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An Environmental Atlas of Albania

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An Environmental Atlas of Albania

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Declaration of originality

This is to certify that the work is entirely my own and not of any other person, unless explicitly acknowledged (including citation of published and unpublished sources). The work has not previously been submitted in any form to the University of Münster or to any other institution for assessment for any other purpose.

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Abstract

The focus of this study is an *environmental atlas* of Albania. Its objective is to contribute to the knowledge of public opinion and decision makers for a better understanding of the environment. The study also aims to find out the differences of environmental quality in the country for two periods of time: the situation from 1945 to 1990 and after the political changes in 1990.

In order to achieve the objectives, wide ranges of data have been processed and ample literatures are consulted. To produce the maps the basic cartographic rules have also been applied. The European Union standards of the environmental quality are used to allow the comparisons. As the result of this study, an environmental atlas is developed, including maps and graphics covering the following topics: *urban air quality, urban noise, forest fires, protected areas, urban waste, bathing water quality and surface water quality/river water quality.*

The findings indicate that the quality of the Albanian environment is comparable with the standards. With regard to the environment the major problems have been identified and the influencing factors have been presented.

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Burned Pastures Area Change	2006-2007	
Protected Areas		
Protected Areas	2007	
Land Cover		
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Urban Waste		
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Bathing Water Quality		
Microbiological Monitoring	2003	
Microbiological Monitoring	2007	
Microbiological Monitoring	2007	Durrresi beach
Surface Water Quality / River Water Quality		
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Chemical Oxygen Demand	COD	
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Acronyms

GIS	Geographic Information Systems
MoEFWA	Ministry of Environment, Forestry and Water Administration
INSTAT	Institute of Statistics
EEA	European Environmental Agency
FAO	Food and Agriculture Organization of the United Nations
IH	Institute of Hydrometeorology
IPH / ISHP	Institute of Public Health
IE	Institute of Environment
INPh	Institute of Nuclear Physics
AEF	Agency of Environment and Forestry
GDFP	General Directorate of Forest and Pastures
FNS	Faculty of Nature Sciences
AUT	Agricultural University of Tirana
MNS	Museum of natural Sciences
MoFACP	Ministry of Food, Agriculture and Consumer Protection
MPWTT	Ministry of Public Work, Transport and Telecommunication
AGS	Albanian Geological Survey
MoTCYS	Ministry of Tourism, Culture, Youth and Sports
CEPP	Committee of Environmental Protection and Preservation
NEA	National Environmental Agency
REC	Regional Environmental Center
NGO	Non-governmental Organization
WHO	World Health Organization
IUCN	International Union for Conservation of Nature
MCPFE	Ministerial Conference on the Protection of Forests in Europe
ODS	Ozone Depleting Substances

Chapter 1

Introduction

1.1 Motivation

The global concern for the environment is motivated by the role that the environment has on human society. Due to this the environmental problems and pollution are attracting attention. In Europe and United States the environmental movement started earlier, but the general awareness increased during the 70's (Hollander, 2003; UEIS & Development).

At the same time, Albania coped with other problems and the environment was not a priority for the government. Some initial steps were made, but very fragmented. With the political changes at the begin of the 90's the Albanian government has increasingly become aware of the important role the environment plays in the economic development of the country (Hema & Malollari, 2002). The study of the environment has been a continuing source of debate between scientists. Environmental scientists have contributed with studies regarding the environment and environmental protection. Geographers have also contributed to these studies by introducing the role of location and producing maps.

This study is motivated by the interest to present the status of the environment in Albania in different aspects, using maps and graphics as a tool, aiming to contribute to the understanding of the environmental problems within the country. In this work, a number of factors that influence the quality of the environment are listed.

With the political changes the lack of environmental information became apparent, and it remains apparent in Albania, although significant progress can be reported. There were also a considerable number of publications concerning the environment mostly focused on specific topics. Recently publications concerning environment at national scale are available as the "Report on Status-of-the-Environment" provided by the Ministry of Environment, Forestry and Water Administration (MoEFWA). This was a further stimulating factor to provide an environmental atlas which tries to visualize and combine data about environmental issues.

In addition to European agreements, Albania has signed and ratified a wide range of international agreements including those concerning climate change, biodiversity protection, hazardous waste transport and international waters. The implementation of these agreements will be important of the country's successful integration into the international community (Ministry of Environment, 2006). This was a further motivation to create an atlas of the environment in Albania.

1.2 Objectives of the study

Because the environment is considered as a priority within the country, we want the environmental atlas to help in better understanding the environment in Albania.

The main objectives of this study are:

- ◆ To contribute in the field of environmental studies by:
 - a) providing maps that reflect the environmental quality for Albania

b) presenting maps that combine the environment quality with the factors that influence

- ◆ To contribute to the knowledge of public opinion and decision makers for a better understanding of environment

According to the main objectives of the study, the research questions are:

1. In which category should we classify the quality of Albanian environment? How does it compare to European standards?
2. What are the main environmental problems in Albania?

1.3 Topics

The work focuses on the Albanian environmental quality following the political changes in 1990. In this regard the atlas tries to deal with a range of topics, although it is clear that covering all themes of the environment is nearly impossible. The following topics are covered: *urban air quality, urban noise, forest fires, protected areas, urban waste, bathing water quality and surface water quality/river water quality.*

Besides these problems, it is important to present the indicating factors. In this respect, this study focuses not only in a visual description of situation but also tries to analyze the causes of environmental problems in Albania.

The focus of this work is also to present a comparison of the Albanian environmental quality in two periods of time; the environmental situation from 1945 to 1990 and the situation after the political changes in 1990 based on literature review. The differences are presented as well as the main factors.

1.4 Data

In order to reach the objectives a wide range of data is necessary. Most of the data was obtained from the MoEFWA report for status of the environment 2005-2007 (online publication and/or direct contact with these institutions), the Albanian Institute of Statistics (INSTAT), European Environmental Agency (EEA), Ministerial Conference on the Protection of Forests in Europe (MCPFE), United Nations Environment Programme (UNEP), Food and Agriculture Organization of the United Nations (FAO).

The main data used and sources are as follows:

- land use map,
(European Environmental Agency / <http://www.eea.europa.eu/>)
- air quality data (main indicators),
(MoEFWA: Report on Status of the Environment 2005-2007 / <http://www.moe.gov.al/>)
- surface water quality data (indicators),
(MoEFWA: Report on Status of the Environment 2005-2007 / <http://www.moe.gov.al/>)
- bathing water quality data,
(MoEFWA: Report on Status of the Environment 2005-2007 / <http://www.moe.gov.al/>) and
European Environmental Agency / <http://www.eea.europa.eu/>)
- urban waste data,
(MoEFWA: Report on Status of the Environment 2003-2004 / <http://www.moe.gov.al/>) and
(MoEFWA: Report on Status of the Environment 2005-2007 / <http://www.moe.gov.al/>)
- forest fire data,
(Agency of Environment and Forestry (AEF) on request by direct contact)

- data regarding protected areas,
(MoEFWA: Report on Status of the Environment 2005-2007 / <http://www.moe.gov.al/>) and the map of Monuments of the Nature in Albania, 2006)
- population data,
(INSTAT / <http://www.instat.gov.al>)
- data regarding economy in Albania. (Ministry of Economy, Trade and Energy METE / <http://www.mete.gov.al>)

The (digital) base map was obtained by direct contact with the authors of the “Atlasi Gjeografik i Popullsise se Shqiperise” (Berxholi, 2003).

1.5 Methodology

This study constitutes of two major parts: a theoretical background and a technical work. In the theoretical background the work consist of literature review, general characteristics of the country focuses on environmental situation and the factors that influence the environment.

The applicative work represents the main part of the study. It tries to visualize and combine data about environmental issues using geo-information technology. The atlas is based on national scale of presentation.

1.6 Limitations of the study

Availability of the data concerning the quality of the environment limited this study. This is related to the fact that Albania does not have a national environmental monitoring center. The main institutional body in Albania for data providing in environmental field is MoEFWA, but the measurements of environmental indicators are conducted from sub-contractors, including Institute of Public Health (IPH), Institute of Hydrometeorology (IH), Institute of Environment (IE); the Institute of Nuclear Physics (INPh), Agency of Environment and Forestry (AEF); General Directorate of Forestry and Pastures (GDFP); Faculty of Natural Science (FNS); Museum of Natural Science (MNS); the Agricultural University of Tirana (AUT); Ministry of Agriculture, Food and Consummator Protection (MoAFCP); Ministry of Public Work, Transport and Telecommunication (MPWTT); Albanian Geological Survey (AGS). Also quantitative data on major topics are missing. For example for PM₁₀ several factors that influence it are listed, but without quantitative weighting. Moreover, monitoring is not done regularly, and this has an impact on the consistency of the datasets.

1.7 Outline of the thesis

This thesis is organized in five chapters. Chapter 1 provides an overview of the study. Chapter 2 outlines the study area. Chapter 3 introduces the environmental situation in Albania, focus on two periods, the situation under the communist regime and the situation after political changes, summarizing briefly the key factors that influenced the environment. Chapter 4 represents the visualization of the environmental atlas, using maps and graphics for different themes. Chapter 5 presents the conclusion of the study and the future work.

Chapter 2

Albania - an overview

2.1 Physical characteristics

The Republic of Albania lays in the South-East Europe, in the Balkan Region, along the Adriatic and Ionian coast. Albania has a surface of 28748km².

In north, Albania borders with Republic of Montenegro, Republic of Kosovo, in East border with Former Yugoslav Republic of Macedonia (FYROM) and in South-East and South with Greece (INSTAT, 2007).

The country is characterized by a variety of relief, climate, water resources, diversity of flora and fauna (Qiriazhi P. & Sala S, 2000). Albania is part of the subtropical Mediterranean climate, with relatively short and humid winters and very dry and hot summers. The average temperatures vary between 3.5°C to 8.9°C during the winter time and between 17.8 ° C to 24.6 ° C during the summer. Average annual precipitation is about 1480 mm, and it varies from West to East. Hydrography of Albania is presented by a dense network, with a total length over 49000 km, with average discharge of 1308 m³/sec resulting in a total annual volume of 41.2 km³ water, or 14000 m³ water per inhabitant. Albania also has big lakes; tectonic lakes (Shkodra, Ohrid, Prespa Lake), carstic, glacial and artificial lakes. Parts of the hydrographic network are also coastal lagoons.

Albania is considered rich in terms of biodiversity. Albanian flora contains about 3200 species of vascular plants and about 1800 species of non-vascular plants. About 30 species are endemic (Qiriazhi P. & Sala S, 2000; Vangjeli, Ruci, Mullaj, & Xhulaj, 2000). There is little knowledge about the fauna. The forest covers about 36% of territory; together with pastures cover 51%. The agricultural land covers 24% of the country and other land occupies 25% of the whole area (MoAFCP, 2008).

2.2 Population, demographic dimensions

According to recent Albanian figures, the number of population is 3.142.239 inhabitants (INSTAT, 2007). The capital of Albania is Tirana. After the independence (1912), the first data regarding Albanian population shows a total number of 804.000 inhabitants (1923). By the end of World War II, the population number had risen up to 1.1 million inhabitants. After the war, under the communist regime (1945-1990) the population number increased to 3.255.900 inhabitants. Following factors explain this increment of population number; pro-natality policy, birth's growth, diminution of children's death rate, prohibition of external migration (INSTAT, 2004b; King & Vullnetari, 2003). With the political changes, and opening of the country the population of Albania decreased slightly. From 1989 to 2001 (census year), Albania's total population was reduced by 3.6% (Agorastakis & Sidiropoulos, 2007). The emigration constitutes one of the most important factors that has affected the demographic and social developments in Albania (Çaro & van Wissen, 2007; INSTAT, 2004b). Diminution of the birth rate is ranked as secondary important factor that have affected the demographic changes of the country (INSTAT, 2004a). According to the last census in 2001 to 2006 the population increased with 15.000 inhabitants. According to (INSTAT, 2004a), the population of Albania in 2020 will increase up to 3.7 million inhabitants.

Year	Total	City		Village	
	thousand	thousand	%	thousand	%
1960 ^a	1607.3	474.3	29.5	1133	70.5
1970 ^a	2135.6	479.7	31.8	1455.9	68.2
1980 ^a	2670.5	897.3	33.6	1773.2	66.4
1990 ^a	3255.9	1176	36.1	2079.9	63.9
2001 ^b	3069.2	1294.2	42.1	1775	57.9
2004 ^c	3127.2	1406.4	44.9	1720.8	55.1
2006 ^d	3142.2	-	-	-	-

Tab. 2-1 Albanian population

Source: a) National Environmental Agency Report, 1999

b) INSTAT: General Census, 2001

c) INSTAT: Albania in figures, 2005

d) INSTAT: Albania in figures, 2007

2.2.1 Urban vs. Rural Population

Traditionally the majority of Albanian population settled in village areas. This was due to political and economical factors. This trend incurred a tremendous change after 1990. The free and uncontrolled movement of the population has had an impact on the change of proportion between the urban and rural population. In 1990 only 36% of population was settled on urban areas, while in 2004 the number increased up to 44.9% according to (INSTAT, 2005). *"The growth of the urban population in contrast to the rural is clearly an indication of population mobility"* (Agorastakis & Sidiropoulos, 2007).

The majority of the urban population is concentrated in the main cities on Western Lowland. Only in the triangle Durres-Tirana-Elbasan the number of urban population is nearly 1 million inhabitants.

2.2.2 Population density and altitude

This indicator shows dramatic changes in Albania. Until 1990 not more than 2/3 of total population, was located at the level 0-300m, while at the heights over 1000 m above sea level only 3% of population was located. In 2005, at the first level (0-300m) is located some 70% of population of the Albania. At the other extreme population at the level of over 1000m has dropped to 1%.

Characteristic for Albanian population is the differentiation in space. In peripheral mountainous regions, population density ranges from 35 to 54 inhabitants/km², while in Western Lowland the density raises up to 650 inhabitants/km² (Tirana-Durres). In 2005, more than 50% of the whole population resided in Western Lowland (Tirana-Kruja-Durres-Vlora, comprehend lowlands in Berat and Elbasan). And the trend shows, that the number of population in this area will increase during the next years.

2.2.3 Age structure

Albania has a very young population. Although, after the year 1990 the birth-number decreased, the young ages still build a solid base on the pyramid.

Age-groups	Number	Percentage
0 - 15	793	25.24
15 - 59	1.963.000	62.47
60+	386	12.29
Total	3.142.000	100

Tab. 2-2 Population age-structure for year 2006
INSTAT: Albania in Figures, 2007

2.2.4 Environmental implication of the population

It has become clear that human population has a powerful effect on the environment. *“Yet the exact relationship between population dynamics and the environment is complex and not well understood”* (Hunter, 2000). The population number is linked to the environment as a result of individual resources needs. Population growth and the increase of imported packed goods increased the production of solid urban waste. All these factors exercise their impact in the quality of air and water mainly (National Environmental Agency, 1999). The distribution of the population has also implications on the environment. The fast growth of the main Albanian cities (urbanization process) increased the pressure over the environment, and this result on lower quality of urban air due to the city activities, pollution of water and human illness as consequence. In the frame of environmental implications of the population Hunter (2000) includes other factors also such as *“population age structure, scientific and technological factors, institutional factors and policy context”*.

2.3 Political context

“Foreign domination has had a profound impact on political developments in Albania. Roman and Byzantine rule was later followed by incorporation into the Ottoman Empire from 1466 to 1912. Independence was proclaimed on 28 November 1912. Zog was proclaimed king in 1928 and reigned until 1939. Pre-war economic dependence on Italy culminated in the invasion (and annexation) of April 1939” (Jeffries, 1993). After the Second World War, Albania was absorbed into the eastern block of communist countries and the communist government under Hoxha got full control over the country. In 1948, the communist regime broke the relationships with Yugoslavia. Hoxha’s extreme ideology led to break relations with Soviet Union in the 1961. Finally the break with China in 1978 and Albania become one of the most isolated countries in Europe. After Hoxha’s death in 1985, the situation remained very difficult, reaching the peak at the end of the eighties. Only at the beginning of 1990 Albania began to move, following the events in Eastern Europe. As a result of protests the first free elections were held in 1991. Nowadays Albania’s goal is to approach a membership in EU.

2.4 Economy

Albania is rich in terms of natural resources. Nevertheless the country remains one of the poorest in Europe. According to the World Bank, gross domestic income per person was of 3412 US dollar in 2007. Albania's low level of economic development is not due to lack of natural resources. Historically other factors had been prevalent.

"Pre-war Albania was the most backward country in Europe. Pre-war industry was restricted in scale and location. 88 percent of all industrial enterprises employed fewer than 15 workers, and by 1938 only 4.5 percent of national income was derived from industry" (Hall, 2002; Jeffries, 1993; Prifti, 1978). The agriculture was the dominant sector in Albanian economy. *"In 1927 per capita income was only 40 US dollar and 90 per cent of national income was derived from agriculture"* (Schnytzer, 1982).

After the Second World War a new industrial 'era' started. Under the socialist rule Albania's economical policy was oriented towards industrial development. *"The Stalinist emphasis upon heavy industrialization, with belching smokestacks viewed as symbol of socialist modernization to be extolled and emulated, was combined by Albania's post-war leadership with dogmatic notions of self-reliance"*(Gurashi & Ziri, 1982; Hall, 2002). All this brought Albanian economy in a deep crisis that was revealed after the country was totally isolated in 1978 (after Albania broke the relations with China). Economical orientation towards heavy industry was considered an important factor with large impact on the environment. The crisis reached the peak by the end of eighties and Albanian economy collapsed. This was a stimulus for political changes which started at early 1990.

The political changes brought as consequences a radical change also in economy. Albania oriented towards free market economy. Most of the large heavy industrial plants were abandoned and some of them are working with reduced capacity.

Also agriculture changed its course. One of the first reforms in post-communist Albania was the land re-ownership. As a result of this reform, farmers showed more interest for their land. But the problems got worse. The agricultural enterprises increased in number, 369.528, but became smaller in size, which reduced their efficacy. Livestock is the major product, which gave in 2007, 57 percent of total agricultural product (MoAFCP, 2008).

Other important branches in Albanian economy are construction and transport which gave 23,2% of GDP (INSTAT, 2007; METE, 2007). Albania offers also a high touristic potential, with many possibilities for further development. Only in the last years tourism started to play a strong role in Albanian economy. According to Albanian figures, for year 2008 in Albania the number of foreign tourists was over 2.1 million (MoTCYS, 2008).

Chapter 3

The environmental situation, the past, the present, influencing factors and policy

3.1 Environmental situation

Environmental problems and pollution are attracting attention more and more nowadays. The environmental pollution is closely connected with natural and human factors. Since the Rio Conference (United Nation Conference on Environment and Development) 1992, the World is watching the environment differently. Albania as part of it cannot be excluded from general policy, but as other countries, it has own characteristics concerning the environment.

Throughout history different factors had played a key role and have affected the quality of the environment. Qiriazhi and Sala (2000) list various facts in this regard:

- *"A low development of industry*
- *A low quantity and quality of agriculture*
- *No large urban remains*
- *Albania's surrounding by neighborhood states with low development of industry"*

In the list of Qiriazhi and Sala (2000) we can add more factors, principally political and social that influenced Albanian environment during the years.

3.2 Situation under communist regime

In general the region of Eastern Europe (Albania included) experienced severe environmental degradation under the Communist regimes. *"Environmental damage was a result of the focus on industrial production to the exclusion of almost all other factors, in particular those not linked to economic performance or security"* (O'Brien, 2005). *"Industrialism was regarded as a drive of abundance and wellbeing. The resulting environmental impacts were seldom acknowledged and drastically downplayed, often through restriction and control over scientific freedom and communication. But the extent to which environmental problems were ignored during Communist times varied between countries"* (Scrieci & Stringer, 2008). *"In contrast to other state socialist countries of Central and East Europe, Albania did not have well developed environmental legislation under the state socialist government"* (Pavlínek & Pickles, 2000). Throughout 45 years of communist regime, Albanian economy was directed to heavy industry and the environment was the last taken into consideration.

Qiriazhi and Sala (2000) list the following factors:

Dominant negative factors

- *"a bad administration of natural resources; forest for example, mainly affected from economical development*
- *use of antiquated technologies in all branches of industry, especially in chemical, leather and paper industry*

- *a wrong orientation of industry and agriculture and a wrong geographical settings of industrial objects which has caused environmental problems for specific areas. In these regions, air, water and water are polluted beyond permitted level, their soils are degraded and their forests and other natural ecosystems are damaged*
- *the absence of a legal base and state institutions for environmental protections*
- *no distinction between industrial and urban remain treatment*
- *insufficient water supply, also for remain treatment*
- *a low awareness of environmental problems. This is a result of total absence of information about the environment"*

Dominant positive factors:

- *"lack of nuclear industry*
- *a low level of consumption*
- *use of returnable packing*
- *high percentage of mass transport and use of bicycles*
- *avoidance of certain chemicals, cosmetic products etc." (Qiriaz P. & Sala S, 2000)*

In the long list of negative factors the industrial sector can be considered as main source of stress for the environment. The economical policies of the regime lead Albania towards industrial development. The main goal was to change the status of Albania from an agricultural to an industrialized country. During the pre-war, the agriculture was the major pillar of economy with 90% of the national income (Schnytzer, 1982). Under socialist development of the country the industrial sector became the main factor for the economy. *"Industry with its major branches, heavy industry, light and food industry generated over 58% of gross domestic product (GDP) of the country. During the industrialization process of the country all important industrial branches were established; chemical industry, producing of nitrogen and phosphate fertilizers, soda ash and caustic soda, as well as pigments, paints and solvents, oil refining, copper smelting, iron metallurgical complexes, cement production, and paper industry"* (Haxhimihali, 2000).

The fast development of all industrial branches had a significant impact for the environment. The negative effect of the industry was worsened, because Albanian industrial activities used old technology. *"Since the very beginning the applied technologies took very little account of the environmental pollution prevention and safety measures, and as a consequence the known environmental problems relate to almost all industrial companies"* (Haxhimihali, 2000). Another source of threatens for the environment have been oil and gas industry, as well as the mining sector. Some of these mining and industrial sites are listed as environmental hotspots (UNEP, 2000a).

"Although not on a high scale, problems were caused from the increased use of chemical pesticides and fertilizers" (KPS, 1988; Papajorgji, 1989). Traditional problem for Albania has been soil erosion. Beside natural factors, human factors also had contributed. *"Severe soil erosion, originally caused by massive deforestation long before the communists came to power and accelerated by overgrazing, unsuitable tillage and farming practices such as terrace building under state socialism"* (Pavlinek & Pickles, 2000). *"A slogan of the late 1960s was 'Let us take to the hills and mountains and make them as beautiful and fertile as the plains'"* (Skarço, 1984). The result was degradation of the soil, which becomes more notable after 1990. As a conclusion we can say that it is still difficult to get a full panorama over the quality of the environment for the period 1944-1990, due to the lack of information. Very limited literature exists, while no data exists or not reported. In some publications as in

(Alcamo, 1992; KPS, 1988) a quantity of insufficient data concerning the pollutants in Albania are reported.

3.3 Transition period

Carter and Turnock (2002) suggest that *"in theory a market economy should safeguard the environment"*, but this has to be taken with care, because the situation differs between countries. Democratic changes in Albania were associated with different problems also concerning the environment. Old problems inherited from past-period were mixed with new phenomena. Pavlinek and Pickles (2000) believes that *"transformation in Center and East European Countries despite both positive and negative factors result in the overall decline of pollution levels across the region"*. As support factor for their theory, both authors state *"the decline of industrial production and the new government's steps to stop the environmental degradation and melioration"*. Most probably starting from this point, are those who believe that environmental situation in Albania is meliorated from past. From other side, among the environmentalists the general opinion is that problems regarding environment increased during transition.

A summary of positive factors which affected the environment during the transition and nowadays are as follow:

- *"interruption of the majority of large industrial plants as a source for pollution of air, soil and water"* (Qiriazhi P. & Sala S, 2000)
- *"reduce of use of chemicals in agriculture"* (Qiriazhi P. & Sala S, 2000)
- creation of governmental and non-governmental organizations (Jancar-Webster, 1998; Qiriazhi P. & Sala S, 2000; Turnock, 2004)
- *"tendency to use new technologies in industry and agriculture according to international standards concerning the environment"* (Qiriazhi P. & Sala S, 2000)
- *"participation of the country in several international treaties"* (Qiriazhi P. & Sala S, 2000)
- *"EU requirements regarding environmental regulations"* (Qiriazhi P. & Sala S, 2000)
- *"privatization in economy, growth of energy price, wood, water and fuel custom policy"* (Qiriazhi P. & Sala S, 2000)
- Environmental education in Albanian schools (Hall, 2004; Sokoli & Doka, 2004)

In the list of factors affecting the environment of Albania, part of it are the negative phenomena also. Qiriazhi and Sala (2000) list some of them:

- *"lack of proper laws and powerful institutions for environmental protection. This has created a favorable situation for damages in forest, pastures, waters, mines etc"*
- *lack of foreign investments*
- *free and uncontrolled movement of population caused many problems in abandoned areas as well as in the hosting areas*
- *tremendous increase of number of vehicles of any type and use of low quality fuel*
- *fast development of some economical sectors as construction, most evident in the main urban areas in Albania"* (Qiriazhi P. & Sala S, 2000)

For the time being the industrial pollution does not constitutes a grave problem for Albania, due to the fact that the large industrial plants are closed or working with reduced capacity. Rapid increase of the number of motor vehicles and use of low quality fuel has played an important role in the deterioration of air quality in main urban areas of the country. Sources

of pollution are also some enterprises of light industry, as those for leather, waste water discharges (Floqi, Vezi, & Malollari, 2007).

Recently, according to Albanian figures, (Ministria e Mjedisit, 2008), the general situation presents stability of environment and for some indicators melioration. The current status of Albanian environment was lastly presented on October 4, 2008 by the Minister of MoEFWP, Prof.Dr.Lufter Xhuveli. He states: *"From the measurements within the country and collection of the data for environmental components for 2005-2007 period and reports from international environmental institutions, Albania was ranked in 25-th place in the world as a country with clean and healthy environment according to Environmental Performance Index (EPI)"*(Ministria e Mjedisit, 2008).

3.4 Policies for environmental protection and conservation

3.4.1 Environmental policy

Before 1990, Albania did not inherit any serious environmental legal framework. The first Albanian legal acts issued on environment during communism period were too unspecific and inadequate (Hema & Malollari, 2002; Pavlínek & Pickles, 2000). According to Hall (2000) early examples of Albanian environmental legislation include those concerning control of hunting (November 1951) and forestry protection (October 1963).

Important legal act can be considered the decree of Council of Ministers nr. 96, date 21.11.1966 for the law on Forest Protection were some forest areas in Lura, Divjaka, Llogora, Drenova, Thethi and Dajti declared 'National Parks'. Lastly, under the communist period was another decree on Council of Ministers, Nr. 100, date 23.09.1981 'Dispose under state protection for rarely natural resource'; and the decree of Ministry of Agriculture and Ministry of Education nr. 9, date 30.11.1981, 29 forest aggregations (315 ha in total), and 214 distinctive trees with natural, esthetic and historical-social values go under state protection. Essentially the legal frame was considered very weak and not completely appropriate, because it was not a real law for protection of the environment. The development of a modern environmental legal system based on democratic principles began only in 1991.

"The legal system is based on the following hierarchy: Constitution, primary legislation (laws) and supporting normative acts, such as by-laws, government decisions, decrees, ministerial orders, regulations, instructions and standards. The Constitution, approved in 1998, calls upon the Albanian authorities to preserve a healthy environment, ecologically suitable for present and future generations (Chapter V on social objectives)"(UNECE, 2002).

The first law on environmental protection enters in force in 1993 and amended on July 1998, while the new law on Environmental Protection was declared on 5 September 2002 (Law on Environmental Protection (No. 9834, 5 September 2002).

"The 2002 Law on Environmental Protection is a comprehensive framework law with the following objectives:

- *Rational use of the environment and reduction of discharges into and pollution of the environment, prevention of its damage, rehabilitation and restoration of the damages environment;*
- *Improvement of environmental conditions, related to the quality of life and protection of public health;*
- *Preservation and maintenance of natural resources, renewable and non-renewable, rational and efficient management by ensuring their regeneration;*
- *Coordination of the state activities to meet the environmental protection requirements;*
- *International cooperation in the field of environmental protection;*

- *Promotion of public participation in environmental protection activities;*
- *Coordination of the economic and social development of the country with the requirements of environmental protection and sustainable development.*
- *Establishment and strengthening of the institutional system of environmental protection on national and local level” (UNECE, 2002).*

In the new Law on Environmental Protection (2002) there are also a considerable number of other laws, decrees, draft's, commandments and Decree of the Council of Ministers (VKM) that promote environmental protection and management (Box. 3-1).

Box 3-1

Some principal legislation related to environment

- Laws on Land and its Distribution (No. 7491 and No. 7501, 19 July 1991)
- Law on City Planning (No. 7693, 20 April 1993, amended 1998)
- Law on Forestry and the Forestry Police Service (No. 7223, 13 October 1992; amended in 1994)
- Law on Environmental Protection (No. 7664, 1993; amended by Law No. 8364, 2 July 1998)
- Law on Hunting and Wildlife Protection (No. 7875, 23 November 1994)
- Law on Fishing and Fish Farming (No. 7908, 5 April 1995)
- Law on Radioactive, Nuclear and Atomic Waste (No. 8025, 9 November 1995)
- Law on Water Resources (No. 8093, 21 March 1996)
- Law on Public Waste Disposal (No. 8094, 21 March 1996)
- Law on the Organization and Functioning of Local Government (No. 8652, 31 July 2000)
- Law on Air Protection (No. 8897, 16 May 2002)
- Law on Protected Areas (No. 8906, 6 June 2002)
- Law on Environmental Protection (No. 9834, 5 September 2002)
- Law on Biodiversity Protection (No. 9587, 20 July 2006)
- Law on Environmental Impact Assessment (No. 8990, 23 January 2003)
- Law for Protected Areas (No.8906, 06 June 2002)
- Law for Administration of Waste Disposal (No.9010, 13 February 2003)
- Decree to Establish Agency of Environment and Forestry (No.579, 23 August 2006)
- Law on Protection of Marine Environment from Pollution and Damage (No.8905, 06 June 2002)
- Law on Assessment and Administration of Noise on the Environment (Nr.9774, 12 July 2007)

Source: (UNECE, 2002), MoEFWA, Center for Official Publications (COP/QPZ)

3.4.2 Institutional base

“The institutional history for environmental protection in Albania starts by the end of seventies. A Central Environmental Protection Commission, established in 1979, operated from the Council of Ministers and included representatives of ministries and research institutes” (Hall, 2002).

In 1991, a Committee for Environmental Protection and Preservation was established within the Ministry of Health. In 1992 the major environmental protection body in Albania was the

Committee of Environmental Protection as part of the Ministry of Health and Environmental Protection (CEP) (Selfo L., 1995).

In 1998, the Albanian Parliament established National Environmental Agency (NEA) as a high state body depending directly on the Council of Ministers (National Environmental Agency, 1999). And later on, in 2001, NEA converted on Ministry of Environment (MoE), which by law (2002) is the main actor for Environmental issues in Albania. The MoE is named MoEFWA. Additional responsible actors on environment are: Permanent Commission on Health and Environment under Albanian Parliament; Council of Ministers; National Council of Territorial Adjustments; Water National Council; MoAFCP; Ministry of Health (MoH); Institute of Public Health (IPH); Institute of Hydrometeorology (IH); Institute of environmental Studies (IES); Institute of Nuclear Physics (INPh); Agency of Environment and Forestry (AEF); Regional Environmental Agencies (REC), nearly 68 Environmental NGO-s (Myftiu A., 2006).

3.4.3 International cooperation and agreements

“Regarding environmental matters, for the first time Albania is named in 1988 in Belgrade in the conference of foreign ministers for tourism, transport and environment protection”. (Hall, 2002)

In July 1989 Albania signed the World Heritage Convention (World Conservation Monitoring Centre, 1990). In June 1990 the country ratified the Barcelona Convention becoming the last Mediterranean country to be part of UNEP Regional Seas Programme. In October 1991 Albania ratified Espoos on "Environmental Impact Assessment in Transboundary Context" (MHEP, 1993).

In the same year (1991), Albania started cooperation with important international bodies like, World Bank, International Money Found, UNDP and European Bank for Reconstruction and Development (EBRD) which played a significant role in environmental initiatives. These are the first international cooperations, lately Albania ratified several other protocols and conventions in environmental regard (Ministria e Mjedisit, 2008).

3.5 Environmental data sources

Earlier in this chapter, we discussed for a wide range of institutions dealing with environment in Albania. In Albania is no national environmental monitoring center. The responsibility for monitoring is spread across several institutions. The main institution for environmental data providing is the MoEFWA as well as INSTAT. In the case of Institute of Statistics, they elaborate the data from MoEFWA or other monitoring institutes, but INSTAT is not involved directly in monitoring process.

3.5.1 Data availability

MoEFWA as main institutional body contracts a certain number of instructions, including: IPH; IH; IE; INPh, AEF, GDFP; FNS; MNS; AUT; MoAFCP; MPWTT; AGS. The major problem regards to the availability of the data for the past. No environmental data for 1945-1990 period of time are published and this does not allow the comparisons to be made influencing the work as well. The monitoring programs in Albania started in late 1970s, but were completely interrupted for some years until they restarted in 1995. For that the acknowledgement of environmental problems before 1990 was not clear. *“Very little published material exist, and even less public debate, on environmental ‘problems’ and their human consequences. Up to this point no data on any form of pollution had been published”* (Hall, 2002).

"Because most of the monitoring analyses are done irregularly, the quality of the environment is represented only partially, if not erratically" (UNECE, 2002).

Only last years have been made some efforts and situation is meliorated. With the new Law on Environmental Protection (2002), Ministry is obligated to prepare, publish and distribute 'State-of-the-Environment' every two years in Albanian and English.

3.5.2 Environmental publications in Albania

Environmental publications in Albania started in the second half of 1950th from the Institute of Hydrometeorology, followed by other institutions such as the Center for Biological Research, the Seismological Center, the Institute of Pedological Studies, the Geographic Studies Center and other institutions belonging to the Academy of Science of Albania established in 1972 (Hall, 2002). Other publication includes the University of Tirana.

Post-communist period is characterized by increasing number of publications and studies on environment. The first publication from specialized institution started in 1993. *"Committee of Environmental Preservation and Protection in July 1993 published the first report addressing environmental issues in country level in Albania"* (MHEP, 1993). Nowadays the number of publications is increasing. Several institutions (University, Research centers etc), researchers, NGO-s, international organizations contribute to present the status of Albanian environment. The major publication on national scale is issued by the MoEFWA named "The Report on Status of the Environment".

Chapter 4

Visualization of the environmental atlas

4.1 Introduction

The atlas is an important analysis of the relationships between the environment and the factors that influence, mainly human. Illustrating through text, maps and graphics how this two components affect each-other, the atlas try to bring together a wealth of information from the most recent data sources.

4.2 Air quality

When we use the terms such, air quality, ambient air pollution in general we refer to air pollution which has accompanied the people along the history. The problems of air pollution exist on local scale, urban scale, regional scale, continental scale, and global scale (Boubel, Fox, Turner, & Stern, 1994). Air pollution is an evident problem in Albania as well. Up to 1990 the industry has been the main air pollutant of the country. With political changes and the drastic decrease of the industry other factors such as road traffic constitute potential threat for air quality for the Albanian cities. In the atlas we deal with the air quality in urban areas as one of the major problems.

4.2.1 Air quality in urban areas

Starting from the availability of the data concerning air quality, the maps (see appendix) presents the main air pollution substances such as; particulate matter (PM₁₀), sulfur dioxide (SO₂), total suspended particulate matter (SPM), nitrogen dioxide (NO₂), ozone (O₃) and lead content.

The graphic presentation is divided in two parts. In the first part 6 maps (one for each pollutant) are presented, describing the current status for the 6 main pollution substances for the year 2007. The second part consists on the graphics used to show the progression of the principal pollutants over the last three years (2005-2007).

Due to the limited number of monitoring stations, on the atlas are represented main urban areas in Albania. Monitoring process includes 7 major cities (Tirana, the capital; Shkodra, Durres, Elbasan, Fier, Lushnje and Korca) with a total number of 15 monitoring stations. The majority of monitoring stations are located in Tirana (7), followed by the Elbasani with 3 monitoring stations and the other cities with one monitoring station. The limitation in the number of monitoring stations does not provide the opportunity to present the situation for the entire country. Nevertheless, the annual averages of the urban stations have been used for the whole region.

In this case, the regional representation of urban air quality has been used and this may lead to confusion. To avoid possible confusion in the maps, we have to clarify that the whole region is considered, but the color does not represent the complete region, but only the city/cities. Furthermore, in brackets are included numbers which indicate the monitoring stations for each of the seven cities represented in the atlas.

4.2.1.1 Suspended Particulate Matter (SPM)

Particulate pollution is a very serious problem in the urban areas of Albania. *“SPM consist of solid and liquid particles emitted from numerous natural and man-made sources and a complex and variable mixture of different sized particles with many chemical components” (Verma, 2006).*

The major sources for suspended particulate matter in urban areas are: burning of fuel, vehicle exhaust, industrial activities, re-suspension of dust, traffic etc. *“Airborne pollutants affect health in varying degrees of severity, ranging from serious illness to premature death in extreme cases. Such pollutants may produce immediate (acute), as well as long term (chronic), symptoms” (Ravindra, 2001).*

The average annual value of SPM for the monitoring stations are compared with the annual average values of Albanian standards and the values of the European Union standards (Ministria e Mjedisit & Pyjeve, 2008).

SPM content in air ($\mu\text{g}/\text{m}^3$)	
Albanian standard	140
EU standard	90

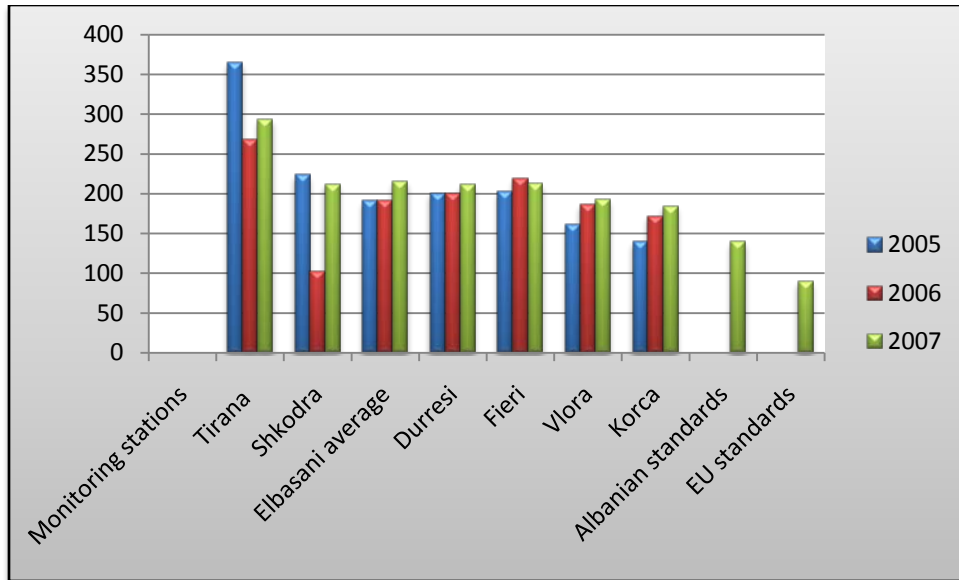
Tab. 4-1: Standards for SPM content in the air
Source: MoEFWA: Report on Status of the Environment 2005-2007

Since the industrial activity in Albania decreased sharply after 1990, some studies reveal the great importance of traffic in emissions (Deliu & Ndroqi, 2005). According to INSTAT, the total number of road vehicles in Albania is 349.626 (2007). The majority of road vehicles use low quality fuel, contributing directly to the pollution of the air in the urban areas. Nevertheless no specific studies for clarifying respective influence of each contributor are carried on yet.

The map shows that all average values of the measurement points throughout Albanian cities exceed Albanian standards as well as European Union standards for SPM (see Tab. 4-1).

The situation is particularly critical in Tirana where the average value exceeds by more than three times the European Union standard, while in one measurement point located in the city the values exceeds the standards by eight times.

In the graph 4.1 the continuity of the SPM content in air at the measurement points for three years (2005-2007) is presented. The picture does not show regularity for all measurement points, but the general conclusion is that all values remain high and exceed the European Union standards. The pollution through SPM remains constant in Albanian cities in high values comparing to national and international standards.



Graph 4-1 SPM content in air for some Albanian cities for 2005-2007
Source: MoEFWA: Report on Status of the Environment 2005-2007

4.2.1.2 Particulate Matter (PM_{10})

In the glossary of EEA, " PM_{10} is defined as an air pollutant consisting of small particles with an aerodynamic diameter less than or equal to a nominal 10 micrometer (about 1/7 the diameter of a single human hair). Their small size allows them to make their way to the air passages deep within the lungs where they may be deposited and result in adverse health effects. PM_{10} also causes visibility reduction¹".

The major sources for particulate matter in the urban areas are: burning of fuel, vehicle exhausts, industrial activities, re-suspension of dust, traffic, construction activities. PM_{10} affects more people than any other pollutant. "Recent studies suggest that short-term variations in particulate matter exposure are associated with health effects even at low levels of exposure (below $100 \mu\text{g}/\text{m}^3$)" (WHO, 2000). "Exposure to particulate matter can aggravate chronic respiratory and cardiovascular diseases, alter host defenses, damage lung tissue, lead to premature death, and possibly contribute to cancer (Ravindra, 2001)".

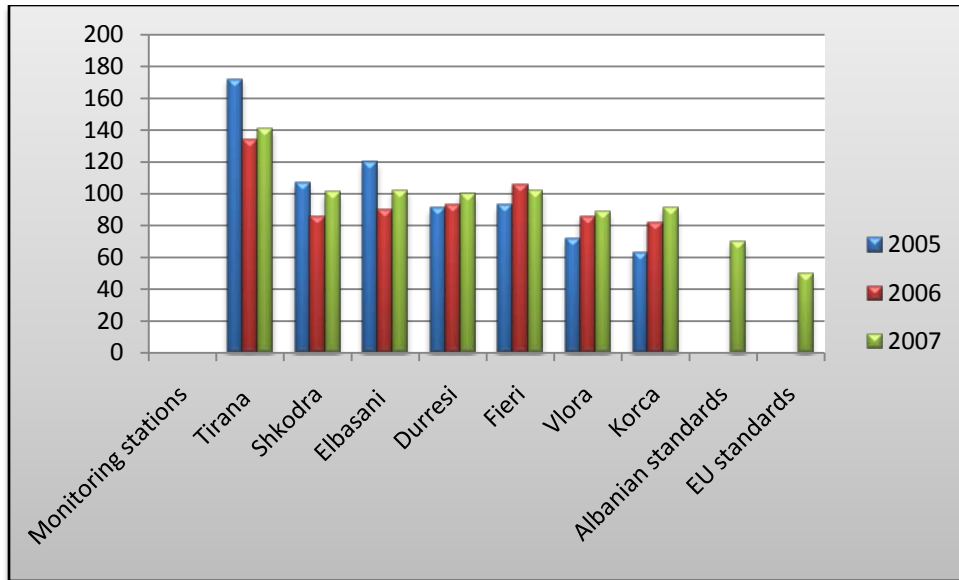
PM ₁₀ content in air (µg/m ³)	
Albanian standard	70
EU standard	40

Tab. 4-2 Standards for PM_{10} content in the air
Source: MoEFWA: Report on Status of the Environment 2005-2007

All the average values at the measurement points throughout Albanian cities exceed Albanian standards as well as the European Union standards for PM_{10} .

As for SPM, in the case of PM_{10} no regularity in the evolution is observed. Despite this, all the values exceed by far the standards, reaching the peak in Tirana (see graph. 4-2).

¹ (<http://glossary.eea.europa.eu>).



Graph 4-2 PM₁₀ content in air for some Albanian cities for 2005-2007
Source: MoEFWA: Report on Status of the Environment 2005-2007

4.2.1.3 Nitrogen dioxide (NO₂)

“Nitrogen dioxide is an oxidant gas that contaminates outdoor air and indoor air in homes with unvented gas appliances” (Samet et al., 1993).

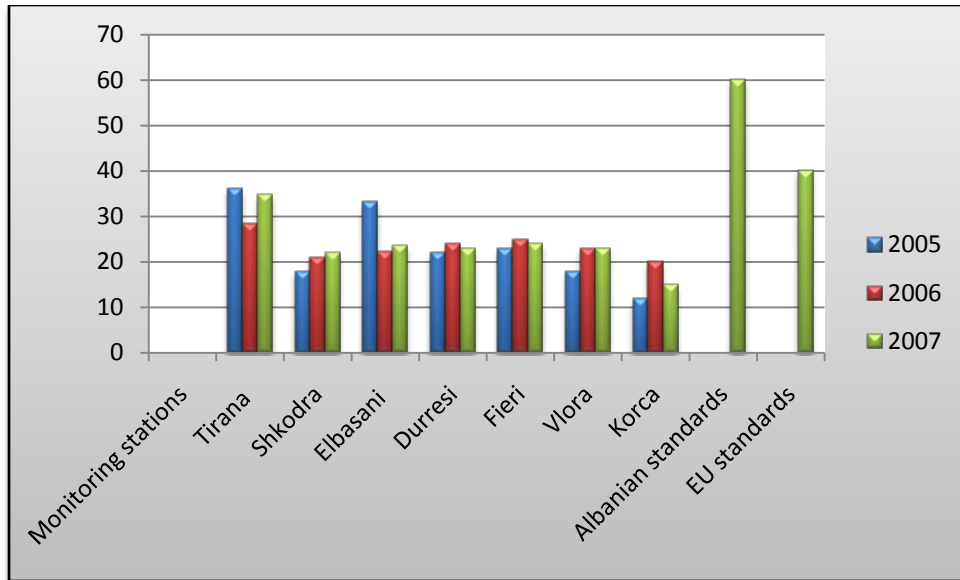
The major sources of NO₂ include motor vehicles and fossil fuel power plants (Emenius et al., 2003; Verma, 2006; WHO, 2000). In the observed cities in Albania is reported that motor vehicles are the main source of NO₂ (Ministria e Mjedisit & Pyjeve, 2008).

“Epidemiological studies have shown that symptoms of bronchitis in asthmatic children increase in association with long-term exposure to NO₂” (Pattenden et al., 2006; WHO, 2000).

NO ₂ content in air (µg/m ³)	
Albanian standard	60
EU standard	40

Tab. 4-3: Standards for NO₂ content in the air
Source: MoEFWA: Report on Status of the Environment 2005-2007

From the map all the average values throughout Albanian cities are in compliance with European Union standards for NO₂ (see tab 4-3). The graph 4-3 confirms low content of NO₂ among the Albanian cities also. A short comparison reveals a diminution of nitrogen dioxide in Tirana and in Elbasan during 2007 comparing to 2005, while in the other cities is noticed a slight increment in 2007. Nevertheless the values remain under the settled standards and for the moment the NO₂ can be considered as lower risk pollutant.



Graph 4-3 Nitrogen dioxide (NO₂) content in air for some Albanian cities for 2005-2007
 Source: MoEFWA: Report on Status of the Environment 2005-2007

4.2.1.4 Sulfur dioxide (SO₂)

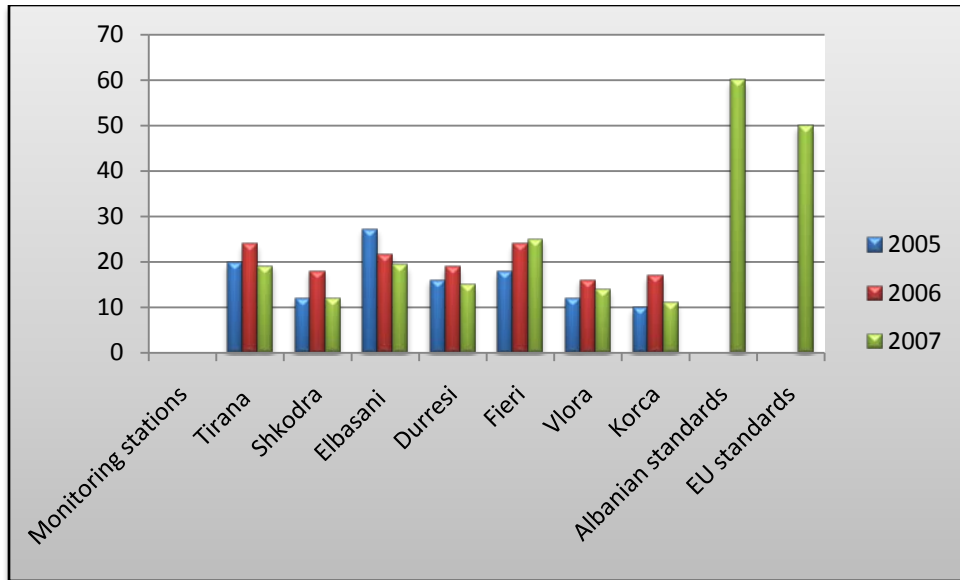
“Sulfur dioxide (SO₂) is a colorless gas which has a pungent odor in high concentrations” (UEIS & Development).

The major sources of SO₂ are power plants, burning of fuels, heating as well as from natural sources, but limited in urban areas. *“SO₂ can affect the respiratory system and the functions of the lungs, and causes irritation of the eyes. Inflammation of the respiratory tract causes coughing, mucus secretion, aggravation of asthma and chronic bronchitis and makes people more prone to infections of the respiratory tract”* (Folinsbee, 1993; Frank, Amdur, Worcester, & Whittenberger, 1962; Nadel, Salem, Tamplin, & Tokiwa, 1965).

SO ₂ content in air (µg/m ³)	
Albanian standard	60
EU standard	50

Tab. 4-4: Standards for SO₂ content in the air
 Source: MoEFWA: Report on Status of the Environment 2005-2007

The map and the graph 4-4 show that all the average values throughout. Albanian cities are in compliance with European Union standards for SO₂ (see tab 4-4) and Albanian standards as well. Low content of SO₂ on the air in Albanian urban areas is due to the lack of large power plants as major source of this gas and the very limited use of coal for heating. According to Albanian figures, urban traffic is considered major source of SO₂, increased number of cars, the age of vehicles, and the low quality of the fuel.



Graph 4-4 Sulfur dioxide (SO₂) content in air for some Albanian cities for 2005-2007
Source: MoEFWA: Report on Status of the Environment 2005-2007

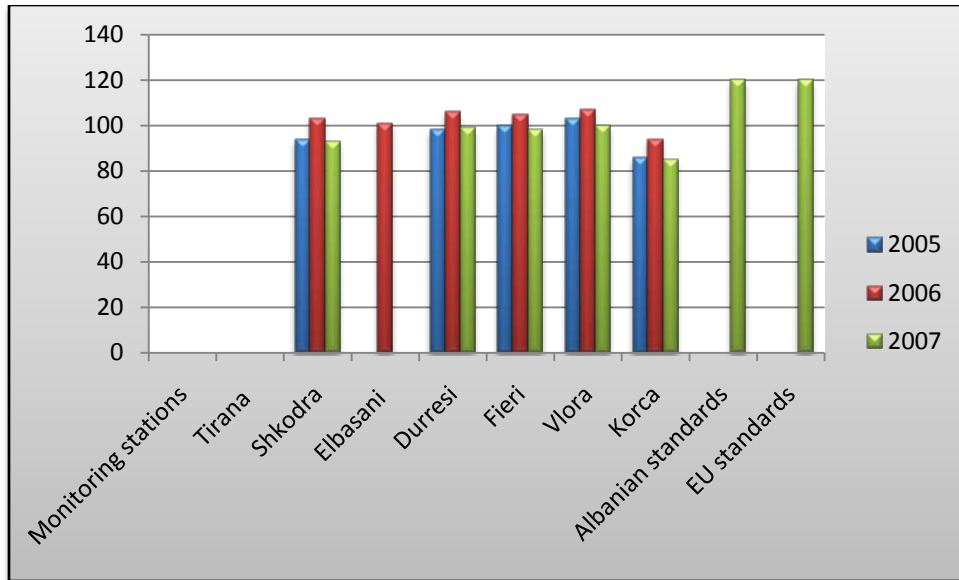
4.2.1.5 Ozone (O₃)

“Ozone is a natural trace gas in the atmosphere. In contrast to diatomic oxygen (O₂), ozone consists of oxygen with three atoms (O₃). Whereas the air contains about 20 % O₂, ozone occurs in very much smaller concentrations” (UEIS & Development).

O ₃ content in air (µg/m ³)	
Albanian standard	120
EU standard	120

Tab. 4-5: Standards for O₃ content in the air
Source: MoEFWA: Report on Status of the Environment 2005-2007

The map and the graph used to describe the content of O₃ in urban air indicate that, the level of O₃ for all Albanian cities in 2007 is under the EU standards. The graph 4-5 also shows a stable situation on the ozone content over Albanian cities for the period 2005-2007.



Graph 4-5 Ozone (O₃) content in air for some Albanian cities for 2005-2007
Source: MoEFWA: Report on Status of the Environment 2005-2007

4.2.1.6 Lead (Pb)

“Lead (Pb) as an additive to petrol has been phased out in the major part of the industrial world, but is still used in many developing countries and economies in transition” (Fenger, 1999).

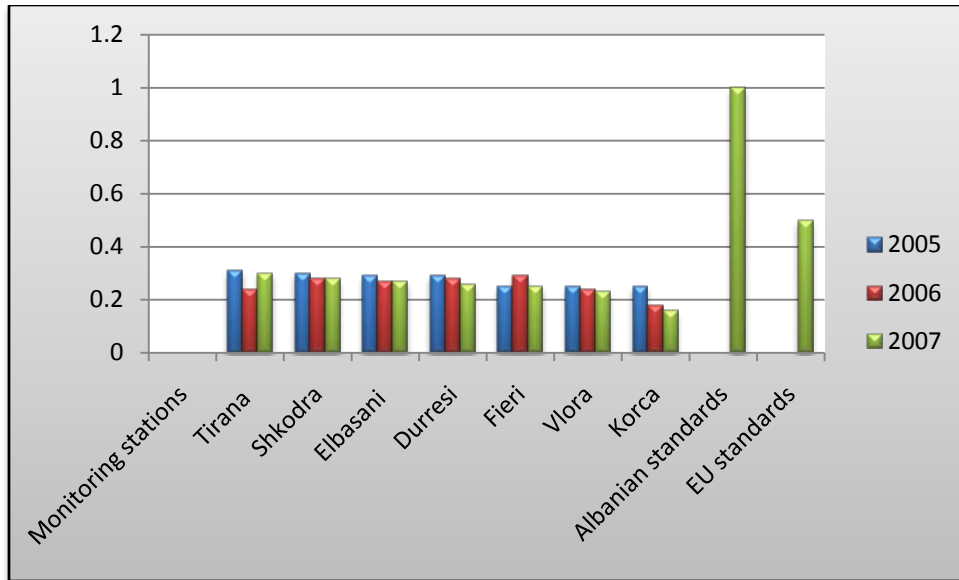
According to Albanian figures, urban traffic is considered major source of lead, increased number of cars, the age of vehicles, and the low quality of the fuel.

“The most sensitive body systems to the effects of lead are the hematopoietic system, the nervous system and the renal system. In addition, lead has been shown to affect the normal functions of the reproductive, endocrine, hepatic, cardiovascular, immunologic and gastrointestinal systems. The most sensitive group to lead poisoning are children” (Larsen & Hagen, 1997).

Lead content in air (µg/m ³)	
Albanian standard	1.0
EU standard	0.5

Tab. 4-6: Standards for lead (Pb) content in the air
Source: MoEFWA: Report on Status of the Environment 2005-2007

From the map, all values result in compliance with European Union standards. The graph 4-6 confirms a stable situation on the lead content with a diminishing trend over all the cities.



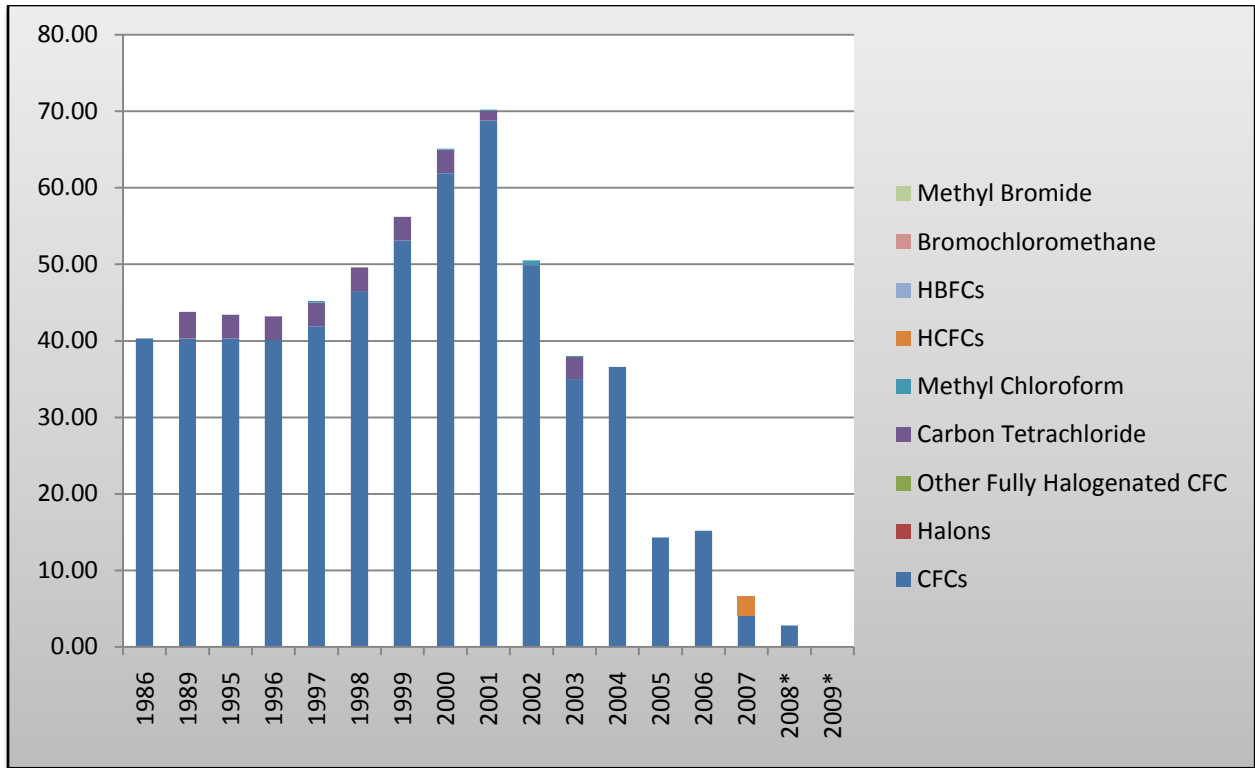
Graph 4-6 Lead (Pb) content in air for some Albanian cities for 2005-2007
Source: MoEFWA: Report on Status of the Environment 2005-2007

4.2.2 Ozone depleting substances

“Ozone depleting substances (ODS) are those substances which deplete the ozone layer and are widely used in refrigerators, air-conditioners, fire extinguishers, in dry cleaning, as solvents for cleaning, electronic equipment and as agricultural fumigants. Ozone depleting substances include: Chlorofluorocarbons (CFCs), Halons, Carbon tetrachloride, Methyl chloroform, Hydrobromofluorocarbons (HBFCs), (HCFCs), Methyl bromide, Bromochloromethane (BCM)²”.

From January 2000, Albania is partner of Convention of Vienna and the Protocol of Montreal. In the frame of the Montreal Protocol, from the beginning of 2001 Albania has the National Plan for Ozone including also the National Plan for elimination of use of elements that dilute the ozone layer. A national Ozone Unit has been established to compile the National Plan and related activities - National Ozone Project Implementation Unit (NOPIU) (Ministria e Mjedisit, 2008). Albania is not a productive country of the ODS, but it is a consumer of. The consumers of the ODS in Albania can be divided in: domestic refrigerators, industrial refrigerators, commercial freezers, refrigerator trucks, air-conditioners, and refrigeration and air conditioning services. According to the data of the United Nation Environment Program (UNEP) and from the data by the MoEFWA, the consumption of ODS in Albania is decreased from 40 tons per year in 1986 (first time data reported) to 4.1 ton per year in 2007 (Graph 4-7).

² <http://www.environment.gov.au/atmosphere/ozone/ods/index.html>



Graph 4-7 ODS consumption in Albania (ton/year)

Source: a) UNEP. Ozone Secretariat

b) MoEFWA: Report on Status of the Environment 2005-2007

* Expected consumption from MoEFWA

4.3 Urban noise

“Noise is defined as ‘unwanted sound’, and is perceived as an environmental stressor and nuisance” (Stansfeld & Matheson, 2003). “Main sources of community noise include road, rail and air traffic, industries, construction and public work, and the neighborhood. The main indoor sources of noise are ventilation systems, office machines, home appliances and neighbors. Typical neighborhood noise comes from premises and installations related to the catering trade (restaurant, cafeterias, discotheques, etc.); from live or recorded music; sport events including motor sports; playgrounds; car parks; and domestic animals such as barking dogs” (Berglund, Lindvall, & Schwela, 1999).

In the list of health effects of noise can be stated: noise-induced hearing impairment; interference with speech communication; disturbance of rest and sleep; psycho physiological, mental-health and performance effects; effects on residential behavior and annoyance; hypertension and ischemic heart disease; and interference with intended activities (Berglund et al., 1999; Stansfeld & Matheson, 2003). The table 4.7 present the World Health Organization (WHO) guideline values according to specific environments.

Specific environment	Critical health effect(s)	LAeq [dB]	Time base [hours]	L _{Amax} , fast [dB]
Outdoor living area	Serious annoyance, daytime and evening	55	16	--
	Moderate annoyance, daytime and evening	50	16	
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	45
bedrooms	Sleep disturbance, night-time	30	8	
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60
School class rooms and pre-schools, indoors	Speech intelligibility, disturbance of information extraction, message communication	35	during class	-
Pre-school Bedrooms, indoors	Sleep disturbance	30	sleeping - time	45
School, playground outdoor	Annoyance (external source)	55	during play	-
Hospital, ward rooms, indoors	Sleep disturbance, night-time	30	8	40 -
	daytime and evenings	30	16	
Hospitals, treatment rooms, indoors	Interference with rest and recovery	#1		
Industrial, commercial, shopping and traffic areas, indoors and Outdoors	Hearing impairment	70	24	110
Ceremonies, festivals and entertainment events	Hearing impairment (patrons:<5 times/year)	100	4	110
Public addresses, indoors and outdoors	Hearing impairment	85	1	110
Music through headphones/ Earphones	Hearing impairment (free-field value)	85 #4	1	110
Impulse sounds from toys, fireworks and firearms	Hearing impairment (adults) Hearing impairment (children)	--	--	140 #2 120 #2
Outdoors in parkland and conservation areas	Disruption of tranquility	#3		

#1: as low as possible;

#2: peak sound pressure (not L_{Amax}, fast), measured 100 mm from the ear;

#3: existing quiet outdoor areas should be preserved and the ratio of intruding noise to natural background sound should be kept low;

#4: under headphones, adapted to free-field values

Tab. 4-7 Guideline values for community noise in specific environments
(Adopted from (Berglund et al., 1999))

The noise is a rising problem in Albania. This can be noticed by the maps as well (see appendix). The maps present the day values and night values respectively for last three years (2005-2007). Due to the limited number of monitoring station (45) the maps include 8 cities (Tirana, Shkodra, Durrës, Elbasan, Fier, Vlora, Korca and Saranda). The maps present a combination of noise and the population density in the regions included in the monitoring program. From the maps the high noise values are registered in the cities with high values of population density. As a result the population affected by the noise in Albania is large. It is evident also the fact that day values for the urban noise are very high. All the average values

are above 65 dB reaching the peak in Tirana with 71 dB in average for the three monitoring years presented on the map. High noise values are registered during the night time as well. From the map result that Tirana remains the city most affected by noise during the night time. The average value of noise for monitoring period is higher than 58 dB. Another finding from the map for night values is the difference between Tirana and the other cities. The average night time value in Tirana is 58 dB, while the average value for the other 7 cities is round 43 dB. This difference can be explained with the fact of the night life impact in Tirana (especially on the weekends).

4.4 Biodiversity

4.4.1 Endangered flora and fauna

Despite its richness in flora and fauna, Albania is considered to have high rate of biodiversity loss in Europe. The Red List of Threatened and Lower Risk plant species of Albania includes 320 species, or 10% of the whole vascular flora (Ruci, Vangjeli, Mullaj, Hoda, & Buzo, 2000), while the number of animal species included in the Albanian Red Book is around 573, of which vertebrates comprise 273 species or 36% of the vertebrates of the country (REC, 2000). However the situation is not very clear because of the data problems. In different reports the data varied.

	Total number of taxa	Threatened taxa IUCN	Threatened taxa % IUCN
Vascular plants	3250 (3228)	320 (234)	7.2
Mollusca	520 (183)	(1)	0.5
Mammals	70 (91)	(21)	23.07
Crustaceans	115	0	0
Reptiles	36 (37)	(9)	24.3
Amphibians	15	2	13.33
Fresh water fish and Marine fish	313 (311)	(16)	5.14
Insects	4000 (680)	(16)	2.35
Birds	323 (330)	17	5.1

Table 4-8 Threatened plant species and threatened fauna species of Albania

Source: a) Biodiversity Strategy and Action Plan, 1999;

b) MoEFWA: Report on Status of the Environment 2005-2007

Note: the number in parentheses indicates the data from MoEFWA

4.4.2 Protected areas

“In Albania, Protected Area are considered the parts/surface of land and/or water, marine/coastal, destined mainly for the conservation of the biological diversity, natural and cultural resources that accompany it/them and are legally managed and/or in other effective ways” (National Environmental Agency, 1999).

The creation of Protected Areas has started in 1940 with the proclamation of the first state Hunting Reserve (Kune-Vain-Tale) in Lezha (National Environmental Agency, 1999).

Since 1940, the number of protected areas increased and according to MoEFWA by the end of 2007 they cover 299.498 ha or 10.42% of the total surface of Albania. The classification of the

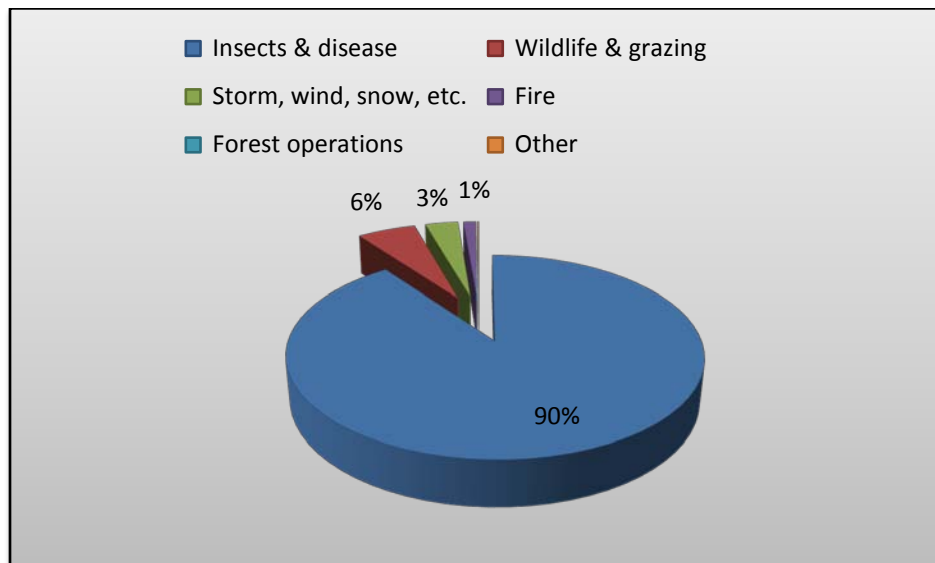
protected areas in Albania is based on the criteria's and categories of the International Union for Conservation of Nature (IUCN).

We present the protected areas in Albania in one map (see appendix) according to the previous work by Qiriazhi and Sala (2006) and enriches with the newly established areas. The delimitations of the established protected areas were adopted from the original map compiled by Qiriazhi and Sala in "Harta e Monumenteve te Natyres te Shqiperise, 2006" (The map of Monuments of the Nature in Albania, 2006)(Qiriazhi & Sala, 2006).

The areas newly established were selected from the report of the MoEFWA. The map presents the status of protected areas by December 2007. The map includes also the protected areas under the RAMSAR Convention.

4.4.3 Forests and forest fires

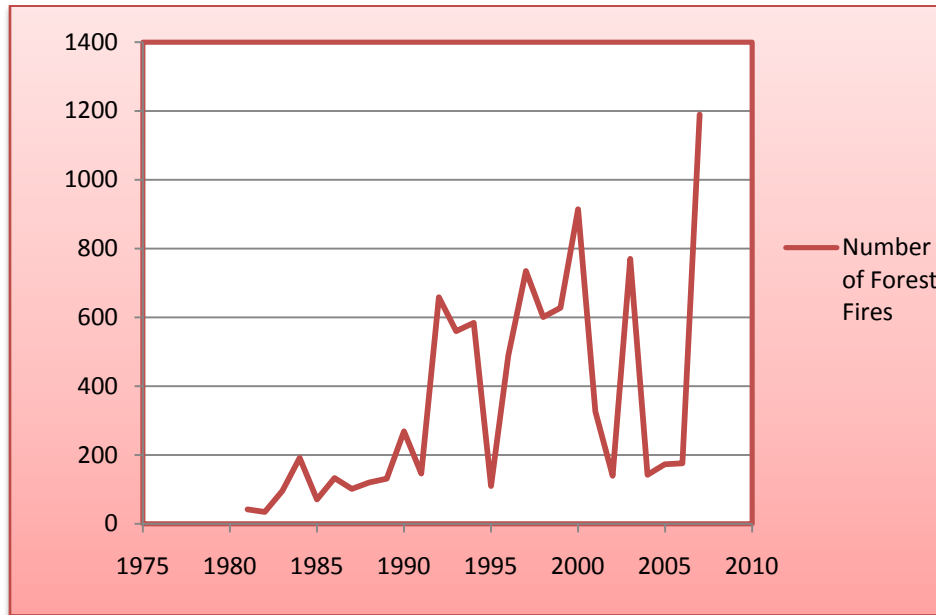
According to the last Albanian figures, in 2007 forests covers 1.043.158 ha or some 36% of the country. This statistics are near to the levels of 1990, where the area covered by forests and other wooded land were 1.043.700,0 ha as reported by the Ministerial Conference on the Protection of Forests in Europe (MCPFE) in 2007 (MCFPE, 2007). Despite this, the lost in forest fund of Albania is high comparing to the data before 1990. According to UNECE (2002) since the 1950s, the forest area has decreased from 45% to 36% of the territory. Throughout history the forest fund of Albania has been affected by different damages. By the MCFPE, in 2005, 92.000 ha were reported as damaged from primary agents in Albania. The *most extensive* damage to forests in Albania was caused by biotic agents; 'insects and diseases' and 'wildlife and grazing' with 85.800 ha. Biotic agents where followed by abiotic agents (fire, storm, wind, snow, drought, mudflow and avalanche) covering 3840 ha. Only 1000 ha reported damaged by human induced factors.



Graph 4-8. Area of damage to forest by different primarily damaging agents, 2005
Source: MCFPE, 2007. State of Europe's Forests 2007

Although the most extensive damage to the forests where caused by biotic agents, forest fires have an important negative impact. In the report of EEA the *most drastic* damages to forests in Europe are caused by forest fires and wind storms. Albanian forests are highly affected from the fires mainly during the summer period. This phenomena causes loss of forest fund

and biodiversity as well. The graph 4-9 presents the number of forest fires occurred in Albania starting from 1981. The causes of occurrence of wildfires can be: human causes, natural causes and unknown causes. According to the data from FAO, 63.7% of the forest fires in Albania are caused by human factors, in 35.5% the causes are classified as unknown and only 0.8% is from natural causes. However, it should be understood that even forest fires marked as “caused by unknown reasons” can be considered as started by people. In Albania in the human-causes we can list: cropland burning and clearing fields for agricultural purpose, recreational purpose, fires set by shepherds and hunters, lack of legislation and institutional responsibility, inadequate management, intentional fires, negligence (Meta M, Hoxhaj G, Dule S, Lacey F, & Zorba P, 2003; Ministria e Mjedisit, 2008).



Graph 4-9 Forest Fires in Albania

Source: a) International Forest Fire News (IFFN) No. 6 - January 1992

b) International Forest Fire News (IFFN) No. 33 – July-December 2005

c) FAO: Fire Management Working Paper FM/11. Report on fires in the Balkan Region. 2006

d) MoEFWA. Report on the Status-of-the-Environment 2005-2007

The forest fires are represented in the atlas by 7 maps (forest fire density map 2006, forest density map 2007, forest fire change 2006-2007, burned forest area 2007, burned pasture area 2007, burned forest area change 2006-2007 and burned forest pasture change 2006-2007) based on the recent data by the MoEFWA (see appendix). For 2006 and 2007 the data are complete for all the 36 districts of Albania. According to data availability, temporal and spatial developments in the forest fire are shown in both maps and charts. The chart shows the variation in the total number of forest fires in Albania starting from 1981 (see graph. 4-9). From the other side the maps show the spatial distribution of the forest fires within the country. To allow the possible comparison a common legend has been used referring to 2007 data. The density maps of forest fires for 2007 and 2006 reflects the comparatively high density of forest fires during 2007 conditioned from high number of forest fires in 2007 (1190). The forest fire change map confirms the increment of the forest fire number in all districts reaching the peak in Puka district (110).

Interest represents the maps “burned forest area change 2006-2007” and “burned pasture change area 2006-2007”. The first map shows that in majority of districts burned area of

forests increases, while in four districts (Kavaja, Lushnje, Fier, Librazhd) burned surface diminishes. In the second map the trend is clear, only in the Devolli district the burned area of pastures decreases in 2007 with respect to 2006, the rest show increases of burned area.

4.5 Wastes

4.5.1 Urban wastes

Municipal wastes represents a significant environmental problem in Albania, as the management is still by large based on simple landfills and dumping sites, whereof many do not comply with required standards.

From the Albanian figures, the generation of municipal wastes per capita in Albania is increasing, and further increase is to be expected due to economic growth, geographical mobility in the form of internal migration, expanding tourism, increase of imported or newly produced everyday products and increase of general consumption (INSTAT, 2004b; UNECE, 2002) .

The topic on municipal waste is presented in four maps: urban waste for 2003, 2005 and 2007 and urban waste and change in population number based on the data from the reports on the status-of-the-environment in Albania for 2003-2004 and 2005-2007 (see appendix). Due to the lack of data concerning the maps for all municipalities in Albania, municipal waste maps are showing the phenomena in the level of Prefectures (highest administrative unit in Albania). According to (Ministria e Mjedisit, 2008) "The Albanian Waste Catalogue" is available yet by the MoPWTT, but the data commonly are contradictory and often incorrect due to the lack of weighting machines for wastes, and the contradictory data on population between municipality registers and data from INSTAT. For the above reasons the quantification of municipal waste is done by assessment based on the conditions for the municipalities and the living standards for communities (economical conditions) as well as from studies made by international consultants and local governments (Ministria e Mjedisit, 2008).

To ease the use of the maps and to allow the comparisons, a single map legend is being used based on the data for 2007. From the maps is possible to have a perception over the evolution in time of urban waste. The maps show an increment of annual waste generation from 2003 to 2007. Interest presents the map that shows a combination between urban waste generation for 2007 and population change from 2003 to 2007.

Year	Municipal waste per inhabitant (ton)
2003 ^a	0.183
2004 ^a	0.192
2005 ^b	0.186
2006 ^b	0.201
2007 ^b	0.208

Tab. 4-9 Annual average of municipal waste per inhabitant for some years

Source: a) MoEFWA. Report on the Status-of-the-Environment 2003-2004

b) MoEFWA. Report on the Status-of-the-Environment 2005-2007

4.5.2 Industrial wastes

Before political changes (1990) the industry has been one of the pillars of the Albanian economy generating more than 50% of the gross domestic production (GDP) of the country.

The situation changed dramatically after 1990. There was a sharp decrease in the industrial production. According to the statistics of the Ministry of Economy, Trade and Energy (METE) by the end of 2006 industry generated only 9.7% of the GDP of the country. Although this, large quantity of industrial wastes are in stock, including hazardous wastes. In many cases, this waste is being stored on site without adequate safeguards or monitoring systems. In 2005 the METE drew up an inventory of industrial wastes and hazardous substances. According to (Ministria e Mjedisit, 2008) the quantity of industrial wastes is 63.423.195,0 t while the annual production is estimated up to 120.000 ton.

From this quantity, hazardous substances accumulated at industrial facilities totaled 12.001.660 t. The hazardous substances are mainly generated from mining industry, oil industry, chemical industry and light industry. Some of the mining and industrial sites are listed as environmental hotspots (Peck, 2006; UNEP, 2000a, 2000b; UNEP. Peck, Stuhlberger, Tremblay, & Davé, 2008).

4.6 Water quality

Albania has abundant water resources, including rivers, lakes, springs, lagoons, groundwater and seas. The total watershed area of Albania covers 43,305 km² of which 28,748 km² lie within its national borders. The annual mean flow is 1308 m³. The total water volume annually reaches 42.25 × 10⁹ m³ or 13,000 m³ capita⁻¹ year⁻¹ (Pano N., 1984). Nevertheless, the country's waters face significant threats due to economical activities (industry, agriculture), other human activities and natural phenomena.

4.6.1 Fresh water quality (River water quality)

The main rivers in Albania are the Buna, the Drini, the Mati, the Erzeni, the Shkumbini, the Semani, and the Vjosa. A quality measurement network is operated to monitor the quality of Albanian rivers. The measurement network in Albania includes a total of 30 measurement points dispersed throughout most important rivers and their tributaries.

For the evaluation of the quality of the rivers *physico-chemical parameters* and concentrations of *nutrients* are used, while the data on *heavy metals* are missing/or not reported. The following parameters: pH, dissolved oxygen (DO), chemical oxygen demand (COD), ammonium (N-NH₄), nitrite (N-NO₂), nitrate (N-NO₃) and phosphate (P_{total}) are covered in the atlas. Assessment of the environmental quality of waters is based on two quality standards: the classification of the Norwegian Institute for Water Research (NIVA) and the European Community Directive (EEC/EEAC/EC 78/659) on "Quality of fresh waters supporting fish life" (BMZ, 1995; Bratli, 2000; Çullaj, Hasko, Miho, Schanz, Brandl, & Bachofen, 2005; Miho A., 2005)

According to EEC/EEAC/EC 78/659, the classification is based on: mandatory level values, and guide level values for salmonid and cyprinid waters. NIVA classification rate the natural freshwater bodies into five quality status levels; from very good (class 1) to very bad (class 5). An environmental quality evaluation for each river station is performed, calculating the average quality class using mean concentrations of nutrients, and physico-chemical parameters in water samples by using the formula:

$$\text{Average class} = \Sigma (\text{Quality class for each parameter}) / \text{no. of parameters} \quad (\text{Miho A., 2005}) \quad (1)$$

The maps (see appendix) consist of single point for each of the monitoring station for the seven parameters which are used to define the status of water quality in the Albanian rivers. Depending on the quality class of the waters, 5 different colors are shown, starting with green

for the first quality class (very good) to the brown used to represent the 5th class (very bad). The atlas includes eight maps; in seven are represented single parameters and in the last map is shown the “average” quality class for 30 monitoring stations based on the formula 1. The data source was the MoEFWA report the values are calculated as annual average for all the parameters.

The pH map shows a stable situation in Albanian rivers. All the values of pH content are in the limits 6-9 according to the mandatory values of (EEC/EEAC/EC 78/659) and higher than the level of first quality class of NIVA classification (pH > 6.5).

“Dissolved oxygen (DO) is considered very important parameter indicating the “health” of water” (Miho A., 2005). From the map of DO, in the majority of measurement points the water quality can be classified good and very good according to NIVA classification (DO > 9 mg/l first class, and DO = 6.4-9 mg/l, second class). Critical situation result in 5 monitoring stations: Tirana River (Rinas); Gjola River (Gjola Bridge), Ishem River, Tirana River (Lana) and Gjanica River (Fier). There the quality of the waters is classified from bad to very bad with values lower than 4 mg/l. The minimum value registered is in Tirana River (Lana) with 1.78 mg/l. Low values of DO are consequence of untreated sewage discharges of major cities in Albania such as Tirana (616,396 inhabitants³), Fieri (66,180 inhabitants⁴). Similar situation is presented on the map that shows the chemical oxygen demand (COD). Important parameters indicating the quality of waters are the *nutrients*; including ammonium (NH₄), nitrites (NO₂), nitrates (NO₃) and phosphorus total (P_{total}). The maps for nutrients show a fair situation in most of the monitoring stations (Miho A., 2005). The content of NO₃ in all monitoring stations in Albanian rivers exceeds the limits of EU directive (CEE/CEEA/CE 78/659). The high content of nitrates is related to untreated sewage discharges, agricultural activity, and fertilizers (Miho A., 2005). NO₂ is of relatively minor eco-toxicological significance. In Albanian rivers the content of nitrites is in accordance with limit values of EU directive with exception of Lana River, Gjanica River affected from waste water discharges of major cities such as Tirana and Fier. The content of ammonium and phosphorus are considered important for the quality of fresh waters. From the maps, majority of the monitoring stations result from fair to very bad class. The main contributions to current status are urban discharges, fertilizers, and waste water from tanneries (Floqi et al., 2007; Miho A., 2005). The last map on river water quality represent a general view for 30 monitoring stations based on the formula (1). From the map in 20 out of 30 monitoring stations the quality of water is classified as good, 5 monitoring stations are classified as fair and in 5 monitoring stations the situation is bad.

4.6.2 Bathing water quality

Bathing represents one of the major outdoor recreational activities in Albania for population during the summer months. The atlas deals with the *microbiological quality* of coastal marine recreational waters. Monitoring of bathing waters in Albania started in 2003 in frame of MEDPOL Program (Mjedisit, 2006; POL/WHO, 2008). The bathing water criteria are based on *microbiological parameters*. The local standards for assessing the quality of recreational waters in Albania are the interim criteria for bathing waters adopted in 1985 by the Contracting Parties to the 1976 Barcelona Convention (tab. 4-11). According to these criteria coastal recreational waters in Albania are considered fit for bathing if, on the basis of at least ten samples per year (collected during the bathing season) a concentration of 100 faecal coliforms per 100 ml of seawater is not exceeded in at least 50% of the samples, and a concentration of 1000 faecal coliforms per 100 ml of seawater is not exceeded in at least 90%

³ http://www.tirana.gov.al/common/images/Statistika_9_mujori_08.pdf.

⁴ Report on the Status of the Environment 2005-2007.

of the samples. According to the Barcelona Convention Criteria, bathing areas are classified into two categories based on whether or not such areas comply with the stipulated criteria. To assess the quality of recreational water a network is operated and it includes a total of 72 measurement points in 2007 from 50 in 2005 in the most important beaches (Velipoja, Shengjin, Durres, Kavaje, Vlore, Dhermi, Himare, Borshi and Saranda). In the atlas, bathing water quality is presented in 3 maps: the quality of bathing waters in 2003; the quality of bathing waters in 2007 and the quality of the bathing waters for Durres beach in 2007 due to large number of monitoring stations for this beach (21) (see appendix).

Parameter	Concentration per 100 ml		Minimum number of samples	Method
	Faecal coliforms	not to be exceeded in 50% of the samples		
100 / 100 ml		1000 / 100		

Tab. 4-10 Mediterranean interim criteria for bathing waters
Source: MoEFWA. Report on the Status-of-the-Environment 2005-2007

In 2003, from the total number of 50 monitoring stations, 38% results in compliance with standards for the two values. In 40% of the cases at least one of the parameters exceeded the limits, while 22% of the monitoring stations result non compliant with standards. In 2007 the number of monitoring stations increased up to 72. From the map can be noticed a melioration of the situation. 65% of monitoring stations result in compliance with requested standards, in 24% of monitoring stations one of the parameters exceeds the standards and the number of stations which not comply with classification criteria decreased to 11%.

Variation in time for the same monitoring stations can be shown from the maps as well. Major improvement is noticed in the northern part of Albania (Velipoje beach and Shengjini beach), in central part in Kavaja beach, in south in Vlora beach, while in Himara beach, Dhermiu beach, Borshi beach the situation shows stability and the bathing waters there are considered the healthiest in Albania (*Ministria e Mjedisit, 2008*). The quality of Albanian beaches is determined by several factors. Main source of the pollution in Albania are domestic sewage discharges (the Albanian cities along the coast have no municipal wastewater treatment plant); rivers and their tributaries; increment of population in the coastal zone; construction (legal and illegal) nearby the coast and discharges directly in the sea water (principally in Durres and Kavaja beach); pollution derived from the atmosphere; pollution from bathers (Geldreich, 1996; *Ministria e Mjedisit, 2008*; POL/WHO, 2008).

Chapter 5

Conclusions and Future Work

5.1 Conclusions

The results of this study are summarized in the framework of research questions on which this work is based on. They are presented as below.

Research question 1: In which category should we classify the quality of Albanian environment? How does it compare to European standards?

Based on the available data, in general we can say that the quality of the Albanian environment *is comparable* with the standards (including Albanian and EU standards).

For the *air quality*, 4 out of 6 parameters (NO₂, SO₂, O₃ and lead) result within standards. Critical problem for the main urban areas included in the monitoring program present the content of SPM and PM₁₀ in the air. The levels of particulate matter (PM₁₀) and total suspended particulate matter (SPM) are alarming, exceeding several times Albanian and the European Union standards.

For the *noise* no fixed limitations exists, but the population on the urban areas is highly exposed. This is true in regard to the fact that majority of the monitoring stations is located on the points characterized by high density of traffic.

A significant step has been made for the conservation of the nature. By the end of 2007, *protected areas* covers 10.42% of the surface of Albania, but still not comparable with EU member states.

Forest fires present a common problem in Albania particularly on summer months. Moreover, the majority of the forest fires in Albania are caused by human factors.

Municipal waste presents a major problem in Albania. The average annual quantity per capita shows an increment. Another important urban waste problem related is the pollution of soil, waters and air due to bad management of the urban wastes.

The water quality of the Albanian rivers shows stability. Despite this the result has to be taken with great care due to the lack of the data for other parameters such as suspended matter, heavy metal content which could affect the quality of the waters. Physic-chemical parameters show good quality for Albanian rivers within the standards. Only in particular rivers the situation is presented critical. Nutrients represent a major problem for Albanian rivers particularly nitrogen and phosphorous. The situation is critical in the rivers downstream due to the high concentration of population and the human activity in big towns.

Bathing water quality is important because bathing represent one of the major recreational activities in Albania on summer months. According to the standards used to evaluate the

quality of bathing waters 65% of monitoring stations result in compliance with, while 11% of the monitoring stations exceed the standards.

Research question 2: What are the main environmental problems in Albania?

According to the work and literature used we can identify some major problems in regard to environment.

- a) Large quantity of the urban wastes dispersed without any criteria and the insufficient management.
- b) Air quality in urban areas especially SPM and PM₁₀ content in the air.
- c) High content of nutrients in rivers, mainly on their downstream due to sewage discharges and discharges by the industrial and agricultural sector.
- d) High microbial pollution in some monitoring points for bathing waters. Despite that the areas are being used regularly for bathing without alerting the population of the risk.
- e) Damage of the forest due to forest fires and illegal cutting.
- f) Erosion (not presented in the Atlas due to the lack of data).

5.2 Discussion

The presented work has own limitations due to the lack of data. The monitoring of the air quality includes only the major cities (7 out of 65). Furthermore the number of monitoring network includes few stations, 15 in total (Tirana has 7 monitoring stations). This reduces the possibility to have better and complete information. The same discussion is valid for the urban noise also. We suggest an increment of monitoring stations as well as the number of cities in monitoring program. For more precise assessment is very important to have data showing the respective weight for each contributor on air quality.

The data situation is complicated concerning urban wastes. The data are reported for municipalities and prefectures, while the calculations are being made within regard of prefectures. Furthermore, the data concerning the population number are often contradictory due to discrepancy on the figures between different data sources.

River water quality data are more complete, but several parameters are missing or not reported such as total suspended solids (TSS) and the data on heavy metals content, considered important to judge the state of health for the river waters.

The discussion is a bit different for the bathing waters. There are necessary some improvements especially for the standards. According to recent report the local standards for assessing the quality of recreational waters in Albania are the interim criteria for bathing waters adopted in 1985 by the Contracting Parties to the 1976 Barcelona Convention described in the previous chapter. To compare the quality of Albanian bathing waters with the EU member states we suggest using as standards the Directive 76/160/EEC concerning the management of bathing water quality.

5.3 Future work

The environment is a very broad term that includes many other features not presented in the current work. In order to have a complete panorama concerning the environment we recommend some points that could be interesting for further studies.

- Online publishing of the work to make it available for all groups of interest, specialists as well as for non-specialist people;

- Enriching the current Atlas with more topics such as erosion, soil contamination, industrial hotspots;
- It could be with great interest to enrich the Atlas with maps and graphics representing the environmental quality before 1990 in order to allow the comparisons and to have a better understanding for the trend of the environment.

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Ministry of the Environment, Forestry and Water Administration (<http://www.moe.gov.al/>)

European Environmental Agency (<http://www.eea.europa.eu/>)

Agency of Environment and Forestry (<http://www.flag-al.org/aefindex.html>)

Institute of Statistics of Albania (INSTAT) (<http://www.instat.gov.al>)

Ministry of Economy, Trade and Energy (METE) (<http://www.mete.gov.al>)

Albanian Center for Official Publications (COP/QPZ) (<http://www.legjislacionishqiptar.gov.al/>)

United Nation Environment Programme (UNEP) (<http://ozone.unep.org/>)

The World Bank (<http://go.worldbank.org/2OJPCVB1E0>)

Yale University. Center for International Earth Science Information Network (CIESIN) Columbia University. <http://epi.yale.edu>

<http://glossary.eea.europa.eu>

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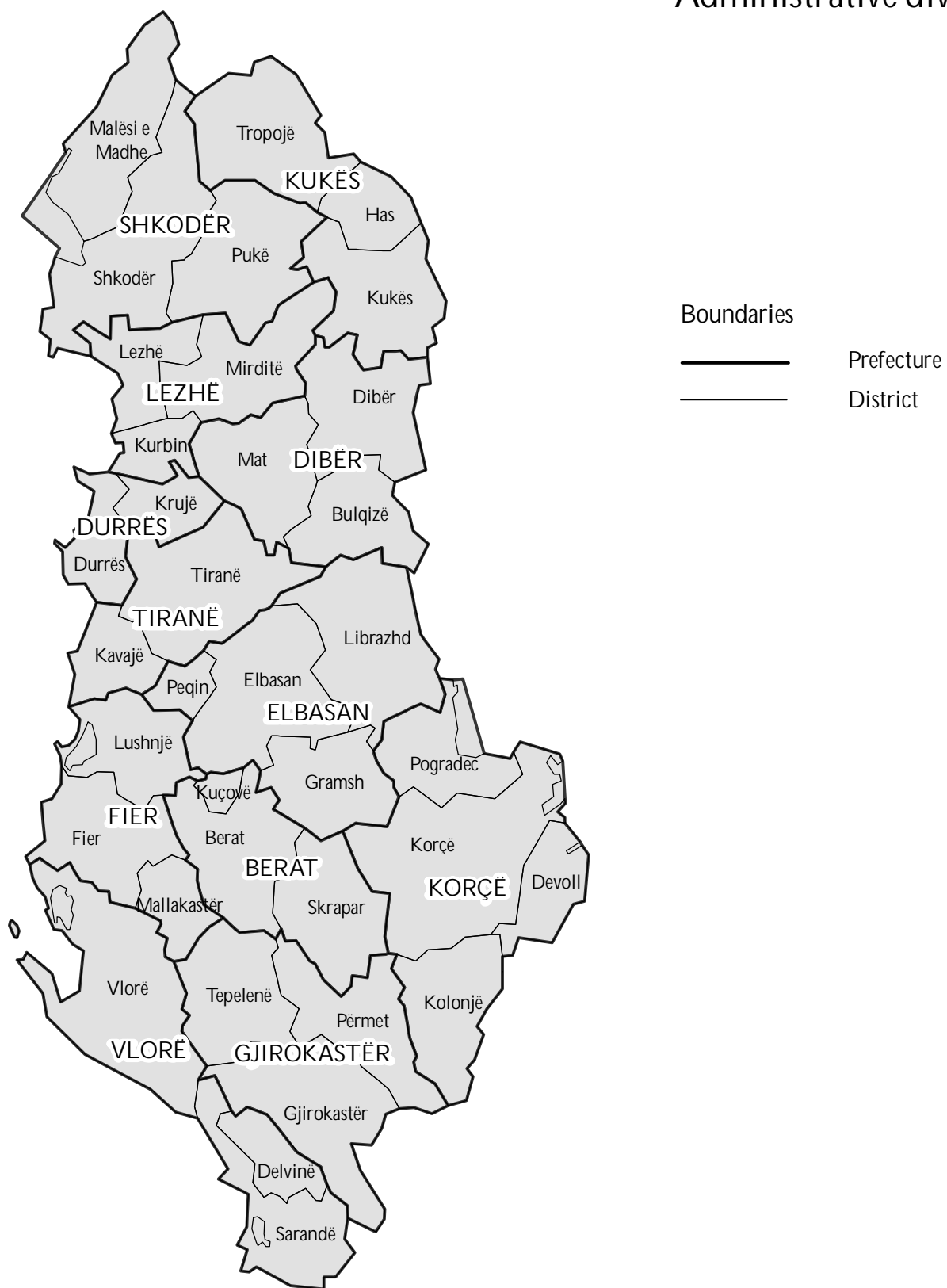
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Appendix

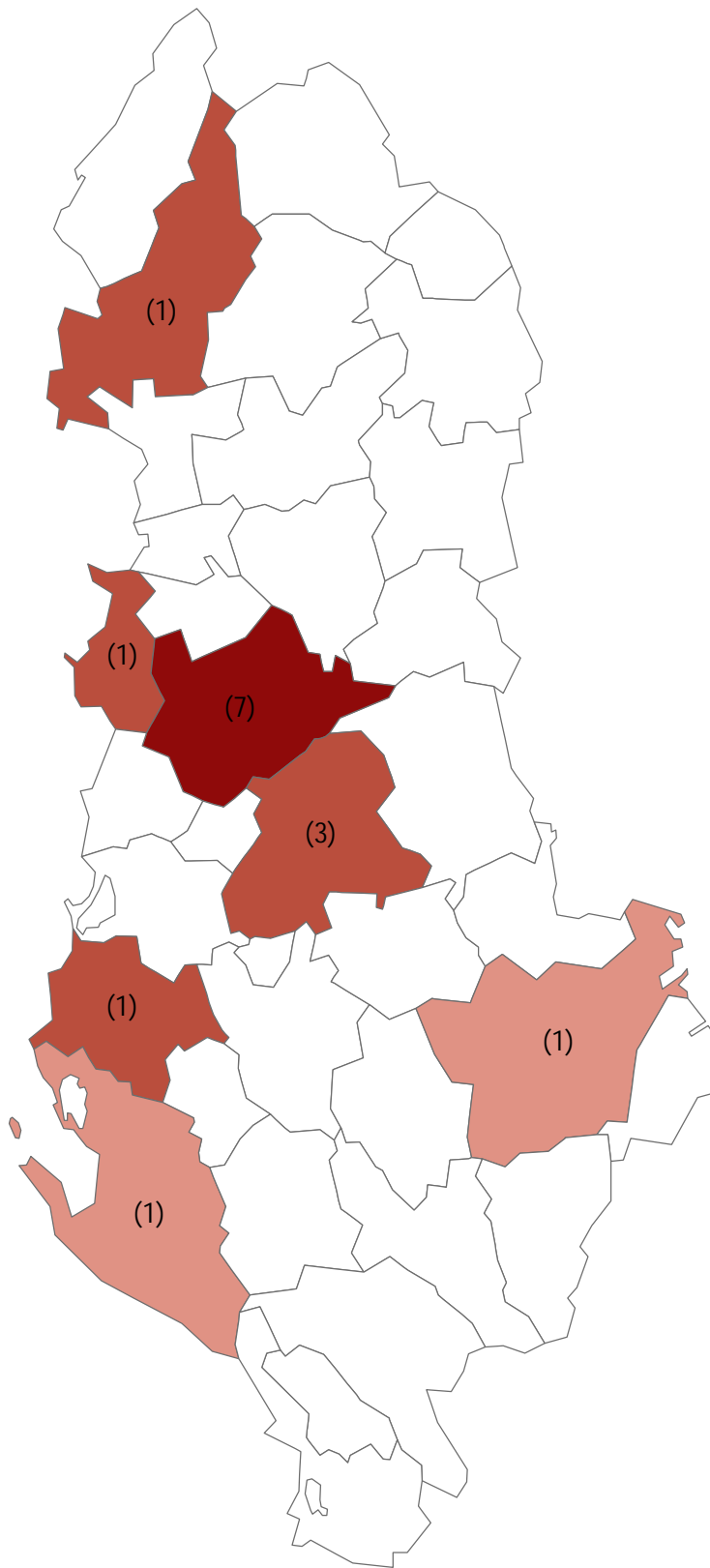
Administrative division



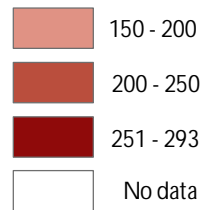
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Atlasi gjeografik i popullsisë së Shqipërisë

Urban Air Quality

Suspended Particulate Matter 2007

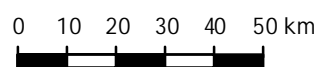


Content in $\mu\text{g}/\text{m}^3$



(1) Number of Measurement points

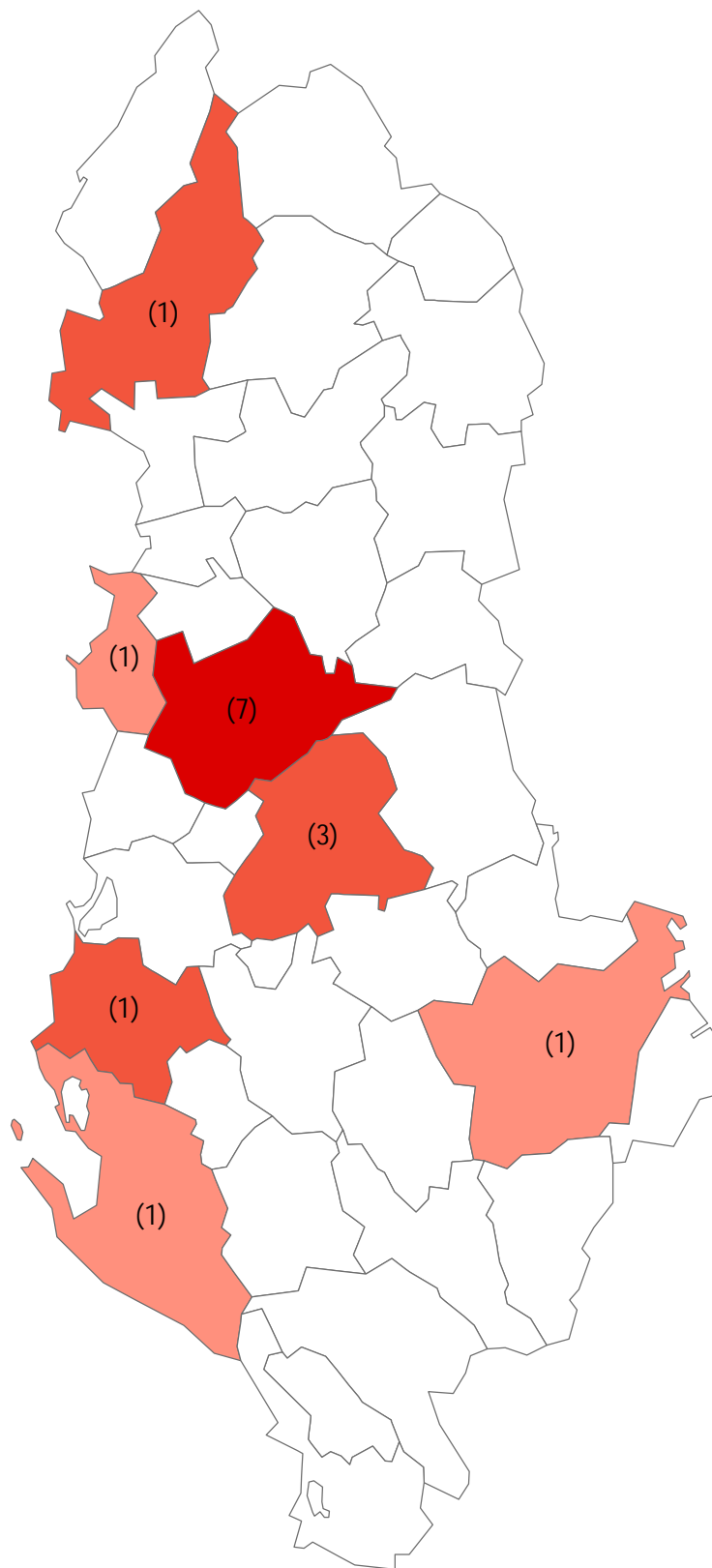
European Union standard $90 \mu\text{g}/\text{m}^3$



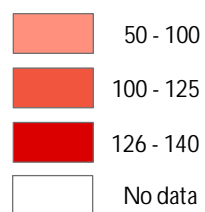
Source:
Atlasi gjeografik i popullsisë së Shqipërisë
Ministry of Environment, Forestry
and Water Administration:
Status of the Environment 2005-2007

Urban Air Quality

Particulate Matter (PM10) 2007

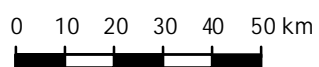


Content in $\mu\text{g}/\text{m}^3$



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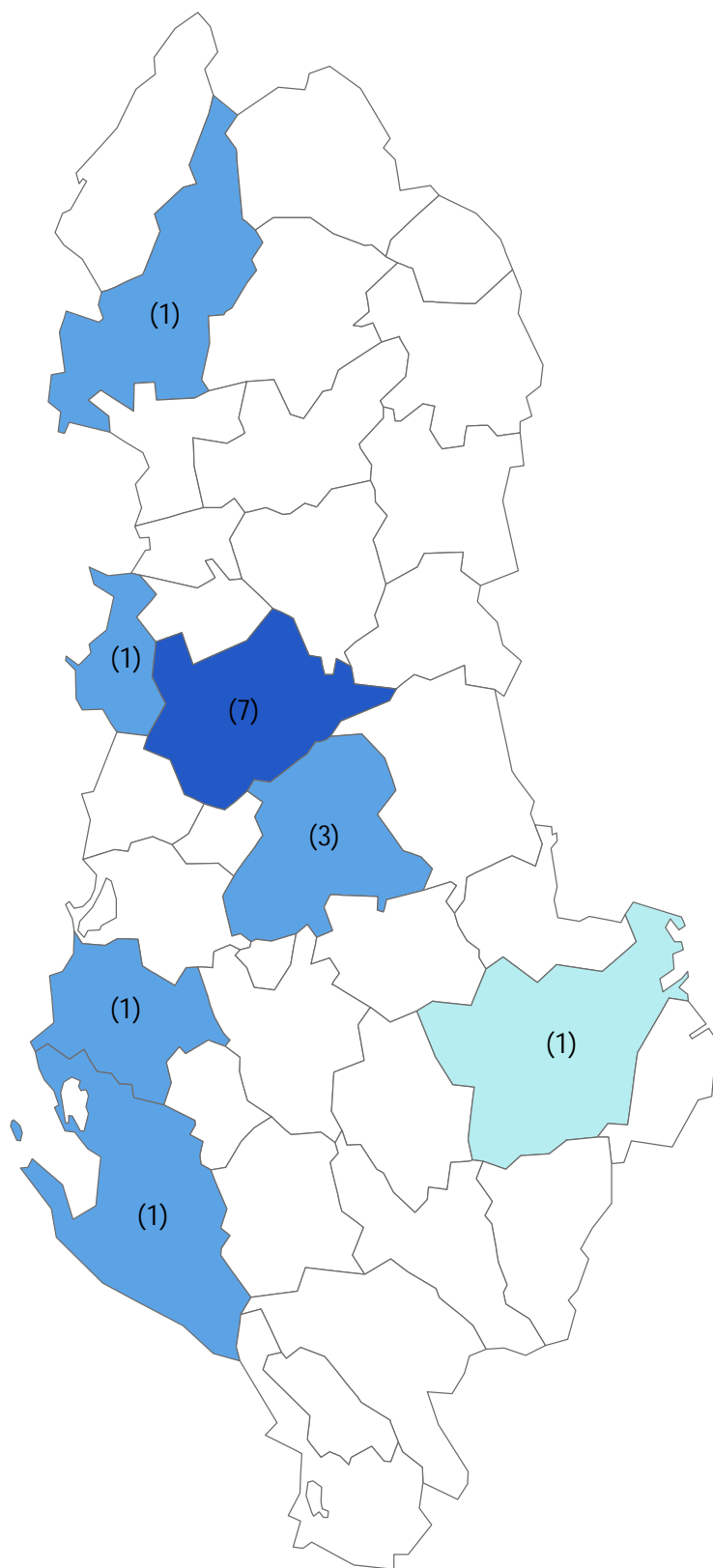
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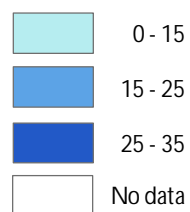
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Ministry of Environment, Forestry
and Water Administration:
Status of the Environment 2005-2007

Urban Air Quality

Nitrogen Dioxide - 2007

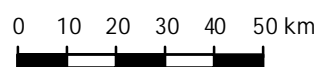


Content in $\mu\text{g}/\text{m}^3$



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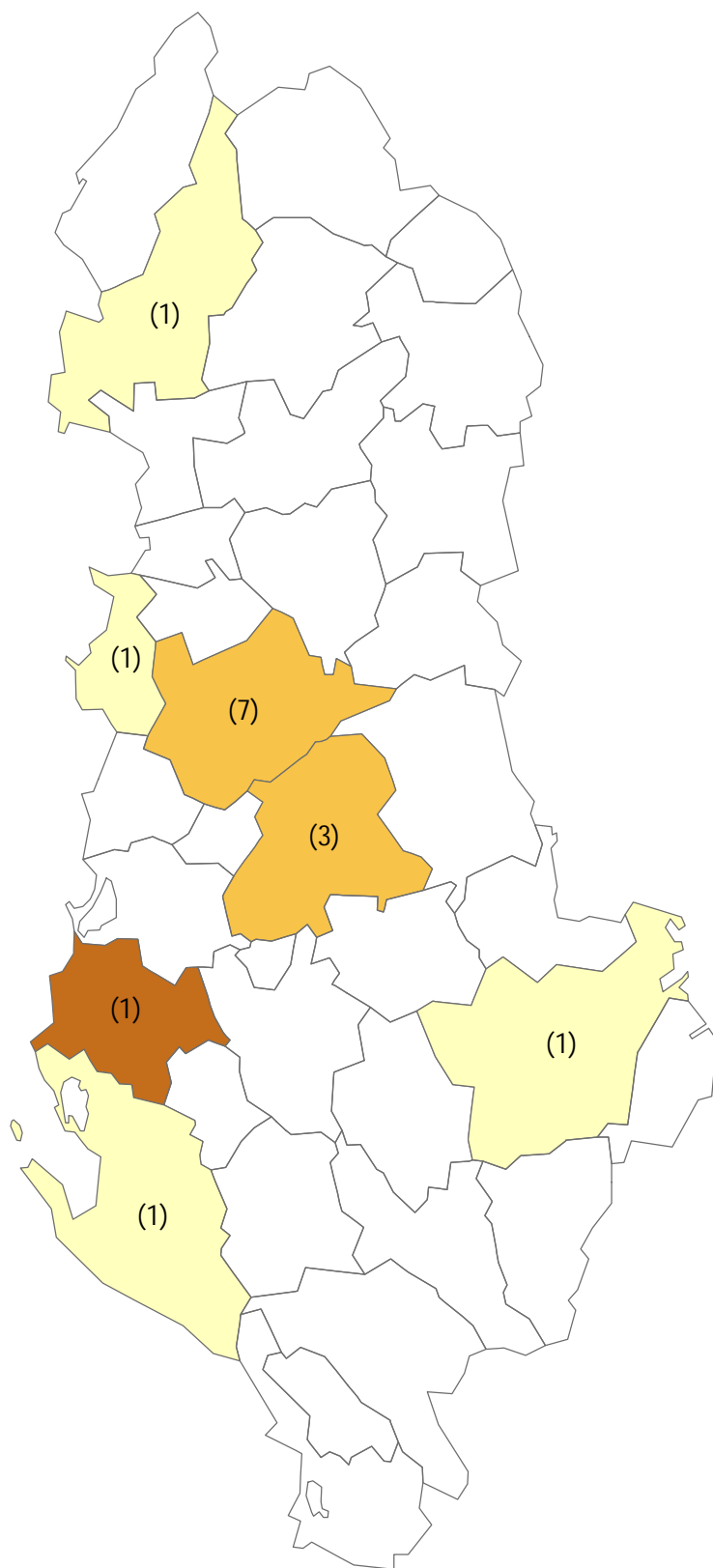
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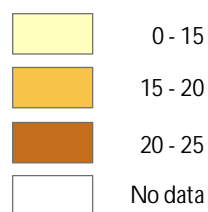
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Ministry of Environment, Forestry
and Water Administration:
Status of the Environment 2005-2007

Urban Air Quality

Sulfur Dioxide - 2007

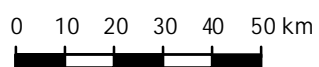


Content in $\mu\text{g}/\text{m}^3$



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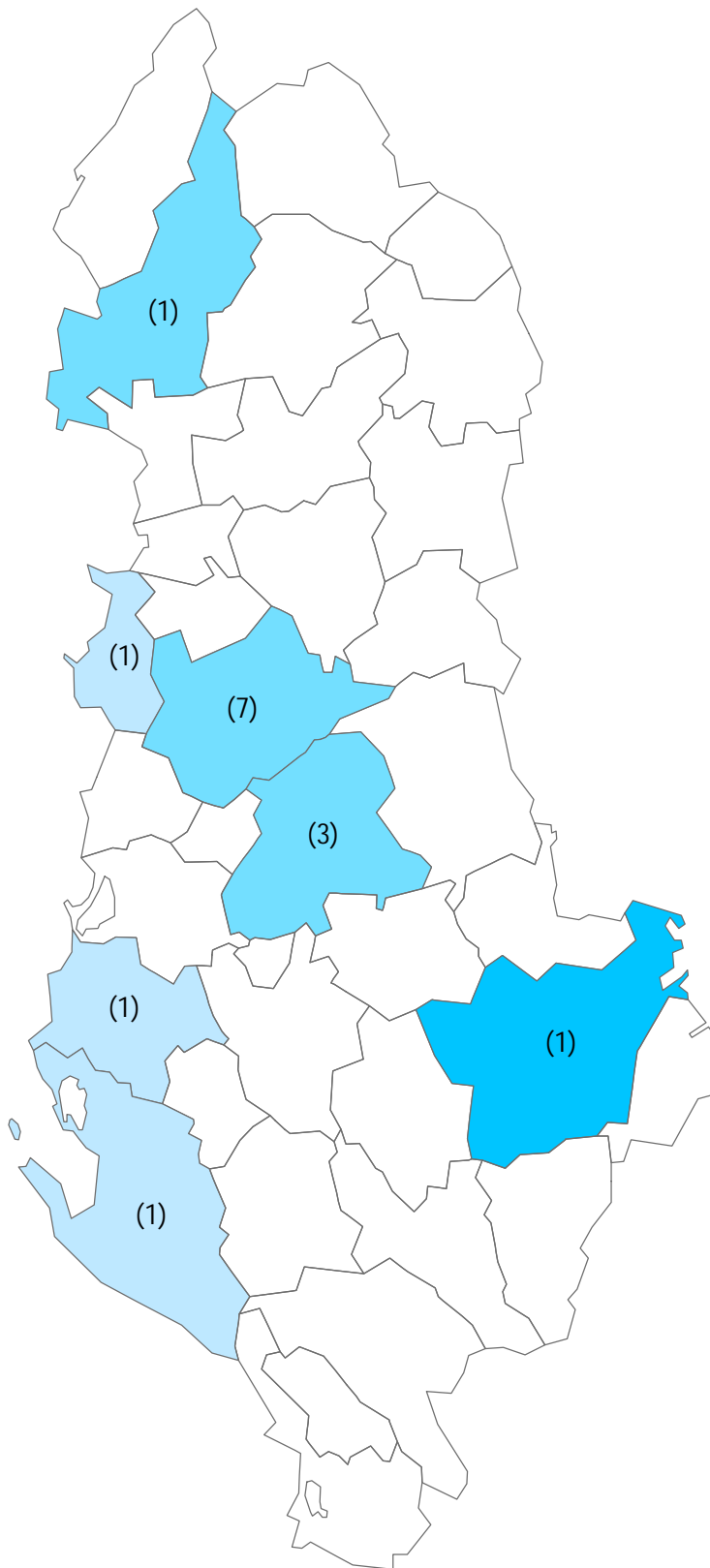
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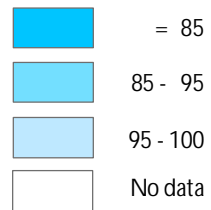
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Ministry of Environment, Forestry
and Water Administration:
Status of the Environment 2005-2007

Urban Air Quality

Ozone - 2007

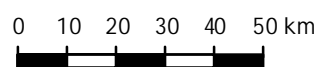


Content in $\mu\text{g}/\text{m}^3$



(1) Number of Measurement points

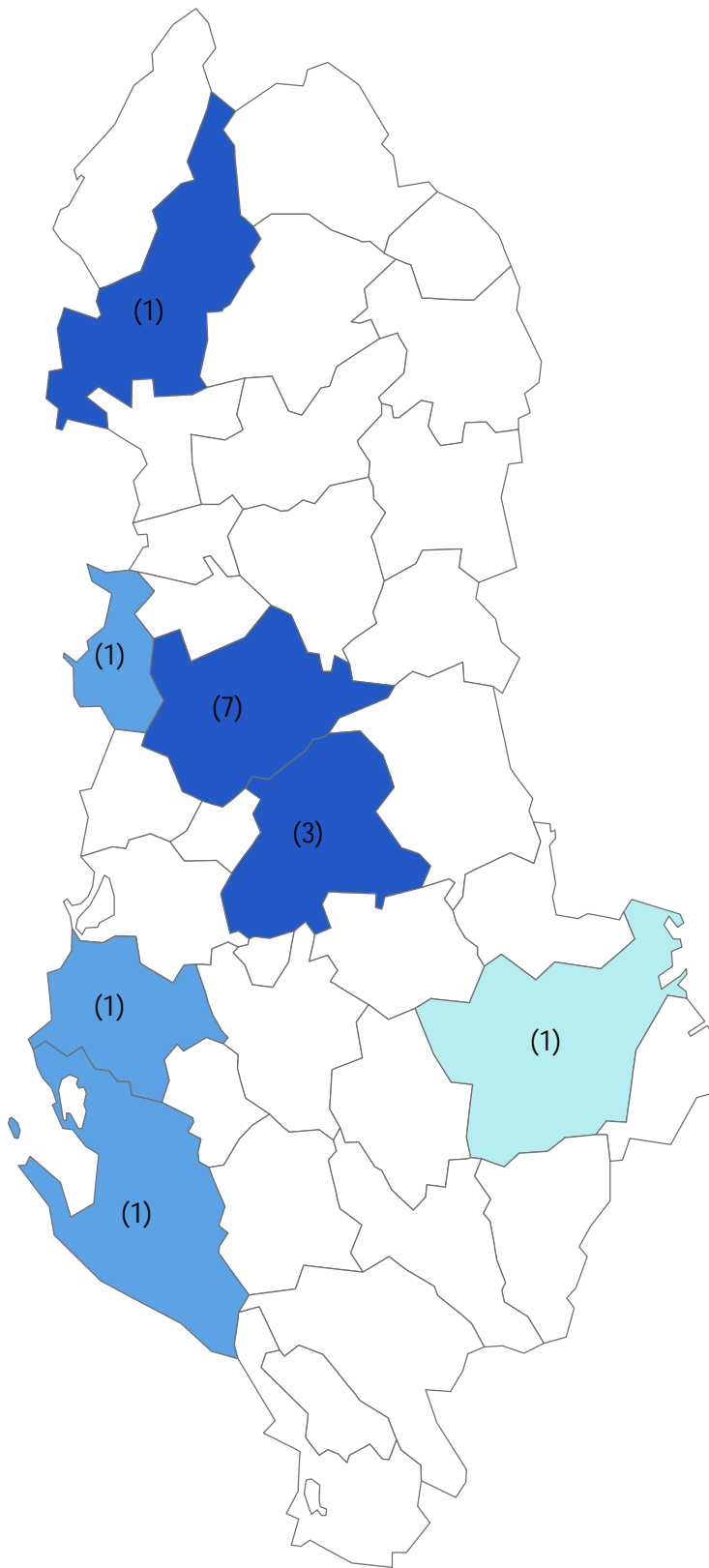
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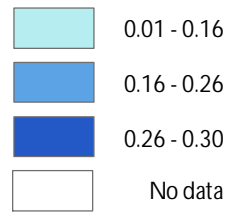
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Ministry of Environment, Forestry
and Water Administration:
Status of the Environment 2005-2007

Urban Air Quality

Lead - 2007



Content in µg/m³



(1) Number of Measurement points

European Union standard 0.5 µg/m³

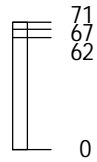
0 10 20 30 40 50 km

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Ministry of Environment, Forestry
and Water Administration:
Status of the Environment 2005-2007

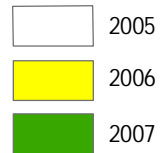
Urban Noise

Day values

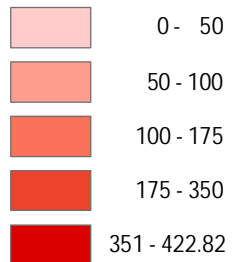
Values in decibel (dB)



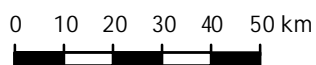
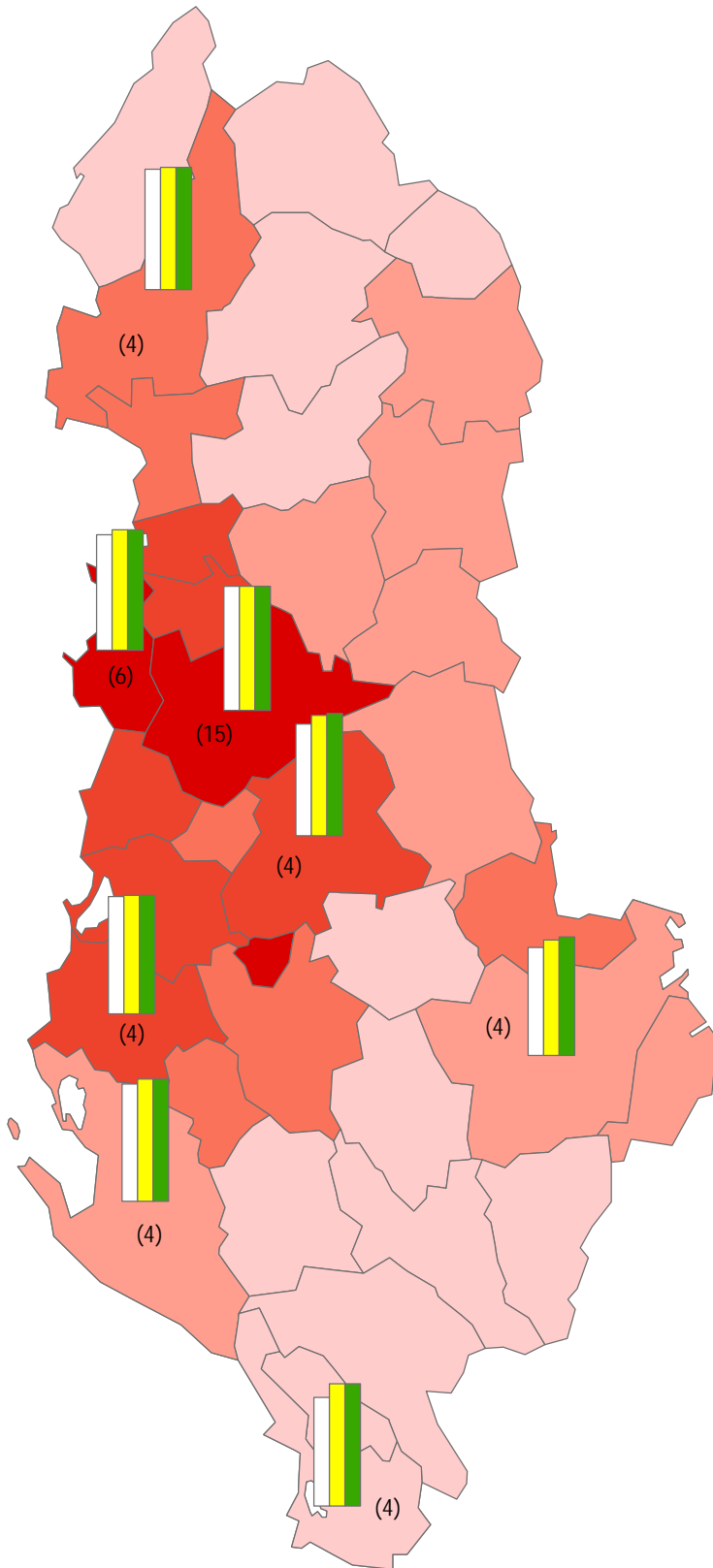
Years



Population Density (2004)
(inh/sq.km)



(4) Number of Measurement points



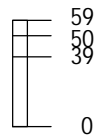
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Status of the Environment 2005-2007
INSTAT

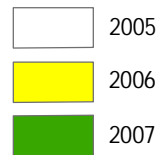
Urban Noise

Night values

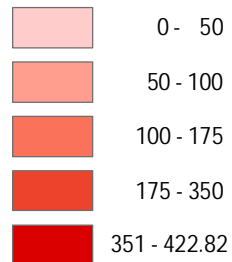
Values in decibel (dB)



Years



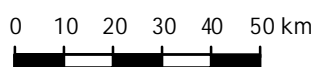
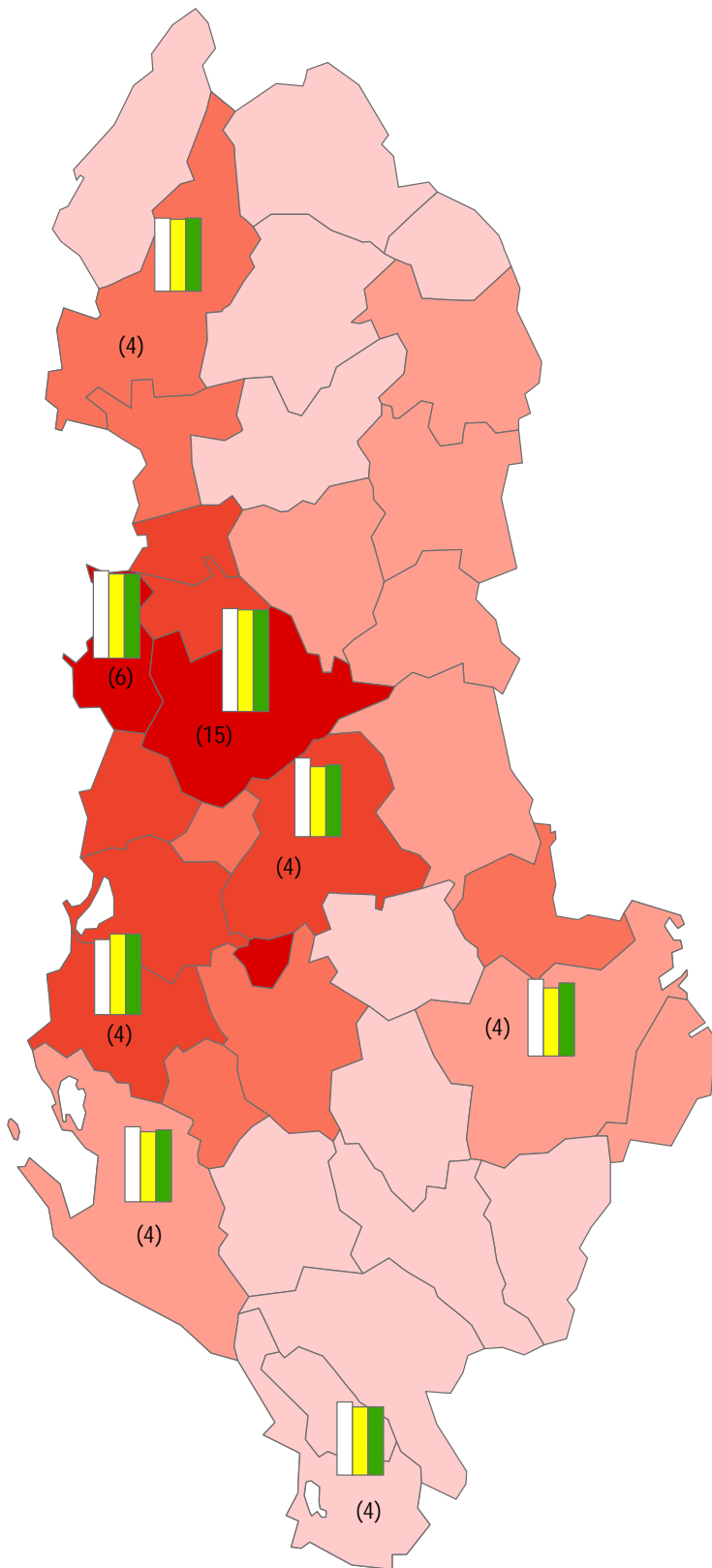
Population Density (2004)
(inh/sq.km)



(4) Number of Measurement points

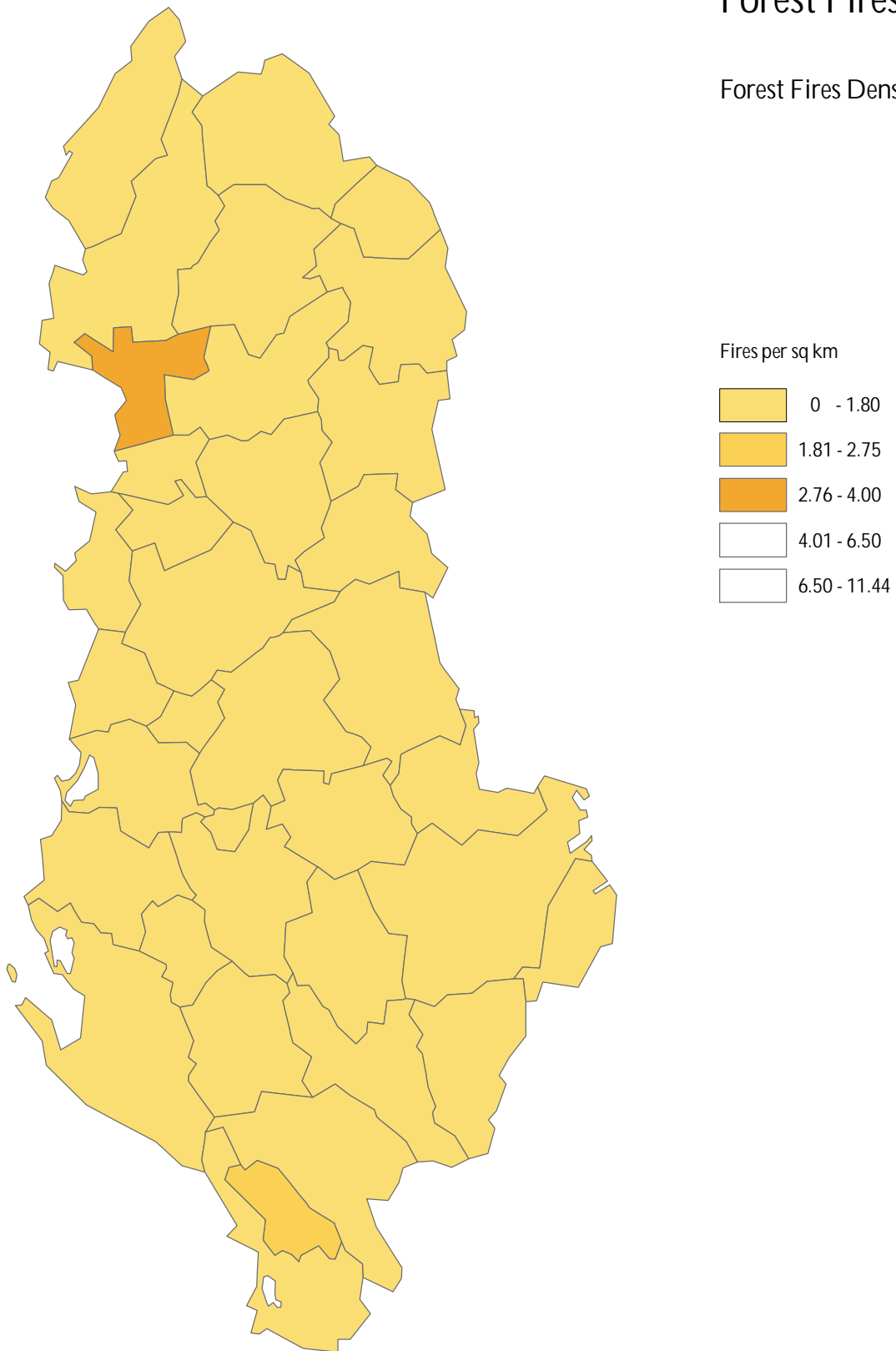
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Status of the Environment 2005-2007
INSTAT



Forest Fires

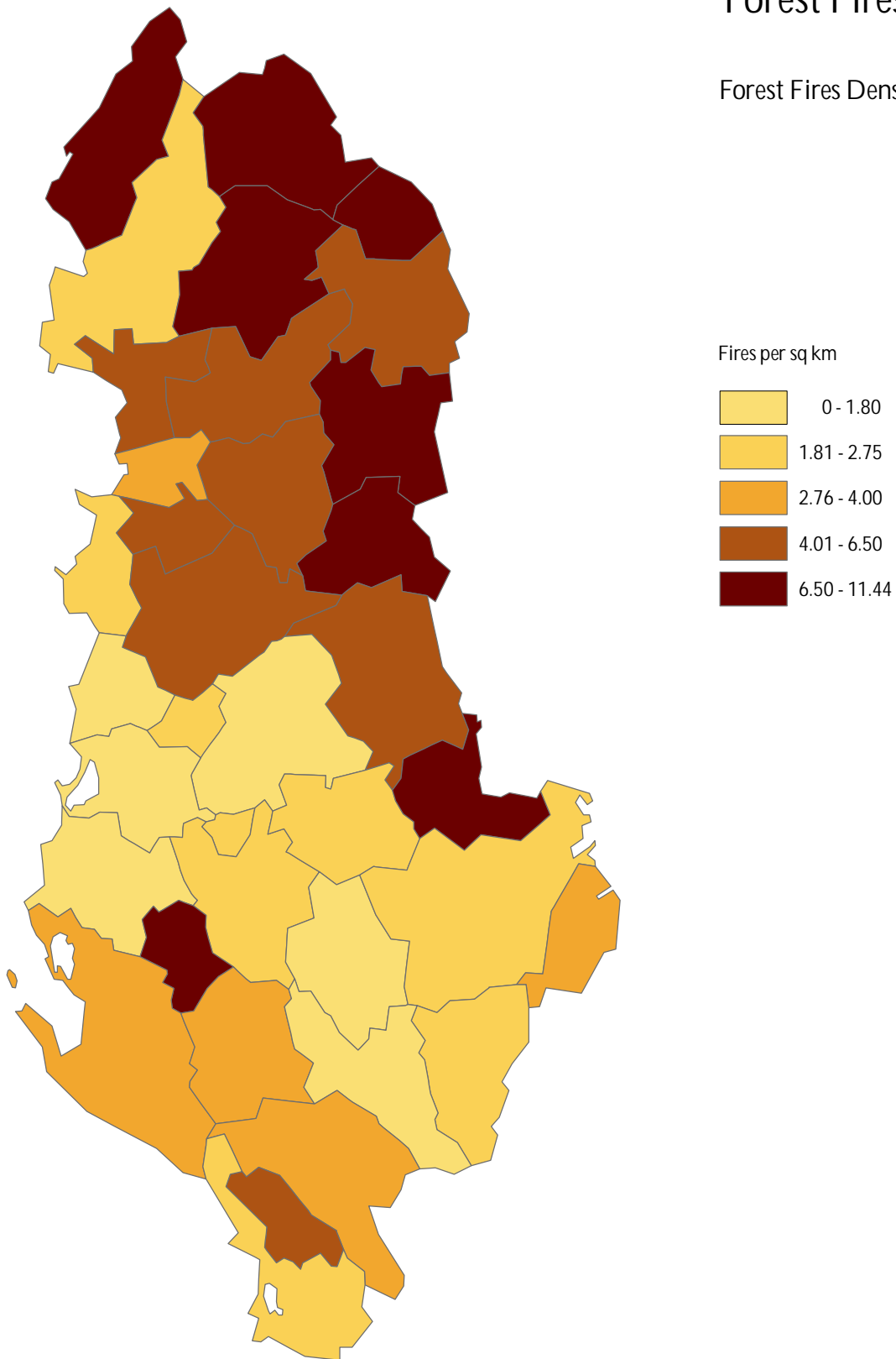
Forest Fires Density 2006



Source:
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Agency of Environment and Forestry

Forest Fires

Forest Fires Density 2007

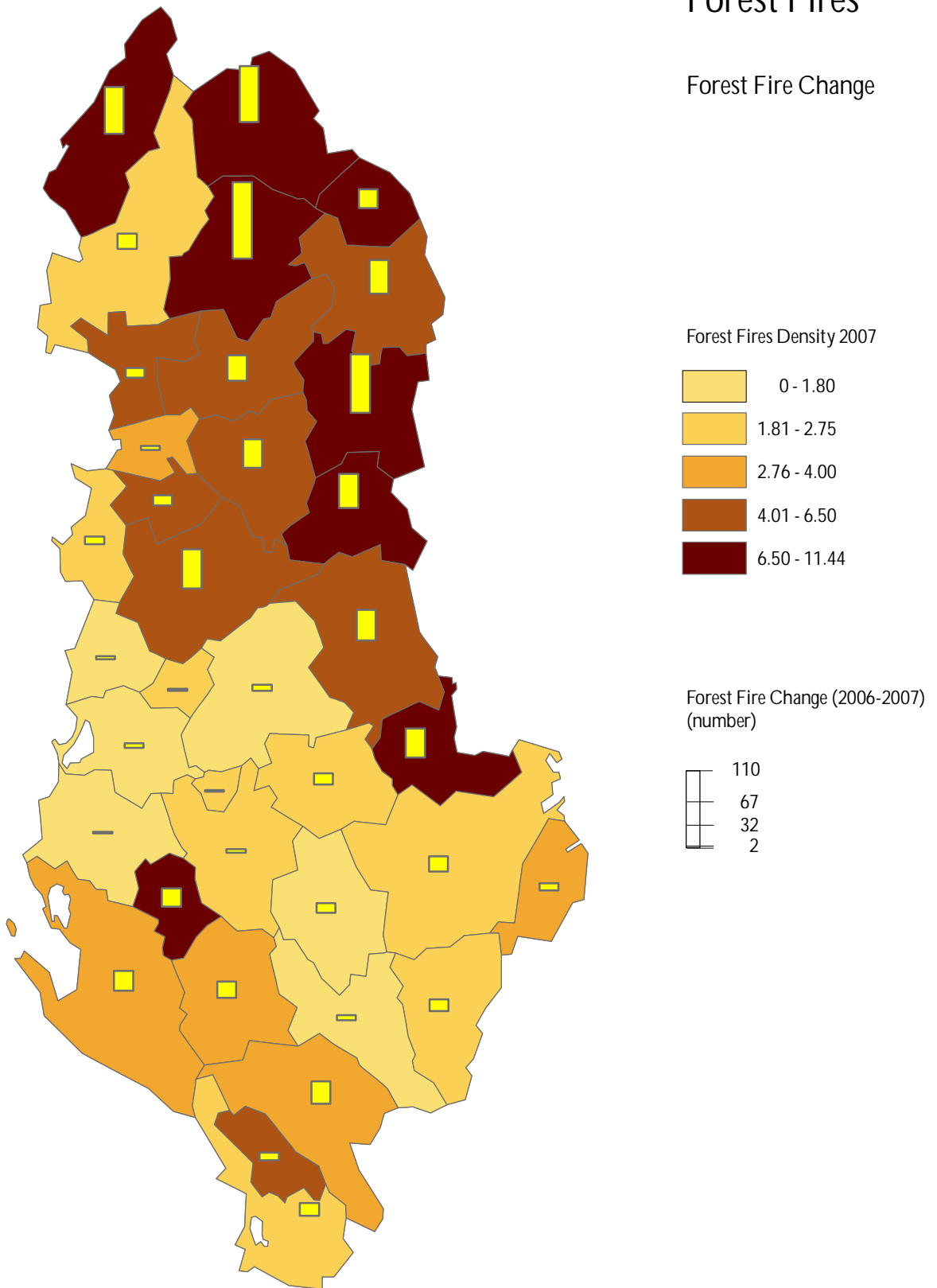


0 10 20 30 40 50 km

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Agency of Environment and Forestry

Forest Fires

Forest Fire Change

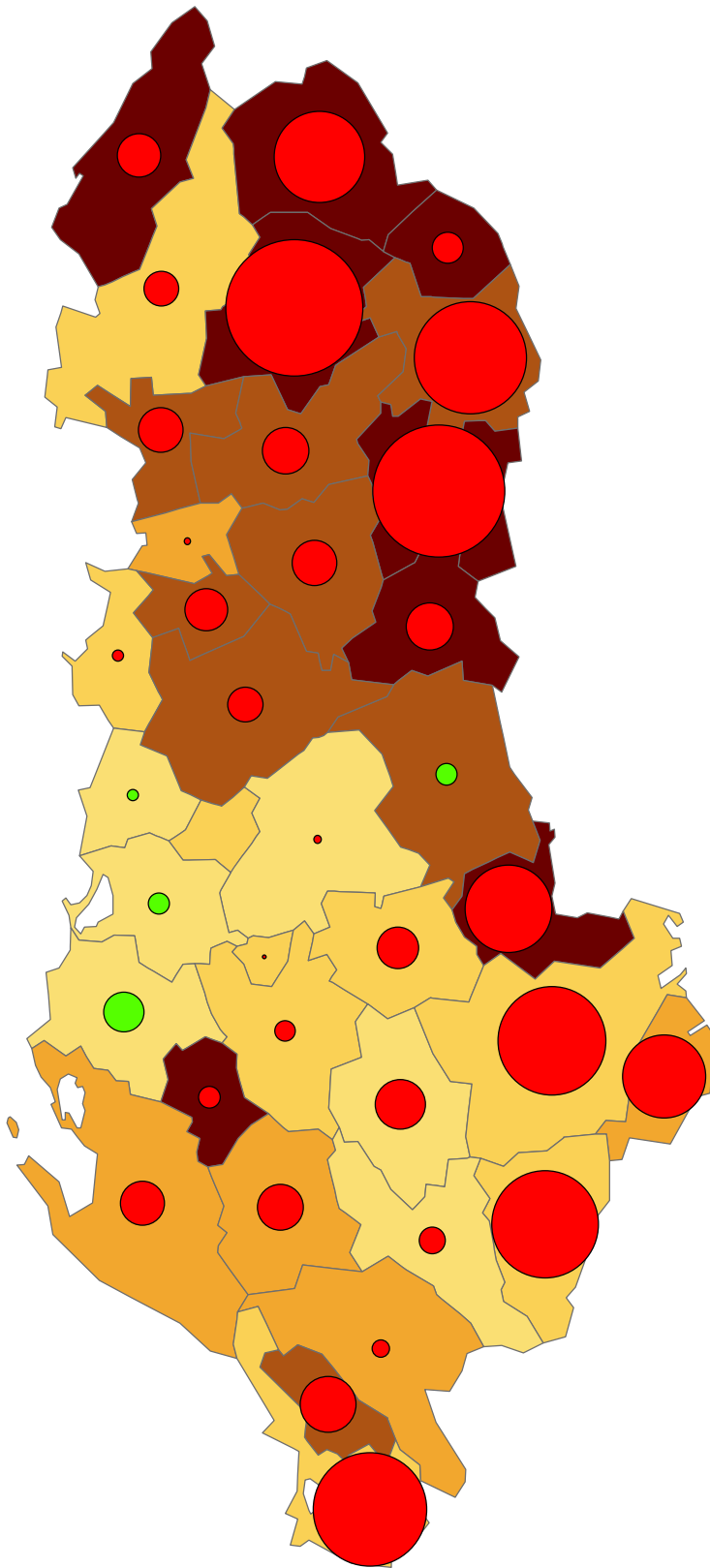


0 10 20 30 40 50 km

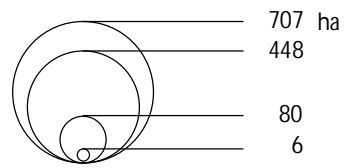
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Agency of Environment and Forestry

Forest Fires

Burned Area Forest

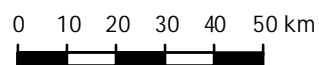
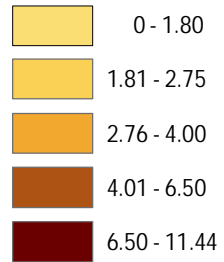


Change in Burned Area 2006-2007



Increasing  Decreasing

Fires per sq km for 2007

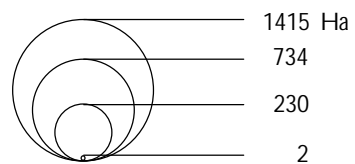


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Forest Fires

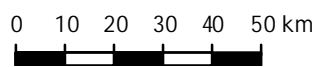
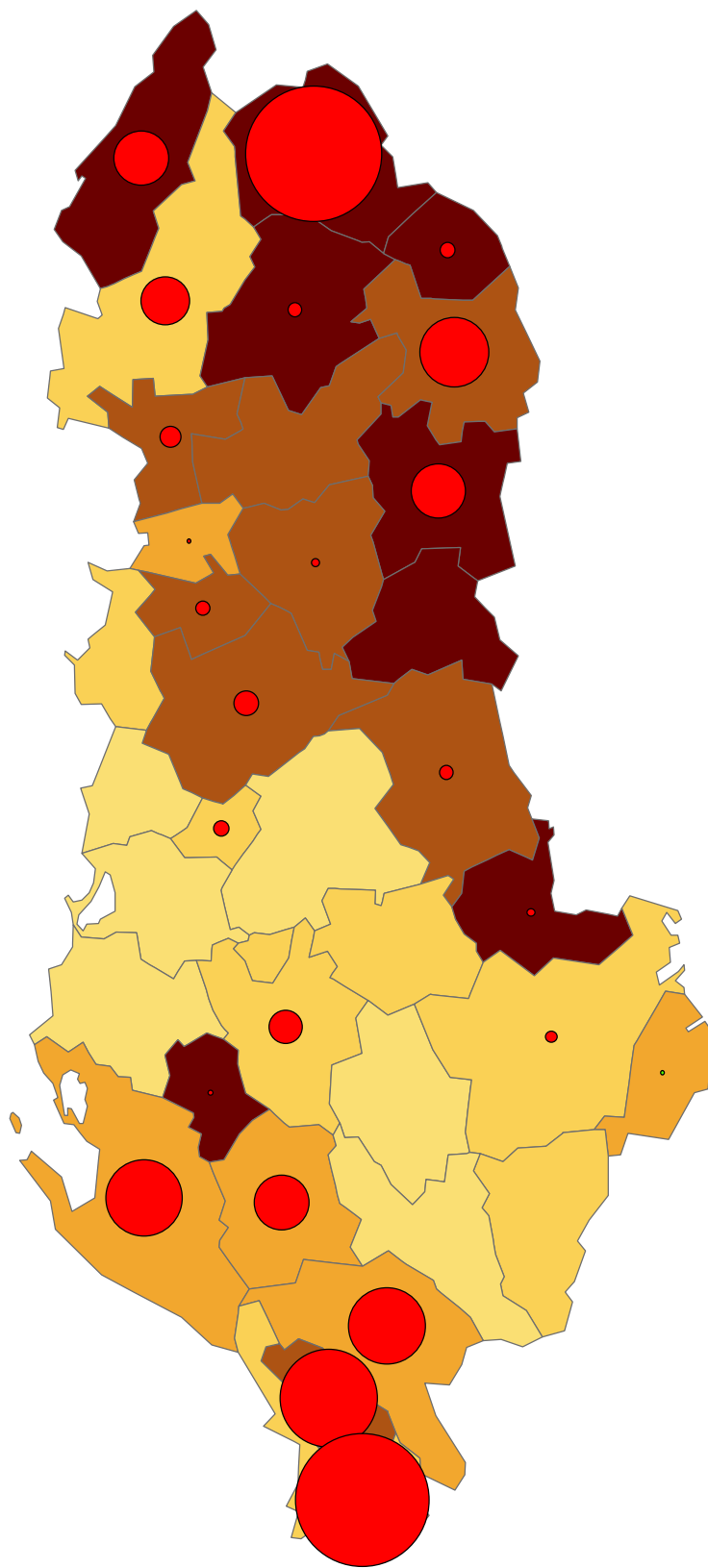
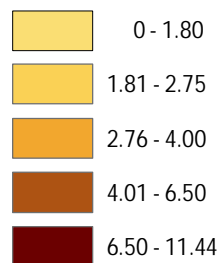
Burned Area Pastures

Change in Burned Area 2006-2007



Increasing  Decreasing

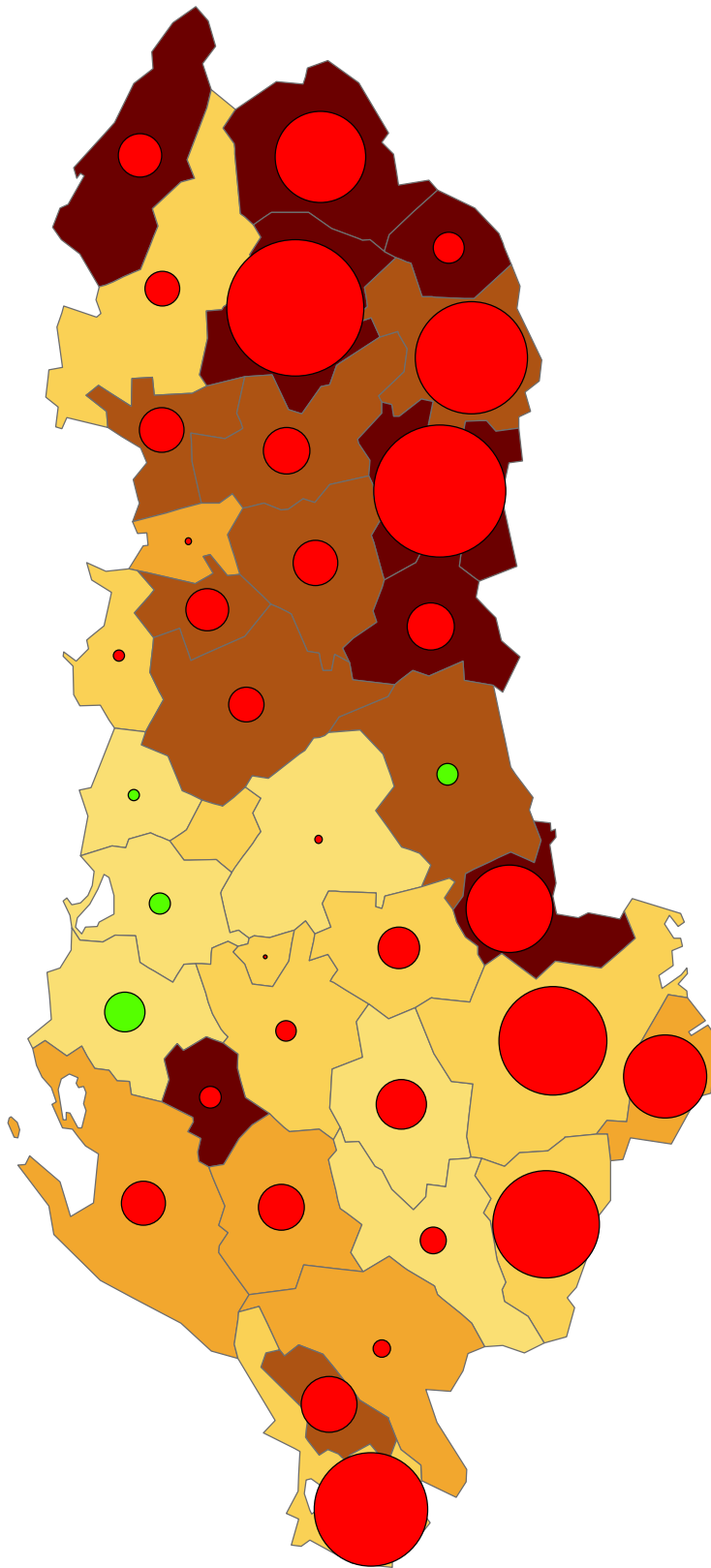
Fires per sq km for 2007



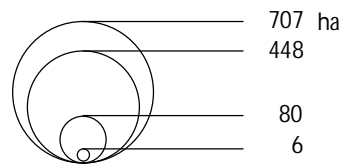
Source:
Atlasi gjeografik i popullsisë së Shqipërisë
Agency of Environment and Forestry

Forest Fires

Burned Area Forest

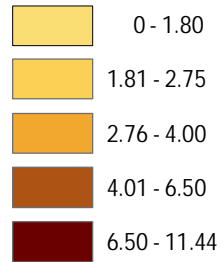


Change in Burned Area 2006-2007



Increasing  Decreasing

Fires per sq km for 2007



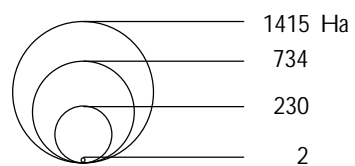
0 10 20 30 40 50 km

Source:
Atlasi gjeografik i popullsisë së Shqipërisë
Agency of Environment and Forestry

Forest Fires

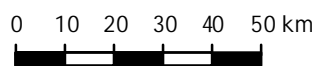
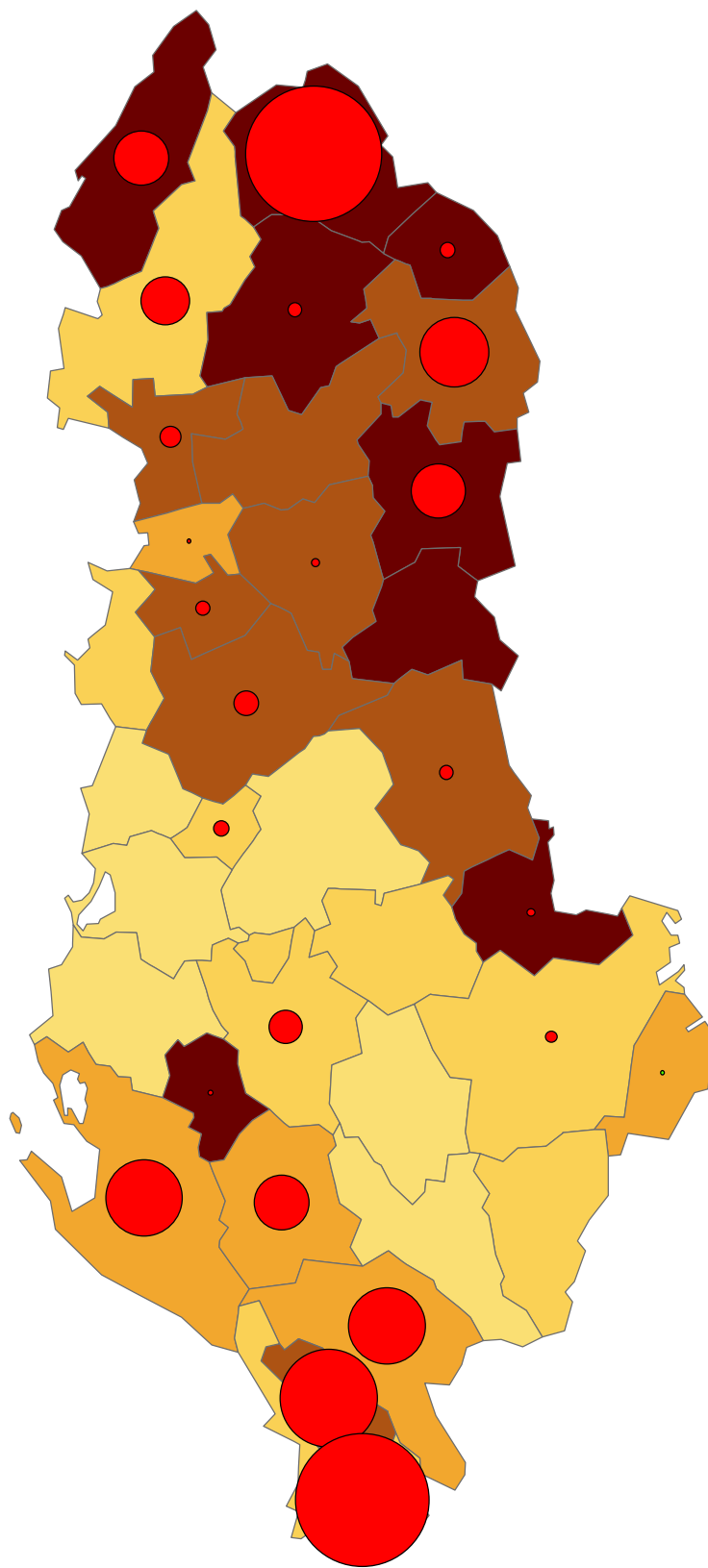
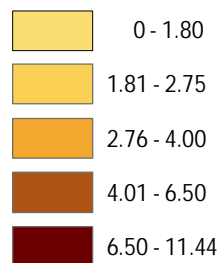
Burned Area Pastures

Change in Burned Area 2006-2007



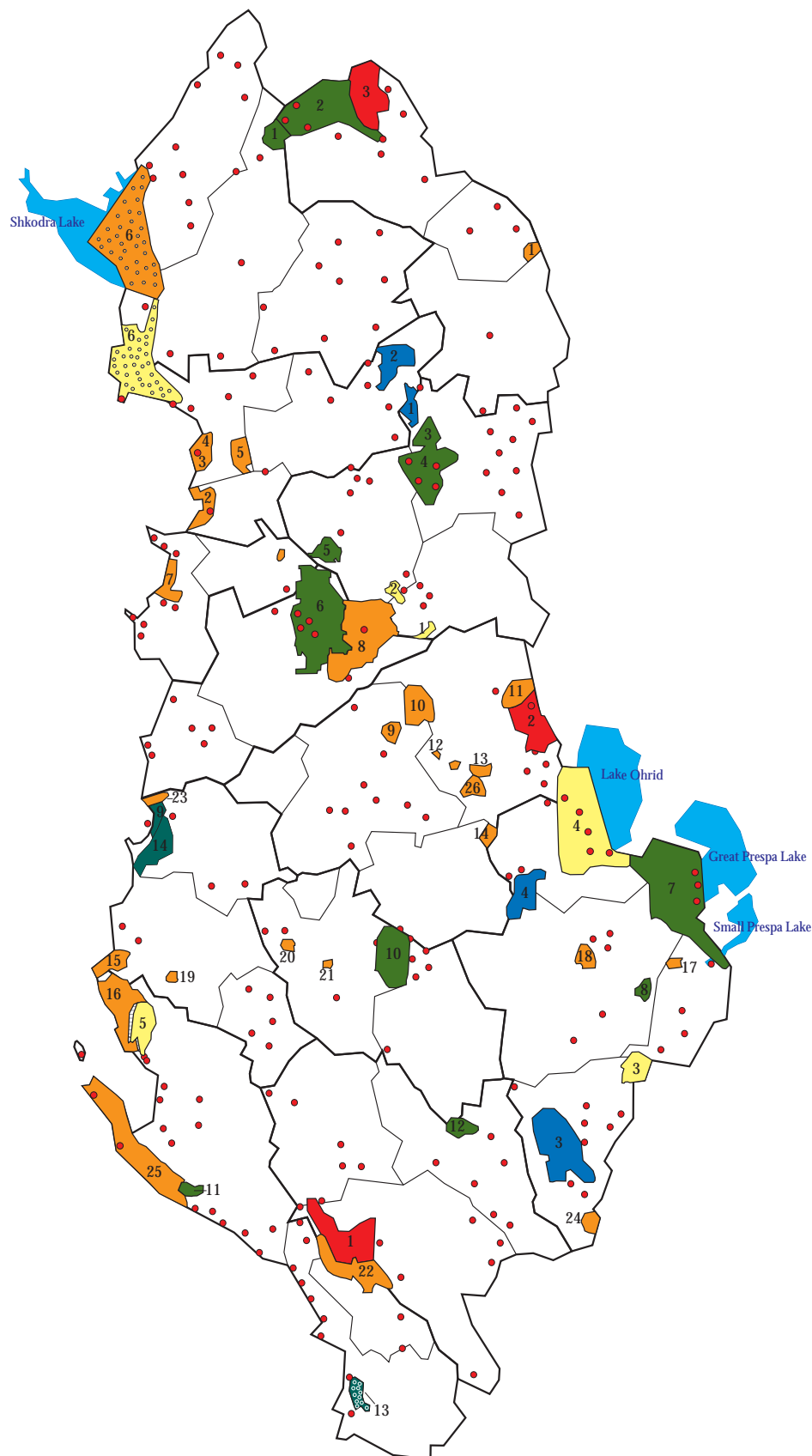
Increasing  Decreasing

Fires per sq km for 2007



Source:
Atlasi gjeografik i popullsisë së Shqipërisë
Agency of Environment and Forestry

Protected Areas



• Nature Monuments

Strict Nature Reserve

- 1. Kardhiq
- 2. Gashi River
- 3. Rrajce

National Parks

- 1. Theth
- 2. Valbona
- 3. Lura
- 4. Zall-Gjocaj
- 5. Qafe Shtame
- 6. Dajt
- 7. Prespa
- 8. Drenova Fir
- 9. Divjaka Pine
- 10. Tomorr
- 11. Llogara
- 12. Hotova Fir
- 13. Butrint
- 14. Karavasta Lagoon

Habitat/Species Management Area

- 1. Tej Drini
- 2. Fushe Kuqe
- 3. Kune
- 4. Vaine
- 5. Berzane
- 6. Shkodra Lake
- 7. Rrushkull
- 8. Qafe Molle
- 9. Qafe Bush
- 10. Kukurman
- 11. Qarrishte
- 12. Sopot
- 13. Polis
- 14. Stravaj
- 15. Pisha Poro Fier
- 16. Pisha Poro Vlore
- 17. Cangonj
- 18. Krastafillak
- 19. Levan
- 20. Balloll
- 21. Bogove
- 22. Rrezome
- 23. Kular
- 24. Shelegur
- 25. Karaburun
- 26. Dardhe

Protected Landscape

- 1. Bize
- 2. Bredhet
- 3. Nikolicë
- 4. Pogradec
- 5. Narta Lagoon
- 6. Bune - Velipoje

Managed Resources Protected Areas

- 1. Luzni Bulac
- 2. Orosh
- 3. Piskal Shqerri
- 4. Guri i Nikes

RAMSAR Sites

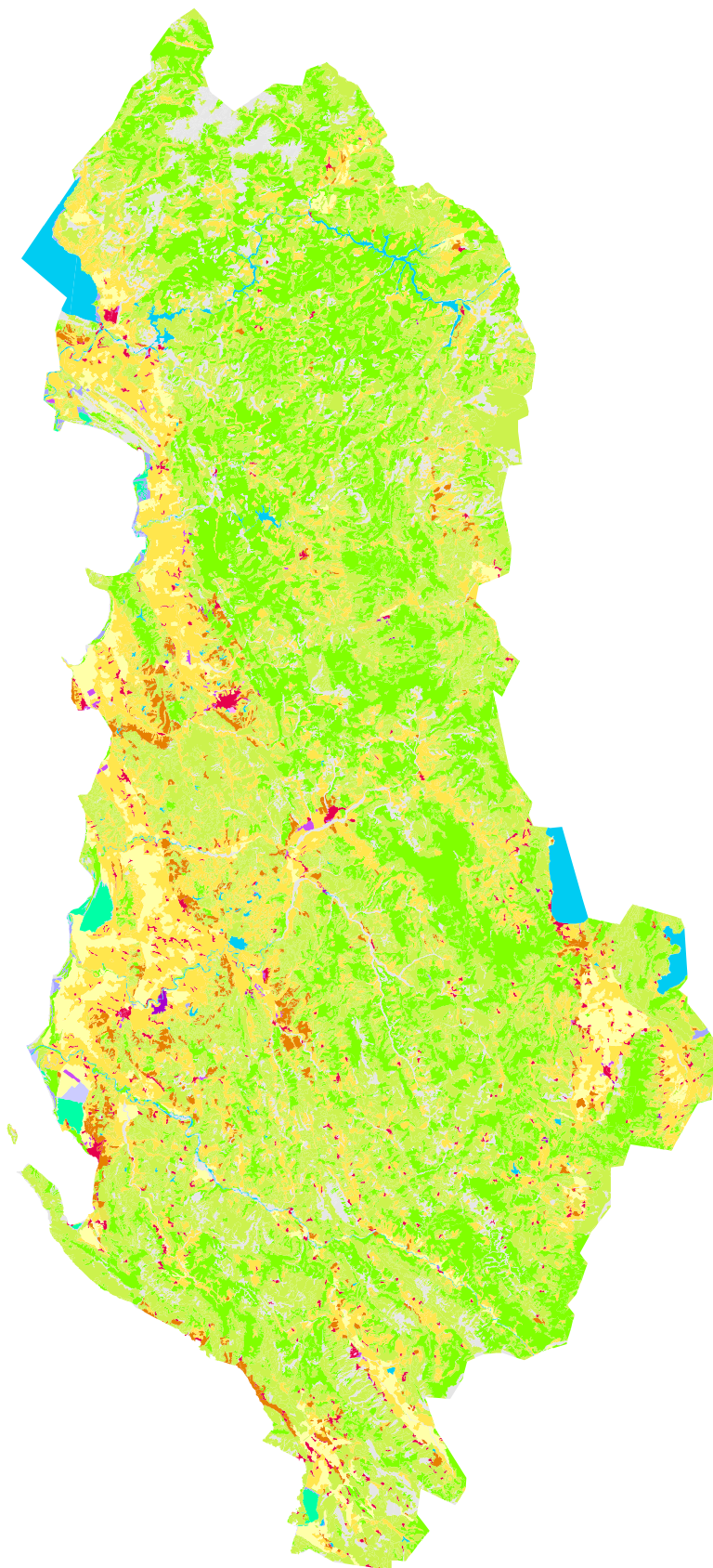
- 1. Shkodra Lake - Buna - Velipoje
- 2. Butrint


0 10 20 30 40 50 km

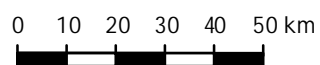


Source:
 Atlasi gjeografik i popullsisë së Shqipërisë
 Ministry of Environment, Forestry and Water
 Administration:
 Status of the Environment 2005-2007
 Monuments of the Nature in Albania 2006

Land Cover



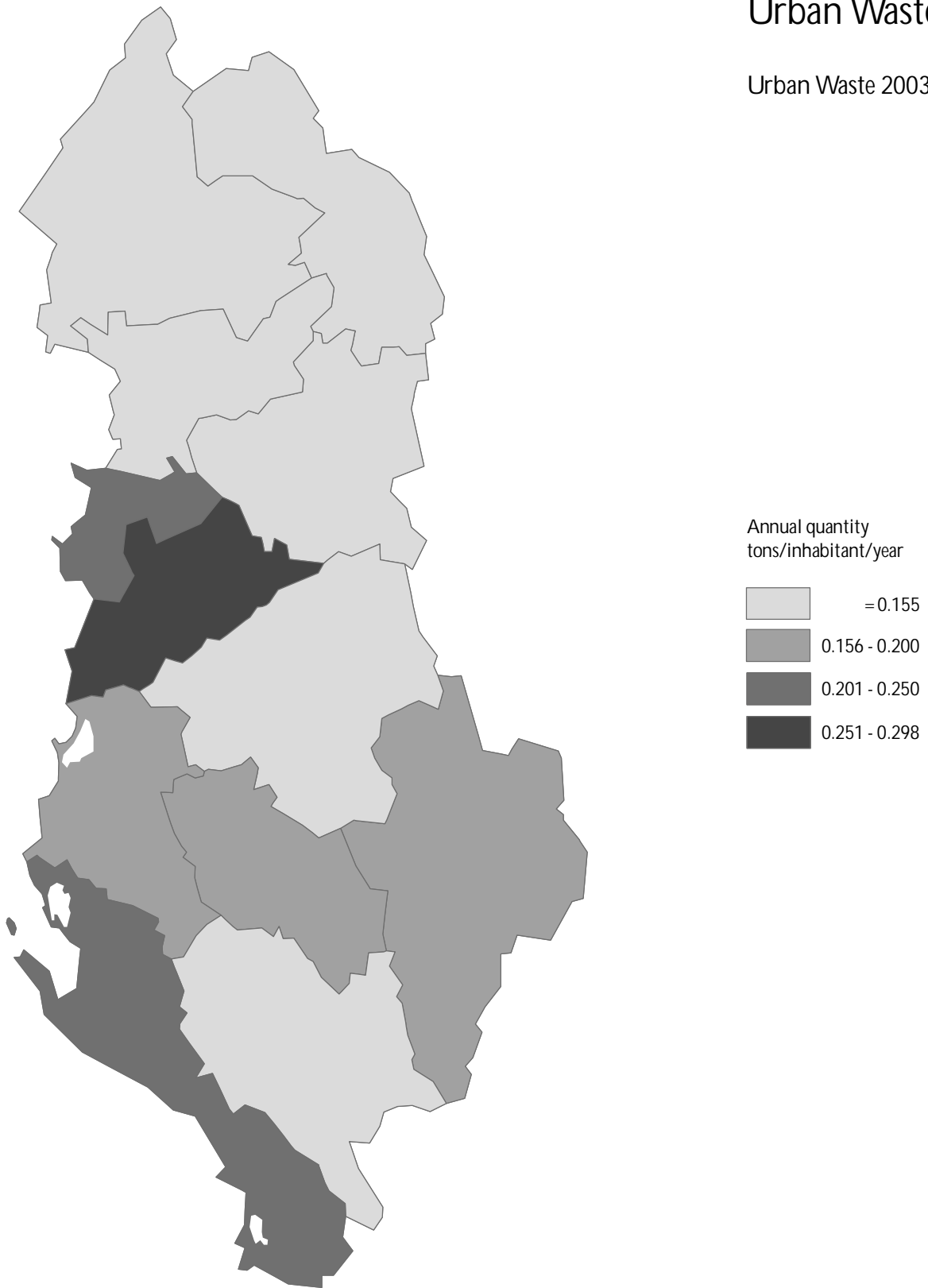
-  Urban fabric
-  Industrial, commercial and transport units
-  Mine, dump and construction sites
-  Artificial, non-agricultural vegetated areas
-  Arable land
-  Permanent crops
-  Pastures
-  Heterogeneous agricultural areas
-  Forest and semi-natural areas
-  Shrub and/or herbaceous vegetation associations
-  Open spaces with little or no vegetation
-  Inland wetlands
-  Coastal wetlands
-  Inland waters
-  Marine waters



Source:
Atlasi gjeografik i popullsisë së Shqipërisë
European Environmental Agency:
Corine land cover 2000

Urban Waste

Urban Waste 2003

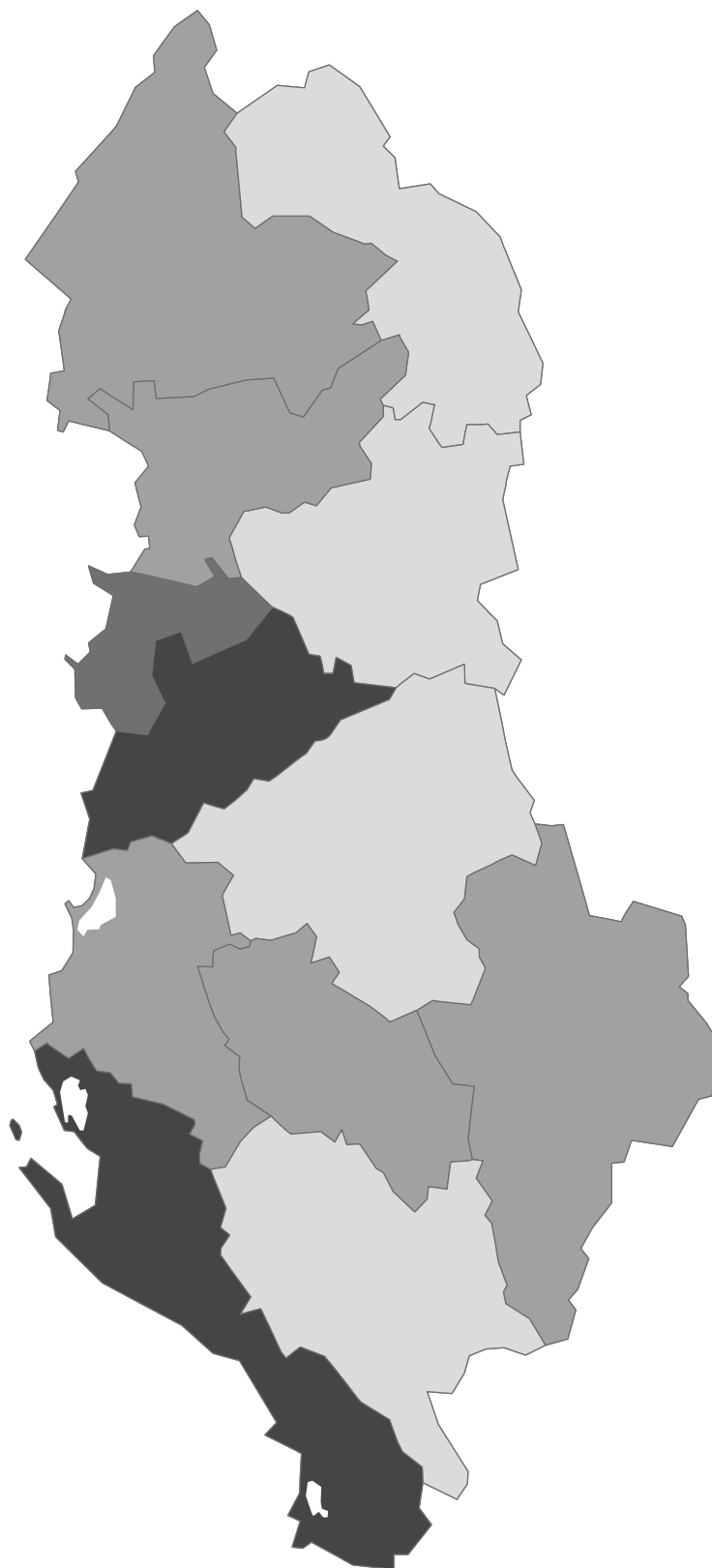


0 10 20 30 40 50 km

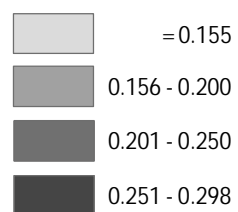
Source:
Atlasi gjeografik i popullsisë së Shqipërisë
Ministry of Environment, Forests and
Water Administration:
Status of the Environment 2003-2004

Urban Waste

Urban Waste 2005



Annual quantity
tons/inhabitant/year

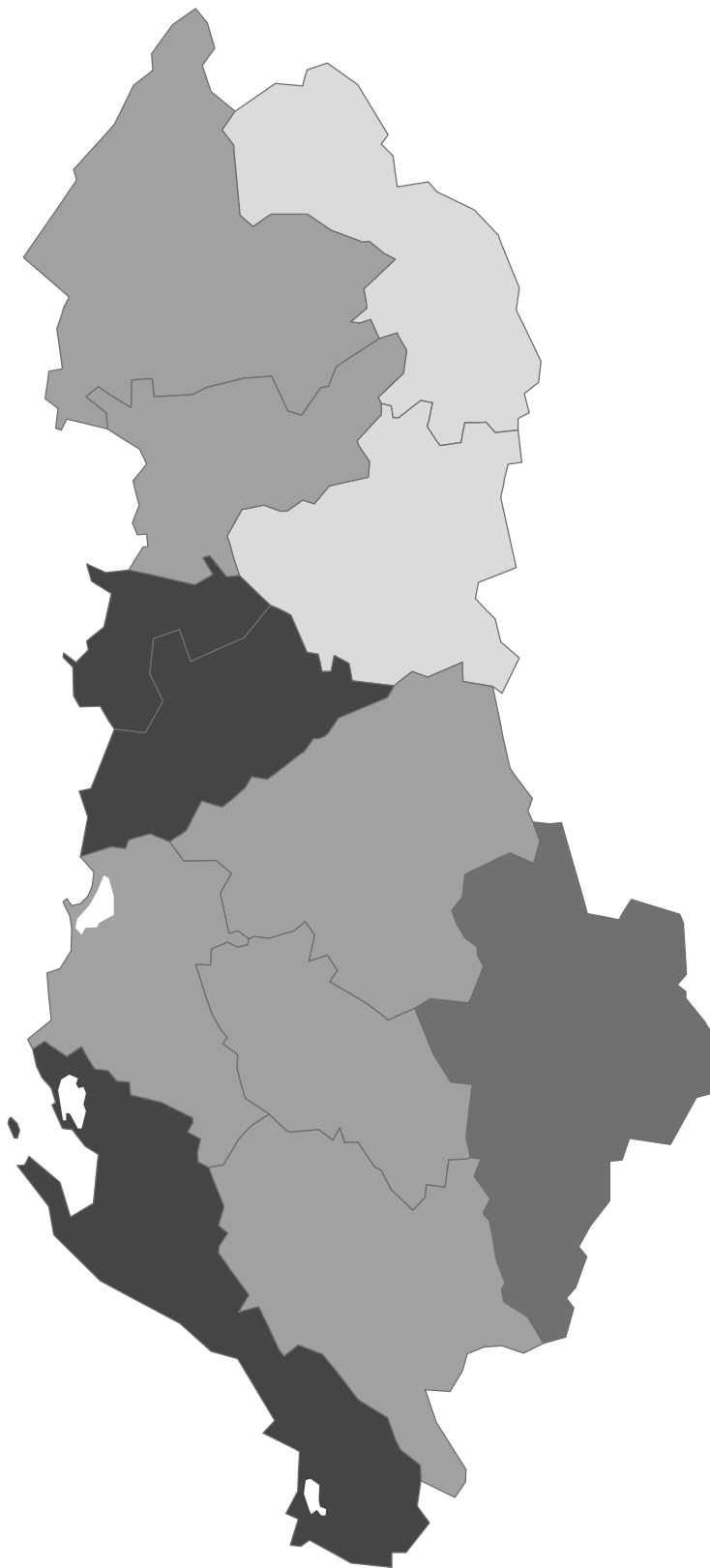


0 10 20 30 40 50 km

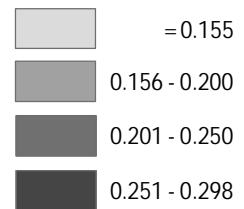
Source:
Atlasi gjeografik i popullsisë së Shqipërisë
Ministry of Environment, Forests and
Water Administration:
Status of the Environment 2005-2007

Urban Waste

Urban Waste 2007



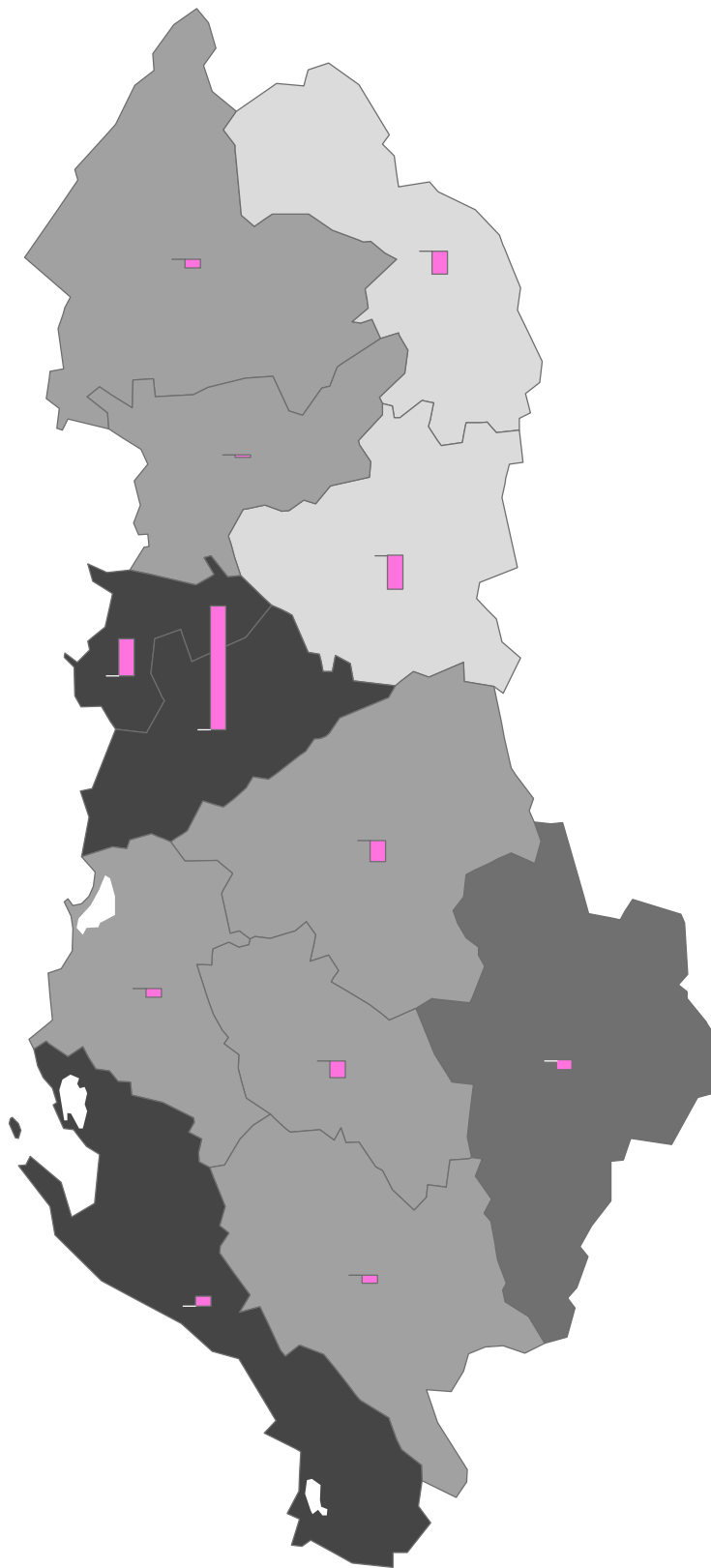
Annual quantity
tons/inhabitant/year



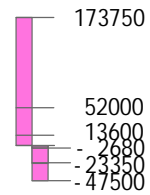
0 10 20 30 40 50 km

Source:
Atlasi gjeografik i popullsisë së Shqipërisë
Ministry of Environment, Forests and
Water Administration:
Status of the Environment 2005-2007

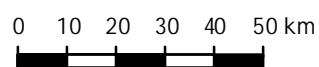
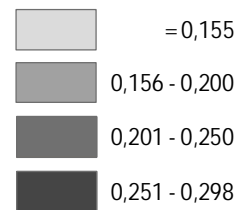
Urban Waste and Change in Population



Population change 2003-2007
inhabitants



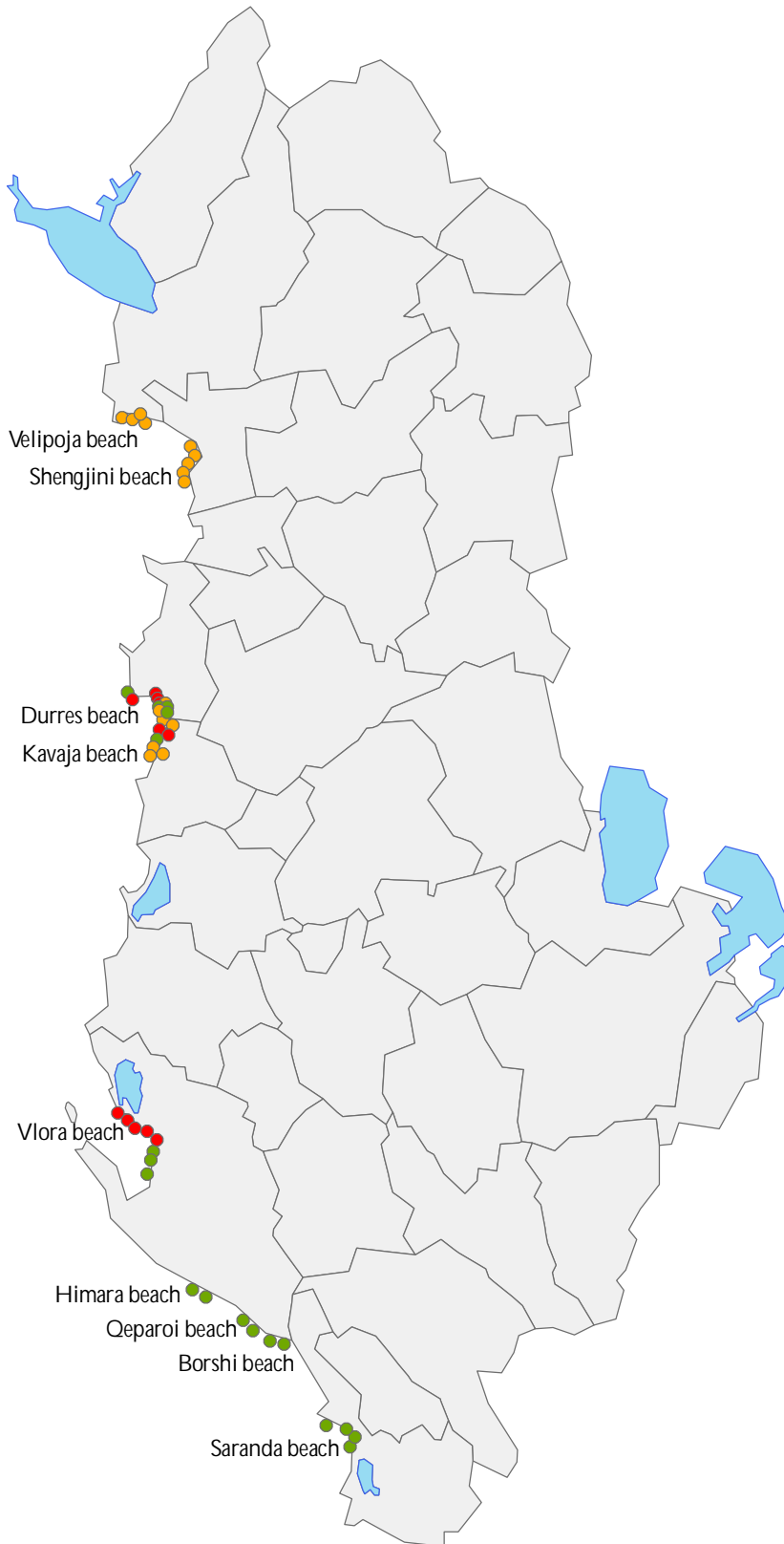
Annual quantity
tons/inhabitant/year for 2007



Source:
Atlasi gjeografik i popullsisë së Shqipërisë
Ministry of Environment, Forests and
Water Administration:
Status of the Environment 2003-2004
Status of the Environment 2005-2007

Bathing Water Quality

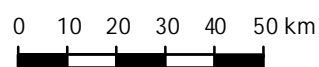
Microbiological Monitoring - 2003



Faecal Coliform

1. <100 per 100 ml in 50% of samples
2. <1000 per 100 ml in 90% of samples

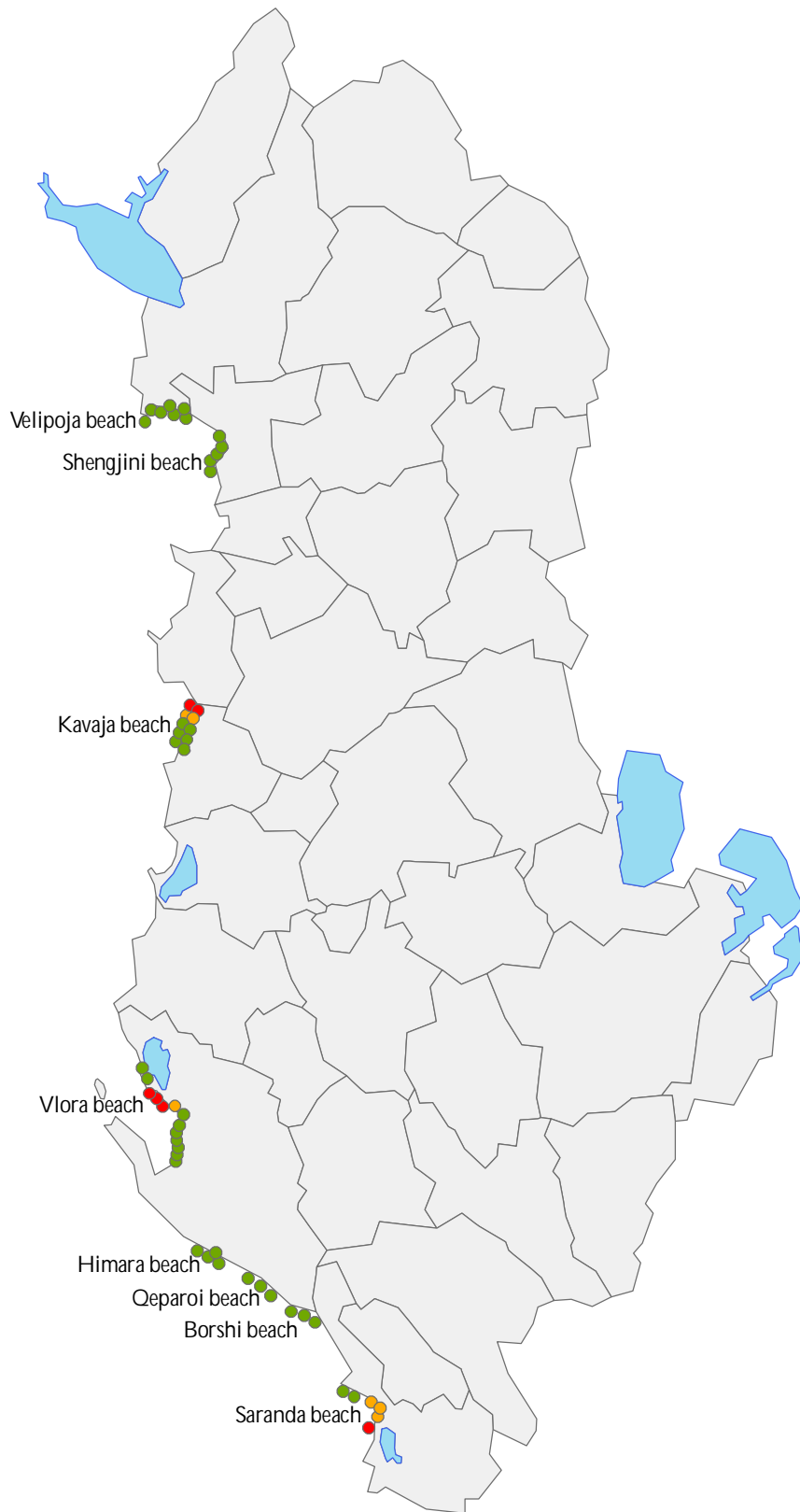
- Compliance with mandatory values
- One of Indicators not compliant
- Not compliant with mandatory values



Source:
Atlasi gjeografik i popullsisë së Shqipërisë
European Environmental Agency (EEA)

Bathing Water Quality

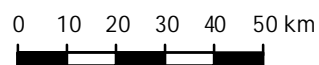
Microbiological Monitoring - 2007



Faecal Coliform

1. <100 per 100 ml in 50% of samples
2. <1000 per 100 ml in 90% of samples

- Compliance with mandatory values
- One of Indicators not compliant
- Not compliant with mandatory values

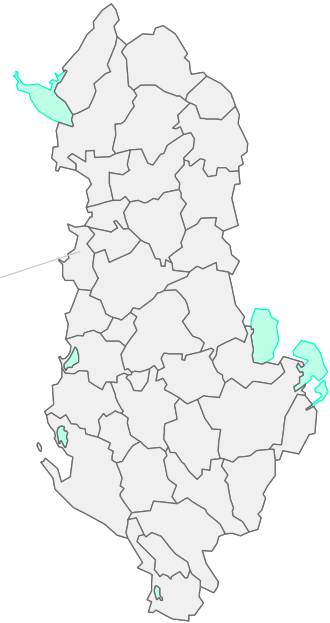
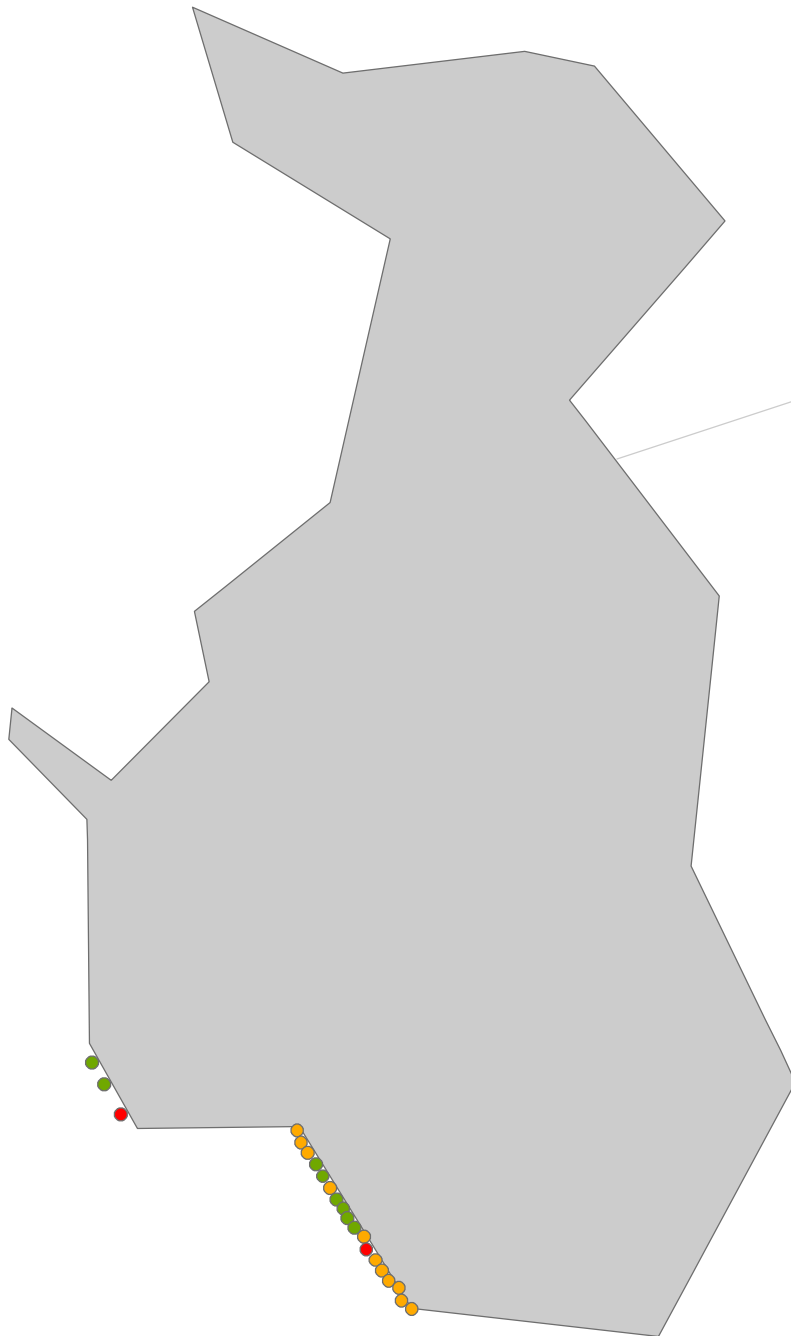


Source:
Atlasi gjeografik i popullsisë së Shqipërisë
Ministry of Environment, Forestry
and Water Administration:
Status of the Environment 2005-2007

Bathing Water Quality

Microbiological Monitoring - 2007

Durrresi beach



Faecal Coliform

1. <100 per 100 ml in 50% of samples
2. <1000 per 100 ml in 90% of samples

- Compliance with mandatory values
- One of Indicators not compliant
- Not compliant with mandatory values

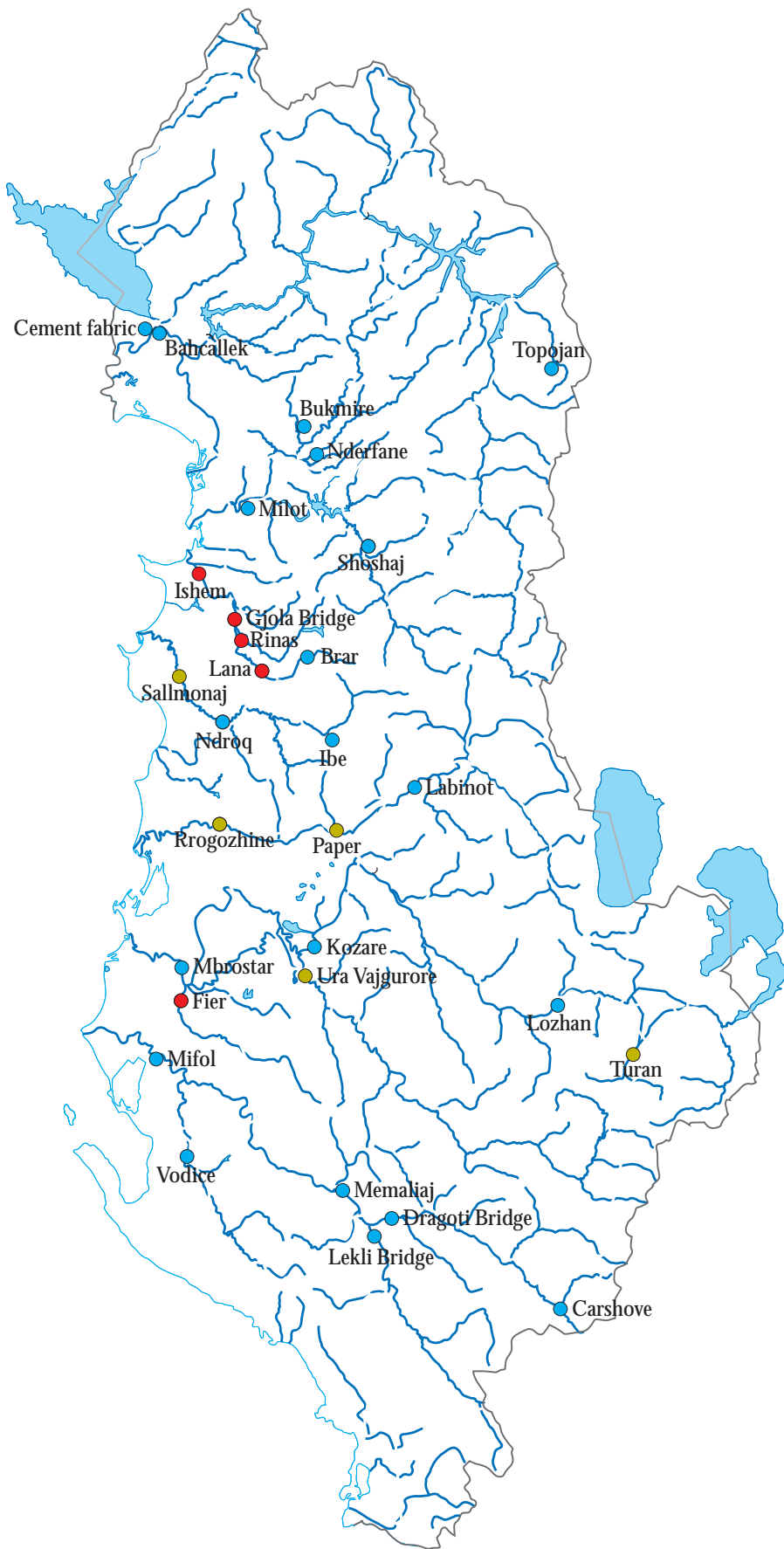


Source:
Atlasi gjeografik i popullsisë së Shqipërisë
Ministry of Environment, Forestry
and Water Administration:
Status of the Environment 2005-2007

Surface Water Quality

River Water Quality

Average quality for 2007



- Quality class I Very good
- Quality class II Good
- Quality class III Fair
- Quality class IV Bad
- Quality class V Very bad

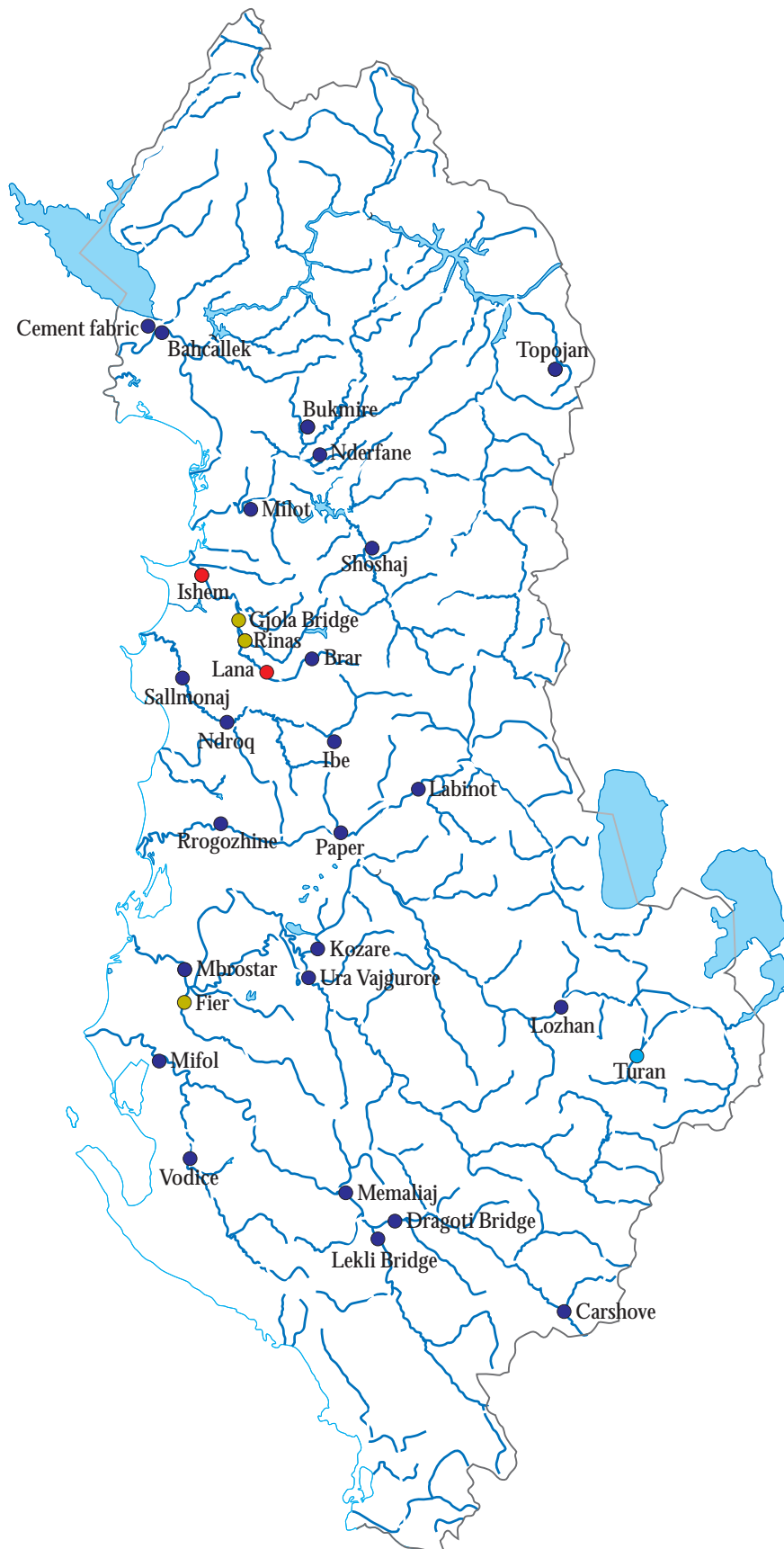


Source:
 Atlasi gjeografik i popullsisë së Shqipërisë
 Ministry of Environment, Forestry and Water
 Administration:
 Status of the Environment 2005-2007

Surface Water Quality

River Water Quality

Chemical Oxygen Demand (COD)



●	Quality class I	Very good	< 2.5 mg/L
●	Quality class II	Good	2.5 - 3.5
●	Quality class III	Fair	3.5 - 6.5
●	Quality class IV	Bad	6.5 - 15.0
●	Quality class V	Very bad	> 15.0

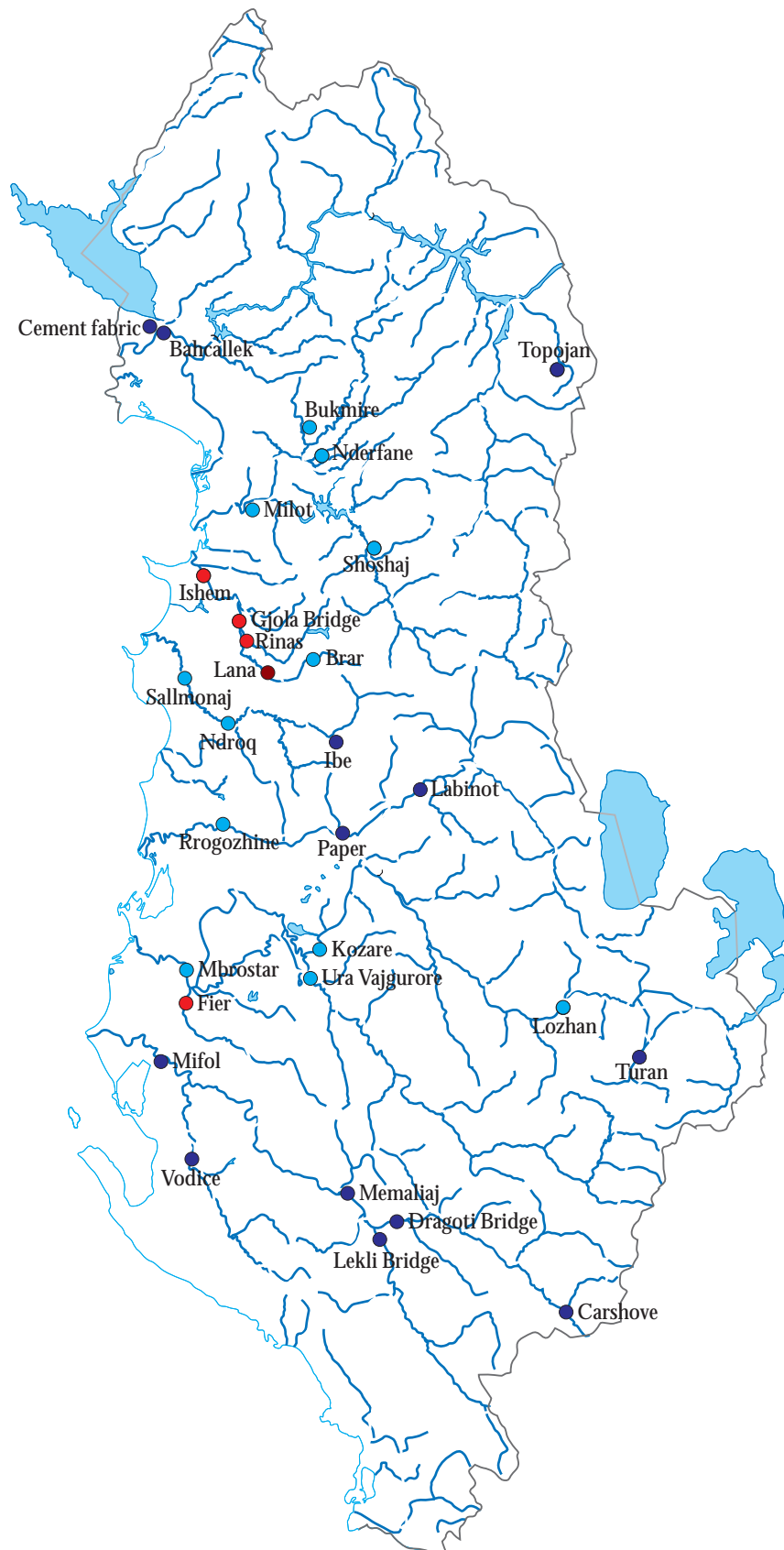


Source:
 Atlasi gjeografik i popullsisë së Shqipërisë
 Ministry of Environment, Forestry and Water
 Administration:
 Status of the Environment 2005-2007

Surface Water Quality

River Water Quality

Dissolved Oxygen (DO)



●	Quality class I	Very good	> 9.0 mg/L
●	Quality class II	Good	6.4 - 9.0
●	Quality class III	Fair	4.0 - 6.4
●	Quality class IV	Bad	2.0 - 4.0
●	Quality class V	Very bad	< 2.0

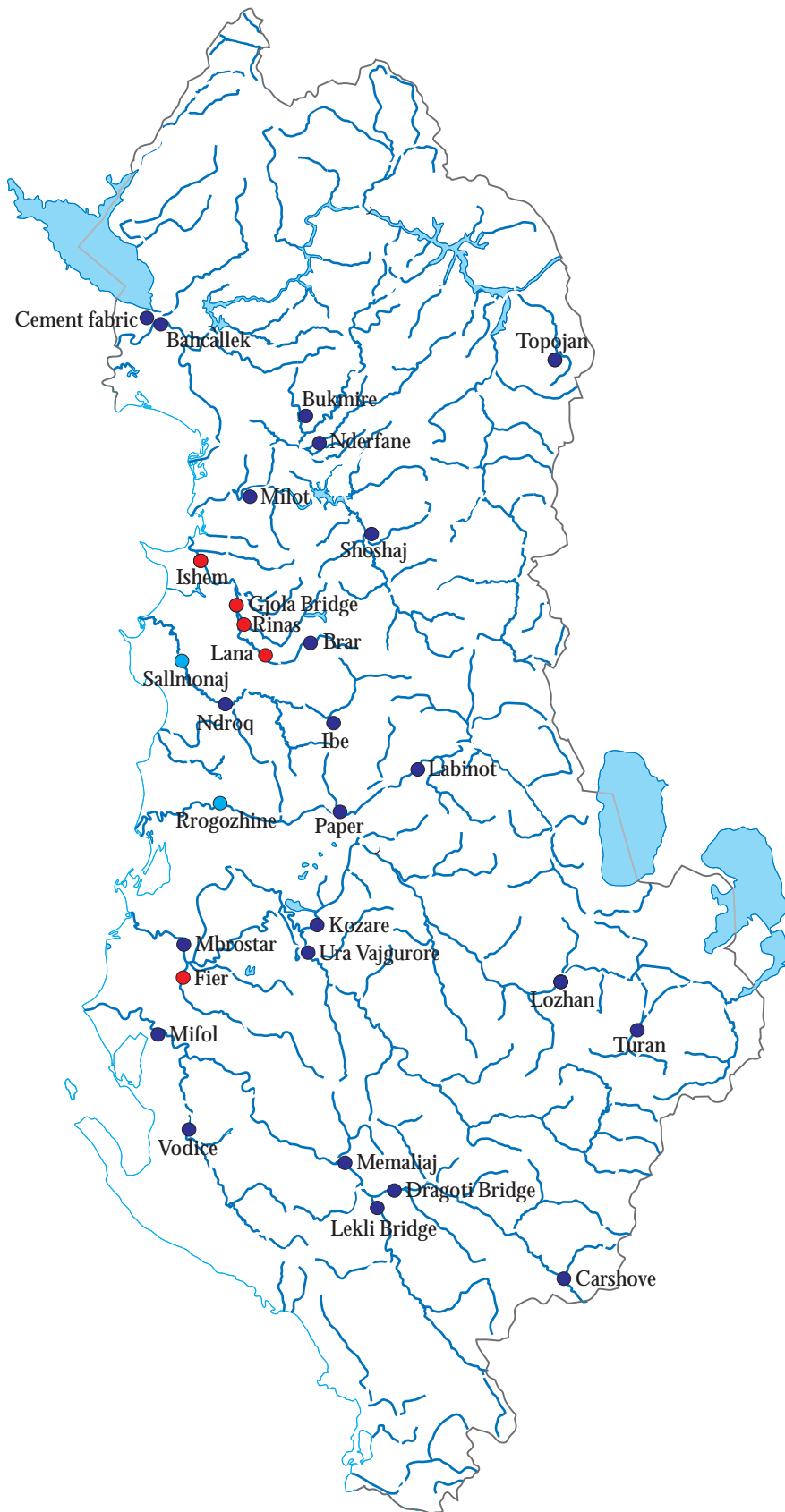


Source:
 Atlasi gjeografik i popullsisë së Shqipërisë
 Ministry of Environment, Forestry and Water
 Administration:
 Status of the Environment 2005-2007

Surface Water Quality

River Water Quality

Ammonium (NH₄)



- Compliant with Directive CEE/78/659
Guide value < 0.2 mg/L
- Compliant with Directive CEE/78/659
Mandatory value < 1.0 mg/L
- Not compliant with mandatory values

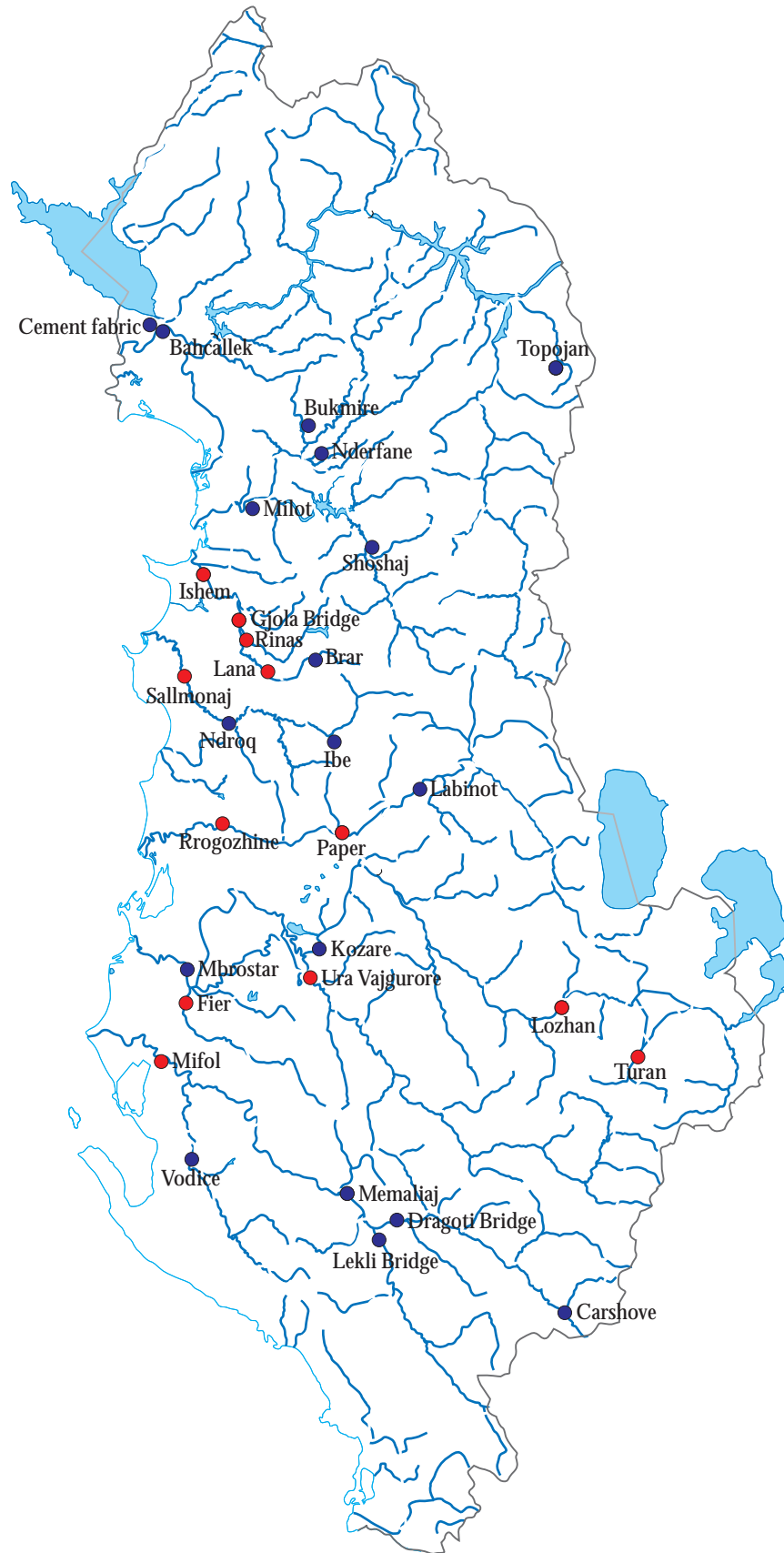
0 10 20 30 40 50 km

Source:
Atlasi gjeografik i popullsisë së Shqipërisë
Ministry of Environment, Forestry and Water
Administration:
Status of the Environment 2005-2007

Surface Water Quality

River Water Quality

Nitrite (NO₂)



- Compliant with Directive CEE/78/659
Guide value < 0.01 mg/L
- Not compliant with guide values

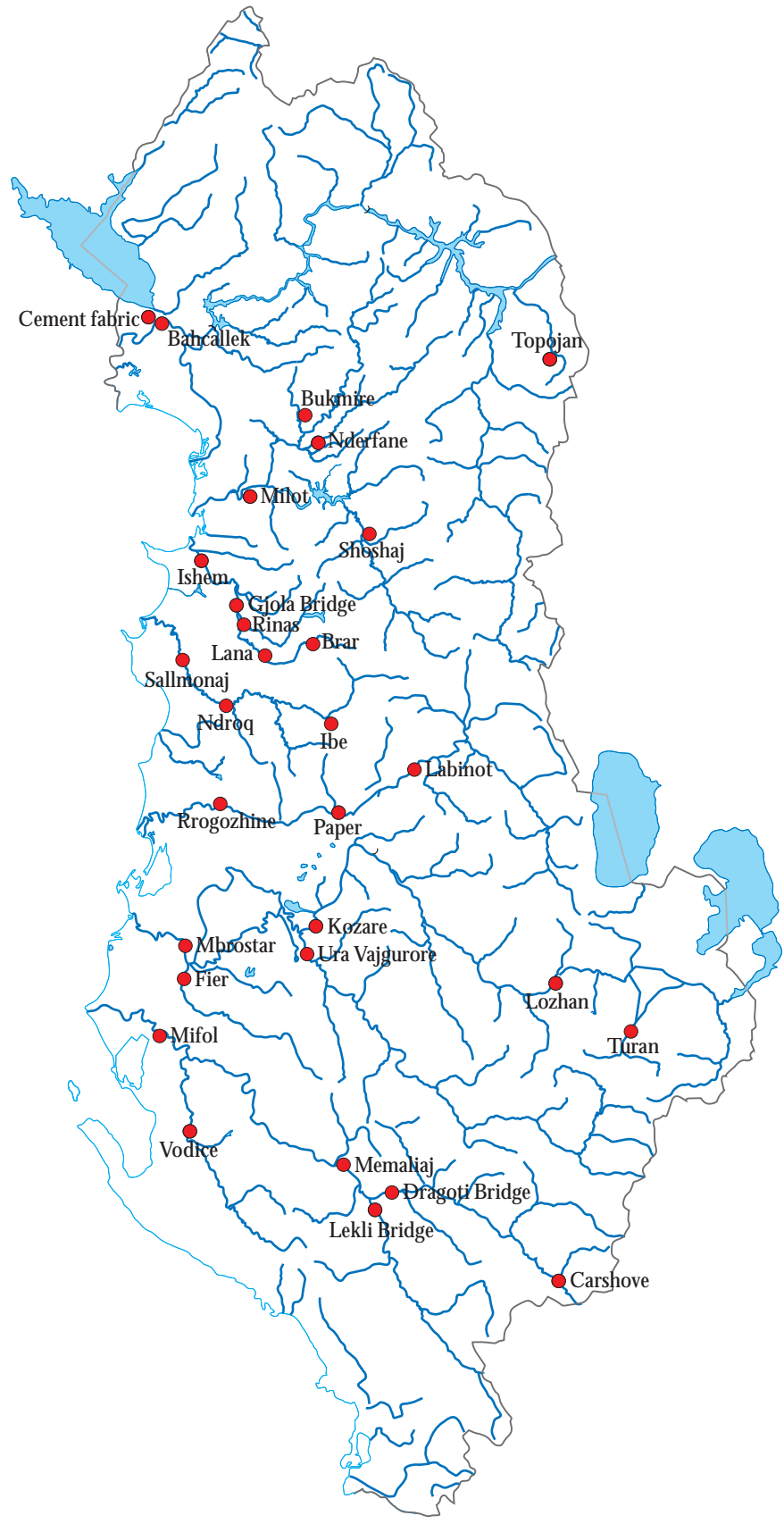


Source:
Atlasi gjeografik i popullsisë së Shqipërisë
Ministry of Environment, Forestry and Water
Administration:
Status of the Environment 2005-2007

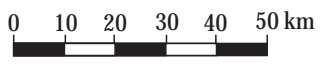
Surface Water Quality

River Water Quality

Nitrate (NO₃)



- Compliant with Directive CEE/78/659
Guide value < 0.01 mg/L
- Not compliant with guide values

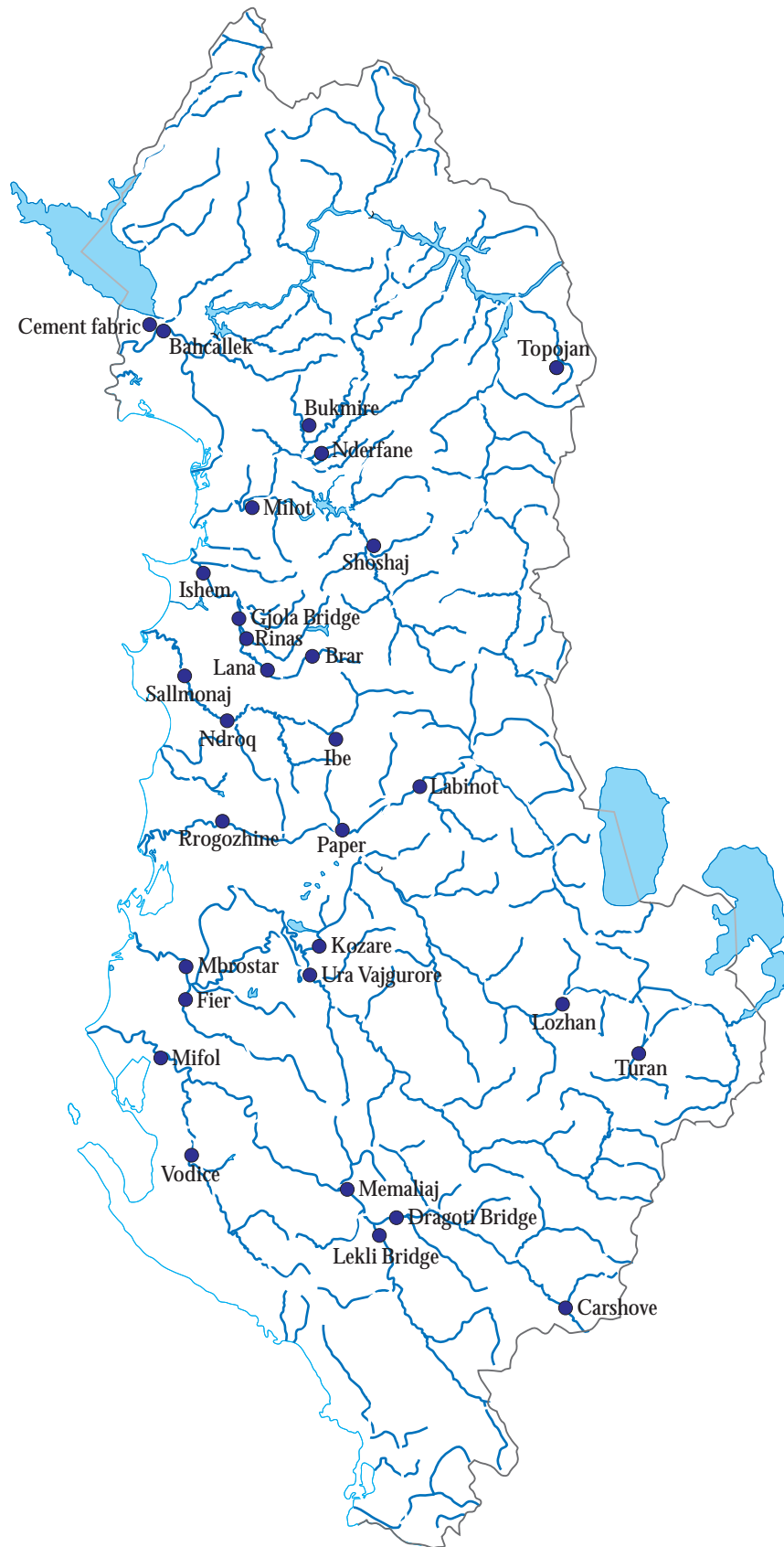


Source:
 Atlasi gjeografik i popullsisë së Shqipërisë
 Ministry of Environment, Forestry and Water
 Administration:
 Status of the Environment 2005-2007

Surface Water Quality

River Water Quality

pH values



pH values

●	Quality class I	Very good	> 6.5
●	Quality class II	Good	6.0 - 6.5
●	Quality class III	Fair	5.5 - 6.0
●	Quality class IV	Bad	5.0 - 5.5
●	Quality class V	Very bad	< 5.0

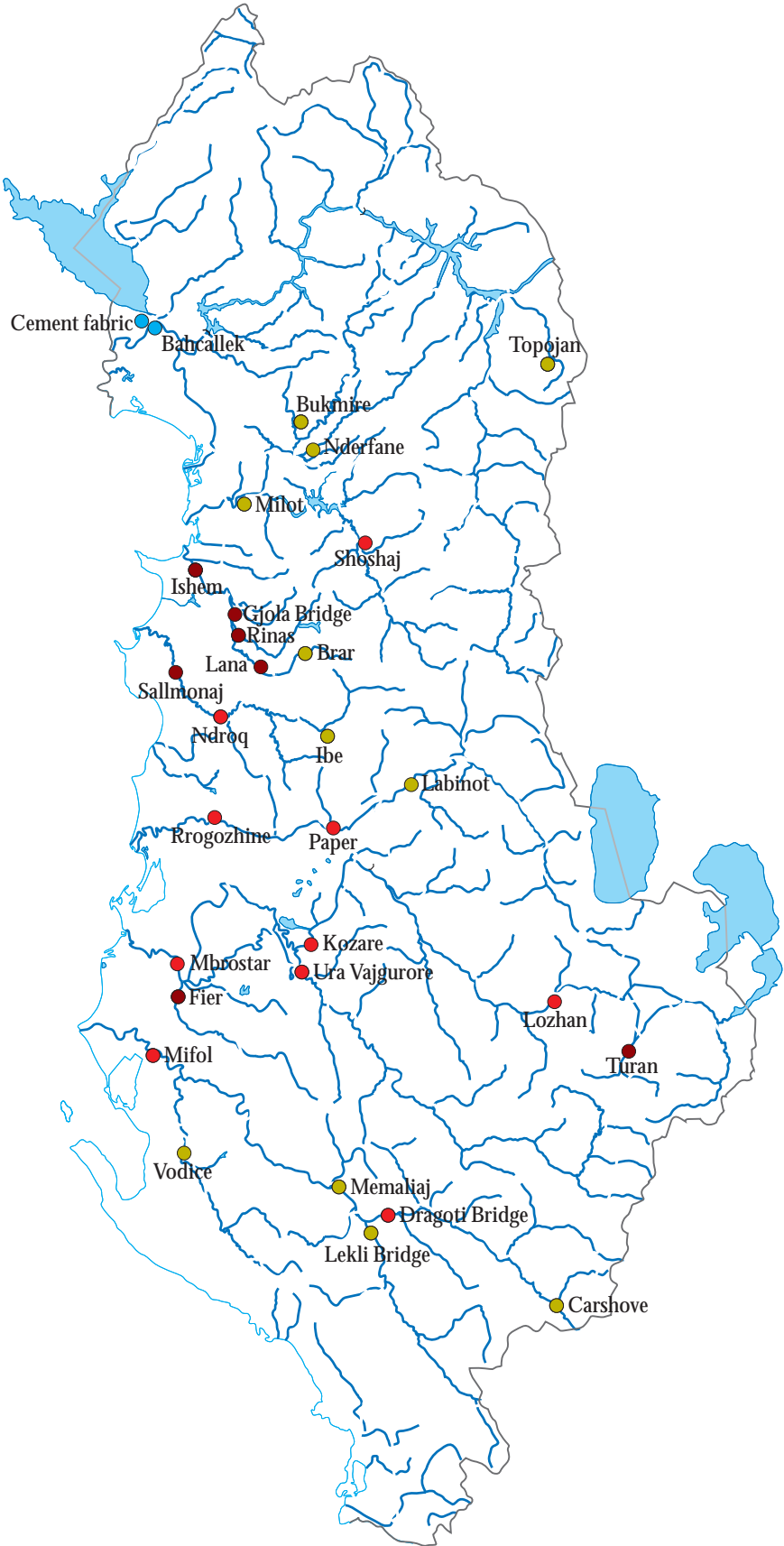


Source:
 Atlasi gjeografik i popullsisë së Shqipërisë
 Ministry of Environment, Forestry and Water
 Administration:
 Status of the Environment 2005-2007

Surface Water Quality

River Water Quality

Phosphore total (P)



●	Quality class I	Very good	< 7.0 mg/L
●	Quality class II	Good	7.0 - 11.0
●	Quality class III	Fair	11.0 - 20.0
●	Quality class IV	Bad	20.0 - 50.0
●	Quality class V	Very bad	> 50.0



Source:
 Atlasi gjeografik i popullsisë së Shqipërisë
 Ministry of Environment, Forestry and Water
 Administration:
 Status of the Environment 2005-2007