SHARED KARST AQUIFER MANAGEMENT OF ALBANIA

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WATERS RESOURCES

- Population of 3.2 million;
- Territory is of 28,749 $km^{2;}$
- Total hydrographic territory is of 44,000 km^2.
- The rest, about 33%, which belongs to the catchments of the rivers Drini and Vjosa, is situated in Greece, FYROM and Kosova.

WATERS RESOURCES

- The average total surface flow is about 42.25 km^3 and the average groundwater flow is about 12.8 km^3 but the total exploitable groundwater resources are calculated to be about 7km^3.
- More then 90 % of drinking and industrial water of Albania is supplied by the groundwater.

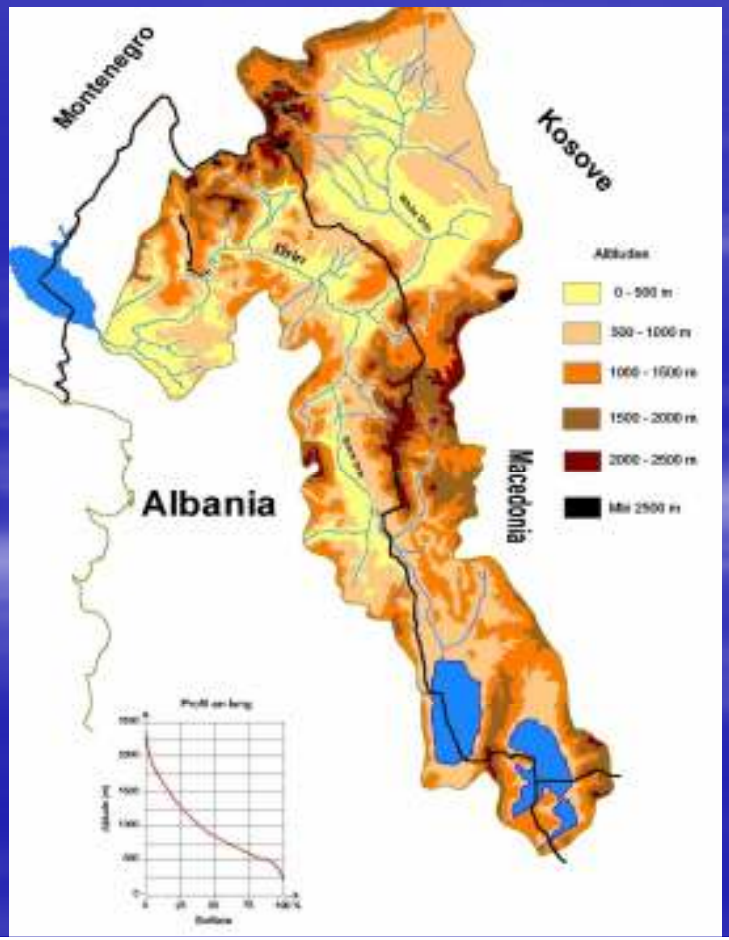
WATER RESOURCES

- The mean annual discharge of all rivers of Albania is about 1300 m^3/s, which corresponds to a specific discharge of 29 $l/s.km^2$.
- Surface water include also the natural lakes of Ohrid, Prespa and Shkodra, a multitude of minor lakes, and reservoirs built along the main rivers. Several lagoons are situated along the sea coast, the main ones being the Karavasta, Narta and Butrinti

SHARED AQIUFERS

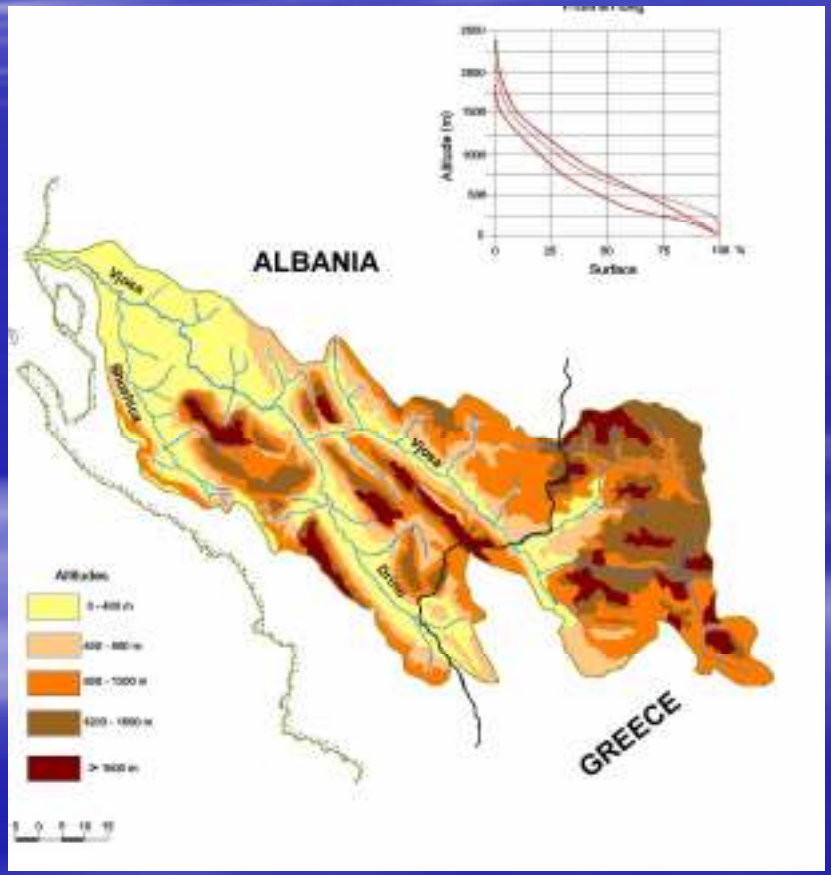
Within this watershed Albania shared with:

- **Monte Negro - Shkodra Lake and Buna River;**
- **Kosova Drini Bardhe River;**
- **FYROM Ohrid Lake and Drini i Zi River.**



SHARED AQIUFERS

- With Greece we shared the aquifer of Vjosa Pavla River watershed,
- and the aquifer of Prespa Lake.



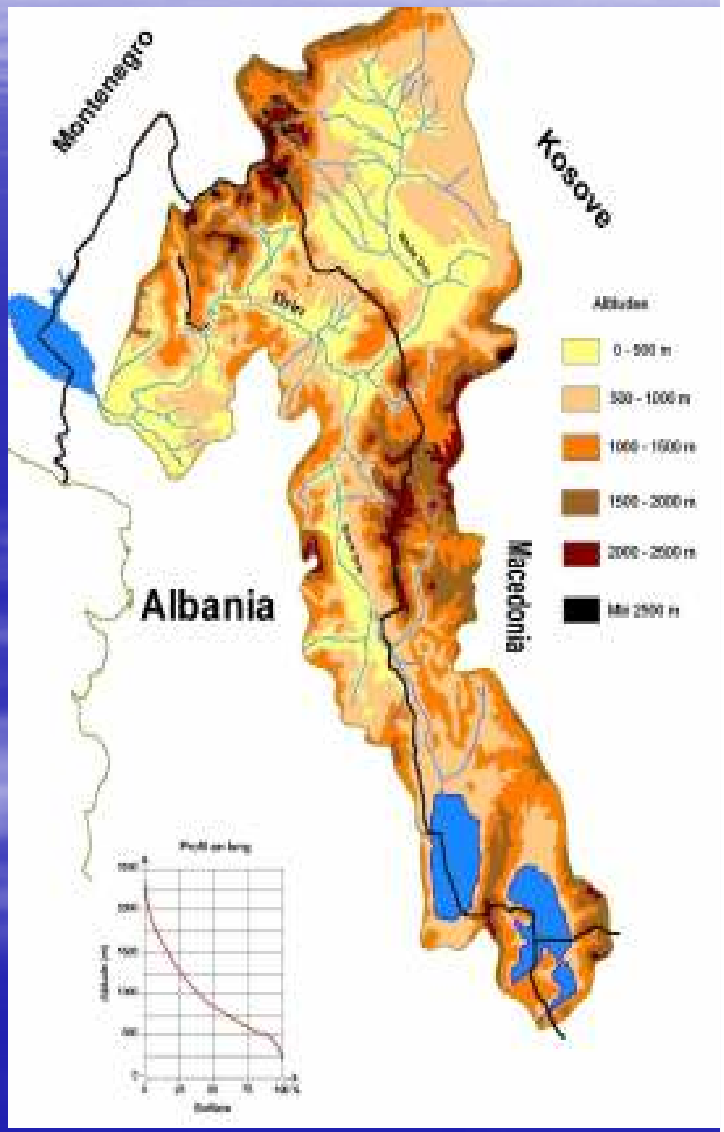
WATER RESOURCES

The Drini River

The hydrographic catchment's of the Drini has a total area of 19,582 km². The Drini is formed by two main tributaries: the Drini i Zi, with a catchment's area of 5,885 km², flowing from FYROM, and the Drini i Bardhe, flowing from Yugoslavia.

The Drini is the most important river in Albania, with the following characteristics:

- annual discharge volume: 11,1 km³
- specific discharge: 24.8 l/s.km²
- one in 10 year high flow: about 13 times the river module.



WATER RESOURCES

Problems

- ✓ A pending threat is the building of a new hydropower plant Bushat on the Drin river near Shkodra (upstream mouth of Buna river from the lake) which is supported by the Chinese government but does not find a majority among local politicians, scientists and local people.
- ✓ The frequency of flooding and the negative impacts of sediments deposition are on the increase.
- ✓ There is very significant sediment movements in the river , but the rate has not change drastically over the time.
- ✓ The most significant factor contributing to flooding and sediment is river instability caused by gravel mining

WATER RESOURCES

Recommendations

- ✓ Modernization of the monitoring network;
- ✓ Monitoring and studying of complex water system (Shkodra lake, Buna and Drini Rivers) to prevent the eventual flooding as that of the years 2003 and 2005);
- ✓ solving the problems of land use and ownership;
- ✓ capacity building'
- ✓ rise of awareness of population living in that region;

WATER RESOURCES

The Vjosa River

The Albanian catchment of the Vjosa River has an area of 4 365 km ² or about 2/3 of the entire catchment's.; the rest is situated in Greece. The largest tributary of Vjosa is the Drino; it has a catchment area of 1320 km², of which 256 km² are situated in Greece. A characteristic feature of the catchment of the Vjosa is the presence of deep karst, which measures an abundant underground supply during the dry season. Basic characteristics are as follows:

- ✓ annual discharge volume: 5,550 million m³,
- ✓ specific discharge: 26 l/s.km²
- ✓ one in 10 year high flow : about 24 times the river module

WATER RESOURCES

Problems

- ✓ Erosion and sedimentation caused by poor land use practiced, such as deforestation
- ✓ water quality problems resulting from industrial, agricultural and municipal pollution
- ✓ The frequency of flooding and the negative impacts of sediments deposition are on the increase. There is very significant sediment movements in the river , but the rate has not change drastically over the time.
- ✓ There is a lot change occurring in how the land is used, but the net effect on stream discharge and sediment production, is not that great.
- ✓ The most significant factor contributing to flooding and sediment is river instability caused by gravel mining
- ✓ - problems associated with land ownership patterns, population demographics, income sources etc. exist

WATER RESOURCES

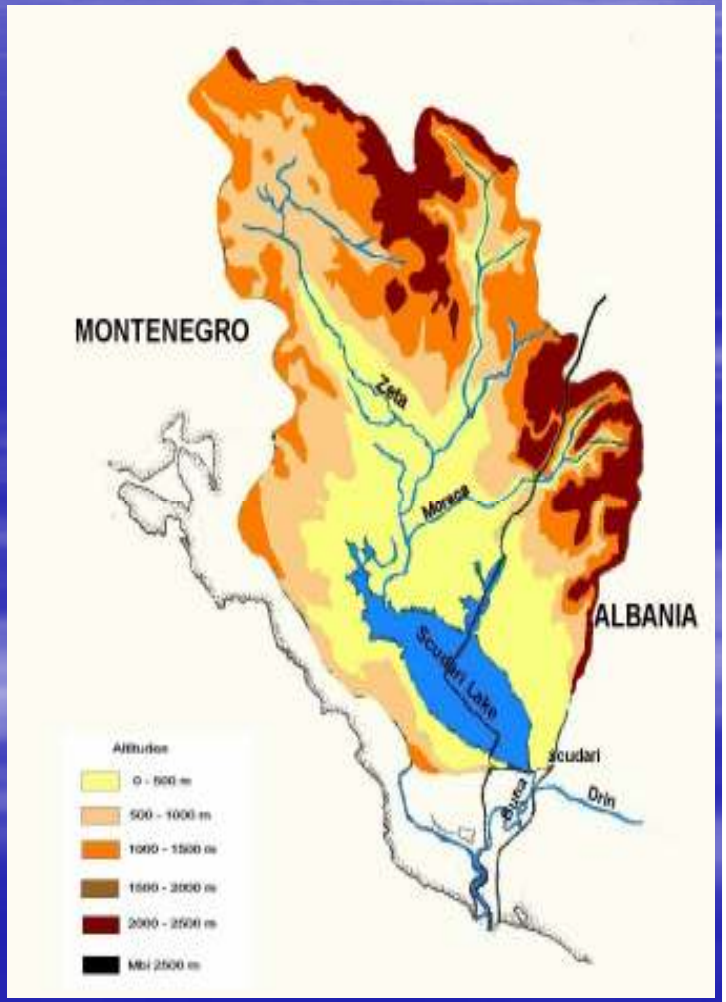
Recommendations

- ✓ - monitor and document the impact of gravel mining activity;
- ✓ - evaluating of changes in the channel of Vjosa river;
- ✓ - establishment of the new permanent forest sample plots.

LAKES

Shkodra Lake (Lacus Labeatus) is the largest lake in the Balkan Peninsula.

- ✓The surface of the lake is 368 km2 of which 149 km2 are located inside the jurisdiction of Albania.
- ✓Its line length is 48 km, its width 26 km. The lake is situated at an average height 4.5 m above the sea level. The surface of the water-collecting basin is 5176 **km²**, with an average water-body volume of 2.6 billion m^3.
- ✓The lake origin is tectonic and karstic. It is a relatively shallow lake with a maximum depth of 9 metres. The shallowest parts of the lake are below sea level and form a cryptodepression.



SHKODRA LAKE

✓Due to its karstic characteristics, Shkoder Lake has long been a research theme and challenge to numerous foreign and domestic scholars and experts. It falls into the category of open lakes. It drains into the Adriatic Sea at the Bojana River with an average discharge of 332 m^3/s, resulting in a total water volume exchange occurring 2-2.5 times per year.

✓The water level of Shkoder Lake varies widely. Extreme observed values are Hmin = 4.97 meters and Hmax = 9.84 meters, and the surface varies between a minimum water level of 395 km^2 , and a maximum of 530 km^2 . Respective water volumes are Vmin = 1.8 km^3 , and Vmax = 4.25 km^3 .

✓In the total inflow of water into the lake, the Moraca River is the most significant tributary. Its watershed area is estimated at 3,200 km^2 , and the river brings 200 m^3/s on average into the lake. The estimated outflow is 330 m^3/s.

SHKODRA LAKE

- Shkodra Lake and its watershed are of important economic value, with huge potential for the economic development of the northern regions of Albania, in terms of fishery, ecotourism, agriculture, hydro energy etc. The ecological value of Lake Shkodra and its watershed are of international importance. The main concerns for Lake Shkodra and its watershed are linked with pollution from human activities, wastewater, urban and industrial wastes , the use of chemicals in agriculture etc.
- Urban wastewater is one of the main concerns for Lake Shkodra A project is being prepared by institutions in Albania and Montenegro and concerns the conservation of Lake Shkodra

SHKODRA LAKE

Problems

- The littoral zone of the lake receives direct impacts by the population living along the shoreline, i.e. illegal constructions (partly tourism-related), multiple disposal of solid waste and discharge of sewage (Shkodra: 150,000 people) due to a bad functioning of the sewage system (this is to be addressed by the WB/GEF project).
- A pending threat is the building of a new hydropower plant Bushat on the Drin river near Shkodra (upstream mouth of Buna river from the lake) which is supported by the Chinese government but does not find a majority among local politicians, scientists and local people.

SHKODRA LAKE

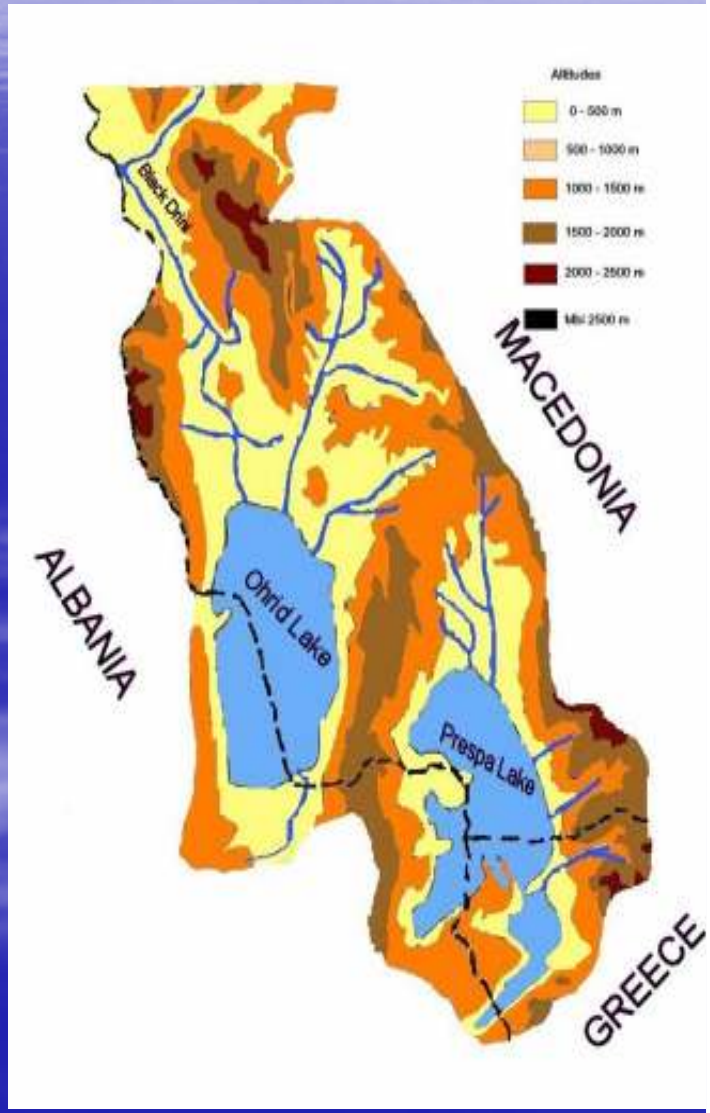
Recommendations

- ✓ - stopping of illegal construction along the shoreline;
- ✓ - sewage management at the city;
- ✓ - water monitoring of the lake;
- ✓ - capacity building;
- ✓ - rise of awareness.

Ohrid – Prespa Lakes

✓ The surface area of Lake Ohrid is 358 km2, of which 249 km2 belongs to Macedonia and 109 km2 to Albania . The coastline of Lake Ohrid is 87.5 km long, of which 56 km belongs to Macedonia and 31.5 km to Albania.

✓ The lake itself has a maximum length of about 30 km and a width that varies from 11.2 km to 14.5 km. The maximum depth is 289 m and average depth is 164 m. The current surface area of the Prespa Lakes (Big and Small) is about 301 km2. The surface area of the Prespa Lakes has been declining for the about 15 years. The surface area reported in 1984 was about 329 km2.



Ohrid – Prespa Lakes

- Because of this high porosity and water content, the rocks of the Prespa-Ohrid area are classified as porous aquifers, karstic and fissured aquifers.
- The water system of Lake Ohrid is rather complex because of the underground links with Lake Prespa. Lake Prespa sits southeast of Lake Ohrid, at an elevation of 845 m, about 15o m higher than Lake Ohrid. About 50% of the water in the Saint Naum and Tushemisht springs on the south coast of Lake Ohrid Lake is from Lake Prespa. The karstic mountains of Mali i Thate in Albania and of Galicica in Macedonia are highly porous, with a high capacity for water transport.

Ohrid – Prespa Lakes

Problems

- ✓ The littoral zone of the lake receives direct impacts by the population living along the shoreline. The habitat destruction and water quality impairment is most severe in the littoral zone in both Macedonia and Albania.
- ✓ In Albania the littoral zone of the town Pogradec is the most impacted. The nutrients and bacteria from the untreated sewage are discharged directly into the lake.
- ✓ The magnitude of the wastewater problem around Pogradec should be discussed separately from the metal contamination from the adjacent, abandoned mines (“hot spots”).

Ohrid – Prespa Lakes

Recommendations

- ✓ Although a Macedonian-Albanian Board for management of Ohrid Lake has been established (1996) there is still much to do about management settings on both sides. The recommended priority actions are:
- ✓ -Identification of polluted areas in the littoral zone;
- ✓ -Decrease the fish catch from the lake;
- ✓ -Treatment of waste water from the city of Pogradec;
- ✓ -Shoreline alteration by development: loss of reed zone and other natural habitats;
- ✓ - Legal framework for decentralisation;
- ✓ - New structures;
- ✓ - Duties & working procedures;
- ✓ - Statutes and regulations;
- ✓ - Polluter register;
- ✓ - Control procedures.

COMPETENT AUTHORITIES FOR WATER RESOURCES MANAGEMENT

- National Water Council chaired by Prime Minister;
- Watershed management authority for each river basin of the country, six all together
  - (plans for watershed management, water abstraction and discharges permits)
- Ministry of Environment, Forest and Water Management (water resources administration);
- Ministry of Health;
  - (monitoring quality of drinking water)
- The Ministry of Territory Planning and Telecomunication
  - manages the water-supply, water/wastewater treatment
- The Ministry of Agriculture and Food is responsable for
  - administrating, maintaining and using the irrigation and draining system

Authorities responsible for water infrastructure

- **At central level:**

✓Directorate General of Water-Supply and Sewerage (DGWSS) within the Ministry of Territory Planning and Telecomunication, based on DCM no. 532 of August 20, 1996 that manages the water supply and sewerage sector, through Water-Supply and Sewerage Enterprises that are operating under the supervision of the Local Government Authorities. DGWSS is responsible for drafting of policies, implementation of legal measures and support with technical assistance to the water-supply and sewerage enterprises.

Authorities responsible for water infrastructure

- **At local level**
- ✓ **Water-Supply and Sewerage Enterprises WSSE** (54 enterprises), regulating the water supply and sewerage sector at the Local Government Level (municipalities). **WSSE** are responsible for the first control of drinkable water quality. **WSSE** which employ 350 persons carry out the sampling, analysis and chlorination of water. In rural areas, the supervision of the water supply and sewerage sector is not organised as a separate institution. In the National strategy for water supply and sewerage in rural areas, it is expected the establishment and operation of RAWSS (Rural Agency for Water-Supply and Sewerage).
- ✓ **Regional Environmental Agencies**
- ✓ **Regional Directories of Public Health**

The local governments are responsible for proper operation and maintenance of water facilities their jurisdictions.

Organs of water management

- The management of water reserves of the Republic of Albania is executed by the National Council of Water (NCW) and by the technical secreatariat at the national level, as well as by the basins authorities at the local level and by other agencies and organisms that the NCW may appoint.
- The Council of Ministers determine the composition of the National Council of Waters representing central organs and institutions that have water as a main activity.
- The National Council of Water determine the composition of the water technical secretariat and of the basins councils.
- For the management of shared waters, on the proposal of the NCW, the Council of Ministers designates a special commissions that manages relations for these waters with bordering countries based on the Albanian legislation and on relevant international conventions.

LEGISLATION : CURRENT SITUATION

- **Law on Water Resources dated on 21.3.1996**

This law aims at:

- ✓ To ensure conservation, development and utilization of water reserves;
- ✓ To ensure the right distribution of water reserves according to aims of use and effective management;
- ✓ To ensure protection of water reserves from pollutions, abusement and overconsuption;
- ✓ To determine the institutional framework at the national and household level to implement a national policy related to direction and management of water sources in the benefit of the population and social-economical interests of the country.

LEGISLATION : CURRENT SITUATION

- Within the meaning of this law:

✓ "Water reserves" are all internal marine waters, surface or groundwater together with atmospheric rains under the jurisdiction and control of the Republic of Albania.

✓ "Water-bearing [aquiferous] basin" is the area of land within which the water after joins a single flow through a network of surface and subsurface flows, spills over to the sea. The geographical borders of the watershed basin are determined by the topographical maps according to water separation lines.

✓ "User" is any district, municipality, village, commune, water users association, state or private enterprise, natural and juridical person that deals with exploration, production, use of water reserves and discharges extra or used waters or other substances.

Some other laws affecting water policy and protection in Albania

- Law on Environmental Protection of 1993 (the LEP),
- Law on Water Supplies and Sewage Water Treatment
- Law on Protected Areas
- Law on Environmental Impact Assessment
- Law on Organization and Functioning of Local Government
- Law on Protection of Transboundary Lakes
- Law on Environmental Management of Wastewater
- Law on Fishing and Fish farms
- Central and Local governments decisions, standards and regulations.

LEP and LWSSWT

- The firs two lows together with the LWR are the three laws affecting directly water policy and protection in Albania.
- The oldest, the **Law on Environmental Protection** of 1993 **(LEP)**, is a framework law establishing a basic structure for environmental impact assessment, permitting of land development and industrial operations, nature protection and environmental monitoring under the authority of the Ministry of Environment, Forestry and Water Management.
- (MEFWM) has overall authority to protect the environment;
- ✓ Has authority to compel EIA for activities “having a strong impact on the environment and which are particularly dangerous to human health”
- ✓ Competing authority for regulating and issuing permits for activities which “have an impact on the environment” (e.g. discharges to water, air and land);
- ✓ Has authority to supervise environmental monitoring, collect and process data;
- ✓ Has structure and staff, but lacks training and equipment to carry out these responsibilities;

The Water Resources Law

- **The Water Resources Law (WRL)** (over cited) establishes a framework for the regulation of all water resources in Albania under the direction of the **National Water Council (NWC)** - a committee of ministers of the national government. The NWC was set up by a decision of the Council of Ministers in 1994.
- **NWC** Is the only institution with overall authority to decide water protection and management strategy;
- Is the only institution with authority to control well-drilling, land management for water protection, banks and shorelines;
- Competing authority for “permitting” sewerage and treatment works, discharges to water and land, water use;
- Competing authority to regulate irrigation;
- Lacks of staff, budget and political authority to carry out these responsibilities.

The Water Supply and Sanitation Low (WSSL)

- Establishes a control structure for the soon-to-be privatized sector of waterworks, sewerage, and waste water treatment facilities under the direction of an independent National Water Supply and Sanitation Regulatory Commission.
- **Commission** has focused authority to regulate water supply and sanitation services to the public;
- Competing authority (with NWC) to regulate water supply and sanitation services to the public;
- Potentially competing authority with (MEFWM) to regulate discharges from WW plants;

Medium-term priorities for 2007 - 2009

- **Legal measures**

✓ Draft law “On the establishment of a network on water policies” will take into consideration the Directive 2000/60/EC, to involve the civil society and decentralised authorities.

✓ **Among all the implementing measures concerning the groundwater are:**

✓ Preparation of an assessment report on “Definition of vulnerable zones” within the meaning of Directive 91/676/EEC.

✓ Drafting of an action programme on the protection and integrated management of groundwater.

✓ Drafting of the 10-year action plan based on the national legislation.

Long-term priorities for 2009 – 2014

- **Legal measures**

✓ Draft law “On prevention of pollution of groundwater caused by toxic and cumulative substances”, with the purpose of strengthening the preventive measures against groundwater pollution and improving the monitoring of discharge of harmful substances in groundwater. This draft law will be drafted in close cooperation with the Ministry of Health, Ministry of Agriculture and Food and Ministry of Environment.

✓ Decision of Council of Ministers “On the development of a combined monitoring-based and modelling based scheme for the protection of groundwater”.

Albania ratified the :

- Convention on the Protection and Use of Transboundary Waters and International Lakes (1994),

- London Protocol on Water and Health (1999).

Partial agreements with Macedonia and Greece, :

- Coordination Committee for Prespa Park ---Joint Declaration of three Prime Ministers on Conservation and Protection of Prespa Park (February 2000)
- Lake Ohrid Management Board (1996)
  - Watershed Management Committee of Ohrid Lake/ Secretariat.

- Memorandum of Understanding for Environmental Protection and Sustainable Development (Ministries of Environment Albania-Macedonia, 2000)
- MOU for Environmental Protection (Albania-Greece 2003).
- Agreement for Protection and Sustainable Development of Lake Ohrid and its Watershed (Draft, adopted by Albanian and Macedonian Parliament

With Montenegro, for the protection of Shkodra Lake, shared between Albania and Montenegro :

- **MOU for collaboration in Water problems, Environmental Protection and Sustainable Development (2003)**
- **Joint Intergovernmental Commission on Water Regulation in Drin and Buna River and within Shkodra Lake**

- So, there are some treaties on shared surface water but non on groundwater issues.

- Groundwater needs a separate attention in agreements between countries in the region and the first step is establishing of joint commission.

CONCLUSIONS

- It is necessary to discuss with neighbor countries for the problems on water use policy;
- To be informed on institutional and legal aspects of water management for each neighbor country
- Exchanging information for water uses to prevent cross-border harm from pollution and from excessive extraction of groundwater
- Exchanging information on reciprocals water studies.
- Notification of planned measures.