

GENERAL STATE OF THE ECOSYSTEM OF LAKE SKADAR AND ITS INFLUENCE ON THE MOVEMENTS AND DEMOGRAPHIC DISTRIBUTION OF THE POPULATION AROUND

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Abstract

Shkodra lake is a carstic lake. The origin results in the Neolithic period. His Biodiversity reaches 236 plant species and 687 animal species. Here are included high varieties of endemic species. In the habitat of these ecosystems nest important threatened species of bird meeting the criteria for admission in the Ramsar Convection. This ecosystem provides important ecological services, impact on climate, water serves as a filter, has medicinal plants. There are 61 species of fish becoming a source of income for the surrounding area. This has the consequence to a changement in the demographic structure in the areas of lake. The population has moved from the mountain zones to the regions around the lake, in the district Shkodra and Malesi e Madhe. The most important populated town is Shkodra with its 110.671 habitants. Around Shkodra Lake, 5 km from the city center is located the largest quarter named "Shiroka" with 1301 habitants and behind her is situated the quarter "Zogaj" with its 386 habitants. In the North-West part of the Shkodra Lake area is located the town of Koplik with 12.574 habitants. This ecosystem offers potential resources that are the basis of the activities such fishing, agriculture and recently tourism.

Keywords: *Shkodra lake, ecosystem, population, habitants, area*

Introduction

Shkodra Lake is the largest lake on the Balkan Peninsula. It is situated in the northwestern part of Albania on the border with Montenegro. The total area is 368 km² of which 149 km² are within Albanian territory and the rest within the Montenegro territory. The lake basin is situated in one of the tectonic depressions paralleling the mountain range at the foot of the Dinaric Alps. The total length of coastline (including islands) is 207 km. The northern shore of the lake is float gradually descending toward the lake. The southern shore is steep and rugged (Anonymous, 1985).

The Skadar Lake is composed principally of three type of systems

1. Lacustrine system with 2 subsystems, limnetik and litoral
2. Riverine system
3. Palustrine system (Dhora, 2012).

Water quality

Temperature

The temperature vary from January to August with 20 degree. Rarelythey fall below under 0 degree. This regime is typical for subtropical lakes (Dhora, 2012).

Ph vary from 7.8-8.2 .Conductivity vary from 240-310 microS/cm. Dissolved oxygen content varies from 7.4-9.3 mg/l. This implies that the water is abundant in oxygen which is important for the biota in the lake. The values of orthophosphate remain about 0.017mg/l and values of nitrite are around 0.023mg/l (Bekteshi, 2006). The Trophic State Index indicate that the water of lake remain ologotrophic (Anonymous, 2011).

Flora and Fauna

Shkodra Lake is a typical shallow temperate lake with water originating from rivers and carstic springs favoring the development of a rich aquatic flora with great variety in communities The total number of macrophytes is 242 plant species .About 62 species are aquatic plant and 180 are herbaceous plants of wet pastures.From 62 plant species 17 are hydrophyte plants, 45 species are submersed plant.

1. Dominant vegetation types are reed bets dominated by *Phragmites australis*, *Scirpus lacustris*
2. Floating macrophytes are *Nuphar luteum*, *Numphae alba* and *Trapa natans*
3. Submersed macrophytes are *Potamogeton lucens*, *Potamogeton crispus*, *Myriophyllum spicatum*, *Ceratophyllum demersum*, *Najas marina*, *Vallisneria spirals* (Anonymous, 2013)

Terrestrial vegetation

Is dominated by xerophytes vegetation with deciduous woods and shrubs .Among the forest communities that currently exist most significant ones are stands of domestic chestnut (*Querceto-Castanetum montenegrinum*), turkish oak (*Quercetum confertae*) and hornbeam (*Carpinetum orientalis*). Stands of willow (*Salicetum alba*) and alder (*Alnus glutinosa*) are the most abundant forets around the lake growing either as rows and trees around the flooding fields (Anonymous, 2005).

Fauna biodiversity consist of: Cnidaria 2 species, Plathelminthes 31 species, Nematoda 11 species, Rotifera 51 species, Mollusca 70 species, Annelida 10 species, Arthropoda 35 species, Crustacea 101.

Fish species

From ichthyologic studies carried out by both states it appears that the lake has 60 fish species belonging to 17 families. Two fish family are especially important. Cyprinidae family with 25 species and Salmonidae family with 9 species (Anonymous, 2005 & Anonymous 2013).

Of the total number of species 35 fish species are autoctone, 16 fish species are aloctone (introduced). From aloctone species 8 species migrate through lake to sea and 9 species are introduced for economic purposes. There are 15 species of Amphibia, 28 species of Reptilia Aves (Birds): there are 282 species which comprise 55% of the number of species all over Europe, 112 of which belong to waterfowl species. The lake hosts on average 21.233 individuals that is more than 20.000 winter water birds. The lake serves as a wintering point respectively for: small cormorans (*Phalacrocorax pygmeus*), which comprises 2.4 % of the regional population and *Chlidonia hybridus* which comprises 1.8% of the regional population (REC 2009).

Mammals: the mammals related to Shkodra lake are not well researched. The total number of species found is 50 (belonging to 6 orders). Only a few mammals are strongly linked to the water habitats, like the otter (*Lutra lutra*) (Anonymous, 2005).

Endemic species are present in Shkodra lake.

The fitoplankton community lists 2 species *Cyclotella scadanensis* and *Cymbella scutariana*

Endemic species of plants are *Trapa longicarpa* subs.*scutariensis* and *Quercus robur* subs.*scutariensis*. Fish species are *Pachycillon pictum* and *Salmothymus obturosirostris* va. *zetensis* Endemic amphibian species are *Pelophylax kartmullri* and *Pelophylax shqiperica* (Anonymous 2013 & Dhora, 2012).

Environmental protection

Decision of Albanian Government nr 684 2.11.2005 to declare Shkodra Lake Managed Natural Reserve

Decision of Albanian Government nr 683 2.11.2005 to include the Shkodra Lake to the Ramsar List (GTZ, 2007).

Scientific methods

About the population that lives in the area of Shkodra Lake have been collected and studied data from several demographic studies about demographic development that concerning to this area.

Data analysis

The northern part of Shkodra lake belong to the district of Malesia e Madhe. The rest of the area belong to the district of Shkodra whose town has the same name. In the southern extremity of lowland near of lake between river Drini and Buna lies city of Shkodra the biggest urban center around and close to the lake. Shkodra (Skadar, Scutari) with an over 2000 years history is a well

known city in Southern Europe principally for the commerce through Buna to Adriatic sea and for his high level of culture and civilization. Rozafa Castel with its famous legend and architecture represents a precious historical and cultural monument.

The district of Shkoder has a surface of 1302.96 km² organized in 2 municipality and 15 communes. The population of the district of Shkoder count in total 217,375 inhabitants, the town has almost 120.000 inhabitant. This numeral has decreased by 15% from 2001. Rural population counts 96,328 inhabitants, almost unchanged from 2001. From 1991 to 2012 the population has a moderate growth of 2.02%. (Anonymous, 2010). Rural population with a decline of 25% is still dominant in measure of 66%.

A lot of small villages occur on the coast of Shkoder lake like Stereo, Amice, Flake, Caldron. Shirk and Zola are included to the administrative unit Nr. 1 of Shkodra city and lie in the western part of the lake. The population of these two quarters is 1,693 residents or 6.9% of the population of nr.1 administrative unit. Shiroka has 308 family and Zogaj has 75 family. Before 1990, the movements of population was limited and in Zogaj was forbidden. After 1990 were emerged population changes as a result of another factor, the immigration (Anonymous, 2013)

Table 1: Display of population growth

	December 1995	January 2006	Population growth
Shkoder	93739	110740	18.1%
Shiroke	996	1304	30.9 %
Zogaj	385	396	2.8 %

Shiroka has the heights growth rate of population, while Zogaj presents lower rate of the population. Shiroka was involved by immigrant movement (moving away of residents) and ingoing of inhabitants from Ana e Malit, Oblike, Dramosh, Villgare etc (GTZ, 2007).

The main economic activities in the past were fishing, the growth of silkworm.

Zogaj has the same features of climate, terrain and economic traditions as Shiroka. Due to a greater distance from Shkodra and due to other factors Zogaj has not undergone demographic fluctuations much more pronounced as Shiroka. In the recent years is increased tourist activity with the construction of a series of bars restaurants and hotels, although with a small accommodation capacity.

To consider the factors like emigration and immigration on population growth, the previsions up to 2030 will be. The annual growth of population by taking in consideration natural movement it will be in the amount 1.3%. This area will be an integral part of the main city (GTZ, 2007). In the eastern shore of Shkodra lake lies Koplík Municipality, and villages Kamicë, Flake, Jubice, Sterbeq, Kalldrun, Dobri Vukpalaj, Gril, Kosan which are located at a distance 1-2 km

from the lake. These areas have enough surface suitable for the cultivation of vegetables, tobacco, forage, viticulture, ethereal plants (Anonymous, 2013).

The population of Koplík Municipality has increased six times. From 1991 where he had 2000 inhabitants today has 11.275 inhabitants. This increase of population came from the people who migrated from the northern mountain areas. From 2005-2007, was observed a stabilization of the population size tending to decrease. This is the result of movement completes families to countries of the European Community (family reunification) or towards the Tirana Metropol. Despite this tendencies the population will growth in the future (Anonymous, 2008).

Among the villages over mentioned Kalldruni is the oldest center in this side of the lake. There are traces of Roman habitations. There is also a tradition of fishing and hunting of wild birds main and economic activities are agriculture, forestry, and fishing. Their impact is not problematic to the natural resource.

Table 2: Distribution of population in the eastern shore of lake

Villages	Inhabitants
Bogiq	670
Dobre	693
Koplík i siperm	1259
Lohe e poshtme	573
Kalldrún	554
Sterbeq	636
Jubice	572
Kamice-Flake	957
Total	5914

Table 3: Distribution of land

Classification of lands	Sip. ha
Agricultural land	3312
Nonproduktive land	960
Pastures, valley forests	400

Total	4672
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Pressures of development to this area

Building projects (Shkoder, Shiroke-Zogaj)

Tourist Activities (Shkoder, Shiroke_Zogaj, east coast.

Movement near the lake

Urban pollution (GTZ', 2007)

What Shkodra lakes biodiversity offers to the population around these shores.

The fish community is one of the main vital component to the ecosystem of Lake Shkodra both macrophytes and water quality in normal parameters. Fish play an important role in the transfer of nutrients from the coast to the pelagial waters (Anonymous, 2013).

1. Considerable community of fish species. As over mentioned the water of lake is perfect for cyprinides, but the inflow by the Moraca river create appropriate conditions for salmonids.

Fish catching is based on the three groups of species. Value for fisheries have two native species, bleak (*Alburnus scoranza*) and carp (*Cyprinus carpio*). Another important group include migratory species into the sea via the river Buna where the most important are kubla

(*Alosa alosa*), eel (*Anguilla anguilla*) and mullets (*Mugil cephalus* and *Lisa ramato*). Third group includes introduced species as Karasin (*Carassius gibelio*) and European perch (*Perca fluviatilis*). Furthermore the birds are fish consumers. Pishivore birds consume fish every year around 7000 kv (Dhora, 2012).

2. Vegetation was represented by the variety of habitats

Forested areas around «Village of Peace» in Tarabosh.

18 (okos) eyes along the eastern coast.

Coastal areas in Flaka village for aquatic woodland vegetation and birds.

Zogaj- Shiroka coast for housing of *Alburnus scoranza* and *Chondrostoma nasus*.

Steppe areas in Postopje with a very interesting vegetation important for medicinal plants

The peat forests and marshes in the area Shkoder-Gril (Anonymous, 2013).

3. Tourism

Recently tourism is expanded along the whole hydrographic net. The highest diversity of habitats as well as natural and cultural potentials of the area offer a high variety of tourism types: balneal, safari, rural, mountainous and cultural tourism. According to GTZ, Concept on Cross-Border Development 2007, the priorities in the direction of the development of tourism are divided to the 5 zones of Shkodra lake among which, three zones belong to the albanian territory.

North_Eastern Zone covering the area between Grude e Re to Hani i Hotit (part of district of Malesi e Madhe).

Although some tourism products can be offered in this zone, the character as a whole doesn't connect this location with intensive tourism development. The development of tourism in this zone

depend highly on the protection of the natural resources (clean water, fish, bird. the orientation of tourism in this zone seem to be directed toward services (restaurants).

Eastern Zone covering the city of Shkodra and its periurban surrounding.

This zone can be called completely urbanized. Shkodra is the political, economic, social and cultural centre on the Albanian part of the lake. The population density is the highest in the entire lake area. The destination of city is the business tourism. The old castle Rozafa is an attraction for international tourists. From the tourism perspective the natural protection of the area doesn't provide particular restriction. The protection of the rivers Buna and Drin are key elements for further developments of the tourism.

Southern Zone in the Albanian part cover the area of Shiroke-Zogaj in the municipality of Shkodra. This zone is characterised by low population density and a weak economic base. It is however, a zone of striking landscape beauty with preserved village architecture and fantastic views. Beside their cultural value the islands close to the shore are also important location for bird breeding. Tourism development in this zone depend highly on the preservation of the natural values. The protection of the environmental values include thus the conservation of the built landscape. Construction of new houses should be minimized. The rehabilitation of hold and damaged houses inside to the existing villages have to receive absolute priority (GTZ 2007).

Finding

In the two shores of lake Shkoder is seen a population increase. In the tourist area Shiroke-Zogaj Shiroka has the highest growth rate of population. The growth rate is 30.9% compared with the growth rate population of Zogaj which is 2.8%. Fishing is the main activity. The quality of water ensure the life of fish species. The coasts of Shiroka and Zogaj are habitats for *Alburnus scoranza*. According to GTZ 2007 Concept on Cross-Border development the most common tourism products for this zone are cycling, sun and beach, sport fishing, bird watching.

The eastern shore of Lake Koplík Municipality had the highest growth rate of population 11.275 inhabitants in 2000 compared with year 1991 which had 2000 inhabitants. The most crowded villages lies at a distance 1-2 km from coasts of lake. Here the most important habitats are 18 okos (eyes) along the eastern coast, the peat forests and marshes in the area Shkoder- Gril, coastal areas in Flaka village for aquatic woodland, vegetation and birds. According to GTZ 2007 Concept on Cross-Border development this area can be offered different tourism products such sport fishing, bird watching, food and beverage.

Conclusions

Lake Shkodra appear today as a sustainable ecosystem with a high biodiversity and oligotrophic waters. This may be one of the factors that has led to population movements from remote northern areas to the towards areas around the lake in search of providing a variety of ecological services which Lake Shkodra ensure for its habitants.

The greatest influence it seen on the most important economic activity such fishery depending on the good quality of water, on the tourism offering a variety of activity such bird watching, cycling sun and beach, city tourism.

In the tourist area Shiroke -Zogaj situated in the western part of Shiroka lake village has been under the influence of migratory movements of the population with the lightest rate growth.

In the eastern zone of lake the municipality of Koplik it observes changes in the movement of the population. The greater increment is from 1991 to 2005. After this years the movements of population appear more stabilized

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