









## Bratislavský kraj

### *General Information*

#### *Land use*

From the landscape structure viewpoint there are three different types of landscapes (geomorphologic complexes) in the Slovakian part of the region with different landscape potential. There are two plain areas from the west to the east: Vienna basin (the valley Dolnomoravský úval goes beyond from the Czech republic, area of flatland Záhorská nížina with complexes of plain Borská nížina and fells Chvojnická pahorkatina) and Small Danube basin (area of plain Podunajská nížina with complexes of flatlands Podunajská rovina and fells Podunajská pahorkatina) which are divided by the massif of Carpathians (Small Carpathians). The northern border is represented by the flysch Slovakian-moravian Carpathians, mountains Považský Inovec and Trábe which take turns with headlands of valley Podunajská nížina along rivers. Border on the north-east is represented by volcanic mountains Pohronský Inovec, Štiavnické vrchy and plain Krupinská planina of the Inner Carpathians (Mazúr, E., Lukniš, M., 1980). Rivers Morava, Danube and Ipe comprise borders on the west, south-west, south and south-east.

Differences in the landscape structure and the strong anthropogenic changes primarily into agriculture productive area will be outcomes of the rate of so-called cultivated land (rate of farmland from the whole territory – see the table) as compared to the extent of forests in the area.

### *Nature conservation and landscape*

#### *Protected areas*

Nature conservation and landscape protection in Slovak republic is supply by the Act No. 543/2002 on Environmental protection and landscape conservation. First level, as a general protection, is applied to the whole territory of Slovakia. The 2nd up to the 5th level, as a special protection, is applied to the protected areas and their buffer zones according to the §17 of the Act on environmental protection and landscape conservation. European Union law and statutes of international conventions geared to the nature conservation and landscape protection were implemented to the environmental law of Slovak republic by means of this Act as well.

Protected areas in terms of §17 of the Act No. 543/2002 on Environmental protection and landscape conservation are as follows:

1. Landscape protected area
2. National park
3. Protected site
4. Nature reserve
5. Natural monument
6. Protected landscape feature
7. Special protected areas

Large-extension protected areas are all protected areas with the area of more than 1000 ha (landscape protected areas and national parks). Small-extension protected areas have the area of less than 1000 ha.

#### *Ecological networks*

Territorial system of ecological stability represents systemic approach to the solution of the quality of the landscape. TSES represents such spatial structure of connected ecosystem, their elements which ensure the diversity of the conditions and form of life in the landscape. They are created in order to preserve optimal landscape structure, minimization conflicts of interest between elements of natural environment and anthropogenic activities. It is supported by several acts (no. 543/2002, no. 24/2006, no. 17/1992, no. 50/1976) in Slovak legislative.

In TSES makes important function also those ecosystems, which should be considered from classical natural preserving point of view as a less valuable. The basement of this system is represented by the biocentres, biocorridors and interactive elements on the local, regional and supraregional level.

TSES projects in Slovak republic were realized “from above down”, from the General supraregional TSES through regional and local TSES. The elements of the supraregional TSES were qualify in General supraregional TSES of Slovak republic confirmed by resolution of the government of Slovak republic number 319 in April 27 1992.

## *State of the environment*

### *Air quality and pollution*

Bratislava County spreads out over an area of 2053 km<sup>2</sup>. The main share in air pollution of Bratislava County has agglomeration Bratislava with 84 % of total emission amount.

Agglomeration Bratislava: Bratislava spreads along both banks of the Danube at the boundary line of the Danube plain and the Little Carpathians, which interferes into the northern part of the city. The ventilation of the city is favourably affected by high wind speeds. With respect to prevailing north-west wind, the city is properly situated to major air pollution sources, which are concentrated in relatively small area between the south-eastern periphery of Bratislava.

The main share in air pollution is from chemical industry, power generation and car transport. Secondary suspended particles, the level of which depends upon meteorological factors, land use and agricultural activities and characteristics of surface, are significant secondary source of air pollution.

Persisting and hardly solvable problem is still increasing concentration of car transport.

### *Water*

EU legislation solves the problems of protection of the sustainable water exploitation by way of Water frame directive (WFD), which has come into force in 2000. By means of this directive the way of water monitoring, assessment and management has been significantly changed in the most of European countries. Slovak republic transformed WFD into new Water Act no. 364/2004 Coll., which entered into force on 1 July 2004. Water Act relates to all forms of water bodies, water protection, rights to waters and their recording, water constructions and rights and duties to plots directly connected with waters.

From the hydrological point of view the area of interest belongs to the Danube catchment. In addition to the Danube River, surface water network comprises rivers Váh, Nitra, Ipe, Hron, Morava and Small Danube, which is the longest and the biggest sinistral arm of the Danube.

#### *Surface water quality*

The basis for surface water quality assessment is the summary of all classification results under the STN 75 7221 STANDARD "Water quality". Classification of surface water quality evaluates water quality through 8 groups of indicators: group A – oxygen demand, group B – basic physical and chemical determinants, group C – nutrients, group D – biological determinants, E – microbiological determinants, group F – micropollutants, group G – toxicity, group H – radioactivity. Using the threshold values system, water is classified into 5 quality categories (I. class – very clean water, II. class – clean water, III. class – polluted water, IV. class – heavily polluted water, V. class – extremely heavily polluted water). Categories I., II. and III. are considered as favourable water quality.

### *Waste*

Since 1993 Programmes of Waste management has been elaborated from the state level in accordance to the state environmental policy. In new SR Programme of Waste Management for years 2006-2010 was respected principles of national plans of waste management preparation, which is recommended by European Committee GR for environment. This document is the reference document for regional programmes of Waste Management for years 2006-2010.

Waste generation according to the categories significantly reflected structure of the economic activities carried on in individual counties and it is only a little connected (except for certain kinds of waste) with number of inhabitant of the county (contrary to the municipal waste). In terms of waste load in Slovak republic, Bratislava and Nitra county belongs to the most loaded territories in terms of waste generation. Trnava county is one of the most loaded counties from the view of hazardous waste amount. Significant occurrence of hazardous waste is also in the territorial smallest county of Bratislava, which is characterized in high concentration of economic activities.

### *Water management*

Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy requires river basin management plans with the aim

to develop for each river basin district and to achieve good ecological and chemical status and contribute to mitigating the effects of floods.

It is needed to reduce the risk of adverse consequences, especially for human health and life, environment, cultural heritage, economic activity and infrastructure.

In developing policies referring to water and land uses will be considered the potential impacts that such policies might have on flood risks and the management of flood risks.

Flood risk management plans should focus on prevention, protection and preparedness.

In order to have available an effective tool for information is necessary to establish flood hazard maps and flood risk maps.

In the context of flood risk management the principle of solidarity between individual regions and member states of the Community is very important.

Development of river basin management plans under of flood risk management plans are elements of integrated river basin management.

Based on available or readily derivable information, such as records and studies on long term developments, in particular impacts of climate change on the occurrence of floods, a preliminary flood risk assessment shall be undertaken to provide an assessment of potential risks.

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index		3,071	3,381	2,976
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	36,37	23,23	16	13,74
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	12,2	11,69	10,82	9,71
Atmosphere pollution ash - emission per 1000 inhabitants (t)	3,9	1,46	1,62	1,32
Atmosphere pollution CO - emission per 1000 inhabitants (t)	5,72	4,45	4,47	5,65
Capacity of landfills per 1000 inhabitants (t)			943,83	940,15

## Trnavský kraj

### *General Information*

region Trnava

### *Land use*

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### *State of the environment*

#### *Air quality and pollution*

Trnava region spread out through the area of 4 145 km<sup>2</sup>.

The most extensive activity in the county is agriculture. Trnava County is one of the most agricultural exploited areas in the Slovak republic. The industry has the dominant role in the northern and central part of the county. The main share in air pollution is from chemical industry, power generation and car transport. The biggest industrial centres (from the view of number of habitats) are Trnava, Skalica, Hlohovec and Jaslovské Bohunice.

The area is well ventilated with small occurrence of calm situation due to favourable orographical and climatic conditions, which cause dispersion of air pollutants. Air quality in the county is affected by long-range air pollution and emissions from the big industrial sources located in the area.

#### *Water*

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<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index		3,354	3,259	3
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	9,33	3,6	1,87	1,01
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	4,98	3,3	3,01	2,79
Atmosphere pollution ash - emission per 1000 inhabitants (t)	5,34	2,14	3,49	3,16
Atmosphere pollution CO - emission per 1000 inhabitants (t)	11,28	7,39	6,79	5,9
Capacity of landfills per 1000 inhabitants (t)			616,78	689,51

## Nitriansky kraj

### *General Information*

Nitra Self-governing Region is located in the southwest of Slovak Republic. It borders with Hungary – in the south, Banská Bystrica Self-governing Region, Trenčín Self-governing Region in the north and Trnava Self-governing Region in the west. The most southern point of the Slovakia is located in Patince.

The Self-governing Region is divided into 7 counties: Komárno, Levice, Nitra, Nové Zámky, Šaľa, Topoľany and Zlaté Moravce.

Almost whole area of the region is located at the Danube upland (Podunajská pahorkatina) and Danube plain (Podunajská rovina) – the parts of Danube Basin. At the north is located the mountain of Trávnice, the south-eastern part is edged by the mountains of Štiavnické vrchy and Pohronský Inovec.

The main part of the region is covered by the high-quality agricultural soil. The region is one of the hottest territories and the most productive agricultural centres of Slovakia. Average year temperature is 10, 2 C.

The southern parts are rich of the water resources. Several thermal springs are located in the region: Podhájska, Patince, Komárno, Poľný Kesov and Štúrovo.

Several rivers flow across the region – Danube, Váh (the longest Slovakian river), Nitra, Hron, Ipeľ, Žitava. Danube and Ipeľ rivers are natural border with Hungary.

### *Land use*

Among the other NUTS 3 regions of the Slovak Republic, Nitra Self-governing region is one of the less developed ones. Regarding the level of development, the region is differentiated to more developed north and laggard south. Development pole of the region is localized in triangle of towns Nitra, Zlaté Moravce and Levice.

Typical feature of the southeastern part of the region is a combination of agricultural country and a town with fewer key industrial activities, with low rate of diversification. The process of transformation in the last decade of 20th century caused a significant decrease of the crucial industrial activity (food processing, ship construction, electrical engineering, production of synthetics, etc.).

Some of the key industrial activities were renewed again, however the previous employment have not been reached.

Demographic depression is another negative feature of the southern, laggard part of the region.

### *Nature conservation and landscape*

#### *Protected areas*

There are no national parks localized in the region, parts of three protected landscape areas (PLA) are localized in the region:

- PLA Ponitrie (15 622 ha) localized in the north, in the counties Nitra, Topoľany and Zlaté Moravce
- PLA Štiavnické vrchy (11 240 ha) in the east, in the Levice county
- PLA Dunajské Luhy in the south, in the Komárno County

Total area of the PLA is 29 484 ha – 4, 65% of the total region's area.

138 small-scale protected areas are located in the region, with total area of 4 218 ha – 0, 66 % of the region's area. The total area of all protected areas with 2nd – 5th degree of protection is 33 300 ha – 5, 25 % of the total region's area.

Protected areas are mainly: water and marshy ornithological localities, dead river channels, areas of salt vegetation, marshes and moorlands, sand's thermophilic biota, remains of well-preserved floodplain forests, beech forests, steppes and forest steppes of the Danube plain (Podunajská rovina).

In Nitra Self-governing region is located the highest number (among Slovak regions) of historical parks, claimed as protected areas. Geomorphologically important features are cave ertova pec with paleontological site and travertine formation in Santovka.

#### *Ecological networks*

Substance of the system consists of bio centres, bio corridors and interaction components of provincial, supra-regional, regional and local value.

## *State of the environment*

### *Air quality and pollution*

The regions are characterised by the different state of environmental burden of particular components of the environment. The environmental burdens are negative effects of anthropogenic activity, which are described by the different rate of risk factors limiting a quality of life.

According the environmental regionalisation of the Slovak Republic from 2005, the share of areas within particular degree of environmental burden is as follows:

- 1st degree (areas with high quality of environment) 7, 53 % ,
- 2nd degree (satisfactory environment) 38, 24 %
- 3rd degree (slightly damaged environment) 27, 61 %
- 4th degree (damaged environment) 19, 52 %
- 5th degree (strongly damaged environment) 7, 1 %

Share of population living in damaged environment is 28, 32%, in strongly damaged environment 28, 86%. In the Nitra county is share of population living in damaged environment 13, 3% (21 755) and in strongly damaged environment 54, 23% (88 683). Counties where majority of population lives in damaged or strongly damaged environment are Nové Zámky and Ša a.

Two environmentally burdened territories are located in Nitra Self-governing region: Dolnopovažská oblas (848 km<sup>2</sup>, with 155 768 inhabitants) and Ponitrianska oblas (234 km<sup>2</sup>, with 147 814 inhabitants).

The following types of pollutants from stationary sources were identified in the region (2005). The emission of solid pollutants increased of 934 t (37, 69%) and emission of CO increased of 1013 t (18, 04%), in the period 2003-2005.

The only pollutant with continual decrease in the period 2003-2005 was SO<sub>2</sub>, with decrease of 1312 t (35, 96%).

The highest share of solid pollutants was produced in Levice county, SO<sub>2</sub> in Ša a and Nové Zámky counties, NO<sub>x</sub> in Nitra, Ša a and Nové Zámky counties and CO in Nitra, Nové Zámky and Levice counties.

The quality of air in the region is affected by long distance transmission of pollutants, but mainly by emission from major sources located in the region. The total number of major and medium sized pollution sources located in the region is 1814. The main share of pollution is caused by chemical industry (fertilizers production, rubber chemicals), food-processing industry, power industry and automobile transport.

### *Water*

There are 54 water courses relevant for water management. The most important are lower reaches of the major Slovak rivers (Váh, Hron, Ipe) with its inflows and number of water canals. The whole southern border of Nitra Self-governing region consists of the river Danube.

There are no water supply flows or basins (used or possibly used as sources of drinking water) in the region. There are no water management protected areas in the region.

In the region is located 83 subterranean water resources in the catchment basins of rivers Danube and Hron (mainly in counties Levice – 54 and Nové Zámky - 22) and 736 subterranean water resources in the catchment basin of river Váh (mainly in counties Nové Zámky - 242 and Nitra – 238).

The relation between the quantity of withdrawn water and features (quantity, spatial and time distribution, hydrological characteristics) of usable ground water is an important indicator in term of water resources protection, utilization and sustainable development.

According the data of Slovak hydro meteorological institute (2004) the average quantity of natural sources of ground water in the region is 146 700 l/s and the usable quantity of ground water is 76 198,4 l/s. The highest quantity of usable ground water is located in counties Komárno and Ša a.

### *Waste*

A balance of waste production according the economic activities enables to identify those sectors, which produce the highest volume of the waste or the significant volume of particular type of waste: industry 41%, agriculture 19,6%, wholesale, retail, repair of motor vehicles and motorcycles and personal and household goods 11,4%, this sector produces also the highest share of hazardous waste (36,5%).

Counties producing the highest share of waste are Nitra, Topo any and Nové Zámky. In terms of hazardous waste, the most burdened counties are Nitra, Levice and Ša a.

### Municipal waste

In 2005, 218 168,64 tons of municipal waste were produced, what is 307,9 kg per inhabitant per year. Counties with the highest municipal waste production per inhabitant are Ša a 360, 87 kg and Nitra 320,62 kg.

The share of separately collected components of municipal waste varies between 2, 56% in Zlaté Moravce county and 5, 34% in Ša a county. The data refers to the level of separated municipal waste collecting, which is not adequate. The average quantity of separated waste per inhabitant was 11, 2 kg.

### Waste management

#### Waste valorisation

The level of waste valorisation depends on the accessibility of particular types of waste in the place of its generation, organization of waste collecting from its producers and producer's costs of services related to collecting and processing of the waste.

Only 2, 33% of total waste produced in 2005 was valorised. The main way of valorisation of municipal waste was composting (60%). The other ways of waste valorisation are negligible, since the fact that there is not a municipal waste incineration plant in the region.

#### Landfills

The share of waste stored in landfills is in the long term stable. In 2005, 48% of total waste produced was stored in landfills of all classes. The highest share of storing in landfills indicates municipal waste, 94% of total municipal waste production was stored in landfills. Such a high share of waste stored in the landfills is caused by two reasons:

- high share of mixed municipal waste, caused by low level of separated collecting of waste
- low share of municipal waste processed by burning, what causes a storage of mixed municipal waste with high share of combustible parts (high share of organic carbon).

#### Waste combustion

Waste combustion is used in municipal as well as in industrial sector; however the share of waste combusted, only 5, 5%, is not sufficient.

#### Facilities of waste management

Infrastructure of waste management for waste processing, in general, mainly consists of landfills and incineration plants.

The number of landfills in 2006 was 26. During the pursuance of Waste management plan of Nitra Self-Governing region until 2005, the capacity of several existing landfills was increased. Since 2009 all the landfills must be up to standards of respective regulations of EU concerning the waste management and landfills.

There is no municipal waste incineration plant in the region and only industrial waste incineration plant is located in the region (DUSLO inc. Ša a).

### *Water management*

#### Potable water.

Resources of surface water are used for supplying of the potable water. Reserves of ground water are localised mainly in the river alluvia.

Existence of quality water resources (with its features: substantiality, quality and localization) is one of the key factors determining expansion of the public water pipelines.

For the supplying of the Nitra Self-governing region are used ground water resources, mainly located outside of the region (in the counties Dunajská Streda and Galanta, in the Trnava Self-governing region). These major resources (Gabíkovo and Jelka) supply the ducts in the counties: Zlaté Moravce, Nové Zámky, Levice, Ša a and partially Komárno. The future development of the public water pipes in the region is also based on these resources. Such water resources are not used in the area of Nitra Self-governing region.

The most important sources of ground water are located within alluvial sediments of the rivers Danube, Váh, Nitra, Žitava and Hron. Many of the resources were polluted by the agriculture and by the deficiently treatment of sewage. The pollution caused that the resources are not usable as the potable water resources.

#### Water management infrastructure

The current state of supplying of the potable water is not satisfactory. The share of households supplied by drinking water was 87, 9 % (2006).

From a total of 354 settlements of the region, the public water piping was established in 311 (at least in the part of settlement), what is 87, 9 %. The only county with 100 % share is Ša a, the lowest share is in Levice county – 76,4 %.

#### Waste water

Total of 37 734 000 m<sup>3</sup> of waste water was drained into water flows in 2003, what is of 4 739 000 less than in 2002. The amount of sewage water of the total waste water was 48, 1 %. The amount of treated waste water was 95, 7 %.

The causes of water pollution in Nitra Self-governing region.

The most significant source of area pollution are agriculture, decanting plants and spread landfills, contaminated irrigation and rainfall water.

The quality of water resources is in the long term negatively affected by the past situation in agriculture and industry. In the areas with intensive agriculture are often exceeded the limits of nitrates, ammonia and nitrites. Many of the resources were removed from the supplying of the drinking water.

The water resources are also affected by the industry, mainly in counties Zlaté Moravce, Ša a and Levice.

#### Waste water treatment management

The share of inhabitants living in the households connected to sewage was 45 % (2005). There is 81 public sewage systems registered in the region. Public sewage is established or in construction in 103 municipalities. Total number of municipalities with sewage water treatment plant is 67. Total amount of waste water drained into water flows from public sewages in 2004 was 38 144 thousands m<sup>3</sup>. Municipal waste water treatment plants treated 36 431 thousands m<sup>3</sup> of waste water. Total length of sewage network is 726 km.

#### Flooding risk management

Important tool of flooding risk management is the project „Flooding warning and forecasting system (POVAPSYS). The main objective of the project is to, through hydrological forecasts and warnings, decrease damage caused by flooding. This will be achieved by establishing of the integrated automatized flooding forecasting and warning system.

The system will enable to issue hydrological forecasts within approximately 100 forecasting profiles, as well as issue the warnings of flooding danger for the relevant areas or watercourses. The system will cooperate with related systems of adjacent countries.

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Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	6,81	5,23	5,63	4,91
Atmosphere pollution ash - emission per 1000 inhabitants (t)	6,18	3,3	4,82	4,32
Atmosphere pollution CO - emission per 1000 inhabitants (t)	12,19	8,91	9,36	9,7
Capacity of landfills per 1000 inhabitants (t)			501,53	524,17

## Budapest f város

### *General Information*

#### *Land use*

Although in Budapest the percentage of agricultural land and agricultural employment is extremely low, food industry is a leading sector. A number of internationally known products are made here such as the Herz salami or the Törley champagne. Budapest also hosts several events related to certain agricultural produce including the International Wine and Champagne Festival and FeHoVa (an international exhibition of arms, hunting and fishing). Markets around Budapest are also well-known. The Great Market Hall is a popular tourist attraction among foreign travellers. Special food markets have been established to sell Hungarian organic products that have also gained considerable popularity by now.

### *Nature conservation and landscape*

#### *Protected areas*

The Danube-Ipoly National Park is one of the most diverse national parks in Hungary. In 1997, the 60 314 ha park was created from Pilis and Börzsöny national parks, with the addition of part of the floodplain of the River Ipoly. This park encompasses areas in Budapest, Pest County, Komárom-Esztergom County and Fejér County. Its offices are in Budapest and in the Jókai garden (Budapest XII), and its headquarters are in Esztergom.

Besides parts of the national park, there is a landscape protection area in Budapest:  
Landscape protection area of Buda.

Other nature conservation areas:

- Buda Sas Hill Nature reserve
- Budapest Botanic Garden Nature reserve
- Háros Island Floodplain Forest Nature reserve
- Jókai Garden Nature reserve
- Surface of Pálvölgyi Cave Nature reserve
- Surface of Szeml hegyi Cave Nature reserve.

#### *Ecological networks*

More than 3 000 ha national protected and Natura 2000 area can be found in the area of the city, but their state is not always suitable. The natural habitats are broken up into little bits, size of the population reduce, the measure of the green areas decreases.

### *State of the environment*

#### *Air quality and pollution*

The emission of all major atmosphere pollution materials have dropped in the past 15 years in Budapest to approximately 25% of their 1996 value. Originally CO was the most important compound but due to changes in heating systems and filtration the quality of Budapest is moderate, from 2002 to 2008 its emission changed from 2300 to 1100 tons/year. Concentrations of SO<sub>2</sub>, CO, benzene and lead are below set limits in Budapest as it is throughout the country. Decreased emissions of sulphur dioxide over the past one to two decades resulted in a lower ambient air concentration of that pollutant

Today the major source of air pollution is transportation: both NO<sub>x</sub> and ash pollution among the worst in the country, and their proportion is significantly higher along the traffic corridors. This is due to the vast number of cars on the road, rising by about 20 000 each year. Many people have moved out to the agglomerate in the past years, but the railway or metro routes have not been developed so quickly, so going to work by car is the only option for many.

NO<sub>x</sub> changed from 15 273 939 to 3 683 247 tons in the same time period. An assessment of the health effects of PM<sub>10</sub> in Budapest and other cities, based on data from 2004, suggests that 170 premature deaths per 100 000 inhabitants per year can be attributed to long-term exposure to high PM concentrations.

## Water

The main river of Budapest is Danube, and several smaller water-course can be found in the area of city (their total registered length is 170 km) The small creeks have low water flow, from this point of view their importance is negligible compared to the Danube. The quality of the Danube is good or bearable, only the aspect of microbiological parameters it belongs to the polluted or highly polluted category. Before finish of the investments of waste water treatments the state of the river was much worse. The quality of smaller water-courses is bad, because of the lot of illegal pollution.

Lots of small lakes are in and around the city.

Budapest has significant amount of ground water. The most part of the area of the city belong to the sensitive category from the aspect of water bases, and six districts (II., IV., V., XII., XXI., and XXII.) belong to the highly sensitive category. Special natural facility is the 120 sources with different temperature.

## Waste

More than 1 269 000 t waste was generated in the economy (data from 2008), from which 87 000 t was hazardous waste. The public sanitation companies collected 892 000 t settlement solid waste but only approx. 5,2 percent come from selective collectors. The rate of households where the waste is collected regularly: 98,6 %. More than 606 000 t waste get into land fills without treatment.

## Water management

The length of flood protection main lines is 53,5 km. The endangered areas are III., IV., XIII., XXI., XXII., XXIII., (high risk), XI. (medium risk), I., II., V., IX., and XX. (mildly risk) Districts. The main water bases can be found under the Szentendre and Csepel Island. The 739 pieces well supply with drinking water the capitol and 21 settlements.

## Indicators of natural conditions

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	2,813	2,813	2,936	3,05
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)		2,06943806	0,091298703	0,032801231
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)		8,831105753	1,943778847	2,157266673
Atmosphere pollution ash - emission per 1000 inhabitants (t)		20,2346	15,1097	9,3899
Atmosphere pollution CO - emission per 1000 inhabitants (t)		1,339150195	0,714485982	0,667739345
Capacity of landfills per 1000 inhabitants (t)	0,12	0,13	0,13	77,09

## Pest megye

### *General Information*

#### *Land use*

The agricultures of Bács-Kiskun and Pest counties, located on the left side of the Danube have a lot in common (and a lot of dissimilarities with counties on the other side of the river in Transdanubia) despite the fact that agriculture has a much higher economic importance for Bács-Kiskun county than for Pest county. Unlike in the counties of Transdanubia, soil in a major part of agricultural lands is mostly unsuitable for farming. The reason for this is that a large part of both counties is situated in Homokhátság, a mostly sand-covered territory. Homokhátság includes large areas of high natural value where nature-friendly farming and land use practices are especially encouraged. Horticulture (in particular the cultivation of vegetables and fruits) is of key importance within agricultural activities in the area. Kecskeméti apricot palinka is produced from apricots grown in the region. An application to register Kecskeméti apricot palinka as a protected geographical indication has been submitted to the European Commission. Homokhátság holds extended areas of grape plantations that are part of the Duna wine region. Two wine sub-regions – Hajós-Baja and Kunság sub-regions – are found in the area. Kunság wine sub-region is the largest wine region of Hungary with a total area of 27903 ha. Hajós-Baja wine sub-region covers a territory of 2304 ha. Each wine sub-region has their own wine route association.

Soil conditions in areas close to the Danube in Bács-Kiskun and Pest counties (Duna plain) are of better quality. A typical vegetable grown here - mostly in nutrient-rich alluvial fields – is pepper from which paprika is made. Most process plants where paprika is produced are based in Kalocsa. An appeal to register paprika as a protected geographical indication has been submitted to the European Commission. The areas around Kalocsa are also nationally important sites of garlic cultivation. Another unique product of the region is oyster mushroom dominated by ZONIKA Ltd. that produces mostly for exports. Hartai sausages are also typical products of the region.

The cultivation of vegetables and fruits is an important occupation in areas of Pest county lying close to Budapest (due to the need for these products in the capital city). Typical local plants are raspberries and red currants (Szob sub-region), strawberries (Tahitótfalu) and sauerkraut of Vecsés. Szobi Szörp Gyümölcsfeldolgozó Zrt. based in Szob is a leading actor in the process industry of berries.

#### *Nature conservation and landscape*

##### *Protected areas*

There are two NPs in the region.

The Danube-Ipoly National Park is one of the most diverse national parks in Hungary. In 1997, the 60 314 ha park was created from Pilis and Börzsöny national parks, with the addition of part of the floodplain of the River Ipoly. This park encompasses areas in Budapest, Pest County, Komárom-Esztergom County and Fejér County. Its offices are in Budapest and in the Jókai garden (Budapest XII), and its headquarters are in Esztergom.

The Kiskunság National Park (Hungarian: Kiskunsági Nemzeti Park) is a national park located mainly in Bács-Kiskun county, but some parts are situated in Pest county. It was created in 1975 and declared a biosphere reserve by the UNESCO. The park covers an area of 570 km<sup>2</sup> and stretches across the Little Cumania (Kiskunság) region of the Great Hungarian Plain.

It is not a single territory, but comprises seven disjoint units, scattered throughout the area.

Besides parts of the national parks, there are the following landscape protection and nature conservation areas in Pest region:

Landscape protection area of Ócsa (also protected area on the basis of the Ramsar convention)

Landscape protection area of Buda

Landscape protection area of Gödöll Hills

Landscape protection area of Tápió-Hajta

Érd Kakukk Hill Natural reserve

Budakalász Botanical Garden Nature Reserve

Cegléd Meadow Nature reserve

Csévharaszi Nature reserve

Dabas Nature reserve

Fót Somlyó Nature reserve  
 Gellérthegy Nature reserve  
 Royal Park of Gödöllő Palace Nature reserve  
 Geographical Center of Hungary (Pusztavacs)  
 Peregő Park Forest Nature reserve  
 Habitat of Szentendrei rose Nature reserve  
 Tura Pasture Nature reserve  
 Vácrátót Botanical Garden Nature reserve.

The Pilis Biosphere Reserve is a biosphere reserve of the UNESCO Man and Biosphere Programme. Additionally there are 33 areas of Natura 2000 in Pest county.

### *Ecological networks*

Settlement and road network of Pest county is dense. The rate of national and local protected area is relative high (11 %). Due to the national and international prescriptions, the ecological network is quite good, protected areas and ecological corridors are appointed.

### *State of the environment*

#### *Air quality and pollution*

The county surrounding the capital city is a relatively unindustrialized region that serves as the site for logistics, commerce and suburban homes – these have relatively low air pollutant emissions, thus the overall grade of air quality is good.

Transportation is a source of NO<sub>x</sub> and ash. The amount of NO<sub>x</sub> has been 15 000 and 2 000 tons per year in the past decade with no growing or decreasing trend. The overall ash pollution of the region remained under 0,5 per year in the same period.

The biggest sites of industry can be found in the city of Százhalombatta (SW of Budapest), and the town of Vác. Százhalombatta hosts an electric power station and an oil refinery of MOL (the only in operation in Hungary). In the past years many measures have been brought about in order to lower emissions (the power station was modified from oil to gas consumption), but especially the refinery spouts high amount of benzene. As wind is in N-S direction, this emission is much more a problem of Fejér county. Vác is the home of a cement factory, it has a high emission of PM 10.

#### *Water*

The country is rich in water-courses. In addition to Danube, Ipoly and Galga River also pass through the county, and several creeks and canals can be found in the area. A special facility of the Danube is the Ráckevei Danube Branch, because its water level is fixed.

There is not large natural lake in Pest county, but several upset and mine lake can be found in the area. The mine lakes mean a lot of problem, because their management is not solved.

The quality of the surface water is quite different. The state of creeks and the upset lakes is quite good, but quality of water of the mine lakes and the Ráckevei Danube Branch is not suitable.

The state of ground waters is quite different. In several place the first layer of water is high polluted, so the deeper layers ensure the drinking water.

#### *Waste*

More than 675 000 t waste was generated in the economy (data from 2008), from which 57 000 t was hazardous waste. The public sanitation companies collected 1 046 000 t settlement solid waste but only approx. 5,4 percent come from selective collectors. The rate of households where the waste is collected regularly: 92,4 %.

#### *Water management*

The flood and inland water cause several problems in the county. The experiences of recent years show that the dams can protect the endangered areas, but they need to renew. Unfortunately there is quite few sources to these works, so the implementation is slow.

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	2,951	2,951	2,939	3,3
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)		5,775232472	1,983319949	0,529832123
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)		7,420873028	12,54827933	1,956558749
Atmosphere pollution ash - emission per 1000 inhabitants (t)		12,8401	10,2403	6,6229
Atmosphere pollution CO - emission per 1000 inhabitants (t)		3,803379668	4,301249092	1,31959756
Capacity of landfills per 1000 inhabitants (t)	12,62	11,52	19,29	6168,68

## Fejér megye

### *General Information*

#### *Land use*

In Fejér county, 84% of the agricultural lands is used as arable land. The Agricultural Research Institute of the Hungarian Academy of Sciences is based in the town of Martonvásár. This partly explains the significance sowing seed production has in the region. The share of grasslands in Fejér county is 11%, the majority of which are found on the brims of Vértes mountain, in Zámoly basin and in Sárvíz valley. Zámoly basin and Sárvíz valley are included in the System of Areas of High Natural Value. Farming practises in use in Zámoly basin have been adjusted to insure the least harm to nature. Pro Vértes Public Foundation that manages this area is specialized in extensive livestock cultivation (the indigenous Hungarian cattle) and grassland cultivation designed to protect bird species. Fejér county has two wine sub-regions: Mór wine sub-region and Etyek-Buda wine sub-region (part of which is located in Pest county). Mór wine sub-region is included in the North Transdanubian wine region and is situated in the Mór trough between the mountains of Bakony and Vértes covering a territory of 890 ha. Móri Ezerjő Wine Route Association is based in this wine region. The total area of Etyek-Buda wine sub-region is 1480 ha and its typical grape varieties are Chardonnay, Italian Riesling, Rheinriesling and Sauvignon blanc. The Etyek and Velence districts of Etyek-Buda wine sub-region are located in Fejér county. Etyek Wine Route Association is based in this wine region.

#### *Nature conservation and landscape*

##### *Protected areas*

There are no National Parks in the region.

Its landscape protection areas are:

- Landscape protection area of Vértes
- Landscape protection area of Sárrét
- Landscape protection area of the Valley of Sárvíz
- Landscape protection area of Southern Mez föld

Nature conservation areas:

- Bels báránd Nature reserve
- Nature reserve of Adony
- Botanical Garden of Alcsút Nature reserve
- Dinnyés Marsh Nature reserve
- Martonvásár Park Nature reserve
- Pákozd Rocking Stones Nature reserve
- Rácalmás Islands Nature reserve
- Rétszilas Lakes Nature reserve
- Sand Pit of Székesfehérvár Nature reserve
- Bird Sanctuary of Velence Nature reserve.

The protected areas on the basis of the Ramsar convention:

- Lake Velence – Dinnyés Marsh
- Rétszilas Lakes.

Besides these, there are 27 Natura 2000 areas.

##### *Ecological networks*

The significant parts of natural habitats of Fejér can be found in the northern area. In the middle and southern part of the county the landscape is characterized by agriculture, so natural values place mosaic-like. Due to the national and international prescriptions, the ecological network is quite good, protected areas and ecological corridors are appointed.

## State of the environment

### Air quality and pollution

Fejér county is featured both historically and at present as an industrialized region, however it is more a territory of less polluting processing industry than of an area of heavy or chemical industry. Many of the mines on the northern part of the region have been closed in the past decades; the only major source of air pollutants is Dunafer Zrt. steel factory.

NOx emission was 2000-2500 tons per year in the region – this value is relatively good in national comparison, the only location of higher concentration was Székesfehérvár where NOx-air quality is moderate.

Due to heavy industry Dunaújváros has a higher PM 10 value.

### Water

The county has quite few water-courses, and their flow is usually low. The more importance one is the Séd, Gaja, and the waters of Malom channel. Their water are usually polluted or high polluted.

The bigger lake of the county is Velencei Lake, and some smaller still water can be found in the area. The significant part of them is artificial.

The state of ground waters is quite bad. In several place the first layer of water is high polluted, so the deeper layers ensures the drinking water.

### Waste

More than 403 000 t waste was generated in the economy (data from 2008), from which 46 800 t was hazardous waste. The public sanitation companies collected 221 000 t settlement solid waste but only approx. 6,7 percent come from selective collectors. The rate of households where the waste is collected regularly: 92,8 %. More than 358 000 t from whole amount of waste get into land fills without treatment.

### Water management

The registered length of water-courses is almost 300 km. The length of flood protection main lines is 31 km, their state is average. In the area of the county 2 inland protecting sectors can be found, their total protected area is 203 km<sup>2</sup>.

### Indicators of natural conditions

Indicator	1996	2001	2005	2008
Water pollution index	2,952	2,952	2,952	4,2
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)		3,237959712	3,756723018	4,969271741
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)		4,691309064	4,704070561	6,703498563
Atmosphere pollution ash - emission per 1000 inhabitants (t)		5,0154	3,8142	2,3564
Atmosphere pollution CO - emission per 1000 inhabitants (t)		89,99568428	50,89776347	53,02812809
Capacity of landfills per 1000 inhabitants (t)	89,11	88,46	12,6	1026,4

## Komárom-Esztergom megye

### *General information*

#### *Land use*

In Komárom-Esztergom county, the percentage of agricultural land is relatively low (56.2%), a major part of which is used as arable land (81%). The share of grasslands that are found in distant patches in the area is 15%. Vineyards cover 1.17% of the land included mostly in Ászár-Neszmély wine sub-region whose total area is 1494 ha and is part of the North Transdanubian wine region. Hilltop Zrt., a major importer of wine, is based in Neszmély. The town of Bábolna in Komárom-Esztergom county is home to a world-famous stud farm (breeding Arabian horses) and to internationally acclaimed selective breeding of poultry (Tetra SL).

### *Nature conservation and landscape*

#### *Protected areas*

The Danube-Ipoly National Park is one of the most diverse national parks in Hungary. In 1997, the 60 314 ha park was created from Pilis and Börzsöny national parks, with the addition of part of the floodplain of the River Ipoly. This park encompasses areas in Budapest, Pest County, Komárom-Esztergom County and Fejér County. Its offices are in Budapest and in the Jókai garden (Budapest XII), and its headquarters are in Esztergom.

Besides parts of the national park, there are the following landscape protection and nature conservation areas in Komárom-Esztergom region:

Landscape protection area of Vértes

Landscape protection area of Gerecse

Dunaalmás Quarry Nature reserve

Tata Kálvária Hill Nature reserve

Vértessz l s Prehistoric finds Nature reserve.

Protected area on the basis of the Ramsar convention:

Őreg Lake of Tata.

Biosphere reserve of the UNESCO Man and Biosphere Programme:

Pilis Biosphere Reserve.

Additionally, there are 19 Natura 2000 areas in Komárom-Esztergom county.

#### *Ecological networks*

Due to the national and international prescriptions, the ecological network is quite good, protected areas and ecological corridors are appointed. The ecological network nets the whole area of the county: the ecological system of Danube connects to the ecological system of Vértes hill via natural areas of rivers and forests. The core areas are usually the protected and Natura 2000 areas.

### *State of the environment*

#### *Air quality and pollution*

Komárom-Esztergom county is one of the most industrialized regions of Hungary and this has a significant mark on air quality. The region is situated in a mountain range rich in minerals and natural resources (bauxite, coal, kaolin, industrial sand, limestone, dolomite). These natural conditions and the closeness of Budapest, major consumer of industrial goods and Danube as transport corridor were the basis of the industrial image of the region – though nowadays transformation is going on for more than 20 years and processing industry is much more important, raw material producing heavy industry is still present.

the most polluting materials are SO<sub>x</sub> (5 147 tons, emission is the biggest value in the country), PM 10 ash (4000 tons in 2008), NO<sub>x</sub> (4000 tons in 2008) both were the third worst values in the year among the 20 Hungarian NUTS 3 regions.

There have been numerous projects aiming at decreasing emissions (e.g. Retrofit program at Oroszlány power station), but new heavy polluting factories are soon to be put into operation (Holcim Hungária Zrt. Cement factory of Nyergesújfalu). Though the technology is the most up-to-date available, dust and ash pollution is likely to grow.

*Water*

The area of the county is rich in rivers; the number of registered water-courses is almost 250. The biggest river is the Danube, and its larger creeks are the Cuhai-Bakony brook, the Conco, the Fényes-ckreek, the Sz ny-Füzi i canal, the Által-brook, the Bicol-creek, the Bajóti creek, the Únyi creek and the Szentlélek-creek.

The more significant lakes and reservoirs are Tatai Öreg-Lake, környei and kecskédi lake, bánhidai and bokodi lake of cooling water, Palatinus-lake, Feketevízéri-lakes. Almost 120 lakes are registered, which area is bigger than half hectare.

*Waste*

More than 1 058 000 t waste was generated in the economy (data from 2008), from which 36 000 t was hazardous waste. The public sanitation companies collected 176 000 t settlement solid waste but only approx. 6,7 percent come from selective collectors. The rate of households where the waste is collected regularly: 92,6 %. More than 863 000 t waste get into landfills without treatment

*Water management*

The state and water quality of the lakes and reservoirs is substandard; the degradation and water supply causes several problems.

The length of flood protection main lines is 22,62 km, the exempted area is 44 km<sup>2</sup>.

There is not area in the county which is covered regularly by inland water In the area of the county 1 protecting sectors can be found, the protected area is 20,79 km<sup>2</sup>,the length of Sz ny-Füzi i drainage canal is 12,783 km.

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	2,786	2,786	2,818	2,933
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)		370,5107615	12,04456107	16,36311036
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)		32,87892966	20,01186688	12,92008558
Atmosphere pollution ash - emission per 1000 inhabitants (t)		3,7009	2,805	1,73
Atmosphere pollution CO - emission per 1000 inhabitants (t)		3,373251726	5,831902857	5,76698702
Capacity of landfills per 1000 inhabitants (t)	5,03	4,93	3,44	559,71

## Gy r-Moson-Sopron megye

### *General information*

#### *Land use*

In Gy r-Moson-Sopron county, the majority of agricultural lands (87%) are used as arable land. The share of grasslands is relatively low (9.4%) and these are rather fragmented with larger undivided areas of grassland remaining in the region of Hanság only. Most grapevine plantations are situated in the hills of Pannonhalma and Fert mellék and in Sopron mountain. The county has two wine sub-regions: Sopron wine sub-region and Pannonhalma-Sokoróalja wine sub-region. Sopron wine region is a single independent wine region covering a territory of 1800 ha where the dominant grape variety grown is Kékfrankos. Pannonhalma-Sokoróalja wine sub-region is part of the North Transdanubian wine region covering a territory of 750 ha. Both wine regions have wine routes and wine route associations. Two areas in the county are listed as areas of high natural value (Hanság and Mosoni-sík) where incentive payments are made to encourage agricultural activities promoting the protection of nature. Livestock and dairy production also plays an important role in the county's agriculture. Óvártej Zrt. that makes various types of cheese popular all over Hungary is based in the Mosonmagyaróvár sub-region.

### *Nature conservation and landscape*

#### *Protected areas*

The Fert -Hanság National Park (Hungarian: Fert -Hanság Nemzeti Park) is a national Park in North-West Hungary in Gy r-Moson-Sopron county. It was created in 1991, and officially opened together with the connecting Austrian Neusiedler See National Park the same year (both parks are attached to Lake Neusiedl/Lake Fert). The park covers 235.88 km<sup>2</sup>, and consists of two main areas.

Other landscape protection and nature conservation areas:

- Landscape protection area of Pannonhalma
- Landscape protection area of Sopron
- Landscape protection area of Szigetköz
- Bécs Hill Nature reserve
- Pine-groove of Feny f Nature reserve
- Ikva Stream Area Nature reserve
- Liget Stream Area Nature reserve
- Linden Park-way of Nagycenk Nature reserve
- Pannonhalma Botanical Garden Nature reserve
- Sopron Botanical Garden Nature reserve.

Protected areas on the basis of the Ramsar convention:

- Lake Fert
- Nyirkai-Hany.

Biosphere reserve of the UNESCO Man and Biosphere Programme:

- Lake Fert Biosphere Reserve.

Additionally 16 Natura 2000 are located in the region.

#### *Ecological networks*

Settlement and road network of the county is dense, so the rate of natural habitats is quite low. Their location is mosaic-like, and they are protected. Due to the national and international prescriptions, the ecological network is quite good, protected areas and ecological corridors are appointed.

## *State of the environment*

### *Air quality and pollution*

The state of the air is not wholly suitable in the county, but the tendency of air pollution is regressive. The pollution generated in industry decreases in recent years, but the noise and pollutants came from transport increased.

In the larger cities (such as Győr, Sopron, etc) which are more considerably pollutant, the air quality is acceptable (by the data of Hungarian Air Quality Network).

### *Water*

The area of the county is rich in water; the largest of them are Danube. Other rivers are Rába, Rábca, Lajta and Marcal. The most importance still water is Lake Fertő (the whole area of the lake is 335 km<sup>2</sup>, but only 82 km<sup>2</sup> belongs to Hungary), and several smaller lake can be found in Hanság (e.g. lake Király, Fehér and Barbacs) and Szigetköz (e.g. near Dunaszeg and Lipót)

The quality of the rivers and Lake Fertő is quite bad: they usually belong to the category 3 (bearable) or 4 (polluted).

The state of ground waters is quite different, but the water bases, founded in deeper layer, are not polluted. The level of water decreased after the river controlling. There was thermal and mineral water in several place (e. g. Balf)

### *Waste*

More than 510 000 t waste was generated in the economy (data from 2008), from which 45 500 t was hazardous waste. The public sanitation companies collected 287 600 t settlement solid waste but only approx. 3,5 percent come from selective collectors. The rate of households where the waste is collected regularly: 95 %. More than 394 000 t waste get into land fills without treatment in 2008.

### *Water management*

The water level of the Danube is controlled, which cause several problems for the living world, the agriculture and forestry.

The water network is dense, but the water flow is quite low in the county. A part of the water-courses is channel; their function is the drainage in rainy period, and watering in dry period.

About 1500 km<sup>2</sup> area is endangered by floods, but their protection is solved. The length of flood protection main lines is 355 km, but only 75 percent of them meet to the standards.

In the area of the county 9 protecting sectors can be found, their total protected area is 2246 km<sup>2</sup>. 2800 km drainage canals can be found in this area, but their state is generally quite neglected.

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	2,725	2,725	2,725	2,667
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)		1,200064671	0,351662114	0,139104526
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)		1,3321401	2,207530561	1,75002468
Atmosphere pollution ash - emission per 1000 inhabitants (t)		5,138	3,9228	2,4514
Atmosphere pollution CO - emission per 1000 inhabitants (t)		1,001951528	1,67436542	1,877911099
Capacity of landfills per 1000 inhabitants (t)	5,94	5,81	10,16	7101,94

## Baranya megye

### *General information*

#### *Land use*

In Baranya county, the percentage of agricultural land (59.76%) is slightly lower than the regional and national average (62%). The county has two wine sub-regions: Mecsekalja and Villány-Siklós wine sub-regions, both part of the Pannon wine region. Villány wine sub-region is one of the best-known wine regions in Hungary. The sub-Mediterranean climate of Villány mountain is primarily ideal for the cultivation of red wine grapes. Villány wine sub-region has a well-developed wine tourism industry. Villány-Siklós Wine Route Association is based in the region. Mecsekalja wine sub-region is divided into several districts with a relatively fragmented network of settlements and a total area of only 500 ha. Pécs-Mecsek Wine Route Association is based here.

#### *Nature conservation and landscape*

##### *Protected areas*

Danube-Drava National Park was founded in 1996 and is located in the south west of Hungary (Baranya, Tolna and Somogy counties). Current area is 490 square kilometres and the majority of national park sites are located within Danube and Drava floodland areas. Altogether 190 km<sup>2</sup> are Ramsar wetlands. Black stork and White-tailed eagle populations are of European significance. Seven invertebrate species are found only here in Hungary. Habitats along the Drava host more than 400 protected plants and animals. Species endemic to national park areas are the black hawthorn and the Drava caddis fly.

Besides parts of the national park, there are the following landscape protection and nature conservation areas in Baranya region:

- Landscape protection area of Eastern Mecsek
- Landscape protection area of Western Mecsek
- Landscape protection area of Zselic
- Surface of the Cave of Abaliget Nature reserve
- Loess-wall of Dunaszekcs Nature reserve
- Fekete Hill Nature reserve
- Jakab Hill Nature reserve
- Melegmány Valley Nature reserve
- Historical Memorial Park of Mohács Nature reserve
- Nagy-Mez –Arany Hill Nature reserve
- Pintér Garden Nature reserve
- Szársomlyó Nature reserve
- Szentegát Forest Nature reserve
- Villány Templom Hill Nature reserve.

Areas on the basis of the Ramsar convention:

- Béda-Karapanca
- Szaporcai Ó-Dráva meder.

Additionally, there are 19 Natura 2000 areas in Baranya county.

##### *Ecological networks*

Settlement and road network of Baranya county is quite dense, and the rate of the agricultural utilized area and the area covered forest is importance. There are relatively many natural habitats. The national and local protected area is 7 percent of the country area. Due to the national and international prescriptions, the ecological network is quite good, protected areas and ecological corridors are appointed.

## State of the environment

### Air quality and pollution

The region has distinguished natural conditions because the rate of the area covered plants is high (large forests in the Mecsek and Villány Mountain). In the larger cities (such as Pécs and Mohács) which are more considerably pollutant, the air quality is good or excellent (by the data of Hungarian Air Quality Network).

### Water

The quantity and quality of groundwater is quite good in the county. The most part of water base is built layer of water and there are 75 vulnerable water base in the county. Baranya has importance stocks of thermal water (the most significant source can be found in Harkány, but several other source are knew, e.g. Szigetvár, Sikonda, etc.).

The hilly area of the county is rich in rivers, but significant amount of water is delivered by only the Danube and Drava. There are not natural lakes in the county, but it has several artificial still waters, the greatest of them is the lake Orf.

### Waste

More than 320 000 t waste was generated in the economy (data from 2008), from which 5 700 t was hazardous waste. The public sanitation companies collected 421 000 t settlement solid waste but only approx. 9 percent come from selective collectors. More than 270 000 t from whole amount of waste get into land fills without treatment

### Water management

The significant part of the surface water is small water-courses, their quality was invariable in the recent years.

There are 71 settlements, which concern the category "high risk" in the point of view of flood.

72 km main protection line belongs to the left riverbank of the Drava. The exempted area is 336,7 km<sup>2</sup>.

The big rivers (Danube and Dráva), and bigger creeks (Baranya canal, Hábi canal, and Kapos water-course) have monitor system, which can sign if the flood comes

### Indicators of natural conditions

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	2,929	2,929	2,929	2,8
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)		41,13494065	0,100166778	0,101068292
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)		8,986015451	6,287969469	4,30803594
Atmosphere pollution ash - emission per 1000 inhabitants (t)		4,7446	3,5541	2,1767
Atmosphere pollution CO - emission per 1000 inhabitants (t)		11,64433725	4,870609565	6,329401777
Capacity of landfills per 1000 inhabitants (t)	5,86	5,87	2,96	197,51

## Tolna megye

### *General information*

#### *Land use*

In Tolna county, the percentage of agricultural land (73.93%) significantly exceeds the national (62.28%) and the regional average (62.58%) as well. Agricultural land used for farming purposes is dominant here too (84.93%). Tolna county has two wine sub-regions: Szekszárd and Tolna wine sub-regions. Both of them are part of the Pannon wine region. Szekszárd wine region covers an area of 2300 ha and is famous for Szekszárdi Bikavér (bull's blood) that contains 2-3 various types of red grapes. Settlements within Tolna wine sub-region – whose total area is 3150 ha – are relatively fragmented. Both wine sub-regions have established wine route associations.

#### *Nature conservation and landscape*

##### *Protected areas*

Duna-Dráva National Park was established in 1996. Gemenc is part of the Danube-Drava National Park, and it is a nature reserve. The frequent floods of the Danube do great injury to its wildlife.

Gemenc is a unique forest that is found between Szekszárd and Baja, in Hungary. This is the only remaining tidal area of the Danube in Hungary. The wood's fauna include stags, boars, storks, grey herons, gyrfalcons, meadow eagles, and kites. Various amphibians and reptiles can also be found. The stag population has worldwide fame, since its genetic stock is outstanding, and the stags' antlers are impressive. Due to the various watery habitats, many fish species are present.

Other landscape protection areas in the region:

Landscape protection area of Southern Mez föld

Landscape protection area of Eastern Mecsek

Bölcske Nature reserve

Kapszeg Lake Nature reserve

Pacsmag Lakes Nature reserve

Szakadát Pasture Nature reserve.

Protected areas on the basis of the Ramsar convention:

Gemenc

Pacsmag Lakes.

Besides the upper, there are 22 Natura 2000 areas in the region.

##### *Ecological networks*

Settlement and road network of Tolna county is middling dense. The rate of national and local protected area is relative low (5 %). Due to the national and international prescriptions, the ecological network is quite good, protected areas and ecological corridors are appointed.

#### *State of the environment*

##### *Air quality and pollution*

The region has distinguished natural conditions because industrial activity is high only in the bigger settlements. In the larger cities (such as Szekszárd, Dombóvár, Paks, etc) which are more considerably pollutant, the air quality is good or acceptable (by the data of Hungarian Air Quality Network).

##### *Water*

The state of ground waters is quite different. In several place the first layer of water is high polluted, so the deeper layers ensures the drinking water.

The area of the county is rich in rivers; the largest of them are Danube and its canals Sió and Szekszád-Bátai main channel. There are several large natural still water, the most importance of them are the backwaters of Danube. The flood and inland waters can cause several problems in the county, because the state of dams and other defense works is not suitable in lots of place.

#### *Waste*

More than 95 000 t waste was generated in the economy (data from 2008), from which 2 900 t was hazardous waste. The public sanitation companies collected 120 000 t settlement solid waste but only approx. 2,5 percent come from selective collectors. More than 114 000 t from whole amount of waste get into land fills without treatment

#### *Water management*

The registered length of water-courses is 332 km, 55 percent of them is in good condition. The navigable river is the Danube, and periodically the Sió channel, when the water of Lake Balaton is bled.

The length of flood protection main lines is 211 km, but only 75 percent of them meet to the standards. The exempted area is 58 800 ha.

The inland water endangers the inhabitants and inner area of the next settlements: csény, Bogyiszló, Sióagárd, Nagydorog, Németkér és M csény. In the area of the county 4 protecting sectors can be found, their total protected area is 64860 ha. 485 km drainage canals can be found in this area, but their state is generally quite neglected.

#### *Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	2,868	2,868	2,895	3,8
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)		0,93324308	0,188410309	0,290952638
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)		4,514012665	0,511984534	0,695756308
Atmosphere pollution ash - emission per 1000 inhabitants (t)		2,9211	2,1729	1,3043
Atmosphere pollution CO - emission per 1000 inhabitants (t)		1,345792596	1,441748448	4,174537849
Capacity of landfills per 1000 inhabitants (t)	12,21	12,08	7,65	2170,65

## Bács-Kiskun megye

### *General information*

After the Danube breaks through the mountains, the landscape is featured by flat plains, and according to natural characteristics the Duna menti Plain (4400 km<sup>2</sup>), the Duna-Tisza közti Plain (plain between the Danube and the Tisza; 7400 km<sup>2</sup>), the Bácska Flatland (1900 km<sup>2</sup>) and Mez föld (4400 km<sup>2</sup>) might be separated from each other. Due to natural features the area is predominantly composed of mosaics of diverse types of agricultural land. A 50-60 m high elevated bank runs along the right bank of the Danube between Budapest and Paks. The bed of the Danube is accompanied by low flood-plain surfaces in narrower and wider zones. The high floodplains, which rise by 2-5 meters over their environment are covered by silty-sandy strata. The Duna-Tisza közti Plain in effect is a series of ridges (Alpár sand-ridge, Kiskunság sand-ridge, Bugac sand-ridge). Genetically the alluvium system of the Danube, which is a residual of a depression, is an elevated relief constituted by shifting sand and sandy loess.

### *Land use*

The agricultures of Bács-Kiskun and Pest counties, located on the left side of the Danube have a lot in common (and a lot of dissimilarities with counties on the other side of the river in Transdanubia) despite the fact that agriculture has a much higher economic importance for Bács-Kiskun county than for Pest county. Unlike in the counties of Transdanubia, soil in a major part of agricultural lands is mostly unsuitable for farming. The reason for this is that a large part of both counties is situated in Homokhátság, a mostly sand-covered territory. Homokhátság includes large areas of high natural value where nature-friendly farming and land use practices are especially encouraged. Horticulture (in particular the cultivation of vegetables and fruits) is of key importance within agricultural activities in the area. Kecskeméti apricot palinka is produced from apricots grown in the region. An application to register Kecskeméti apricot palinka as a protected geographical indication has been submitted to the European Commission. Homokhátság holds extended areas of grape plantations that are part of the Duna wine region. Two wine sub-regions – Hajós-Baja and Kunság sub-regions – are found in the area. Kunság wine sub-region is the largest wine region of Hungary with a total area of 27903 ha. Hajós-Baja wine sub-region covers a territory of 2304 ha. Each wine sub-region has their own wine route association.

Soil conditions in areas close to the Danube in Bács-Kiskun and Pest counties (Duna plain) are of better quality. A typical vegetable grown here - mostly in nutrient-rich alluvial fields –is pepper from which paprika is made. Most process plants where paprika is produced are based in Kalocsa. An appeal to register paprika as a protected geographical indication has been submitted to the European Commission. The areas around Kalocsa are also nationally important sites of garlic cultivation. Another unique product of the region is oyster mushroom dominated by ZONIKA Ltd. that produces mostly for exports. Hartai sausages are also typical products of the region.

The cultivation of vegetables and fruits is an important occupation in areas of Pest county lying close to Budapest (due to the need for these products in the capital city). Typical local plants are raspberries and red currants (Szob sub-region), strawberries (Tahitótfalu) and sauerkraut of Vecsés. Szobi Szörp Gyümölcsfeldolgozó Zrt. based in Szob is a leading actor in the process industry of berries.

### *Nature conservation and landscape*

#### *Protected areas*

The Kiskunság National Park (Hungarian: Kiskunsági Nemzeti Park) is a national park located mainly in Bács-Kiskun county, Hungary. It was created in 1975 and declared a biosphere reserve by the UNESCO. The park covers an area of 570 km<sup>2</sup> and stretches across the Little Cumania (Kiskunság) region of the Great Hungarian Plain. It is not a single territory, but comprises seven disjoint units, scattered throughout the area.

One of these is the Kiskunság's Puszta where annual events are held reviving the old pastoral life and cattle breeding customs.

Another is Lake Kolon near the town of Izsák. It is famous for its marsh tortoises, herons, expanses of untouched reeds and nine species of orchids which grow in the vicinity. An interesting natural phenomenon is the sand dunes in the vicinity of Fülöpháza. They are said to move under favourable wind conditions.

The nature conservation areas in the region:

Habitat of Grecian foxglove Nature reserve of Bácsalmás  
 Red Marsh of Császártöltés Nature reserve  
 Geological excavation of Csólyospálos Nature reserve  
 Lake Földvári of Dávod Nature reserve  
 Seven-valley of Érsekhalom Nature reserve  
 Meadow of Hajós and loess banks Nature reserve  
 Sand-steppe of Hajós Nature reserve  
 Kalmár Forest of Jászszentlászló Nature reserve  
 Sand-drifts of Kéleshalom Nature reserve  
 Meadows of Kisk rös Nature reserve  
 Fejeték Marsh of Kiskunhalas Nature reserve  
 Kunfehértó Forest Nature reserve  
 Szalag Forest of Kunpeszér Nature reserve  
 Lake Péteri Bird Sanctuary Nature reserve  
 Lake Szelidi Nature reserve.

The protected areas on the basis of the Ramsar convention:

Kiskunság  
 Upper-Kiskunság  
 Lake Kolon (Izsák)  
 Csongrád-Bokros Saline Lake.

The biosphere reserve of the UNESCO Man and Biosphere Programme:

Kiskunság Biosphere Reserve.

Besides these, there are 46 Natura 2000 areas in the region.

#### *Ecological networks*

Settlement and road network of Bács-Kiskun county is quite sparse, but the rate of the agricultural utilized area is importance (the county is characterized by agrarian activity), so there are relatively few natural habitats. Due to the national and international prescriptions, the ecological network is quite good, protected areas and ecological corridors are appointed.

#### *State of the environment*

##### *Air quality and pollution*

The region has distinguished natural conditions because the main activity is agriculture. In the larger cities (such as Kecskemét, Baja, Kalocsa, etc.) which are more considerably pollutant, the air quality is good (by the data of Hungarian Air Quality Network).

##### *Water*

The quantity of groundwater is few or quite polluted, so it is not suitable for living world, and it may not use for human aims. The surface water cause a lot of problems too: in some areas flood can cause damages, while lack of water must be got over in other areas. Flood can cause damage to the society and economy. The existing protective system (e.g. dikes, drain canals) must be renovated and increased, because they are not suitable to defend from a bigger flood (as the examples of recent years shows). Lack of water is a quite serious problem in Homokhátság, which is a very arid area of Bács-Kiskun county. Because of the water management activities in the past, the balance of water supply was upset. This affects seriously to the living world (changing of the habitats), and it caused difficult situation for the agriculture.

##### *Waste*

More than 268 000 t waste was collected in the economy (data from 2008), from which 14 400 t was hazardous waste. The public sanitation companies collected 237 000 t settlement solid waste but only less than 2 percent

come from selective collectors. More than 300 000 t from whole amount of waste get into land fills without treatment

### *Water management*

There are two big river (Danube and Tisza), and two big lake (Szelidi and Vadkerti Lake) in the county. Flood endangers 1675,4 km<sup>2</sup> along the Danube. The length of flood protection main lines is 130 km. The state of a part of the dam (about 25 percent) is not suitable.

The water management must wrestle with several problems, because the water supply of the area is very unbalanced. The inland water must be led from the area in rainy period, and then lack of water causes problems in dry seasons.

### *Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	3	3	2,984	3,15
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)		0,05504062	0,102006751	0,071422664
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)		0,599942758	0,799361994	0,689792574
Atmosphere pollution ash - emission per 1000 inhabitants (t)		6,3771	4,7987	2,9262
Atmosphere pollution CO - emission per 1000 inhabitants (t)		0,48802683	0,654697875	0,452970055
Capacity of landfills per 1000 inhabitants (t)	10,68	10,55	4,65	1932,2

## Osje ko-baranjska županija

### *General information*

Osje ko-baranjska županija is unit of local self-government established in 1993. It is located in the north-east part of Republic of Croatia in Pannonian basin, with the area that makes 7,3% of total area of Croatia. It encompasses the entire lower flow of the Drava river to its estuary into the Danube. The county area extends to Donji Miholjac and Našice in the West, Erdut in the east, Hungarian border in the north and Vukovar-Srijem county in the south. County encompasses several larger geographic units: Baranja in the north-east, Podravina and Našice area in the west and akovo region in the south. Those regions are famous for their wine hills and vineyards. The soil of the region is suitable for growing all kind of crops-cereals, fruit and vegetables, as well as for forest and pasture land thanks to Drava and Danube rivers which run through the area together with their tributaries. The periodically inundated Danube River area has created the Kopa ki rit (Kopa ki Wetlands), a world-known refuge for numerous bird species, proclaimed a Nature Park and protected as a special zoological reservation.

### *Land use*

Osijek-Baranja County is predominantly a plains region suitable for agricultural development. 260,778 ha are arable lands and 82,868 ha are forested. Over 90% of the land is arable land and gardens, orchards take 1% of the land as well as vineyards, meadows 2% and pastures around 6% of the land. The most widely-grown cultures are wheat and maize (cereals) and sugar beet and sunflower (industrial plants). Wet soils along the river flows are more suitable for growing vegetables while hills and slopes make great place for growing fruits and grapevine. In addition, one of the most important agricultural businesses in the region is livestock production, especially pigs and cattle.

The largest forest areas can be found along the rivers Drava and Danube as well as on the Pannonian hills in the western part of the County. Total forest resources in the County count up to 18.663.900 cubic m with various types of trees. The dominant types of trees in the lowland vegetation area are common oak, ash, black alder, willow and poplar. The most common trees in elevated areas which are never reached by floods are oak and hornbeam trees and in hilly areas sessile oak, hornbeam, beech, birch and cerris trees. Average annual allowable cut in the Osijek-Baranja County forests is 370.667 cubic m, with the annual increment of 680.600 cubic m.

### *Nature conservation and landscape*

#### *Protected areas*

Within the county area, in 5 categories of protection (nature park; special reserve; significant landscape; park architecture and nature monument) there are 17 protected nature values which makes around 2% of the county area. The biggest part of the area of protected nature values belongs to the Park of nature "Kopacki rit" with special zoological reserve.

Kopa ki rit is the largest fish nursery in the Danube region.

There are 44 fish species registered in the wetlands, with the largest population of carp, pike, catfish and pike perch.

The most special features of Kopa ki rit are the endangered European bird species who come here to nest regularly: black stork, prairie falcon, white heron and wild goose. Kopa ki rit is the Ramsar Area protected by Ramsar Convention (Convention on internationally important flood areas), included in the IBA (Important Bird Area) list and is nominated for UNESCO - World Natural Heritage.

List of protected areas in OBC:

- NATURE PARK: Kopa ki rit, Bilje, area: 17.700Ha
- SPECIAL RESERVE: Kopa ki rit ( zoological), Bilje, 6.700Ha; Podpanj (ornitological), Donji Miholjac, 84,99Ha
- SIGNIFICANT LANDSCAPES: Erdut, 160Ha
- PARK ARCHITECTURE: Bilje - Park around the castle, 8,00Ha; epin - Park around the castle, 2,32Ha; Dalj- Park near patriarchy Erdut, 1,22Ha; Donji Miholjac- Park around the castle, 13,49Ha; akovo - Strossmayerov perivoj, 8,66Ha; akovo- Mali park, 1,80Ha;

Kneževo- Park around the castle; Popovac, 7,00Ha; Našice- park around the castle, 34,34Ha; Osijek- Park kralja Petra Krešimira IV, 2,43Ha;  
 Osijek- Perivoj kralja Tomislava, 12,00Ha; Tenja- Park around the castle, 2,92Ha; Valpovo - Park, 24,88Ha;  
 NATURE MONUMENT: Meadow area in Bilje cemetery, 0,62Ha.

### *Ecological networks*

Ministry of Environmental Protection and Physical Planning (MEPPP) applied and implemented (through the European Commission LIFE III Fund in 2002.), the project "Building-up the National Ecological Network as a Part of the Pan-European Ecological Network & NATURA 2000 Network" (project acronym CRO-NEN). Implementation of this project is one of the obligations Croatia has to meet in the accession process to the European Union. Concept of Ecological network represents implementation of EU legislation according to the following guidelines: Conservation of wild birds (Council Directive 79/409/EEC) and Conservation of natural habitats and wild fauna and flora (Council Directive 92/43/EEC). Based on these Directives, state members of EU are obliged to determine the areas important for conservation of threatened European species and habitats. These areas then become part of the EU ecological network NATURA2000.

New nature protection law (NN 162/03) defines National ecological network (NEN) as network of nationally and internationally important areas. NEN, once established, will be included in PEEN, that is developed by European Centre for Nature Conservation. Within the project, ECNC is coordinating three workshops with the purpose of training Croatian governmental "nature protection" staff on the issues of ecological network.

All national parks and nature parks, including majority of special reserves, present and suggested by spatial plans are included in ecological network area. Ecological network area enclose majority of natural corridors like waterflows, forest corridors, swamp areas as a birds removal route station and other landscape elements, which provide wild species movement.

Except in NEN, OB county is a part of the Biosphere Reserve Mura-Drava-Danube, proclaimed by Croatian-Hungarian Cooperation between Ministries responsible for nature conservation. Goals of the Biosphere are:

- to ensure proper management of the core zone in biosphere reserve
- to encourage development of mutual relations between parks and institution in the region with proposals for new projects that could be applied for financing.

Since March 2008 Croatian and Hungarian Ministries responsible for nature conservation work on preparation of Croatian-Hungarian Trans-boundary Biosphere Reserve Mura-Drava-Danube.

### *State of the environment*

#### *Air quality and pollution*

The basic legislation is Air Protection Act (Official gazette 178/04), defining measures, way of organizing, implementing and controlling protection and improvement of air quality. Air quality and pollution levels have been continuously monitored in Osijek-Baranya County since 1995. The most intensive measurements in the County were conducted during 2005 and 2006 on 22 monitoring stations, which has created great prerequisites for good evaluation of air quality. Results of measurements are delivered to Institute for medical research and the Occupational Health in Zagreb to create a single report for the Republic of Croatia. Since 2009 monitoring is carried out also in the towns Našice, Beli Manastir, akovo, Valpovo and Beliš e. All together, air quality in Osijek-Baranya County is good, and implementation of the four-year Programme for Air Quality Protection and Improvement in Osijek-Baranya County for the period 2010-2014 will provide opportunities for good monitoring and maintaining of air quality.

#### *Water*

According to the distribution of the water pollution by counties, Osijek-Baranja county belongs to lower lever polluted areas with 9%.

Sewage and waste water treatment in the Osijek-Baranja County, which greatly lags behind water supply, had already been recognized as one of the important factors in protecting groundwater and surface water resources. Drainage of waste water is organized only in larger settlements, while small settlements and rural areas don't have waste water drainage systems. Public sewerage system usually discharge waste water into the receiver with

no previous treatment, which often leads to degradation of eco-system in receivers with smaller quantities of water. The basic legislation covering water protection is Water Act (Official gazette 107/95, 150/05), defining legal status of water, way and conditions of water management (use, water protection, etc.), way of organizing and carrying out water management, work of water inspection, etc. With the Water Act the current situation of drainage and wastewater treatment in the Osijek-Baranja County has been fully recorded along with the basic objectives and priority actions to address these issues. Insight into the elaborate of the Water Act may be viewed in the County Department of Physical Planning.

### *Waste*

Two groups are to be distinguished today in the classification of waste: first refers to municipal waste which includes household waste, waste from cleaning of public surfaces and the waste of similar type produced in economy, institutions and services. Second group, the so-called industrial waste is generated by production processes and services, and, according to some of its attributes it is different from the first group. Waste collection in the Osijek - Baranja County is carried out in 136 settlements, i.e. in 51% of all settlements. There are approximately 300,000 inhabitants in the settlements with organized waste collection (90% of the County population). Waste is deposited on a number of landfills, but it needs to be emphasized that there is also a great number of non-sanitary landfills, the so - called "wild " dumpsites, which aggravates the waste - related problems. Unfortunately, the majority of landfills has no inspection certificate.

The category of the so-called hazardous waste is not regulated in a satisfactory manner, as only two companies have the authorization for waste collection, however, temporary storage and processing can be performed by only one of them, and that only for one category of

hazardous waste. Hazardous waste represents one of the main problems which are not solved also at the state level, and as such, it creates serious danger for health of people and animals as well as for the environment.

There is also inert waste which does not cause grave

consequences for ecology, but has adverse effects on landscapes and, in general, represents obstacle for the smooth functioning of the entire area. There are altogether 14 landfills where municipal firms deposit waste and they are located in all larger settlements where specialized

firms for the collection, distribution, destruction and storage of waste are operating. OB county supported the project of regional waste landfill and it is already planned by the new urbanistic plan.

### *Water management*

Croatia can be considered a water-abundant country, with overall renewable resources amount to 71.4 BCM or 14,900 m per capita, out of which about 60% are generated within Croatia and the remaining from upstream countries (namely, Slovenia, Austria, Bosnia and Herzegovina and Hungary). Resources are unevenly distributed throughout the country. With flows of border rivers included, overall renewable resources amount to 156.3 BCM or 35,200 m<sup>3</sup> per capita.

For the purpose of water management, Croatian territory is divided into four water districts plus the Zagreb Metropolitan Area water district. These water districts are:

- \* the Sava River basin,
- \* the Drava and Danube basin,
- \* the Dalmatian basin,
- \* the Istrian and Littoral basin.

The Osijek - Baranja County water supply system is organized in seven water supply areas which although they cover the entire area of the County do not match its territorial distribution. Water supply areas are the following: water supply area of the Osijek city, Našice, akovo, Valpovo, Beliš e, Donji Miholjac and Baranja. The management structure is based on companies providing utility services which are increasingly going through the process of transformation into capital firms with a concession profile. Except numerous firms managing water supply there is also a number of waterworks managed by utility companies in the ownership of municipalities. The most important water supply systems have the following characteristics:

- water supply area Osijek which supplies the Osijek city and its suburbs has approximately 400 km of compression pipelines and approximately 27,000 water connections. Within the frame of this water supply system the coverage is 92%. Big consumers which do not require sanitary quality of water have their own system of industrial water.

- water supply area Našice includes the town of Našice and parts of municipalities Donja Motina, Podgora and Đurđinovac. The system is based on the using of underground waters. The total length of water supply network is 140 km. Except the central water pumping site Velimirovac, there is also water pumping site Toplice, located in the mountainous area, with a drilled well. There is one more water pumping site, Seona, for which hydrological research needs to be carried out.

- water supply area Donji Miholjac covers the town of Donji Miholjac. This water pumping site was built back in 1981 in the same time when water network was built.

Currently, the water network numbers 1,600 connections for households and 100 companies. Works on the improvement of industrial water on the water pumping site Donji Miholjac are currently in process.

- water supply area Valpovo ensures the supply of households, industrial water, water for processing and industrial water. Water pumping site Jarovac is designed as a compression-based supply system where, by means of the pumps, the purified underground water is being pressured into transport and distribution network. Supply and distribution network extends in the total length of 58 km.

- water supply area Đakovo includes several separate water supply systems and smaller waterworks. The most important is the system of the town of Đakovo with the settlements Đakovačka Satnica, Đakovački Selci, Piškorevci, Budrovci, Novi Perkovci and Pisak. The water supply system consists of scooping up of underground water on the three water pumping sites: Trslana, in the southern part of Đakovo, Paščin Bunar and the basin, located in the settlement but without the ensured sanitary protection zones.

- water supply area Belišće is based on the scooping up of water from the Drava River. The system ensures drinkable water for the needs of Belišće industry as well as water supply systems of Valpovo and Belišća. Water abstracted from the River Drava is characterized by significant oscillation in quality.

- water supply area Baranja is based on water pumping sites Livada, Meće and Prosine, as well as on the new water pumping sites Topolje, Nove Livade, Silmeđe and Zlatna Greda, and the system itself encompasses the following settlements: Beli Manastir, Branjin Vrh, Šumarine, Šećerana and Karanac.

The characteristic of underground waters, used in the majority of water supply areas in the Osijek - Baranja County for the supply of water is an increased concentration of organic substances and metals such as iron, manganese and especially arsenic which even with the current water processing method does not fall up to the level of 10 g/l, which is the maximum allowed value as per the Rulebook on Sanitary Quality of Drinking Water. Based on that, it can be concluded that almost half of the population of the Osijek - Baranja County is drinking sanitary unsafe water, considering the concentration of arsenic.

### *Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index				2,02
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)			9,92	9,73
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)			8,93	9,28
Atmosphere pollution ash - emission per 1000 inhabitants (t)			7,82	7,79
Atmosphere pollution CO - emission per 1000 inhabitants (t)			7,41	7,54
Capacity of landfills per 1000 inhabitants (t)			3340	4250

## Vukovarsko-srijemska županija

### *General information*

Vukovar–Srijem County, one of 21 Croatian regional self-governments, is situated at the very north-east of Croatia, between rivers Danube and Sava and comprises historic regions Eastern Slavonia and Western Srijem (Syrmlia). Bordering with Serbia in the East and Bosnia and Herzegovina in the South. It covers an area of 2448 km<sup>2</sup> or 2.8% of Croatia's total surface area, or 4,3% of land of Croatian territory. The local countryside is mainly flat, its highest peak being akula near the city of Ilok (294 meters above sea level), and the lowest peak at Spa va in Posavina (78 m).

The Vukovar-Srijem County has a moderate continental climate, characterized by sunny and hot summers, and cold, snowy winters. The mean annual temperature hovers around 11°C with a mean maximum temperature of 29.9°C, and a mean minimum temperature of 12. 2°C). The wettest periods of the year are spring and mid-summer, which benefits crop production.

### *Land use*

The Vukovar-Srijem County has the most fertile plough land (150,000 ha of very fertile soil). The most fertile soil is crnica (black soil) in the Vukovar plains. Soil, mild continental climate and favourable annual rainfall arrangement enable quality agricultural production. Ancient forests, which cover an area of over 70,000 ha, constitute a great natural heritage. Especially well-known are common oak forests.

### *Nature conservation and landscape*

#### *Protected areas*

In Vukovar-Srijem County is protected 1.342,23 ha of natural values, i.e. approximately 0.55% of total surface area of the County, which is considerably less than the total protected areas in Croatia according to the Law on the Protection of Nature (approximately 9% of the total territory).

Protected natural values of the County:

3 special reserve of forest vegetation:

Lože (108,7 ha; year of protection: 1975)

Radiševo (4,1 ha; year of protection: 1975)

and Vukovar Danube ait 115 ha; year of protection 1989)

5 natural monuments - a rare specimen trees in

Ivankovo (- ; year of protection 1999)

Županja (- ; year of protection 1976)

Stari Mikanovci (- ; year of protection 1999)

Drenovci (- ; year of protection 1961 and 1999);

4 monuments of landscape architecture:

parks Lenije in Vinkovci (4 ha; year of protection 1999)

parks in Nuštar (13,17 ha; year of protection 1971)

park in Ilok (5 ha; year of protection 1973);

3 significant landscape:

the area along the river Vuka (694.81 ha; year of protection 1999)

Spa va (278.0 ha; year of protection 1999)

Virovi (185 ha; year of protection 1999);

3 forest parks:

Kunjevci (25.98 ha; year of protection 1999)

Kanovci (18.16 ha; year of protection 2003)

Zvirinac (39.05ha; year of protection 1999).

### *Ecological networks*

New nature protection law (NN 162/03) defines National ecological network (NEN) as network of nationally and internationally important areas. NEN, once established, will be included in PEEN, that is developed by European Centre for Nature Conservation. Within the project, ECNC is coordinating three workshops with the purpose of training Croatian governmental "nature protection" staff on the issues of ecological network.

All national parks and nature parks, including majority of special reserves, present and suggested by spatial plans are included in ecological network area. Ecological network area enclose majority of natural corridors like waterflows, forest corridors, swamp areas as a birds removal route station and other landscape elements, which provide wild species movement

In Vukovar-Srijem county there are 17 areas and 2 points important for all various kinds of species - 96.347 ha. The largest areas include huge area of Spa va with swamps and oak forests in the south of Vukovar-Srijem county.

Spa va basin is the largest area of alluvial pedunculate oak forests in Croatia, including the forest vegetation reserve Radiševo. It is an important area for preservation of bird species, primarily black stork (*Ciconia nigra*), white-tail eagle (*Haliaeetus albicila*), and lesser spotted eagle (*Aquila pomarina*). These are endangered species at the EU level. There are also some other species in this area. This area is at risk due to changeable water regime of the forest, hunting, poaching, disappearance of pastures and meadows

### *State of the environment*

#### *Air quality and pollution*

In Vukovar-Srijem County there are no stations for continuous monitoring of air quality, however, the results of measurements in neighboring counties can be concluded that the air quality satisfactory.

Although that there is no systematic measurements, it is assumed that most pollution comes from: the heating of premises and equipment (16 contaminants according to data from 2004.), emissions from process technology (Dilj - Vinkovci, PIK - Vinkovci, Plinacro - machinery Slavonia, etc.), emissions from industrial plants (Sladorana - Zupanja, PIK - Vinkovci, Cestorad - Vinkovci, etc.), traffic (exhaust gases of vehicles), unregulated disposal (eg landfill Bazjaš in Privlaka and Petrova ka dola in Vukovar, which occasionally leads to inflammation of waste), Cattle farms (reek, ammonia and nitrogen) and septic tanks.

Pollen content in the air is not continuously measures. However, ambrosia has been detected (*Ambrosia artemisiifolia* L.). Map of ambrosia areas has been developed only for the town of Vinkovci.

According to the data obtained by conducting surveys in towns and municipalities of the County (June-August 2006), most units of local self-government has listed traffic as the main source of air pollution, while in towns also industry is given. Traffic is the primary source of nitrogen dioxide (road traffic accounts for 40%, and non-road traffic accounts for 24.7% of the total emissions), heavy metals (70.6% is due to road traffic) and carbon monoxide (road traffic accounts for 40%, and non-industrial heating furnaces for 39.4%) in Croatia. Besides traffic, sources of emissions in non-industrial settlements are non-industrial heating furnaces on solid and liquid fuels.

Unregulated waste dumps are an important problem. Dumped waste sometimes catches fire, producing smoke, gases and soot which are then air-borne together with waste residues to the environment.

Special form of air pollution are odours produced by irregularly maintained septic tanks and from livestock farms built in the vicinity of settlements. Agriculture (especially livestock farming) is the main source of ammonium emissions in the air (90.7 % of ammonium discharged in the air in Croatia originates from agricultural activities).

#### *Water*

Vukovar-Srijem County has a highly developed hydrographic network. Its area is bounded by two large rivers (the Sava and Danube) and divided by many rivers and extensive drainage network from I to IV order. Rivers, streams and canals I and II order extending the length of 851 km a detailed canal network III and IV in order of length of 4748 km. Condition of surface water is monitored at 12 stations.

According to the National Programme for monitoring surface water quality, water is controlled at the river basin of the Danube, Drava and Sava in 12 stations in the County, namely in Vukovar, Borovu and Iloku (Danube), Bršadin and Tordinci (Vuka), Gunja and Županja (Sava), Vinkovci, Lipovac and Andrijaševci (Bosut) and Apaševci (Spa va).

Water quality is worse than acceptable according to the State Plan for Water Protection. Surface water is most often polluted by discharged untreated municipal waste water, pollution from farm accidents, illegal waste dumps, traffic and agricultural areas, and cross-border pollution.

### *Waste*

Waste Management Plan for Vukovar-Srijem County was developed in 2008 for the period until 2011. However, implementation level is very low. Namely, location was determined and preparation works started on construction of the County Waste Management Centre. As this is a very complex and expensive project, it will require a lot of time and huge financial investments.

The envisaged County Waste Management Centre – Stari Jankovci should be used for prevention purposes. It should provide possibilities for systematic waste disposal and processing in accordance with the current Croatian and EU regulations.

Waste is deposited to 6 official landfills and 85 unauthorized dumping sites which are occasionally maintained. System of separate collection of waste is in the process of foundation (it is possible only in 12 settlements and only for some types of waste).

Organized waste collection in VSC is carried out by 20 municipal companies and concession holders. This service is available to 70% of the population.

The recycling yard system has been still not fully in place. Development opportunities are seriously restricted due to required modifications in physical plans, which still have not been adopted by units of local self-government.

The implementation level for adopted waste management plans at local level is very low.

### *Water management*

More than 95% of the County population is supplied with drinking water from water supply system. In addition to the Regional water supply system for eastern Slavonia, part of population is supplied from local water supply systems in which water meets only the lowest acceptable standards (heavy metal pollution). In the County there are 42 public water supply systems and 72 public wells (2003).

The town of Vukovar and adjacent settlements are supplied with water directly from the Danube (previously treated), and they have no alternative solution in the event of potential larger river pollution. This means that use of drinking water would be forbidden in the event of an accident.

Towns and settlements of Vukovar-Srijem County have been connected to the regional water supply network of eastern Slavonia in phases. Water source of good quality can be found in Brod-Posavina County. So far the following towns and settlements have been connected to this water supply system: Vinkovci, Županja, Gradište, Cerna, Andrijaševci, Rokovci, Ivankovo, Mikanovci and Voinci.

Water supply infrastructure is in bad condition. The network is more than 30 years old. There are large water losses (for example, over 50% in some local systems) due to war damages and defects caused by old system.

Water supply in the County is mostly managed by public companies at town levels, but there are also some local water supply networks. Only 15 water wells is protected in sense that water protection zones have been declared.

In terms of the number of settlements connected to water supply network, the situation is relatively satisfying.

The existing network of public wells and piezometric wells requires reconstruction and decision whether to be further used or abandoned. Registry of polluters for every water supply system should be developed as a proposal for protection of wells. This should be done in accordance with Regulations on determining the zones of sanitary protection (Official gazette 55/02).

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index				
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)			9,92	9,73
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)			8,93	9,28
Atmosphere pollution ash - emission per 1000 inhabitants (t)			7,82	7,79
Atmosphere pollution CO - emission per 1000 inhabitants (t)			7,41	7,54
Capacity of landfills per 1000 inhabitants (t)				

## Beogradska oblast

### *General information*

The Serbian part of the Danube region comprises two natural/geographic entities: the Pannonia plain and the Balkan Peninsula. Rivers Sava and the Danube form a natural border between the two.

The northern part of the region is mainly lowland whereas its southern and south-eastern parts are marked by hilly and mountainous landscapes. The lowland includes Vojvodina and areas marginal to the Pannonian Plain (Posavina, Pomoravlje, Stig and Negotinska krajina), whereas the upland belongs to the Carpathian-Balkan Mountain range (southeastern and eastern part of the Danube region) and the Dinaric Alps (Sumadijske planine). Total surface of the Serbian part of Region is 2,931,498 ha. The farmland has the biggest share (66.4%), followed by the forest (15.3%) and building land (12.6%). The miscellaneous areas occupy 5.7% of the total surface. The share of arable land in total farmland is 91.1%.

The biggest share of farmland is in Vojvodina's counties; the forestland has a high share in Branicevski and Borski County, whilst the biggest percentage of building land can be found within the City of Belgrade (38.27%).

The Law on the protection of nature (Official Journal of the Republic Serbia n°36/09) defines seven types of protected areas, namely:

1. national parks,
2. natural parks,
3. landscapes of extraordinary importance,
4. rigorous natural reserves,
5. special natural reserves,
6. natural monuments,
7. protected habitats.

In Serbian part of the Danube region there are 11 vast (with surface above 1,000 ha) and 174 small protected areas (with surface below 1,000 ha).

Large protected areas include 2 national parks, 7 special natural reserves, 1 natural monument and 1 landscape of extraordinary importance, the total surface being 196,331 ha. These areas are spread over eight counties (City of Belgrade, Zapadnbacki, Juznbacki, Srednjobanatski, Juznobanatski, Sremski, Branicevski and Borski County).

All large protected areas are within I category of protection, the exceptions being Special Natural reserve Kardjorjjevo that is within II category and Landscape of extraordinary importance Kosmaj within III category.

Activities on identification areas for Natura 2000 ecological networks (SPA and SAC) have started.

The Regulations on the Ecological Networks was adopted by the Government of the Republic of Serbia in 2011. The Ecological Network includes ecologically important areas, ecological corridors and buffer zones from where it is needed.

Danube with protected areas included is one of the ecological corridors of international importance according to the Regulations on the Ecological Networks.

In Serbian part of the Danube region, 22 areas were included in the EMERALD network that establishes areas that are important for implementing Bern Convention (The Convention on the Conservation of European Wildlife and Natural Habitats - Bern, 1979). Areas within EMERALD network (EMERALD network of Areas of Special Conservation Interest - ASCI) have total surface of 215,271.15 ha.

Areas of particular importance at the international level in the Serbian part of the Danube area are 23 Important Bird Areas (IBAs) with total surface of 411,368 ha, 21 Important Plant Areas (IPAs) with total surface of 244,758.03 ha and 9 Prime Butterfly Areas in Europe (PBAs) with total surface of 177,266 ha. According to the Ramsar Convention 6 areas with total surface of 48,370 ha is protected in Serbian part of the Danube region.

The main sources of air pollution in the Danube area are thermal plants, rayon heating systems, households, motor vehicles and industry. The biggest air pollution comes from the combustion of low quality lignite and motor fuels. The main sources of air pollution are thermal plants situated in Kolubarski and Kostolacki lignite basins. Kolubarski basin (thermal power plants Nikola Tesla A and B and Kolubara A) emits 112,864 tons of SO<sub>x</sub>, 30,650 tons of NO<sub>x</sub> and around 4,400 tons of particles per year. Kostolacki basin releases 103,000 tons of SO<sub>x</sub>, 9,800 tons of NO<sub>x</sub> and 2,800 tons of particles per year. Thermal plants also produce 5.5 million tons of fly-ash that is being stored contrary to regulations. Other important sources of pollution are oil refineries, cement factory, chemical industry, as well as steel factory. Pollution from the traffic is facing an increase, especially in the big cities.

According to the Regulation on water classification (Official Journal of the Socialist Republic of Serbia n ° 5/68), there exist following water classes in Serbia: I, IIa, IIb, III and IV, as well as OC (out of class). Regulation on water

classification makes distinction between four classes of water quality, according to their level of contamination and their use:

class I – waters which in their natural state or after disinfection could be used for providing drinking water to the settlements, within the food industry and for breeding noble fish species (salmonidae family);

class II – waters which are convenient for bathing, recreation and water sports, for breeding less noble fish species (cyprinidae family), as well as for providing drinking water to the settlements and food industry after being properly treated (coagulation, filtration and disinfection);

class III – waters which can be used for irrigation and in industries, except food production;

class IV – waters which can be used only after a special treatment; as well as

OC (out of classes).

There are two sub-classes within the water class II: sub-class IIa, including waters which, after a regular treatment (coagulation, filtration and disinfection) can be used for providing drinking water to the settlements, for bathing and for the production of food and sub-class IIb, including waters which can be used for water sports, recreation, for breeding less noble fish species (cyprinidae family) and as drinking water for the cattle. Division of water into classes and sub-classes has been performed according to different indicators and their limit values, defined by this Regulation.

Water quality class of the Danube when it enters Serbia from Hungary is III, while its quality at the exit, when it enters Romania and Bulgaria, is in class II/III.

Water quality assessment of accumulations (artificial lakes) is being practiced at three points on the surface (at the dam, in the middle and at the beginning of lake) as well as along its depth (surface, middle depth and bottom).

The monitoring of ground water regime is being performed in five areas (Velika Morava, Kolubara, Backa, Banat and Srem). When evaluating the quality of ground waters situated along riversides a special attention is given to dangerous and harmful materials that have previously been detected in the rivers.

Nine regional water supply systems within the Danube Area are planned to be established: Timo ki, Mlavsko-moravski, Kolubarski, Savsko-beogradski, Sremski, Novosadski, Ba ki, Gornja Tisa and Južnobanatski.

Spas of national importance within the Danube area are: Selters, Banja Junakovi , Vrdni ka Banja, Banja Rusanda, Banja Slankamen and Palana ki Kiseljak.

According to the National Waste Management Strategy, there are 59 landfills for communal waste within the Danube area. Data on communal waste amounts that are generated at NUTS<sub>4</sub> (municipal) level are incomplete and unreliable. Total estimated amount of communal waste in Serbia is 2,374,374 t/year. Estimated amount of communal waste produced on yearly basis is 1,543,545 t/year in the Danube area. However, installations for biological treatment and incineration of communal waste do not exist. Installation for treatment or disposal of dangerous waste does not exist either. Biggest amounts of non-dangerous industrial waste come from processing industries. Important amounts of waste come also from agriculture, exploitation of mineral resources and construction. Ten regional waste management centres are planned to be established in the Danube area. They should include: a regional landfill, an installation for separation of recycling waste, transfer stations, a composting installation and centres for separate collection of recycling waste.

The new Law on waters (Official Journal of the Republic of Serbia n° 30/2010) is harmonised with the Water Framework Directive (2000/60/EC) as the basic framework for water management in the EU member states. During the preparation of this law, other relevant EU documents were also taken into account. According to the new Law, integrated water management consists of measures and activities for maintaining and improving water regimes, ensuring required water quantities and demanded quality for different purposes, protection of water from pollution and protection from water harmful effects. Competences for water management in Serbia are entrusted to the Ministry of agriculture, forestry and water management (Republic Office for Waters), other relevant ministries, provincial bodies, local self-governments (municipalities and cities) and public water management companies („Srbijavode“, „Vode Vojvodine“ and „Beogradvode“).

The Republic Office for Waters, within the Ministry of agriculture, forestry and water management, is responsible for: water management policies; multiple water use; risk management (protection from floods, ice, erosion etc.); water protection and rational water use; management of water regimes; control and management of border rivers' regimes; water supply (except water distribution); other responsibilities prescribed by the Law.

Public water management companies are responsible for: management of water resources; control, management and improvement of water regimes; maintenance and reconstruction of water management infrastructure; flood management and drainage; protection of waters from pollution; other activities prescribed by the Law.

Local self-governments are responsible for water distribution and management of local water supply systems as well as for other activities prescribed by the Law.

Water regimes are being maintained and improved according to the Water Management Strategy of Serbia, water management plans, annual water management programmes, risk management plans (flood risk management plans, general and operational flood protection plans) as well as water protection plans (plans for the protection of water from pollution and monitoring programme).

Water bodies or sources that serve as regional water supply systems represent assets of general interest. Their perimeters are designated by the Government. Three protection zones are being assigned within these perimeters: broad protection zone, narrow protection zone and immediate protection zone.

There are nine regional water supply systems planned to be established in the Danube Area: Timo ki, Mlavsko-moravski, Kolubarski, Savsko-beogradski, Sremski, Novosadski, Ba ki, Gornja Tisa and Južnobanatski. The regional water supply systems cover 9.33% of the Danube area in Serbia. Their share is the highest in Brani evski County (4.25% of the Danube area territory) and the lowest in Južnoba ki (0.13% of the Danube area territory). In order to operate the regional water supply systems in the Danube area, there exist 3 artificial lakes (Grlišće, Rovni and Sava lake-WPI Makiš) and 8 more are planned to be created (Bogovina, Zukovac, Okoliste, Vitman and Gradac, Ku evo, Dubo ica, Ribnica and Gornja Ljubovi a).

Underground water sources are the biggest provider of water for households and industry. In Vojvodina, underground water sources are the only sources of water supply. The capacity of underground water sources (Q) above 1000 l/s can be found in three counties, from 500 to 1000 l/s can be found in 5 counties whereas in one county the capacity is under 500 l/s.

### *Land use*

With 49.75% share, farmland is the most present land use in Beogradska oblast although this share is much smaller than in other Serbian Danube regions. Around 94% of farmland is arable. The share of built-up land is very high - nearly 40% of the total area of Beogradska oblast. The forest land occupies less than 10% while miscellaneous areas have the smallest share: 2.37%.

### *Nature conservation and landscape*

#### *Protected areas*

Until 2005 the City of Belgrade had a very small share of protected natural heritage on its territory (only 0.0012%) and that is why this county was ranked at 8th position for all the chosen years (1996, 2001 and 2005).

Concerning the large protected areas the City of Belgrade includes Landscape of extraordinary importance Kosmaj (3,514 ha), under legal protection since 2005.

There are also 37 small-scaled protected areas in the City of Belgrade (2 landscapes of extraordinary importance, 2 natural reserves and 33 natural monuments).

#### *Ecological networks*

EMERALD Areas of Special Conservation Interest in the City of Belgrade are Avala (489.13 ha) and Kosmaj (3,514.50 ha).

IBA in the City of Belgrade is Usce Save u Dunav (9,790.00 ha).

PBAs in the City of Belgrade are Kosmaj (1,171.00 ha) and Avala (502 ha).

There is no protected area based on the Ramsar Convention in the City of Belgrade.

### *State of the environment*

#### *Air quality and pollution*

Average annual values of immissions of SO<sub>2</sub>, smoke and NO<sub>2</sub> were the highest in the Danube region, placing the City of Belgrade at the last (9th) rank in all the chosen years (1996, 2001 and 2005). Emissions of the PM, SO<sub>2</sub> and NO<sub>2</sub> were the highest in the Region in 2007 (8,274.4938 t/year of PM, 128,165.8616 t/year of SO<sub>2</sub> and 34,722.7719 t/year of NO<sub>2</sub>). This is to say that the air quality here is the worst in the Region.

The main sources of the air pollution in the City of Belgrade are: Thermal plants Nikola Tesla A and B in the Municipality of Obrenovac (SO<sub>2</sub>, NO<sub>2</sub>, PM 10); Thermal plant Kolubara in the Municipality of Lazarevac (PM 10).

Thermal power plants Nikola Tesla A and B and Kolubara A emit 112,864 tons of SO<sub>x</sub>, 30,650 tons of NO<sub>x</sub> and around 4,400 tons of particles per year.

Thermal plants (Nikola Tesla A and B, Kolubara A and Kostolac A and B) also produce 5,5 million tons of fly-ash that is being stored contrary to regulations.

*Water*

According to capacity of underground water sources (5946 l/s in both 2001 and 2005), the City of Belgrade occupied 1st rank, with the highest capacity of underground water sources in the region. According to the share of regional water supply sources, the City of Belgrade was ranked on 6th position in both in 1996 and 2001 as the share of 4.72% in both years was below average for the Danube region (9.88%). According to quality analysis of Sava's and the Danube's waters in 1996, 2001, 2005 and 2008, none of the examined river profiles satisfied the demanded II water quality class (Zemun class II/III and Ostruznica class II/III), with exception of the profile at the metering station Ostruznica in 2001.

There is one spa of national importance in the City of Belgrade: Selters spa with hyper-thermal alkaline-muriatic carbo-acidic mineral water "Selters", with a temperature of 50°C.

*Waste*

Estimated amount of communal waste produced on yearly basis is 897,707 t/year in the City of Belgrade. One regional waste management centre is planned to be established in the City of Belgrade.

As far as number of landfills is concerned, with 6 out of 59 communal landfills in the Danube region, the City of Belgrade occupied 4th position in 2003.

*Water management*

There is one regional water supply system planned to be established in Beogradska oblast - Savsko-beogradski regional water supply system.

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index				
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)				93,24
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)				26,56
Atmosphere pollution ash - emission per 1000 inhabitants (t)				8,67
Atmosphere pollution CO - emission per 1000 inhabitants (t)				
Capacity of landfills per 1000 inhabitants (t)				

## Borska oblast

### *General information*

The Serbian part of the Danube region comprises two natural/geographic entities: the Pannonia plain and the Balkan Peninsula. Rivers Sava and the Danube form a natural border between the two.

The northern part of the region is mainly lowland whereas its southern and south-eastern parts are marked by hilly and mountainous landscapes. The lowland includes Vojvodina and areas marginal to the Pannonian Plain (Posavina, Pomoravlje, Stig and Negotinska krajina), whereas the upland belongs to the Carpathian-Balkan Mountain range (southeastern and eastern part of the Danube region) and the Dinaric Alps (Sumadijske planine). Total surface of the Serbian part of Region is 2,931,498 ha. The farmland has the biggest share (66.4%), followed by the forest (15.3%) and building land (12.6%). The miscellaneous areas occupy 5.7% of the total surface. The share of arable land in total farmland is 91.1%.

The biggest share of farmland is in Vojvodina's counties; the forestland has a high share in Branicevski and Borski County, whilst the biggest percentage of building land can be found within the City of Belgrade (38.27%).

The Law on the protection of nature (Official Journal of the Republic Serbia n°36/09) defines seven types of protected areas, namely:

1. national parks,
2. natural parks,
3. landscapes of extraordinary importance,
4. rigorous natural reserves,
5. special natural reserves,
6. natural monuments,
7. protected habitats.

In Serbian part of the Danube region there are 11 vast (with surface above 1,000 ha) and 174 small protected areas (with surface below 1,000 ha).

Large protected areas include 2 national parks, 7 special natural reserves, 1 natural monument and 1 landscape of extraordinary importance, the total surface being 196,331 ha. These areas are spread over eight counties (City of Belgrade, Zapadnbacki, Juznbacki, Srednjobanatski, Juznobanatski, Sremski, Branicevski and Borski County).

All large protected areas are within I category of protection, the exceptions being Special Natural reserve Kardjorjjevo that is within II category and Landscape of extraordinary importance Kosmaj within III category.

Activities on identification areas for Natura 2000 ecological networks (SPA and SAC) have started.

The Regulations on the Ecological Networks was adopted by the Government of the Republic of Serbia in 2011. The Ecological Network includes ecologically important areas, ecological corridors and buffer zones from where it is needed.

Danube with protected areas included is one of the ecological corridors of international importance according to the Regulations on the Ecological Networks.

In Serbian part of the Danube region, 22 areas were included in the EMERALD network that establishes areas that are important for implementing Bern Convention (The Convention on the Conservation of European Wildlife and Natural Habitats - Bern, 1979). Areas within EMERALD network (EMERALD network of Areas of Special Conservation Interest - ASCI) have total surface of 215,271.15 ha.

Areas of particular importance at the international level in the Serbian part of the Danube area are 23 Important Bird Areas (IBAs) with total surface of 411,368 ha, 21 Important Plant Areas (IPAs) with total surface of 244,758.03 ha and 9 Prime Butterfly Areas in Europe (PBAs) with total surface of 177,266 ha. According to the Ramsar Convention 6 areas with total surface of 48,370 ha is protected in Serbian part of the Danube region.

The main sources of air pollution in the Danube area are thermal plants, rayon heating systems, households, motor vehicles and industry. The biggest air pollution comes from the combustion of low quality lignite and motor fuels. The main sources of air pollution are thermal plants situated in Kolubarski and Kostolacki lignite basins. Kolubarski basin (thermal power plants Nikola Tesla A and B and Kolubara A) emits 112,864 tons of SO<sub>x</sub>, 30,650 tons of NO<sub>x</sub> and around 4,400 tons of particles per year. Kostolacki basin releases 103,000 tons of SO<sub>x</sub>, 9,800 tons of NO<sub>x</sub> and 2,800 tons of particles per year. Thermal plants also produce 5.5 million tons of fly-ash that is being stored contrary to regulations. Other important sources of pollution are oil refineries, cement factory, chemical industry, as well as steel factory. Pollution from the traffic is facing an increase, especially in the big cities.

According to the Regulation on water classification (Official Journal of the Socialist Republic of Serbia n ° 5/68), there exist following water classes in Serbia: I, IIa, IIb, III and IV, as well as OC (out of class). Regulation on water

classification makes distinction between four classes of water quality, according to their level of contamination and their use:

class I – waters which in their natural state or after disinfection could be used for providing drinking water to the settlements, within the food industry and for breeding noble fish species (salmonidae family);

class II – waters which are convenient for bathing, recreation and water sports, for breeding less noble fish species (cyprinidae family), as well as for providing drinking water to the settlements and food industry after being properly treated (coagulation, filtration and disinfection);

class III – waters which can be used for irrigation and in industries, except food production;

class IV – waters which can be used only after a special treatment; as well as

OC (out of classes).

There are two sub-classes within the water class II: sub-class IIa, including waters which, after a regular treatment (coagulation, filtration and disinfection) can be used for providing drinking water to the settlements, for bathing and for the production of food and sub-class IIb, including waters which can be used for water sports, recreation, for breeding less noble fish species (cyprinidae family) and as drinking water for the cattle. Division of water into classes and sub-classes has been performed according to different indicators and their limit values, defined by this Regulation.

Water quality class of the Danube when it enters Serbia from Hungary is III, while its quality at the exit, when it enters Romania and Bulgaria, is in class II/III.

Water quality assessment of accumulations (artificial lakes) is being practiced at three points on the surface (at the dam, in the middle and at the beginning of lake) as well as along its depth (surface, middle depth and bottom).

The monitoring of ground water regime is being performed in five areas (Velika Morava, Kolubara, Backa, Banat and Srem). When evaluating the quality of ground waters situated along riversides a special attention is given to dangerous and harmful materials that have previously been detected in the rivers.

Nine regional water supply systems within the Danube Area are planned to be established: Timo ki, Mlavsko-moravski, Kolubarski, Savsko-beogradski, Sremski, Novosadski, Ba ki, Gornja Tisa and Južnobanatski.

Spas of national importance within the Danube area are: Selters, Banja Junakovi , Vrdni ka Banja, Banja Rusanda, Banja Slankamen and Palana ki Kiseljak.

According to the National Waste Management Strategy, there are 59 landfills for communal waste within the Danube area. Data on communal waste amounts that are generated at NUTS<sub>4</sub> (municipal) level are incomplete and unreliable. Total estimated amount of communal waste in Serbia is 2,374,374 t/year. Estimated amount of communal waste produced on yearly basis is 1,543,545 t/year in the Danube area. However, installations for biological treatment and incineration of communal waste do not exist. Installation for treatment or disposal of dangerous waste does not exist either. Biggest amounts of non-dangerous industrial waste come from processing industries. Important amounts of waste come also from agriculture, exploitation of mineral resources and construction. Ten regional waste management centres are planned to be established in the Danube area. They should include: a regional landfill, an installation for separation of recycling waste, transfer stations, a composting installation and centres for separate collection of recycling waste.

The new Law on waters (Official Journal of the Republic of Serbia n° 30/2010) is harmonised with the Water Framework Directive (2000/60/EC) as the basic framework for water management in the EU member states. During the preparation of this law, other relevant EU documents were also taken into account. According to the new Law, integrated water management consists of measures and activities for maintaining and improving water regimes, ensuring required water quantities and demanded quality for different purposes, protection of water from pollution and protection from water harmful effects. Competences for water management in Serbia are entrusted to the Ministry of agriculture, forestry and water management (Republic Office for Waters), other relevant ministries, provincial bodies, local self-governments (municipalities and cities) and public water management companies („Srbijavode“, „Vode Vojvodine“ and „Beogradvode“).

The Republic Office for Waters, within the Ministry of agriculture, forestry and water management, is responsible for: water management policies; multiple water use; risk management (protection from floods, ice, erosion etc.); water protection and rational water use; management of water regimes; control and management of border rivers' regimes; water supply (except water distribution); other responsibilities prescribed by the Law.

Public water management companies are responsible for: management of water resources; control, management and improvement of water regimes; maintenance and reconstruction of water management infrastructure; flood management and drainage; protection of waters from pollution; other activities prescribed by the Law.

Local self-governments are responsible for water distribution and management of local water supply systems as well as for other activities prescribed by the Law.

Water regimes are being maintained and improved according to the Water Management Strategy of Serbia, water management plans, annual water management programmes, risk management plans (flood risk management plans, general and operational flood protection plans) as well as water protection plans (plans for the protection of water from pollution and monitoring programme).

Water bodies or sources that serve as regional water supply systems represent assets of general interest. Their perimeters are designated by the Government. Three protection zones are being assigned within these perimeters: broad protection zone, narrow protection zone and immediate protection zone.

There are nine regional water supply systems planned to be established in the Danube Area: Timo ki, Mlavsko-moravski, Kolubarski, Savsko-beogradski, Sremski, Novosadski, Ba ki, Gornja Tisa and Južnobanatski. The regional water supply systems cover 9.33% of the Danube area in Serbia. Their share is the highest in Brani evski County (4.25% of the Danube area territory) and the lowest in Južnoba ki (0.13% of the Danube area territory). In order to operate the regional water supply systems in the Danube area, there exist 3 artificial lakes (Grlišće, Rovni and Sava lake-WPI Makiš) and 8 more are planned to be created (Bogovina, Zukovac, Okoliste, Vitman and Gradac, Ku evo, Dubo ica, Ribnica and Gornja Ljubovi a).

Underground water sources are the biggest provider of water for households and industry. In Vojvodina, underground water sources are the only sources of water supply. The capacity of underground water sources (Q) above 1000 l/s can be found in three counties, from 500 to 1000 l/s can be found in 5 counties whereas in one county the capacity is under 500 l/s.

### *Land use*

Compared to other counties in the Serbian part of the Region structure of land use in Borski County is significantly different. Majority of the territory is covered by forests with 46.70% and farmland area with almost 43%. Built-up area and miscellaneous cover almost equal area, 5.17% and 5.23% of total territory of the County.

### *Nature conservation and landscape*

#### *Protected areas*

According to the share of protected areas (15.97% in 1996 and 16.47% in 2001 and 2005), Borski County occupied 1st rank in the Region. This share was far beyond regional average for the chosen years.

Large protected areas on the territory of the Borski County are National Park erdap (total area 63,608 ha, partly on the territory of the Borski county) and Natural Monument Lazarev Kanjon (total area 1,755 ha, partly on the territory of the Borski county).

The territory of Borski County includes 10 small-scaled protected areas (3 natural reserves and 7 natural monuments).

#### *Ecological networks*

EMERALD Areas of Special Conservation Interest on the territory of the Borski County (ASCI) are Felješana (15.28 ha), Mustafa (79.64 ha), Lazarev kanjon (total area 1,755 ha, partly on the territory of Borski County), erdap (total area 63,608 ha, partly on the territory of Borski County) and Ku ajske planine (total area 103,108.90 ha, partly on the territory of Borski County).

IBAs on the territory of Borski County are Mala vrbica (1,722), Zlotska klisura (total area 14,672 ha, partly on the territory of Borski County) and erdap (total area 77,095 ha, partly on the territory of Borski County).

IPAs on the territory of Borski County are erdap (total area 65,293.30 ha, partly on the territory of Borski County), Kladovo-Radujevaca (-), Veliki krš i Stol (2,483.31 ha) and Klisura Lazareve reke (1,916.97 ha).

PBAs on the territory of Borski County are Stol - Veliki krš (4,989 ha), erdap (total area 73,234 ha, partly on the territory of Borski County) and Lazarev kanjon (total area 6,263 ha, partly on the territory of Borski County).

There is no protected area based on the Ramsar Convention in the Borski County.

### *State of the environment*

#### *Air quality and pollution*

According to average annual values of SO<sub>2</sub> immissions in 2005, Borski County occupied 4th rank. As far as concentrations of smoke and NO<sub>2</sub> are concerned in 2005, the County occupied 3rd rank for the smoke and 1st

rank for the NO<sub>2</sub>. The immission of SO<sub>2</sub> was higher, but the immissions of smoke and NO<sub>2</sub> were less in 2007 than in 2005.

One of the main sources of SO<sub>2</sub> air pollution is Cooper Mininig and Smelting Complex Bor in the Borski County.

*Water*

Capacity of underground water sources was 215 l/s, and the County was at the 9th position both in 1996 and 2001 with the lowest capacity of underground water sources in the region. According to regional water supply sources, Borski County occupied 3rd rank, as the share of 14.55% in both years was beyond the regional average. According to water quality analysis of the Danube in 1996, 2001 and 2005, none of the examined river profiles satisfied completely the demanded II water quality class (Radujevac class II/III and III). The same situation was in 2008 (Radujevac class II/III).

*Waste*

Estimated amount of communal waste produced on yearly basis is 15,757 t/year in Borski County.

According to the number of landfills in 2003, Borski County occupied 5th rank, as it had 5 out of 59 communal landfills.

*Water management*

Two out of nine regional water supply systems planned to be established in the Dunav region are important for the water supplying of the Borski County.

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index				
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)				671,38
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)				1,23
Atmosphere pollution ash - emission per 1000 inhabitants (t)				1,91
Atmosphere pollution CO - emission per 1000 inhabitants (t)				
Capacity of landfills per 1000 inhabitants (t)				

## Brani evska oblast

### *General information*

The Serbian part of the Danube region comprises two natural/geographic entities: the Pannonia plain and the Balkan Peninsula. Rivers Sava and the Danube form a natural border between the two.

The northern part of the region is mainly lowland whereas its southern and south-eastern parts are marked by hilly and mountainous landscapes. The lowland includes Vojvodina and areas marginal to the Pannonian Plain (Posavina, Pomoravlje, Stig and Negotinska krajina), whereas the upland belongs to the Carpathian-Balkan Mountain range (southeastern and eastern part of the Danube region) and the Dinaric Alps (Sumadijske planine). Total surface of the Serbian part of Region is 2,931,498 ha. The farmland has the biggest share (66.4%), followed by the forest (15.3%) and building land (12.6%). The miscellaneous areas occupy 5.7% of the total surface. The share of arable land in total farmland is 91.1%.

The biggest share of farmland is in Vojvodina's counties; the forestland has a high share in Branicevski and Borski County, whilst the biggest percentage of building land can be found within the City of Belgrade (38.27%).

The Law on the protection of nature (Official Journal of the Republic Serbia n°36/09) defines seven types of protected areas, namely:

1. national parks,
2. natural parks,
3. landscapes of extraordinary importance,
4. rigorous natural reserves,
5. special natural reserves,
6. natural monuments,
7. protected habitats.

In Serbian part of the Danube region there are 11 vast (with surface above 1,000 ha) and 174 small protected areas (with surface below 1,000 ha).

Large protected areas include 2 national parks, 7 special natural reserves, 1 natural monument and 1 landscape of extraordinary importance, the total surface being 196,331 ha. These areas are spread over eight counties (City of Belgrade, Zapadnbacki, Juznbacki, Srednjebanatski, Juznobanatski, Sremski, Branicevski and Borski County).

All large protected areas are within I category of protection, the exceptions being Special Natural reserve Kardjorjjevo that is within II category and Landscape of extraordinary importance Kosmaj within III category.

Activities on identification areas for Natura 2000 ecological networks (SPA and SAC) have started.

The Regulations on the Ecological Networks was adopted by the Government of the Republic of Serbia in 2011. The Ecological Network includes ecologically important areas, ecological corridors and buffer zones from where it is needed.

Danube with protected areas included is one of the ecological corridors of international importance according to the Regulations on the Ecological Networks.

In Serbian part of the Danube region, 22 areas were included in the EMERALD network that establishes areas that are important for implementing Bern Convention (The Convention on the Conservation of European Wildlife and Natural Habitats - Bern, 1979). Areas within EMERALD network (EMERALD network of Areas of Special Conservation Interest - ASCI) have total surface of 215,271.15 ha.

Areas of particular importance at the international level in the Serbian part of the Danube area are 23 Important Bird Areas (IBAs) with total surface of 411,368 ha, 21 Important Plant Areas (IPAs) with total surface of 244,758.03 ha and 9 Prime Butterfly Areas in Europe (PBAs) with total surface of 177,266 ha. According to the Ramsar Convention 6 areas with total surface of 48,370 ha is protected in Serbian part of the Danube region.

The main sources of air pollution in the Danube area are thermal plants, rayon heating systems, households, motor vehicles and industry. The biggest air pollution comes from the combustion of low quality lignite and motor fuels. The main sources of air pollution are thermal plants situated in Kolubarski and Kostolacki lignite basins. Kolubarski basin (thermal power plants Nikola Tesla A and B and Kolubara A) emits 112,864 tons of SO<sub>x</sub>, 30,650 tons of NO<sub>x</sub> and around 4,400 tons of particles per year. Kostolacki basin releases 103,000 tons of SO<sub>x</sub>, 9,800 tons of NO<sub>x</sub> and 2,800 tons of particles per year. Thermal plants also produce 5.5 million tons of fly-ash that is being stored contrary to regulations. Other important sources of pollution are oil refineries, cement factory, chemical industry, as well as steel factory. Pollution from the traffic is facing an increase, especially in the big cities.

According to the Regulation on water classification (Official Journal of the Socialist Republic of Serbia n ° 5/68), there exist following water classes in Serbia: I, IIa, IIb, III and IV, as well as OC (out of class). Regulation on water

classification makes distinction between four classes of water quality, according to their level of contamination and their use:

class I – waters which in their natural state or after disinfection could be used for providing drinking water to the settlements, within the food industry and for breeding noble fish species (salmonidae family);

class II – waters which are convenient for bathing, recreation and water sports, for breeding less noble fish species (cyprinidae family), as well as for providing drinking water to the settlements and food industry after being properly treated (coagulation, filtration and disinfection);

class III – waters which can be used for irrigation and in industries, except food production;

class IV – waters which can be used only after a special treatment; as well as

OC (out of classes).

There are two sub-classes within the water class II: sub-class IIa, including waters which, after a regular treatment (coagulation, filtration and disinfection) can be used for providing drinking water to the settlements, for bathing and for the production of food and sub-class IIb, including waters which can be used for water sports, recreation, for breeding less noble fish species (cyprinidae family) and as drinking water for the cattle. Division of water into classes and sub-classes has been performed according to different indicators and their limit values, defined by this Regulation.

Water quality class of the Danube when it enters Serbia from Hungary is III, while its quality at the exit, when it enters Romania and Bulgaria, is in class II/III.

Water quality assessment of accumulations (artificial lakes) is being practiced at three points on the surface (at the dam, in the middle and at the beginning of lake) as well as along its depth (surface, middle depth and bottom).

The monitoring of ground water regime is being performed in five areas (Velika Morava, Kolubara, Backa, Banat and Srem). When evaluating the quality of ground waters situated along riversides a special attention is given to dangerous and harmful materials that have previously been detected in the rivers. Nine regional water supply systems within the Danube Area are planned to be established: Timo ki, Mlavsko-moravski, Kolubarski, Savsko-beogradski, Sremski, Novosadski, Ba ki, Gornja Tisa and Južnobanatski. Spas of national importance within the Danube area are: Selters, Banja Junakovi , Vrdni ka Banja, Banja Rusanda, Banja Slankamen and Palana ki Kiseljak.

According to the National Waste Management Strategy, there are 59 landfills for communal waste within the Danube area. Data on communal waste amounts that are generated at NUTS<sub>4</sub> (municipal) level are incomplete and unreliable. Total estimated amount of communal waste in Serbia is 2,374,374 t/year. Estimated amount of communal waste produced on yearly basis is 1,543,545 t/year in the Danube area. However, installations for biological treatment and incineration of communal waste do not exist. Installation for treatment or disposal of dangerous waste does not exist either. Biggest amounts of non-dangerous industrial waste come from processing industries. Important amounts of waste come also from agriculture, exploitation of mineral resources and construction. Ten regional waste management centres are planned to be established in the Danube area. They should include: a regional landfill, an installation for separation of recycling waste, transfer stations, a composting installation and centres for separate collection of recycling waste.

The new Law on waters (Official Journal of the Republic of Serbia n° 30/2010) is harmonised with the Water Framework Directive (2000/60/EC) as the basic framework for water management in the EU member states. During the preparation of this law, other relevant EU documents were also taken into account. According to the new Law, integrated water management consists of measures and activities for maintaining and improving water regimes, ensuring required water quantities and demanded quality for different purposes, protection of water from pollution and protection from water harmful effects. Competences for water management in Serbia are entrusted to the Ministry of agriculture, forestry and water management (Republic Office for Waters), other relevant ministries, provincial bodies, local self-governments (municipalities and cities) and public water management companies („Srbijavode“, „Vode Vojvodine“ and „Beogradvode“).

The Republic Office for Waters, within the Ministry of agriculture, forestry and water management, is responsible for: water management policies; multiple water use; risk management (protection from floods, ice, erosion etc.); water protection and rational water use; management of water regimes; control and management of border rivers' regimes; water supply (except water distribution); other responsibilities prescribed by the Law.

Public water management companies are responsible for: management of water resources; control, management and improvement of water regimes; maintenance and reconstruction of water management infrastructure; flood management and drainage; protection of waters from pollution; other activities prescribed by the Law.

Local self-governments are responsible for water distribution and management of local water supply systems as well as for other activities prescribed by the Law.

Water regimes are being maintained and improved according to the Water Management Strategy of Serbia, water management plans, annual water management programmes, risk management plans (flood risk management plans, general and operational flood protection plans) as well as water protection plans (plans for the protection of water from pollution and monitoring programme).

Water bodies or sources that serve as regional water supply systems represent assets of general interest. Their perimeters are designated by the Government. Three protection zones are being assigned within these perimeters: broad protection zone, narrow protection zone and immediate protection zone.

There are nine regional water supply systems planned to be established in the Danube Area: Timo ki, Mlavsko-moravski, Kolubarski, Savsko-beogradski, Sremski, Novosadski, Ba ki, Gornja Tisa and Južnobanatski. The regional water supply systems cover 9.33% of the Danube area in Serbia. Their share is the highest in Brani evski County (4.25% of the Danube area territory) and the lowest in Južnoba ki (0.13% of the Danube area territory). In order to operate the regional water supply systems in the Danube area, there exist 3 artificial lakes (Grlišće, Rovni and Sava lake-WPI Makiš) and 8 more are planned to be created (Bogovina, Zukovac, Okoliste, Vitman and Gradac, Ku evo, Dubo ica, Ribnica and Gornja Ljubovi a).

Underground water sources are the biggest provider of water for households and industry. In Vojvodina, underground water sources are the only sources of water supply. The capacity of underground water sources (Q) above 1000 l/s can be found in three counties, from 500 to 1000 l/s can be found in 5 counties whereas in one county the capacity is under 500 l/s.

### *Land use*

Farmland is the most present category of land use on the territory of the Branicevski County with 59.11% but much less compared to other counties. Around 88.5% of farmland is arable. High share of forest area with 30.60% should be emphasized. The built-up area covers 5.37% while the miscellaneous land is represented with 4.86%.

### *Nature conservation and landscape*

#### *Protected areas*

According to share of protected areas (5.64%), Branicevski County was very close to the regional average in 1996, 2001 and 2005 but it occupied 5th rank. The share of protected areas did not change in the period from 1996 to 2005.

Large protected areas on the territory of the Branicevski County is National Park Djerdap (total area 63,608 ha, partly on the territory of the Branicevski County).

The territory of the Branicevski County includes 14 small-scaled protected areas (1 landscape of extraordinary importance, 1 natural reserve and 12 natural monuments).

#### *Ecological networks*

EMERALD Areas of Special Conservation Interest on the territory of the Branicevski County (ASCI) are Klisura Osaniceke reke (30,44 ha), Busovata (15,86 ha), Djerdap (total area 63608,45 ha, partly on the territory of the Branicevski County) and Kucajske planine (total area 103108,90 ha, partly on the territory of the Branicevski County).

IBAs on the territory of the Branicevski County are Zlotska klisura (total area 14,672 ha, partly on the territory of the Branicevski County) and Djerdap (total area 77,095 ha, partly on the territory of the Branicevski County).

IPA on the territory of the Branicevski County is Djerdap (total area-65,293.30 ha, partly on the territory of the Branicevski County).

PBA on the territory of the Branicevski County is Djerdap (total area 73,234 ha, partly on the territory of the Branicevski County).

### *State of the environment*

#### *Air quality and pollution*

According to average annual values of SO<sub>2</sub> immissions in 2005, Branicevski County occupied 4th rank. As far as concentrations of smoke and NO<sub>2</sub> are concerned in 2005, the County occupied 2nd rank. Average annual

immissions of the SO<sub>2</sub> and smoke have slightly increased in 2001, whereas average annual immission of NO<sub>2</sub> faced a decrease in 2005 comparing to the year 2001. The immission of SO<sub>2</sub> was higher, but the immissions of smoke and NO<sub>2</sub> were less in 2007 than in 2005.

One of the main source of SO<sub>2</sub>, PM 10 and NO<sub>2</sub> pollution in the Branicevski County as well as in Serbia and the Danube area are Thermal plants Kostolac A and B in Kostolac.

Kostolacki basin releases 103,000 tons of SO<sub>x</sub>, 9,800 tons of NO<sub>x</sub> and 2,800 tons of particles per year. Thermal plants (situated in Kolubarske and Kostolacki lignite basins) also produce 5,5 million tons of fly-ash that is being stored contrary to regulations.

### Water

Capacity of underground water sources was 620 l/s, associating Branicevski County to other counties with capacity of underground water sources from 500 to 1000 l/s. The County was at the 8th position in both 1996 and 2001. According to regional water supply sources, Branicevski County occupied 1st rank, as the share of 32.21% in both years was far beyond regional average. According to water quality analysis of the Danube in 1996 and 2005, none of the examined river profiles satisfied the demanded II water quality class (Veliko Gradiste and Dobra class II/III and III). There are no data on water quality for the year 2001. In 2008 water quality class was II/III both in Veliko Gradiste and Dobra.

### Waste

Estimated amount of communal waste produced on yearly basis is 33,886 t/year in the Branicevski County. According to number of landfills in 2003, Branicevski County occupied 4th rank, as it had 6 out of 59 communal landfills (the same as the City of Belgrade).

A regional waste management centre is planned to be established in the Branicevski County.

### Water management

Out of nine regional water supply systems planned to be established in the Danube Area the most important for Branicevski County is Mlavsko-moravski. The regional water supply systems cover 9.33% of the Danube area in Serbia. Their share is the highest in Branicevski County (4.25% of the Danube area territory).

In order to operate the regional water supply systems in the Danube area 8 artificial lakes are planned to be created – two in the Branicevo County (Vitman and Gradac, and Kucevo).

### Indicators of natural conditions

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index				
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)				567,89
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)				90,48
Atmosphere pollution ash - emission per 1000 inhabitants (t)				43,11
Atmosphere pollution CO - emission per 1000 inhabitants (t)				
Capacity of landfills per 1000 inhabitants (t)				

## Podunavska oblast

### *General information*

The Serbian part of the Danube region comprises two natural/geographic entities: the Pannonia plain and the Balkan Peninsula. Rivers Sava and the Danube form a natural border between the two.

The northern part of the region is mainly lowland whereas its southern and south-eastern parts are marked by hilly and mountainous landscapes. The lowland includes Vojvodina and areas marginal to the Pannonian Plain (Posavina, Pomoravlje, Stig and Negotinska krajina), whereas the upland belongs to the Carpathian-Balkan Mountain range (southeastern and eastern part of the Danube region) and the Dinaric Alps (Sumadijske planine). Total surface of the Serbian part of Region is 2,931,498 ha. The farmland has the biggest share (66.4%), followed by the forest (15.3%) and building land (12.6%). The miscellaneous areas occupy 5.7% of the total surface. The share of arable land in total farmland is 91.1%.

The biggest share of farmland is in Vojvodina's counties; the forestland has a high share in Branicevski and Borski County, whilst the biggest percentage of building land can be found within the City of Belgrade (38.27%).

The Law on the protection of nature (Official Journal of the Republic Serbia n°36/09) defines seven types of protected areas, namely:

1. national parks,
2. natural parks,
3. landscapes of extraordinary importance,
4. rigorous natural reserves,
5. special natural reserves,
6. natural monuments,
7. protected habitats.

In Serbian part of the Danube region there are 11 vast (with surface above 1,000 ha) and 174 small protected areas (with surface below 1,000 ha).

Large protected areas include 2 national parks, 7 special natural reserves, 1 natural monument and 1 landscape of extraordinary importance, the total surface being 196,331 ha. These areas are spread over eight counties (City of Belgrade, Zapadnbacki, Juznbacki, Srednjobanatski, Juznobanatski, Sremski, Branicevski and Borski County).

All large protected areas are within I category of protection, the exceptions being Special Natural reserve Kardjorjjevo that is within II category and Landscape of extraordinary importance Kosmaj within III category.

Activities on identification areas for Natura 2000 ecological networks (SPA and SAC) have started.

The Regulations on the Ecological Networks was adopted by the Government of the Republic of Serbia in 2011. The Ecological Network includes ecologically important areas, ecological corridors and buffer zones from where it is needed.

Danube with protected areas included is one of the ecological corridors of international importance according to the Regulations on the Ecological Networks.

In Serbian part of the Danube region, 22 areas were included in the EMERALD network that establishes areas that are important for implementing Bern Convention (The Convention on the Conservation of European Wildlife and Natural Habitats - Bern, 1979). Areas within EMERALD network (EMERALD network of Areas of Special Conservation Interest - ASCI) have total surface of 215,271.15 ha.

Areas of particular importance at the international level in the Serbian part of the Danube area are 23 Important Bird Areas (IBAs) with total surface of 411,368 ha, 21 Important Plant Areas (IPAs) with total surface of 244,758.03 ha and 9 Prime Butterfly Areas in Europe (PBAs) with total surface of 177,266 ha. According to the Ramsar Convention 6 areas with total surface of 48,370 ha is protected in Serbian part of the Danube region.

The main sources of air pollution in the Danube area are thermal plants, rayon heating systems, households, motor vehicles and industry. The biggest air pollution comes from the combustion of low quality lignite and motor fuels. The main sources of air pollution are thermal plants situated in Kolubarski and Kostolacki lignite basins. Kolubarski basin (thermal power plants Nikola Tesla A and B and Kolubara A) emits 112,864 tons of SO<sub>x</sub>, 30,650 tons of NO<sub>x</sub> and around 4,400 tons of particles per year. Kostolacki basin releases 103,000 tons of SO<sub>x</sub>, 9,800 tons of NO<sub>x</sub> and 2,800 tons of particles per year. Thermal plants also produce 5.5 million tons of fly-ash that is being stored contrary to regulations. Other important sources of pollution are oil refineries, cement factory, chemical industry, as well as steel factory. Pollution from the traffic is facing an increase, especially in the big cities.

According to the Regulation on water classification (Official Journal of the Socialist Republic of Serbia n ° 5/68), there exist following water classes in Serbia: I, IIa, IIb, III and IV, as well as OC (out of class). Regulation on water

classification makes distinction between four classes of water quality, according to their level of contamination and their use:

class I – waters which in their natural state or after disinfection could be used for providing drinking water to the settlements, within the food industry and for breeding noble fish species (salmonidae family);

class II – waters which are convenient for bathing, recreation and water sports, for breeding less noble fish species (cyprinidae family), as well as for providing drinking water to the settlements and food industry after being properly treated (coagulation, filtration and disinfection);

class III – waters which can be used for irrigation and in industries, except food production;

class IV – waters which can be used only after a special treatment; as well as

OC (out of classes).

There are two sub-classes within the water class II: sub-class IIa, including waters which, after a regular treatment (coagulation, filtration and disinfection) can be used for providing drinking water to the settlements, for bathing and for the production of food and sub-class IIb, including waters which can be used for water sports, recreation, for breeding less noble fish species (cyprinidae family) and as drinking water for the cattle. Division of water into classes and sub-classes has been performed according to different indicators and their limit values, defined by this Regulation.

Water quality class of the Danube when it enters Serbia from Hungary is III, while its quality at the exit, when it enters Romania and Bulgaria, is in class II/III.

Water quality assessment of accumulations (artificial lakes) is being practiced at three points on the surface (at the dam, in the middle and at the beginning of lake) as well as along its depth (surface, middle depth and bottom).

The monitoring of ground water regime is being performed in five areas (Velika Morava, Kolubara, Backa, Banat and Srem). When evaluating the quality of ground waters situated along riversides a special attention is given to dangerous and harmful materials that have previously been detected in the rivers.

Nine regional water supply systems within the Danube Area are planned to be established: Timo ki, Mlavsko-moravski, Kolubarski, Savsko-beogradski, Sremski, Novosadski, Ba ki, Gornja Tisa and Južnobanatski.

Spas of national importance within the Danube area are: Selters, Banja Junakovi, Vrdni ka Banja, Banja Rusanda, Banja Slankamen and Palana ki Kiseljak.

According to the National Waste Management Strategy, there are 59 landfills for communal waste within the Danube area. Data on communal waste amounts that are generated at NUTS<sub>4</sub> (municipal) level are incomplete and unreliable. Total estimated amount of communal waste in Serbia is 2,374,374 t/year. Estimated amount of communal waste produced on yearly basis is 1,543,545 t/year in the Danube area. However, installations for biological treatment and incineration of communal waste do not exist. Installation for treatment or disposal of dangerous waste does not exist either. Biggest amounts of non-dangerous industrial waste come from processing industries. Important amounts of waste come also from agriculture, exploitation of mineral resources and construction. Ten regional waste management centres are planned to be established in the Danube area. They should include: a regional landfill, an installation for separation of recycling waste, transfer stations, a composting installation and centres for separate collection of recycling waste.

The new Law on waters (Official Journal of the Republic of Serbia n° 30/2010) is harmonised with the Water Framework Directive (2000/60/EC) as the basic framework for water management in the EU member states. During the preparation of this law, other relevant EU documents were also taken into account. According to the new Law, integrated water management consists of measures and activities for maintaining and improving water regimes, ensuring required water quantities and demanded quality for different purposes, protection of water from pollution and protection from water harmful effects. Competences for water management in Serbia are entrusted to the Ministry of agriculture, forestry and water management (Republic Office for Waters), other relevant ministries, provincial bodies, local self-governments (municipalities and cities) and public water management companies („Srbijavode“, „Vode Vojvodine“ and „Beogradvode“).

The Republic Office for Waters, within the Ministry of agriculture, forestry and water management, is responsible for: water management policies; multiple water use; risk management (protection from floods, ice, erosion etc.); water protection and rational water use; management of water regimes; control and management of border rivers' regimes; water supply (except water distribution); other responsibilities prescribed by the Law.

Public water management companies are responsible for: management of water resources; control, management and improvement of water regimes; maintenance and reconstruction of water management infrastructure; flood management and drainage; protection of waters from pollution; other activities prescribed by the Law.

Local self-governments are responsible for water distribution and management of local water supply systems as well as for other activities prescribed by the Law.

Water regimes are being maintained and improved according to the Water Management Strategy of Serbia, water management plans, annual water management programmes, risk management plans (flood risk management plans, general and operational flood protection plans) as well as water protection plans (plans for the protection of water from pollution and monitoring programme).

Water bodies or sources that serve as regional water supply systems represent assets of general interest. Their perimeters are designated by the Government. Three protection zones are being assigned within these perimeters: broad protection zone, narrow protection zone and immediate protection zone.

There are nine regional water supply systems planned to be established in the Danube Area: Timo ki, Mlavsko-moravski, Kolubarski, Savsko-beogradski, Sremski, Novosadski, Ba ki, Gornja Tisa and Južnobanatski. The regional water supply systems cover 9.33% of the Danube area in Serbia. Their share is the highest in Brani evski County (4.25% of the Danube area territory) and the lowest in Južnoba ki (0.13% of the Danube area territory). In order to operate the regional water supply systems in the Danube area, there exist 3 artificial lakes (Grlišće, Rovni and Sava lake-WPI Makiš) and 8 more are planned to be created (Bogovina, Zukovac, Okoliste, Vitman and Gradac, Ku evo, Dubo ica, Ribnica and Gornja Ljubovi a).

Underground water sources are the biggest provider of water for households and industry. In Vojvodina, underground water sources are the only sources of water supply. The capacity of underground water sources (Q) above 1000 l/s can be found in three counties, from 500 to 1000 l/s can be found in 5 counties whereas in one county the capacity is under 500 l/s.

### *Land use*

The most common category of land use in Podunavska oblast is farmland with share of 78.12% out of which more than 98% is arable. The share of farmland is followed by the share of built-up area with 11.22%. Forest land covers 6.73% of the territory of Podunavska oblast whereas miscellaneous area is present with 3.93%.

### *Nature conservation and landscape*

#### *Protected areas*

There are only 12 small-scaled protected areas in Podunavska oblast (10 natural monuments and 2 others).

#### *Ecological networks*

International ecological corridors in Podunavska oblast are the Danube and Velika Morava River. EMERALD Area of Special Conservation Interest on the territory of Podunavska oblast (ASCI) is Šalina ki lug (19.22 ha).

There are no areas of particular importance at the international level in the Podunavski County.

### *State of the environment*

#### *Air quality and pollution*

According to the average annual values of SO<sub>2</sub> immissions in 2005, Podunavska oblast occupied 5th rank among 9 Danube regions in Serbia. As far as concentrations of smoke and NO<sub>2</sub> are concerned, the region occupied 6th rank. In the period 1996-2005, average annual immissions of SO<sub>2</sub> were constantly decreasing, while average annual immissions of smoke and NO<sub>2</sub> faced an increase in the year 2001. The immissions of SO<sub>2</sub>, smoke and NO<sub>2</sub> were less important in 2007 than in 2005.

One of the main source of PM<sub>10</sub> pollution in Podunavska oblast as well as in Serbia and the Danube area is the US Steel Factory in Smederevo.

#### *Water*

The capacity of underground water sources was 730 l/s, associating Podunavska oblast to other NUTS<sub>3</sub> regions with capacity of underground water sources from 500 to 1000 l/s. The region was at the 5th position in both 1996 and 2001 among 9 Danube regions in Serbia. According to regional water supply sources, Podunavska oblast occupied 2nd rank in both 1996 and 2001, as the share of 20.83% in both years was above the regional average (9.88%). According to water quality analysis of the river Velika Morava in 1996 and 2008, the examined river

profiles did not satisfy the demanded IIa water quality class (Šalinac and Ljubi evski Most class III/IV). There are no data on water quality for the years 2001 and 2005. In 2008 water quality class of the Danube river was III. There is one spa of national importance in the Podunavska oblast - Palana ki kiseljak spa with four sources of mineral waters with temperature of 56°C. Waters belong to the category of sodium hydro-carbonate, carbo-acidic hypo-thermals.

#### *Waste*

Estimated amount of communal waste produced on yearly basis is 51,741 t/year in Podunavska oblast. One regional Waste Management centre is planned to be established in this region, as well as one Central Regional Storage for dangerous waste.

According to the number of landfills in 2003, Podunavska oblast occupied 6th rank among 9 Danube regions in Serbia, as it had 4 out of 59 communal landfills.

#### *Water management*

Out nine regional water supply systems planned to be established in the Danube Area the most important for Podunavski County is Mlavsko-moravski.

#### *Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index				
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)				0,31
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)				9,82
Atmosphere pollution ash - emission per 1000 inhabitants (t)				7,5
Atmosphere pollution CO - emission per 1000 inhabitants (t)				
Capacity of landfills per 1000 inhabitants (t)				

## Južnoba ka oblast

### *General information*

The Serbian part of the Danube region comprises two natural/geographic entities: the Pannonia plain and the Balkan Peninsula. Rivers Sava and the Danube form a natural border between the two.

The northern part of the region is mainly lowland whereas its southern and south-eastern parts are marked by hilly and mountainous landscapes. The lowland includes Vojvodina and areas marginal to the Pannonian Plain (Posavina, Pomoravlje, Stig and Negotinska krajina), whereas the upland belongs to the Carpathian-Balkan Mountain range (southeastern and eastern part of the Danube region) and the Dinaric Alps (Sumadijske planine). Total surface of the Serbian part of Region is 2,931,498 ha. The farmland has the biggest share (66.4%), followed by the forest (15.3%) and building land (12.6%). The miscellaneous areas occupy 5.7% of the total surface. The share of arable land in total farmland is 91.1%.

The biggest share of farmland is in Vojvodina's counties; the forestland has a high share in Branicevski and Borski County, whilst the biggest percentage of building land can be found within the City of Belgrade (38.27%).

The Law on the protection of nature (Official Journal of the Republic Serbia n°36/09) defines seven types of protected areas, namely:

1. national parks,
2. natural parks,
3. landscapes of extraordinary importance,
4. rigorous natural reserves,
5. special natural reserves,
6. natural monuments,
7. protected habitats.

In Serbian part of the Danube region there are 11 vast (with surface above 1,000 ha) and 174 small protected areas (with surface below 1,000 ha).

Large protected areas include 2 national parks, 7 special natural reserves, 1 natural monument and 1 landscape of extraordinary importance, the total surface being 196,331 ha. These areas are spread over eight counties (City of Belgrade, Zapadnobački, Južnobački, Srednjobanatski, Južnobański, Sremski, Branicevski and Borski County).

All large protected areas are within I category of protection, the exceptions being Special Natural reserve Kardjorđjevo that is within II category and Landscape of extraordinary importance Kosmaj within III category.

Activities on identification areas for Natura 2000 ecological networks (SPA and SAC) have started.

The Regulations on the Ecological Networks was adopted by the Government of the Republic of Serbia in 2011. The Ecological Network includes ecologically important areas, ecological corridors and buffer zones from where it is needed.

Danube with protected areas included is one of the ecological corridors of international importance according to the Regulations on the Ecological Networks.

In Serbian part of the Danube region, 22 areas were included in the EMERALD network that establishes areas that are important for implementing Bern Convention (The Convention on the Conservation of European Wildlife and Natural Habitats - Bern, 1979). Areas within EMERALD network (EMERALD network of Areas of Special Conservation Interest - ASCI) have total surface of 215,271.15 ha.

Areas of particular importance at the international level in the Serbian part of the Danube area are 23 Important Bird Areas (IBAs) with total surface of 411,368 ha, 21 Important Plant Areas (IPAs) with total surface of 244,758.03 ha and 9 Prime Butterfly Areas in Europe (PBAs) with total surface of 177,266 ha. According to the Ramsar Convention 6 areas with total surface of 48,370 ha is protected in Serbian part of the Danube region.

The main sources of air pollution in the Danube area are thermal plants, rayon heating systems, households, motor vehicles and industry. The biggest air pollution comes from the combustion of low quality lignite and motor fuels. The main sources of air pollution are thermal plants situated in Kolubarski and Kostolacki lignite basins. Kolubarski basin (thermal power plants Nikola Tesla A and B and Kolubara A) emits 112,864 tons of SO<sub>x</sub>, 30,650 tons of NO<sub>x</sub> and around 4,400 tons of particles per year. Kostolacki basin releases 103,000 tons of SO<sub>x</sub>, 9,800 tons of NO<sub>x</sub> and 2,800 tons of particles per year. Thermal plants also produce 5.5 million tons of fly-ash that is being stored contrary to regulations. Other important sources of pollution are oil refineries, cement factory, chemical industry, as well as steel factory. Pollution from the traffic is facing an increase, especially in the big cities.

According to the Regulation on water classification (Official Journal of the Socialist Republic of Serbia n ° 5/68), there exist following water classes in Serbia: I, IIa, IIb, III and IV, as well as OC (out of class). Regulation on water

classification makes distinction between four classes of water quality, according to their level of contamination and their use:

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class II – waters which are convenient for bathing, recreation and water sports, for breeding less noble fish species (cyprinidae family), as well as for providing drinking water to the settlements and food industry after being properly treated (coagulation, filtration and disinfection);

class III – waters which can be used for irrigation and in industries, except food production;

class IV – waters which can be used only after a special treatment; as well as

OC (out of classes).

There are two sub-classes within the water class II: sub-class IIa, including waters which, after a regular treatment (coagulation, filtration and disinfection) can be used for providing drinking water to the settlements, for bathing and for the production of food and sub-class IIb, including waters which can be used for water sports, recreation, for breeding less noble fish species (cyprinidae family) and as drinking water for the cattle. Division of water into classes and sub-classes has been performed according to different indicators and their limit values, defined by this Regulation.

Water quality class of the Danube when it enters Serbia from Hungary is III, while its quality at the exit, when it enters Romania and Bulgaria, is in class II/III.

Water quality assessment of accumulations (artificial lakes) is being practiced at three points on the surface (at the dam, in the middle and at the beginning of lake) as well as along its depth (surface, middle depth and bottom).

The monitoring of ground water regime is being performed in five areas (Velika Morava, Kolubara, Backa, Banat and Srem). When evaluating the quality of ground waters situated along riversides a special attention is given to dangerous and harmful materials that have previously been detected in the rivers.

Nine regional water supply systems within the Danube Area are planned to be established: Timo ki, Mlavsko-moravski, Kolubarski, Savsko-beogradski, Sremski, Novosadski, Ba ki, Gornja Tisa and Južnobanatski.

Spas of national importance within the Danube area are: Selters, Banja Junakovi , Vrdni ka Banja, Banja Rusanda, Banja Slankamen and Palana ki Kiseljak.

According to the National Waste Management Strategy, there are 59 landfills for communal waste within the Danube area. Data on communal waste amounts that are generated at NUTS<sub>4</sub> (municipal) level are incomplete and unreliable. Total estimated amount of communal waste in Serbia is 2,374,374 t/year. Estimated amount of communal waste produced on yearly basis is 1,543,545 t/year in the Danube area. However, installations for biological treatment and incineration of communal waste do not exist. Installation for treatment or disposal of dangerous waste does not exist either. Biggest amounts of non-dangerous industrial waste come from processing industries. Important amounts of waste come also from agriculture, exploitation of mineral resources and construction. Ten regional waste management centres are planned to be established in the Danube area. They should include: a regional landfill, an installation for separation of recycling waste, transfer stations, a composting installation and centres for separate collection of recycling waste.

The new Law on waters (Official Journal of the Republic of Serbia n° 30/2010) is harmonised with the Water Framework Directive (2000/60/EC) as the basic framework for water management in the EU member states. During the preparation of this law, other relevant EU documents were also taken into account. According to the new Law, integrated water management consists of measures and activities for maintaining and improving water regimes, ensuring required water quantities and demanded quality for different purposes, protection of water from pollution and protection from water harmful effects. Competences for water management in Serbia are entrusted to the Ministry of agriculture, forestry and water management (Republic Office for Waters), other relevant ministries, provincial bodies, local self-governments (municipalities and cities) and public water management companies („Srbijavode“, „Vode Vojvodine“ and „Beogradvode“).

The Republic Office for Waters, within the Ministry of agriculture, forestry and water management, is responsible for: water management policies; multiple water use; risk management (protection from floods, ice, erosion etc.); water protection and rational water use; management of water regimes; control and management of border rivers' regimes; water supply (except water distribution); other responsibilities prescribed by the Law.

Public water management companies are responsible for: management of water resources; control, management and improvement of water regimes; maintenance and reconstruction of water management infrastructure; flood management and drainage; protection of waters from pollution; other activities prescribed by the Law.

Local self-governments are responsible for water distribution and management of local water supply systems as well as for other activities prescribed by the Law.

Water regimes are being maintained and improved according to the Water Management Strategy of Serbia, water management plans, annual water management programmes, risk management plans (flood risk management plans, general and operational flood protection plans) as well as water protection plans (plans for the protection of water from pollution and monitoring programme).

Water bodies or sources that serve as regional water supply systems represent assets of general interest. Their perimeters are designated by the Government. Three protection zones are being assigned within these perimeters: broad protection zone, narrow protection zone and immediate protection zone.

There are nine regional water supply systems planned to be established in the Danube Area: Timo ki, Mlavsko-moravski, Kolubarski, Savsko-beogradski, Sremski, Novosadski, Ba ki, Gornja Tisa and Južnobanatski. The regional water supply systems cover 9.33% of the Danube area in Serbia. Their share is the highest in Brani evski County (4.25% of the Danube area territory) and the lowest in Južnoba ki (0.13% of the Danube area territory). In order to operate the regional water supply systems in the Danube area, there exist 3 artificial lakes (Grlišće, Rovni and Sava lake-WPI Makiš) and 8 more are planned to be created (Bogovina, Zukovac, Okoliste, Vitman and Gradac, Ku evo, Dubo ica, Ribnica and Gornja Ljubovi a).

Underground water sources are the biggest provider of water for households and industry. In Vojvodina, underground water sources are the only sources of water supply. The capacity of underground water sources (Q) above 1000 l/s can be found in three counties, from 500 to 1000 l/s can be found in 5 counties whereas in one county the capacity is under 500 l/s.

### *Land use*

Majority of the territory of the Južnoba ka oblast is farmland (73.03%) out of which 94% is arable. The forests are the least represented with only 6.51% similar to the miscellaneous areas. The built-up area covers 13.96% of the territory.

### *Nature conservation and landscape*

#### *Protected areas*

Share of protected areas in the Juznbacki County was below the regional average in 1996, 2001 and 2005 although it augmented for 1.58% in 2001. This county was ranked at 7th position in 1996 and at 6th position in 2001 and 2005.

Large protected areas in the Juznbacki County are National Park Fruska Gora (total area – 25,393 ha, partly on the territory of the Juznbacki County), Special Nature Reserve Karadjordjevo (2,955 ha) and Special Nature Reserve Koviljsko-Petrovaradinski rit (total area – 4,840 ha, partly on the territory of the Juznbacki County).

The biggest number (41) of small-scale protected areas (1,000 ha) can be found in Juznbacki County (3 natural parks, 5 natural reserves, 32 natural monuments and 1 “other”).

#### *Ecological networks*

EMERALD Area of Special Conservation Interest on the territory of the Juznbacki County (ASCI) are Fruska gora (total area - 25,393.00 ha partly in the Juznbacki County), Koviljsko-Petrovaradinski rit (total area - 4.840,61 ha, partly on the territory of the Juznbacki County), Karadjordjevo (2,955.33 ha) and Tikvara (508,14 ha).

Areas of particular importance at the international level in the Danube area are:

IBAs in the Juznbacki County are Jegricka (4,112 ha), Karadjordjevo (4,851 ha), Titelski breg (14,317 ha), Koviljski rit (total area 9,340 ha, partly on the territory of the Juznbacki County) and Fruska gora (total area 49,210 ha, partly on the territory of the Juznbacki County).

IPAs in the Juznbacki County are Rimski Sanac (102,80 ha), Koviljsko-petrovaradinski rit (5,703.29 ha), Zabalj (1,249.34 ha), Titelski breg (total area 436.75 ha, partly on the territory of the Juznbacki County) and Fruska Gora (total area 21,780.48 ha, partly on the territory of the Juznbacki County).

PBA in the Juznbacki County is Fruska Gora (total area 34,771 ha, partly on the territory of the Juznbacki County).

## State of the environment

### Air quality and pollution

According to average annual values of SO<sub>2</sub> immissions in 2005, Juznbacki County occupied 1st rank (the smallest concentration of this pollutant in the Region). According to average annual concentrations of smoke, the County, however, occupied 5th rank. Measurements of NO<sub>2</sub> immissions did not take place in this county. The immission of SO<sub>2</sub> and smoke were less in 2007 than in 2005.

Oil Refinery in Novi Sad and Cement factory in Beocin are important sources of the air pollution in the Juznbacki County as well as in the Danube area and in Serbia.

### Water

Capacity of underground water sources was 1634 l/s, associating Juznbacki County to other counties with capacity of underground water sources above 1000 l/s. The County was at the 2nd position in both 1996 and 2001. According to share of regional water supply sources, Juznbacki County occupied 9th rank in both 1996 and 2001 (0,95%). According to water quality analysis of the Danube and Tisa in 1996, 2001, 2005 and 2008, none of the examined river profiles satisfied the demanded II water quality class (Novi Sad class III, Titel class III/IV).

### Waste

Estimated amount of communal waste produced on yearly basis in the Juznbacki County is 212,928 t/year. One Regional waste Management centre is planned to be established in the Juznbacki County).

According to number of landfills in 2003, Juznbacki County occupied 1st rank as it had the highest number of landfills in the Region (12 in total).

### Water management

There are nine regional water supply systems planned to be established in the Danube Area out of which two are important for Juznbacki County: Novosadski and Backi regional water . The regional water supply systems cover 9.33% of the Danube area in Serbia. Their share is the lowest in Juznbacki (0.13% of the Danube area territory).

### Indicators of natural conditions

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index				
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)				2,2
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)				5,06
Atmosphere pollution ash - emission per 1000 inhabitants (t)				0,12
Atmosphere pollution CO - emission per 1000 inhabitants (t)				
Capacity of landfills per 1000 inhabitants (t)				

## Južnobanatska oblast

### *General information*

The Serbian part of the Danube region comprises two natural/geographic entities: the Pannonia plain and the Balkan Peninsula. Rivers Sava and the Danube form a natural border between the two.

The northern part of the region is mainly lowland whereas its southern and south-eastern parts are marked by hilly and mountainous landscapes. The lowland includes Vojvodina and areas marginal to the Pannonian Plain (Posavina, Pomoravlje, Stig and Negotinska krajina), whereas the upland belongs to the Carpathian-Balkan Mountain range (southeastern and eastern part of the Danube region) and the Dinaric Alps (Sumadijske planine). Total surface of the Serbian part of Region is 2,931,498 ha. The farmland has the biggest share (66.4%), followed by the forest (15.3%) and building land (12.6%). The miscellaneous areas occupy 5.7% of the total surface. The share of arable land in total farmland is 91.1%.

The biggest share of farmland is in Vojvodina's counties; the forestland has a high share in Branicevski and Borski County, whilst the biggest percentage of building land can be found within the City of Belgrade (38.27%).

The Law on the protection of nature (Official Journal of the Republic Serbia n°36/09) defines seven types of protected areas, namely:

1. national parks,
2. natural parks,
3. landscapes of extraordinary importance,
4. rigorous natural reserves,
5. special natural reserves,
6. natural monuments,
7. protected habitats.

In Serbian part of the Danube region there are 11 vast (with surface above 1,000 ha) and 174 small protected areas (with surface below 1,000 ha).

Large protected areas include 2 national parks, 7 special natural reserves, 1 natural monument and 1 landscape of extraordinary importance, the total surface being 196,331 ha. These areas are spread over eight counties (City of Belgrade, Zapadnbacki, Juznbacki, Srednjobanatski, Juznobanatski, Sremski, Branicevski and Borski County).

All large protected areas are within I category of protection, the exceptions being Special Natural reserve Kardjorjjevo that is within II category and Landscape of extraordinary importance Kosmaj within III category.

Activities on identification areas for Natura 2000 ecological networks (SPA and SAC) have started.

The Regulations on the Ecological Networks was adopted by the Government of the Republic of Serbia in 2011. The Ecological Network includes ecologically important areas, ecological corridors and buffer zones from where it is needed.

Danube with protected areas included is one of the ecological corridors of international importance according to the Regulations on the Ecological Networks.

In Serbian part of the Danube region, 22 areas were included in the EMERALD network that establishes areas that are important for implementing Bern Convention (The Convention on the Conservation of European Wildlife and Natural Habitats - Bern, 1979). Areas within EMERALD network (EMERALD network of Areas of Special Conservation Interest - ASCI) have total surface of 215,271.15 ha.

Areas of particular importance at the international level in the Serbian part of the Danube area are 23 Important Bird Areas (IBAs) with total surface of 411,368 ha, 21 Important Plant Areas (IPAs) with total surface of 244,758.03 ha and 9 Prime Butterfly Areas in Europe (PBAs) with total surface of 177,266 ha. According to the Ramsar Convention 6 areas with total surface of 48,370 ha is protected in Serbian part of the Danube region.

The main sources of air pollution in the Danube area are thermal plants, rayon heating systems, households, motor vehicles and industry. The biggest air pollution comes from the combustion of low quality lignite and motor fuels. The main sources of air pollution are thermal plants situated in Kolubarski and Kostolacki lignite basins. Kolubarski basin (thermal power plants Nikola Tesla A and B and Kolubara A) emits 112,864 tons of SO<sub>x</sub>, 30,650 tons of NO<sub>x</sub> and around 4,400 tons of particles per year. Kostolacki basin releases 103,000 tons of SO<sub>x</sub>, 9,800 tons of NO<sub>x</sub> and 2,800 tons of particles per year. Thermal plants also produce 5.5 million tons of fly-ash that is being stored contrary to regulations. Other important sources of pollution are oil refineries, cement factory, chemical industry, as well as steel factory. Pollution from the traffic is facing an increase, especially in the big cities.

According to the Regulation on water classification (Official Journal of the Socialist Republic of Serbia n ° 5/68), there exist following water classes in Serbia: I, IIa, IIb, III and IV, as well as OC (out of class). Regulation on water

classification makes distinction between four classes of water quality, according to their level of contamination and their use:

class I – waters which in their natural state or after disinfection could be used for providing drinking water to the settlements, within the food industry and for breeding noble fish species (salmonidae family);

class II – waters which are convenient for bathing, recreation and water sports, for breeding less noble fish species (cyprinidae family), as well as for providing drinking water to the settlements and food industry after being properly treated (coagulation, filtration and disinfection);

class III – waters which can be used for irrigation and in industries, except food production;

class IV – waters which can be used only after a special treatment; as well as

OC (out of classes).

There are two sub-classes within the water class II: sub-class IIa, including waters which, after a regular treatment (coagulation, filtration and disinfection) can be used for providing drinking water to the settlements, for bathing and for the production of food and sub-class IIb, including waters which can be used for water sports, recreation, for breeding less noble fish species (cyprinidae family) and as drinking water for the cattle. Division of water into classes and sub-classes has been performed according to different indicators and their limit values, defined by this Regulation.

Water quality class of the Danube when it enters Serbia from Hungary is III, while its quality at the exit, when it enters Romania and Bulgaria, is in class II/III.

Water quality assessment of accumulations (artificial lakes) is being practiced at three points on the surface (at the dam, in the middle and at the beginning of lake) as well as along its depth (surface, middle depth and bottom).

The monitoring of ground water regime is being performed in five areas (Velika Morava, Kolubara, Backa, Banat and Srem). When evaluating the quality of ground waters situated along riversides a special attention is given to dangerous and harmful materials that have previously been detected in the rivers.

Nine regional water supply systems within the Danube Area are planned to be established: Timo ki, Mlavsko-moravski, Kolubarski, Savsko-beogradski, Sremski, Novosadski, Ba ki, Gornja Tisa and Južnobanatski.

Spas of national importance within the Danube area are: Selters, Banja Junakovi, Vrdni ka Banja, Banja Rusanda, Banja Slankamen and Palana ki Kiseljak.

According to the National Waste Management Strategy, there are 59 landfills for communal waste within the Danube area. Data on communal waste amounts that are generated at NUTS<sub>4</sub> (municipal) level are incomplete and unreliable. Total estimated amount of communal waste in Serbia is 2,374,374 t/year. Estimated amount of communal waste produced on yearly basis is 1,543,545 t/year in the Danube area. However, installations for biological treatment and incineration of communal waste do not exist. Installation for treatment or disposal of dangerous waste does not exist either. Biggest amounts of non-dangerous industrial waste come from processing industries. Important amounts of waste come also from agriculture, exploitation of mineral resources and construction. Ten regional waste management centres are planned to be established in the Danube area. They should include: a regional landfill, an installation for separation of recycling waste, transfer stations, a composting installation and centres for separate collection of recycling waste.

The new Law on waters (Official Journal of the Republic of Serbia n° 30/2010) is harmonised with the Water Framework Directive (2000/60/EC) as the basic framework for water management in the EU member states. During the preparation of this law, other relevant EU documents were also taken into account. According to the new Law, integrated water management consists of measures and activities for maintaining and improving water regimes, ensuring required water quantities and demanded quality for different purposes, protection of water from pollution and protection from water harmful effects. Competences for water management in Serbia are entrusted to the Ministry of agriculture, forestry and water management (Republic Office for Waters), other relevant ministries, provincial bodies, local self-governments (municipalities and cities) and public water management companies („Srbijavode“, „Vode Vojvodine“ and „Beogradvode“).

The Republic Office for Waters, within the Ministry of agriculture, forestry and water management, is responsible for: water management policies; multiple water use; risk management (protection from floods, ice, erosion etc.); water protection and rational water use; management of water regimes; control and management of border rivers' regimes; water supply (except water distribution); other responsibilities prescribed by the Law.

Public water management companies are responsible for: management of water resources; control, management and improvement of water regimes; maintenance and reconstruction of water management infrastructure; flood management and drainage; protection of waters from pollution; other activities prescribed by the Law.

Local self-governments are responsible for water distribution and management of local water supply systems as well as for other activities prescribed by the Law.

Water regimes are being maintained and improved according to the Water Management Strategy of Serbia, water management plans, annual water management programmes, risk management plans (flood risk management plans, general and operational flood protection plans) as well as water protection plans (plans for the protection of water from pollution and monitoring programme).

Water bodies or sources that serve as regional water supply systems represent assets of general interest. Their perimeters are designated by the Government. Three protection zones are being assigned within these perimeters: broad protection zone, narrow protection zone and immediate protection zone.

There are nine regional water supply systems planned to be established in the Danube Area: Timo ki, Mlavsko-moravski, Kolubarski, Savsko-beogradski, Sremski, Novosadski, Ba ki, Gornja Tisa and Južnobanatski. The regional water supply systems cover 9.33% of the Danube area in Serbia. Their share is the highest in Brani evski County (4.25% of the Danube area territory) and the lowest in Južnoba ki (0.13% of the Danube area territory). In order to operate the regional water supply systems in the Danube area, there exist 3 artificial lakes (Grlišće, Rovni and Sava lake-WPI Makiš) and 8 more are planned to be created (Bogovina, Zukovac, Okoliste, Vitman and Gradac, Ku evo, Dubo ica, Ribnica and Gornja Ljubovi a).

Underground water sources are the biggest provider of water for households and industry. In Vojvodina, underground water sources are the only sources of water supply. The capacity of underground water sources (Q) above 1000 l/s can be found in three counties, from 500 to 1000 l/s can be found in 5 counties whereas in one county the capacity is under 500 l/s.

### *Land use*

Almost 80% of the territory of Južnobanatska oblast is farmland out of which 91.30% is arable. Forest land and built-up area are represented with 6.57% and 10% respectively, only 3.82% belonging to the category of miscellaneous areas.

### *Nature conservation and landscape*

#### *Protected areas*

The share of protected areas in Juznobanatski County is 8.20% and above the Danube region's average. Number of the protected areas did not change after 1996.

Large protected areas in the Juznobanatski County is the Special Nature Reserve Deliblatska pescara (34,829 ha). 17 small-scale protected areas (less than 1,000 ha) can be found in Juznobanatski County (2 natural parks, 2 natural reserves and 13 natural monuments).

#### *Ecological networks*

EMERALD Area of Special Conservation Interest on the territory of the Juznobanatski County (ASCI) are Deliblatska pescara (35,840 ha), Vrsacke planine (4,408 ha) and Pancevacke ade (1141.13 ha).

Areas of particular importance at the international level in the Danube area are:

IBAs in the Juznobanatski County are Vrsacke planine (12,069 ha), Deliblatska pescara (48,758 ha), Labudovo okno (6,488 ha) and Srednje Potamisje (total area 14,507 ha, partly on the territory of the Juznobanatski County).

PAs in the Juznobanatski County are Srednji Banat II (total area 4,045.68 ha, partly on the territory of the Juznobanatski County), Vrsacke planine (61,143.60 ha), Deliblatska Pescara (total area 35,810.92 ha) and Ponjavica (170.54 ha).

PBA in the Juznobanatski County is Deliblatska pescara (35,496 ha).

Special Nature Reserve Labudovo okno with total surface of 3,733 ha is one of 6 Ramsar areas that are situated in the Danube reagon.

### *State of the environment*

#### *Air quality and pollution*

There were no metering stations for measuring SO<sub>2</sub>, smoke and NO<sub>2</sub> immissions in 1996, 2001 and 2005. The main source of air pollution in Južnobanatska oblast is the Industrial Complex in Pan evo.

### Water

Capacity of underground water sources was 1004 l/s, associating Južnobanatska oblast to other NUTS3 regions with capacity of underground water sources above 1000 l/s. The region occupied 3rd position in both 1996 and 2001 among 9 Danube regions in Serbia. According to the share of regional water supply sources, Južnobanatska oblast occupied 4th rank in both 1996 and 2001 as the share of 5.51% in both years was below the Danube region's average in Serbia. According to water quality analysis of the Danube and Tamiš River in 1996, 2001, 2005 and 2008, none of the examined river profiles satisfied the demanded II water quality class (Pan evro class III and III/IV, Banatska Palanka class III).

### Waste

Estimated amount of communal waste produced on yearly basis is 102,278 t/year in Južnobanatska oblast. Two regional waste management centres are planned to be established in this NUTS3 region. According to the number of landfills in 2003, Južnobanatska oblast occupied 3rd rank among 9 Danube regions in Serbia (8 communal landfills out of 59 in the Danube region).

### Water management

There is one regional water supply system planned to be established in the Juznobanatski county – Juznobanatski regional water supply system.

### Indicators of natural conditions

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index				
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)				17,75
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)				7,62
Atmosphere pollution ash - emission per 1000 inhabitants (t)				0,98
Atmosphere pollution CO - emission per 1000 inhabitants (t)				
Capacity of landfills per 1000 inhabitants (t)				

## Srednjobanatska oblast

### *General information*

The Serbian part of the Danube region comprises two natural/geographic entities: the Pannonia plain and the Balkan Peninsula. Rivers Sava and the Danube form a natural border between the two.

The northern part of the region is mainly lowland whereas its southern and south-eastern parts are marked by hilly and mountainous landscapes. The lowland includes Vojvodina and areas marginal to the Pannonian Plain (Posavina, Pomoravlje, Stig and Negotinska krajina), whereas the upland belongs to the Carpathian-Balkan Mountain range (southeastern and eastern part of the Danube region) and the Dinaric Alps (Sumadijske planine). Total surface of the Serbian part of Region is 2,931,498 ha. The farmland has the biggest share (66.4%), followed by the forest (15.3%) and building land (12.6%). The miscellaneous areas occupy 5.7% of the total surface. The share of arable land in total farmland is 91.1%.

The biggest share of farmland is in Vojvodina's counties; the forestland has a high share in Branicevski and Borski County, whilst the biggest percentage of building land can be found within the City of Belgrade (38.27%).

The Law on the protection of nature (Official Journal of the Republic Serbia n°36/09) defines seven types of protected areas, namely:

1. national parks,
2. natural parks,
3. landscapes of extraordinary importance,
4. rigorous natural reserves,
5. special natural reserves,
6. natural monuments,
7. protected habitats.

In Serbian part of the Danube region there are 11 vast (with surface above 1,000 ha) and 174 small protected areas (with surface below 1,000 ha).

Large protected areas include 2 national parks, 7 special natural reserves, 1 natural monument and 1 landscape of extraordinary importance, the total surface being 196,331 ha. These areas are spread over eight counties (City of Belgrade, Zapadnbacki, Juznbacki, Srednjobanatski, Juznbanatski, Sremski, Branicevski and Borski County).

All large protected areas are within I category of protection, the exceptions being Special Natural reserve Kardjorjevo that is within II category and Landscape of extraordinary importance Kosmaj within III category.

Activities on identification areas for Natura 2000 ecological networks (SPA and SAC) have started.

The Regulations on the Ecological Networks was adopted by the Government of the Republic of Serbia in 2011. The Ecological Network includes ecologically important areas, ecological corridors and buffer zones from where it is needed.

Danube with protected areas included is one of the ecological corridors of international importance according to the Regulations on the Ecological Networks.

In Serbian part of the Danube region, 22 areas were included in the EMERALD network that establishes areas that are important for implementing Bern Convention (The Convention on the Conservation of European Wildlife and Natural Habitats - Bern, 1979). Areas within EMERALD network (EMERALD network of Areas of Special Conservation Interest - ASCI) have total surface of 215,271.15 ha.

Areas of particular importance at the international level in the Serbian part of the Danube area are 23 Important Bird Areas (IBAs) with total surface of 411,368 ha, 21 Important Plant Areas (IPAs) with total surface of 244,758.03 ha and 9 Prime Butterfly Areas in Europe (PBAs) with total surface of 177,266 ha. According to the Ramsar Convention 6 areas with total surface of 48,370 ha is protected in Serbian part of the Danube region.

The main sources of air pollution in the Danube area are thermal plants, rayon heating systems, households, motor vehicles and industry. The biggest air pollution comes from the combustion of low quality lignite and motor fuels. The main sources of air pollution are thermal plants situated in Kolubarski and Kostolacki lignite basins. Kolubarski basin (thermal power plants Nikola Tesla A and B and Kolubara A) emits 112,864 tons of SO<sub>x</sub>, 30,650 tons of NO<sub>x</sub> and around 4,400 tons of particles per year. Kostolacki basin releases 103,000 tons of SO<sub>x</sub>, 9,800 tons of NO<sub>x</sub> and 2,800 tons of particles per year. Thermal plants also produce 5.5 million tons of fly-ash that is being stored contrary to regulations. Other important sources of pollution are oil refineries, cement factory, chemical industry, as well as steel factory. Pollution from the traffic is facing an increase, especially in the big cities.

According to the Regulation on water classification (Official Journal of the Socialist Republic of Serbia n ° 5/68), there exist following water classes in Serbia: I, IIa, IIb, III and IV, as well as OC (out of class). Regulation on water

classification makes distinction between four classes of water quality, according to their level of contamination and their use:

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class III – waters which can be used for irrigation and in industries, except food production;

class IV – waters which can be used only after a special treatment; as well as

OC (out of classes).

There are two sub-classes within the water class II: sub-class IIa, including waters which, after a regular treatment (coagulation, filtration and disinfection) can be used for providing drinking water to the settlements, for bathing and for the production of food and sub-class IIb, including waters which can be used for water sports, recreation, for breeding less noble fish species (cyprinidae family) and as drinking water for the cattle. Division of water into classes and sub-classes has been performed according to different indicators and their limit values, defined by this Regulation.

Water quality class of the Danube when it enters Serbia from Hungary is III, while its quality at the exit, when it enters Romania and Bulgaria, is in class II/III.

Water quality assessment of accumulations (artificial lakes) is being practiced at three points on the surface (at the dam, in the middle and at the beginning of lake) as well as along its depth (surface, middle depth and bottom).

The monitoring of ground water regime is being performed in five areas (Velika Morava, Kolubara, Backa, Banat and Srem). When evaluating the quality of ground waters situated along riversides a special attention is given to dangerous and harmful materials that have previously been detected in the rivers.

Nine regional water supply systems within the Danube Area are planned to be established: Timo ki, Mlavsko-moravski, Kolubarski, Savsko-beogradski, Sremski, Novosadski, Ba ki, Gornja Tisa and Južnobanatski.

Spas of national importance within the Danube area are: Selters, Banja Junakovi , Vrdni ka Banja, Banja Rusanda, Banja Slankamen and Palana ki Kiseljak.

According to the National Waste Management Strategy, there are 59 landfills for communal waste within the Danube area. Data on communal waste amounts that are generated at NUTS<sub>4</sub> (municipal) level are incomplete and unreliable. Total estimated amount of communal waste in Serbia is 2,374,374 t/year. Estimated amount of communal waste produced on yearly basis is 1,543,545 t/year in the Danube area. However, installations for biological treatment and incineration of communal waste do not exist. Installation for treatment or disposal of dangerous waste does not exist either. Biggest amounts of non-dangerous industrial waste come from processing industries. Important amounts of waste come also from agriculture, exploitation of mineral resources and construction. Ten regional waste management centres are planned to be established in the Danube area. They should include: a regional landfill, an installation for separation of recycling waste, transfer stations, a composting installation and centres for separate collection of recycling waste.

The new Law on waters (Official Journal of the Republic of Serbia n° 30/2010) is harmonised with the Water Framework Directive (2000/60/EC) as the basic framework for water management in the EU member states. During the preparation of this law, other relevant EU documents were also taken into account. According to the new Law, integrated water management consists of measures and activities for maintaining and improving water regimes, ensuring required water quantities and demanded quality for different purposes, protection of water from pollution and protection from water harmful effects. Competences for water management in Serbia are entrusted to the Ministry of agriculture, forestry and water management (Republic Office for Waters), other relevant ministries, provincial bodies, local self-governments (municipalities and cities) and public water management companies („Srbijavode“, „Vode Vojvodine“ and „Beogradvode“).

The Republic Office for Waters, within the Ministry of agriculture, forestry and water management, is responsible for: water management policies; multiple water use; risk management (protection from floods, ice, erosion etc.); water protection and rational water use; management of water regimes; control and management of border rivers' regimes; water supply (except water distribution); other responsibilities prescribed by the Law.

Public water management companies are responsible for: management of water resources; control, management and improvement of water regimes; maintenance and reconstruction of water management infrastructure; flood management and drainage; protection of waters from pollution; other activities prescribed by the Law.

Local self-governments are responsible for water distribution and management of local water supply systems as well as for other activities prescribed by the Law.

Water regimes are being maintained and improved according to the Water Management Strategy of Serbia, water management plans, annual water management programmes, risk management plans (flood risk management plans, general and operational flood protection plans) as well as water protection plans (plans for the protection of water from pollution and monitoring programme).

Water bodies or sources that serve as regional water supply systems represent assets of general interest. Their perimeters are designated by the Government. Three protection zones are being assigned within these perimeters: broad protection zone, narrow protection zone and immediate protection zone.

There are nine regional water supply systems planned to be established in the Danube Area: Timo ki, Mlavsko-moravski, Kolubarski, Savsko-beogradski, Sremski, Novosadski, Ba ki, Gornja Tisa and Južnobanatski. The regional water supply systems cover 9.33% of the Danube area in Serbia. Their share is the highest in Brani evski County (4.25% of the Danube area territory) and the lowest in Južnoba ki (0.13% of the Danube area territory). In order to operate the regional water supply systems in the Danube area, there exist 3 artificial lakes (Grlišće, Rovni and Sava lake-WPI Makiš) and 8 more are planned to be created (Bogovina, Zukovac, Okoliste, Vitman and Gradac, Ku evo, Dubo ica, Ribnica and Gornja Ljubovi a).

Underground water sources are the biggest provider of water for households and industry. In Vojvodina, underground water sources are the only sources of water supply. The capacity of underground water sources (Q) above 1000 l/s can be found in three counties, from 500 to 1000 l/s can be found in 5 counties whereas in one county the capacity is under 500 l/s.

### *Land use*

The majority of the territory of Srednjobanatska oblast consists of farmland (84.13%) out of which 84.60% is arable. Here lies the most abundant farmland in the Serbian part of the Danube Region - completely contrary to the representation of forests that occupy only 2% of the total area of Srednjobanatska oblast. Built-up area occupies 9.56% of the territory, while the miscellaneous areas occupie 4.29%.

### *Nature conservation and landscape*

#### *Protected areas*

Share of protected areas in Srednjobanatski County (2.83% in 1996 and 3.13% in 2001 and 2005) was below the Danube region's average (6.25% in 1996 and 6.58% in 2001 and 2005) in all the three years.

Large protected area in the Srednjobanatski County is the Special Nature Reserve Stari Begej-Carska Bara (1,676 ha, with buffer zone of 7,532 ha)

10 small-scale protected areas (less than 1,000 ha) can be found in Srednjobanatski County (1 natural park, 2 natural reserves and 7 natural monuments).

#### *Ecological networks*

EMERALD Areas of Special Conservation Interest on the territory of the Srednjobanatski County (ASCI) are Slano kopovo (976.45 ha) and Begej-Carska Bara (1,676.00 ha).

Areas of particular importance at the international level in the Danube area are:

IBAs in the Srednjobanatski County are Becejski ribnjak (4,807 ha), Slano kopovo (9,344 ha), Okanj and Rusanda (10,194 ha), Carska bara (11,570 ha), Gornje Potamisje (20,087 ha) and Srednje Potamisje (total area 14,507 ha, partly on the territory of the Srednjobanatski County).

IPAs in the Srednjobanatski County are Slano kopovo (991.62 ha), Titelski breg (total area 436.75 ha, partly on the territory of the Srednjobanatski County), Srednji Banat I (6,216.09 ha) and Srednji Banat II (total area 4,045.68 ha, partly on the territory of the Srednjobanatski County), Srednji Banat –Muzlja-Aradac (5,680.41 ha) and Stari Begej-Carska Bara (1,617.92 ha).

Two of 6 Ramsar areas in the Serbian part of the Danube area are situated in Srednjobanatski County (Stari Begej-Carska Bara with surface of 1,767 ha and Slano Kopovo, 976 ha).

*State of the environment*

*Air quality and pollution*

According to average annual values of SO<sub>2</sub> immissions in 2005, Srednjobanatski County occupied 2nd rank (small concentration of this pollutant). According to average annual concentrations of smoke, the County occupied 4th rank. In 2008 the immission of SO<sub>2</sub> and smoke were less than in 2005. Measurements of NO<sub>2</sub> immissions did not take place in this county.

*Water*

Capacity of underground water sources was 648 l/s, associating Srednjobanatski County to other counties with capacity of underground water sources from 500 to 1000 l/s. The County was at the 6th position in both 1996 and 2001. According to share of regional water supply sources, Srednjobanatski County occupied 8th rank in both 1996 and 2001 as the share of 1.72% in both years was below average for the Danube region. According to water quality analysis of Tisa and Tamis in 1996, 2001, 2005 and 2008, none of the examined river profiles satisfied the demanded II water quality class (Novi Becej class III and III/IV, Jasa Tomic class II/III and IV).

One spa of national importance is located in the Srednjobanatski County. Rusanda spa - there is a curative effect of mineral peloid (mud) from Rusanda lake. Thermal water from a well, with a temperature of 32°C and belonging to the category of sodium hydro-carbonate sulphur chemo-thermals.

*Waste*

Estimated amount of communal waste produced on yearly basis in the Srednjobanatski County is 71,608 t/year. One Regional Waste Management Centre for Communal Waste as well as one Central Regional Storage for dangerous waste are planned to be established in the Srednjobanatski County.

According to number of landfills in 2003, Srednjobanatski County occupied 5th rank with 5 communal landfills out of 59 in the Danube Region.

*Water management*

There are nine regional water supply systems planned to be established in the Danube Area out of which Novosadski and Gornja Tisa systems are important for the Srednjobanatski County.

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index				
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)				1,41
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)				4,23
Atmosphere pollution ash - emission per 1000 inhabitants (t)				0,14
Atmosphere pollution CO - emission per 1000 inhabitants (t)				
Capacity of landfills per 1000 inhabitants (t)				

## Sremska oblast

### *General information*

The Serbian part of the Danube region comprises two natural/geographic entities: the Pannonia plain and the Balkan Peninsula. Rivers Sava and the Danube form a natural border between the two.

The northern part of the region is mainly lowland whereas its southern and south-eastern parts are marked by hilly and mountainous landscapes. The lowland includes Vojvodina and areas marginal to the Pannonian Plain (Posavina, Pomoravlje, Stig and Negotinska krajina), whereas the upland belongs to the Carpathian-Balkan Mountain range (southeastern and eastern part of the Danube region) and the Dinaric Alps (Sumadijske planine). Total surface of the Serbian part of Region is 2,931,498 ha. The farmland has the biggest share (66.4%), followed by the forest (15.3%) and building land (12.6%). The miscellaneous areas occupy 5.7% of the total surface. The share of arable land in total farmland is 91.1%.

The biggest share of farmland is in Vojvodina's counties; the forestland has a high share in Branicevski and Borski County, whilst the biggest percentage of building land can be found within the City of Belgrade (38.27%).

The Law on the protection of nature (Official Journal of the Republic Serbia n°36/09) defines seven types of protected areas, namely:

1. national parks,
2. natural parks,
3. landscapes of extraordinary importance,
4. rigorous natural reserves,
5. special natural reserves,
6. natural monuments,
7. protected habitats.

In Serbian part of the Danube region there are 11 vast (with surface above 1,000 ha) and 174 small protected areas (with surface below 1,000 ha).

Large protected areas include 2 national parks, 7 special natural reserves, 1 natural monument and 1 landscape of extraordinary importance, the total surface being 196,331 ha. These areas are spread over eight counties (City of Belgrade, Zapadnbacki, Juznbacki, Srednjebanatski, Juznobanatski, Sremski, Branicevski and Borski County).

All large protected areas are within I category of protection, the exceptions being Special Natural reserve Kardjorjjevo that is within II category and Landscape of extraordinary importance Kosmaj within III category.

Activities on identification areas for Natura 2000 ecological networks (SPA and SAC) have started.

The Regulations on the Ecological Networks was adopted by the Government of the Republic of Serbia in 2011. The Ecological Network includes ecologically important areas, ecological corridors and buffer zones from where it is needed.

Danube with protected areas included is one of the ecological corridors of international importance according to the Regulations on the Ecological Networks.

In Serbian part of the Danube region, 22 areas were included in the EMERALD network that establishes areas that are important for implementing Bern Convention (The Convention on the Conservation of European Wildlife and Natural Habitats - Bern, 1979). Areas within EMERALD network (EMERALD network of Areas of Special Conservation Interest - ASCI) have total surface of 215,271.15 ha.

Areas of particular importance at the international level in the Serbian part of the Danube area are 23 Important Bird Areas (IBAs) with total surface of 411,368 ha, 21 Important Plant Areas (IPAs) with total surface of 244,758.03 ha and 9 Prime Butterfly Areas in Europe (PBAs) with total surface of 177,266 ha. According to the Ramsar Convention 6 areas with total surface of 48,370 ha is protected in Serbian part of the Danube region.

The main sources of air pollution in the Danube area are thermal plants, rayon heating systems, households, motor vehicles and industry. The biggest air pollution comes from the combustion of low quality lignite and motor fuels. The main sources of air pollution are thermal plants situated in Kolubarski and Kostolacki lignite basins. Kolubarski basin (thermal power plants Nikola Tesla A and B and Kolubara A) emits 112,864 tons of SO<sub>x</sub>, 30,650 tons of NO<sub>x</sub> and around 4,400 tons of particles per year. Kostolacki basin releases 103,000 tons of SO<sub>x</sub>, 9,800 tons of NO<sub>x</sub> and 2,800 tons of particles per year. Thermal plants also produce 5.5 million tons of fly-ash that is being stored contrary to regulations. Other important sources of pollution are oil refineries, cement factory, chemical industry, as well as steel factory. Pollution from the traffic is facing an increase, especially in the big cities.

According to the Regulation on water classification (Official Journal of the Socialist Republic of Serbia n ° 5/68), there exist following water classes in Serbia: I, IIa, IIb, III and IV, as well as OC (out of class). Regulation on water

classification makes distinction between four classes of water quality, according to their level of contamination and their use:

class I – waters which in their natural state or after disinfection could be used for providing drinking water to the settlements, within the food industry and for breeding noble fish species (salmonidae family);

class II – waters which are convenient for bathing, recreation and water sports, for breeding less noble fish species (cyprinidae family), as well as for providing drinking water to the settlements and food industry after being properly treated (coagulation, filtration and disinfection);

class III – waters which can be used for irrigation and in industries, except food production;

class IV – waters which can be used only after a special treatment; as well as

OC (out of classes).

There are two sub-classes within the water class II: sub-class IIa, including waters which, after a regular treatment (coagulation, filtration and disinfection) can be used for providing drinking water to the settlements, for bathing and for the production of food and sub-class IIb, including waters which can be used for water sports, recreation, for breeding less noble fish species (cyprinidae family) and as drinking water for the cattle. Division of water into classes and sub-classes has been performed according to different indicators and their limit values, defined by this Regulation.

Water quality class of the Danube when it enters Serbia from Hungary is III, while its quality at the exit, when it enters Romania and Bulgaria, is in class II/III.

Water quality assessment of accumulations (artificial lakes) is being practiced at three points on the surface (at the dam, in the middle and at the beginning of lake) as well as along its depth (surface, middle depth and bottom).

The monitoring of ground water regime is being performed in five areas (Velika Morava, Kolubara, Backa, Banat and Srem). When evaluating the quality of ground waters situated along riversides a special attention is given to dangerous and harmful materials that have previously been detected in the rivers.

Nine regional water supply systems within the Danube Area are planned to be established: Timo ki, Mlavsko-moravski, Kolubarski, Savsko-beogradski, Sremski, Novosadski, Ba ki, Gornja Tisa and Južnobanatski.

Spas of national importance within the Danube area are: Selters, Banja Junakovi , Vrdni ka Banja, Banja Rusanda, Banja Slankamen and Palana ki Kiseljak.

According to the National Waste Management Strategy, there are 59 landfills for communal waste within the Danube area. Data on communal waste amounts that are generated at NUTS<sub>4</sub> (municipal) level are incomplete and unreliable. Total estimated amount of communal waste in Serbia is 2,374,374 t/year. Estimated amount of communal waste produced on yearly basis is 1,543,545 t/year in the Danube area. However, installations for biological treatment and incineration of communal waste do not exist. Installation for treatment or disposal of dangerous waste does not exist either. Biggest amounts of non-dangerous industrial waste come from processing industries. Important amounts of waste come also from agriculture, exploitation of mineral resources and construction. Ten regional waste management centres are planned to be established in the Danube area. They should include: a regional landfill, an installation for separation of recycling waste, transfer stations, a composting installation and centres for separate collection of recycling waste.

The new Law on waters (Official Journal of the Republic of Serbia n° 30/2010) is harmonised with the Water Framework Directive (2000/60/EC) as the basic framework for water management in the EU member states. During the preparation of this law, other relevant EU documents were also taken into account. According to the new Law, integrated water management consists of measures and activities for maintaining and improving water regimes, ensuring required water quantities and demanded quality for different purposes, protection of water from pollution and protection from water harmful effects.

Competences for water management in Serbia are entrusted to the Ministry of agriculture, forestry and water management (Republic Office for Waters), other relevant ministries, provincial bodies, local self-governments (municipalities and cities) and public water management companies („Srbijavode“, „Vode Vojvodine“ and „Beogradvode“).

The Republic Office for Waters, within the Ministry of agriculture, forestry and water management, is responsible for: water management policies; multiple water use; risk management (protection from floods, ice, erosion etc.); water protection and rational water use; management of water regimes; control and management of border rivers' regimes; water supply (except water distribution); other responsibilities prescribed by the Law.

Public water management companies are responsible for: management of water resources; control, management and improvement of water regimes; maintenance and reconstruction of water management infrastructure; flood management and drainage; protection of waters from pollution; other activities prescribed by the Law.

Local self-governments are responsible for water distribution and management of local water supply systems as well as for other activities prescribed by the Law.

Water regimes are being maintained and improved according to the Water Management Strategy of Serbia, water management plans, annual water management programmes, risk management plans (flood risk management plans, general and operational flood protection plans) as well as water protection plans (plans for the protection of water from pollution and monitoring programme).

Water bodies or sources that serve as regional water supply systems represent assets of general interest. Their perimeters are designated by the Government. Three protection zones are being assigned within these perimeters: broad protection zone, narrow protection zone and immediate protection zone.

There are nine regional water supply systems planned to be established in the Danube Area: Timo ki, Mlavsko-moravski, Kolubarski, Savsko-beogradski, Sremski, Novosadski, Ba ki, Gornja Tisa and Južnobanatski. The regional water supply systems cover 9.33% of the Danube area in Serbia. Their share is the highest in Brani evski County (4.25% of the Danube area territory) and the lowest in Južnoba ki (0.13% of the Danube area territory). In order to operate the regional water supply systems in the Danube area, there exist 3 artificial lakes (Grlišće, Rovni and Sava lake-WPI Makiš) and 8 more are planned to be created (Bogovina, Zukovac, Okoliste, Vitman and Gradac, Ku evo, Dubo ica, Ribnica and Gornja Ljubovi a).

Underground water sources are the biggest provider of water for households and industry. In Vojvodina, underground water sources are the only sources of water supply. The capacity of underground water sources (Q) above 1000 l/s can be found in three counties, from 500 to 1000 l/s can be found in 5 counties whereas in one county the capacity is under 500 l/s.

### *Land use*

Similar to other NUTS 3 regions in Serbia, farmland is the most present in Sremska oblast with almost 68% of the total area out of which 96% is arable. Forest land covers 16.27% of the territory and that is among the highest shares of forest land in the Serbian part of the Project area. Built-up area covers 11% of the territory whereas 4.80% belongs to the category of miscellaneous areas.

### *Nature conservation and landscape*

#### *Protected areas*

According to share of protected areas, Sremski County was above regional average in all the three years, occupying 2nd rank. In 2001, share of protected areas was for 0.64% higher than in 2001.

Large protected areas in the Sremski County are National Park Fruska Gora (total area – 25,393 ha, partly on the territory of the Sremski County), Special Nature Reserve Koviljsko-Petrovaradinski rit (total area – 4,840 ha, partly on the territory of the Sremski County), Special Nature Reserve Obedska bara (9,820 ha with buffer zone of 19,611 ha) and Special Nature Reserve Zasavica (1,150 ha).

22 of small-scale protected areas (with surface less than 1,000 ha) can be found in Sremski County (9 natural reserves, 12 natural monuments and 1 “other”).

#### *Ecological networks*

EMERALD Area of Special Conservation Interest on the territory of the Sremski County (ASCI) are Fruska gora (total area -25,393 ha partly in the Sremski County), Special Nature Reserve Koviljsko-Petrovaradinski rit (total area – 4,840 ha, partly on the territory of the Sremski County), Special Nature Reserve Obedska bara (9,860 ha) and Special Nature Reserve Zasavica (total area 670 ha, partly on the territory of the Sremski County).

Areas of particular importance at the international level in the Danube area are:

IBAs in the Sremski County are Koviljski rit (total area 9,340 ha, partly on the territory of the Sremski County), Dunavski lesni odsek (5,304 ha), Fruska gora (total area 49,210 ha, partly on the territory of the Sremski County), Obedska bara (29,913 ha), Bosutske sume (25,931 ha) and Zasavica (4,670 ha).

IPAs in the Sremski County are Fruska Gora (total area 21,780.48 ha, partly on the territory of the Sremski County), Obedska bara (9,863.77 ha), and Zasavica (665.67 ha).

PBAs in the Sremski County are Fruska Gora (total area 34,771 ha, partly on the territory of the Sremski County) and Zasavica (1,819 ha).

Two Ramsar areas are situated in Sremski County (Obedska Bara – 17,501 ha and Zasavica – 1,913 ha).

## *State of the environment*

### *Air quality and pollution*

According to average annual values of SO<sub>2</sub> immissions in 2001, Sremski County occupied 1st rank and in 2005, 3rd. According to average annual concentrations of smoke, the County occupied 1st rank in both years (the smallest concentrations in the Region). Average annual concentrations of smoke and SO<sub>2</sub> in 2005 almost halved comparing to the year 2001. Measurements of NO<sub>2</sub> immissions did not take place in this county. The immission of SO<sub>2</sub> and smoke were higher in 2007 than in 2005. Emissions of the PM, SO<sub>2</sub> and NO<sub>2</sub> in 2007 were as follows: 14.4612 t/year of PM, 99.8348 t/year of SO<sub>2</sub> and 156.4818 t/year of NO<sub>2</sub>.

### *Water*

The capacity of underground water sources was 796 l/s, associating Sremski County to other counties with capacity of underground water sources from 500 to 1000 l/s. The County was at the 4th position in both 1996 and 2001. According to regional water supply sources, Sremski County occupied 7th rank in both years, as share of 4.42% was below regional average. According to water quality analysis of the river Sava in 1996, none of the examined river profiles satisfied the demanded II water quality class (Jamena class III, Sremska Mitrovica class II/III). In 2001, water quality was satisfying on all profiles/metering stations (II class) whereas in 2005, water class was satisfactory at the metering station Sremska Mitrovica and was not adequate at profile Jamena (class III). In 2008 as well as in 1996, none of the examined river profiles satisfied the demanded II water quality class (Jamena class III, Sremska Mitrovica class II/III).

There are two spas of national importance in the Sremski County: Vrdnicka spa with Thermal water with a constant temperature of 32.5 degrees Celsius, which classifies it into hypothermal waters, with a wide spectre of influences on the human organism, and Slankamen spa which has mineral waters with a temperature of 18.4°C. Slankamen spa belongs to the group of salty-iodine waters of sodium type. The water contains sodium-chloride, iodine, magnesium, calcium, strontium and barium.

### *Waste*

Estimated amount of communal waste produced on yearly basis in the Sremski County is 101,143 t/year.

Two regional waste management centres are planned to be established in the Sremski County.

According to number of landfills in 2003, Sremski County occupied 2nd rank with 9 out of 59 landfills in the Region.

### *Water management*

There is one regional water supply system planned to be established in Sremski County – Sremski regional water supply system.

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index				
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)				0,38
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)				0,22
Atmosphere pollution ash - emission per 1000 inhabitants (t)				54,41
Atmosphere pollution CO - emission per 1000 inhabitants (t)				
Capacity of landfills per 1000 inhabitants (t)				

## Zapadnoba ka oblast

### *General information*

The Serbian part of the Danube region comprises two natural/geographic entities: the Pannonia plain and the Balkan Peninsula. Rivers Sava and the Danube form a natural border between the two.

The northern part of the region is mainly lowland whereas its southern and south-eastern parts are marked by hilly and mountainous landscapes. The lowland includes Vojvodina and areas marginal to the Pannonian Plain (Posavina, Pomoravlje, Stig and Negotinska krajina), whereas the upland belongs to the Carpathian-Balkan Mountain range (southeastern and eastern part of the Danube region) and the Dinaric Alps (Sumadijske planine). Total surface of the Serbian part of Region is 2,931,498 ha. The farmland has the biggest share (66.4%), followed by the forest (15.3%) and building land (12.6%). The miscellaneous areas occupy 5.7% of the total surface. The share of arable land in total farmland is 91.1%.

The biggest share of farmland is in Vojvodina's counties; the forestland has a high share in Branicevski and Borski County, whilst the biggest percentage of building land can be found within the City of Belgrade (38.27%).

The Law on the protection of nature (Official Journal of the Republic Serbia n°36/09) defines seven types of protected areas, namely:

1. national parks,
2. natural parks,
3. landscapes of extraordinary importance,
4. rigorous natural reserves,
5. special natural reserves,
6. natural monuments,
7. protected habitats.

In Serbian part of the Danube region there are 11 vast (with surface above 1,000 ha) and 174 small protected areas (with surface below 1,000 ha).

Large protected areas include 2 national parks, 7 special natural reserves, 1 natural monument and 1 landscape of extraordinary importance, the total surface being 196,331 ha. These areas are spread over eight counties (City of Belgrade, Zapadnobački, Juznobački, Srednjebanatski, Juznobański, Sremski, Branicevski and Borski County).

All large protected areas are within I category of protection, the exceptions being Special Natural reserve Kardjorđjevo that is within II category and Landscape of extraordinary importance Kosmaj within III category.

Activities on identification areas for Natura 2000 ecological networks (SPA and SAC) have started.

The Regulations on the Ecological Networks was adopted by the Government of the Republic of Serbia in 2011. The Ecological Network includes ecologically important areas, ecological corridors and buffer zones from where it is needed.

Danube with protected areas included is one of the ecological corridors of international importance according to the Regulations on the Ecological Networks.

In Serbian part of the Danube region, 22 areas were included in the EMERALD network that establishes areas that are important for implementing Bern Convention (The Convention on the Conservation of European Wildlife and Natural Habitats - Bern, 1979). Areas within EMERALD network (EMERALD network of Areas of Special Conservation Interest - ASCI) have total surface of 215,271.15 ha.

Areas of particular importance at the international level in the Serbian part of the Danube area are 23 Important Bird Areas (IBAs) with total surface of 411,368 ha, 21 Important Plant Areas (IPAs) with total surface of 244,758.03 ha and 9 Prime Butterfly Areas in Europe (PBAs) with total surface of 177,266 ha. According to the Ramsar Convention 6 areas with total surface of 48,370 ha is protected in Serbian part of the Danube region.

The main sources of air pollution in the Danube area are thermal plants, rayon heating systems, households, motor vehicles and industry. The biggest air pollution comes from the combustion of low quality lignite and motor fuels. The main sources of air pollution are thermal plants situated in Kolubarski and Kostolacki lignite basins. Kolubarski basin (thermal power plants Nikola Tesla A and B and Kolubara A) emits 112,864 tons of SO<sub>x</sub>, 30,650 tons of NO<sub>x</sub> and around 4,400 tons of particles per year. Kostolacki basin releases 103,000 tons of SO<sub>x</sub>, 9,800 tons of NO<sub>x</sub> and 2,800 tons of particles per year. Thermal plants also produce 5.5 million tons of fly-ash that is being stored contrary to regulations. Other important sources of pollution are oil refineries, cement factory, chemical industry, as well as steel factory. Pollution from the traffic is facing an increase, especially in the big cities.

According to the Regulation on water classification (Official Journal of the Socialist Republic of Serbia n ° 5/68), there exist following water classes in Serbia: I, IIa, IIb, III and IV, as well as OC (out of class). Regulation on water

classification makes distinction between four classes of water quality, according to their level of contamination and their use:

class I – waters which in their natural state or after disinfection could be used for providing drinking water to the settlements, within the food industry and for breeding noble fish species (salmonidae family);

class II – waters which are convenient for bathing, recreation and water sports, for breeding less noble fish species (cyprinidae family), as well as for providing drinking water to the settlements and food industry after being properly treated (coagulation, filtration and disinfection);

class III – waters which can be used for irrigation and in industries, except food production;

class IV – waters which can be used only after a special treatment; as well as

OC (out of classes).

There are two sub-classes within the water class II: sub-class IIa, including waters which, after a regular treatment (coagulation, filtration and disinfection) can be used for providing drinking water to the settlements, for bathing and for the production of food and sub-class IIb, including waters which can be used for water sports, recreation, for breeding less noble fish species (cyprinidae family) and as drinking water for the cattle. Division of water into classes and sub-classes has been performed according to different indicators and their limit values, defined by this Regulation.

Water quality class of the Danube when it enters Serbia from Hungary is III, while its quality at the exit, when it enters Romania and Bulgaria, is in class II/III.

Water quality assessment of accumulations (artificial lakes) is being practiced at three points on the surface (at the dam, in the middle and at the beginning of lake) as well as along its depth (surface, middle depth and bottom).

The monitoring of ground water regime is being performed in five areas (Velika Morava, Kolubara, Backa, Banat and Srem). When evaluating the quality of ground waters situated along riversides a special attention is given to dangerous and harmful materials that have previously been detected in the rivers. Nine regional water supply systems within the Danube Area are planned to be established: Timo ki, Mlavsko-moravski, Kolubarski, Savsko-beogradski, Sremski, Novosadski, Ba ki, Gornja Tisa and Južnobanatski.

Spas of national importance within the Danube area are: Selters, Banja Junakovi, Vrdni ka Banja, Banja Rusanda, Banja Slankamen and Palana ki Kiseljak.

According to the National Waste Management Strategy, there are 59 landfills for communal waste within the Danube area. Data on communal waste amounts that are generated at NUTS<sub>4</sub> (municipal) level are incomplete and unreliable. Total estimated amount of communal waste in Serbia is 2,374,374 t/year. Estimated amount of communal waste produced on yearly basis is 1,543,545 t/year in the Danube area. However, installations for biological treatment and incineration of communal waste do not exist. Installation for treatment or disposal of dangerous waste does not exist either. Biggest amounts of non-dangerous industrial waste come from processing industries. Important amounts of waste come also from agriculture, exploitation of mineral resources and construction. Ten regional waste management centres are planned to be established in the Danube area. They should include: a regional landfill, an installation for separation of recycling waste, transfer stations, a composting installation and centres for separate collection of recycling waste.

The new Law on waters (Official Journal of the Republic of Serbia n° 30/2010) is harmonised with the Water Framework Directive (2000/60/EC) as the basic framework for water management in the EU member states. During the preparation of this law, other relevant EU documents were also taken into account. According to the new Law, integrated water management consists of measures and activities for maintaining and improving water regimes, ensuring required water quantities and demanded quality for different purposes, protection of water from pollution and protection from water harmful effects. Competences for water management in Serbia are entrusted to the Ministry of agriculture, forestry and water management (Republic Office for Waters), other relevant ministries, provincial bodies, local self-governments (municipalities and cities) and public water management companies („Srbijavode“, „Vode Vojvodine“ and „Beogradvode“).

The Republic Office for Waters, within the Ministry of agriculture, forestry and water management, is responsible for: water management policies; multiple water use; risk management (protection from floods, ice, erosion etc.); water protection and rational water use; management of water regimes; control and management of border rivers' regimes; water supply (except water distribution); other responsibilities prescribed by the Law.

Public water management companies are responsible for: management of water resources; control, management and improvement of water regimes; maintenance and reconstruction of water management infrastructure; flood management and drainage; protection of waters from pollution; other activities prescribed by the Law.

Local self-governments are responsible for water distribution and management of local water supply systems as well as for other activities prescribed by the Law.

Water regimes are being maintained and improved according to the Water Management Strategy of Serbia, water management plans, annual water management programmes, risk management plans (flood risk management plans, general and operational flood protection plans) as well as water protection plans (plans for the protection of water from pollution and monitoring programme).

Water bodies or sources that serve as regional water supply systems represent assets of general interest. Their perimeters are designated by the Government. Three protection zones are being assigned within these perimeters: broad protection zone, narrow protection zone and immediate protection zone.

There are nine regional water supply systems planned to be established in the Danube Area: Timo ki, Mlavsko-moravski, Kolubarski, Savsko-beogradski, Sremski, Novosadski, Ba ki, Gornja Tisa and Južnobanatski. The regional water supply systems cover 9.33% of the Danube area in Serbia. Their share is the highest in Brani evski County (4.25% of the Danube area territory) and the lowest in Južnoba ki (0.13% of the Danube area territory). In order to operate the regional water supply systems in the Danube area, there exist 3 artificial lakes (Grlišće, Rovni and Sava lake-WPI Makiš) and 8 more are planned to be created (Bogovina, Zukovac, Okoliste, Vitman and Gradac, Ku evo, Dubo ica, Ribnica and Gornja Ljubovi a).

Underground water sources are the biggest provider of water for households and industry. In Vojvodina, underground water sources are the only sources of water supply. The capacity of underground water sources (Q) above 1000 l/s can be found in three counties, from 500 to 1000 l/s can be found in 5 counties whereas in one county the capacity is under 500 l/s.

### *Land use*

Majority of the territory of Zapadnoba ka oblast is farmland (68.08%) out of which 94% is arable. An important part of the territory of this NUTS 3 region are miscellaneous areas (18.81%). Built-up areas cover 8.98% of the territory, occupying only 4.13%.

### *Nature conservation and landscape*

#### *Protected areas*

Share of protected areas in Zapadnoba ki County in 1996, 2001 and 2005 was 8.12% and above regional average. Number of protected areas did not change after 1996. This county was ranked at 4th position in all the three years.

Large protected areas in the Zapadnoba ki County is the Special Nature Reserve Gornje Podunavlje (19,648 ha). 11 small-scale protected areas (less than 1,000 ha) can be found in Zapadnoba ki County (11 natural monuments).

#### *Ecological networks*

EMERALD Area of Special Conservation Interest on the territory of the Zapadnoba ki County (ASCI) is Gornje Podunavlje (19,380 ha).

Areas of particular importance at the international level in the Danube area are:

IBA in the Zapadnoba ki County is Gornje Podunavlje (22,617 ha).

IPAs in the Zapadnoba ki County are Gornje Podunavlje (19,379.61 ha) and Telecka I (205.96 ha).

PBA in the Zapadnoba ki County is Gornje Podunavlje (19,021 ha).

One of 6 Ramsar areas in the Serbian part of the Danube region is situated in Zapadnoba ki County - Special Nature Reserve Gornje Podunavlje with total surface of 22,480 ha.

### *State of the environment*

#### *Air quality and pollution*

According to average annual values of SO<sub>2</sub> immissions in 2005, Zapadnoba ki County occupied 2nd rank due to the small concentration of this pollutant. According to average annual concentrations of smoke, the County, however, was placed just after the City of Belgrade (7th rank). Measurements of NO<sub>2</sub> immissions did not take place in this county. The immission of SO<sub>2</sub> and smoke were less in 2007 than in 2005.

*Water*

The capacity of underground water sources was 627 l/s, associating Zapadnbacki County to other counties with capacity of underground water sources from 500 to 1000 l/s. The County was at the 7th position in both 1996 and 2001. According to regional water supply sources the County occupied 5th rank, as the share of 5.0% in both years was below regional average. According to water quality analysis of the Danube in 1996, 2001, 2005 and 2008, none of the examined river profiles satisfied the demanded II water quality class (Bezdan class III/IV, Bogojevo class II/III).

There is one spa of national importance in the Zapadnbacki county – Junakovic spa with springs of thermo-mineral water of temperature up to 60°C. The water contains sodium, lithium, calcium and magnesium.

*Waste*

Estimated amount of communal waste produced on yearly basis is 56,497 t/year in the Zapadnbacki County.

One regional waste management centre is planned to be established in the Zapadnbacki County.

According to number of landfills in 2003, Zapadnbacki County occupied 6th rank with 4 communal landfills out of 59 in the Danube region.

*Water management*

There is one regional water supply system planned to be established in Zapadnbacki County - Backi regional water supply system.

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index				
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)				0,9
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)				0,54
Atmosphere pollution ash - emission per 1000 inhabitants (t)				0,16
Atmosphere pollution CO - emission per 1000 inhabitants (t)				
Capacity of landfills per 1000 inhabitants (t)				

## Judetul Braila

### *General information*

Braila county is situated in the South-Eastern part of Romania, having as Danube neighbours Gala i county at North, Tulcea county at East, Constan a and Ialomi a counties in South. It is located in central and Northern part of Brigan Plain and on the Danube Valley.

Other river valleys are: Siret, Buz u and C l m u i. The climate is temperate with semi-arid nuances. The main rivers crossing the county are: the Danube river, Siret, Buz u and C l m u i rivers. The length of hydrographic network is 603.5 km, out of which the Danube has 222.5 km. The Danube river and other watercourses are totally impounded: the Danube river on 217.4 km, Buzau river on 85.5 km, Calmatui river on 84.5 km and Siret river on 40.3 km. Between the arms of the Danube is situated the Big Island of Braila (76700 hectares) and the Natural Park Small Pond of Braila (17529 hectares).

Besides the numerous lakes there are also salted therapeutic lakes, with mud (vegetable slime): Salt Lake I and II, Caineni Bai, Movila Miresii, Batogu. There are also sweet water lakes and fish ponds.

### *Land use*

The farmland has the biggest share in total area: 81.30%, followed by 6.23% other areas (non productive land, construction, roads and railways) and forests/other forest vegetation land (5.93%). The waters and ponds areas represent 0.65% from the total area. The share of arable land in total farmland is 90.04%.

### *Nature conservation and landscape*

#### *Protected areas*

In Braila county there are 3 protected areas of national interest (according to Law no.5/2000): the Small Pond of Braila (Parcul Natural Balta Mica a Brailei) – natural park, Jirlau-Visani Lake – natural reserve and Camnita Forrest – natural reserve, totalizing 18368.86 hectares, out of which the Small Pond of Braila has 17529 hectares.

According to Law no.5/2000 regarding the approval of the National Spatial Plan, Section III – Protected Areas, the Small Pond of Braila had an area of 17529 ha, but according to other further evaluations from 2005 executed by the County Cadaster Agency, its area resulted to be 20562.39 ha

The Small Pond of Braila is the only area with natural hydrologic regime (floodable area) after the damming of 75% from the former Big Island of Braila. 53.6% from its area is occupied by forests, 27.5% by lakes, 12.9% by wet lands and 6% areas by pastures. By reason of the big number of water birds, the Small Pond of Braila was declared in 2001 a RAMSAR site, the second in Romania after the Danube Delta. In 2007 the Small Pond of Braila was declared both SPA and SCI, on 20460 hectares.

Natura 2000 sites are represented in Braila county by 4 SCIs and 7 SPAs.

#### *Ecological networks*

In 2000, Romania has initiated together with Bulgaria, Moldavia and Ukraine the creation of "Danube Green Corridor", which is a regional ecological network in the Danube floodplain.

On June 5th, 2000, the Ministries of Environment of Romania, Bulgaria, Moldova and Ukraine have signed the Declaration of the Lower Danube Green Corridor, recognizing the need and responsibility to conserve and sustainably manage one of the most biodiversity regions in the world.

The project aims primarily the creation of an integrated ecological network in order to maintain a healthy wetland, restore and protect an area covering almost 900,000 ha along the Lower Danube, and to promote sustainable socio-economic development of the area.

From total surface:

- 713 385 ha represents natural protected areas:
- 20 446,6 ha of wetlands that are not included on the protected area list:
- 161 883 ha are proposed for ecological reconstruction.

The second ecological network is represented by Natura 2000 program, which is aimed at the protection and management of species and habitats, their natural territory. The Birds and Habitats Directives are implemented in Romania by Government Decision no.1284/2007 and the Order no.1964/2007 of the Ministry of Environment and Sustainable Development.

NATURA 2000 sites are represented in Braila county by:

- 7 SPAs, summing 33917.5 hectares, representing 7.1% from the total area of the county: Maxineni, Balta Alba - Amara – Jirlau, Dunarea Veche - Bratul Macin, Ianca - Plopu – Sarat, Lunca Siretului Inferior, Balta Mica a Brailei, Balta Tataru.

- 4 SCIs, having together 39514.4 ha, representing 8.3% from the total area of the county: Valea Calmatuului, Bratul Macin, Balta Mica a Brailei, Balta Alba - Amara - Jirlau - Lacul Sarat Caineni.

### *State of the environment*

#### *Air quality and pollution*

air monitoring showed the following:

- Average annual concentrations of NO<sub>2</sub> were less than 10% from the maximum admissible concentration.
- Average annual concentrations of SO<sub>2</sub> were less than 27% from the maximum admissible concentration.
- Average annual concentrations of NH<sub>3</sub> represented only 10% from the maximum admissible concentration.
- for ash, the average annual concentrations represented between 24 and 45% from the 10% from the maximum admissible concentration.

Analyzing the evolution of annual average concentrations of the monitored atmospheric pollutants between 2000 and 2007, it was observed a decreasing tendency, with values below the maximum admissible concentrations.

The inventory of the atmosphere emissions showed that most of the pollutants resulted from activities as electric and heating production (SC Termoelectrica, Electrocentrale Br ila Branch, SC CET SA Br ila, districts or public heating power plants), from iron metals (SC Promxe SA, SC Laminorul SA), food industry (SC Marex SA, SC Soroli Cola SA), timber manufacturing (SC Pal SA), animal husbandry (SC Caruz Br ila SA, SC Cruciani Impex SA, SC Pig Complex SA, Baldovine ti and Tichile ti farms, SC Agrimon SRL, Opri ene ti chicken farms, Traianu and Plopu chicken farms, SC Vegetal Trading SRL) and houseworks (SC Tracon SRL).

Between 2005 and 2008 it was observed an important decreasing of the quantity of SO<sub>2</sub> due to the dropping of the black oil consumption at SC Termoelectrica SA and Electrocentrale Br ila. In this period the SO<sub>2</sub> emissions decreased from 4300 t in 2005 to 983 t in 2008, respectively from 11.60 t/1000 inhabitants to 2.71 t/1000 inhabitants.

Regarding the NO<sub>x</sub> pollution, the emissions increased from 3251 t in 2008 to 4078 t in 2009, respectively from 8.97 t/1000 inhabitants in 2008 to 11.32 t/1000 inhabitants in 2009.

The atmosphere pollution with COV (organic volatile compounds), heavy metals and organic pollutants is increasing due to increased number of cars during the last years. The COV emissions increased from 2730 t in 2001 to 5090 t in 2005 and 18440 t in 2008, respectively from 7.1 t/1000 inhabitants in 2001 to 50.89 t/1000 inhabitants in 2008. In 2009 decreased to 7.23 t/1000 inhabitants.

Since the monitoring of atmosphere pollutants didn't show overflows of limit values, in Braila county there are no critical areas regarding the atmosphere pollution.

The powder in 2009 registered an annual average concentration less than in 2008 with 20-25%.

#### *Water*

In Braila county were not registered critical areas regarding the pollution of surface water in 2009. Regarding the underground water, there are 21 critical areas due to the historical pollutions from 1986 (Tepes Voda locality from Movila Miresii commune) and 1991 (Chercea district from Braila municipality), both due to oil products. Regarding the pollution with nitrates from agricultural sources, vulnerable areas from the underground water pollution point of view are Galbenu, Movila Miresii, Vadeni, Sutesti, Traian, Chiscani and Visani. This historical pollution is due to agriculture and animal husbandry units that are closed now.

The Danube River has 3 monitoring sections, with a similar evolution as previous years, the average values of most physical and chemical indicators situating its water in the II<sup>nd</sup> class of quality. Although there is a pollution determined by used water disposals, the big flow of the river doesn't allow the pollutants to modify its quality class.

Buz u River has 2 monitoring sections, its physical and chemical analyses showing the improvement of water quality, belonging to the 2<sup>nd</sup> class quality.

C lm ui River has monitoring points in the section Pod Cuza Vod and in sections Pod Cire u and Pod Berte ti, its water quality belonging to the 2<sup>nd</sup> class of quality, according to Order no. 1146/2002 of Environment and Sustainable Development Ministry.

Underground water was monitored in 47 drills, the values of analyzed indicators showing that they are overflowing the limits stipulated in STAS 1342/91 and Law no. 458/2002 – Drinking Water Indicators. There are

overflows for organic materials (iron, nitrates) due to the influence of surface streams (main source being their anthropic load) and to insufficient treated or un-cleaned used water evictions.

*Waste*

The municipal waste was stored in un-ecological landfills in Ianca town until 2010 and in Faurei town, going to be closed in 2017. A conform landfill (ecological landfill) for municipal waste in Braila county is situated in Muchea locality. In 2009 here was stored a quantity of 70041.96 tones.

A waste disposal area is represented by TRACON S.R.L. Br ila. Industrial waste stockpiles are situated in Br ila, on Chi cani chemical platform.

*Water management*

To ensure the drinking and industrial water demand of Braila county consumers, there are water adduction pipelines from the Danube. The most important adductions are: Danube– Ianca adduction, L=37.5 km, Q=270 l/s; Urleasca – Movila Miresii adduction, length 11.5km; Ianca – Furei adduction, length 20.5 km; Gropeni pump station adduction – Gropeni locality, length 1.0 km.

Danube River is the main source of water supply, providing the 2 water supply systems of the county: 1. Braila zonal system, supplying localities Br ila, Chi cani (Chi cani, Lacul S rat, V rs tura), Cazasu, V deni (V deni, Baldovine ti). Danube’s water catchment is achieved by a bank inlet situated nearby Chiscani locality. This water is finally treated in 2 water treatment stations, at Chi cani and Br ila. 2. Ianca – Gropeni regional system. Water catchment is achieved by a bank inlet on the Danube’s branch Calia, in the proximity of Gropeni locality. The captured water is treated in 3 water treatment stations: Gropeni, Ianca and Movila Miresii, ensuring drinking water for Ianca town and another 13 communes.

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	3,15	3,13	3,39	3,29
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	9,51	1,52	11,6	2,71
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	10,83	10,6	10,96	8,97
Atmosphere pollution ash - emission per 1000 inhabitants (t)	1,8	1,58	1,63	1,33
Atmosphere pollution CO - emission per 1000 inhabitants (t)	59,348	43,64	24,45	19,94
Capacity of landfills per 1000 inhabitants (t)	31,29	31,68	1005,84	1236,78

## Judetul Constanta

### *General information*

Constanta county is situated in the South-Eastern extremity of Romania.

In North is separated from Tulcea County by a conventional line, between the Danube and Black Sea, crossing Casimcea plateau and the Razim lagoon Complex (Zmeica and Sinoe lakes).

In South is limited by the state frontier between Romania and Bulgaria, traversing the Southern Dobrogea plateau between Ostrov and Vama Veche.

In West the Danube River separates Constanta County from Calarasi, Ialomitia and Braila counties, flowing along the high bank of Dobrogea.

In East – between Gura Portitei and the locality Vama Veche, the Dobrogea plateau is wet by the Black Sea. The Romanian territorial waters are extended on 22 marine miles from the shore line (22 km equivalents), established according international conventions.

In Constanta county is prevailing the plateau structure (Dobrogea Plateau) having a low altitude.

The climate is temperate continental with an annual average temperature of 10-11°C, and with precipitation below the national average. The Black Sea has a strong influence on a strip of several tens of kilometers inward.

The most important hydrographic unit of the county is the Black Sea, situated in the Eastern part of the county.

The hydrographic network contains also watercourses (the Danube on 137 km) and is enriched by the exploitation of the Danube – Black Sea Channel (on 64.2 km), Poarta Alba – Midia Channel (on 27.5 km) and the irrigation channels from Valea Carasu. A distinct feature of the county is the presence of natural and meadow lakes and of the lagoons (Oltina, Sinoie, Tasaul, and Techirghiol). The hydrographic network includes also the waterways.

Constanta County owns one of the most representative tourist facilities. By its geographic positioning, climate, relief, archaeological sites, natural reserves, accommodation places, possibilities for trips and cruises, the territory of the county offers a diversity of tourist activities.

The Romanian Black Sea coast represents one of the most important tourist areas in Romania reported to other tourist areas.

Regarding the state of environment, in Constanta county the quantity of SO<sub>2</sub> and CO<sub>2</sub> emissions increased in 2009 compared to 2008 (additional burnings in energetic sector).

### *Land use*

The farmland has the highest biggest share (79.81%) from the total area, followed by the other areas (non productive land, construction, roads and railways) (8.17%). Waters and ponds occupy 6.44%. The forests and other forest vegetation lands represent 5.55% from the total area. The share of arable land in total farmland is of 86.07%.

### *Nature conservation and landscape*

#### *Protected areas*

In Constanta county there are 38 protected areas (according to Law no.5/2000 regarding the approval of the National Spatial Plan, Section III – Protected Areas, HG no.2151/2004 and to HG 1143/2007 regarding the declaring of new natural protected areas) representing 2.77% from the total area of the county: 5 scientific reserves (IUCN category I), 12 nature monuments (IUCN category III) and 21 natural reserves (IUCN category IV), totalizing 19617.1 hectares.

36 protected areas are declared at national level, and 2 at local level, by county decisions.

Thus:

According to Law no.5/2000 regarding the approval of the National Spatial Plan, Section III – Protected Areas, in Constanta county is situated a part of the protected area of international importance, the Danube Delta Biosphere Reserve (580 000 ha), with a triple protection status. There are also 27 reserves and nature monuments:

1. Vama Veche – 2 Mai (Acvatoriul litoral marin), 5 000 ha
2. Grindul Chituc, 2 300 ha
3. Grindul Lupilor, 2 075 ha
4. Corbu-Nunta I, 1 610 ha
5. Cetatea Histria, 350 ha
6. Pere ii calcaro i de la Petro ani, 4,80 ha
7. Locul fosilifer Aliman, 15 ha

8. Reciful neojurassic de la Topalu, 8 ha
9. Locul fosilifer Credin a, 6 ha
10. Locul fosilifer Cernavod , 3 ha
11. Locul fosilifer eimenii Mari, 0,50 ha
12. Pe tera La Adam, 5 ha
13. Pe tera Gura Dobrogei, 5 ha
14. Pe tera Limanu, 1 ha
15. Valu lui Traian, 5 ha
16. P durezza Hagieni, 392,9 ha
17. P durezza Dumbraveni, 345,7 ha
18. Recifii jurasici Cheia, 170 ha
19. P durezza Canaraua Fetii, 168,3 ha
20. Padurea Fântâni a-Murfatlar, 66,4 ha
21. P durezza Esehioi, 26 ha
22. Dunele marine de la Agigea, 25 ha
23. Dealul Alah Bair, 10 ha
24. Lacul Agigea, 86,8 ha
25. Canarelele din Portul Hâr ova, 5,3 ha
26. Locul fosilifer Movila Banului, 4 ha
27. Obantul Mare i Pe tera Movable, 12 ha

According to HG no.2151/2004 regarding the declaring of new natural protected areas, there are 7 natural reserves:

1. Celea Mare – Valea lui Ene, 54 ha
2. P durezza Cetate, 62 ha
3. P durezza Bratca, 67 ha
4. Lacul Oltina, 2 290 ha
5. Lacul Bugeac, 1 434 ha
6. Lacul Dun reni, 703 ha
7. Lacul Vederoasa, 517 ha

According to HG 1143/2007 regarding the declaring of new natural protected areas, there is 1 natural reserve: Gura Dobrogei, 243 ha.

Techirghiol lake was declared protected area by HG1266/2000 and a RAMSAR site in 2006. Situated nearby the Black Sea coast, this unique lake in the country is divided into 3 areas by 2 dams built in the years '80. The Eastern part of the lake has strongly salted water, the middle one has brackish water and the Western one has sweet water, offering thus a diversity of habitats.

Natura 2000 sites are represented in Constanta county by 19 SCIs and 22 SPAs.

### *Ecological networks*

The "Danube Green Corridor" is a regional ecological network in the Danube floodplain, crossing all Danube counties.

Another ecological network is represented by Natura 2000 program. NATURA 2000 sites are represented in Constanta county by:

- 22 SPAs, summing 203755 hectares, representing 28.8% from the total area of the county: Dunare – Ostroave, Canarelele de la Orsova, Balta Mica a Brailei, Aliman – Adamclisi, Padurea Hagieni, Allah Bair – Capidava, Baneasa - Canaraua Fetei, Dumbraveni, Lacul Siutghiol, Lacurile Tasaul – Corbu, Dunarea Veche - Bratul Macin, Lacul Techirghiol, Lacul Oltina, Stepa Casimcea, Lacul Dunareni, Marea Neagra, Balta Vederoasa, Lacul Bugeac, Delta Dunarii and Complexul Razim – Sinoie, Cheile Dobrogei, Stepa Saraiu – Horea, Limanu – Herghelia.
- 19 SCIs, having together 94401,1 ha, representing 13,3% from the total area of the county: Canarelele Dunarii, Fantanita Murfatlar, Padurea Esehioi - Lacul Bugeac, Mlastina Hergheliei - Obantul Mare si Pestera Movablei, Pestera Limanu, Plaja submersa Eforie Nord - Eforie Sud, Izvoarele sulfuroase submarine de la Mangalia, Dumbraveni - Valea Urluia - Lacul Vederoasa, Podisul Nord Dobrogean, Zona marina de la Capul Tuzla, Delta Dunarii, Vama Veche - 2 Mai, Dealul Alah Bair, Recifii Jurasici Cheia, Padurea Hagieni - Cotul Vaii, Padurea si Valea Canaraua Fetii – Iortmac, Dunele marine de la Agigea, Bratul Macin, Balta Mica a Brailei

## *State of the environment*

### *Air quality and pollution*

There were not registered air emissions overflows in 2008 because of the meteorological and climatic conditions, favourable to the dispersion and also because of the conversion of NO<sub>x</sub> into ozone under the solar radiation (for ozone there were high values recorded systematically during the summer). Critical areas were identified in 2008 in Constanta County. They are: Constanta agglomeration central area, the adjacent areas of Termoelectrica S.A. Palas (from combustion) and of LAFARGE ROMCIM Medgidia (powder emissions), Constan a harbour area (powder emissions), Rompetrol N vodari refinery and petrochemical activities (CO, SO<sub>2</sub>, H<sub>2</sub>S emissions), the oil terminal – Constan a harbour (volatile hydrocarbon emissions).

According to the “Report regarding the state of environment in Constanta county, 2009” the quantity of SO<sub>2</sub> emissions decreased in 2009 (65351.2 t) compared with 2001 (317834 t), but increased compared with previous year (26613.6 t in 2008). The values of SO<sub>2</sub> emissions increased in 2009 compared with 2008 due to the contribution of combustion from energetic sector, but also from the sector of non-industrial combustion.

Reported at 1000 inhabitants the SO<sub>2</sub> emissions were 425 t in 2001, 25.1 t in 2005, 36.95 t in 2008 and 90.5 t in 2009.

The NO<sub>x</sub> emissions also decreased from 91130 t in 2001 to 12204.6 t in 2009. The values of NO<sub>x</sub> emissions increased in 2009 compared with 2008 (from 7607.81 t in 2008 to 12204.6 t in 2009) due to non-industrial combustions installations. Reported at 1000 inhabitants, the NO<sub>x</sub> emissions were 121.98 t in 2001, 8.07 t in 2005, 9.8 t in 2008 and 16.9 t in 2009.

The COV emissions fluctuated from a maximum of 31395 t in 2001 (42 t/1000 inhabitants) to 4364 t in 2005 (8.1 t/1000 inhabitants), than increased to 17735 t in 2008 (24.6 t/1000 inhabitants). In 2009 the quantity of COV emissions decreased to 11280 t (15.6 t/1000 inhabitants).

Regarding the powders, at all monitoring station registered exceeding at daily limit values for the human health, both in 2008 and in 2009.

### *Water*

The quality of the main rivers is the following:

Casimcea river has the Vth general quality class;

Agi Cabul river has the Vth general quality class;

The Danube-Black Sea Channel has the IIInd general quality class;

The Poarta Alb -Midia-N vodari Channel has the IIInd general quality class;

The Danube has the IIInd general quality class.

Regarding the underground water pollution in Constanta county, some drills are exposed to organic pollution due to several deposits of animals waste disposed on un-authorized areas and nearby the sources (ex. Dulcesti, Biruinta, Pecineaga, Albesti sources) or due to chemical pollution, especially with nitrates from chemical fertilizers and waste (ex. Techirghiol, Mihail Kogalniceanu, Biruinta, Pecineaga, Hârsova sources). To be potable, the water is treated with chlorine gas.

Critical areas of water pollution are: S.C. Petromidia S.A. and S.C. Fertilchim S.A. N vodari, S.C.LAFARGE S.A. Medgidia. Regarding the surface and underground water pollution RAJA Constan a is the first emissary. Additionally, there are accidental pollutions caused by transit commercial ships that are polluting the Black Sea or the Danube by illegal discharges.

### *Waste*

There are several waste disposal areas managed by Ovidiu TRACON S.R.L. Brila Mangalia Albesti, ECO GOLD INVEST S.A. Mangalia Costinesti, IRIDEX GROUP IMPORT-EXPORT S.R.L. Bucharest. There is a Hazardous waste disposal managed by MARWAY-FERTILCHIM S.A. NVODARI. Waste incinerators are operating at: ECOFIRE Constan a and ROSAL ECOLOGIC Constan a. Industrial waste stockpiles are situated at Petromidia.

Conform landfills for municipal waste in Constanta county are in Ovidiu, Costinesti, Albesti localities and in Constanta harbor, altogether storing a quantity of 341804.75 tones of waste in 2009.

In Constanta county the municipal waste is stored in un-ecological landfills in Harsova (will be closed in 2010), Cernavoda and Techirghiol (both will be closed in 2012), and in Murfatlar, where is intended to be closed in 2015.

*Water management*

The hydrographic network of the county has as main water course the Danube River, with a length of 137 km on its territory.

A characteristic of the county is represented by its natural lakes (Nunta i, Corbu, Ta aul, Siutghiol, T b c rie, Tatlageac, Bugeac lakes), meadow lakes and lagoons (Oltina, Sinoe, Techirghiol, Mangalia).

The hydrographic network is enlarged by the Danube-Black Sea Channel, used on a distance of 64.2 km, Poarta Alb - Midia Channel on a distance of 27,5 km and by irrigation channels in Carasu Valley.

Water resources are:

- Surface water resources: 2117 million m<sup>3</sup>, out of which are usable 1947 million m<sup>3</sup>
- Underground water resources: 1515 mill. m<sup>3</sup>, out of which are usable 252 million m<sup>3</sup>;
- The Danube: 85000 millions m<sup>3</sup>, out of which are usable 22226 million m<sup>3</sup>.

The main water works are used for pisciculture and irrigation: ibrin, Nazarlâc, Limanu, as well as for flood attenuation at Pieti -Gârliciu.

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	1,81	1,7	1,97	1,96
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	937	425,43	25,08	37
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	58,42	122	8,06	9,81
Atmosphere pollution ash - emission per 1000 inhabitants (t)	15,6	9,94	0,77	0,8
Atmosphere pollution CO - emission per 1000 inhabitants (t)	95,2	76,44	70,71	82,95
Capacity of landfills per 1000 inhabitants (t)	16724,18	16728,97	17471,91	12390,62

## Judetul Galati

### *General Information*

Galati county is situated in the South-Eastern part of the country, occupying a geo-strategic position in Romania. Its Danube neighbours are: in South – Braila and Tulcea counties, towards East – Republic of Moldova and Ukraine.

Its position on the outside of the Carpathian curve, offers a view with mellowed heights, between 310 m in north and 5-10 m in south and is characterized by the contact area between the southernmost hills of the Plateau of Moldavia, the Romanian Plain and Dobrogea Plateau. The county's territory has a continental climate with some variation depending on the terrain and river network orientation.

The main rivers are: the Danube river, Siret, Buz u and Bârlad.

### *Land use*

The farmland has the biggest share (80,27%), followed by forests and other forest vegetation lands (9,81%) and other areas (non productive land, construction, roads and railways) - 6,90%. The waters and ponds areas represent 3,00% of the total surface. The share of arable land in total farmland is 81,77%.

### *Nature conservation and landscape*

#### *Protected areas*

In Galati county there are 17 protected areas of national interest .

According to Law no.5/2000 regarding the approval of the National Spatial Plan, Section III – Protected Areas, in Dolj county were declared 16 protected areas, totalizing 1184.6 hectares:

- Dunele de nisip de la Hanu Conachi, 199,3 ha
- P durea Gârboavele, 230 ha
- P durea Breana – Ro cani, 78,3 ha
- Locul fosilifer Tirighina – Barbo i, 1 ha
- Locul fosilifer Rate , 1,5 ha
- P durea Fundeanu, 53,2 ha
- P durea Talasmani, 20 ha
- P durea Buciumeni, 71,2 ha
- Ostrovul Prut, 62 ha
- Balta Potcoava, 49 ha
- Balta Talabasca, 139 ha
- Locul fosilifer Bere ti, 49 ha
- Lunca Joas a Prutului, 81 ha
- Lacul Pochina, 74,8 ha
- Lacul Vl scu a, 41,8 ha
- P durea Pog ne ti, 33,5 ha

In 2004, by the Government Decision HG no.2151/2004 regarding the declaring of new natural protected areas it was declared the Natural Park „Lunca Joas a Prutului Inferior”(the Low Meadow of Inferior Prut) with an area of 8247 hectares. The park contains also 259.6 ha previously declared naturel reserves by Law 5/2000: Balta Vl cu a (41,8ha), Balta Pochina (74,8ha), Ostrovul Prut (62 ha) and Lunca Joas a Prutului (81ha) -Balta Ma a.

There are also 6 protected areas declared by local decisions in 1994, totalizing 72.52 hectares.

Thus, protected areas are occupying 8059.92 hectares, representing 1.8% from the total area of the county.

Natura 2000 sites are represented in Galati county by 11 SCIs (out of which the Low Meadow of Inferior Prut is the largest) and 3 SPAs.

#### *Ecological networks*

The "Danube Green Corridor" is a regional ecological network in the Danube floodplain, crossing all Danube counties.

Another ecological network is represented by Natura 2000 program. NATURA 2000 sites are represented in Galati county by:

- 3 SPAs, summing 38227.3 hectares, representing 8.6% from the total area of the county: Lunca Siretului Inferior, Delta Dunarii and Complexul Razim – Sinoie, Lunca Prutului - Vladesti - Frumusita.
- 11 SCIs, having together 6838 ha, representing 1.5% from the total area of the county: Dunele de nisip de la Hanul Conachi, Padurea Breana-Rosceni, Padurea Mogos-Matele, Padurea Poganesti, Padurea Balta-Munteni, Padurea Garboavele, Padurea Merisor - Cotul Zatuanului, Padurea Torcesti, Lunca Joasa a Prutului, Padurea Talasmani, Raul Prut.

### *State of the environment*

#### *Air quality and pollution*

There are no critical situations in the atmosphere pollution. Critical potential areas are the bordering areas of the industrial platform of the biggest syderurgic factory in România: S.C. MITTAL STEEL S.A Galati (ex Sidex Galati). Other pollution sources can occur from the energetic sector and the car traffic. The SO<sub>2</sub> emissions had a maximum value in 2007 (21285 t) then decreased to 12365 t in 2008 and 6825 t in 2009. Reported at 1000 inhabitants the SO<sub>2</sub> emissions decreased from 31.1 t in 2005 to 20.2 t in 2008 and 11.2 t in 2009.

The NO<sub>x</sub> emissions increased between 2005 and 2007 but then dropped in 2008 and 2009. Thus, reported at 1000 inhabitants the quantities were 21.96 t in 2005, 20.62 t in 2008 and 11.8 t in 2009.

Also the COV emissions increased between 2005 and 2007 with 1400 t then decreased to 4885 t in 2008 and 2882 t in 2009. The decreasing was between 13.63 t/1000 inhabitants in 2005 to 7.99 t/1000 inhabitants in 2008 and 4.73 t in 2009.

In 2008 were registered 71 overflows of the limit value (which is 50 µg/m<sup>3</sup>/m<sup>3</sup>) due to the unfavorable meteorological conditions (fog, calm of the atmosphere) that didn't allow the dispersion of the pollutants into the atmosphere, but also due to punctual and lineal sources, as industrial areas, building yards, thermal isolation of the houses, the traffic. The annual average concentration was 22.166 µg/m<sup>3</sup>, 1.8 times less than the annual limit value for the human health (40µg/m<sup>3</sup>).

#### *Water*

Regarding the physical-chemical indicators, the water quality is:

- Prut river, II<sup>nd</sup> quality (L= 124km);
- Bârlad river, III<sup>rd</sup> quality (L=39km) and IV<sup>th</sup> quality (L=18km);
- Zeletin river, II<sup>nd</sup> quality (L=83km);
- Siret river, II quality on the total length of the river in the county;
- Danube river, II<sup>nd</sup> quality on its total length from the county. Pollutant loadings are comparable with previous years due to reduced or stopped activities of some important pollutant economic agents.

A critical area of water pollution is S.C. MITTAL STEEL S.A. Galati. Regarding the surface and underground water pollution, S.C. MITTAL STEEL S.A. Galati is the first emissary for the Danube River, Galati city being for the Prut River.

Another critical area regarding the water quality is represented by Geru river, downstream Cudalbi at the confluence with Gologan river, on 9 km.

#### *Waste*

In Galati county are 4 un-ecological landfills for municipal waste: 2 of them were closed in 2009, the other 2 are going to be closed in 2014 and 2017.

There is a hazardous waste disposal managed by S.C. MITTAL STEEL S.A. Galati. Here are also industrial waste stockpiles.

The disposal of municipal waste is taking place at the municipal landfill from Galati municipality – Tirghina, operated by SC ECOS PREST SA.

In Tecuci municipality the final municipal waste disposal is taking place at the Tecuci municipal landfill, operated by SC TERMSAL SA Tecuci.

In Târgu Bujor and Beresti towns the public administrations are responsible with waste collecting and their management.

In Galati county are no stations for mechanic and biologic treatment, composting stations or for mechanical treatment. It is envisaged the construction of a mechanic and biologic treatment station nearby Galati municipality.

In rural areas were identified 191 rural waste disposals, none of them being conform to the environment protection requirements. According to the Law, until 16 July 2009 they had to be closed.

### *Water management*

The territory of the county contains the confluence between Prut (L=103km), Siret (L=150km) and Danube (L=22km) rivers. Thus, the hydrographic network of the county is very rich.

The main water works in the county are accumulations used against floods: Ijdileni and Frumu ica.

Surface water resources are three times more extended than the underground ones, if we consider the average multi-annual flows. Because the usage of underground sources is less expensive and theoretically they have a better quality, these are mostly used for drinking water supply, the surface one being used for industrial needs, irrigation, pisciculture and other. 183 million m<sup>3</sup> of surface water are usable, the underground one being of 22.9 million m<sup>3</sup>.

### *Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	1,807	1,804	2,05	1,93
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	36	29,85	31,1	20,2
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	422	343,11	21,96	20,62
Atmosphere pollution ash - emission per 1000 inhabitants (t)	4	3,11	2,56	2,4
Atmosphere pollution CO - emission per 1000 inhabitants (t)	220	156,38	44,84	55,97
Capacity of landfills per 1000 inhabitants (t)	1176,97	1173,88	8413,7	8536,27

## Judetul Tulcea

### *General information*

Tulcea county is situated in the Northern part of the historical region of Dobrogea. Tulcea municipality is crossed by the parallel 45° North latitude. Sulina city is the Eastern extremity of Romania. Tulcea municipality is a Danube port and entrance into Danube Delta.

Encircled in 3 parts by water, its neighbours are at West Braila and Galati counties, at North with Ukraine by the Danube as border, at East with Black Sea, having Constanta county as terrestrial county limit at South.

By its area is one of the biggest counties from the country.

Thanks to its geographical position, Tulcea county has almost all relief forms from Romania, from Macinului Mountains – the oldest mountains in Romania and one of the oldest in Europe – to Danube Delta, new land in continuously shaping, the youngest land in Romania.

The county's territory belongs to an ancient continental promontory, partially submerged in the Danube's Meadow and Delta. The landscape includes regions of low altitude between 0-6 m (alluvial plains, delta and lake marsh), as well as regions with higher altitudes. The altitudes are between 0 at the Black Sea level (sfintul Gheorghe) and 467 m (Macinului Mountains).

The Danube Delta is declared a Biosphere Reserve in 1990 and it represents one of the biggest wetlands in the world.

The Eastern part of the county is wet by the waters of the Razim-Sinoie Lagoon Complex.

Regarding the air quality, in Tulcea county the quantity of SO<sub>2</sub> and CO<sub>2</sub> emissions increased in 2009 compared to 2008, mostly because of the cars traffic.

### *Land use*

The farmland has the highest share (42.82%) from the total area, followed by waters and ponds (41.41%). Forests and other forest vegetation land have 10.99% from the total area. The other areas (non productive land, construction, roads and railways) are occupying 4.77% of the total area. The share of arable land in total farmland is of 80.02%. Between 2003 and 2009 important areas (320 thousand sq.m.) that initially had agricultural destinations were used for other destinations, especially for household sewerage systems and wastewater treatment plants, for mobile telephony, other constructions or as wind parks placements.

### *Nature conservation and landscape*

#### *Protected areas*

In 2009, in Tulcea county were 53 natural protected areas of different types: 1 Biosphere Reserve, 1 National park, 34 natural reserves (including Macinului Mountains) and 17 Natura 2000 sites (8 SCIs and 9 SPAs) declared by Order of MMDD no.1964/2007, respectively by HG 1284/2007.

The 34 protected areas of national interest are covering 20825.25 hectares (according to Law no.5/2000 and to Government Decision no.2151/2004) representing thus 2.45% from the total area of the county: 33 natural reserves (summing 9504,25 hectares) and 1 national park (National Park Macinului Mountains – 11321 hectares).

The protected areas situated on the territory of Tulcea county and recognized at national level by Law no.5/2000 regarding the approval of the National Spatial Plan, Section III – Protected Areas are:

1.

The Danube Delta Biosphere Reserve – 580 000 ha, structured by functional areas in:

1. areas with integral protection: 50 600 ha (18 reserves)

2. tampon areas: 223 300 ha

3. economic areas: 306 100 ha

The Danube Delta Biosphere Reserve is the biggest protected natural area in Romania, with a triple status: Biosphere Reserve, RAMSAR site and Natural and Cultural World Heritage site. It is the only protected area in Romania having its own law, administrative structure (Administration of the Danube Delta Biosphere Reserve) and management plan.

The Danube Delta Biosphere Reserve includes 18 areas of integral protection, out of which 15 are in Tulcea county: S r turile Murighiol (87 ha), Ro ca-Buhaiova (9 625 ha), P durea Letea (2 825 ha), Grindul i Lacul R ducu (2 500 ha), Lacul Nebunu (115 ha), Complexul V tafu-Lungule (1625 ha), P durea Caraorman (2 250 ha), Arinisul

Erenciuc (50 ha), Insula Popina (98 ha), Complexul Sacalin-Z toane (21 410 ha), Complexul Periteasca-Leahova (4 125 ha), Capul Dolo man (125 ha), Lacul Potcoava (652 ha), Lacul Belciug (110 ha), Lacul Rotundu (228 ha).

2.

The National Park Macinului Mountains – 11 321 ha

3.

9 Natural Reserves: P durezza Valea Fagilor, 154 ha, which is included in National Park Macinului Mountains, Rezerva ia Natural Dealul Bujorului (50,8 ha), Rezerva ia de liliac Valea Oilor (0,35 ha), Rezerva ia de liliac Fântâna Mare (0,3 ha), Vârful Secarul (34,5 ha), Rezerva ia Botanic Korum Tarla (2 ha), Locul fosilifer Dealul Bujoarele (8 ha), Rezerva ia Geologic Agighiol (9,7 ha), P durezza Niculiel (11 ha).

4.

According to the Government Decision regarding the declaring of new natural protected areas - HG no.2151/2004, in 2004 were declared another 24 natural reserves.

1.P durezza Babadag-Codru, 618 ha

2.Lacul Traian, 326 ha

3.Muchiile Cernei-Iaila, 1 891 ha

4.Beidaud, 1 121 ha

5.Valea Mahomencea, 1 029 ha

6.Dealul Ghiunghiurmez, 1 421 ha

7.Chervant-Priopcea, 568 ha

8.C lug ru-Iancina, 130 ha

9.Muntele Consul, 328 ha

10.Dealul Sarica, 120 ha

11.Dealurile Be tepe, 415 ha

12.Enisala, 57 ha

13.Carasan-Teke, 244 ha

14.Valea Ostrovului, 71 ha

15.Uspenia, 22 ha

16.Edirlen, 32,8 ha

17.Casimcea, 137 ha

18.Coltanii Mari, 53 ha

19.Peceneaga, 132 ha

20.M gurele, 292 ha

21.R zboieni, 41 ha

22.Dealul Deniztepe, 305 ha

23.Dealul Mândre ti, 5 ha

24.M n stirea Coco , 4,6 ha

Having in view the importance of flora and fauna of the area, on Tulcea territory was declared 17 Natura 2000 sites: 9 SPAs (by HG 1284/2007) and 8 SCIs (by MMDD Order no.1964/2007). From the total SCIs and SPAs, 15 are overlapping with the natural protected areas previously declared, totally including them and almost doubling their areas at county level. The total area of SCI and SPA sites (exclusively the area occupied by the marine territorial waters) is of 696 269.55 hectares, covering more than 80% from the county area.

The territory of the marine area proposed to be included in Natural 2000 network is of 95562.43 hectares.

### *Ecological networks*

NATURA 2000 sites are represented in Tulcea county by:

- 9 SPAs, summing 693021.13 hectares, representing 81.5% from the total area of the county: Bestepe – Mahmudia, Deniz Tepe, Dunarea Veche - Bratul Macin, Stepa Casimcea, Lacul Beibugeac, Macin – Niculitel, Padurea Babadag, Marea Neagra, Delta Dunarii and Complexul Razim – Sinoie.

- 8 SCIs, having together 532336,52 ha, representing 62,6% from the total area of the county: Dealurile Agighiolului, Podisul Nord Dobrogean, Bratul Macin, Deniz Tepe, Delta Dunarii, Delta Dunarii - zona marina, Muntii Macinului, Structuri submarine metanogene - Sf.Gheorghe.

## *State of the environment*

### *Air quality and pollution*

Potential air polluting sources are: the industrial platform Tulcea West, S.C. ALUM S.A. Tulcea and S.C. FERAL S.R.L. but still in 2008 were no critical areas regarding the atmosphere pollution.

In 2009 it was observed an increasing with about 7.3% of the emissions of acidifying substances compared with previous year. The cause is the traffic increasing but also the re-opening of the Enterprise SC Alum SA Tulcea, which was close between 2007 and 2008 to be re-technologized.

The decreasing of the quantity of SO<sub>2</sub> emissions in 2008 in comparison with previous years (304.22 t in 2008, 4763 t in 2005 and 4845 t in 2001) is explained by the reducing of activities generating SO<sub>2</sub> emissions and of the share of sulphure in fuels. In 2009 (347 tones) the SO<sub>2</sub> emissions increased compared with 2008 especially because of the cars traffic. Reported at 1000 inhabitants the SO<sub>2</sub> emissions decreased from 18.9 t in 2005 to 1.4 t in 2009.

The NO<sub>x</sub> emissions also decreased from 5272 t in 2001 to 1200 t in 2009. Reported at 1000 inhabitants, the NO<sub>x</sub> emissions were 20.1 t tones in 2001 and 4.9 t in 2009. The COV emissions decreased in the period 2001-2008 from 2541 t to 1291 t but in 2009 increased again to 1774 t. Reported at 1000 inhabitants, represented 9.53 t in 2001 and 7.17 t in 2009.

In 2009, the specific powders pollution sources in Tulcea county are metallurgical and chemical industries, thermal centrals and car traffic. The limit annual value for the protection of human health was not exceeded in none of the automatic monitoring stations for the air quality, situated in this county.

### *Water*

According to STAS 4706/1988, the county watercourses have the following qualities classes:

- Slava brook, 1st quality at discharge;
- Hamangia brook. II<sup>nd</sup> quality at discharge and 1st quality upstream V. Alecsandri;
- Tai a brook, , 1st quality at discharge;
- Teli a brook, 1st quality at discharge;
- Casimcea brook, upstream Casimcea and R zboieni, 1st quality.

Danube's water was reported with II<sup>nd</sup> class quality (according to Order 1146/2002, approving the Normative regarding the reference objective for the classification of surface waters), reflecting the quality condition for the protection of aquatic ecosystems.

From 20 drills analyzed by SGA Tulcea in 2003, 5 had high values for nitrites (between 59.66 and 2449.48 mg/l), overflowing until 50 times the maximum admissible concentration for drinking water. High values for nitrites were observed in some individual wells, too.

In Tulcea county was not registered surface or underground water pollution in 2009.

### *Waste*

The industrial waste stockpiles are at Alum SA Tulcea.

A conform landfill for municipal waste is functioning in Vararie area (storing 26316.81 tones of waste in 2009).

In Tulcea county are 4 un-ecological landfills for municipal waste: 2 of them were closed in 2009 (from Babadag and Isaccea), the other 2 going to be closed in 2015 (Agighiol) and 2016 (Macin).

In March 2009 began to function the Tulcea municipal conform zonal landfill for non-hazardous and stable, non-reactive hazardous waste belonging to SC ECOREC SA Bucharest, but its sorting station didn't function in 2009.

In Romania, according to Government Decision no.349/2008 regarding the waste disposal, all rural landfills had to be re-habilitated until July 16th, 2009. In Tulcea county were re-habilitated 139 rural landfills.

### *Water management*

Tulcea county is encircled in 3 parts by water: Danube towards East and North, Black Sea and Razim Lagoon Complex towards East.

Inland hydrographic network is represented by brooks, with very short and irregular flow of watercourse: Tai a (the longest course – 47 km), Teli a (41 km), Slava (41 km), Ceamurlia, Topolog, Casimcea. The Danube borders the county on 276 km.

The most important lakes situated in the Danube Meadow are: Carcaliu, Jijila, Crapina lakes in North-Est and Rotund, Telincea, Saun, Parche and Somova lakes in the Northern part.

The youngest geo-morphological unit in the county (and also in the country) is the Danube Delta, located between the 3 Danube's braces:

- Chilia, at North – 116 km;
- Sfântul Gheorghe, at South – 109 km
- Sulina, median – 63 km .

At South from Sf. Gheorghe brace is the Lagoon Complex Razim-Sinoe, formed by Razim, Babadag, Golovi a, Zmeica and Sinoe lakes, having large areas and low depths.

Surface water resources of the county are: Danube River with adjacent braces and channels, Razim and Babadag lakes (supplied by the Danube with sweet water) and the inner watercourses.

In 2008, average flows of the Danube on its braces were:

- Sf. Gheorghe -1599 m<sup>3</sup>/s;
- Sulina -1120 m<sup>3</sup>/s;
- Tulcea - 2806 m<sup>3</sup>/s;
- Chilia - 2777 m<sup>3</sup>/s;
- M 44 - 5583 m<sup>3</sup>/s.

#### *Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	3,77	3,51	3,57	3,67
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	18,63	18,43	18,9	1,22
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	23,2	20,1	11,19	4,57
Atmosphere pollution ash - emission per 1000 inhabitants (t)	7	4,49	2,5	1,02
Atmosphere pollution CO - emission per 1000 inhabitants (t)	65	50,39	47,37	9,24
Capacity of landfills per 1000 inhabitants (t)	1985,79	2021,94	267,57	271,3

## Judetul Calarasi

### *General information*

C l r a i county is situated in the South-Eastern part of Romania and of Romanian Plain, on the left bank of the Danube, at the border with Bulgaria. Its Danube neighbours are Ialmitia county in North, Constanta county at South-East, Giurgiu and Ilfov counties at West and North-West.

The relief is characterized by plain with narrow valleys, the plain area being grouped in four major units (B r g a n Plain, Mosti tea Plain, V l s i a Plain and Burnaz Plain), plus the Danube Valley.

The climate is temperate continental with homogeneous regime, due to the uniformity of the plain, characterized by hot summers and cold winters. The extreme South of the county has the specific climate of the Danube Valley, with warmer summers and milder winters than the rest of the plain.

The hydrographic network is dominated by the Danube river, divided in two arms (Borcea on the left side and Old Danube on the right side) that together are closing Ialomi a Pond (or the Great Island of Ialomi a). Arge river flows into the Danube in the Western part of the city Olteni a, after the confluence with the Dâmbovitza river, in Bude ti town. Besides the natural lakes, there is also a network of lakes used for irrigation and fish farming, out of which are mentioned: Iezeru-Mosti tea, Fr sinet, Gurb ne ti, Fundulea lakes.

### *Land use*

The farmland has the highest share (83.77%) from the total area, followed by other areas (non productive land, construction, roads and railways), meaning 5.94% from total. Waters and ponds have 5.88%. The forests and other forest vegetation land are occupying 4.39% of the total area. The share of arable land in total farmland is 97.32%.

The area of the farmland registered at the end of 2008 was with 400 hectares lower than in 2006 and with 1929 hectares lower than in 2000.

### *Nature conservation and landscape*

#### *Protected areas*

According to the Annual Report regarding the state of environment factors in Calarasi county in 2009, there were 5 natural protected areas, having together 34009 hectares, covering 6,6% from the total area of the county.

-1 natural monument: Ciornuleasa Forest – 75,2 ha (according to Law no.5/2000 regarding the approval of the National Spatial Plan, Section III – Protected Areas)

-3 natural reserves declared by The Government Decision HG no.2151/2004 regarding the declaring of new natural protected areas: Ostrovul oimul - 20,1 ha, Ostrovul Haralambie - 45 ha, Ostrovul Cioc ne ti - 207 ha and

-1 area of special avifaunistic protection: Iezerul C l r a i, 2877 ha declared by the same HG.

Natura 2000 network includes 2 SCIs and 7 SPAs.

#### *Ecological networks*

The "Danube Green Corridor" is a regional ecological network in the Danube floodplain, crossing all Danube counties.

Another ecological network is represented by Natura 2000 program.

NATURA 2000 sites are represented in Calarasi county by:

- 7 SPAs, summing 28195 hectares, representing 5.5% from the total area of the county: Dunare – Ostroave, Lacul Galatui, Bratul Borcea, Iezerul Calarasi, Dunare – Oltenita, Ciocanesti – Dunare, Valea Mostistea.

- 2 SCIs, having together 18967,3 ha, representing 3.7% from the total area of the county: Canaralele Dunarii and Oltenita - Mostistea – Chiciu.

### *State of the environment*

#### *Air quality and pollution*

In present the sources determining the atmosphere pollution have an average – even low impact upon the air quality, due mainly to the economic restructuring in several sectors of activity and also to the extension of natural gas utilization as fuel by commercial societies and for residential and institutional heating. Although on the

territory of the county are no more major industrial objectives, in last years the contribution of urban sources at the atmosphere pollution increased. This process was generated by the intensification of road traffic and by the maintaining and extension of private residential heating systems. In Calarasi municipality were identified gas emissions coming from: the waste incineration (Calarasi County Hospital, chicken abattoir from S.C. AVICOLA S.A. Calarasi), technologic activities (platform of the ex- siderurgic Factory S.C.SIDERCA S.A. Calarasi, asphalt preparation S.C. SPATII VERZI S.A.).

In Oltenita municipality gas emissions were coming from industrial and waste activities.

Other polluted areas are Tamadau Mare and Stefan cel Mare communes.

The SO<sub>2</sub> emissions registered a maximum value in 2008 (998 t), compared with 2001 (41.14 t), 2005 (176 t) and 2009 (710). Reported at 1000 inhabitants, the values decreased from 3.18 t in 2008 to 2.27 t in 2009.

The values of NO<sub>x</sub> emission also registered a maximum value in 2008 (561 t) compared with 2005 (42 t) or 2009 (1448). Reported at 1000 inhabitants, the NO<sub>x</sub> emissions were almost similar in 2008 (4.99 t) and in 2009 (4.63 t) compared with 32.8 t in 2001 and 5.06 t in 2005.

The COV emissions were higher in 2009 (2200 t) than in 2005 (52 t) or 2008 (1885 t), also reported at 1000 inhabitants were higher quantities in 2009 (5.47 t) than in 2008 (4.63 t), 2005 (0.16 t) or 2001 (1.81 t).

In 2009 were registered exceeding of ash concentrations during the cold periods of the year (due to heating systems) and due to the specific climate situation (intense wind that carried dust particles from the plain areas close to Calarasi municipality).

### *Water*

For Clrai municipality, especially in Clrai and Olteni municipalities, a serious problem is represented by the water supply, since their water source is the Danube river, both localities depending on the quality of the Danube. The inappropriate technical state of wastewater treatment stations as well as the use of old technologies determines an advanced biological and microbiological pollution of the Danube river – Borcea branch.

Because of the low industrialization degree of the county, the agricultural areas are less affected by the characteristic pollutant factors, supporting only the action of factors such as erosion or chemical pollution from soils treatment, having a negative influence upon the underground waters.

Regarding the physical-chemical indicators, the water quality is:

- The Danube river, IInd category (L=150km)
- Arge river, IInd category (L= 9km) and IIIrd category (L= 37km);
- Dâmbovița river, Vth category (L=23km);
- Cânu river, IIIrd category (L=31km);
- Luica river, IIIrd category (L=17km);

Critical areas of water pollution are: S.C.Siderca S.A. Calarasi. For surface and underground water pollution the critical area is S.C. COMCEH Calarasi. The Danube is polluted here because of the discharges of used water insufficiently cleaned.

### *Waste*

A special problem is the storing of the waste, the county having a low number of ecological landfills. The activity of waste collection, transport and storing is achieved in urban settlements, in rudimentary local dumps without monitoring. In rural localities, the storing is in inappropriate places or temporary holes, without environment protection.

There is an important waste disposal area at Drajna Est, coping with the industrial waste stockpiles from S.C.Siderca S.A. There is a zonal ecological waste disposal at Dragalina.

### *Water management*

The hydrographic network has as main watercourse the Danube River, delimiting the county in its South and South-East parts. The Danube is splitting into 2 branches – Borcea branch on the left and Dunrea Veche (Old Danube) on the right side, encompassing Balta Ialomiei (Ialomita's Pond). The Danube wets on 150 km the territory of the county. The average multi-annual flow is of 5890 m<sup>3</sup>/s at the entrance into the county and approx. 5970 m<sup>3</sup>/s at the exit. The flow is mainly on the Old Danube (Dunrea Veche) (90 %), Borcea branch being poor supplied with water (approx. 600 m<sup>3</sup>/s). After its confluence with Rul branch, this share increases to approx. 60 %, allowing the navigation that nowadays is achieved on the route Dunrea Veche – Rul – Borcea.

Arge and Dâmbovi a rivers are also wetting the South-Western part of the county by their lower sectors. Other small rivers are Mosti tea (1734 km<sup>2</sup>), Berza (66 km<sup>2</sup>), Zboiul (100 km<sup>2</sup>). The average density of the hydrographic network is 0.12 km/km<sup>2</sup>, one of the lowest densities in the country. In the North-Eastern part of the county the density is almost zero.

Besides these waters there are several important water accumulations, used to attenuate the floods, for irrigation and pisciculture: Iezer-Mosti tea, Fr sinet, G l ui, Gurb ne ti, Fundulea and M riu a. Total permanent water volume is of approx. 580 millions m<sup>3</sup>.

The water resources of the county are:

Surface resources: 659638.5 million m<sup>3</sup>, out of which usable resources 596564.6 million m<sup>3</sup>;

Underground resources: 264.9 million m<sup>3</sup>, out of which usable resources 624.9 million m<sup>3</sup>.

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	2,75	2,67	3,12	3
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	0,2	0,12	0,55	3,18
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	2	1,32	0,13	4,99
Atmosphere pollution ash - emission per 1000 inhabitants (t)	1	0,74	0,07	5,82
Atmosphere pollution CO - emission per 1000 inhabitants (t)	45	32,22	2,32	12,06
Capacity of landfills per 1000 inhabitants (t)	2923,71	629,25	850	860,9

## Judetul Giurgiu

### *General information*

Giurgiu county is situated in the Southern part of the country, in Romanian Plain. On its Southern part the Danube is separating Giurgiu county from Bulgaria on 76 km. The Danube meadow, influenced by the direct action of the river, with widths that can reach 10 km, is embanked and channeled on large areas, being transformed into agriculture terrain. In the area occupied by Giurgiu municipality the meadow has altitudes between 20-27 m. Around Giurgiu municipality are channels and arms, adapted on former brooks, used in navigation, agriculture and tourism.

A special place is occupied by the valleys of the Danube and Arge watercourses, with their tributaries. Following the pattern of the Romanian Plain, which it belongs, Giurgiu county has a continental climate.

The hydrographic network has 847 km in Giurgiu county. Main water courses are: Danube river with 122 km length of hydrographic basin, Arge river with a length of hydrographic basin of 725 km and its effluents: Neajlov, Câlניה, Dâmbovic, Sabar, Ciorogârla, etc. The average density of the hydrographic network is 0.24 km/km<sup>2</sup>.

The hydrographic network is completed by ponds and natural lakes summing an area of 13.44 km<sup>2</sup> and artificial lakes occupying 28.07 km<sup>2</sup>.

### *Land use*

The farmland has the highest share (78.61%) from the total area of the county, followed by forests and other forest vegetation land (10.77%) and other areas (non productive land, construction, roads and railways) occupying 6.64%. The waters and ponds represent 3.97% from the total area. The share of arable land in total farmland is 93.65%.

In Giurgiu county were found 53 areas vulnerable to the nitrates pollution coming from agricultural activities.

Each year a part of the agriculture land is used for building yards or for new constructions (dwellings, roads etc.). Thus, in 2009, 232 hectares from the agriculture land were used to build new dwellings.

In Giurgiu county there are lands with lack of forest vegetation, but with availability for forestation (especially those soils with humidity excess, with surface and underground erosion, acid soils etc.). Still, in 2009 were not forested any degraded soils. Also, in 2009 were regenerated 356 hectares of forest.

Drought and the desert transformations represent a problem of Giurgiu county, determined by complex interactions between physical, biological, political, social, cultural and economical factors, the result being the degradation of terrains. The most evident effects are the soil degradation and the decreasing of agricultural production.

### *Nature conservation and landscape*

#### *Protected areas*

In Giurgiu county were declared 6 protected areas of national interest.

According to Law no.5/2000 regarding the approval of the National Spatial Plan, Section III – Protected Areas, there are 4 protected areas, summing 558.5 hectares:

- 1.P durezza Oloaga – Gr dinari, 248 ha
- 2.P durezza Padina Tarului, 230 ha
- 3.P durezza Manafu, 28 ha
- 4.Rezerva ia Te ila, 52,5 ha

In 2004, the Government Decision HG no.2151/2004 regarding the declaring of new natural protected areas included also the Natural Park Comana, with 24 963 hectares.

In 2007, accorded to HG 1143/2007 regarding the declaring of new natural protected areas it was declared the natural reserve Cama-Dinu-P s ric (2400 ha).

The total area covered by protected areas of national interest is of 27921.5 ha, representing 7.9% from the total area of the county.

Natura 200 sites are represented in Giurgiu county by 4 SPAs and 4 SCIs, declared by HG 1284/2007 and Order no.1964/2007.

### *Ecological networks*

The "Danube Green Corridor" is a regional ecological network in the Danube floodplain, crossing all Danube counties.

Another ecological network is represented by Natura 2000 program.

NATURA 2000 sites are represented in Giurgiu county by:

- 4 SPAs, summing 40962.6 hectares, representing 11.6% from the total area of the county: Dunare – Oltenita, Ostrovu Lung – Gostinu, Vedea – Dunare, Comana.
- 3 SCIs, having together 33902.1 ha, representing 9.6% from the total area of the county: Gura Vedei - Saica – Slobozia, Lunca Mijlocie a Argesului, Padurea Bolintin, Comana.

### *State of the environment*

#### *Air quality and pollution*

In Giurgiu county the main air pollution sources are:

- steam power plants, both for residential and industrial heating
- road traffic, in the last years the number of vehicles increasing
- naval traffic, Giurgiu municipality being Danube port and transited by cruise and cargo ships
- burning of fuels in private households, since Giurgiu county is supplied with gas in a very low share (in urban localities only partially).

In Giurgiu County are no critical areas, the air has a good quality, which was maintained in the last years. The quantities of atmosphere emissions dropped yearly, mainly because of the decrease in the industrial sector and the economic re-conversion.

According to the Agency for the Environment protection Giurgiu, "Report on the state of environment in Giurgiu county, 2009", the quantity of SO<sub>2</sub> emissions decreased in 2009 (2340.63 tones) compared with 2008 (2171.11 tones). Reported at 1000 inhabitants the SO<sub>2</sub> emissions were 11.9 tones in 2005, 7.68 tones in 2008 and 8.3 tones in 2009.

The quantity of NO<sub>x</sub> emissions increased from 1448.3 tones in 2005 to 2107.5 tones in 2008 and 2753.4 tones in 2009. Reported at 1000 inhabitants, the NO<sub>x</sub> emissions were 5.1 tones in 2005, 7.5 tones in 2008 and 9.8 tones in 2009.

The quantity of COV emissions increased in 2009 (3820 tones) compared with 2008 (1454 tones). Reported at 1000 inhabitants the SO<sub>2</sub> emissions increased from 3.35 t in 2005 to 5.2 t in 2008 and 13.6 t in 2009.

Regarding the powders, in 2009 didn't registered exceeding of daily limit value for human health protection.

#### *Water*

In 2005, the quality of interior rivers in analyzed sections was the following (according to Order 1146/2002): Danube river, on its total length in the county, Ist category, L= 76 km;

Arge river, Ist category, L= 118 km;

Neajlov river, IInd category, L= 100 km;

Dâmbovnic river, IInd category, L=24 km;

Glavacioc river, IInd category, L=25 km;

Milcov river, IInd category, L=33 km;

Câlni tea river, IIIrd category, L=26 km;

Ilfov river, IInd category, L=31 km;

Sabar river, IInd category, L=59 km;

Ciorogârla river, IInd category, L=20 km

The quality of surface water is influenced by waste water that was incorrectly treated in municipal and industrial wastewater treatment stations (because of insufficient wastewater treatment capacities). Surface water pollution is also produced by residual fertilizers in the soil and by farms and waste disposals infiltrations. Inland surface waters were also polluted by oil products and the Danube is affected by accidental flows from ships.

In 2009, the quality of surface water belonged to the IInd and IIIrd class quality. There were no degraded surface water

The quality of surface water is influenced by the quality of the effluents because of the low capability of wastewater treatment stations. The improvement of wastewater treatment stations is a major necessity, the authorities of public administration initiating projects with European funding in this respect.

Underground pollution is generated especially by uncontrolled waste disposal and animal husbandry residues, by the cars traffic (heavy metal pollution) and oil extraction activities (oil products pollution). Can be also mentioned the pollution due to irrational use of fertilizers (especially nitrates, nitrites and phosphates).

### *Waste*

In Giurgiu county the main option regarding the waste removal is their disposal.

In 2008 and 2009, most waste was eliminated by disposal in existent conform stockpiles from Chiajna, Glina and Vidra (waste from Giurgiu municipality and Mihailesti town) and in a lower share those collected from Bolintin Vale town, which were discharged in its local, un-conform stockpile.

The waste management in rural area is deficient. The waste was eliminated in the first half of 2009 by disposal in each locality, in special areas established by local counties decisions, later being transported to Glina, Vidra and Chiajna.

Regarding household waste, in Giurgiu county are functioning 1 urban waste disposal and 217 waste disposal spaces in rural area. In 2009 were closed 203 such rural waste disposal spaces.

It is intended that, by implementation of the project "System of integrated management for Giurgiu county" to achieve a conform stockpile on an area of 6 hectares and a capacity of approx.7900 thousand cube meters, as well as the closure of Giurgiu and Bolintin Vale waste disposals.

### *Water management*

Average density of hydrographic network on the territory of the county is of 0.24 km/km<sup>2</sup>.

The Danube river flows in Giurgiu county on a West-East direction on 76 km and has a flow of 5600 m<sup>3</sup>/s (in springtime 10000 m<sup>3</sup>/s). The regime of its natural flows is influenced and controlled by the 2 dams from Iron Gates.

Main water courses (the county water surface resource) are: Arge – L=118 Km; Neajlov - L=100 Km; Câlni tea - L=62 Km; Sabar - L=59 Km; Ciorogârla - L=20 Km.

The Arges river has many complex water works that modified its flow.

There are 123 accumulation lakes used to attenuate the floods, to produce electric energy, in irrigations, pisciculture and leisure. Seven of them are managed by National Agency Romanian Waters (AN Apele Române), 40 by the National Company for the Management of Fishing Stock (Compania Națională de Administrare a Fondului Piscicol) and 76 by local councils and economic agencies.

Underground resources ensure the water supply of Bucharest and Giurgiu municipalities and Mihailesti and Bolintin Vale towns. These resources are:

Ulmi – 44.000 m<sup>3</sup>/day – 263 drills of small and average depth (255) – conserved at the end of 2005;

Arcuda – 9400 m<sup>3</sup>/day – 130 drills of small and average depth (59 functioning),

B l noaia, B lanu, Slobozia I, II , Vieru :

- 49 drills of small depth – 31.190 m<sup>3</sup>/day;

- 15 drills of deep depths – 36.374 m<sup>3</sup>/day.

Water sources for economic agents are:

Front I Roata – 350 m<sup>3</sup>/day – 4 drills of average depths (are functioning 2 drills);

Front II Roata – 351 m<sup>3</sup>/day – 2 drills of average depths.

Giurgiu county has average possibilities of underground water catchment. Better catchment areas are situated in Arges river meadow, in the North-Eastern part of the county (used for Bucharest municipality water supply) and in the Danube meadow (for Giurgiu municipality water supply).

*Indicators of natural conditions*

<b>Indicator</b>	<b>1996</b>	<b>2001</b>	<b>2005</b>	<b>2008</b>
Water pollution index	1,82	1,74	2,13	2,07
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	30	19,38	11,94	7,68
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	50	32,8	5,06	7,45
Atmosphere pollution ash - emission per 1000 inhabitants (t)	10	5,99	0,93	1,37
Atmosphere pollution CO - emission per 1000 inhabitants (t)	350	285,29	18,02	18,77
Capacity of landfills per 1000 inhabitants (t)	996,89	1021,31	1047,07	1060,61

## Judetul Ialomița

### *General information*

Ialomița county is situated in the South-Eastern part of Romania, having as Danube neighbours Braila county in North, Constanta county in East, Calarasi county in South and Ilfov county in West.

It is located in the Eastern part of the Oriental Romanian Plain (occupying 65% from its total area). Its shape is a long stripe on the West-East direction along the lower watercourse of Ialomița river. The average altitude is of 45 m. The Eastern part the county includes a sector of the Danube's meadow (15% of its area). The internal meadow (known as Borcea Pond) begins in the vicinity of Fetesti town. In the past, Borcea Pond had a complex relief (bank ridges of 2-3 m height) but nowadays the entire pond is embanked, drained and used for agriculture.

The climate is continental, characterized by relatively high annual and diurnal thermal amplitude and by small quantities of waterfalls, drought being a specific phenomenon of the area. The hydrographic network of the county is represented by the Danube river with Borcea arm and the Old Danube, by the Prahova and Ialomița rivers, meadow lakes (Piersica, Bantu), Amara, Ezer, Strachina, Fundata Lakes.

### *Land use*

Being a county with large area of plain and arable land, the county has a very fertile soil. 84.03% from total area of the county is agricultural land, out of which 94.03% arable land. Forests represent only 5.81% from the total area of the county. Water and ponds areas are occupying 2.94% of the total area.

### *Nature conservation and landscape*

#### *Protected areas*

In Ialomița county are 3 protected areas of national interest, summing 94.4 hectares:

-Alexeni Forest – 37 ha, declared as natural monument in HG 2151/2004 regarding the declaring of new natural protected areas,

-Canton Hatis forest – 6.4 ha, declared as natural reserve on the same government decision

-Rodeanu Lake natural reserve – 51 ha, declared by HG 1143/2007 regarding the declaring of new natural protected areas

According to HG 2151/2004 regarding the declaring of new natural protected areas were also declared areas of avifaunistic special protection the following lakes, summing 1849 hectares, being also included in NATURA 2000 network:

1. Lacul Fundata, 510 ha

2.Lacul Amara, 162 ha

3.Lacul Strachina, 1050 ha

4.Lacurile Bentu Mic – Bentu Mic Cotoi – Ben u Mare, 127 ha

There are also 7 natural protected areas declared by local (county) decisions.

There are 9 NATURA 2000 sites: 7 SPAs (out of which Strachina, Amara and Fundata lakes, Small Pond of Braila and Borcea Arm) and 2 SCIs.

#### *Ecological networks*

The "Danube Green Corridor" is a regional ecological network in the Danube floodplain, crossing all Danube counties.

Another ecological network is represented by Natura 2000 program. NATURA 2000 sites are represented in Ialomița county by:

- 7 SPAs, summing 19884.5 hectares, representing 4.5% from the total area of the county: Canaralele de la Orsova, Allah Bair – Capidava, Bratul Borcea, Gradistea - Caldarusani – Dridu, Lacurile Fundata – Amara, Balta Mica a Brailei, Lacul Strachina

- 2 SCIs, having together 6288.5 ha, representing 1.4% from the total area of the county: Canaralele Dunarii and Balta Mica a Brailei.

## *State of the environment*

### *Air quality and pollution*

The quantity of SO<sub>2</sub> emissions decreased in 2009 (40.04 t) compared with 2008 (165.12 t) or 2005 (666.194 t). Reported at 1000 inhabitants the SO<sub>2</sub> emissions were 0.46 t in 2001, 2.27 t in 2005, 0.57 t in 2008 and 0.14 t in 2009.

The NO<sub>x</sub> emissions also decreased from 4279.376 t in 2001 to 2633.3 t in 2009. Reported at 1000 inhabitants, the NO<sub>x</sub> emissions were 14.1 t in 2001, 16.4 t in 2005, 13.7 t in 2008 and 9.2 t in 2009.

The SO<sub>2</sub> and NO<sub>x</sub> emissions decreased in 2009 because of the reduction or interruption of activities at several economic agents.

The COV emissions decreased beginning with 2005, from 7696 t to 3188 t in 2008 and 1397.5 t in 2009. Reported at 1000 inhabitants, the quantities also decreased from 26.3 t in 2005 to 11.01 t in 2008 and 4.86 t in 2009.

In 2009, the daily concentrations of powders registered 51 overflows of the limit value (50 µg/m<sup>3</sup>). Out of these, 20 values were registered at one urban station due to the intense car traffic from the area, of the domestic heating in wintertime, and the rest of 31 exceeding were registered at the station of industrial type, due to the intense traffic of heavy cars, to the agriculture works and of residential heating.

### *Water*

Critical areas due to surface water pollution are:

Borcea branch – Fete ti area, downstream of urban wastewater discharge coming from Fetesti municipality;

Ialomi a river – Slobozia area, downstream of discharges belonging to S.C. EXPUR S.A. – Slobozia point, S.C. URBAN S.A. Slobozia, S.C. AVICOLA S.A. Slobozia, S.C. AMONIL S.A. Slobozia;

Ialomi a river – Urziceni area, downstream of urban and industrial wastewater discharges originated by Urziceni municipality;

Ialomi a river – Adâncata area, downstream of the confluence with Prahova river.

Critical areas from the underground water pollution point of view are:

Phreatic layer in the area of chemical plant S.C. AMONIL S.A. Slobozia;

Aquifer from urban waste disposal zones Slobozia, Urziceni, Fete ti, nd rei;

Phreatic layer from the areas nd rei, Milo e ti, Grindu, Reviga, Movili a, Fierbin i lakes, where drinking water has overflowing values at nitrates indicator.

### *Waste*

In Ialomita county is 1 urban landfill and 151 rural landfills.

Municipal waste from Ialomita county is transported and stored in Slobozia conform landfill belonging to the economic agent SC VIVANI SALUBRITATE SA. In 2009 was stored a smaller quantity of waste than in 2008, due to the applied selective collection and to the endowment of the economic agent with the municipal waste sorting station.

This conform zonal landfill for non-hazardous waste is situated outside Slobozia locality, at 2 km and has an exploiting period of 20 years.

The municipal waste from Urziceni municipality is transported to the transfer station where are manually sorted and from here is transported to the zonal conform landfill.

In Tandarei town is going to be finalized a transfer station, the waste being nowadays transported to the zonal conform landfill from Slobozia municipality.

Also in Fete ti municipality the municipal waste is transported from the transfer station to the same conform landfill.

Until 2009 the household waste was stored in local rural dumps managed by local councils. In the same year were closed 141 un-conform landfills and 10 dumps were still functioning.

There are no industrial waste stockpiles.

### *Water management*

Ialomi a county is covered on the West-East direction by Ialomita river (175 km), Sarata brook (21 km) and Prahova river (30 km), and in the Eastern direction by the Danube river („Old Danube” - 75 km) and Borcea branch (48 km). Hydrographic network is completed by numerous lakes and ponds. The most important lakes are:

- Amara Lake: is a natural lake, originated from a derelict arm of Ialomita river. It has 132 hectares and a water volume of 2640 million cube meters. The water is chlorine and sodium, sulphated and magnesium. It is a therapeutic lake.

- Fundata lake is also therapeutic, is originated from a fluvial lagoon, have an area of 500 hectares and a volume of 10 million cube meters, having a balneal character.

- Strachina lake is a fluvial lagoon on the lower watercourse of Ialomita valley. It has 159 Km<sup>2</sup>, a length of 9.5 Km and a depth of maximum 3 m. It is a fishing pond.

- Dridu lake is an accumulation lake situated on Ialomita river, having a volume of 45 million cube meters.

Theoretical resource of surface water is 1895 million m<sup>3</sup>, from which is usable 1386 million m<sup>3</sup>. Theoretical resource of underground water is of 443 million m<sup>3</sup>, from which is usable 181 million m<sup>3</sup>.

Potential and technical water resources in Ialomita county are:

- The Danube river – for drinking and industrial water supply
- Dridu accumulation lake – for industrial use, irrigations and pisciculture
- Ialomi a river – for industrial use
- Underground sources – for drinking and industrial water supply.

### *Indicators of natural conditions*

<b>Indicator</b>	<b>1996</b>	<b>2001</b>	<b>2005</b>	<b>2008</b>
Water pollution index	2,47	2,49	2,73	2,63
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	1,5	0,46	2,27	0,57
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	0,39	14,05	16,34	13,69
Atmosphere pollution ash - emission per 1000 inhabitants (t)	2,5	2,02	2,36	1,97
Atmosphere pollution CO - emission per 1000 inhabitants (t)	55	46,02	26,84	20,79
Capacity of landfills per 1000 inhabitants (t)	5587,16	5606,24	5601,6	5572,43

## Judetul Teleorman

### *General information*

Teleorman county is situated in the southern part of the country, in the middle of the Romanian Plain. Teleorman is a small county. Its Danube neighbors are Olt county in west and Giurgiu county in east. Danube is its Southern limit, as border between Romania and Bulgaria. The altitudes vary between 20 m in the Danube meadow and 160-170 m in its northern part.

The county is characterized by a flat relief. The territory of the county looks monotone at first and includes a part of the Romanian Plain and Danube Valley. The continental temperate climate is characterized by high caloric potential, large amplitudes of air temperature, low rainfall amounts and often torrential in the summer, and frequent droughts. Danube is crossing the county territory, also the Olt, Vedea, Teleorman and Cîlmăușii rivers. The two ports on the Danube (Turnu Măgurele and Zimnicea) offer great opportunities for river transport.

### *Land use*

Since the county has a large flat area, it has a very fertile soil. The farmland has the highest share (86.21%) and is followed by other areas (non productive land, construction, roads and railways) - 5.96% and also forests and other forest vegetation lands (5.13%). The waters and ponds have 2.68% from total surface. The share of arable land in total farmland is 91.12%.

### *Nature conservation and landscape*

#### *Protected areas*

In Teleorman county there are 5 protected areas of national interest, summing 1782 hectares and representing 0.3% from the total area of the county:

- 2 natural reserves: Ostrovul Gasca - 58 ha and Pădurea Troianu - 71 ha, declared by the Government Decision HG 2151/2004 regarding the declaring of new natural protected areas,
- 2 natural reserves: Ostrovul Mare - 140 ha and Pădurea Pojoratele - 58 ha, declared by the Government Decision HG 1143/2007 regarding the declaring of new natural protected areas, and
- 1 special protection avifaunistic area: Balta Suhaia, 1455 ha

There are also 7 Natura 2000 sites (43100 hectares, occupying 7.44% from the total area of the county), out of which 4 are SPA and 3 are SCI.

#### *Ecological networks*

The "Danube Green Corridor" is a regional ecological network in the Danube floodplain, crossing all Danube counties.

Another ecological network is represented by Natura 2000 program. NATURA 2000 sites are represented in Teleorman county by:

- 4 SPAs, summing 35708.7 hectares, representing 6.2% from the total area of the county: Confluența Olt-Dunăre, Suhaia, Vedea, Valea Oltului Inferior.
- 3 SCIs, having together 7389.93 ha, representing 1.3% from the total area of the county: Corabia - Turnu Măgurele, Gura Vedei - Saica - Slobozia, Pădurea Troianu

### *State of the environment*

#### *Air quality and pollution*

Annual emissions of lead and non methane organic volatile compounds increased in 2008, compared with 2007, especially from production processes and traffic. Because of the high quantities of emissions, the industrial areas represent pollution sources. The chemical fertilizers factories from Turnu Măgurele (S.C. Donau Chem. S.R.L. Turnu Măgurele) are still representing a potential chemical risk. Comparing the values from 2001 to 2008 the air quality improved significantly, there haven't been overflows of the maximum acceptable quantities.

According to the "Report regarding the state of environment in Teleorman county, 2009" the quantity of SO<sub>2</sub> emissions decreased in 2009 (230.566 tones) compared with 2001 (714.17 tones). Reported at 1000 inhabitants the SO<sub>2</sub> emissions were 1.566 tones in 2001, 1.17 tones in 2005, 0.72 tones in 2008 and 0.57 tones in 2009.

The NO<sub>x</sub> emissions also decreased from 3403.1 t in 2001 to 2315.728 t in 2009. Reported at 1000 inhabitants, the NO<sub>x</sub> emissions were 7.5 t in 2001, 7.89 t in 2005, 6.32 t in 2008 and 5.75 t in 2009.

The COV emissions increased since 2001, from 321.8 t to 2200.7 t in 2009. Reported at 1000 inhabitants, the values increased from 0.71 t in 2001 to 3.6 t in 2005, 4.63 t in 2008 and 5.5 t in 2009.

#### Cross-border pollution

In Teleorman county are 2 important areas regarding the cross-border pollution: Turnu Magurele city, where is the Enterprise of chemical fertilizers SC Donau Chem SRL Turnu Magurele and Zimnicea city. The pollution produced by the Enterprise from Turnu Magurele is affecting the locality Nicopole from Bulgaria, while Zimnicea town is affected by the cross-border pollution due to the Enterprise of viscose and cellulose from Svistov locality situated on the Bulgarian side.

In the year 2009 the automatic stations for the monitoring of air quality at the border with Bulgaria didn't function.

In 2009 the average annual concentration for PM<sub>10</sub> determined in controlling points exceeded the annual limit value for the human health protection (40 µg/m<sup>3</sup>), its value being of 49.47 µg/m<sup>3</sup>. In Alexandria municipality the main powder sources are building yards and road transport.

### *Water*

In 2008, the surface water was monitored on a length of 948 km. The quality classes of the rivers sections in relation to physical and chemical indicators and reported to the length of the monitored inland rivers were the following:

- II quality class – 368 km, representing 38.82 %
- III quality class – 441 km, representing 46.52 %
- IV quality class – 36 km, representing 3.80 %
- V quality class - 103 km, representing 10.86%

It was observed an improvement of the river sections quality classes III to II in Arge and Vedea basins on 196 km and a deterioration of situation, from IV to V quality classes on 103 km.

The quality of water is affected by the county economic specific activities. The main water pollution sources in Teleorman counties are: chemical industry, mining industry, animal husbandry and agriculture. Diffuse pollution is referring to pollutants entries into the aquatic environment, coming from sources difficult to identify and control. It is included here the agriculture pollution (due to fertilizers utilization), atmosphere solid and/or liquid disposals. Diffuse sources include also pollution caused by the consumption of raw products or materials from industry (mining industry) or households.

Teleorman county is bordered at South on a distance of 87 km by the Danube, being in the same time the natural limit between Romania and Bulgaria. The main Danube's affluent on Romanian sector in this county is Vedea River. According to quality standards stipulated in the Order MMGA no. 161/2006, Danube River belongs to the II<sup>nd</sup> quality class both from physical and chemical and biological indicators point of view.

The oil fields generated connected activities that can become permanent or accidental pollution sources. Regarding the watercourses crossing these areas, the critical areas concerning the pollution with oil liquids are:

- Videle-Vadu Lat Deposit Group: Milcov, Sericu, Teleorman, Clujna and Glavacioc watercourses
- Preajba North and South Deposit Group: Glavacioc, Dâmbovnic, Valea de Margine, Jirnov watercourses

Agriculture, one of the main economic activities of Teleorman county, is a potential water pollution source in the case of excessive chemical fertilizers utilization.

Wastewater discharges, inappropriately treated are a potential surface water pollution source. Also the landfills and animal husbandry farms are potential polluters for surface and underground water.

### *Waste*

#### Municipal waste

In the county are no authorized waste deposits. The 5 urban un-conform landfills existent in the county (having a total area of 14.9 hectares) suspended their activity in 2007. Since then, the household waste resulted from population and economical agents were un-selectively collected and stored in inappropriate dumps not in accordance with national and European legislation. The project initiated in 2005 by Teleorman County Council "Integrated system for the waste management in Teleorman county" is still in progress.

*Water management*

The hydrographic network of the county is represented by the Danube, bordering it in its Southern part. Still, most of the county is drained by rivers Vedea, Cîlmui (affluent of Argeș river), Glavacioc and, in the North-Eastern part, by Dâmbovnic, Teleorman, Urlui, Nanov, Bratcov, Burdea, Câinelui, Claniștea. The density of hydrographic network is generally reduced, varying between 0.2 – 0.3 km/km<sup>2</sup> in Boianu and Gvanu –Burdea Plains and less than 0.1 km/km<sup>2</sup> in Burnas Plain. Total length of the hydrographic network is 1591 km. Very important for economy and environment protection are medium and inferior rivers watercourses, on which is supervised the monitoring and control activities, respectively on a length of 948 km on inland rivers and on the Danube.

The lakes are represented both by natural and artificial ones. The natural lakes, numerous in the past along the Danube, were reduced as a result of the River’s meadow banking and drainage, today lasting only a few of them. Out of these, Suhaia Lake is managed as stew. Artificial lakes are represented by many ponds and stews located in the rivers meadows.

The county water resources are represented by surface and underground water. The theoretical surface water resource is of 4730 million m<sup>3</sup>, from which technically usable are 3482.6 million m<sup>3</sup>. Theoretical underground water resource is of 1834 million m<sup>3</sup>, from which technically usable are 1666 million m<sup>3</sup>.

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	2,47	2,43	2,99	2,8
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	5,97	1,57	1,17	0,72
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	42,56	7,5	7,89	6,32
Atmosphere pollution ash - emission per 1000 inhabitants (t)	2,5	2,12	2,23	1,79
Atmosphere pollution CO - emission per 1000 inhabitants (t)	21	18,52	19,99	16,3
Capacity of landfills per 1000 inhabitants (t)	13072	2565,87	2755,06	4155,86

## Municipiul Bucuresti

### *General information*

Bucharest is situated in the South-Eastern part of Romania, its plain relief belonging to the Vl siei Plain, on Dambovita and Colentina rivers, situated in the hydrographic basin of Arges river. The climate is temperate continental with hot summers and cold winters. The City's altitude is 70-80 m above the Black Sea level. The Dambovita river is crossing Bucharest on 16.2 km. Colentina river has numerous crooks with ponds forming at the entry in Bucharest a chain of natural lakes (Mogo oia, Str ule ti, B neasa, Her str u, Floreasca, Tei, Fundata, Pantelimon).

Bucharest is the main political, economic, financial, commercial, cultural, educational, transport, informational, sport and tourist center of the country.

Bucharest is not occupying a large area, doesn't have important mineral resources and has a high population density. Its specific urban development problems are specific to big cities: small area, predominant vertically development, lack of green spaces, intense car traffic especially in the central part of the city, atmosphere pollution generated by car traffic and heating systems.

### *Land use*

Most surface of Bucharest is occupied by constructions and transport network (road and railroad). Thus, other areas - non productive land, constructions, roads and railways - have the biggest share: 78.47% in total area, followed by farmland (15.13%), waters and ponds (3.81%). The forests and other forest vegetation lands occupy only 2.56%. The share of arable land in total farmland is 84.63%.

In Bucharest area the excessive forest clearing of Vlasiei forest from the past 2 centuries allowed the extension of agriculture on the remained rich brown soils.

### *Nature conservation and landscape*

#### *Protected areas*

In Bucharest are no protected areas, since this is an urban ecosystem, whose criteria don't meet the requirements of a protected area, but still there are species protected by law: 30 species of protected trees, declared nature monuments.

Also there are not SCIs or SPAs.

#### *Ecological networks*

### *State of the environment*

#### *Air quality and pollution*

Air pollution in Bucharest municipality has a specific character, due to multiple pollution sources with different heights and with uneven repartition on the territory of the city.

The concentration of industrial and urban activities in Bucharest represents a disadvantage considering the habitat pollution, as a secondary effect of these activities. The pollution sources in Bucharest are not only concentrated in big industrial fix sources (industrial platforms) but also inserted within settlements areas intensely populated. Also the car traffic, especially along the big arteries, including heavy traffic, is another air pollution source for the capital-city. Excepting industrial activities and car traffic there are also other air pollution sources in Bucharest: building yards and concrete mixers, central and heat power stations (CETs), diffuse combustion sources.

The CO<sub>2</sub> emissions come from specific combustion processes in CET and industrial combustion installations (approx. 90% from the total emissions). In 2008, in Bucharest the CO<sub>2</sub> emissions came from car traffic (90%), CETS (5%) and industry (4%).

The COV emissions are very high in Bucharest, but decreasing from a maximum of 27772 t in 2005 (14.43 t/1000 inhabitants) to 15476.7 t in 2008 (10.75 t/1000 inhabitants) and 17642 t in 2009 (9.07 t/1000 inhabitants).

The quantity of SO<sub>2</sub> emissions decreased in 2009 (3265 tones) compared with 2001 (41483 tones). Reported at 1000 inhabitants the SO<sub>2</sub> emissions were 20.77 tones in 2001, 15.26 tones in 2005, 1.109 tones in 2008 and 1.68 tones in 2009. In 2009 the SO<sub>2</sub> emissions came from the heating systems (burnings in energetic industry) and from road traffic.

The NOx emissions fluctuated from 22516 tones in 2001 to 12873 tones in 2005, 20901 tones in 2008 and 17642 tones in 2009. Reported at 1000 inhabitants, the NOx emissions were 11.28 tones in 2001, 6.69 tones in 2005, 10.75 tones in 2008 and 9.07 tones in 2009. In 2009 the NOx emissions came also from road traffic and heating systems (burnings in energetic industry).

The ash emissions fluctuated from 2820 tones in 2001 to 879.9 tones in 2005, 1881.1 tones in 2008 and 994.21 tones in 2009. Reported at 1000 inhabitants, the ash emissions were 1.36 tones in 2001, 0.457 tones in 2005, 0.968 tones in 2008 and 0.511 tones in 2009.

In 2009 the annual average concentration exceeded the annual limit value for the human health protection (40µg/m<sup>3</sup>) at almost all monitoring stations. The most severely situation is registered in the center of the city, where the main pollution source is the road traffic. Compared with previous years was noticed a decreasing of the powders concentration, but in some traffic stations the average annual concentrations seriously outrun the limit values.

### *Water*

The raw water coming from the surface water sources Arge and Dâmbovi a is not entirely in accordance with STAS 4706/1988, respectively of 1st category (for drinking water supply). Referring to the Capital must be mentioned that more than 95% from drinking water sources (surface and underground) have ensured the sanitary protection areas, according to provisions of the Order of Health Ministry no.536/1997, in the last years being achieved works for these areas delineation at the level of underground catchments Arcuda, Ulmi and Bragadiru.

Some dwellings situated in peripheral areas are supplied from underground water sources, from individual wells or drills. The water quality is inadequate from physical, chemical or bacteriological points of view. This is happening because the above-mentioned sources are generally capturing water from phreatic layer, easy to contaminate as result of inappropriate hygienic and sanitary conditions (ex. household residues or latrines in the proximity of the water source). This situation is known by the Capital City Hall and Prefecture, being recommended to avoid the usage of those water sources as drinking sources and to take measures to extend the centralized water and sewerage network. The inhabitants from these areas were recommended not to use these water sources.

### *Waste*

City waste collected from Bucharest is evicted in 3 ecological landfills: one in Bucharest (Chiajna Rudeni Landfill) and 2 in Ifov county (in Vidra and Glina). They are managed by Glina ECOREC S.A. Popesti Leordeni, Vidra ECO SUD S.R.L. Bucuresti, Chiajna IRIDEX GROUP IMPORT EXPORT Bucharest.

In Bucharest Municipality is the Chiajna Rudeni Landfill, for non-dangerous waste.

### *Water management*

The main rivers crossing Bucharest municipality are Dâmbovi a and Colentina. 86% from the drinking water comes from surface water sources (1.3 million m<sup>3</sup>/day) namely from Dâmbovi a and Arge Rivers and only 14% from underground sources (180000 m<sup>3</sup>/day).

On Colentina river were created, from upstream to downstream, between Buftea and Cernica, a series of 15 lakes, out of which 5 lakes (Buftea, Buciumeni, Mogo oiaia, Chitila and Cernica) are situated on the territory of Ifov county and th rest of 10 lakes (Str ule ti, Grivi a, B neasa, Her str u, Floreasca, Tei, Plumbuita, Fundeni, Pantelimon I and Pantelimon II) are on the administrative territory of Bucharest. Their purpose is to ensure the water for multiple uses – industrial, irrigations, leisure.

By its steppe climate, typical for the Baragan Plain, Bucharest lacks the humidity, creating thus a physical unease. The lack of humidity was partially compensated by the creation of the lakes nearby the city area.

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	2,09	2,08	2,63	2,45
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	27	20,77	15,24	1,11
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	16	11,3	6,68	10,75
Atmosphere pollution ash - emission per 1000 inhabitants (t)	2,5	1,36	0,457	0,698
Atmosphere pollution CO - emission per 1000 inhabitants (t)	9	5,59	34,34	47,23
Capacity of landfills per 1000 inhabitants (t)	2358	6467	6652	6557

## Judetul Ilfov

### *General information*

Ilfov county is situated in the South-Eastern part of the country, in the middle of the Walachian Plain, surrounding like a ring Bucharest municipality, in the hydrographic basins of Arges, Ialomita and Mostitea rivers. It is the smallest county of Romania.

The county is situated exclusively in the plain area having an altitude between 50 m and 120 m, fully or partially belonging to the Vlasia Plain subunit (portions of Snagov, Movilei and Câlnului Plains). The climate is temperate continental with an excessive shade.

The residence of Ilfov county is in Bucharest. In the past, Bucharest city was located in the middle of Ilfov county and was belonging to it. In 1968, Bucharest was declared municipality with rank of county, separated from Ilfov county. In 1981 the name of Ilfov county was "Ilfov Agriculture Sector", having only 1 town (Buftea) and 26 communes. In 1996 its name was changed into „Ilfov county” and was legally transformed into a county in 1997. In present Ilfov county has 8 cities (Buftea, Otopeni, Popesti Leordeni, Pantelimon, Voluntari, Magurele, Bragadiru, Chitila) and 32 communes.

### *Land use*

The farmland has the highest share (67.97%) in total area, followed by forests and other forest vegetation land (15.94%) and other areas (non productive land, construction, roads and railways) occupying (12.72%). The waters and ponds areas represent 3.35% from the total surface. The share of arable land in total farmland is of 95.98%.

### *Nature conservation and landscape*

#### *Protected areas*

According to Law 5/2000, in Ilfov county were declared 2 natural protected areas of national interest: Snagov Lake (100 hectares) and Snagov Forest (10 hectares) and according to H.G. no.792/1990 was declared Scrovi tea natural protected area (3374 ha).

They occupy 3484 hectares and represent 2.2% from the total area of the county.

Natura 2000 sites are: Gradistea – Caldarusani – Dridu, declared SPA by Government Decision no. 1284/2007 (totalizing 6 642.3 ha) and Scrovistea (SCI), overlapping on the protected area (3374 ha), situated at 45 km from Bucharest, representing a tourist area.

#### *Ecological networks*

NATURA 2000 sites are represented in Ilfov county by:

- 1 SPA, covering 5200.9 hectares in Ilfov county, representing 3.3% from the total area of the county: Gradistea - Caldarusani - Dridu.
- 1 SCI, covering 3374 hectares in Ilfov county, representing 2.13% from the total area of the county: Scrovistea.

### *State of the environment*

#### *Air quality and pollution*

In Ilfov county the air is polluted due to its very close proximity to Bucharest, absorbing by dispersion the emissions from the capital.

Since the socio-economic development in Ilfov county was faster than in other counties - having a big diversity of human activities - the pollution is a secondary effect of these activities.

There are six air pollution sources (concentrated on the existent industrial platforms, new industrial areas, large settlement areas) and mobile (from traffic, especially along national roads towards Bucharest or on the Ring Highway around Bucharest).

Industrial objectives from Ilfov county are situated on existent platforms nearby Bucharest, such as: Jilava, Magurele or Pantelimon-Neferal platforms, but also on new locations in which is developed especially food industry (Popesti-Leordeni town, Tunari, Domnesti) or storing activities (commerce, hypermarkets). On the Ring Highway are also developed objectives with important contribution to air pollution (ex. constructions).

The quantity of SO<sub>2</sub> emissions decreased in 2009 (82.32 t) compared with 2008 (129.021 t) or 2005 (190.25 t). Thus, reported at 1000 inhabitants the SO<sub>2</sub> emissions were 0.671 t in 2005, 0.424 t in 2008 and 0.264 t in 2009. The NO<sub>x</sub> emissions fluctuated from 1607.7 t in 2005 to a maximum of 7778.9 t in 2006, 225.885 t in 2008 and 467.26 t in 2009 (in 2006 most indicators had maximum values). Reported at 1000 inhabitants, the NO<sub>x</sub> emissions were 5.673 t in 2005, 0.743 t in 2008 and 1.496 t in 2009.

According to the "Report on the state of environment in Ilfov county, 2009" the quantity of COV emissions increased in 2008 (1901 t) compared with 2005 (410 t) or 2001 (165 t), and in 2009 decreased a little (1334 t). Reported at 100 inhabitants, the values show also a maximum in 2008 (6.25 t). According to the data values, it was observed an improvement of the air quality in Ilfov county, haven't been reported overflows at the NO<sub>x</sub>, SO<sub>2</sub>, COV pollutants. Regarding the ash, it was observed the decrease of the number of overflows, but the overflows still exist, because of construction activities (building yards).

At Balotesti station the limit value (40µg/m<sup>3</sup>) was exceeded with 20%, and at Magurele station with 80%.

### *Water*

The critical areas of surface and underground water are Glina area (where the wastewater from Bucharest is evicted in Dambovita river) and the areas polluted with nitrates from historical agricultural sources. There are 7 localities with such nitrates pollution: 1 Decembrie, Chitila, Ciorogarla, D r ti, Dobroie ti, Jilava, M gurele.

Also, due to the lack of municipal and communal wastewater treatment stations, can be considered as critical areas the following localities from Ilfov county that are evacuating wastewater into surface water: Bragadiru, Cornetu, 1 Decembrie, Otopeni, Snagov.

From physical-chemical point of view, the water is of 1st category for rivers Sabar (L=174km), Dâmbovi a (upstream sector from the future Glina wastewater treatment station L=255km), Ciorogârla (L=57km), Colentina (L=101km), Vl sia (L=23km). In the 2nd category of quality are rivers Vl sia (L=12km) and Cociovali tea (L=49km). Dâmbovi a river is degraded downstream the future wastewater treatment station (L=31km).

### *Waste*

Ilfov county has special characteristics regarding the municipal waste management:

- is adjacent to Bucharest municipality, supporting the eviction of all its types of waste. Although since 2007 is functioning the waste storing station on the conform landfill from Glina, still the selective collecting of municipal waste in Bucharest is achieved only in a share of 15%.
- In 2009 the waste sorting station associated to Vidra-Ecosud conform landfill was authorized for functioning.
- The activities with significant impact upon the environment factors moved from Bucharest into the towns, communes and villages from Ilfov county.
- The heavy road transport towards and from Bucharest is developed on the roads of Ilfov county
- Were created 3 ecological landfills, out of which 2 are serving Ilfov county (Vidra – SC Eco Sud SRL and Glina – SC Ecorec SA) and 1 stock-pile (Rudeni - SC Iridex Group SRL) for Bucharest municipality.

In 2009 were closed end ecologized all 28 un-conform landfills.

In Ilfov County there are 42 house waste disposals. There are also 9 waste disposals that should be closed because they overreached their stocking capacity. Ilfov County represents the final collecting point for much of the waste produced in the capital city, Bucharest.

Hazardous waste was disposed in special disposals in Ilfov County, one of which managed by TURNU S.A. TURNU MAGURELE. Regarding the industrial waste stockpiles, there are 6 in Ilfov County: Bragadiru, Peris, Pantelimon, Glina, Buftea, Vidra.

### *Water management*

Surface water resources of the county are few, main rivers being Ialomi a, Arge , Dâmbovi a and Ilfov, with a potential of 3 thousands m<sup>3</sup>/year. Natural lakes represent also a source water resource (Snagov Lake and C ld ru ani Lake). Underground water resources are not enough studied. It is supposed that their exploitation is 6.3 m<sup>3</sup>/s.

On Dâmbovi a river (belonging to Arges hydrographic basin) was established the accumulation lake Lacul Morii, with a volume of 19.4 million cube meters, and another 11 water joints, with another 1.5 million cube meters.

On Colentina river was created a chain of lakes with 15 barrier lakes, with a total volume of approx. 41.7 million cube meters, out of which the most important is Buftea pool. From the 15 lakes, 9 belong to the Bucharest city hall.

The most important lakes belonging to lalomi a hydrographic basin are Snagov lake (with a total volume of 32.2 million cube meters, an area of 565 hectares) and C ld ru ani lake (with a volume of 21.0 million cube meters and an area of 325 hectares).

On the other rivers were created fish ponds.

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	2,09	2,08	2,63	2,45
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	0,85	0,73	0,67	0,4
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	6,5	4,5	5,69	0,74
Atmosphere pollution ash - emission per 1000 inhabitants (t)	1	0,64	0,8	0,05
Atmosphere pollution CO - emission per 1000 inhabitants (t)	14	16,2	21,62	69,72
Capacity of landfills per 1000 inhabitants (t)	19461,14	53158,02	51868,5	48348,1

## Judetul Dolj

### *General information*

Dolj county is situated in the South-South-Western part of Romania, being crossed from North to South by the Jiu river on 140 km.

The Danube goes to the Southern part of the county on 150 km, as natural border with Bulgaria.

The Danube neighbours of Dolj county are Mehedinti county at West and Olt county at East.

The link between Dolj county and the neighbouring Bulgarian regions is ensured by the 2 main ports from Bechet and Calafat towns.

The landscape is dominated by the Romanian Plain but in the northern part there are also hills. The climate is temperate continental with Mediterranean influences.

The hydrographic network is represented by the Danube (on 150 km) and Jiu (140 km) rivers and by lakes and ponds (Bistre , Fountain Banului, Maglavit, Golenti, Ciuperceni Lakes).

The main secondary rivers are Amaradia (34 km on the territory of Dolj county), Desnatui (84 km), Teslui (73 km).

The main lake of the county is Bistret lake (with a total area of 1867 hectares and a volume of 28 million cube meters). Another important lake is Isalnita accumulation lake (180 hectares and 1.4 million cube meters).

The quality of Jiu river is affected by the economic activities from this county and from the other neighbouring counties.

### *Land use*

The Carpathian depression facilitates the agricultural use of the terrain, Dolj county owning 4% from the total agricultural area of Romania, being the second one from this point of view at national level. Also it occupies the 5th position regarding the share of lakes and ponds (2.5% from national total).

The farmland has the highest share (78.93%), followed by forests and other forest vegetation land (11.47%) and other areas (non productive land, construction, roads and railways) that occupy 6.78%. The waters and ponds areas represent 2.80% of the total area. The share of arable land in total farmland is 83.53%.

### *Nature conservation and landscape*

#### *Protected areas*

According to Annual Report regarding the State of Environment in Dolj county, in 2009 the total protected area was of 3687.3 ha, representing 0.5% from the total area of the county.

There are 37 protected areas, out of which:

-18 are declared by Law no.5/2000 regarding the approval of the National Spatial Plan, Section III – Protected Areas, totalizing 661 hectares:

- 1.Poiana Bujorului din P durezza Pleni a, 50 ha
- 2.Valea Rea - Radovan, 20 ha
- 3.Dunele D buleni („La Cetate”), 8 ha
- 4.Paji tea halofil Gighera, 4 ha
- 5.Paji tea Cetate din Lunca Dun rii, 6 ha
- 6.Paji tea Gogo u- tef nel, 10 ha
- 7.Locul fosilifer Bucov , 4 ha
- 8.Locul fosilifer Dr nic, 6 ha
- 9.Ciuperceni – Desa, 200 ha
- 10.Lacul Adun a ii de Geormana, 102 ha
- 11.Complexul lacustru Preajba – F c i, 28 ha
- 12.Balta Cilieni-B ile ti, 47 ha
- 13.Lacul lonele, 3,2 ha
- 14.Balta Neagr , 1,2 ha
- 15.Balta Lat , 28 ha
- 16.Râurile Desn ui i Terpezi a amonte de Fântânele, 80 ha
- 17.Râul B l san amonte de B ile ti, 36 ha
- 18.Lacul Caraula, 28 ha

-1 natural reserve declared by The Government Decision HG no.2151/2004 regarding the declaring of new natural protected areas: Zaval natural reserve, 351,3 ha

-and 18 protected areas (forest reserves) declared by local decisions, totaling 2675 ha.

There are also 7 NATURA 2000 sites: 4 SPAs (56502.4 hectares, occupying 7.62% from total area of the county) and 3 SCIs (90684 hectares, representing 12.24% from the total area of the county).

### *Ecological networks*

In 2000, Romania has initiated together with Bulgaria, Moldavia and Ukraine the creation of "Danube Green Corridor", which is a regional ecological network in the Danube floodplain, crossing all Danube counties. The total surface is of approx. 900 000 ha, out of which 713 385 ha represents natural protected areas (Ciuperceni-Desa reservation: 200 ha in Dolj county).

The second ecological network is represented by Natura 2000 program, which is aimed at the protection and management of species and habitats, their natural territory.

NATURA 2000 sites are represented in Dolj county by:

- 4 SPAs, summing 55908.4 hectares, representing 7.5% from the total area of the county: Maglavit, Bistret, Calafat - Ciuperceni – Dunare, Confluenta Jiu – Dunare.
- 3 SCIs, having 105821.5 ha, representing 14.3% from the total area of the county: Ciuperceni – Desa, Poiana Bujorului din Padurea Plenita, Coridorul Jiului.

### *State of the environment*

#### *Air quality and pollution*

From 2005 to 2008, the concentration of atmospheric pollutants in Dolj County is stable. The main emissaries are local and regional, such as CET (thermo-electric centrals), car traffic - to which a considerable increase was registered – ash pits, the desertification of agricultural land, the high natural level of ash, the lack of diversified forest land to absorb part of the existing pollutants.

According to the Agency for the Environment protection Dolj, the quantity of SO<sub>2</sub> emissions increased in 2009 (99095 tones) compared with 2008 (87789 tones). Reported at 1000 inhabitants the SO<sub>2</sub> emissions were 17.8 tones in 2001, 26.5 tones in 2005, 123.9 tones in 2008 and 140.5 tones in 2009.

Also the quantity of NO<sub>x</sub> emissions increased from 6903 tones in 2005 to 19711 tones in 2008 and 17153 tones in 2009. Reported at 1000 inhabitants, the NO<sub>x</sub> emissions were 9.6 tones in 2005, 27.8 tones in 2008 and 24.3 tones in 2009.

The COV emissions increased in 2008 (6063 t) compared with 2005 (1728 t), from 2.4 t/1000 inhabitants in 2005 to 8.56 t/1000 inhabitants in 2008. In 2009 the COV emissions decreased to 5352 t (7.6 t/1000 inhabitants).

In 2008, at the city stations were observed maximum annual overflows. The maximum admissible limit for the daily average (50 µg/m<sup>3</sup>) was often exceeded at the traffic and urban stations. Major pollution sources in Craiova agglomeration area are the burning processes from thermal stations, as well as domestic activities (heating), ash stock-piles of thermal stations, cars traffic and building yards.

By monitoring the 2009 emissions of PM<sub>10</sub> it was observed the decreasing of average annual value and of the number of the limit admissible exceeding values for daily averages, compared with previous years. The highest values for powder were registered within winter months, due to the dwellings heating.

#### *Water*

The quality of the important watercourses in the county is the following:

- Jiu river, Ist category, L= 47 km and IInd category, L=150 km
- Amaradia category, Ist category, L= 72 km and IInd category, L=34 km;
- Plosca river, Ist category, L=35 km;
- Raznic river, Ist category, L=55 km and IInd category, L=3 km;
- Mere el river, Ist category, L=42 km;
- Danube river, Ist category, L=136 km and IInd category, L=46 km.

The most important critical area from the point of view of water quality is Breasta-Craiova area. Here the phreatic water from Jiu meadow was captured in 5 drills and sent to Breasta station to be used as water supply in Craiova municipality. The chemical and physical analysis performed at the monitoring drills associate the water pollution with sulphate and iron with the ash pits from CET II Craiova. The main pollution sources in Jiu catchment are DOLJCHIM Craiova and RAACT Craiova.

### Waste

In Dolj county there is a zonal ecological waste disposal, the waste disposal area being Craiova Public Sanitation System. Hazardous waste disposal area is DOLJCHIM SA CRAIOVA (15.8 ha). In Craiova municipality is one incinerator for hazardous waste (SC Guardian SRL), regional incinerator that in 2009 incinerated 80.45 tones of hazardous industrial waste.

In Dolj county there is no authorized incinerators for municipal waste. They are eliminated by disposal. In 2009 municipal waste was disposed at the ecologic waste disposal from Mofleni and also in 3 un-conform waste disposals in urban area and 309 rural waste disposals.

### Water management

According to their flow quantity, the main water resources of the county are: the Danube river, with a watercourse of 150 km on the territory of the county, Jiu river crossing the county from North to South on 154 km and Amaradia river that is flowing into Jiu river, its longest affluent on the territory of the county.

On the territory of Dolj county are situated the following accumulations: Ialni a (1.65 milion m<sup>3</sup>), Fântânele (37 million m<sup>3</sup>), Caraula (2.2 million m<sup>3</sup>), having as main function to attenuate floods, and Bistre natural lake (82.2 million m<sup>3</sup>) on Dezn ui river, additionally used in pisciculture.

In 2008, the usable county water resources were of 127.1 million m<sup>3</sup> surface water and 13.2 million m<sup>3</sup> of underground water. According to county data, theoretical water resources are of 2.05 million m<sup>3</sup> surface water and 0.55 million m<sup>3</sup> underground water. The major problem is the overstressing of existent water sources.

### Indicators of natural conditions

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	2,04	1,86	1,72	1,87
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	24	17,82	26,5	123,9
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	11	9,98	9,57	27,8
Atmosphere pollution ash - emission per 1000 inhabitants (t)	1	0,63	1,86	7,86
Atmosphere pollution CO - emission per 1000 inhabitants (t)	25	30,55	37,85	115,89
Capacity of landfills per 1000 inhabitants (t)	4000	4211	3842	3605

## Judetul Mehedinti

### *General information*

Mehedin i county is situated on the South-West part of Romania, where the Danube exits from the narrow path, on its lower sector.

Its Danube neighbours are Caras Severin county at west and Dolj county at east. In South, its Danube neighbours are Serbia and Bulgaria.

The county includes three forms of relief: mountains (26.8% of the county's area), plateau (29.9%) and plain (34.7%).

The hydrographic network contains mainly the Danube and Motru rivers and their direct or indirect influents, rivers like Cerna, Topolnia, Co u tea, Blahnia and Drincea. Due to the specific lithology, the Danube changes its direction, forming several islets: Ada Kaleh (sunk under the waters of the lake Iron Gates I), Golu, Simian, Corbului and Ostrovu Mare.

The county has an important technical and economical potential due to the hydro lakes and hydroelectric power plants of the Danube at Iron Gates I and II, situated respectively downstream of Gura Vaii locality and at Ostrovu Mare. Warm climate with Mediterranean influences favored the growth of specific Southern plants and shrubs, and the existence of specific species of animals and reptiles.

### *Land use*

The farmland has the highest share (59.59%) of the total area, followed by forests and other forest vegetation lands (30.37%) and other areas (non productive land, construction, roads and railways) that represents 6.57%. The waters and ponds areas are occupying 3.44% of the total area. The share of arable land in total farmland is 64.10%. Forests represent a notable asset of the county.

### *Nature conservation and landscape*

#### *Protected areas*

The total protected area is of 174897 ha, representing 35.7% from the county area.

Protected areas are represented by:

- 3 Parks: The Iron Gates Natural Park (59 585 ha of the Park is situated on the territory of the county), Domogled-Valea Cernei National Park (8 220 ha within the county), and Geoparcul Platoul Mehedinti Natural Park (106 000, situated in totality on the territory of the county)

- 32 protected areas of national interest declared by Law no.5/2000 regarding the approval of the National Spatial Plan, Section III – Protected Areas:

1. Pe tera Epuran, 1 ha
2. Izvorul i stânc riile de la Câmana, 25 ha
3. Gura V ii – Vârciorova, 305 ha
4. Valea Ogl nicului, 150 ha
5. Lunca Vânjului, 14 ha
6. P durezza de liliac Ponoarele, 20 ha
7. Tuf ri urile mediteraneene de la Isverna, 10 ha
8. Vârful lui Stan, 120 ha
9. Valea esna, 160 ha
10. P durezza Borov , 30 ha
11. P durezza Bunget, 18,2 ha
12. P durezza Dr ghiceanu, 60 ha
13. Dealul Duhovnei, 50 ha
14. Dealul V r nic, 350 ha
15. Cazanele Mari i Cazanele Mici, 215 ha
16. Locul fosilifer vini a, 95 ha
17. Locul fosilifer Bahna, 10 ha
18. P durezza Stârmina, 100,3 ha
19. Complexul carstic de la Ponoarele, 100,0 ha
20. Pere ii calcaro i de la Izvoarele Co u tei, 60 ha

21. Cheile Co u tei, 50 ha
22. Cornetul Babelor i Cerboanei, 40 ha
23. Cornetul Piatra Înc lecat , 12 ha
24. Cheile Topolni ei i Pe tera Topolni ei, 60 ha
25. Cornetul B l ii, 30 ha
26. Cornetul V ii i Valea M n stirii, 40 ha
27. Locul fosilifer Malov , 6 ha
28. Cracul G ioara, 5 ha
29. Tuf ri urile mediteraneene Cornetul Obâr ia-Clo ani, 60 ha
30. Cracul Crucii, 2 ha
31. Fa a Virului, 6 ha
32. Locul fosilifer Pietrele Ro ii, 1 ha

- 1 protected area declared by HG no.2151/2004 regarding the declaring of new natural protected areas: Pe tera Izverna, 2 ha

- 2 local protected areas, declared by local decisions: Hinova-Ostrovul Corbului – 185 ha, and Garla Mare-Salcia – 907 ha

NATURA 2000 is represented by 5 SPAs and 5 SCIs. Some of them are situated inside other protected areas.

#### *Ecological networks*

NATURA 2000 sites are represented in Mehedinti county by:

- 5 SPAs, summing 108626.5 hectares, representing 22.0% from the total area of the county: Gruia - Garla Mare, Muntii Almajului – Locvei, Blahnita, Cursul Dunarii - Bazias - Portile de Fier, Domogled - Valea Cernei.

- 5 SCIs, having 110964.5 ha, representing 22.5% from the total area of the county: Padurea Starmina, Platoul Mehedinti, Domogled - Valea Cernei, Portile de Fier, Coridorul Jiului.

#### *State of the environment*

##### *Air quality and pollution*

The main activities generating pollution are: the energy production based on fossil fuel, shipyard construction sites, the chemical industry, the wood processing activity, the rail traffic, activities related to the transportation of gas and fuel.

Air pollution sources are: ROMAGPROD (H<sub>2</sub>S emissions) and ROMAG TERMO (CO<sub>2</sub>, SO<sub>2</sub>, NO<sub>x</sub>, and suspension powder), SC. CELROM SA. The decrease in the CO<sub>2</sub> emissions from ROMAG TERMO is due to the project “Strengthening the efficiency of CET system in Drobeta Turnu Severin”.

The typical emissions related to the activities presented are: SO<sub>2</sub>, H<sub>2</sub>S, NO<sub>x</sub>, N<sub>2</sub>O, CO, CO<sub>2</sub>, COV, CH<sub>4</sub>, NH<sub>3</sub>, and PM<sub>10</sub>.

The quantity of SO<sub>2</sub> emissions are very high in Mehedinti county, decreasing in 2009 (68929.6 t) compared with 2008 (99599.3 t) and 2005 (103854.3 t). Reported at 1000 inhabitants the quantities of SO<sub>2</sub> emissions were 341.8 t in 2005, 337.3 t in 2009 and 235.3 t in 2008.

The NO<sub>x</sub> emissions fluctuated from 6362.9 t in 2005 to 6131.6 t in 2008 and 6765.3 t in 2009. Reported at 1000 inhabitants, the NO<sub>x</sub> emissions were 20.9 t in 2005, 20.8 t in 2008 and 23.1 t in 2009. The NO<sub>x</sub> concentrations in 2009 were slightly above those from previous year, but still they were within the limit values.

The values of surveyed powder emissions exceeded the maximum admissible concentrations and are coming from the traffic and from domestic heating.

The average COV values are also very high, still lower in 2009 (8148 t) than in 2008 (25029 t), the maximum values registering in 2005 (36556 t). Reported at 1000 inhabitants, the values decreased from 120.3 t in 2001 to 25028 t in 2008 and 27.82 t in 2009.

The PM<sub>10</sub> concentrations had high values due to car traffic and domestic heating, exceeding the maximum admissible concentrations (7 times).

### *Water*

The quality of county inland rivers is of II<sup>nd</sup> and III<sup>rd</sup> categories. The Danube has the II<sup>nd</sup> category on the territory of the county. Sporadically the oxygen regime is insignificantly diminished during the summer in the downstream section of Drobeta Turnu Severin, being located after the discharge of non-treated urban wastewater.

Underground water represents the main resource for population water supply, especially in rural areas. Since it supplies drinkable water to a numerous population, its quality is very important. Sometimes underground water has not the standard requirements, containing pollutants from natural sources or anthropic activities.

Into phreatic layers, outside localities, was observed an increasing of nitrates compounds, seldom overflowing the drinkable limits, but inside the localities the increasing is alarming, overlapping the existent pollution sources.

Centralized water supply for urban and rural localities located in plain area will reduce the usage of wells and subsequently the penetration into the human body of phreatic water nitrates.

The general quality of the water is good. Still, there are several monitored emissaries like: ROMAG Drobeta Turnu Severin and S.C. Bere Spirt S.A. Drobeta Turnu Severin.

### *Waste*

In 2009 were generated 70817.58 t of municipal waste, out of which 2.8% in rural area. Only 0.03% was selectively collected.

The waste is disposed outside localities, on exhausted soils, established by local authorities.

Since 2009 there is an ecologic waste stockpile in Drobeta Turnu Severin municipality, covering its necessities and of Vânju Mare, Or ova and Baia de Aram cities, where the traditional waste stockpiles have been closed due to the disaccord with the European Union standards.

### *Water management*

Danube river has 195 km on the territory of the county. Hydrographic basin of Mehedinti county has an area of 4933 km<sup>2</sup> and a hydrographic network of 1456 km, containing plain watercourses with slow water flow and hill and mountain watercourses with rapid flow.

Theoretic and usable water resources are:

-Surface water: theoretical – 94937 thousand m<sup>3</sup>, from which are used 66593 thousand m<sup>3</sup>;

-Underground water: theoretical – 4728 thousand m<sup>3</sup>, from which are used 2941 thousand m<sup>3</sup>.

The Danube water is the main drinking water resource that supplies the locality Drobeta Turnu Severin (with no alternative sources, representing thus a major dysfunction), for industrial water or for irrigations. The other water courses have low flows, only a few number offering possibilities of accumulations as barrier lakes in order to supply the localities with water and to attenuate the floods. Ieselnita is the only watercourse used as water supply (supplying Ieselnita locality)

On some watercourses sections, whit flood risk, were made regulations and embankments.

There are also non-permanently watercourses producing floods and banks erosions during torrential rains. The permanent and non-permanent lakes have a landscape and fishy role.

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	1,6	1,42	1,47	1,43
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	5	3,25	341,77	337,34
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	2,5	1,15	20,94	20,77
Atmosphere pollution ash - emission per 1000 inhabitants (t)	0,3	0,16	2,98	4,686
Atmosphere pollution CO - emission per 1000 inhabitants (t)	21	16,18	137,89	154
Capacity of landfills per 1000 inhabitants (t)	4930,9	5036,11	5314,8	5469,98

## Judetul Olt

### *General information*

Olt County (5498 km<sup>2</sup>) and is located in the southern part of Romania, on the lower course of the river that gave the name of the county. Its Danube neighbours are: at West – Dolj county and at East – Teleorman county.

The landscape of Olt County belongs to two main units, respectively Getic Plateau in the north, occupying one third of the surface and Romanian Plain (“Campia Romana”) in the south, occupying two thirds.

Olt county’s territory is crossed by two major rivers: the Danube and Olt Rivers. The Danube river flows within the county on a length of 47 km. Olt river crosses the county on a length of 100 km from north to south.

The county has low altitudes and is symmetric to the Olt river bed.

The Danube represents the natural border with Bulgaria on 47 km length. Danube Valley, oriented from west to east, has an obvious asymmetric character with the right versant high and steep, which dominates the down plain of the Danube with large terraces on the Romanian bank. The Olt Valley is a real hydrographical and economical axis to the county.

The continental temperate climate has a humid touch in the North and arid in the South.

### *Land use*

Due to its vast fertile land, the county is among the most important agricultural areas of the country. The farmland has the highest share (70.08%), followed by forests and other forest vegetation lands (10.89%) and other areas (non productive land, construction, roads and railways) that occupy (6.67%). The waters and ponds areas represent 3.34% from the total area. The share of arable land in total farmland is of 89.33%.

### *Nature conservation and landscape*

#### *Protected areas*

There are 12 national protected areas, summing approx.7000 ha, representing 1.3% of the total area of the county.

Thus, there are 6 protected areas and natural monuments listed in Law no.5/2000 – Law regarding the approval of the National Spatial Plan, Section III – Protected Areas:

- 1.P durezza Seaca-Opt ani, 135 ha
- 2.P durezza Brani tea Catârilor, 301,3 ha
- 3.P durezza C lug reasc , 40 ha
- 4.Casa P durii din P durezza Potelu, 1,5 ha
- 5.Rezerva ia de bujori a Academiei, 54,9 ha
- 6.Rezerva ia de arborete de gârni , 121 ha

and 6 protected areas declared by the Government Decision regarding the declaring of new natural protected areas - HG no.2151/2004:

2 natural reserves:

- 1.Valea Olte ului, 900 ha
- 2.P durezza Re ca, 50 ha

and 4 special avifaunistic protected areas (SPAs) declared by the same government decision:

- 1.Lacul Streje ti (Olt county andVâlcea county), 2378 ha
- 2.Lacul Slatina, 645 ha
- 3.Lacul Izbiceni, 1 095 ha
- 4.Iris-Malu Ro u, 1 380 ha

There are also other local protected areas, such as Topana Forest (120 ha).

There are 14 NATURA 2000 sites (3 SPAs and 11 SCIs).

#### *Ecological networks*

The "Danube Green Corridor" is a regional ecological network in the Danube floodplain, crossing all Danube counties.

Another ecological network is represented by Natura 2000 program.

NATURA 2000 sites are represented in Olt county by:

- 3 SPAs, summing 41288.4 hectares, representing 7.5% from the total area of the county: Confluenta Olt-Dunare, Confluenta Jiu-Dunare, Valea Oltului Inferior.
- 11 SCIs, having together 17262.6 ha, representing 3.16% from the total area of the county: Valea Oltetului, Padurea Calugareasca, Padurea Topana, Corabia - Turnu Magurele, Coridorul Jiului, Padurea Sarului, Padurea Resca Hotarani, Branistea Catarilor, Seaca – Optasani, Padurea Vladila, Padurea Studinita.

### *State of the environment*

#### *Air quality and pollution*

Due to geographic location (in the Danube's plain), Olt county has a characteristic concerning air pollution. Considering the lack of forests, the winds from East and South-West disperse sand covering the soil in the Southern and Western part of the county, towards inhabited areas. The main polluted cities are Slatina, Bal and Corabia.

According to the Agency for the Environment protection Olt, "Report on the state of environment in Olt county, 2009", the quantity of SO<sub>2</sub> emissions decreased in 2009 (1276 tones) compared with 2008 (4662 tones). Reported at 1000 inhabitants the SO<sub>2</sub> emissions were 5.45 t in 2001, 9.55 t in 2005, 9.90 t in 2008 and 2.72 t in 2009.

Also the quantity of NO<sub>x</sub> emissions decreased from 1692 t in 2008 to 760 t in 2009. Reported at 1000 inhabitants, the NO<sub>x</sub> emissions were 3.3 t in 2005, 3.59 t in 2008 and 1.6 t in 2009.

The COV emission increased from 345 t in 2001 to 618 t in 2005, 1583 t in 2008 and 3168 t in 2009. Also reported at 1000 inhabitants, the quantities were increasing from 0.68 t in 2001, to 1.28 t in 2005, 3.36 t in 2008 and 6.79 t in 2009.

The values of PM<sub>10</sub> average annual concentration in 2009 was of 23.97 µg/m<sup>3</sup>.

#### *Water*

The samples takeoff from different individual or public sources indicated the inadequate quality of water, with overflows at chemical (nitrites, nitrates) and bacteriologic indicators. This is happening due to non-implication of local factors (town halls, dispensaries) in sanitation and disinfection measures. The quality of main rivers of the county is:

- Olt river: II<sup>nd</sup> category of quality at physical-chemical indicators in Slatina and Izbiceni sections; III<sup>rd</sup> category in Stoene ti section.
- Olte river has III<sup>rd</sup> category at physical-chemical indicators.
- Teslui river: III<sup>rd</sup> and IV<sup>th</sup> category at physical-chemical indicators.
- Vedea river I<sup>st</sup> and II<sup>nd</sup> category.

Water quality varies from the second class (which includes also the barrier lakes) to the fifth class. A major pollution source in the Olt catchment is Slatina industrial platform.

#### *Waste*

The municipal waste is eliminated by disposal in municipal stockpiles. In 2009 were functioning 6 municipal stockpiles: in Slatina, Caracal, Corabia, Bals, Draganesti-Olt and Scornicesti urban localities, having altogether a capacity of 1466500 mc.

The waste disposals from Olt county are not upgraded, none of them being environmental authorized. Each urban locality has its own municipal stockpile.

In rural area, the waste is dumped in un-authorized disposals.

By the project „The integrated waste management” which is in course will be accomplished a regional waste stockpile. Also were proposed 4 transfer stations in Caracal, Corabia, Bal and Scornice ti localities. All non-conform disposals will be closed after the opening of the new regional stockpile. Thus, in 2007 had to be closed the municipal waste disposal from Slatina, in 2009 from Scornice ti and Dr g ne ti–Olt and in 2017 will be closed those from Caracal, Bal and Corabia.

In Olt county the industrial waste in 2008 was disposed in ecologic disposals (S.C.ALRO S.A.Slatina, S.C.ALROM S.A.Slatina) and in temporary deposits (S.C.SMR S.A.Bals).

In Olt county are 4 industrial deposits:

- industrial ecological stock-pile S.C.ALRO S.A. Slatina (treated aluminum) functioning since 2002
- industrial ecologic dump ALRO Slatina, functioning since 2003

- industrial stock-pile S.C.EKOMIN S.R.L. Titu-Slatina, not functioning any more, but with ecological restoration works
- industrial stock-pile S.C. SMR S.A.Bals – the activity of disposal is stopped, on the site going to be opened a new ecological waste dump.

The big economic agents generating industrial waste are:

- S.C.ALRO S.A. SLATINA
- S.C. ALPROM S.A. SLATINA
- S.C. ELETROCARBON S.A. SLATINA
- S.C. ARTROM S.A. SLATINA
- S.C. SMR S.A. BALS
- S.C. TERMEX S.A. BALS
- S.C INSTIRIG S.A. BALS.

### *Water management*

Water resources of the hydrographic basin from Olt county are represented by surface water – Olt and Danube rivers – and underground water.

These resources are uneven distributed among the county, as space and time. To balance the users’ needs with the available water sources, many water management works were accomplished in time, such as: barrier lakes, watercourses derivations, dams and regulations. These works cover the water necessities of population, industry, transport, pisciculture, are reducing the flood risks and are decreasing the draught effects.

From total water amount were took 41519 thousand m<sup>3</sup> of water:16884 thousand m<sup>3</sup> took from underground and 24635 thousand m<sup>3</sup> from surface waters: 3603 thousand m<sup>3</sup> from Danube and 21032 thousand m<sup>3</sup> from Olt rivers.

### *Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	2,29	2,27	2,63	2,23
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	6,5	5,45	9,55	2,73
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	4	3,31	3	3,9
Atmosphere pollution ash - emission per 1000 inhabitants (t)	1	0,56	0,5	0,6
Atmosphere pollution CO - emission per 1000 inhabitants (t)	18	15,85	14,04	16,7
Capacity of landfills per 1000 inhabitants (t)	1025,9	1048,8	1097,85	3295,03

## Judetul Caras-Severin

### *General information*

Caras Severin county belongs to Banat historical region, having as Danube neighbour Mehedinti county and Serbia on the other side of the Danube.

65.4% from the county is occupied by mountains. Hills have a small extension, occupying 10.8% and the depressions 16.5%. The last place is represented by the plains – 7.3% of surface.

The climate is temperate continental with sub-Mediterranean shades. The existence of a predominantly mountainous terrain materialized in an extensive network of water, carst landforms in Anina and Locvei Mountains, on Cerna Valley and Danube path (gorges, plateau carsts with sinkholes, caves and potholes).

The basement of county is rich in minerals and useful minerals. To note are the Ruschita marble reserves, which resembles the appreciated marble of Carrara.

### *Land use*

The forests and other forest vegetation lands have the highest share (48.27%), followed by farmland (46.63%) and other areas (non productive land, construction, roads and railways) that represent 3.93% from the total area. The waters and ponds areas have a share of 1.15% from total area. The share of arable land in total farmland is of 32.02%.

### *Nature conservation and landscape*

#### *Protected areas*

Large areas of the county having special landscape qualities were declared nature reserves and consequently integrated into the National Parks area. According to Law 5/2000 and to HG 2151/2004, in Caras Severin are the following protected areas:

Parks:

- 4 National Parks: Semenic-Cheile Carasului and Cheile Nerei-Beusnita, totally on the territory of the county, and Domogled-Valea Cernei and Retezat, belonging to other counties also. From their total area of 171911 ha, 101018 ha are on the territory of Caras-Severin county (58.8%).
- 1 Natural Park: Portil de Fier (Iron Gates) Natural Park, belonging to Mehedinti county also, having 74774 ha on the territory of Caras-Severin county (64.7% from the area of the Park) from its total area of 115655.8 ha.

In Caras-Severin county these 5 national and natural parks have together 175792 hectares, occupying 20.6% from the total area of the county.

Natural Reserves:

- 27 natural reserves situated inside the national and natural parks (30927 ha)

From these, according to Law no.5/2000 regarding the approval of the National Spatial Plan, Section III – Protected Areas, there are:

1. Cheile Nerei-Beu ni a Reserve, 3 081,3 ha
2. Valea Ciclovei – Ilidia, 1 865,6 ha
3. Cheile u arei, 246 ha
4. Izvorul Big r, 176,6 ha
5. Lisovacea, 33 ha
6. Ducin, 260,7 ha
7. Cheile Cara ului, 3 028,3 ha
8. Izvoarele Cara ului, 578 ha
9. Izvoarele Nerei, 5 028 ha
10. Cheile Gârli tei, 517 ha
11. Bârzavi a, 3 406,9 ha
12. Buhui-Marghita , 979 ha
13. Pe tera Comarnic, 0,10 ha
14. Pe tera Popov , 0,10 ha
15. Pe tera Buhui, 0,10 ha
16. Groposu, 883,6 ha

- 17.Domogled Reserve, 2 382,8 ha
- 18.Coronini-Bedina, 3 864,8 ha
- 19.launa – Craiova, 1 545,1 ha
- 20.Belareca, 1 665,7 ha
- 21.Pe tera Bârzoni, 0,10 ha
- 22.Valea Mare, 1 179 ha
- 23.Balta Nera – Dun re, 10 ha
- 24.Râpa cu l stuni din Valea Divici, 5 ha
- 25.Bazia , 170,9 ha

According to HG no.2151/2004 regarding the declaring of new natural protected areas, there are the following natural reserves:

- 1.Pe tera cu ap din valea Polevii (The cave with water from Polevii Valley), inside the Iron Gates Natural Park (Parcul Natural Por ile de Fier), 3,2 ha
- 2.Pe tera Exploratorii 85 (The cave Exploratorii 85)(National Park Semenic Cheile Cara ului), 15 ha

- 26 natural reserves situated outside the natural and national parks (4228.5 ha).

From these, according to Law no.5/2000 regarding the approval of the National Spatial Plan, Section III – Protected Areas, there are:

- 1.larda ti a, 501,6 ha
- 2.Fânea a cu narcise Zerve ti, 40 ha
- 3.Locul fosilifer Soceni, 0,40 ha
- 4.Cheile Globului, 225 ha
- 5.Cheile Rud riei, 250 ha
- 6.„Cuptor” - Br di oru de Jos, 0,50 ha
- 7.„Sfinxul B n ean”, 0,50 ha
- 8.„Râpa neagr ”, 5 ha
- 9.Dealul Petrolea – Cuptoare, 5 ha
- 10.Valea Greaca, 9 ha
- 11.Ravena Crouri, 7 ha
- 12.Oga ul Sl tinic, 1 ha
- 13.P durea Ezeri el, 120 ha
- 14.Locul fosilifer de la Apadia, 1 ha
- 15.Locul fosilifer de la Deline ti, 4 ha
- 16.Locul fosilifer de la Ezeri , 2 ha
- 17.Locul fosilifer de la Globu Craiovei, 2 ha
- 18.Locul fosilifer de la Petro ni a, 3 ha
- 19.Locul fosilifer de la Târnova, 2 ha
- 20.Locul fosilifer de la Tirol, 0,5 ha
- 21.Locul fosilifer de la Valea Pai, 2 ha
- 22.Locul fosilifer de la Zorlen u Mare, 3 ha

According to HG no.2151/2004 regarding the declaring of new natural protected areas, there are the following natural reserves:

- 1.Dancioanea, 337 ha
- 2.P durea Ple u, 1 980 ha
- 3.Rusca Montana, 604 ha
- 4.Dealul Caraula, 123 ha

- 1 scientific reserve inside the natural park (1.1 ha)

Also 3 areas of special avifaunistic protection are within the Natural Park Iron Gates (2149 ha). Thus, According to HG no.2151/2004 regarding the declaring of new natural protected areas there are:

- 1.Zona umed (The wetland) Ostrov-Moldova Veche (Parcul Natural Por ile de Fier), 1 627 ha
- 2.Zona umed (The wetland) Insula Calinov (Parcul Natural Por ile de Fier), 24 ha
- 3.Divici-Pojejena (Parcul Natural Por ile de Fier - Iron Gate atural Park), 498 ha

The Retezat Mountain is a Biosphere reserve of the UNESCO Man and Biosphere Programme.

As NATURA 2000 sites, were declared 9 SCIs and 6 SPAs.

### *Ecological networks*

In 2000, Romania has initiated together with Bulgaria, Moldavia and Ukraine the creation of "Danube Green Corridor", which is a regional ecological network in the Danube floodplain. The total surface is of approx. 900 000 ha.

The second ecological network is represented by Natura 2000 program, which is aimed at the protection and management of species and habitats, their natural territory. An ecological network is achieved by implementing the Birds and Habitats Directives (Directive on the Conservation of natural habitats and species of plants and wild animals and 92/43 EC Directive 79/409 on the conservation of wild birds).

Natura 2000 Program is implemented by:

- Government Decision no.1284/2007 regarding the declaring of special protection areas (SPAs) as part of Natura 2000 network in Romania, and by

- Order no.776/2007 regarding the declaring of the sites of community importance (SCIs) as part of the Natura2000 network in Romania.

The largest number of Natura 2000 sites in the Danube area can be found in Constanta, Tulcea, Galati and Caras-Severin counties.

NATURA 2000 sites are represented in Caras-Severin county by:

- 6 SPAs, summing 176575.6 hectares, representing 20.7% from the total area of the county, and

- 9 SCIs, having 253377 ha, representing 29.7% from the total area of the county.

### *State of the environment*

#### *Air quality and pollution*

The COV emissions were very high in 2005 (23620 t), decreasing to 16559 t in 2005 and increasing again in 2009 to 17201 t. Reported at 1000 inhabitants, the values increased from 24 t in 2001, 71.17 t in 2005, 50.9 t in 2008 and 53.3 t in 2009.

The quantity of SO<sub>2</sub> emissions decreased in 2009 (648 t) compared with 2008 (874 t), 2001 (20076 t) and 2005 (19832). Reported at 1000 inhabitants the SO<sub>2</sub> emissions were 57.3 t in 2001, 59.8 t in 2005, 2.7 t in 2008 and 2.0 t in 2009.

The NO<sub>x</sub> emissions fluctuated from 3275 t in 2001 to 3951 t in 2005 and 2433 t in 2008, increasing in 2009 to 2930 t. Reported at 1000 inhabitants, the NO<sub>x</sub> emissions were 9.3 t in 2001, 11.9 t in 2005, 7.5 t in 2008 and 9.1 t in 2009.

In 2008, the measured concentrations at SO<sub>2</sub> and NO<sub>x</sub> didn't exceed the allowed limits at the level of existing monitoring stations.

Instead, the daily concentrations totally exceeded the allowed limits at PM (suspensions and sediment powder) in all monitoring stations. Thus, the annual emission of suspensions increased to 4411t. Cities like Resita, Caransebes, Otelu Rosu, B ile Herculane, Boc a, Oravi a, Moldova Nou and Anina (the area nearby the household waste stock-piles) are affected by the fume/fog resulted from the waste incineration, pathogen germs and disagreeable odours. The 2008 State of Environment Report confirms the improvement of air quality in Re i a Municipality, previously influenced by the activity of SC TMK Resita SA. In the city Otelu Rosu, CS DUCTIL STEEL SA represents a major pollution source, its effects being felt in this area.

During the year 2008 the daily concentrations of the total powder almost totally exceeded the alert limit (70% from the maximum admissible concentration). Overflows of maximum admissible concentration both at powder and at PM<sub>10</sub> were observed.

#### *Water*

Regarding the quality of surface water, 71% from the water control sections showed a water of 2nd quality class, 18% of first class, 7% of IIIrd class and only 4% of IVth class.

The quality of underground water improved in 2008 compared with 2007, although being registered some exceeding at the maximum allowed limits at some indicators, according to the Law 311/2004 regarding the drinking water. The critical pollution areas are situated in Timis and Barzava hydrographic basins.

Thus, on Timis river, near Caransebes municipality is a critical area of underground water pollution, coming from domestic pollution and from the lack of house waste water treatment stations and also from diffuse pollution. On Barzava river, downstream Bocsa in the frontier area, is another critical pollution area due to animal husbandry farms (Bocsa) and from town utilities (Bocsa and Deta communes), and also from diffuse pollution. It was observed that it is maintaining a high level of pollution in the phreatic aquiferous layers in those areas in which certain production units diminished their activities or even were closed.

In Nera-Cerna and Danube hydrographic basins were not registered overflows according to the law 311/2004.

Major water pollution sources in Caras-Severin county in 2008 were:

- SC AQUACARA SA Exploatare Reia (utilities), emissary: Barzava river, insufficiently cleaned
- SC TMK (C.S.R.) Reia (iron and steel industry), emissaries: Barzava river, Valea Mare and Terova, sufficiently cleaned
- SC AQUACARA SA Exploatare Caransebe (utilities), emissary: Timis river, insufficiently cleaned
- Uzina Constructoare de Masini Reia (engineering industry), emissary: Barzava river, sufficiently cleaned
- SC AQUACARA SA Exploatare Bile Herculanene (utilities), emissary: Cerna river, insufficiently cleaned
- Bozovici and Mehadia town halls (utilities), emissaries: Minis and Bela Rea rivers, not cleaned
- SC MOLDOMIN SA Moldova Nou: Vrad, Suvarov and Florimunda mines (mining), emissary: the Danube river, insufficiently cleaned
- SC AQUACARA Exploatare Moldova Nou (utilities), emissary: the Danube river, not cleaned

Excepting some sections, global water quality belongs to 1st category, ensuring thus the necessary water demands. The water of the main lakes belongs also to 1st category.

#### Wastewater

From a total of 45 existent wastewater stations, 87% had a satisfactory functioning in 2008.

11,5% from the wastewater didn't need to be treated, 10,5% were not treated at all, 6,9% were insufficiently treated and 71,1% were sufficiently treated.

#### Waste

Since the number of inhabitants decreased in the last years, also the quantity of municipal waste decreased, in 2007 the total quantity being of 155 967.4 t.

In the county there is no ecologic stockpile.

In all localities the municipal waste is stored without a previous treatment of the final disposal. There is no transfer or sorting stations, no composting installations, no mechanic or biologic treatment of waste.

The only modality of municipal waste discharge is its disposal. There are no ecologic stockpiles of house waste, in each urban or rural locality being a waste dump. The urban dumps are dating from 25-40 years ago. In 2008, in Caras Severin county were functioning 8 city stock-piles (at Resiya, Caransebes, Baile Herculanene, Otelu Rosu, Anina, Bocsa, Oravita and Moldova Noua).

None of them have facilities for the environment protection, none of them being sanitary authorized.

There are no important waste disposal areas or hazardous waste disposal areas.

The Plan for the Implementation of the 1999/31/CE Directive regarding the waste disposal, respectively the Government Decision no.349/2005 established the closing date for each municipal waste disposal. Thus, 3 were closed in 2009, 3 will be closed in 2011 and 2 in 2012.

The same situation is in rural area, where all waste disposals should have been closed until July 2009.

Within the project named "Integrated management system in Caras-Severin county" it will be achieved a zonal waste disposal for municipal waste.

#### Water management

Caras Severin County has an important hydrographic network. In Banat Mountains, mostly located on the territory of this county, are springing Cerna, Timiul, Bârzava, Caraul and Nera rivers. Together with their effluents they are forming a hydrographic network of 3273 km on the territory of the county. Danube River is forming the Southern limit of the county, on a length of 64 km.

Natural lakes of Caras-Severin county are not so numerous and have small dimensions, the most important being the karst lakes.

Anthropic lakes (accumulations) are used to produce electric energy and to supply localities with drinking water. The main lakes are: Trei Ape (V=6.34 million m<sup>3</sup>), Gozna (12 million m<sup>3</sup>), Vliug (1.2 million m<sup>3</sup>), Secu (15.1 million m<sup>3</sup>).

m<sup>3</sup>). The following accumulations are used against floods: Cadar-Duboz (35.7 million m<sup>3</sup>), Gherteni (17.7 million m<sup>3</sup>), Cara and Liava (9.5 million m<sup>3</sup>).

The main watercourse works to be used against floods are: Timi river management (between Lugoj municipality and border) L= 273 km, Bârzava river management (between Reia municipality and border) L=155km, Cara river management (between Tigvanu and border) L=137 km.

Characteristic for underground water are the thermal-mineral springs. Besides those from Bile Herculane, such springs are also in the areas of Mehadica-Cuptoare and Oravia -Ciclova.

#### *Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	1,58	1,46	2,14	1,48
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	67	57,3	59,76	2,7
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	16,65	9,34	11,9	7,47
Atmosphere pollution ash - emission per 1000 inhabitants (t)	7	4,52	5,75	3,61
Atmosphere pollution CO - emission per 1000 inhabitants (t)	42	25,44	106,09	88,28
Capacity of landfills per 1000 inhabitants (t)	4824,85	4992,24	5270,04	5377,1

## Vidin

### General information

The total area of the territory of Vidin is 303,287.6 hectares, representing 10.9 percent of the territory of the Danube region.

In most areas of the municipalities in this area is the municipality of Vidin - 50,130.1 ha or 16.5% of the whole area. Belogradchik municipality followed by 13.5% (41,066.5 ha) Dimovo - 40,249.3 ha (13.3%) Chuprene - 32,731.6 ha (10.8%), etc. With the smallest size is the area of the municipality of Novo Selo - 10,948.7 ha, or 3.6 percent of the area.

### Land use

Agricultural land occupies the largest part of the area - 202,353.4 hectares or 66.7% (average for the region at 73.0 percent and 58.7 percent for the country). The largest area is in its municipalities of Vidin - 36927.8 ha Dimovo - 27940.8 ha Tower - 21684.8 ha, etc.

The largest relative share of the total agricultural land area compared to the total area of municipalities is in Novo Selo - 82.7%, Ruzhintsi - 77.6%, Boynitsa - 77.5%, Bregovo - 75.6%, and the smallest is its share in the municipalities Chuprene - Belogradchik and 42.2% - 51.0%.

Arable land has a total area of 170,440.1 hectares, representing 84.2 percent of agricultural land, or 56.2 percent of the total area.

Forests occupy 71,624.3 ha (23.6% on average for the region 18.4% and 33.6% for the country). Forestation of the territory varies from 50.6% in the municipality Chuprene 41.2 percent - in the Municipality of Belogradchik and others., Up 2.7 percent in the Municipality of Novo Selo.

Urban areas have a total area of 14,227.9 ha (4.7% of the total area of the region with an average 5.7%). The largest is the area in the municipalities of Vidin - 4309.6 ha Dimovo - 2018.3 ha and the smallest - in the municipality of Novo Selo - 555.6 ha.

The water area is 7480.8 ha.

The rest of the region is occupied by other areas with total area of 7601.2 ha (2.5% of the area of the field).

### Nature conservation and landscape

#### Protected areas

#### Major Characteristics of the protected areas

Name Category Location

(municipality) Year Area (ha)

1. Belogradchishki skali Natural monument Belogradchik 1949 598,7
2. Borovia kamak Natural monument Belogradchik 1976 1,3
3. Bialata voda - waterfall Natural monument Belogradchik 1976 1,1
4. Vrasha Chuka Protected site Kula 2003 67,6
5. Levi I Desni pech.-caves Natural monument Chuprene 1976 0,2
6. Lipaka Protected site Gramada 2003 17,6
7. Midjur Protected site Chuprene 2009 150,9
8. Kutovo island Protected site Vidin 2007 118,3
9. Bliznatsite Island Protected site Vidin 2007 11,2
10. Petrov Tsilak - waterfall Natural monument Bopinitsa 1982 0,2
11. Venets cave, in Chukara area  
Natural monument Dimovo 1971 1,0
12. Magurata Cave Natural monument Belogradchik 1960 84,4
13. Rakoviski Monastery Protected site Makresh 1975 28,1
14. Chuprene Reserve Chuprene 1973 1439,2
15. Chuprenski buki Protected site Belogradchik, Chuprene 2007 542,3

*Ecological networks**State of the environment**Air quality and pollution*

Sources of air pollution are industrial combustion plants and road transport.

In general the whole area is characterized by sulfur and carbon dioxide pollution during the heating season, due to massive use of fossil fuels in both the residential and public sector.

*Water*

The waters of the Danube in the area of Vidin correspond to the maximum permissible concentration for the third category, ie heavily contaminated and can only be used for irrigation of crops. On all other rivers that pass through the region, its waters meet the second category, ie contaminated medium. Subject to control are surface waters through the implementation of monthly monitoring regarding the compliance with their design category and waste water as a result of production activity of firms along the Danube and across rivers in Vidin flowing into it. The latest analysis of the state of the Danube River and its tributaries Voinishka, Topolovets River, Vidbol River, river and river Lom Archar show a trend to improve their qualities, due mainly to the decline of manufacturing activities including fertilization of agricultural cultures. Exception is Timok River, which greatly increased the content of heavy metals in its waters.

*Waste*

According to data of the National Statistical Institute - Newsletter Environment in 2008 in the region operate 49 landfills.

Under construction is a regional landfill. It is envisaged that site will serve the population of all municipalities in the territory of Vidin.

*Water management**Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index				1,42
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	23,22	1,39	57,44	25,79
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	180,72	1,3	21,18	27,49
Atmosphere pollution ash - emission per 1000 inhabitants (t)	5,75			
Atmosphere pollution CO - emission per 1000 inhabitants (t)	1,23	0,79	2,84	0,7
Capacity of landfills per 1000 inhabitants (t)			1333	1039

## Montana

### General information

The total area of the territory of Montana is 363,557.5 hectares, representing 13.1 percent of the territory of the Danube region.

The largest area of the municipalities in this district has the municipality of Montana - 65,268.1 ha or 18.0% of the whole area. Municipalities to follow are Berkovitsa 46,504.3 ha (12.8%) Valchedram - 43,151.4 ha (11.9%), Lom - 32,388.2 ha (8.9%) etc. With the smallest size is the area is the municipality of Medkovets - 19,108.9 ha, or 5.3 percent of the area.

### Land use

Agricultural land occupies the largest part of the area - 202,353.4 hectares or 66.7% (average for the region at 73.0 percent and 58.7 percent for the country). The largest area is in its municipalities of Vidin - 36927.8 ha Dimovo - 27940.8 ha Tower - 21684.8 ha, etc.

The largest relative share of the total agricultural land area compared to the total area of municipalities is in Novo Selo - 82.7%, Ruzhintsi - 77.6%, Boynitsa - 77.5%, Bregovo - 75.6%, and the smallest is its share in the municipalities Chuprene - Belogradchik and 42.2% - 51.0%.

Agricultural land occupies the largest part of the area - 248,260.8 hectares or 68.3% (average for the region at 73.0 percent and 58.7 percent for the country). Is most area municipalities into Montana - 47044.9 ha Valchedram - 38622.0 ha Boychinovtsi - 25669.9 ha, etc.

The share of agricultural land to total area of the municipalities is the largest municipal Medkovets - 92.3%, Yakimovo - 90.9%, Valchedram - 89.5%, Boychinovtsi - 83.3 %, the smallest proportion their municipalities Chiprovtsi - 40.6%, and George Damianovo - 44.4 %.

Arable land area has a total area of 210,429.2 hectares, representing 84.8 percent of agricultural land, or 57.9 percent of the total area.

Forests occupy 84,430.4 ha (23.2% on average for the region 18.4% and 33.6% for the country). Woodiness of the territory varies from 52.7% in the municipality Chiprovtsi 51.5% in the municipalities and George-Damianovo Varshets, etc, to 0.0 percent in the municipality Medkovets.

Urban areas have a total area of 19,476.0 ha (5.4% of the total area of the region with an average 5.7%). The largest is the area in the municipalities of Montana - 3561.0 ha Lom - 2737.8 ha and the smallest - in the Municipality of George-Damianovo - 720.4 ha.

The area of water areas is 9125.4 ha.

The rest of the region is occupied by other areas with total area of 2264.9 ha (0.6% of the area of the field).

### Nature conservation and landscape

#### Protected areas

##### Major Characteristics of the protected areas

Name Category Location

(municipality) Year Area (ha)

1. Vodnia skok Natural monument George Damianovo 1980 0,1
2. Vrachanski Balkan (part). Nature park Varshets 2003 5536,0
3. Gornata Koria Reserve Berkovitsa 1981 161,0
4. Durshin Falls Natural monument George Damianovo 2008 0,1
5. Ibisha Managed nature reserve Valchedram 1984 34,3
6. Kaleto Protected site Berkovitsa 2003 23,6
7. Kitkata Protected site Montana 2003 1,8
8. Kopren- Ravno Buche-Kalimanitsa-Deyanitsa Protected site George Damianovo 1973 536,4
9. Mishin Kamuk Natural monument Chiprovtsi 1962 0,5
10. Mramornata Cave Natural monument Berkovitsa 1971 16,2
11. Island Tsibar Protected site Valchedram 2007 101,5
12. Ravensko gradishte Protected site Chiprovtsi 2005 186,0
13. Ribarnitsi Orsoya Protected site Lom 2001 150,3
14. Samarite Protected site Berkovitsa 2007 108,0
15. Sto ovtsi Protected site Montana 2005 289,8

16. Uruchnik Protected site Berkovitsa 1973 51,2
17. Usketo Protected site George Damianovo 1992 1,9
18. Haidushki waterfalls Natural monument Berkovitsa 1966 1,0
19. Shumaka Protected site Medkovets 2001 0,5

### *Ecological networks*

### *State of the environment*

#### *Air quality and pollution*

The main sources of air pollution are concentrated in the district town of Montana. In other localities industrial sources have negligible impact on air quality (AAQ).

Given the widespread use of solid fuel for heating in the residential sector, construction and repair, increased traffic, temperature inversions, dry and windy weather, separate exceedings of the limit of the daily average particles concentrations have been found. The concentration of sulfur and nitrogen dioxide have a pronounced seasonal setting depending on the solid fuels used in households. In recent years, there are not reported exceedings of the limit - the levels of hydrogen sulphide into the air.

In recent years, a reduction of harmful emissions into the air from industrial sources is reported. This is mainly due to the gasification technology, heat and combustion equipment, and upgrading of treatment facilities for waste gases.

Serious problem for air quality and forest fires are lighting stubble and pastures

#### *Water*

On the territory of Montana district the analyzes of the state of water in inland rivers show stabilization of the improved in recent years situation and meet the design categories. The results of analysis of the state of inland rivers in the region are: Voinishka, Archar, Lom, Tsibritsa and Ogosta (excluding the mouth and downstream) show improved stabilization of situation in recent years and with few exceptions (Ogosta and Botunia River) meet the design categories. An exception is the point at Ogosta River after Montana city and Botunia River before its flow into the Ogosta River during low water.

#### *Waste*

In Montana district operating are 14 landfills (2008) Under development is the reconstruction and modernization of municipal solid waste landfill. The site will serve all municipalities in Montana district, along with Krivodol municipality, Vratsa district.

Production of hazardous waste generated in the region, in quantity are the most waste steel - Waste molding compound screenings of quartz sand, foundry cores (Berg, Montana Fittings AD, ref Ltd.) followed metal chips and small-sized pieces of ferrous metals (Balkan AD, Mir SA, etc..) waste from clothing ("May AD) and wood processing industry (SD Sirakov & Co, Arsov 90 - Ivan Arsov SA).

Hazardous hospital waste of the Hospital in Montana is burned in special furnaces. Waste from Hospital - Berkovitsa Ltd., Berkovitsa municipality, Montana district, Hospital Lom Ltd. Lom municipality, Montana district is transmitted to the incinerator for disposal of hospital waste in Alexandrovska Hospital, Sofia.

#### *Water management*

*Indicators of natural conditions*

<b>Indicator</b>	<b>1996</b>	<b>2001</b>	<b>2005</b>	<b>2008</b>
Water pollution index				1,419
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	3,18	5,5	5,43	0,75
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	12,18	1,04	1,02	0,25
Atmosphere pollution ash - emission per 1000 inhabitants (t)	2,18			
Atmosphere pollution CO - emission per 1000 inhabitants (t)	12,46	54,77	51,93	0,08
Capacity of landfills per 1000 inhabitants (t)			25,4	10,75

## Vratsa

### General information

The total area of the territory of Vratsa District is 361,976.9 hectares, representing 13.0 percent of the territory of the Danube region.

The largest areas of the municipalities in this district has the municipality of Vratza - 67,940.3 ha or 18.8% of the whole area. Followed by the municipalities of Byala Slatina 57,234.3 hectares 15.8%) Mezdra - 51,911.2 ha (14.3%), etc. With the smallest size is the area of the municipality Hajredin - 18,906.9 ha, or 5.2 % of the area.

### Land use

The Agricultural land occupies the largest part of the area - 275,864.1 hectares or 76.2% (average for the region at 73.0 percent and 58.7 percent for the country). The largest area is in its municipalities of Byala Slatina - 48,373.7 ha and Vratsa - 47,227.4 ha.

The share of agricultural land to total area of the municipalities is the largest municipal Hajredin - 90.2%, Borovan - 87.6%, Mizia - 86.8%, and the smallest proportion in the municipality of Mezdra - 56 1%.

Arable land has a total area of 227,944.1 hectares, representing 82.6 percent of agricultural land, or 63.0 percent of the total area.

Forests occupy 53,589.4 ha (14.8% on average for the region 18.4% and 33.6% for the country). Forestation of the territory varies from 34.5% in the municipality of Mezdra 27.3 percent - in the municipality of Roman, etc, to 1.6 percent in the municipality of Hajredin.

Urban areas have a total area of 21,258.4 ha (5.9% of the total area of the region with an average 5.7%). The largest is the area in the Municipality of Vratsa - 4656.3 ha, Byala Slatina - 3521.5 ha and the smallest - in the Roman Municipality - 1118.9 ha.

The water area is 6705.9 ha.

The rest of the region is occupied by other areas with total area of 4559.1 ha (1.3% of the area of the field).

### Nature conservation and landscape

#### Protected areas

Major Characteristics of the protected areas

Name Category Location (municipality) Year Area (ha)

1. Bojiite mostive Natural monument Vratsa 1964 15,0
2. Borov kamak Protected site Vratsa 2003 164,6
3. Borovan mound Protected site Borovan 2003 198,8
4. Vejdata Protected site Vratsa 2003 62,6
5. Vola Protected site Vratsa 2003 101,7
6. Vratsata Natural monument Vratsa 1964 2,0
7. Vrachanski Balkan (part) Nature park Vratsa Krivodol, Mezdra 2003 19700,6
8. Vrachanski Karst Reserve Vratsa 1983 1438,9
9. Govedarnika Natural monument Mezdra 1972 2,5
10. Gola Bara Protected site Oryahovo 2003 2,0
11. Galabarnika Natural monument Roman 1972 3,5
12. Kalugerski grad- Topolite Protected site Oryahovo 2003 0,2
13. Kamarata Natural monument Roman 1974 1,0
14. Kitkata Protected site Byala Slatina 2003 2,0
15. Kozloduy Protected site Kozloduy 2003 10,0
16. Koritata Protected site Misia 2003 2,0
17. Kochumina Protected site Oryahovo 2003 2,5
18. Ledenika-cave Natural monument Vratsa 1960 102,3
19. Novata cave Natural monument Mezdra 1962 0,5
20. Padinite Protected site Vratsa 2007 623,0
21. Ponora Natural monument Vratsa 1962 17,2
22. Rechka-trove of rare birds and plant species Protected site Vratsa 1990 94,1
23. Ritlite Natural monument Mezdra 1938 123,3
24. Samuilitsa one and two Natural monument Roman 1972 3,5

25. Tepeto Protected site Krivodol 2003 6,0
26. Typical river landscape mound-Daneva Protected site Misia 1982 4,9
27. Chervenitsa Natural monument Roman 1974 3,0
28. Chuklite Natural monument Roman 1974 1,0

### *Ecological networks*

### *State of the environment*

#### *Air quality and pollution*

The most common pollutants in different trends in their total annual emissions can be summarized as follows:

- With few exceptions, the trend is to reduce pollution levels. In recent years are recorded significantly lower concentrations in the air, but at and over the limit. Problem areas remain, in which there are chemical companies - one of them is Vratsa.
- Emissions of carbon monoxide have been reduced significantly due to fewer forest fires than in previous years. Domestic combustion processes are the biggest sources of carbon monoxide emitting 50 percent of the total. No abnormal values are detected in the district.
- A minimum increase of ammonia is reported due to the increased number of livestock kept and the treatment and disposal of waste.
- In general, nitrogen dioxide levels remain fairly constant mainly due to increased consumption of coal and wood in the residential sector. The largest source of dioxins are central heating plants.
- The dust particles are still the most problematic pollutant, the tendency is to preserve the traditional high levels of contamination throughout the region. Significant contribution to this is the widespread use of solid fuels (wood and coal) for domestic heating, exhaust gases from moral and physical aging fleet of the country.
- Only concerning the lead there is maintained sustained downward trend in emissions across the region. The significant decline is from industry and road transport. Increase consumption of unleaded petrol has led to a reduction of this pollutant.

#### *Water*

Examined indicators of the water in the Danube in Vratsa district are within permissible concentrations and the river waters meet their design category for all tested parameters.

There is a trend towards retaining and improving water status in both the short and long term. Regardless of single exceedances recorded for some of the indicators, most of them remain permanently below the levels for the category of water source.

In certain areas, is maintained a trend of sustained record of relatively high concentrations of certain pollutants. In almost all river streams in the villages without GSPOV a high levels of nitrogen and phosphate forms, especially in low water is measured. Such example for the field are Skat and Iskar Rivers. The basic object-pollutant in this respect is an urban sewage - Mezdra discharged in Varbeshka bara river before flowing into Iskar river and urban sewage - Byala Slatina.

#### *Waste*

In 2008 in the region operate eight landfills.

Built and in operation is a regional landfill for municipal waste - Vratsa - Mezdra.

Registered are 7 landfills and hazardous waste production (NPP-Kozloduy - non-radioactive waste and non-industrial waste generated in the zone of Kozloduy, TA "Himenergo", "Metizi AD, Eliseina EAD Hemus- M ", "Holcim "AD, Garant JSC).

On the territory of the district there are three landfills for construction waste: landfills of municipalities Vratsa, Byala Slatina and Mezdra.

In Mezdra hospital operates an incinerator for hospital waste treatment in the region. Hospital Oryahovo has an hospital waste furnace in which is disposed own hospital waste.

*Water management*

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index				1,427
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	2,1	13,62	21,79	1,15
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	122,35	6,49	7,31	3,17
Atmosphere pollution ash - emission per 1000 inhabitants (t)	2,74			
Atmosphere pollution CO - emission per 1000 inhabitants (t)	1,81	3,5	4,63	0,52
Capacity of landfills per 1000 inhabitants (t)			840	1311

Pleven

*General information*

The total area of the territory of Pleven is 465,332.4 hectares, representing 16.8 percent of the territory of the Danube region.

The largest area in the district has the municipality of Pleven - 80,971.2 ha or 15.8% of the whole area. It is followed by the municipalities of Dolna Mitropolia 67,489.7 ha (13.2%), Cherven Briag - 48,578.2 ha (9.5%) etc. With the smallest size is the area of the municipality Pordim - 23,813.2 ha, or 4.7 percent of the area.

*Land use*

Agricultural land occupies the largest part of the area - 377,389.4 hectares or 81.1% (average for the region at 73.0 percent and 58.7 percent for the country). The largest area is in its municipalities Pleven - 63958.4 ha, Dolna Mitropolia - 57579.3 ha, etc.

The share of agricultural land to total area of the municipalities is the largest in the municipalities of Knezha - 91.2%, Iskar - 86.6%, Dolna Mitropolia - 85.3% and Pordim - 85.4%, and the smallest is their share in Belene Municipality - 71.1 percent.

Arable land has a total area of 325,322.4 hectares, representing 86.2 percent of agricultural land - the highest in the region, or 69.9 percent of the total area.

Forests occupy 41,710.0 ha (9.0 percent average for the region at 18.4 percent and 33.6 percent for the country). Forestation of the territory varies from 15.2 percent in the Municipality of Cherven Briag, 14.9 percent in the municipality of Nikopol, 13.7 percent - in Belene Municipality and others., Up to 1.4 percent is in the municipality Knezha.

Urban areas have a total area of 27,516.4 ha (5.9% of the total area of the region with an average 5.7%). The largest is the area in the municipalities of Pleven - 6707.7 ha, Lower Metropolis - 3340.1 ha and the smallest - the Iskar Municipality - 1020.3 ha.

The water area is 15,353.7 ha.

The rest of the region is occupied by other areas with total area of 3362.9 ha (0.7% of the area of the field).

*Nature conservation and landscape*

*Protected areas*

Major Characteristics of the protected areas

Name Category Location (municipality) Year Area (ha)

1. Brestishko Branishte Protected site Pleven 2003 20,0
2. Bulin dol Protected site Pleven 2003 0,5
3. Skoka Waterfall Belilkata Natural monument Cherven Briag 1976 0,2
4. Vulchitrun forest Protected site Pordim 2003 25,1
5. Garvanitsa Protected site Pleven 2003 32,7
6. Genchov orman Protected site Gulyantsi 2003 27,3
7. Gininata Cave Natural monument Dolni Dubnik 1974 2,5
8. Golia Wrah Protected site Cherven Briag 2003 7,0
9. Group of centuries-old trees Natural monument Dolna Mitropolia 1977 0,2
10. Drenovitsa Protected site Cherven Briag 2003 20,0
11. Dulgata bara-Monument Protected site Pleven 2003 1,6
12. Eliata Protected site Nikopol 1981 30,0
13. Kaylaka (including Bohotskata Forest) Protected site Pleven 1972 999,8
14. Karst gorge Chernelka Natural monument Dolni Dubnik 1969 449,2
15. Katinata Protected site Gulyantsi 2003 28,0
16. Kiselets Protected site Belene 2003 10,0
17. Kitka Reserve Belene 1981 254,0
18. Koridorite Protected site Dolna Mitropolia 2008 27,5
19. Kopenite Natural monument Cherven Briag 1972 4,3
20. Lagat, Dramkata Protected site Dolna Mitropolia 2003 39,0
21. Marinovets Protected site Cherven Briag 2003 4,0
22. Milka Reserve Belene 1948 30,0

23. A deposit of petrified trunks and stumps of pine trees from the Taxodiaceae family in m.Kaleto Natural monument Dolna Mitropolia 1976 5,0
24. A deposit of petrified trunks and stumps of pine trees from the Taxodiaceae family in m.Tashkovoto Natural monument Dolna Mitropolia 1976 1,5
25. Deposit of Tertiary (tortonski) fossils Natural monument Pleven 1972 420,0
26. Opanski Bair Natural monument Pleven 1969 53,0
27. Ormana Protected site Iskar 2003 2,0
28. Ornitsite Protected site Pleven 2003 50,0
29. Malak Boril Island Protected site Dolna Mitropolia 2005 99,1
30. Persinski marshes Protected site Belene 1981 385,2
31. Palaza Protected site Belene 2003 0,5
32. Persin Iztok Protected site Belene 2003 718,9
33. Nature Park (part) Nature park Belene, Nikopol 2000 18838,1
34. Nanning kamak cave Natural monument Nikopol 1996 2,6
35. Cave Razbititsa Natural monument Pleven 1969 0,5
36. Caves Protected site Dolni Dubnik 1975 16,0
37. Pipra - Kaletto Protected site Cherven Briag 2003 1,1
38. Plavata Protected site Nikopol 2003 28,1
39. Povara Protected site Pordim 2003 0,3
40. Stone Bridge in Sedlarkata m.Ezeroto Natural monument Cherven Briag 1972 0,5
41. Rock church Natural monument Nikopol 2003 1,0
42. Skalni kukli m.Pladnishteto Natural monument Cherven Briag 1972 64,2
43. Rock formation Kuklite in m.Uleya Natural monument Cherven Briag 1972 10,9
44. Studenetz Natural monument Dolni Dubnik 1972 350,0
45. Taraklaka Protected site Levski 2003 35,0
46. Tectonic comb Kaletto Natural monument Cherven Briag 1961 57,4
47. Turiata Protected site Pleven 2003 150,8
48. Deposit of fossil fauna in Baden m.Mosta of Vit river Natural monument Pleven 1987 3,2
49. Haidushkata Cave Natural monument Cherven Briag 1976 0,3
50. Cherveniq briag Protected site Gulyantsi 2003 0,2
51. Cheshmata Protected site Dolna Mitropolia 2003 0,2
52. Cholashki orman Protected site Dolna Mitropolia 2003 82,5
53. Shturka Protected site Cherven Briag 2003 1,0

### *Ecological networks*

### *State of the environment*

### *Air quality and pollution*

The studies carried out required the following conclusions about air quality in the area:

- There is a persistent tendency to reduce air pollution caused by the suspension of a number of enterprises pollutants and measures for workers for cleaning the air / Plevenski cement/; There is still a high level of contamination with total dust in Pleven.
- The problem is air quality in the region of gr.Nikopol due to transboundary pollution in Romania.
- Contamination of the smaller settlements increased in winter months due to domestic heating by solid fuel and motor transport.
- Old cars are a major pollutant to share around 40-50%. In some regions of Pleven, nodal Wheel, measured emissions exceed the limits significantly.
- The majority of centrally heated private homes in Pleven by TPP Pleven, which is a gaseous fuel is favorable factor for the reduction of pollution.

### *Water*

In the analysis of the Danube and Iskar rivers (third category), Vit river (second and third category in separate sections) Osam river (second and third category) meet the design categories. Dams Enitsa and Goren Dabnik are second class.

*Waste*

In Pleven operate 19 landfills.

Under the national program are separate regional landfills the following design:

- Regional Waste Management Pleven, Pleven, including municipalities, Dolni Dubnik, Lower Metropolis, and Pordim Gulyantsi;
- Municipalities Levski, Nikopol and Belene are included in the regional project in cooperation with municipalities Pavlikeni and Svishtov;
- Knezha Municipality, together with other municipalities outside the Pleven region is included in the regional landfill Oryahovo;
- Municipality of Cherven Briag will be incorporated into the landfill project in the Municipality Lukovit with municipalities Teteven Yablanitsa Lukovit (Lovech) and Roman (Vratsa District).

*Water management**Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index				1,484
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	13,18	7,05	14,44	2,55
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	12,76	2,84	4,9	2,77
Atmosphere pollution ash - emission per 1000 inhabitants (t)	9,8			
Atmosphere pollution CO - emission per 1000 inhabitants (t)	2,18	1,6	2,25	0,7
Capacity of landfills per 1000 inhabitants (t)			5040	2989

## Veliko Tarnovo

### *General information*

The total area of the territory of Veliko Tarnovo is 466,157.2 hectares, representing 16.8 percent of the territory of the Danube region.

In most municipalities in the area of the field is that of Veliko Tarnovo - 88,534.5 ha or 19.0% of the whole area. Elena followed by 67,138.9 ha (14.4%), Svishtov - 62,532.1 ha (13.4%) Pavlikeni - 62,269.0 ha (13.4%), etc. With the smallest size is the area of the municipality Suhindol - 15,702.2 ha, or 3.4 percent of the area.

### *Land use*

Agricultural land occupies the largest part of the area - 309,010.0 hectares or 66.3% (average for the region at 73.0 percent and 58.7 percent for the country). The largest area is in its municipalities of Veliko Tarnovo - 52856.1 ha, Svishtov - 51087.2 ha Pavlikeni - 50611.8 ha, etc.

The share of agricultural land to total area of the municipalities is the largest in municipality Svishtov - 81.7%, Polski Trambesh - 81.6%, -81.3% Pavlikeni, and the smallest proportion in the Elena - 39.6%.

Arable land area has a total area of 262,353.1 hectares, representing 84.9 percent of agricultural land, or 56.3 percent of the total area.

Forests occupy 114,855.9 ha (24.6% on average for the region 18.4% and 33.6% for the country). Woodiness within 24.6 percent is highest within the Danube region, and ranges from 55.6% in Elena, 44.7 percent - in the municipality Zlataritsa etc., to 7.4 percent in Svishtov.

Urban areas have a total area of 29,249.3 ha (6.3% of the total area of the region with an average 5.7%). The largest is the area in the municipalities of Veliko Tarnovo - 5923.4 ha Pavlikeni - 4286.9 ha and the smallest - in the municipality Suhindol - 590.3 ha.

The water area is 9191.2 ha.

The rest of the region is occupied by other areas with total area of 3850.8 ha (0.8% of the area of the field).

### *Nature conservation and landscape*

#### *Protected areas*

##### Major Characteristics of the protected areas

Name Category Location (municipality) Year Area (ha)

1. Belokravishtnitsa protected site Elena 2007 226,8
2. Bogdanov Dol protected site Suhindol 2002 3,1
3. Bojur poliana protected site Gorna Oryahovitsa 2002 19,7
4. Bozhurluka protected site Svishtov 2002 3,9
5. Biala Krava reserve Elena 1968 93,5
6. Waterfall of r.Miykovska natural monument Elena 1974 0,4
7. Glavite protected site Veliko Tarnovo, Elena 2007 291,0
8. Derventa protected site Veliko Tarnovo 2002 15,3
9. Dzholyungyol protected site Gorna Oryahovitsa 2002 19,1
10. Dryankov hill natural monument Veliko Tarnovo 1991 8,0
11. Emenski Canyon natural monument Veliko Tarnovo Pavlikeni 1980 25,6
12. Zhelezartsi protected site Strazhitsa 2002 31,2
13. Kaykusha protected site Svishtov 1978 155,4
14. Kapinovski Falls natural monument Veliko Tarnovo 1965 0,2
15. Kaya bunar natural monument Veliko Tarnovo 1971 80,0
16. Komitski dupki protected site Pavlikeni 2002 1,0
17. Kosovo protected site Veliko Tarnovo 2002 178,9
18. Lesopark a protected site Lyaskovets 2005 100,2
19. Manastirskoto protected site Veliko Tarnovo 2002 21,3
20. Markov buk protected site Elena 2007 182,0
21. Meshovata forest protected site Svishtov 1992 6,0
22. Momin Skok natural monument Pavlikeni 1965 0,2
23. Musina Cave natural monument Pavlikeni 1972 0,3
24. Nikolinski kladenets protected site Veliko Tarnovo 2002 0,2

25. Persina (part) nature park Svishtov 2000 2924,1
26. Ponorite natural monument Pavlikeni 1981 0,2
27. Pregrada protected site Veliko Tarnovo 2002 3,5
28. Preobrajenski Monastery protected site Veliko Tarnovo 2002 17,1
29. Rusalka protected site Svishtov 2005 213,0
30. Savchov chair protected site Veliko Tarnovo 1968 103,5
31. Slona protected site Elena 1991 13,3
32. Staria dub protected site Svishtov 1988 86,3
33. Studen klazenets (part) protected site Veliko Tarnovo, Tryavna 1989 63,0
34. Haidushki Chukar protected site Elena 1968 33,9

### *Ecological networks*

### *State of the environment*

### *Air quality and pollution*

The territory of the Danube region Veliko Tarnovo is one of the areas for assessment and management of air quality (air quality) in which there is excess of the levels of particulate matter, sulfur dioxide and hydrogen sulfide. Sources of excessive pollution are residential heating, industrial and transport activities, incl. poor maintenance of road pavements. Pollution from road transport is mainly due to aging fleet. The impact of industry and agriculture is negligible and the local Area. In most industries there are no local treatment facilities. An important feature associated with the detention of foul and cold air inversions are in Gornooryahovskoto reduction - one of the most significant across northern Bulgaria.

In monitoring the situation on air in Veliko Tarnovo, Gorna Oryahovitsa Svishtov and observed the following trends:

- The average sulfur dioxide levels maintained sustained downward trend. The highest figures were recorded during the heating season and a major proportion of this is the work of local parokotelni plants and domestic heating. With gasification of cities to significantly decrease the levels of this pollutant.
- Nitrogen dioxide are relatively constant and within the limit levels. Registered episodic exceedances in cities, mainly due to the old fleet.
- The average concentrations of hydrogen sulfide have strong discontinuous nature, industrial activities are the cause.
- The trend to lower annual concentrations of lead aerosols throughout the area because of the cessation of production and use of leaded petrol and introduced the system of quality control of fuels used.
- Members are exceedances of annual and average daily rate of particulate matter. The reason for the high levels of dust is low blagoustroenost, cleaned the street network and extensive use of solid fuels (wood and coal). The trend is to preserve the traditional high levels of pollution within the cities.

### *Water*

The region studied indicators of surface waters meet the design categories.

Status of surface and groundwater in the area depends on the concentration of urban population and industrial activities and the degree of completion of the sewerage and sewage treatment infrastructure.

Major pollutants of surface waters are effluent from urban settlements without wastewater treatment plants for waste water - Lyaskovetz, Elena, Gorna Oryahovitsa P. Trambesh town, city Suhindol, Pavlikeni. The biggest polluter of the Yantra river with industrial effluents is "Sugar factories AD Gorna Oryahovitsa.

Qualitative composition of the waters of the Yantra river and its tributaries are monitored through monthly monitoring of national systems for environmental monitoring. Analysis of results shows that the rivers in the basin of the river Yantra were good oxygen regime and parameters corresponding to the limit concentrations (MAC) for their project category. Surface water monitoring points are not met its major categories as follows: nitrite nitrogen - the peak is during the summer months when high temperatures accelerate the processes of nitrification and denitrification, phosphates and suspended solids due to the direct discharge of domestic sewage from urban locations in the wetlands.

### *Waste*

In 2008 in the region operate 40 landfills.

In the construction of a regional landfill for municipal solid waste, which will serve the municipalities of Veliko Tarnovo, Gorna Oryahovitsa Lyaskovets Elena Zlataritsa and Strazhitsa.

*Water management*

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index				1,433
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	37,11	45,62	29,11	28,49
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	7,82	8,83	9,43	14,46
Atmosphere pollution ash - emission per 1000 inhabitants (t)	15,42			
Atmosphere pollution CO - emission per 1000 inhabitants (t)	1,4	0,98	1,17	0,66
Capacity of landfills per 1000 inhabitants (t)			1241	1081

## Ruse

### General information

The total area of the territory of Rousse region is 287,506.7 hectares, representing 10.4 percent of the territory of the Danube region.

In most municipalities in the area of the field is that of Ruse - 54,320.0 ha or 18.9% of the whole area. Follows General Ivanovo - 49,783.4 ha (17.3%) Vetovo - 35,260.0 ha (12.3%), etc. With the smallest size is the area of the municipality Borovo - 25,222.7 ha, or 8.8 percent of the area.

### Land use

- Agricultural land occupies the largest part of the area - 218,814.9 hectares or 76.1% (average for the region 73.0 percent and 58.7 percent for the country). The largest area is in its municipalities Ruse - 41457.3 ha, Ivanovo - 39135.8 ha, Biala - 26172.3 ha, etc.

The share of agricultural land to total area of the municipalities is the largest in Tsenovo - 83.4%, Ivanovo - 78.6%, Slivo pole - 77.2 percent, the smallest proportion in the municipality of Vetovo - 71.5%.

Arable land area has a total area of 188,079.8 hectares, representing 86.0 percent of agricultural land, or 65.4 percent of the total area.

- Forests occupy 40,191.1 ha (14.0% on average for the region 18.4% and 33.6% for the country). Forestation of the territory varies from 21.9% - in Dve Mogili municipality, 20.3% in Vetovo municipality etc., up to 8.1 percent in Sliven municipality.

- Urban areas have a total area of 17,438.6 ha (6.1% of the total area of the region with an average 5.7%). The largest is the area in the Ruse Municipality - 5501.9 ha, Ivanovo - 2180.2 ha and the smallest - in the general price - 1202.2 ha.

- The water area is 7701.6 ha.

The rest of the region is occupied by other areas with total area of 3360.5 ha (1.2% of the area of the field).

### Nature conservation and landscape

#### Protected areas

Major Characteristics of the protected areas

Name Category Location (municipality) Year Area (ha)

1. Beli Lom (part) Reserve Vetovo 1980 370,4
2. Vekovna Tserova forest protected site Ivanovo 1981 0,9
3. Dickili tash natural monument Ivanovo 1970 1,8
4. Doychov Island protected site Pine 2007 16,0
5. natural habitat of Crimean salvia (*Salvia scabiosifolia*) protected site Biala 2006 3,5
6. Kalimok-Brushlen (part) protected site Slivo field 2001 1546,8
7. Complex Telika Aleko protected site Ruse, Sliven area 2004 206,0
8. Lomia protected site Vetovo (RS), Tsar Kaloyan (Rz) 2007 278,3
9. Mamula natural monument Vetovo 1970 0,9
10. Field of an ordinary liquorice protected site Price 1976 0,3
11. Orlova Chuka natural monument Two mounds, Ivanovo 1962 82,2
12. Orlova tchuka natural monument Vetovo 1981 35,7
13. Ribarnitsite (part) protected site Vetovo 1981 25,4
14. Rusenski Lom Nature park Vetovo, Ivanovo 2002 3408,0

#### Ecological networks

#### State of the environment

#### Air quality and pollution

Problems with air pollution are only in Ruse. Aggravated condition of the atmospheric air caused by almost constant above the level content of excessive dust, hydrocarbons, hydrogen sulfide, nitrogen and sulfur oxides and aerosols. Reasons for this are the busiest traffic and the influence of Eastern and Western plots. The main

source of pollutants during the winter period is residential heating with solid fuel as a significant part of the territory has no central heating.

In the remaining territory of the area air condition is very good. Local pollution in settlements is crossed by busy roads in the adjacent neighborhoods, and near the village of Martin in action on the production zone is formed in the former factory of heavy engineering.

Although the main enterprises in pollutants are either closed or operating with reduced capacity, it can be argued that air quality was within the rules because:

- Wear of existing treatment facilities for companies working deteriorating air quality.
- On the territory of Ruse Municipality has two thermal power plants and many industries whose technological furnaces operate on solid and liquid fuel.
- Start up new companies with faulty treatment facilities.
- A serious factor in air pollution is the operation of a large number of old cars, trucks and buses, which discharge into the atmosphere large amounts of harmful compounds.
- With central heating has a small proportion of the population, local heating systems with solid fuel are a major source of municipal air pollution by sulfur dioxide and dust.

The main source of emission located outside the territory of Ruse, but affecting the air quality in the municipality, an industrial complex in the Romanian town of Giurgiu (temporary ceased its operations).

### *Water*

The territory of Rousse region examined indicators of surface waters meet the design categories.

Data on the River Lom and Ruse Yantra (III receiver category) within the field indicate that standards are not exceeded in terms of acidic and oxidizing conditions. Solids, however, than MAC, while the iron is likely to significantly more preing the MAC. The content of ammonium and nitrate nitrogen and phosphate is likely a permanent reduction.

Along the river Yantra are built numerous livestock farms, all indiscriminately discharging waste products into a river.

### *Waste*

In 2008 in the region operate 32 landfills. Municipal landfills are in the city of Ruse, Borovo Dve Mogili and Tsenovo village and have permission to perform activities with household, construction, industrial and hazardous waste.

Industrial waste generated by various individuals and legal entities operating in the municipalities, are deposited on landfill for municipal and construction waste

The primary method for waste disposal is landfill.

### *Water management*

#### *Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index				1,583
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	32,4	75,41	20,31	14,36
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	10,9	14,69	16,04	19,92
Atmosphere pollution ash - emission per 1000 inhabitants (t)	3,61			
Atmosphere pollution CO - emission per 1000 inhabitants (t)	0,74	1,63	2,51	0,68
Capacity of landfills per 1000 inhabitants (t)			1849	1615

## Razgrad

### *General information*

The total area within the region of Razgrad is 241,618.6 hectares, representing 8.7% of the territory of the Danube region.

In most municipalities in the area of the field is that of Razgrad - 63,487.6 ha or 26.3% of the whole area. Municipalities to follow Kubrat 43,516.3 ha (18.0%) Isperih - 40,224.4 ha (16.6%), etc. With the smallest size is the area of the municipality of Tsar Kaloyan - 16,119.6 ha, or 6.7 percent of the area.

### *Land use*

- Agricultural land occupies the largest part of the area - 179,408.9 hectares or 74.2% (average for the region at 73.0 percent and 58.7 percent for the country). The largest area is in its municipalities of Razgrad - 47555.7 ha Kubrat - 34714.9 ha Isperih - 30016.7 ha, etc.

The share of agricultural land to total area of the municipalities is the largest municipal Kubrat - 79.8%, Loznitsa - 75.8%, Razgrad - 74.9 percent, the smallest proportion in the municipality of Zavet-65 3%.

Arable land has a total area of 150,457.4 hectares, representing 83.9 percent of agricultural land, or 62.3 percent of the total area.

- Forests occupy 45,626.6 ha (18.9% on average for the region 18.4% and 33.6% for the country). Forestation of the territory varies from 29.2% in the municipality Zavet to 14.7 percent in Kubrat. In the area of forests in this part of the Danube region included protective forest belts designed to protect the topsoil from wind erosion. Waistbands have snow keeping role and protect the autumn crops.

- Urban areas have a total area of 13,283.4 ha (5.5% of the total area of the region with an average 5.7%). The largest is the area in the municipalities of Razgrad - 3806.6 ha Isperih - 2726.9 ha and the smallest - in the municipality of Tsar Kaloyan - 610.8 ha.

- The water area is 1422.7 ha.

The rest of the region is occupied by other areas with total area of 1877.0 ha (0.8% of the area of the field).

### *Nature conservation and landscape*

#### *Protected areas*

Major Characteristics of the protected areas

Name Category Location (municipality) Year Area (ha)

1. Beli Lom (part) Reserve Tsar Kaloyan 1980 405,1
2. Bojurite protected site Isperih 1978 3,2
3. Old oak forest protected site Loznitsa 1976 10,5
4. Big South natural monument Razgrad 1972 62,8
5. Kolchakovskata Korja protected site Samuel 1979 25,5
6. Lomi protected site Tsar Kaloyan (Rz) Vetovo (RS) 2007 278,3
7. Myushtereka protected site Kubrat 1976 5,0
8. Field of spring sowbread protected site Razgrad 1980 61,3
9. Trove of Turkish hazel protected site Kubrat 1979 5,8
10. Habitat of red peony protected site Isperih 1978 4,7
11. Along a gully Topchiysko natural monument Kubrat, Razgrad 1976 72,0
12. Ribarnitsi (part) protected site Tsar Kaloyan 1981 25,8
13. Yuperska Korja protected site Kubrat 1972 23,3

#### *Ecological networks*

#### *State of the environment*

##### *Air quality and pollution*

The impact of industry and agriculture on air quality is negligible and the local Area. In the mass burning of used household solid fuels, emissions are low altitude and low temperature emission. Particulate matter are still the most problematic pollutant in the region, the tendency is to preserve the traditional high levels of pollution in the towns. The reason for the high levels of dust is low blagoustroenost, cleaned the street network and extensive

use of solid fuels (wood and coal). Main source of emissions from mobile sources are exhaust fumes from motor vehicles.

### *Water*

The region studied indicators of surface waters meet the design categories.

The waters of the river Beli Lom town after much higher than the levels of biogenic substances - different forms of nitrogen and phosphates linked. The monitoring of the status of surface waters are carried out by the National Environmental Monitoring. According to the expert opinion of RIEW - Ruse, water quality meets hygiene standards.

### *Waste*

According to the National Statistical Institute in 2008 in the region operate 20 landfills. In no modern facilities meeting the requirements for safe treatment of hospital waste.

### *Water management*

#### *Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index				1,429
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	3,82	1	1,53	0,64
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	8,18	1,45	1,86	1,51
Atmosphere pollution ash - emission per 1000 inhabitants (t)	1,74			
Atmosphere pollution CO - emission per 1000 inhabitants (t)	0,75	1,97	2,94	0,39
Capacity of landfills per 1000 inhabitants (t)			455	334

## Silistra

### General information

The total area within the region of Silistra is 284,628.5 hectares, representing 10.3 percent of the territory of the Danube region.

In most areas of the municipalities in this area is the municipality Dulovo - 56,632.6 ha or 19.9% of the whole area. Silistra Municipalities followed by 51,589.1 ha (18.1%) Glavinitsa - 48,123.0 ha (16.9%), etc. With the smallest size is the area of the municipality Alfatar - 24,856.6 ha, or 8.7 percent of the area.

### Land use

- Agricultural land occupies the largest part of the area - 205,587.0 hectares or 72.2% (average for the region at 73.0 percent and 58.7 percent for the country). The largest area is in its municipalities Dulovo - 40507.0 ha, Silistra - 38998.2 ha Glavinitsa - 34318.6 ha, etc. The share of agricultural land to total area of the municipalities is the largest municipal Sitovo - 79.7%, Silistra - 75.6%, Kaynardzha - 73.9 percent, the smallest proportion in the municipality Alfatar - 59.0%.

Arable land area has a total area of 170,793.6 hectares, representing 83.1 percent of agricultural land, or 60.0 percent of the total area.

- Forests occupy 57,386.4 ha (20.2% on average for the region 18.4% and 33.6% for the country). Woodiness of the territory varies from 36.8% in the municipality Alfatar to 11.6 percent in the municipality Sitovo. In the area of forests in this part of the Danube region included and protective forest belts designed to protect the topsoil from wind erosion. Waistbands have snegozadarzhashta role and protect the autumn crops.

- Urban areas have a total area of 14,314.7 ha (5.0% of the total area of the region with an average 5.7%). The largest is the area in the Municipality of Silistra - 3622.6 ha Dulovo - 2758.3 ha and the smallest - in the municipality Alfatar - 905.7 ha.

- The water area is 5628.4 ha.

The rest of the region is occupied by other areas with total area of 1712.0 ha (0.6% of the area of the field).

### Nature conservation and landscape

#### Protected areas

Name Category Location (municipality) Year Area (ha)

1. Marsh near Malak Preslavets village protected site Glavinitsa 2004 147,3
2. Vratata natural monument Kajnardja 1987 2,4
3. Garvanski marshes protected site Sitovo 2003 280,0
4. Goliamata cheshma protected site Kajnardja 2003 1,5
5. Gornata koria protected site Sitovo 1968 4,0
6. Kalimok- brashlian (part) protected site Tutrakan 2001 4405,5
7. Karakuz protected site Alfatar 1992 74,1
8. Malak Kanagiol protected site Alfatar, Kajnardja, Silistra 2005 370,0
9. Midjit Tabia protected site Silistra 2003 17,2
10. Ostrata kanara natural monument Sitovo 1981 1,0
11. Pojarevo island protected site Tutrakan 1995 71,0
12. Pametnika protected site Silistra 2003 33,8
13. Pelikanite protected site Silistra 2007 542,8
14. Peshterata natural monument Kajnardja 1987 8,1
15. Saia Kulak protected site Tutrakan 2003 1,8
16. Srebarna managed nature reserve Silistra 1948 892,0
17. Suha river (part) protected site Kajnardja 2007 683,6

*Ecological networks**State of the environment**Air quality and pollution*

In the region is registered exceeding of the levels of fine particulates matter and sulfur dioxide in the atmospheric air. In the region there are no large and aggressive emitters.

*Water*

The examined indicators of surface waters on the territory of Silistra meet the design categories.

No registered indicators with values above the limit concentration (MAC) for Grade III receiving water (categorized as the Danube), for most indicators values are several times lower than the norms.

Groundwater Status - In all observed points in the field values are registered in the ecological threshold normalization in Ordinance 1 / 07.07.2002 on taking over the threshold of contamination was registered in only one value Tutrakan - total iron.

*Waste*

In the district there are 27 operating landfills.

On the territory of the district is planned one regional landfill - near Silistra. It is under construction.

*Water management**Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index				1,361
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	9,29	6,99	3,53	1,83
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	1,24	0,73	0,63	0,39
Atmosphere pollution ash - emission per 1000 inhabitants (t)	2,07			
Atmosphere pollution CO - emission per 1000 inhabitants (t)	0,18	1,58	1,5	0,09
Capacity of landfills per 1000 inhabitants (t)			645	15414

## Izmai kyj rayon

### *General information*

Izmail district (Izmailskiy rayon) was formed in 1954. It is located in the southern part of Odessa region on the border with Romania.

Climate is hot, dry and with short warm winters, average summer temperature is +27C.

Area: 1,2 km<sup>2</sup>

It consists of 22 villages and 1 urban village.

Population: over 50 thousand people.

National composition of the population: Ukrainians - 28,9%, Bulgarians - 25,7%, Moldovans - 27,6%,

Russians - 16,2%, other nationalities - 1,6%.

Izmail is one of the most developed districts of southern Ukraine in agricultural, social and cultural sense. This is multinational land with rich historical and cultural traditions and modern tourist attractions. On the wealth of flora and fauna the region can be called a unique place, thanks to diverse nature of the land (lakes: Yalpug, Kugurlui estuary, Danube Delta Biosphere Reserve and the islands Tattaru, Small and Large Dallaire). 69 historical and cultural monuments are located in the district, two of them are of the world significance - "Meridian" and "Trubayivskiy mound". More than 30 nationalities live in 23 towns of our area who have their own history, traditions, customs, folklore, national cuisine and culture.

### *Land use*

Izmail district is traditionally a land of a large diversified farming and processing industry. Arable land area covers 78 thousand hectares. Irrigation systems are operating in the area. Agriculture specializes in growing grain, vegetables, seeds, fruits, grapes, melons. Fisheries and fishery commodity, dairy farming, pig and sheep breeding are highly developed. There are 37 major cooperatives, 15 agricultural Ltd, 23 AB, 2 agricultural associations, 8 private enterprises, 530 farms.

Major industrial processing enterprises are located in urban village Suvorove and Kamenka in the district center. In the village Kamenka there is a cattle and pig factory which breeds black-spotted cows and large white pigs, in the village Utkonosivka there is a sheep breeding factory.

The land use structure in the Izmail district is as follows:

- Farmland – 77,05%
- Arable land – 66,67%
- Forest – 4,44%
- Water surface – 11,39 %
- Wetlands – 3,85 %
- Built-up area – 3,02%
- Miscellaneous area – 0,25%

There is a high potential for renaturalisation of abandoned farmlands and fish ponds in the historical floodplain of the Danube River.

### *Nature conservation and landscape*

#### *Protected areas*

There are 4 protected areas of local importance designated in the district with the total area of 2984 ha. The district's share of protected areas is 2,4%.

The areas are:

- Regional landscape park "Izmail Islands" - 1366 ha
- Zakaznik (preserve) "Lung" - 1452,85 ha
- Zakaznik (preserve) "Baranivskiy forest" - 163 ha
- Park – a monument of landscape architecture "City garden", Izmail – 1,5 ha

1 Ramsar site is partially located within the borders of Izmail district:

- Kugurlui Lake (6500 ha) supports internationally important numbers of various species of migrating, breeding and molting waterbirds. Nationally and internationally rare bird species occur at the site. It is also important as a breeding and nursery area for fish and amphibians. The lake and its reed-beds are identified as 'territories, reserved for protection' at the regional level.

The district has high potential for establishment of nationally designated protected areas, especially in the context of creation of a trilateral (Romania, Ukraine, Moldova) Danube Delta biosphere reserve.

### *Ecological networks*

The southern part of the district belongs to the national 'Lower-Danube' ecological region and lies at the crossing of the 'Lower Danube' longitudinal and 'Ialpug' latitudinal regional ecological corridors. Additionally the district is recognised of international importance for migrating birds, being a part of the Lower Danube Green Corridor.

### *State of the environment*

#### *Air quality and pollution*

The total emissions of pollutants in 2008 was 4856 tons, of which 2678 tons from fixed sources, 1975 t – from motor transport

Emissions of the main pollutants in 2008:

- Emission of PM – 191,01 tons (1,48 t/1000 persons)
- Emission of SO<sub>2</sub> – 351,51 tons (2,72 t/1000 persons)
- Emission of NO<sub>x</sub> – 3622,65 tons (28,03 t/1000 persons)
- Emission of CO – 6763,52 tons (52,34 t/1000 persons)

Main sources of air pollution are

- Izmail cellulose and cardboard factory
- motor transport
- Port of Izmail
- Izmail shipyard
- petrol stations

#### *Water*

Water resources of the district are presented by the Danube River and Ialpug and Kugurlui, Katlabuh and Safiany, and Kitai Lakes.

Mineralisation of waters of the Ialpug Lake was 1032,9 mg/l in 2008 with a tendency for decrease, which makes its water suitable for irrigation and water supply for livestock farming. Waters of the Ialpug Lake are frequently contaminated with drainage waters. For this reason waters of the lake are of not high enough quality to be used for drinking water supply, thus a number of settlements located on the banks of the lake use delivered water. Nevertheless, the largest settlement on the lake, Bolgrad, uses Ialpug water for drinking and household water supply. Water and living resources of the Ialpug-Kugurlui lake system are used for recreation (water-related tourism on Ialpug, hunting and fishing on Kugurlui), fish farming is well developed on Kugurlui Lake. Main sources of water pollution in the catchment area of the Kagul and Kartal Lakes on the territory of Izmail district are 1 livestock farm, 2 illegal dumps and surface run-off from arable lands.

Mineralisation of waters of the Katlabuh and Safiany Lakes was 1925,7 mg/l in 2008 with a tendency for decrease, caused by implementation of water exchange measures. Generally, the quality of water of the lakes stipulates their use for irrigation and agricultural use. Main sources of water pollution in the catchment area of the Katlabuh and Safiany lakes are 16 livestock farms, 8 illegal dumps (with the total area of 12,5 ha), and surface run-off from arable lands. Additionally, 3 storage places of expired pesticides and fertilisers (with the totally stored volume of 230 tons) are located in the catchment of the Katlabuh and Safiany lakes. The storage facilities are in poor condition or totally crumbled, which causes the high risk of water contamination.

The Kitai Lake is the water body with the highest mineralisation in the Ukrainian part of the Danube Delta sub-basin (4776,0 mg/l in 2008). For this reason its waters are not used neither for water supply, nor for irrigation. Main sources of water pollution in the catchment area of the Kitai lake on the territory of the Izmail districts are 1 livestock farm, 2 illegal dumps (with the total area of 4,5 ha), and surface run-off from arable lands.

Ground waters are the source of drinking water supply of significant importance for the district (totally 39 water wells), but the system of monitoring of their quality is poorly developed and observations are mainly irregular. The main source of pollution of ground waters are waste water filter fields.

*Waste*

The only way of treatment of solid household waste is burial at landfills and dumps. There are 16 registered landfills (with the area of 110 ha) and 12 illegal waste dumps. Estimated volume of waste accumulated in the district is more than 50000 tons.

*Water management*

Hydrological regime of the lakes is managed through the system of feeding canals and channels with sluices, taking water from the Danube River. Normally, during the spring flood the lakes are filled with the Danube water which is afterwards discharged back into the Danube during the summer/autumn mean water period. The organisation solely responsible for water management in the district is the Izmil Division for Integrated Water Use of the Danube River Basin Management Department.

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	2,97	2,79	2,75	2,63
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)		1,57	3,17	2,72
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)		16,17	32,64	28,03
Atmosphere pollution ash - emission per 1000 inhabitants (t)		0,85	1,72	1,48
Atmosphere pollution CO - emission per 1000 inhabitants (t)		30,19	60,94	52,34
Capacity of landfills per 1000 inhabitants (t)		1138,211	23966,47	27339,21

## Kilii kyi rayon

### *General information*

The district is located in the far south-west of Odessa region and covers the area of 1359 sq. km. From the south and south-west, it is limited by the state border along the Danube River (with Romania), from the east and south east – by the Black Sea and the Sasyk (Kunduk) Liman (estuary). The district borders on Artsyz and Tatarbunary districts of Odessa oblast in the North and Izmail district in the West. In 2003 Zmiinyi Island was also joined to the administrative subordination of Kiliya district. The Danube Biosphere Reserve is situated on the territory of the district.

The district consists of 17 settlements governed by 2 urban and 13 rural councils. Population – 54,4 thousand people (2008).

The main district's economical and geographical advantages are the coastal location, access to the Danube River, vast areas of natural landscapes.

As an administrative unit the district was formed in November 11, 1940.

One its features are its advantageous economic and geographical position and great natural potential.

### *Land use*

Natural-resource potential of the area promotes high-productive agricultural manufacture. The district has 64 thousand hectares of agricultural land. Among them 36 are irrigated.

The main specialization of agricultural manufacture is cultivation of cereals and industrial crops. Each year the area with the rape culture is increasing.

Natural and climatic conditions of the region provide good harvests of rice.

Such enterprises as “Mayak”, “Danube”, Ltd “Prydunays'ka rice farming” (which conducts research of new varieties of seeds) are involved in rice cultivation. Every year over 5 hectares can be employed for sowing rice with a total output of more than 12 tons.

Winemaking is developing and restoring. Total area of vineyards in the region is 1.5 hectares, 89 hectares of which are on drip irrigation. Main producers of grapes are “Druzhba” and Ltd. “Agro-Danube”. Ltd. “Agro-Danube” is widely uses technology of drip irrigation of vineyards and gardens.

Cattle industry is specializing in breeding of cattle, pigs and sheep. The largest companies that work in this direction are Ltd. “Ermak” and Ltd. “Victory”. For high animal productivity the company was honored with the diplomas and awards of various exhibitions.

Aviculture is quickly developing in the area. Company “Victoria” is growing such breed of geese as “Big grey”. Another company “Friendship” has grown geese breed - “Italian White”.

Of considerable importance is an industrial fishing that has more than 20 business entities. The total fish catch per year exceeds 1000 tons. The main fishing areas are the Black Sea and Azov Sea, the Danube River, lakes Sassyk and China, the main industrial types of fish are Danube herring, perch, carp, bream, carp.

Owing to a large number of natural building materials such as cane, its procurement and processing is developing. Almost all the harvesting and processing enterprises are concentrated in the town of Vylkovo. The enterprises of the district annually exported a large number of cane to Europe.

The land use structure in the Reni district is as follows:

- Farmland – 56,36%, of them:
  - o Arable land – 49,27%
- Forest – 1,84%
- Water surface – 15,89 %
- Wetlands – 21,78 %
- Built-up area – 2,87%
- Miscellaneous area – 1,25%

### *Nature conservation and landscape*

#### *Protected areas*

There are 2 protected areas of national and 1 of local importance designated in the district with the total area of 46741,9 ha. The district's share of protected areas is 34%.

The areas are:

- National importance:

- o Danube Biosphere Reserve – 46402,9 ha
- o Zakaznik (preserve) “Zmiinyi Island” - 232 ha
- Local importance:
- o Zakaznik (preserve) “Lisky” - 107 ha

1 Ramsar site is completely located within the borders of Kiliya district:

- Kiliyske Hyrlo (mouth) (32800 ha) was first designated for the Ramsar List by the former Soviet Union on 11 October 1976. The site, a delta of the north Danube River channel, is situated along the Black Sea near the Romanian border. It comprises numerous channels, alluvial islands, swamp areas, floodplain forests, freshwater lakes, and sandy spits enclosing bays. Vegetation includes hydrophilic communities, reed and sedge marshes, and dune communities. The site supports numerous rare, relict and endemic plant species. The threatened waterbirds *Pelecanus crispus* and *Aythya nyroc* nest at the site, and the threatened Red-breasted Goose *Branta ruficollis* winters in the area. The site provides habitat for large numbers of many species of wintering, migrating, breeding and molting waterbirds, as well as breeding and nursery places for fish and amphibians. Human activities include hunting, fishing, livestock grazing, haymaking, and recreation.

### *Ecological networks*

The district in the whole and its southern part in particular play one of the major roles in the ecological network of the Odessa oblast and south of Ukraine. The district's parts belongs to the national 'Lower-Danube' ecological region and lies within the 'Azov-Black Sea' national ecological corridor. The following regional ecological corridors cross different parts of the Kiliya district: 'Lower Danube', 'Kirgizh-Kitai', 'Sasyk-Kogylnik' and 'Black Sea coastal and marine'. Additionally the district is recognised of international importance for migrating birds, being a part of the Lower Danube Green Corridor.

Services of eco-tourism in the area are provided by the Danube Biosphere Reserve, which together with "Vylkovo-Pelican-Tour" and "Vylkovo Tour" are serving the largest number of tourists. Local travel agencies cooperating with the tourist company "Transkruyiz" Izmail, which organizes the cruise ships in the Danube delta to foreign tourists with visiting the town of Vylkovo.

### *State of the environment*

#### *Air quality and pollution*

The total emissions of pollutants in 2008 were 3536 tons, of which 308 tons from fixed sources, 2844 t – from motor transport

Emissions of the main pollutants in 2008:

- Emission of PM – 49,5 tons (0,91 t/1000 persons)
- Emission of SO<sub>2</sub> – 92,9 tons (1,71 t/1000 persons)
- Emission of NO<sub>X</sub> – 355 tons (6,52 t/1000 persons)
- Emission of CO – 2453,5 tons (45,07 t/1000 persons)

Main sources of air pollution are

- Kiliya shipyard
- motor transport
- petrol stations

#### *Water*

Water resources of the district are presented by the Danube River, including the branches and channels of the Kiliya Delta, Stensovsko-Gebrianovskie reed-bed and Kitai and Sasyk Lakes.

The Kitai Lake is the water body with the highest mineralisation in the Ukrainian part of the Danube Delta sub-basin (4776,0 mg/l in 2008). For this reason its waters are not used neither for water supply, nor for irrigation. Main sources of water pollution in the catchment area of the Kitai lake on the territory of the Kiliya district are 12 livestock farms, 6 illegal dumps (with the total area of 9 ha), and surface run-off from arable lands.

Main sources of water pollution in the catchment area of the Sasyk Lake and Stensovsko-Gebrianovskie reed-bed on the territory of the Kiliya district are 4 livestock farms, 7 illegal dumps (with the total area of 14,5 ha), 9 waste water filtration fields (area of 14,5 ha) and surface run-off from arable lands.

Ground waters are the source of drinking water supply of significant importance for the district (totally about 20 water wells), but the system of monitoring of their quality is poorly developed and observations are mainly irregular. The main source of pollution of ground waters are waste water filter fields.

### *Waste*

The only way of treatment of solid household waste is burial at landfills and dumps.

There are 15 registered landfills (with the area of 40 ha) and 13 illegal waste dumps (23,5 ha). Estimated volume of waste accumulated in the district is more than 24000 tons.

### *Water management*

Hydrological regime of the Kitai Lake and Stensovsko-Gebrianovskie reed-bed is managed through the system of feeding canals and channels with sluices, taking water from the Danube River. Normally, during the spring flood the lakes are filled with the Danube water which is afterwards discharged back into the Danube during the summer/autumn mean water period.

The organisations responsible for water management in the district are the Kiliya and Vilkovo Divisions for Integrated Water Use of the Danube River Basin Management Department.

### *Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	2,84	2,73	2,74	2,52
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)		0,74	0,68	1,71
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)		2,82	2,6	6,52
Atmosphere pollution ash - emission per 1000 inhabitants (t)		1,99	0,36	0,91
Atmosphere pollution CO - emission per 1000 inhabitants (t)		19,49	18	45,07
Capacity of landfills per 1000 inhabitants (t)		56494,16	59893,81	23889,2

## Renii kyï rayon

### *General Information*

Reni district is located in the southwestern part of the Odessa region within the Danube plain and covers an area of 86.1 hectares. In the northwest the district borders on the Republic of Moldova, in the east - with Bolgradsky district, in the southwest it borders on Izmail district and on Romania on the Danube river.

In this region there is such a unique body of water as lake Cahul, flooded lowland lake in the Danube river, situated in the Reni district of Odessa region east of the city of Reni. Area lakes have seasonal fluctuations and ranges from 82 to 93.5 km. Maximum depth of the lake is 7 m, an average one is 1,5 - 2 m. The southern part of lake is wide (width - up to 11 km, in length - 18 km) in the north it is a narrow and elongated (width - up to 2 km, in length - 15 km). Summer temperatures are up to +30 ° C, in winter the lake freezes. Mineralization of water is from 0,8 to 1,5 g / l. From the north, the lake flows into the river Cahul.

The climate of the district is temperate continental. For natural and climatic conditions this district is the best area for high intensity of agriculture, fisheries, tourism and recreation.

The main feature of economic-geographical location of the district is its riverine and border location.

There are minor minerals extraction operations in the district (sand, clay), providing materials for local construction needs.

### *Land use*

For natural and climatic conditions this district is the best area for high intensity of agriculture, fisheries, tourism, recreation and recuperation. Agricultural land covers 41.646 ha. Arable land amounts to 34.008 ha. Total crops sown area makes up 30,3 thousand ha, 22,8 ha are cereal crops, 4,7 ha – industrial crops, 1,1 of potatoes and melon cultures, 1,7 - fodder crops. Production of cereals in 2009 was 33.5 thousand tons, sunflower - 1.9, potatoes - 2,2, vegetables – 3,9, fruits and berries 2,7, grapes 7.

The land use structure in the Reni district is as follows:

- Farmland – 50,17%
- Arable land – 39,5%
- Forest – 3,02%
- Water surface – 38,33 %
- Wetlands – 4,88 %
- Built-up area – 2,56%
- Miscellaneous area – 1,05%

There is a high potential for renaturalisation of abandoned farmlands in the historical floodplain of the Danube River.

### *Nature conservation and landscape*

#### *Protected areas*

There are no designated protected areas (under national law) in the district. The only type of status, given to some valuable territories is the 'territories, reserved for protection', which does not provide any special conditions for the management of these territories.

At the same time two wetlands have been designated as Ramsar sites:

- Kartal Lake (500 ha) with numerous species of rare and protected plants occur. The site is important for migrating, breeding and molting birds, and supports internationally important numbers of nesting *Phalacrocorax pygmeus*. Of the 140 bird species registered at the site, 32 are nationally rare. It provides important breeding and nursery areas for fish and amphibians
- Kugurlui Lake (6500 ha) supports internationally important numbers of various species of migrating, breeding and molting waterbirds. Nationally and internationally rare bird species occur at the site. It is also important as a breeding and nursery area for fish and amphibians.

The district has high potential for establishment of nationally designated protected areas, especially in the context of creation of a trilateral (Romania, Ukraine, Moldova) Danube Delta biosphere reserve.

### *Ecological networks*

Despite there are no elements of national/regional ecological network (protected areas) in the district, it is crossed by the 'Lower Danube' longitudinal and 'Ialpuș' latitudinal regional ecological corridors. Additionally the district is recognised of international importance for migrating birds, being a part of the Lower Danube Green Corridor.

### *State of the environment*

#### *Air quality and pollution*

The total emissions of pollutants in 2008 was 4856 tons, of which 2678 tons from fixed sources, 1975 t – from motor transport

Emissions of the main pollutants in 2008:

- Emission of PM – 67,98 tons (1,75 t/1000 persons)
- Emission of SO<sub>2</sub> – 28,88 tons (0,74 t/1000 persons)
- Emission of NO<sub>x</sub> – 386,58 tons (9,96 t/1000 persons)
- Emission of CO – 2107,09 tons (54,29 t/1000 persons)

Main sources of air pollution are

- Port of Reni, including oil terminal
- petrol stations
- motor transport

#### *Water*

Water resources of the district are presented by the Danube River and Kagul, Kartal, Ialpuș and Kugurlui Lakes. Before 2003 the Kagul Lake was the cleanest of the Ukrainian Danube Lakes, but discharge of nutrient pollutants (mainly nitrogen and phosphorus compounds) has increased three times till 2008. Now the indicators of organic (nutrient) pollution of the lake exceed the national water quality standards 4-8 times. Still the Kagul Lake is the water body with the lowest mineralisation in the region (420 mg/l) which stipulates more or less intense use of its water for irrigation and fish farming. Main sources of water pollution in the catchment areas of the Kagul and Kartal Lakes on the territory of the Reni district are 8 livestock farms, 8 illegal dumps (with the total area of 45 ha) and surface run-off from arable lands.

Mineralisation of waters of the Ialpuș Lake was 1032,9 mg/l in 2008 with a tendency for decrease, which makes its water suitable for irrigation and water supply for livestock farming. Waters of the Ialpuș Lake are frequently contaminated with drainage waters. For this reason waters of the lake are of not high enough quality to be used for drinking water supply, thus a number of settlements located on the banks of the lake use delivered water. Nevertheless, the largest settlement on the lake, Bolgrad, uses Ialpuș water for drinking and household water supply. Water and living resources of the Ialpuș-Kugurlui lake system are used for recreation (water-related tourism on Ialpuș, hunting and fishing on Kugurlui), fish farming is well developed on Kugurlui Lake. Main sources of water pollution in the catchment area of the Ialpuș and Kugurlui lakes on the territory of the Reni district are 7 livestock farms, 5 illegal dumps (with the total area of 12 ha) and surface run-off from arable lands. Ground waters are the main source of drinking water supply in the district (totally 43 water wells), but the system of monitoring of their quality is poorly developed and observations are mainly irregular. The main source of pollution of ground waters are 11 waste water filter fields with the total area of 41,5 ha.

#### *Waste*

The only way of treatment of solid household waste is burial at landfills and dumps. There are 7 registered landfills (with the area of 11,56 ha) and 13 illegal waste dumps (56 ha). Estimated volume of waste accumulated in the district is more than 7800 tons.

There is one waste incinerator, located on the territory of the Commercial Sea Port of Reni, which is not functioning.

#### *Water management*

Hydrological regime of the lakes is managed through the system of feeding canals and channels with sluices, taking water from the Danube River. Normally, during the spring flood the lakes are filled with the Danube water which is afterwards discharged back into the Danube during the summer/autumn mean water period.

The organisation solely responsible for water management in the district is the Reni Division for Integrated Water Use of the Danube River Basin Management Department.

*Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	3,02	3,27	2,72	2,59
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)		0,36	0,53	0,74
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)		4,81	7,05	9,96
Atmosphere pollution ash - emission per 1000 inhabitants (t)		0,85	1,24	1,75
Atmosphere pollution CO - emission per 1000 inhabitants (t)		26,24	38,42	54,29
Capacity of landfills per 1000 inhabitants (t)		1045,296	1075,269	9522,09

## Moldavian Danube Area

### General Information

In Moldova, the Danube passes a small area near the village Giurgiulesti NUTS<sub>4</sub> Cahul, which borders the NUTS<sub>4</sub> Cantemir Taraclia and Gagauzia.

Entering the Danube at the confluence of the Prut River Moldovan near an area of 1 km about Giurgiulesti. This portion is a transverse valley with altitudes below 100 m and represents the southern limit of NUTS<sub>4</sub> Cahul. Only the affluent in this moldavian area is the Prut River.

NUTS<sub>4</sub> Cahul: is a scant steppe landscape of ravines, natural monuments (meadows, lakes, mineral, scenic areas and recreational spaces) artificial canals systems with technical and economic potential.

NUTS<sub>4</sub> Cantemir: extended pre-Danubian steppe north of the forest landscape filled Tigheci; natural monuments (meadows, lakes, mineral, scenic areas and recreation spaces) artificial canals systems used in economics.

NUTS<sub>4</sub> Taraclia: be found in pre-Danubian steppe with meadows, lakes, natural monuments and landscapes and areas for recreational facilities. It is inhabited by two centuries of ethnic Bulgarians.

NUTS<sub>4</sub> Autonomous Territorial Unit Gagauzia (UTAG): lies in the fragmentary pre-Danubian steppe pasture, farmland and natural monuments. It is inhabited by two centuries of ethnic Gagauz, the only orthodox people of turkic origin.

In Moldova, natural areas are identified and delineated territories in accordance with Law No. 1538-XIII, "Law on State Protected Natural Areas". Protected areas of national interest in the four districts of Moldova are 11 categories and sub-categories:

- Scientific Reserves
- Nature Reserves (forest, steppe, medicinal plants)
- Preserves the resources
- Preserves the landscape
- Natural monuments (geo-paleontology, water, trees, etc.)
- natural areas of multifunctional management, etc..

Area bordered by the Danube and Prut River in Moldova is well represented in the list of State Protected Natural Areas (adopted on 25. 02.1998 in the Moldovan Parliament, No.1538-XIII). Like that in the studied region are identified 34 reserves and nature monuments.

In accordance with Annex "Law on State Protected Natural Areas" (adopted on 25.02.1998 in the Moldovan Parliament, No.1538-XII) was established to achieve the cadastre of protected areas (in the national environment including currently funded by GEF / UNDP Moldova made GIS maps of natural areas in the country).

### Land use

Soils are the main source of Cahul district and national wealth, the use of which depends on national economy. The most widespread soils are chernozem and occupies about 70 percent of agricultural land and about 53% of the total district.

Creditworthiness is assessed district average soil with 58 balls.

Land structure is as follows: The total area of 154528,35 hectares of which the district is:

1. Agricultural land - 98871,74 ha or 64% of the total area including:

- Arable land - 80203,04 hectares or 51,9% of the total

- perennial plantations - 17915,74 hectares or 11,6%, of which :

- Orchards - 2653,88 ha or 1,7%
- Vine - 14951,74 hectares or 9,7%
- Other - 310,12 ha or 0,2%

- pastures - 410,79 hectares or 0,3%

- others with agricultural -342,17 ha or 0,2%

2. Land villages, towns for construction of dwelling houses, buildings, social facilities - 8550,59 ha or 5,5%,

3. Land for industry, transport, telecommunications and other special purposes - 2202,14 ha or 1,4%

4. Land for natural protection, health, recreational activities, historical and cultural land value, land area and suburban green areas -106,37 ha or 0,1%,

5. Forest land - 17773,51 hectares or 11,5%,

6. Land Water Fund - 6063,91 ha or 3,9%,

7. Land Reserve Fund - 20953,09 hectares or 13,6%.

In NUTS<sub>4</sub> Cantemir area of agricultural land is 65,670 hectares.

Share of agricultural land is 49586,1 ha.

41247,6 ha of arable land,↵

orchards - 2276,2 ha,↵

vine-5425, 9 ha,↵

pastures - 9632 ha,↵

forests - 12709 ha.↵

In 2010 were planted 90 hectares of vines, orchards -140 ha.

### *Nature conservation and landscape*

#### *Protected areas*

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- Scientific Reserves
- Nature Reserves (forest, steppe, medicinal plants)
- Preserves the resources
- Preserves the landscape
- Natural monuments (geo-paleontology, water, trees, etc.)
- natural areas of multifunctional management, etc.

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NUTS 4 Cahul, in the village Slobozia Mare is located "Prutul de Jos" scientific reserve, founded in 1991. Here are Geological and paleontological monuments of nature-5, Natural Assurance of medicinal herbs-1-2 Resources Reserves, Ramsar Convention Sites-1.

NUTS4 Cantemir territory are located and taken under state protection following categories of reserves and natural monuments: Geological and paleontological monuments of nature-1, Forest nature reserves -1, Mixed Natural Reserves -1, Landscape Reserves -3.

NUTS4 Taraclia territory are located and taken under state protection following categories of reserves and natural monuments: Geological and paleontological monuments of nature-3, Areas of multifunctional management, key factors of steppe vegetation - 2.

NUTS4 UTAG territory are located and taken under state protection following categories of reserves and natural monuments: Geological and paleontological monuments of nature-5, Botanical natural monuments – 2, Natural monuments trees – 1, Forest nature reserves – 1, Natural reserves of medicinal herbs-1, Resources Reserves-2, Areas of multifunctional management, key factors of steppe vegetation – 2.

#### *Ecological networks*

In 2000, Moldova together with Bulgaria, Romania and the Ukraine have started creating Danube Green Corridor, which is an eco-regional network in the Danube river meadow. The total area is 870000 ha, of which 713385 are protected natural areas. The same declaration of cooperation mentioned in the Danube Delta and Lower Prut to conserve natural areas, signed by the national average of Moldova, Romania and Ukraine (June 5, 2000).

Also environmental authority in Moldova developed the concept of national ecological network, included later (2008) National Spatial Plan.

### *State of the environment*

#### *Air quality and pollution*

Air quality in Moldova is conditional synergy of carbon located in 3 distinct geographic zone:

- national, in particular automobiles,
- CET, for boiler rooms, industrial enterprises, fuel stations,
- landfill waste dumps from mining of limestone flour and dumps in near towns;

After information Center for Preventive Medicine in 2008, about 12% of samples taken in areas of health protection of enterprises indicated exceeded the maximum quantity allowed Comrat including (20%).

In 2008, the 179,000 tons of emissions, 23,300 tons (13%) were in the South Region. About 160,000 tons or 89% of the total mass of emissions is generated by moving sources, which are predominant (80%), the absolute majority of administrative units. The volume of emissions generated from these sources will condition and spatial distribution of total emissions. Thus, the maximum volume of emissions is proved in Chisinau (48,000 t) and Balti (26,000 t), Cahul (6800 tonnes) and in Gagauzia (5700 t). The minimum volume is estimated in the districts Taraclia (609 tons), Cantemir (929 tons).

Maximum ratio of total emissions and land protection function referred to evidence and Gagauzia (694 kg / ha). They are subject to maximum fuel consumption, increased intensity of traffic, higher degree of industrialization, the high share of mining and construction industry and in Gagauzia and the low level of afforestation. Minimum values (up to 150 kg / ha) is Cantemir district, which has a lower degree of industrialization.

Exhaust emissions from mobile sources recorded a steady growth in recent years due to increasing number of cars, of which 70% are relatively hazardous waste and air quality and health of human body. In 2008, of the 159,000 tons of emissions from mobile sources, 20 500 tons (13%) in South Region. Emission maximum volume documented in Cahul (6300 tonnes) and in Gagauzia (5400 t). The minimum volume is estimated in the districts Taraclia (422 tons), Cantemir (857 tons).

### *Water*

Since 1990, because of economic decline, the decline of heavy industry and falling water use in industry and agriculture, the quality of surface water resources has improved. For instance, currently, up to 84% on average of the waters to be treated are actually being purified, comparing to 67% in the 1980s. The majority of rivers belong to the third class of water pollution, i.e., medium pollution level. Regarding big rivers, water quality in the Dniester and Prut Rivers is usually classified as “relatively good” to “moderately polluted”.

Water quality in the South of Moldova the Prut River in 2008 is presented in the Annual Report Environmental Agency (EA) Cahul 2008. Samples were taken from 2 areas in region: town Cahul and village Giurgiulesti. Prut river waters in the AE activity Cahul corresponding legislation in force in addition to substances suspended COD, BOD<sub>5</sub>. Be partially pollution a result of discharges to water treatment plants to cities Leova, Cantemir and Cahul and non-water protection zones around villages. Waters of river Frumoasa upstream of Cahul corresponding norms by all indications outside the suspended substances and downstream of town do not correspond to the following indices: suspended substances, COD, BOD<sub>5</sub>, NH<sub>4</sub> +, NO<sub>3</sub> -, NO<sub>2</sub> -.

Be partially pollution a result of discharges to water treatment plants to cities Cantemir and Cahul and non-water protection zones around villages.

Along small rivers were monitored: Bothna, Ichel, Isnovat, Cubolta, Cop ceanca, Rautel, Cainari, Cahul, Frumoasa, Valley Galmagei, Willow, Tigheci. Small river pollution sources are grazing cattle manure and sewage from households, lack of wastewater treatment plants in villages, unauthorized dumps, cleared forest strips. All this has caused the deposit silt in river beds and along the way, their dissection. Analyses of these rivers show higher indices exceeded provided for fish.

EA Cahul made organic control of lake water Congaz, UTAG. According to the results obtained, the content of COD, suspended substance, dry residue, NH<sub>4</sub> + NO<sub>2</sub> - in the lake Congaz exceed norms. Both in 2007 and 2008 as in Gagauzia were recorded cases of accidental pollution of water from the river Yalpug without wastewater treatment discharges from the town Comrat and wastewater disposal system in the domestic sector.

### *Waste*

Compared with the industrialized nations, the Republic of Moldova does not have very large stocks of industrial waste. The main problem is the recycling and treatment of such waste, which is done only superficially and for a very narrow range of waste. In recent years, the growth of industrial production and construction boom in the conditioning, direct, and increasing volumes of industrial waste. However, this is not reflected in official statistics because many companies do not provide statistical authorities and ecological information on waste management. At the end of 2008 there were 4,0 mln tonnes of waste, including the South Region the lowest volume - only 21 000 t.

The absolute majority of administrative units are oscillating trend surface unauthorized landfills, with a slight reduction. A substantial decrease in this indicator is showing NUTS<sub>4</sub> Taraclia. In 2008 increased in area landfills NUTS<sub>4</sub> Cahul. Maximum area of unauthorized landfills NUTS<sub>4</sub> documented in Gagauzia (28.4 ha) and maximum weight ramps unauthorized areas (80%) is found in NUTS<sub>4</sub> Cantemir.

A critical ecological situation is found in overloaded landfills solid waste storage in Comrat (UTAG). This work is causing great environmental damage and population factors in the area. Due to overload landfills, but also to increase household consumption, area and volume ramps municipal waste deposited an evolution oscillating, but with a slight upward trend. In 2008, the total area of municipal ramps up to 1402 hectares, including South Region - 278 ha. Volume of waste disposed was 32.7 million m<sup>3</sup>, including South Region - 2.5 million m<sup>3</sup>. Excessive increase in the volume of waste in the years 2001-2007 are observed in Cantemir, Cahul and Gagauzia.

### *Water management*

Currently, the aquatic resources of the Republic of Moldova consists of 3621 rivers and rivulets total length of about 16 000 km, 4117 natural lakes and artificial ponds, groundwater with more than 7000 water fountains and some 166 500 ground food water wells.

Average surface water resource in the Republic of Moldova, represented mainly by the rivers of the republic (Nistru and Prut), is estimated at 13,2 billion m<sup>3</sup>. Groundwater reserve is estimated at about 2,8 billion m<sup>3</sup>. Thus, the theoretical potential of water is about 16 billion m<sup>3</sup>, which means about 4000 m<sup>3</sup> / capita / year (in Europe 4560 m<sup>3</sup>/inhabitant/year). Use around 300 m<sup>3</sup>/inhabitant/year currently, which is less than 8% (in Europe 720 m<sup>3</sup> /per capita /per year, which is about 20%). Taking into account available resources in Moldova and fertilizing aspect of agriculture, we could get real about 1100 m<sup>3</sup>/inhabitant/year.

While Moldova has water reserves, the country currently faces a number of issues, including:

1. The intensive use of deep groundwater: its level in some regions has declined by almost 100 m below mean sea level and falling.
2. Use enough water transit, which is a virtually inexhaustible source of water for the country.
3. For the moment there is not a common concept of wise use of water resources and as a result, water management in the country is defective and unbalanced.
4. Wastewater purification systems are physically and morally obsolete, exploiting more than 25 to 30 years without being rebuilt and do not meet either the current treatment technologies.

If in 1990 the country functioned 304 wastewater treatment plants currently operate more than 50 practice. Note that in towns Nistru and Prut River does not operate normally under any treatment plant.

5. Due to the inefficient operation of wastewater purification stations, the quantity of pollutants to be above the limit permitted by the environmental authority.

### *Indicators of natural conditions*

<i>Indicator</i>	<i>1996</i>	<i>2001</i>	<i>2005</i>	<i>2008</i>
Water pollution index	1,807	1,804	2,05	1,93
Atmosphere pollution SO <sub>2</sub> - emission per 1000 inhabitants (t)	0,62	0,69	0,67	0,87
Atmosphere pollution NO <sub>x</sub> - emission per 1000 inhabitants (t)	0,85	0,83	0,81	3,67
Atmosphere pollution ash - emission per 1000 inhabitants (t)	0,87	0,91	1,44	1,78
Atmosphere pollution CO - emission per 1000 inhabitants (t)	1,05	1,07	1,69	17,82
Capacity of landfills per 1000 inhabitants (t)	1658,27	1421,67	8055,55	9414,89





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