

## Social Economic Aspects of Fishery and Fishing Activities in Albanian Part of Prespa Lakes<sup>#</sup>

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**Abstract:** Prespa Lakes region is shared by Albania, Greece and Macedonia. The basin includes Micro Prespa and Macro Prespa Lakes, and the surrounding forested mountainous slopes, covering a total area of 27 750 ha. The area is characterized by its natural beauty, its great biodiversity and its populations of rare water birds. The fauna of the area includes characteristically 23 species of fish (8 endemic species) and approximately 46 species of mammals. The basin is of a specific importance for water birds as the Dalmatian pelican, white pelicans and pygmy cormorants. This level of biodiversity and endemism makes these lakes special by any standards. Based on the cultural elements Prespa is representing a remarkable importance. Prespa Lake is among the seventeen most ancient lakes on earth and is estimated to be more than five million years old. The aim of the present paper is to provide information on the current situation of the fisheries on the Albanian side of the lakes Macro and Micro Prespa, along with the existing practices and regulations, and to offer views from an Albanian perspective that will help resolve some of the current difficulties. This paper also presents to a wider public the economic, ecological and evolutionary importance of these lakes. Fishing is one of the main economic activities in the area. On the Albanian side some 100 fishermen from the villages around the lakes regularly fish these waters. Unfortunately, their activities are disorganised and carried out on an individual basis, while half of them fish informally, i.e. without a licence. The water and fishery policies and practices applied in Albania over the last fifty years have negatively affected the region's biodiversity in general and its fish species in particular. Lake Micro Prespa especially has suffered substantial, though reversible, damage from a policy that turned this internationally important lake into little more than a reservoir for the local, albeit nationally economically important, irrigation system. It is very important for the future of the species found in the Prespa region, as well as for the communities that depend upon them, to strive, through best practices, analysis of policy and positive actions of trans-boundary cooperation, to improve the current situation. Some remedies are presented in the present paper.

**Key words:** Prespa Lake, fishery, fishing activities, endemic species, economic development

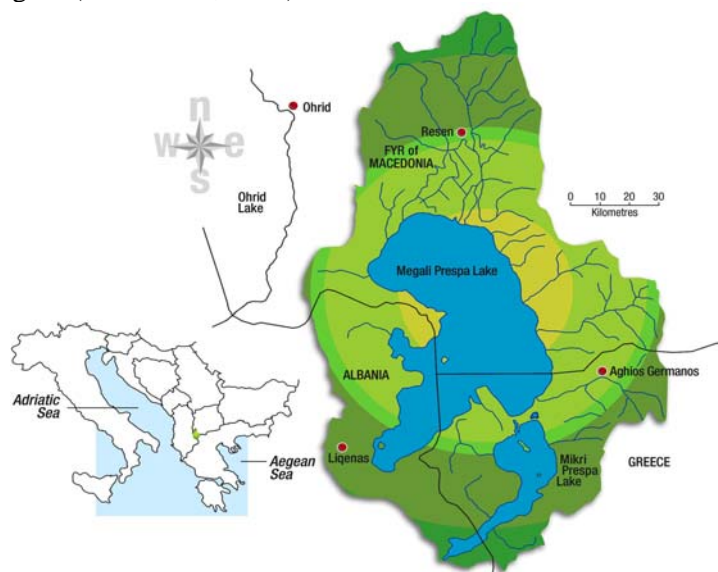
### Introduction

Lakes Macro and Micro Prespa (~ 41°N, and ~ 21°E), connected between them, actually forming one wetland, are the largest water body of the Balkans (Figure 1). Lake Macro Prespa (surface area 253.6 km<sup>2</sup>) belongs to three countries: Albania, Greece and the Former Yugoslavian Republic of Macedonia (FYR Macedonia), while Lake Micro Prespa (47 km<sup>2</sup>) is shared between Albania and Greece. They are of Tertiary origin and have only underground outlets. The lakes are at 850 metres above sea level (a.s.l.) amidst mountains rising to over 2500 m a.s.l. (Crivelli & Catsdaorakis, 1997). There has been considerable human modification of the local hydrology with the diversion of the Agios Germanos stream from Micro Prespa to Macro Prespa on the Greek side and of the River Devoll into Micro Prespa on the Albanian side. The region is internationally recognized as one of Europe's most ecologically important areas or biodiversity "hot spots" (Albrecht *et al.*, 2008; Schultheiss *et al.*, 2008), as well as an ecosystem of global significance on account of the concentration of many rare and important ecological values. The region hosts populations of numerous rare, relict, endemic, endangered or threatened species. The rate of endemism and sub-endemism among species in the region, which is partly due to the great habitat diversity concentrated in a small

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area, makes it unique and extremely important from a biodiversity conservation perspective at any scale, be that European or global. Prespa Lakes belong to the “Southeast Adriatic Drainages” freshwater ecoregion (Abell *et al.*, 2008).



**Figure 1.** Prespa Lakes region

Crivelli *et al.* (1997) published an overview on the fish and fisheries of Prespa lakes. Lakes Prespa are generally characterised by a high biodiversity and especially a high variety of fish fauna, making this an important lake for the Balkan. From ichthyologic studies carried out it appears that the lakes have 23 fish species. Seven of them are considered as vulnerable or threatened (endangered or critically endangered). The relatively high number of endemic species (eight species of fish are endemic to Lakes Prespa catchment and one is endemic to the Balkans) makes the lake significant on regional level.

One major problem is the lack of storage facilities. These need to be set up to enable the produce to be stored prior to going to market. Another problem is lack of stocking facilities, and finally there is a need to improve the agricultural drainage system and introduce new working processes in order to maintain the waters flowing in to and out of the lake basin at an acceptable level. In addition, the damage caused by the inflow of massive quantities of silt into Lake Micro Prespa must be reversed. Dredging and redirection of the river back on to its original course, or installation of appropriate, efficient silt collectors would be two obvious interventions.

### ***The fishery statistics***

In years, production and structure has gone under oscillations (Table1, 2). In table 1 is shown fishery statistics for Macro Prespa (Kapedani & Gambetta, 1997), and in table 2 are shown fishing data for the Albanian part of Micro and Macro Prespa for year 1987, 1989 and 1990. Despite the limited area in Albanian part of Micro Prespa Lake, interest in its fishery aspect is high as it is shown in figure 2 (Kapedani & Gambetta, 1997), which gives the total catches, and for the time period between 1948 and 1995.

After years'70-ies the fish yield in Albanian part of Prespa was increased mainly by the perfection of bleak fishing using lights. But the decrease after 1986 may be by the decrease of fish reserves due to continuous decrease of water level (more than 6 m). The littoral zone of fine and clean gravel, considered an ideal habitat for the reproduction of bleak, disappeared. The lakeshore retires, from the gravel to muddy and sludgy, have probably caused difficulties into regeneration of bleak reserves. Albanian part had appropriate zones for the reproduction of bleak and carp, which actually part of them have been substituted by the organic depositions. With the decrease of water level it is evidenced also a decrease and retire of reed bed, which in 1997 was reduced until 20-25 % of the surface occupied before 1986. This limitation of vegetation belt have probably affected on the growth,

sheltering and feeding of skardinus and rutilus. The same can be confirmed for the decrease of the carp, which is a periphytonic breeding species, and very good indicator of these habitats. Moreover, this situation is considered to be mainly of natural origin rather than anthropogenic. Curiously, those authors mentioned since 1986 *Silurus glanis* and *Red Piranha*, *Serrasalmus nattereri* (Cypriniformes, Serrasalminae, from South America) as predator introduced species. Shumka *et al.* (2008) do not mention the second species as introduced in Albania, and consider that *Silurus glanis* has been introduced in 1991.

**Table 1.** Fishery statistics for the Albanian part of Macro Prespa

Years	Carp (%)	Nase (%)	Bleak (%)	Total catch (kv*)	Yield (kg/ha)
1954-1960	20	13	67	1500	3
1960-1970	13	5	82	3700	9
1971-1975	3	6	91	18072	90
1976-1980	0.5	4	95.5	25989	129
1981-1985	0.5	3	96.5	22415	112
1986-1990	4	5	91	12177	60
1991-1995	5	8	87	6933	34

1 kv = 100 kg

The last decrease (after 1991) was because of transition situation in Albania, mainly due to not regular and controlled fishing activities, and to decrease of demand for bleak. While the decrease in Micro Prespa, especially after 1987, is related with water input from Devolli River, high alluvial depositions into the lake, in the most important fishery habitats. As a matter of the fact, whole areas of the bleak and carp growth and reproduction, as well as the benthos rich in mussels, have been totally disappeared. However, till 1995 no decrease in carp production has been noticed. Since 1971, a fish breeding enterprise was established in Zvezda (Korça district), dealing with rearing carp and releasing them into the lake to enhance fish stocks and hence the fisheries. This station is managed by Fishery Research Institute of Durrësi. But during last decade fish local fishermen have over exploited resources in an illegal or uncontrolled way. In some cases, even dynamite fishing has occurred. Instead of only four fishing groups before 1991 (licensed and controlled), there are only two organized and licensed fishing groups (1997), equipped with fishing boats. But there are many others aiming to earn some money by fishing, selling the fish in Korça, or beyond the state border. The marked is rather distant, and the road not very comfortable, therefore high quantities of fish deteriorate.

**Table 2.** Fish catches (kg/year) for the Albanian part of Macro and Micro Prespa lakes, for three years

Species	1987	1989	1990
<b>Macro Prespa</b>			
<i>Squalius prespensis</i> and <i>Chondrostoma prespense</i>	7800	15411	7351
<i>Alburnus belvica</i>	237200	210314	13
<i>Carassius auratus</i>	0	702	26
Total	246700	234518	8958
Yield (kg/ha)	63.6	60.4	2.3
<b>Micro Prespa</b>			
<i>Cyprinus carpio</i>	1000	7200	6028
<i>Anguilla anguilla</i>	0	600	315
<i>Squalius prespensis</i> and <i>Chondrostoma prespense</i>	6700	5300	1854
<i>Alburnus belvica</i>	4100	19200	1434
Total	11800	32300	9631
Yield (kg/ha)	23.6	64.6	19.3

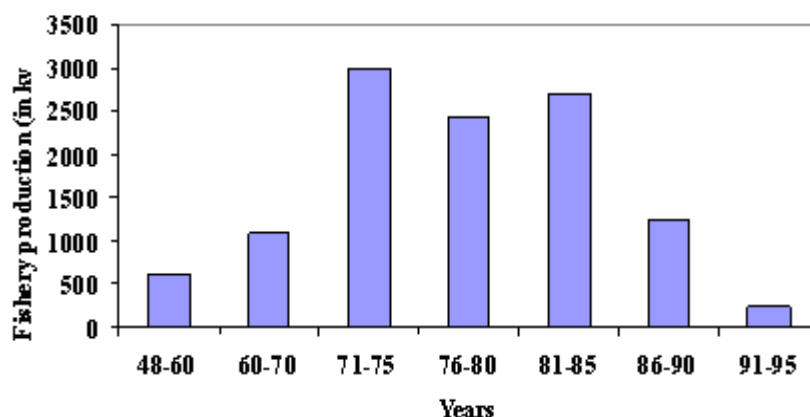
Fishery statistics are a useful tool to monitor fishery activity and in a certain extent some fish species abundance (e.g. then targeted fish species, in Prespa: carp). However, the fishery statistics can be useful and efficient, only if the following conditions are fulfilled: (a) Clear fishing regulations common to the three countries should exist; (b) the statistics should be as much as possible reliable

and poaching (illegal fishing) should be reduced at strict minimum; (c) the fishing effort is documented: the minimum data needed being the number of licensed fishermen, but better an estimation of the number of nets set per month; (c) a strong implementation of fishing regulations (the existing ones or new ones) with fines and confiscated fishing material including boat if needed.

The regulations of fishery management are still not guided by a joint strategy among the three countries for the preservation of this valuable ecosystem. Measures should be taken for the coordinated fishing within three countries. Specific steps should be undertaken for preservation and increasing of authentic fishes by the relevant ministries, local authorities and companies that are based on the exploitation of fish resources.

### ***Economic analysis of fishery***

Local economic conditions are very poor, conditions are tough and the quality of life is of a low standard. There are many social problems and the lake provides one of the few means of feeding the local population. Fishing is one of the most important income sources in the National Park (NP)-Albania. It is estimated that approximately 100 households in Macro Prespa depend on the fishing, thereof alone 20 families from the village Kallamas. In the past, fish was subject to extreme pressure, a fact that entailed changes in the fish population and fish community structure. The increase of production during last decades has mostly been the result of improving of fishing techniques and decrease of professional and amateur fishermen in these areas.



**Figure 2.** Fishery production (in kv) in Albanian part of Micro Prespa Lake

Species in low number, which are usually endemic species, are in danger of further decreasing. Fishing is controlled by a licensing system and a fishing ban. The NP administration has implemented a one-month fishing ban during the spawning season May/June. It is reported that the majority of fishermen respects the ban. Fishermen have to pay €40 for a one-year fishing licence, which is not paid by all of them. Thus, there are some illegal fishing activities occurring in the area.

Economically valuable fish species, such as carp (*Cyprinus carpio*), have dropped while less demanded smaller fish species have increased. The average daily catch of one fisherman is 25 kg of small fishes (only small quantity of carp) between April and October. Between November and March, the average daily catch is 1.5 kg of carp (only small quantity of small fishes). It is assumed that some of presently applied fishing techniques are not sustainable because too many fishes are caught.

In most fishing households, at least two people are involved. While the men go fishing by boat, many women take the bus to the closest city Korça (45 minutes far) to sell the fish in the streets. They do not sell the fish on the local fish market because they do not have a business licence. In Korça, the average price for small fish is 0.5€/kg, for carp 3.5 €/kg. The price is lower in May/June and higher in October/November. Although the average price is 30% higher in Korça than in the Prespa area, it is difficult to sell the fish and means a long and hard working day. Smaller quantities of fish are sold in Prespa area. There are traders who buy the fish in the area. Some fishermen dry small fishes with salt for the winter period but only in small quantities because they need to sell the daily catch for income generation. A disproportion exists between supply, which is bigger in winter, and demand, which is higher in summer, and market fluctuations are high.

Grazhdani (2008) calculated the income from the fishery of the Albanian part of both lakes together. She considered that there were ca. 50 licensed fishermen and 50 not licensed. The average monthly turnover from fishing is €250 and the yearly turnover amounts to € 3,000. The yearly turnover corresponds to about 10% more than the average household income in the area and to about 42% less than the countrywide average. It is assumed that at least two people in these households are involved in fishing and that some families have an additional income from emigrated households members but others not. During a few months of the year, the monthly turnover from fishing can be very low, accounting to above €85. The maximum income loss for one month can be about €450. Fishing contributes to 150 000€ per years ( $50 \times 3,000\text{€}$ ), which is much less than firewood production and livestock breeding, but more than tourism and honey production.

### ***Policy framework in the fishery sector***

The Freshwater Fish Directive – 78/659/EEC of 18 July 1978 on the quality of fresh waters needing protection or improvement in order to support fish life. It has been significantly amended on several occasions, the last time on the 6 September 2006 (Directive 2006/44/EC). This directive concerns mainly the quality of waters and mandates minimal water levels for riverine biodiversity. It distinguishes salmonid waters and cyprinid waters. By the end of 2013 the Water Framework Directive (WFD; 2000/60/EC) will replace Freshwater Fish Directive – 78/659/EEC.

The WFD means continued improvement in fish stocks through improved habitats and improved water quality and quantity. The emphasis is on achieving good overall ecological status, not just on complying with water quality standards. The WFD lists fish amongst the biological elements (Annex V) which should be used for classification of ecological status of surface waters (rivers, lakes and transitional waters (estuaries). “Ecological status” (Article 2 (21)) is an expression of the quality of the structure and functioning of aquatic ecosystems associated with surface waters, classified in accordance with Annex V. Water management is on the basis of River Basin Districts (RBDs). The Directive specifies that fish shall be monitored at all sites selected for Surveillance Monitoring (SM). Fish are an indicator of water quality. Healthy fish stocks indicate good water quality. The variables to be used in any fish index are composition, abundance and age class structure.

Fish monitoring might be useful in the future to any study dealing with a lake fish index for south-eastern Europe, because it will give relative fish abundance, species composition, but age structure of fish present as required by the Directive. For the latter, the fish length distribution will be transformed in age structure by applying length-age matrix already published in various scientific papers (Rosecchi *et al.*, 1993; Sinis & Petridis, 1995; Crivelli *et al.*, 1996, 1997) or using unpublished data.

The legislation in the field of fisheries in Albania is based on both the exploitation of fish resources in a responsible way and the development of the sector. Fishing activity is regulated by Law No. 7908, dated 5.4.1995, ‘On Fishery and Aquaculture’, by Law No. 8763, dated 2.4.2001. ‘About the supplement on the law No. 7908, dated 5.4.1995, ‘On Fishery and Aquaculture’ and by Law No. 8870, dated 21.3.2002. ‘On amendments to Law No. 7908 dated 5.4.1995, ‘On Fishery and Aquaculture’ and Regulation No. 1 in implementation of this law. The general principle of this Legislation is to support the FAO Code of Conduct for Responsible Fisheries. The laws prescribe the functions of central and local consultative organs, scientific research, the manner of practice of fishing or aquaculture activities, or both, the management of lagoons and the manner of control. It also includes contraventions, sanctions and responsibilities. Theoretically, there is good coverage of all relevant issues in the sector and EU guidance in drafting the new legislation has been successfully adopted.

In terms of the Prespa Park it will be a step forward towards the harmonization of the legislation and regulation in Albanian side within bordering countries.

### **Conclusions**

Given the relevant legislation on water use and administration, fisheries, nature conservation and biodiversity there is a need for integration of the different sectors. While a broad legal framework covering all issues exists, there is a need for setting up priorities for securing a healthy environment for future generations.

The fishery authorities have to be oriented towards protection and enrichment of autochthonous fish stocks, such as local forms of common carp, barbel and nase, absolute exclusion of stocking by non-native fish species and forms of species, and protection and maintenance of winter refuges for the lakes' fish species.

There is an urgent need for implementing a better control and rational utilisation of the lakes' resources. Implementation of the licensing system would be the first step towards a rational exploitation of fish stocks. Furthermore, a set of rules should be introduced to set up a sound management policy. These rules must include the following: prevention of fishing during the natural reproduction period; reduction in the maximum limit of catch per unit effort; prevention of fishing in specific parts of the lake throughout the year and support for sustainable traditional fishing methods.

Regular monitoring and information is needed on population, communities and the dynamics of the aquatic ecosystem. It is necessary that the regulations of fishery management be guided by a joint strategy among the three countries for the preservation of this valuable ecosystem. This system will include strategic approaches to addressing the driving forces of overexploitation and to providing sustainable livelihoods for the people of the area. Specific steps should be undertaken for preservation and increasing of authentic fishes by the relevant ministries, local authorities and companies that are based on the exploitation of fish resources. Proposed items are:

- Introduction of new species must be strictly prohibited, without any approval of structures related to the preservation, development and exploitation of lakes on national and international levels, in order to avoid the ecological catastrophes as well as every change in the hydrological and hydrotechnical aspects.
- In order to have a more rational management of the lakes, their fishery management should be left to non-governmental organizations and organized groups on the lake level, approved by local authorities and licensed by the relevant ministry.
- Measures must be taken to avoid the further filling of Micro Prespa and competent authorities must be charged with the supervision and solution of this problem.
- The very grave situation of the low level of these lakes requires the establishment of national and international commissions to study these phenomena.

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