta, as well as at other wetlands such as lake Koronia (5-10 individuals), Spercheios delta (1 - 2 individuals), Amvrakikos gulf (nine individuals in January 1999), the lake of Ioannina and Drepano (a small coastal wetland near Nafplio, one individual in January 1998) (Tsiakiris, pers. comm.) and the lagoon of Pylos (one individual in the wintering period 1997-1998), (Bonetti pers. comm.).



**Figure 1.** Changes of the wintering population of the Pygmy Cormorant in Greece, during the wintering periods 1997-1998 and 1998-1999 (until January). (\*: the Prespa population is not included).

## DATA ON THE BIOLOGY AND THE ECOLOGY OF THE PYGMY CORMORANT

The Pygmy Cormorant is the smallest in size species within the family of Phalacrocoracidae. This family consists of a total of 37 species worldwide, out of which, three are found in Europe. The other two species of the family of Phalacrocoracidae, which live in Europe (and in Greece), are the Cormorant (*Phalacrocorax carbo*) and the Shag (*Phalacrocorax aristotelis*).

Its body length is 45 - 55 cm (approximately half of the size of the Cormorant). The colour of the body is black whereas the head is brownish.

The Pygmy Cormorant lives in freshwater wetlands and more rarely, particularly during winter, in coastal wetlands. It nests in reedbeds or on dense trees of riparian (both lakeside and riverine) forests, in colonies which are either exclusive to the species or mixed with herons, Cormorants, Glossy Ibises (*Plegadis falcinellus*) and Spoonbills (*Platalea leucorodia*). In the riparian forests, it constructs its nest near the ground or half way up to the canopy of the trees, which are mainly willows (Kerkini), but also tamariscs (*Tamarix* spp.) (Axios delta in Greece, and Ajerbaitzan). It nests principally in inland freshwater wetlands and occasionally in coastal ones (Axios delta) (Crivelli et al. in press, Kazantzidis 1998).

Around April it lays 2 to 8 eggs (average clutch size 4.5 – 5.3 eggs per nest) which are incubated alternatively by both parents for 26 - 30 days (Tucker & Heath 1994, Nazirides & Papageorgiou 1996). The hatching success (number of eggs hatched in relation to the total of eggs laid) varies from 74% to 78.7% and the breeding success varies from 68.1% - 69.9% (Nazirides & Papageorgiou 1996). The number of hatchlings fledged per nest varies from 3.5 to 5 (Nazirides & Papageorgiou 1996, Crivelli et al. in press). The nestlings grow into independent juveniles at around the age of 41 - 70 days (Cramp & Simmons 1977, Tucker & Heath 1994, Handrinos 1992, Crivelli et al. in press).

The prey of the Pygmy Cormorant consists of coarse fish, amphibians and more rarely small mammals, large water insects and crustaceans. According to Willems & de Vries (1998), pellet analysis during the breeding period in Prespa, showed that the prey fish were: *Cyprinus carpio*, *Rutilus ohridanus prespensis*, *Leuciscus cephalus*, *Chondrostoma prespensis*, *Chalcalburnus belvica*, *Alburnoides bipunctatus*, *Carassius auratus*, *Tinca tinca* and *Pseudorasbora parva*. The insects, which were only found at a

relatively low percentage (4%), were water – affiliated and belonged to the orders of Odonata and Coleoptera (families Dytischidae and Hydrophilidae) (Willems & de Vries 1998). At lake Kerkini, the fish species most commonly found in nestling pellets was *Rutilus rutilus* (in percentage 55% of pellets), *Lepomis gibbosus* (percentage 28.3%) and *Alburnus alburnus* (percentage 26,7%) (Crivelli et al. in press).

The most important feeding habitats of the Pygmy Cormorant (in order of significance) are the areas around reedbeds (Mikri Prespa, lake Kastoria, lake Petron, lake Ismaris, lake Vistonis), the permanent or temporal freshwater marshes (Evros delta, lake Ismaris, lake Vistonis), the drainage canals and the irrigation canals (Axios delta, Nestos delta, Evros delta, lake Kerkini), the river banks (Axios, Nestos, Strymon), the coastal areas (lake Megali Prespa, lake Kerkini) and the lagoons or the marine shoreline (particularly in winter) (Porto Lagos, Axios delta, Nestos Delta) (Kazantzidis and Nazirides in press).

The breeding habitats are the reedbeds (lakes Petron and Mikri Prespa) and the riparian forest vegetation (lake Kerkini). During the wintering period, the Pygmy Cormorants roost mainly on arborescent riparian vegetation (Nestos delta, lake Vistonis, Evros delta, Axios delta, lake Kerkini, lake Kastoria) and in reedbeds (lakes Ismaris and Mikri Prespa) (Kazantzidis and Nazirides in press).

## **CONSERVATION PROBLEMS AND CONSTRAINTS**

In the view of Heredia et al. (1996) the main problems the Pygmy Cormorant faces in Europe are the drainage and the degradation of its breeding and wintering habitats, disturbance of hydrological regime of wetlands, heavy metals, agrochemicals, hunting and disturbance, capture of individuals in fishermen's nets and climatic changes.

The major problems that the Pygmy Cormorant faces in Greece are as follows:

### **1. Damage or degradation of riparian (by lakeshore or along riverbanks) forests**

This problem is caused by activities such as:

- Sand extraction conducted at riverbeds (particularly of Axios) during which, fragments of the riparian forests are cleared to facilitate the access of sand collection or transport vehicles.
- Illegal logging, conducted mainly at the outflow of rivers Kompsatos and Kosynthos (lake Vistonis), at lake Kerkini, at the deltas of Evros, Nestos and Kalamas and at lake Kastoria (with the purpose to expand agriculture).
- Grazing of livestock in cases where they inhibit natural regeneration of the forest (lake Ismaris, lake Kerkini, Axios delta).

The inundation of the Kerkini riparian forest for a long period of time results to the inability of the forest for natural regeneration and to gradual death of the trees (Crivelli et al. 1995). Moreover, the artificial pine forest in Porto Lagos has suffered severe degradation due to the deposition of material dredged out from the lagoon. This forest was a site for breeding and roosting of the species in the past (Jerrentrup et al. 1988, de Nobel et al. 1990).

The impact of the problems of destruction or degradation of the riparian forests, basically concern the wintering populations because of the restriction in the capability to find appropriate sites for roosting. In Kerkini the degradation of the forest is believed to affect the breeding population as well.

### **SIGNIFICANCE OF THE PROBLEM: HIGH**

### **2. Disturbance**

It is caused mainly by activities such as:

- Illegal hunting performed mainly near the foraging sites of the species (it must be noted that the Pygmy Cormorant is a non game species and is rarely shot by hunters). The areas where this problem is observed are lake Ismaris, Evros delta,

Nestos delta, Kalamas delta, lake Petron and occasionally lake Kerkini and Axios delta (particularly near the roosting locations).

- The frequent passage by boat or presence of people near the feeding sites. This problem is particularly intense at the Evros delta where fishermen move about by boat near the feeding or roosting sites of the species. The problem exacerbates at the Evros delta due to the usage of the huts that were illegally constructed by fishermen or hunters at the river embankment.
- Sport fishing practiced in the drainage canals and at the river banks near feeding locations. This problem is particularly serious at the Axios delta.
- Visits near the breeding sites, with the purpose of birdwatching from a short distance and photographing. This problem is particularly important at lake Kerkini and in Prespa.
- Traffic circulation near the feeding sites of the species. The problem is more intense at Vistonis and is caused by cars capacitated for driving off the road for recreation purposes.
- Legal or illegal fishing near the breeding sites. The problem is identified mainly in Kerkini and in Prespa. This kind of disturbance, due to its long duration, can be particularly harmful to the Pygmy Cormorant. The change of the breeding location of the species at Prespa in 1998 (in relation to the breeding location in 1997) is thought to be due to the severe disturbance which took place in April 1998 near the colony, by a fisherman who tried to place his net near the bird colony.

It is possible that disturbance has adversely affected the breeding success, but also the feeding efficiency of the Pygmy Cormorant.

#### **SIGNIFICANCE OF THE PROBLEM: HIGH**

### **3. Restriction of the foraging sites**

The decline of the foraging sites is mainly caused by activities such as:

- Drainage works carried out at the eastern part of lake Vistonis. The project, which is under way, aims at the creation of agricultural land by restricting the areas that periodically flood at the east part of Vistonis. Apart from the fact that the marshes of the eastern part of Vistonis constitute an integral part of the wetland, the attempt to

drain them will bring about serious negative impacts on the foraging sites of the Pygmy Cormorant, but also of other species.

- Soil toppings performed at the Axios delta, at feeding sites of the species, with deposits of inert material, industrial and domestic wastes.

**SIGNIFICANCE OF THE PROBLEM: HIGH**

#### **4. Disturbance of the hydrological regime**

This problem is identified mainly in the following cases:

- Interruption of water supply to the river bed, resulting to the restriction of the species' feeding sites. This problem is recorded at the bed of river Nestos, due to the retention of the water behind the dams (occasionally) and at the bed of river Strymon upstream lake Kerkini (during summer months).
- The planning for the elevation of the peripheral dykes and of the water level of lake Kerkini will cause further degradation of the riparian forest. Moreover, it is estimated that there will be shrinkage of the shallow water areas and the wet meadows at the northern and north-eastern part of the lake, which are feeding habitats for the species.
- Water level decrease in lake Petron, which reduces the fish spawning sites, but also the feeding sites of the Pygmy Cormorant.
- Sea water intrusion in lake Ismaris.
- Non-rational use of water in the Evros delta. The recent drainage of the periodic marshes at the river floodplain after the destruction of the dam at the embankment, resulted to the restriction of the feeding sites of the Pygmy Cormorant. This drainage affected the greatest percentage of the species population that feeds in the Greek part of the delta.

**SIGNIFICANCE OF THE PROBLEM: HIGH**

#### **5. Reedbed burning**

It is estimated that a problem may be caused due to reedbed burning. Nevertheless, in certain areas (e.g. Prespa) it has been shown that reed burning, when it is carried out at a certain period of time (winter), may bring positive results with regard to the creation of appropriate feeding habitats. Problems, especially for the breeding populations, may be

caused by reedbed burning, when this takes place during spring (observed at lake Petron and at the old river beds of Axios). In this case, nesting sites or locations of the species may possibly be damaged (burnt).

**SIGNIFICANCE OF THE PROBLEM: LOW**

## **6. Water pollution**

The water of most wetlands where the Pygmy Cormorant breeds or winters, contains several types of pollutants in concentrations which vary among different sites (Zalidis et al. 1993, Albanis et al. 1994, Oikonomopoulos 1994, Maliokas et al. 1996, Hollis & Stevenson 1997, Paraskevopoulos et al. 1997, Arapis 1998, Lazaridou 1998). High quantities of pollutants in certain wetlands origin from neighbouring countries (Bulgaria, Former Yugoslav Republic of Macedonia) via the rivers Axios, Strymon, Nestos and Evros.

The impacts of pollution on the Pygmy Cormorant are known not at present, although it is possibly indirectly affected, through the food chain. Nevertheless, data will be required to document this presumption. Studies on other bird species in wetlands where the Pygmy Cormorant winters, have indicated that certain polluting substances accumulate in the tissues, feathers or in the eggs of those species, as well as in many organisms which constitute their prey (Goutner & Furness 1996, Albanis et al. 1996, Goutner et al. 1997). Some of these organisms are also prey of the Pygmy Cormorant.

**SIGNIFICANCE OF THE PROBLEM: UNKNOWN**

## **7. Drowning in fishing nets**

This problem probably exists at a small scale. At Porto Lagos a small number of individuals are trapped and drown in the protective nets placed by the fishing co-operatives over the fish wintering canals in order to restrict predation by piscivorous birds. At Kerkini, a small number of nestlings drown in fishing nets when placed near the colony.

**SIGNIFICANCE OF THE PROBLEM: LOW**

## **8. Hunting**

This problem is rather restricted. It has been observed that in certain areas (e.g. Axios delta) a small number of individuals are hunt occasionally. Further and more specific investigation is needed to estimate the impact on the population of the species.

**SIGNIFICANCE OF THE PROBLEM: UNKNOWN**

### **CONSERVATION STATUS OF THE SPECIES IN GREECE**

- ⇒ It is considered specially protected species according to the Ministerial Decision 414985/85 “Management measures for wild avifauna” (GG 757 B/19-12-1985). This decision was taken so as to adjust the Greek legislation to the EC Directive 79/409 for the conservation of birds and their habitats.
- ⇒ Its hunting is prohibited in accordance to the decision No 180755/4425/79, “about definition of beneficial game and prohibition of hunting for several species of birds which are directly threatened with extinction” (GG 866/28-9-1979).
- ⇒ It is included in Annex II (strictly protected species) of Law 1335/83 “for the conservation of wildlife and the natural environment in Europe” (or the Bern Convention).
- ⇒ It is included in the Red Data Book of Threatened Vertebrates of Greece, where it is characterised as Endangered species of the E2 category (the dangers threatening the species within this category, at least at present, are not immediate) (Handrinos 1992).

## LEGAL STATUS, STATUS OF THE SPECIES AND ACTIONS IMPLEMENTED FOR ITS CONSERVATION AT THE PRINCIPAL WINTERING AND BREEDING SITES

### EVROS DELTA

#### Legal status <sup>1</sup>

- Wetland of International Importance (Ramsar Convention) Legislative Act 191/74, GG 350 A/19-11-1974.
- Special Protection Area (Directive 79/409/EEC for the conservation of birds and their habitats). Ministerial Decision 414985/1985, GG 757 B/19-12-1985.
- Site of Community Importance (Directive 92/43/EEC for the conservation of natural habitats as well as the wild fauna and flora - NATURA 2000 Network). Common Ministerial Decision 33318/3028/1998 published in GG 1289 B/28-12-98.
- Game refuge (part of the wetland, 46,000 stremmata). Decision of the Minister of Agriculture 79081/2926/2-8-1991. GG 674/B/91
- For the area there has been issued a Joint Ministerial Decision about “Measures for the protection of the wetlands and the natural formations at the estuary of river Evros and their wider area”. JMD 8586/1838, GG 376 B/27-4-1998.

In addition: Important Bird Area for Greece (Hellenic Ornithological Society 1994).

#### Status of the species

The Pygmy Cormorant used to breed at the Evros delta until 1967 (Miller 1969). Since then it is present in the area during the wintering period, while large numbers pass by during spring and autumn migration (Goutner et al. 1988, Kazantzidis and Nazirides in press).

#### • Important sites

Foraging: A high percentage, 50-90 % of the population which winters at the Evros delta, feeds in the Turkish part of the delta. The flood plain of the eastern part of the delta attracts up to 43% - 49% of the population that feeds at the Greek part of the delta,

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<sup>1</sup> Regulations and laws of more general nature that relate to environmental protection and are applicable to the entire country, are not included here. The same stands for all areas described hereafter.

for as long as the plain remains flooded. The drainage ditches and the canals of the area constitute a feeding site for 36% - 47% of the population which feeds at the Greek part of the delta whereas lake Nymphon is a feeding site for approximately 10% of the population (Kazantzidis and Nazirides in press).

Roosting: Location Topsis at the south-eastern part of the delta, which is the roosting site for the entire population that winters in the area (Kazantzidis and Nazirides in press).

• **Percentage of the Greek population present in the area**

During the wintering period 1997-1998, 69.4% - 76.9% of the total population wintering in Greece, was present in the area (Kazantzidis and Nazirides in press).

**Actions for the conservation and protection of the species**

1. Tree-planting along drainage canals, with the objective to create suitable resting habitats (Athanasίου et al. 1998).
2. Artificial decoys of Pygmy Cormorant, nests, and a sonar system for the simulation of their calls, were placed in riparian forest vegetation near the roosting location of the wintering population, with the objective to attract them for nesting (Athanasίου et al. 1998).
3. Flooding of certain sites in order to create feeding sites for the species (on-going).
4. Actions to inform local authorities and raise public awareness about the species (Dimitriou 1999):
  - organisation of 1-day informative conferences
  - publication of informative leaflet and poster
  - preparation of educational material for schools
  - construction and placement in the area, of informative and warning sign posts

**Research**

Jerrentrup et al. 1988, Kazantzidis and Nazirides (in press).

**LAKE ISMARIS**

**Legal status**

- Wetland of International Importance (Ramsar Convention). L.A. 191/74, GG 350 A/19-11-1974.
- Special Protection Area (Directive 79/409/EEC for the conservation of birds and their

habitats). Ministerial Decision 414985/1985, GG 757 B /19-12-1985.

- Site of Community Importance (Directive 92/43/EEC for the conservation of natural habitats as well as the wild fauna and flora - NATURA 2000 Network). Common Ministerial Decision 33318/3028/1998 published in GG 1289 B/28-12-98.
- Game refuge (part of the wetland). GG 130 B/12-2-1979.
- Lake Ismaris and the Rhodopi lagoons are included in the National Park of Eastern Macedonia – Thrace. A Joint Ministerial Decision has been issued for the “designation of the wetlands Nestos delta, lake Vistonis, lake Ismaris and their wider area as a Park”. JMD 5796/96, GG 854 B/16-9-1996.

In addition: Important Bird Area for Greece (Hellenic Ornithological Society 1994).

### **Status of the species**

The Pygmy Cormorant bred at the lake until the 60's in small populations (Jerrentrup et al. 1988). Since then it is found in the area during winter as well as during spring and autumn migration. The population of Ismaris together with the population of Vistonis and Porto Lagos should be considered as a single population (Kazantzidis and Nazirides in press).

#### **• Important sites**

Foraging: The shoreline zone with the reedbeds, the temporal marshes of the southern part of the lake, the river beds of Vosvozis and Filiouris and occasionally the coastal lagoons of Rhodopi (particularly Xirolimni, Ptelea and Elos) (Kazantzidis and Nazirides in press).

Roosting: The reedbed at the north-eastern part of lake Ismaris during the periods of wintering and migration (Kazantzidis and Nazirides in press).

#### **• Percentage of the Greek population present in the area**

During the wintering period 1997-1998, 6.2% - 6.8% of the total population wintering in Greece, was present in the area (Kazantzidis and Nazirides in press).

### **Actions for the conservation and protection of the species**

1. Tree-planting along drainage canals, with the objective to create suitable resting habitats (Athanasidou et al. 1998).

2. Artificial decoys of Pygmy Cormorant, and a sonar system for the simulation of their calls, were placed near the roosting location of the wintering population, with the objective to attract them for nesting (Athanasίου et al. 1998).
3. Actions to inform local authorities and raise public awareness about the species (Dimitriou 1999):
  - organisation of 1-day informative conferences
  - publication of informative leaflet and poster
  - preparation of educational material for schools
  - construction and placement in the area, of informative and warning sign posts

### **Research**

Jerrentrup et al. 1988, Kazantzidis and Nazirides (in press).

## **LAKE VISTONIS - PORTO LAGOS**

### **Legal status**

- Wetland of International Importance (Ramsar Convention). L.A. 191/74, GG 350 A/19-11-1974.
- Special Protection Area (Directive 79/409/EEC for the conservation of birds and their habitats). Ministerial Decision 414895/1985, GG 757 B /19-12-1985.
- Site of Community Importance (Directive 92/43/EEC for the conservation of natural habitats as well as the wild fauna and flora - NATURA 2000 Network). Common Ministerial Decision 33318/3028/1998 published in GG 1289 B/28-12-98.
- Game refuge (part of the wetland). GG 666 B/78.
- Lake Vistonis and Porto Lagos are included in the National Park of Eastern Macedonia – Thrace. A Joint Ministerial Decision has been issued for the “designation of the wetlands Nestos delta, lake Vistonis, lake Ismaris and their wider area as a Park”. JMD 5796/96, GG 854 B/16-9-1996.

In addition: Important Bird Area for Greece (Hellenic Ornithological Society 1994).

### **Status of the species**

The Pygmy Cormorant bred in the planted forest of Porto Lagos until 1986, though in small numbers (six pairs in 1986) (Jerrentrup et al. 1988, de Nobel et al. 1990). Since

then, it is found in the area during winter. It is presumed that the few individuals that remain during summer do not breed. Populations of Vistonis – Porto Lagos and the population of Ismaris are considered as a single population (Kazantzidis and Nazirides in press).

- **Important sites**

Foraging: The feeding sites of the species are the reedbeds around the lake, the periodically flooded areas at the east and west of Vistonis, the beds of the torrents flowing in it and the Lagos lagoon of Porto Lagos. Occasionally, during winter, Pygmy Cormorants may also be seen at the lagoons Lafri and Lafrouda (Kazantzidis and Nazirides in press).

Roosting: The north-eastern part of Vistonis near the inflow of Kompsatos river and occasionally the sites with tree or shrub vegetation at the Lagos lagoon in Porto Lagos (Kazantzidis and Nazirides in press).

- **Percentage of the Greek population present in the area**

During the wintering period 1997-1998, 6.2% - 6.8% of the total population wintering in Greece, was present in the area (Kazantzidis and Nazirides in press).

**Actions for the conservation and protection of the species**

1. Tree-planting in the artificial forest of Porto Lagos in order to rehabilitate it (Athanasίου et al. 1998). In this forest there is a heron colony (in the past Pygmy Cormorants nested and roosted there) (Jerrentrup et al. 1988, de Nobel et al. 1990).
2. Survey about the causes of degradation of the planted forest of Porto Lagos (ongoing).
3. Actions to inform local authorities and raise public awareness about the species (Dimitriou 1999):
  - organisation of 1-day informative conferences
  - publication of informative leaflet and poster
  - preparation of educational material for schools
  - construction and placement in the area, of informative and warning sign posts

## **Research**

Jerrentrup et al. 1988, Kazantzidis and Nazirides (in press).

## **NESTOS DELTA**

### **Legal status**

- Wetland of International Importance (Ramsar Convention). L.A. 191/74, GG 350 A/19-11-1974.
- Special Protection Area (Directive 79/409/EEC for the conservation of birds and their habitats). Ministerial Decision 414895/1985, GG 757 B/19-12-1985.
- Site of Community Importance (Directive 92/43/EEC for the conservation of natural habitats as well as the wild fauna and flora - NATURA 2000 Network). Common Ministerial Decision 33318/3028/1998 published in GG 1289 B/28-12-98.
- Game refuge (parts of the wetland). GG 132 B/86, 778 B/82.
- The Nestos delta is included in the in the National Park of Eastern Macedonia – Thrace. A Joint Ministerial Decision has been issued for the “designation of the wetlands Nestos delta, lake Vistonis, lake Ismaris and their wider area as a Park”. JMD 5796/96, GG 854 B/16-9-1996.

Moreover: Important Bird Area for Greece (Hellenic Ornithological Society 1994).

### **Status of the Species**

The Pygmy Cormorant used to breed in the area until the 60’s (Bauer et al. 1969, Jerrentrup et al. 1988). Today it is found in the area during the wintering period.

#### **• Important sites**

Foraging: The river bed, the drainage and other canals of the area as well as the lagoons of Vassova, Agiasma and Keramoti. Occasionally the lakes of Chrissoupoli and the marine shoreline (Kazantzidis and Nazirides in press).

Roosting: The roosting sites of the species at the Nestos estuary near the Community of Dasochori and at the point of the river outflow into the sea (Kazantzidis and Nazirides in press).

#### **• Percentage of the Greek population present in the area**

During the wintering period 1997-1998, 2.4% of the total population wintering in Greece, was present in the area (Kazantzidis and Nazirides in press).

### **Actions for the conservation and protection of the species**

Actions to inform local authorities and raise public awareness about the species

(Dimitriou 1999):

- organisation of 1-day informative conferences
- publication of informative leaflet and poster
- preparation of educational material for schools
- construction and placement in the area, of informative and warning sign posts

### **Research**

Jerrentrup et al. 1988, Kazantzidis and Nazirides (in press).

## **LAKE KERKINI**

### **Legal status**

- Wetland of International Importance (Ramsar Convention). L.A. 191/74, GG 350 A/19-11-1974.
- Special Protection Area (Directive 79/409/EEC for the conservation of birds and their habitats). Ministerial Decision 414985/1985, GG 757 B /19-12-1985.
- Site of Community Importance (Directive 92/43/EEC for the conservation of natural habitats as well as the wild fauna and flora - NATURA 2000 Network). Common Ministerial Decision 33318/3028/1998 published in GG 1289 B/28-12-98.
- Game refuge. GG 1060 B/3-12-97.
- For the area there has been issued a Joint Ministerial Decision “Measures for the protection of the Kerkini artificial wetland and its wider area”. JMD 66272/25-6-1993, GG 493 B/7-7-1993. Revision: JMD 66231/2051/3-3-1996, GG 259 B/19-4-1996.
- Prohibition of logging in poplar plantations (of private or public property) during the breeding period of the birds around the lake and by the river. Forestal prohibition act 27/97 (Ref. No 218/22-9-97).

Moreover: Important Bird Area for Greece (Hellenic Ornithological Society 1994).

### **Status of the species**

The Pygmy Cormorant breeds and winters in the area (Nazirides & Papageorgiou 1996).

#### **• Important sites**

Breeding: The riparian forest at the outflow of river Strymon into the lake (Nazirides & Papageorgiou 1996).

Foraging: The river bed of Strymon upstream the lake and downstream the dam, the wet meadows, the drainage and irrigation canals and the coastal zone along the dykes (Kazantzidis and Nazirides in press).

Roosting: The roosting sites at the river bed at the south of the dam (two locations north of the Strymoniko bridge), at the water pumping station Y2 (eastern part of the lake) and the riparian forest at the outflow of the river into the lake (location of the colony) (Kazantzidis and Nazirides in press).

#### **• Percentage of the Greek population present in the area**

Kerkini hosts 38.2% - 40% of total breeding Greek population, whereas during the wintering period 1997-1998, 6.8% of the total population wintering in Greece, was present in the area (Kazantzidis and Nazirides in press).

### **Actions for the conservation and protection of the species**

1. Wardening of the colonies, particularly during the breeding season.
2. Tree-planting within fenced fragments of the riparian forest, where there is the mixed colony (Athanasίου et al. 1998).
1. Creation of non-intrusion zones near the colony in order to prevent disturbance of the species by fishermen or visitors during the breeding period (Athanasίου et al. 1998).
2. Actions to inform local authorities and raise public awareness about the species (Dimitriou 1999):
  - organisation of 1-day informative conferences
  - publication of informative leaflet and poster
  - preparation of educational material for schools
  - construction and placement in the area, of informative and warning sign posts

## **Research**

Jerrentrup et al. 1988, Nazirides & Papageorgiou 1996, Crivelli et al. in press, Kazantzidis and Nazirides (in press).

## **AXIOS – LOUDIAS – ALIAKMON DELTA AND GALLIKOS ESTUARY**

### **Legal status**

- Wetland of International Importance (Ramsar Convention). L.A. 191/74, GG 350 A/19-11-1974.
- Special Protection Area (Directive 79/409/EEC for the conservation of birds and their habitats). Ministerial Decision 414985/1985, GG 757 B /19-12-1985.
- Site of Community Importance (Directive 92/43/EEC for the conservation of natural habitats as well as the wild fauna and flora - NATURA 2000 Network). Common Ministerial Decision 33318/3028/1998 published in GG 1289 B/28-12-98.
- Game refuge (parts of the wetland). GG 73220/2096/26-4-1988, 378 B/81.
- For the area, in 1999 there has been issued a Joint Ministerial decision “Measures for the protection of Aliki Kitrous, the lower part and the deltas of the rivers Aliakmon, Loudias, Axios, Gallikos, the Kalochori lagoon and their wider area”. JMD 14874/3291/98, GG 687 B/6-7-1998.

Moreover: Important Bird Area for Greece (Hellenic Ornithological Society 1994).

### **Status of the species**

The Pygmy Cormorant used to breed at the Axios delta until 1989 (5-7 pairs) in the mixed heron colony (Kazantzidis 1998). Today it can only be found during the wintering period.

#### **• Important sites**

Foraging: The river beds of Axios and Aliakmon, the former river beds of Axios (eastern and western oxbow lakes), the drainage and other canal, as well as the marshes with reedbeds in the Axios delta and the Gallikos estuary (Kazantzidis and Nazirides in press).

Roosting: The roosting sites on trees along the bank of Axios river north of the bridge of the National Highway of Thessaloniki – Katerini as well as on trees along the former

river beds of Axios (eastern and western oxbow lakes) (Kazantzidis and Nazirides in press).

- **Percentage of the Greek population present in the area**

During the wintering period 1997-1998, 17% - 18.7% of the total population wintering in Greece, was present in the area (Kazantzidis and Nazirides in press).

**Actions for the conservation and protection of the species**

1. Construction of three lakes in the flood plain of river Axios, in order to create suitable feeding habitats for the species (Athanasidou et al. 1998).
2. Dredging of part of a Pygmy Cormorant feeding site (freshwater marsh) in order to improve it as a feeding habitat.
3. Tree-planting around the constructed lakes, and on an islet of Axios in order to create suitable breeding or resting locations.
4. Actions to inform local authorities and raise public awareness about the species (Dimitriou 1999):
  - organisation of 1-day informative conferences
  - publication of informative leaflet and poster
  - preparation of educational material for schools
  - construction and placement in the area, of informative and warning sign posts

**Research**

Jerrentrup et al. 1988, Kazantzidis and Nazirides (in press).

**LAKE PETRON**

**Legal status**

- Site of Community Importance (Directive 92/43/EEC for the conservation of natural habitats as well as the wild fauna and flora - NATURA 2000 Network). Common Ministerial Decision 33318/3028/1998 published in GG 1289 B/28-12-98.
- Moreover: Important Bird Area for Greece (Hellenic Ornithological Society 1994).

**Status of the species**

The Pygmy Cormorant breeds at lake Petron. A small number is found at the lake during winter (Jerrentrup et al. 1988).

- **Important sites**

Breeding: The reedbeds at the northern and south-eastern part of the lake (Kazantzidis and Nazirides in press).

Foraging: Along the reedbed of the lake and in particular, at the northern and north-western part, near the natural fish farms (Kazantzidis and Nazirides in press).

Roosting: The trees at the northern and north-western part of the lakeshore constitute a site for resting and roosting (Kazantzidis and Nazirides in press).

- **Percentage of the Greek population present in the area**

The area hosts 1.6% - 2.3% of the total population breeding in Greece.

**Actions for the conservation and protection of the species**

1. Small – scale tree planting along drainage canals, in order to create resting sites near the feeding sites of the species (Athanasίου et al. 1998).
2. Actions to inform local authorities and raise public awareness about the species (Dimitriou 1999):
  - organisation of 1-day informative conferences
  - publication of informative leaflet and poster
  - preparation of educational material for schools
  - construction and placement in the area, of informative and warning sign posts

**Research**

Jerrentrup et al. 1988, Kazantzidis and Nazirides (in press).

**LAKE KASTORIA**

**Legal status**

- Site of Community Importance (Directive 92/43/EEC for the conservation of natural habitats as well as the wild fauna and flora - NATURA 2000 Network). Common Ministerial Decision 33318/3028/1998 published in GG 1289 B/28-12-98.
- Game refuge (the entire lake). GG 648 B/91.

Moreover: Important Bird Area for Greece (Hellenic Ornithological Society 1994).

### **Status of the species**

At older times, the Pygmy Cormorant used to breed at lake Kastoria in small numbers (Jerrentrup et al. 1988, Nazirides & Papageorgiou 1996, Handrinos & Akriotis 1997). In 1992 and 1993, 12 - 20 pairs nested at the lake (Catsadorakis, pers. comm.). Today it winters in the area.

#### **• Important sites**

Foraging: The lake's shoreline along the reedbed, the northern and north-eastern part of the lake with the wet meadows and the shoreline along the lake's peninsula (Kazantzidis and Nazirides in press).

Roosting: The trees north of the town of Kastoria at the western part of the lake (Kazantzidis and Nazirides in press).

#### **• Percentage of the Greek population present in the area**

During the wintering period 1997-1998, 1.8% - 2% of the total population wintering in Greece, was present in the area.

### **Actions for the conservation and protection of the species**

1. Small – scale tree planting at the northern part of the lake, in order to create resting sites near the feeding sites of the species (Athanasidou et al. 1998).
2. Actions to inform local authorities and raise public awareness about the species (Dimitriou 1999):
  - organisation of 1-day informative conferences
  - publication of informative leaflet and poster
  - preparation of educational material for schools
  - construction and placement in the area, of informative and warning sign posts

### **Research**

Jerrentrup et al. 1988, Kazantzidis and Nazirides (in press).

## **LAKES MIKRI AND MEGALI PRESPA**

### **Legal status**

- National Park. Presidential Decree 46 /14-1-1974, GG 19 /23-1-1974.
- Wetland of International Importance (Ramsar Convention). L.A. 191/74, GG 350 A/19-11-1974.

- Special Protection Area (Directive 79/409/EEC for the conservation of birds and their habitats). Ministerial Decision 414985/1985, GG 757 B /19-12-1985.
- Site of Community Importance (Directive 92/43/EEC for the conservation of natural habitats as well as the wild fauna and flora - NATURA 2000 Network). Common Ministerial Decision 33318/3028/1998 published in GG 1289 B/28-12-98.
- Landscape of Outstanding Natural Beauty. Ministerial Decision A/Φ31/23211/1747/1975 of 27-1-1977, GG 86 /10-2-77.
- Game refuge. GG 757 B/82.
- Moreover: 1) Important Bird Area for Greece (Hellenic Ornithological Society 1994).  
2) Biogenetic Reserve (Kedron Forest).

### **Status of the species**

The Pygmy Cormorant breeds and winters in Prespa (Catsadorakis 1986, Jerrentrup et al. 1988, Catsadorakis et al. 1996, Nazirides & Papageorgiou 1996, Catsadorakis 1997).

#### **• Important sites**

Breeding: The sites of the species' colonies in Mikri Prespa (Mikrolimni, Vromolimni and Agios Achillios) (Catsadorakis et al. 1996).

Foraging: The reedbeds spreading along the perimeter of lake Mikri Prespa and the wet meadows. At Megali Prespa they use the rocky and sandy beaches for feeding and resting (Kazantzidis and Nazirides in press).

Roosting: The reedbeds at the north-western part of Mikri Prespa (Kazantzidis and Nazirides in press).

#### **• Percentage of the Greek population present in the area**

The area hosts 58.4% - 59.5% of the total population breeding in Greece. During the wintering period 1997-1998, 9.3% - 10.9% of the total population wintering in Greece, was present in the area (Kazantzidis and Nazirides in press).

### **Actions for the conservation and protection of the species**

3. Wardening of the colonies, particularly during the breeding season.
4. Creation of non-intrusion zones near the colonies, in order to prevent disturbance from fishermen or visitors.

5. Fencing and management of reedbeds with the purpose of improving the feeding habitats of the Pygmy Cormorant (Athanasiou et al. 1998). This action is on-going and is performed by the Society for the Protection of Prespa, in co-operation with the Range Management Sector of the Faculty of Forestry, Aristotle University of Thessaloniki, and the biological station Tour du Valat (France).
6. Tree-planting along part of the shoreline of Megali Prespa in order to create resting habitats for the Pygmy Cormorant (Athanasiou et al. 1998).
7. Actions to inform local authorities and raise public awareness about the species (Dimitriou 1999):
  - organisation of 1-day informative conferences
  - publication of informative leaflet and poster
  - preparation of educational material for schools
  - construction and placement in the area, of informative and warning sign posts

### **Research**

Jerrentrup et al. 1998, Catsadorakis et al. 1996, Willems & de Vries 1998, Kazantzidis and Nazirides (in press).

## **KALAMAS DELTA**

### **Legal status**

- Special Protection Area (Directive 79/409/EEC for the conservation of birds and their habitats). Ministerial Decision 414985/1985, GG 757 B/19-12-1985.
- Site of Community Importance (Directive 92/43/EEC for the conservation of natural habitats as well as the wild fauna and flora - NATURA 2000 Network). Common Ministerial Decision 33318/3028/1998 published in GG 1289 B/28-12-98.
- Game refuges: 1) Permanent game refuges (older Kalamas estuary, Valtos bay and Drepano bay, surface area 17,800 stremmata). Decision of the Min. for Agriculture 67468/1450/6-3-1989. 2) Temporary waterfowl game refuge (at the marshes between old and current bed of Kalamas, surface area 25,000 stremmata). Decision 2066/9-7-1996 by the Division of Forestry of Thesprotia “Prohibition of waterfowl game hunting by any floating vessel for a period of five years”.

Moreover: 1) Important Bird Area for Greece (Hellenic Ornithological Society 1994). 2) Within the Kalamas delta there are 10 registered archaeological sites

### **Status of the species**

The Pygmy Cormorant winters in the area occasionally and in small numbers (Jerrentrup et al. 1998).

#### **• Important sites**

Foraging: The coastal zone and the beds (former and current) of Kalamas river.

#### **• Percentage of the Greek population present in the area**

The highest population (65 individuals) was recorded in 1988 (Hellenic Ornithological Society 1982-1995).

### **Actions for the conservation and protection of the species**

Actions to inform local authorities and raise public awareness about the species (Dimitriou 1999):

- organisation of 1-day informative conferences
- publication of informative leaflet and poster
- preparation of educational material for schools
- construction and placement in the area, of informative and warning sign posts

### **Research**

Jerrentrup et al. 1998, Kazantzidis and Nazirides (in press).

## **PART II**

### **AIM OF THE NATIONAL ACTION PLAN**

The aim of the National Action Plan is, in the short run the maintenance of the Pygmy Cormorant population in Greece at least at today's level and, in the long run, the increase of its population, so as it will no longer be registered as a threatened species in our country.

### **OBJECTIVE OF THE NATIONAL ACTION PLAN**

The objective of the National Action Plan is the intervention and action in the following sectors:

#### **1. Policy and Legislation**

*1.1 Promotion or encouragement of a policy in favour of the Pygmy Cormorant in Greece.*

*1.1.1. Designation of all breeding and roosting sites of the Pygmy Cormorant under a stricter protection regime.*

Certain roosting or breeding sites of the species are not designated under some protection regime. Therefore these sites lack the institutional support for their safeguard. The competent authorities must include the sites which are important for the species or entire unprotected areas, in future regulations for the conservation of species and their habitats.

Priority: High

Timetable: Short-term

Implementation feasibility: Medium

Implementation agency: Min. for the Environment, Min. for Agriculture

*1.1.2. To safeguard that the economic activities developed in wetlands where the Pygmy Cormorant either breeds or winters, are conducted in a way which will not affect the species adversely.*

Several economic activities exercised in wetlands are often performed in a way that affects the species' conservation negatively. The competent civil services must take control over these activities, by issuing specifications that take into account the needs, but also the particularities of each area. In those areas where the legislation already

exists but is violated, the enforcement and control mechanism must be activated more efficiently.

Priority: High

Timetable: Short-term

Implementation feasibility: Medium

Implementation agency: Min. for Environment, Min. for Agriculture, Regional Services (Forest Agencies), Local Government

*1.1.3. To safeguard that the recreational activities taking place in wetlands where the Pygmy Cormorant breeds or winters, are conducted in a way which will not affect the species adversely.*

Several recreational activities exercised at wetlands, such as hunting, sport fishing and ecotourism, are often performed in a way that hinders the conservation of the species. The negative impact mostly relates to the disturbance that these activities cause to the feeding, roosting and breeding sites. The competent civil services must take control over these activities, by issuing specifications that take into account the needs, but also the particularities of each area. In those areas where the legislation already exists but is violated, the enforcement and control mechanism must be activated more efficiently.

Priority: High

Timetable: Short-term

Implementation feasibility: Medium

Implementation agency: Min. for Environment, Min. for Agriculture, Regional Services (Forest Agencies), Local Government

*1.1.4. Preparation of Special Management Studies and Plans for Development and Management for the areas which still lack them and which constitute breeding and wintering sites for the Pygmy Cormorant.*

It has been determined that studies of this type constitute the basic “tools” for the management of the areas and wherever they have been carried out, they have been considered to have set the bases for their conservation. The preparation of such studies also for the remaining areas where the Pygmy Cormorant winters or breeds, will fill

great part of the gap that exists for those areas with regard to knowledge and management.

Priority: High

Timetable: Short-term

Implementation feasibility: High

Implementation agency: Min. for Environment

*1.2 Development of collaboration with neighbouring countries of the Balkans, in view of the joint research and conservation of the species.*

The effective protection of the Pygmy Cormorant requires coordinated action among the countries. The collaboration, in particular with Balkan countries, would greatly improve knowledge on the species, but also on the problems it faces within its wider distribution range, thereby enhancing the opportunities for a more effective intervention for its conservation.

Priority: Medium

Timetable: Medium-term

Implementation feasibility: Medium

Implementation agency: Environmental NGOs in collaboration with government agencies.

*1.3. Establishment of a mechanism for provision of consultation and information exchange between state services and NGOs.*

The operation of such a mechanism is estimated to bring multiple benefits, not only to the Pygmy Cormorant, but also for other issues related to the fauna and to wetlands. The timely information exchange through this mechanism will be able to prevent actions or decisions that may be detrimental to the Pygmy Cormorant or its habitats.

Priority: Medium

Timetable: Long-term

Implementation feasibility: Medium

Implementation agency: Min. for Environment, Min. for Agriculture, environmental NGOs

## **2. Conservation of the species and of its habitats**

### *2.1. Promotion of the management of freshwater wetlands in a way which will be favourable to the Pygmy Cormorant.*

The incorrect water management in wetlands has caused the loss or degradation of wide wetland areas, several of which, constitute feeding sites for the species.

Priority: High

Timetable: Short-term

Implementation feasibility: Medium

Implementation agency: Min. for Agriculture, Min. for Environment

### *2.2. Implementation of specific management measures for the improvement or creation of suitable habitats for breeding, feeding or resting of the species, wherever believed necessary.*

The existence of suitable breeding and feeding habitats are among the main prerequisites for the conservation of the species in a certain area. The creation of such habitats is believed to increase the possibilities of its maintenance or attraction to that area, particularly at the areas where it used to breed in recent years. Such actions could be included in the work plans implemented or prepared by various civil services for wetlands.

Priority: High

Timetable: Medium-term

Implementation feasibility: Medium

Implementation agency: Environmental NGOs, Min. for Environment, Min. for Agriculture, Regional Services (Forest Agencies)

### *2.3. Restoration of the species' habitats which were subjected to damage or degradation due to human activities.*

Several breeding and feeding habitats of the Pygmy Cormorant, particularly the riparian forest vegetation along the rivers and the lakeside, as well as the periodically flooded areas, have been degraded in recent years, resulting to a decline in its population in these areas. Their restoration is expected to contribute to the rehabilitation of the population to its former size. The prevention of any further damage or degradation of wetland areas must constitute a prerequisite in

development planning by the competent services. In case that wetland degradation does occur, the necessary restoration measures should be taken immediately.

Priority: Medium

Timetable: Medium-term

Implementation feasibility: Low

Implementation agency: Environmental NGOs, Min. for Environment, Min. for Agriculture, Regional Services (Forest Agencies)

*2.4. Intensification of the effort to restrict the activities which cause disturbance to, or degrade habitat quality (such as illegal hunting, fishing or logging, uncontrolled waste disposal etc.) at the wintering and breeding sites of the species.*

The disturbance at the roosting and feeding sites of the species from basically illegal activities, may hinder breeding attempts of the species at sites where it does not breed. The encouragement of the competent state services (forest services) or the hunting clubs towards the increased supervision and guarding of sensitive areas is expected to restrict the incidents of the species' disturbance.

Priority: High

Timetable: Short-term

Implementation feasibility: Medium

Implementation agency: Min. for Environment (Information Centres), Min. for Agriculture, Regional Services (Forest Agencies), Hunting Clubs

*2.5. Encouragement of the civil services, the industrial enterprises and the Local Government towards the effort to restrict water pollution in wetlands.*

Although the way in which pollution affects the Pygmy Cormorant is unknown until today, it is presumed that it does affect it indirectly. Despite the fact that in certain sites there are biological waste treatment plants, a delay is observed in their operation, resulting to further burdening of the recipient water bodies by the effluents or wastes. It would be an interesting idea for methods such as natural effluent treatment through reedbeds to be applied where this opportunity exists.

Priority: Medium

Timetable: Medium-term

Implementation feasibility: Medium

Implementation agency: Local Government, private individuals, Min. for Environment, Min. for Agriculture

### **3. Monitoring and Research**

#### *3.1. Monitoring of the breeding and wintering population at the principal areas where the species breeds and winters.*

The great changes recorded recently in the size of the breeding, and in particular the wintering populations in Greece, poses an imperative necessity of the species' populations monitoring at regular time intervals.

Priority: High

Timetable: Medium-term

Implementation feasibility: High

Implementation agency: Environmental NGOs

#### *3.2. Monitoring, on a regular basis, of human activities as well as of ecological change at the principal sites where the species breeds or winters.*

Monitoring of the state of wetlands constitutes one of the main elements for the immediate and effective intervention wherever a problem is identified. Already, through the Programme Agreements of the Min. for Environment about wetlands, in certain areas and where the Information Centres are in operation, it seems that the monitoring and problem identification projects begin to produce results. Nevertheless, the improvement of their efficiency and their implementation in more areas, should be encouraged. Moreover, the collaboration with experts is estimated to largely improve the effectiveness of these projects.

Priority: High

Timetable: Medium-term

Implementation feasibility: Medium

Implementation agency: Min. for Environment (Information Centres), Environmental NGOs

#### *3.3. Research on the feeding ecology of the Pygmy Cormorant.*

Although there is data on the species' feeding ecology in Prespa and in Kerkini, it is estimated that more intense research in more wetlands will provide most useful knowledge on the biology and ecology of the species. This knowledge, if properly utilised, may contribute to its more effective conservation.

Priority: Medium

Timetable: Medium-term

Implementation feasibility: High

Implementation agency: Environmental NGOs, Universities

*3.4. Research on the dispersal and the movements of the Pygmy Cormorant by the ringing method.*

This research is expected to provide precise information about the movements and the dispersal of the species. The results are believed to be useful for the conservation and management of the species within its distribution range.

Priority: Average

Timetable: Long-term (partly under implementation)

Implementation feasibility: High

Implementation agency: Environmental NGOs

*3.5. Research on the hunting pressure exercised upon the Pygmy Cormorant, in the feeding or roosting sites of the Pygmy Cormorant where hunting takes place.*

Even though it seems that the incidents of kills due to hunting are not numerous, it is estimated that a specific research would give a clearer picture of this issue. Since the Greek bibliography lacks this type of research, it is argued that the results and experience that will emerge from this attempt will also prove beneficial to other bird species.

Priority: Low

Timetable: Long-term

Implementation feasibility: Medium

Implementation agency: Environmental NGOs, Hunting Clubs, Min. for Agriculture, Regional Services (Forest Agencies)

*3.6. Research on the influence of pollution on the Pygmy Cormorant.*

Until today, the way in which pollution affects the Pygmy Cormorant is not known. Such a research may prove significant for the conservation of the species.

Priority: Medium

Timetable: Medium-term

Implementation feasibility: Medium

Implementation agency: Universities

#### **4. Information and awareness**

*4.1. Promotion of the policy for information and awareness of wetland users, but also of decision-makers with regard to wetlands where the Pygmy Cormorant breeds or winters.*

Priority: Medium

Timetable: Medium-term (partly under implementation)

Implementation feasibility: High

Implementation agency: Environmental NGOs, Min. for Environment (Information Centres)

*4.2. Promotion of the policy for information, collaboration and training of the staff of the Information Centres of the Min. for Environment (or other information centres of similar nature) who are responsible for the wardening - conservation of wetlands.*

Priority: Medium

Timetable: Medium-term (partly under implementation)

Implementation feasibility: High

Implementation agency: Environmental NGOs

## **PART III**

### **PROPOSED ACTIONS AND ACTIVITIES PER AREA**

#### **EVROS DELTA**

##### **Policy and legislation**

1.1.1. Designation of the species' roosting site (Topsi area) under a stricter protection regime.

1.1.3. Definition of specific rules for the development of eco-touristic activities.

1.2. Co-operation with Bulgaria, Turkey and Romania for further investigation of the relationship of the populations concentrating in the Evros delta, with the populations in those countries.

##### **Conservation of the species and of its habitats**

2.1./2.2./2.3. Management of the delta freshwater in a way that favours the creation of flooded areas for a long period. The proposal mostly refers to the flood plain of the eastern part of the delta, which constitutes the main feeding site for the species.

2.2. Planting of tree or shrub vegetation along the banks of selected drainage canals, in order to increase resting locations and decrease disturbance in these locations that constitute feeding sites for the species.

2.3. Specific planning for the clearing of the drainage canals, in order to inhibit degradation of the breeding or feeding habitats of the fauna. Clearing during autumn (so that it does not coincide with the breeding season of the fauna) and the alternating clearing of the banks are some of the suggested solutions (See also: Ward et al. 1994, Bousbouras in press).

2.4. Control of the illegal construction activities, particularly along the eastern river branch and the river alignment. Examination of the possibility to concentrate all relevant legal activities in a location where it will not cause disturbance to the avifauna, away from the roosting site of the Pygmy Cormorant.

2.4. Enhancement of wardening for the restriction of illegal hunting.

##### **Monitoring and research**

3.5. Preparation of a study on the hunting pressure and its impact on the Pygmy Cormorant.

3.3. Preparation of a study on the feeding ecology of the species

### **Information and awareness**

4.2. Collaboration with the staff of the Information Centre with regard to issues related to information about the status of the Pygmy Cormorant in the area, to environmental quality monitoring and to alerting the competent authorities about the problems faced by the wetland.

## **LAKE ISMARIS**

### **Conservation of the species and of its habitats**

2.2. Fencing of the riparian forest in order to reduce disturbance and enhance natural regeneration.

2.2. Prohibition of vehicle access to the eastern dyke of the lake, in order to reduce disturbance to the avifauna and in particular of the Pygmy Cormorant.

2.3. Re-flooding of the areas east of the lake, in order to create feeding habitats suitable to the species.

2.2. Construction of gradients in Vosvozis upstream its outflow into the lake in order to retain the water and maintain it during summer months. Special care must be taken for the needs of fish mobility.

2.3. Provision to prevent salt water intrusion into the lake during summer months, by the placement of special sluices.

2.4. Enhancement of wardening in the areas adjacent to the lake, in order to restrict illegal hunting.

## **LAKE VISTONIS – PORTO LAGOS**

### **Conservation of the species and its habitats**

1.1.2./2.1./2.3. Restoration of the wet meadows and marshes at the eastern part of lake Vistonis and immediate rejection of any additional attempt to drain them.

2.2./2.3. Fencing of the riparian forests of Kosynthos and Kompsatos, in order to avoid further degradation or damage and enhancement of natural regeneration.

2.4. Enhancement of wardening in order to restrict illegal hunting and logging locally.

### **Monitoring and research**

3.5. Preparation of a study on the hunting pressure and the degree to which it affects the Pygmy Cormorant.

### **Information and public awareness**

4.2. Collaboration with the staff of the local Information Centre, with regard to issues related to information on the status of the Pygmy Cormorant in the area, to environmental quality monitoring, and identification of the wetland's problems to the competent authorities.

## **NESTOS DELTA**

### **Policy and legislation**

1.1.1. Designation of the Chrissoupoli lakes under a stricter protection zone.

1.1.2./ 2.1. Safeguard of a permanent flow in river Nestos throughout the year.

### **Conservation of the species and its habitats**

2.4. Enhancement of wardening for the restriction of illegal hunting.

2.1./2.3. Enrichment of the lagoons with freshwater. This can be achieved by re-positioning the torrent beds into the lagoons, as in the past. Special care must be taken to avoid pollution of the lagoons by effluents disposed in certain torrents.

### **Monitoring and research**

4.3. Preparation of a study on the feeding ecology of the species.

3.5. Preparation of a study on the hunting pressure and on the degree to which it affects the Pygmy Cormorant.

### **Information and public awareness**

4.2. Collaboration with the staff of the local Information Centre, with regard to issues related to information on the status of the Pygmy Cormorant in the area, to environmental quality monitoring, and identification of the wetland's problems to the competent authorities.

## **LAKE KERKINI**

### **Policy and legislation**

1.1.2./2.1. Abolition of the plan for the elevation of the lake's water level and water saving through works for the improvement of the irrigation networks' effectiveness.

1.1.3. Establishment of rules for the regulation of tourist activities in the lake, particularly during the breeding period (March - July).

1.2./3.1. Further research on the species in the wider area with the collaboration of scientific bodies or NGOs from Bulgaria and Romania.

### **Conservation of the species and its habitats**

2.4. Enhancement of the wardening of the lake in order to restrict illegal activities e.g. illegal logging, hunting and fishing.

2.2./2.3. Tree-planting and fencing in parts of the riparian forest in order to re-create the forest, but also the reedbeds, in an artificial manner.

2.2. Specific planning for the clearing of the drainage canals, in order to protect breeding or feeding habitats of the fauna from degradation. Clearing during autumn (so that it does not coincide with the breeding period of the fauna) and the alternating clearing of the banks are among the indicated solutions (see also: Ward et al. 1994, Bousbouras in press).

### **Monitoring and research**

3.3. Further research on the feeding ecology of the species.

3.6. Preparation of a study on the influence of pollution on the Pygmy Cormorant.

### **Information and public awareness**

4.2. Collaboration with the staff of the local Information Centre, with regard to issues related to information on the status of the Pygmy Cormorant in the area, to environmental quality monitoring, and identification of the wetland's problems to the competent authorities.

## **AXIOS – LOUDIAS – ALIAKMON DELTA AND GALLIKOS ESTUARY**

### **Policy and legislation**

1.1.1. Extension of the protected zone of the area so as to include the former river beds of Axios (eastern and western oxbow lakes) north of the National Highway of Thessaloniki – Katerini up to the Community of Anatoliko.

1.1.1./1.1.2. Establishment of regulations for the disposal of wastes and liquid effluents, including inert material.

1.1.1./1.1.3. Establishment of regulations for the performance of sport fishing in the area. Prohibition of this activity in the marshes and especially along the former river beds of Axios (eastern and western oxbow lakes) and investigation of the possibility to organise specific locations for it.

1.1.2. Removal of the animal farming settlements from the river beds and from the former beds of Axios (eastern and western oxbow lakes) and control of their effluent

disposal. 1.1.3. Extension of the hunting prohibition so as to include the former river beds of Axios (eastern and western oxbow lakes).

### **Conservation of the species and its habitats**

2.2./2.3. Enhancement of the riparian zone of trees north of the bridge of the National Highway of Thessaloniki – Katerini.

2.3. Planting in the devegetated banks and in the areas where vegetation was damaged by sand extraction activities, and fencing in order to assist natural regeneration.

2.2. Restoration of the former beds of Axios at the sites where they have been filled up with domestic wastes, and inert material or encroached and occupied by animal farming settlements.

2.4. Enforcement of wardening in order to restrict activities such as illegal hunting, fishing and logging.

2.2. Specific planning for the clearing of the drainage canals, in order to protect breeding or feeding habitats of the fauna from degradation. Clearing during autumn (so that it does not coincide with the breeding period of the fauna) and the alternating clearing of the banks are among the indicated solutions (see also: Ward et al. 1994, Bousbouras in press).

### **Monitoring and research**

3.2. Identification and registration of the polluting sources of the wider area.

### **Information and public awareness**

4.2. Collaboration with the staff of the local Information Centre, with regard to issues related to information on the status of the Pygmy Cormorant in the area, to environmental quality monitoring, and identification of the wetland's problems to the competent authorities.

## **LAKE PETRON**

### **Policy and legislation**

1.1.1. Establishment of legal protection for the area. Preparation of a Specific Management Study in order to designate the area under a certain protection status (Special Protection Area)

1.1.2. Definition of a lowest acceptable water level for the lake. The withdrawal of the water level is believed to have a negative impact on the breeding success of the fish and to restrict the feeding sites of the Pygmy Cormorant.

1.1.3. Prohibition of hunting in the lake. The species' population decrease during winter is estimated to be due to hunting.

**Conservation of the species and its habitats**

2.2. Enhancement of the riparian zone of trees, particularly at the northern and north-eastern part of the lake.

2.4. Enforcement of the wardening of the lake, in order to restrict illegal activities (reedbed burning, illegal hunting or fishing, domestic waste disposal).

2.5. Immediate operation of the biological treatment plant for the effluents of Amyndeo and connection of all polluting units with it (cheese-dairies, abattoir and neighbouring communities).

**LAKE KASTORIA**

**Policy and legislation**

1.1.1. Establishment of legal protection for the area. Preparation of a Specific Management Study in order to designate the area under a certain protection status (Special Protection Area)

**Conservation of the species and its habitats**

2.2./2.3. Tree-planting in the parts of the riparian forests that were subject to logging.

2.4. Enforcement of the wardening for the restriction of the activities concerning mainly the damage or degradation of the riparian forest.

**PRESPA**

**Policy and legislation**

1.2./3.1. Further research on the species in the wider area, through the collaboration of scientific bodies and NGOs from Albania and FYROM.

**Conservation of the species and its habitats**

2.3. Investigation for the feasibility of re-creating part of, or extending, the wet meadows of Mikri Prespa.

2.4. Enforcement of the wardening of the area in order to restrict illegal activities (such as illegal fishing and uncontrolled waste disposal) so as to diminish disturbance, especially during the birds' breeding season.

2.5. Management of the effluents of the human settlements, in order to prevent water quality degradation in the lakes.

2.2./2.3. Construction of passages along the gradients of the Agios Germanos river, for the fish that move along its banks.

#### **Information and public awareness**

4.2. Collaboration with the staff of the local Information Centre, with regard to issues related to information on the status of the Pygmy Cormorant in the area, to environmental quality monitoring, and identification of the wetland's problems to the competent authorities.

### **KALAMAS DELTA**

#### **Policy and legislation**

1.1.1. Issuing of a Joint Ministerial Decision for the delineation and definition of uses in the area.

1.1.3. Extension of the hunting prohibition to a greater area than the current one, including the outlet points of the river's estuary as well as the freshwater marshes.

1.1.2./2.5. Concentration of all stable settlements for the animals in specific locations where treatment of their effluents will be easier, in order to reduce pollution in marshes and canals.

#### **Conservation of the species and its habitats**

2.1./2.2. Management of the freshwater in a way that it remains in the marshes even in summer months. All freshwater marshes of the area (marshes of Sagiada, marshes at the periphery of Mavro Oros, marsh of Filippiada etc.) may remain flooded during summer under appropriate management measures (e.g. usage of water from the drainage canals or through the already existing pumping stations).

2.2./2.3. Tree-planting along the beds of Kalamas and in the sites where the arborescent vegetation has shrunk by illegal logging or was burnt.

2.4. Enforcement of the wardening for restricting activities such as illegal hunting or logging.

## **PART IV**

### **DISSEMINATION AND PROMOTION OF THE NATIONAL ACTION PLAN FOR THE PYGMY CORMORANT**

A prerequisite for the effective implementation progress of the National Action Plan for the Pygmy Cormorant is its widest possible dissemination.

This publication is addressed to the civil services involved in managerial aspects of the natural environment and more specifically of wetlands, local bodies, University departments and NGOs. All the above, to a greater or lesser degree, make decisions about wetlands, implement various projects, prepare studies upon the species or more generally, upon wetlands. The integration of certain of the proposals included in the present Action Plan within future decisions or projects and activities of the above bodies, will definitely constitute an important step towards the conservation of the species. In particular, the possibility of the herein included proposals to be integrated in the imminent Presidential Decrees or other legislative regulations.

The co-operation of all involved bodies (as suggested under “Implementation agency”) is thought as particularly useful, if not necessary and is expected to play a substantial role in the effective implementation of the National Action Plan.

The implementation and progress of the National Action Plan must be systematically reviewed at least every five years. The Hellenic Ornithological Society and the World Wide Fund for Nature (WWF – Greece) in collaboration with local NGOs such as the Society for the Protection of Prespa, are recommended as the appropriate bodies for undertaking the supervision of the implementation of the National Action Plan. It is moreover proposed that the above NGOs update the Action Plan at least every five years.

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