Umwelt Bundes Amt
Für Mensch und Umwelt

Bundesministerium
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und Reaktorsicherheit

Implementation of the EU Water Framework Directive in Bulgaria

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Sub-River Basins Osam and Vit

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0. Introduction

0.1 Preliminary remarks

The German Federal Ministry of Environment, Nature Protection and Nuclear Safety has given advisory assistance to the Republic of Bulgaria preparing the implementation of the EU Water Framework Directive (WFD). The advice was given in the context of the EU-Phare-support programme („Phare-Twinning-Projects“) during a two-year german-bulgarian twinning-project. One objective of the project covered the development of the structure of a River Basin Management Plan (RBMP) for the bulgarian part of the Danube catchment area by the regional river basin directorate in Pleven and in accordance with the WFD.

The structure of the RBMP was developed examplarily for the sub-basins Osam and Vit. The emphasis was more on the general conception and the appropriate proceedings during the development of the plan than on the elaboration of the plan itself. Some issues hat been covered detailed, in order to exemplify the nature of a RBMP. Some issues are merely titled.

A binding definition of the structure of the management plans is given in appendix VII WFD

River basin management plans shall cover the following elements:

1. a general description of the characteristics of the river basin district required under Article 5 and Annex II.

   This shall include:

   1.1 for surface waters:
   - mapping of the location and boundaries of water bodies,
   - mapping of the ecoregions and surface water body types within the river basin,
   - identification of reference conditions for the surface water body types;

   1.2. for groundwaters:
   - mapping of the location and boundaries of groundwater bodies;

2. a summary of significant pressures and impact of human activity on the status of surface water and groundwater, including:
   - estimation of point source pollution,
   - estimation of diffuse source pollution, including a summary of land use,
   - estimation of pressures on the quantitative status of water including abstractions,
   - analysis of other impacts of human activity on the status of water;

3. identification and mapping of protected areas as required by Article 6 and Annex IV;

4. a map of the monitoring networks established for the purposes of Article 8 and Annex V, and a presentation in map form of the results of the monitoring programmes carried out under those provisions for the status of:

   4.1 surface water (ecological and chemical);

   4.2 groundwater (chemical and quantitative);

   4.3 protected areas;

5. a list of the environmental objectives established under Article 4 for surface waters, groundwaters and protected areas, including in particular identification of instances

where use has been made of Article 4(4), (5), (6) and (7), and the associated information required under that Article;

6. a summary of the economic analysis of water use as required by Article 5 and Annex III;

7. a summary of the programme or programmes of measures adopted under Article 11, including the ways in which the objectives established under Article 4 are thereby to be achieved;

   7.1 a summary of the measures required to implement Community legislation for the protection of water;

   7.2 a report on the practical steps and measures taken to apply the principle of recovery of the costs of water use in accordance with Article 9;

   7.3 a summary of the measures taken to meet the requirements of Article 7;

   7.4 a summary of the controls on abstraction and impoundment of water, including reference to the registers and identifications of the cases where exemptions have been made under Article 11(3)(e);

   7.5 a summary of the controls adopted for point source discharges and other activities with an impact on the status of water in accordance with the provisions of Article 11(3)(g) and 11(3)(i);

   7.6 an identification of the cases where direct discharges to groundwater have been authorised in accordance with the provisions of Article 11(3)(j);

   7.7 a summary of the measures taken in accordance with Article 16 on priority substances;

   7.8 a summary of the measures taken to prevent or reduce the impact of accidental pollution incidents;

   7.9 a summary of the measures taken under Article 11(5) for bodies of water which are unlikely to achieve the objectives set out under Article 4;

   7.10 details of the supplementary measures identified as necessary in order to meet the environmental objectives established;

   7.11 details of the measures taken to avoid increase in pollution of marine waters in accordance with Article 11(6);

8. a register of any more detailed programmes and management plans for the river basin district dealing with particular sub-basins, sectors, issues or water types, together with a summary of their contents;

9. a summary of the public information and consultation measures taken, their results and the changes to the plan made as a consequence;

10. a list of competent authorities in accordance with Annex I;

11. the contact points and procedures for obtaining the background documentation and information referred to in Article 14(1), and in particular details of the control measures adopted in accordance with Article 11(3)(g) and 11(3)(i) and of the actual monitoring data gathered in accordance with Article 8 and Annex V.

Additional the bulgarien part of the danube river bisain is characterized in a short chapter ahead.

0.2 Characteristics of the bulgarian Danube catchment area

0.2.1 General discription

The bulgarian part of the Danube catchment area borders on Rumänia in the North, on Serbis in the West, on the bulgarien part of the Black Sea catchment area and on the bulgarian aegaes catchment areas in the South (see Figure 1 and Figure 2).

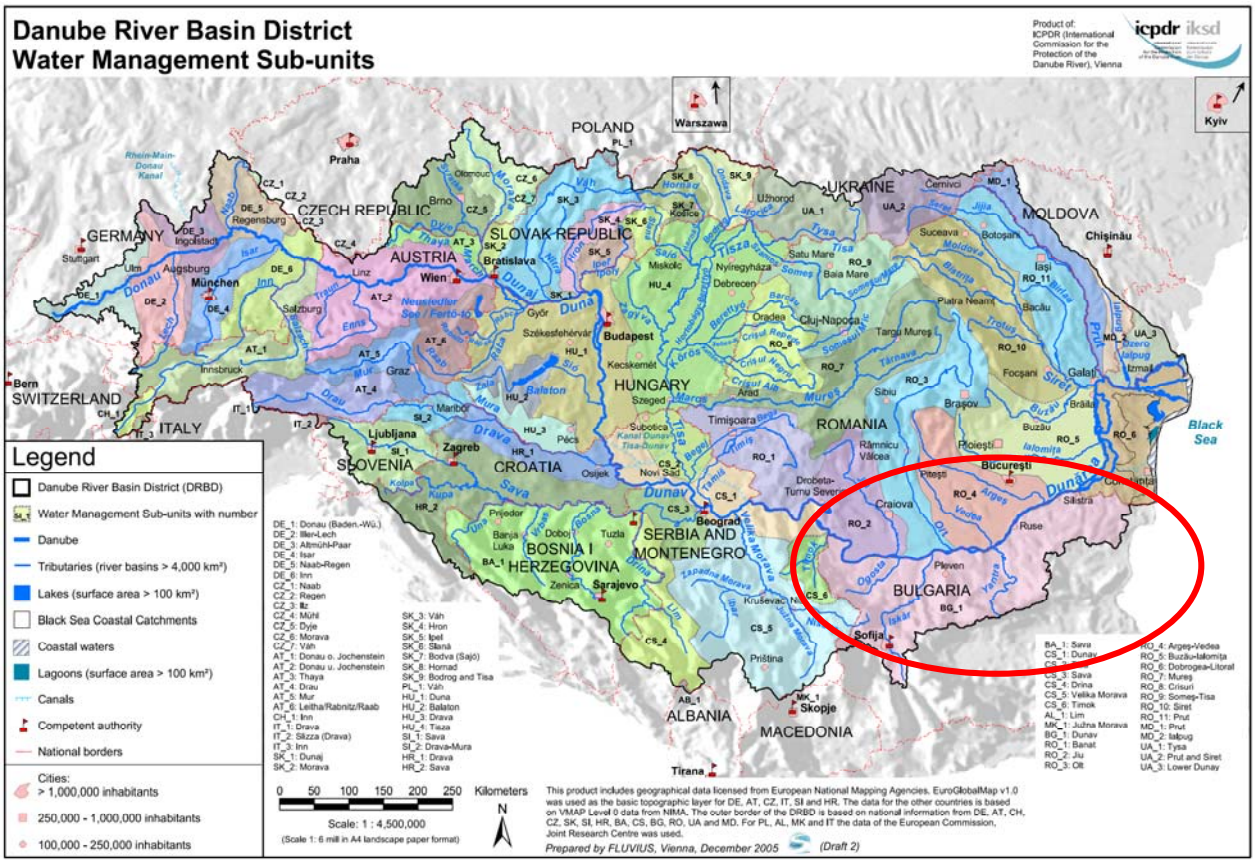

Figure 1: Position and delineation of the bulgarien part of the Danube River Basin

The Bulgarian Danube catchment area covers a total surface area of about 46.930 km^2 and has a population of about 3.44 Mio. The rivers have a total length of 4,413 km, not counting the Danube itself. The area covers ca. 25 % of the total surface area of Bulgaria and there are living 45 % of its total population. The Bulgarian capital Sofia (Iskar-sub-basin) is the fast growing economical centre of Bulgaria. It has a population of 1.5 Mio., which are 45 % of the total population of the Danube catchment area.

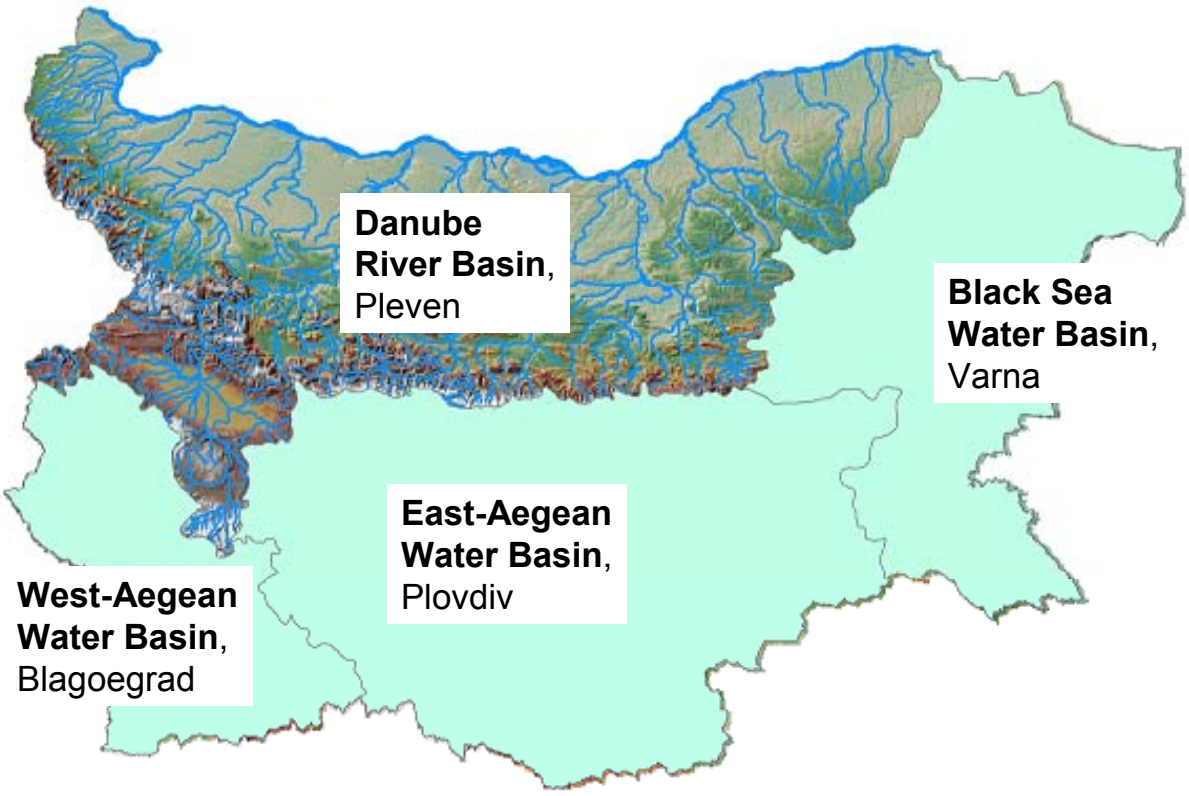

Figure 2: Position and delineation of the bulgarian River Basins

0.2.2 Ecoregions and water body types in the Danube catchment area

In Bulgaria there are parts of two ecoregions:

- Ecoregion 12 (Pontic Province) and
- Ecoregion 7 (Eastern Balkan).

The boundary between those two ecoregions runs North of the Balkan mountains from West to East. Accordingly both ecoregions are also to be found in the Danube catchment area (see Figure 3).

The total ecoregion 12 (Pontic Province) includes Wallachia, Dobruja, the southern Bessarabia, the river mouth areas of the Danube, Dniester, Bug and Dnieper as well as the Krim up to the Strait of Kerch. Its northern boundary runs at about 250 m.a.s.l. along the Ploesti – Buzau – Kischinew – Kirowograd – Dnjepropetrowsk – Shdanow-line to the coast of the Sea of Asov.

In the flat or a little wavy Bulgarian landscape with altitudes from 0 to 200 m and from 200 to 800 m there can be found different kinds of sand, clay, loam and limestone. Under the soils there are diluvial and alluvial soils, rendzina and chernozems with different lime-contents. The land is mainly used for arable farming and forestry.

The ecoregion 7 (Eastern Balkan) covers the Balkan Mountains, the Rhodope Mountains, the East Macedonia, the East of Greece and the offshore islands of the Aegean Sea, but not the islands near the Anatolian coast (Tenedos to Rhodos). The Western boundary is the “Vardar-line” (Morava – Eastern Morava – Vardar) (all rivers excl.), the Northern boundary the Danube (excl.) from the Morava river mouth to the East up to the Bulgarian border, from there along the 500-m-line of the Balkan Mountains up to the Black Sea coast, south of Varna. The South-eastern boundary is the coast of the Sea of Marmara.

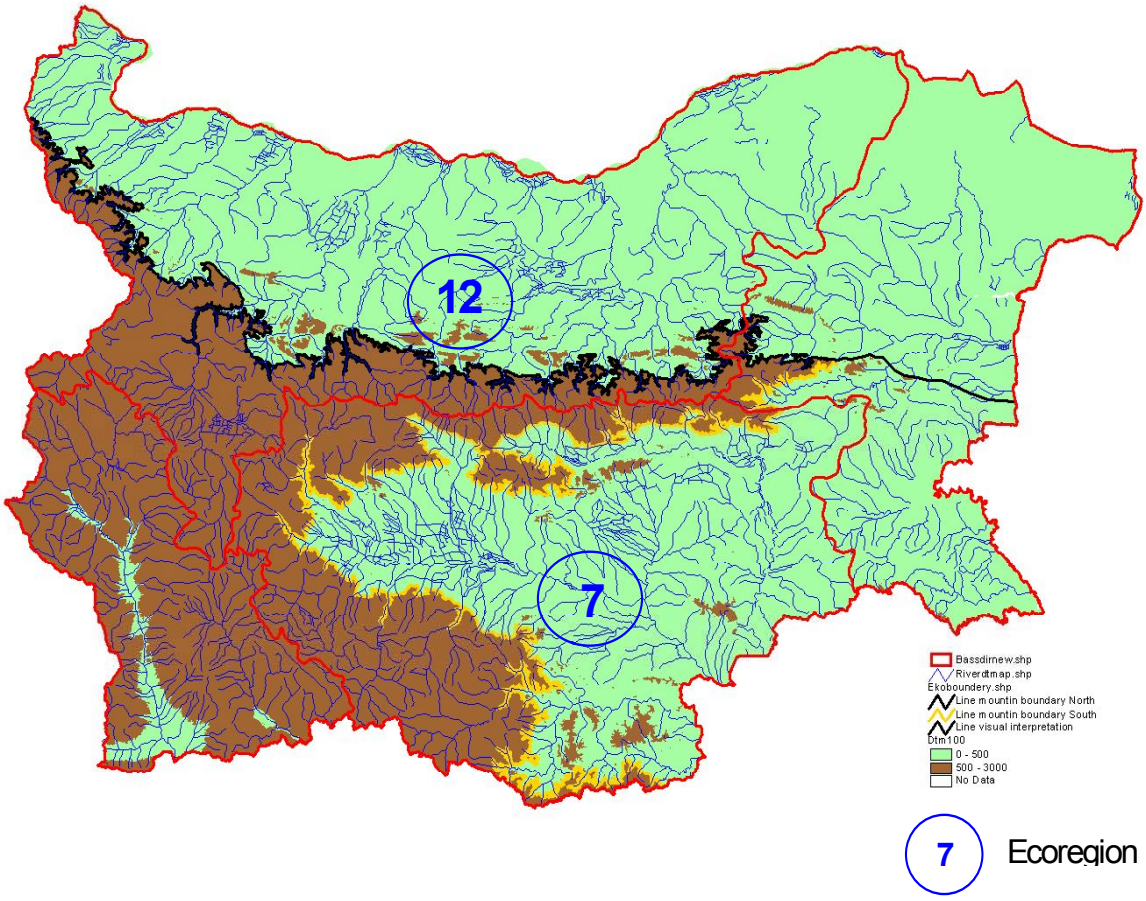

Figure 3: Location and boundaries of the ecoregions in the Danube catchment area

In Bulgaria the landscape of these ecoregions is characterized by flat and hilly areas, foothills and mountain areas. The altitudes are 200-800 m and higher than 800 m. The land is mainly used for grassland farming and forestry.

In Bulgaria there were identified 34 water body types, of which 12 types are to be found in the Danube catchment area. For the identification of the water body types as described in system B of the WFD, the parameters named in Figure 4 have been used.

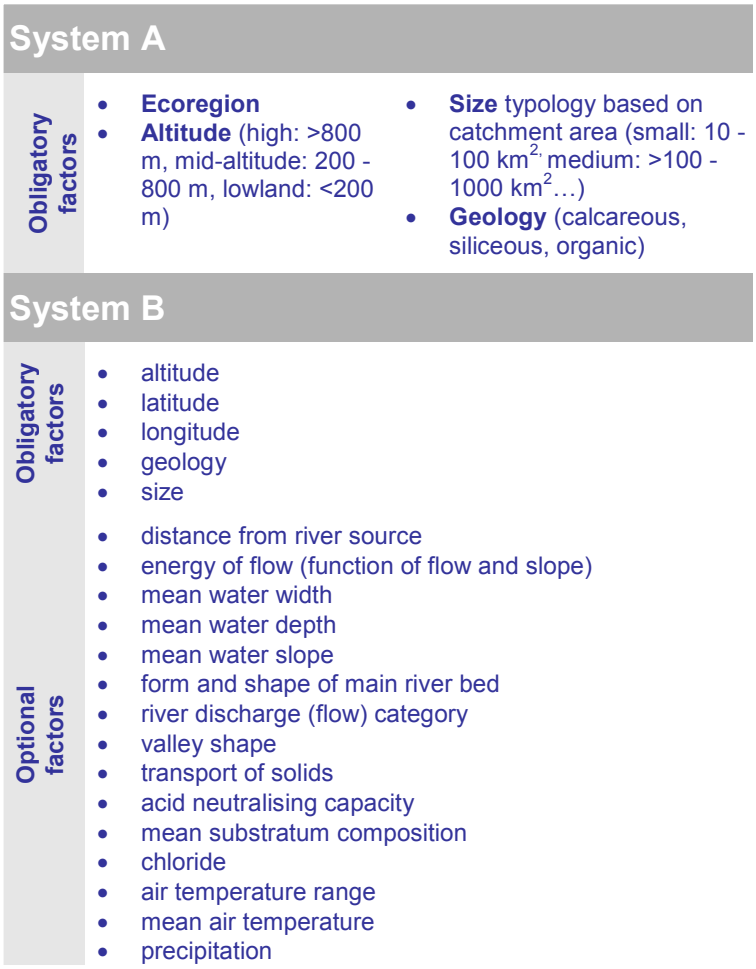

Figure 4: Parameters for the characterization of flowing water types using System A and B

In the Danube catchment area the water body types listed in Table 1 have been identified.

Table 1: Flowing water types in the Danube catchment area

Type No	Name	Size (catchment area [km²])	Geology	Altitude [m]	Dominant Substrate	Hydrology	Slope [%]
Ecoregion 12							
1	Small loess rivers	10-100	calcareous	<200, 200-800	fine (loess)	permanent	< 0,2
2	Medium-sized and large rivers with fine substrate	100-1.000, 1.000-10.000	calcareous	<200	fine (loess, sand)	permanent	< 0,2 (> 0,2)
7	Mid-sized stone dominated mountain rivers	100-1.000	calcareous	200-800	stone	permanent	> 0,2
8	Bedrock rivers*	10-100, 100-1.000	calcareous, siliceous	<200, 200-800, 800-1800	bedrock	permanent	> 0,2
Ecoregion 7							
9	Small sand dominated rivers	10-100	siliceous	<200, 200-800	sand	permanent	< 0,2
10	Small rivers with sand and pebble substrate	10-100	calcareous	< 200, 200-800	sand, pebble	permanent	> 0,2
11*	Medium-sized and large rivers with sand and pebble substrate	100-1.000, 1.000-10.000	calcareous	< 200, 200-800	sand, pebble	permanent	> 0,2
18	Stone or bedrock dominated Alpine and Moraine rivers	10-100, 100-1.000	calcareous, siliceous	>1800	stone, rock, bedrock	permanent	> 0,2
19	Organic dominated Alpine and Moraine rivers	10-100	organic	>1800	organic	permanent	> 0,2
Ecoregion independent types							
21	Small and medium-sized temporary karst rivers	10-1.000	calcareous	<200, 200-800	stone, pebble, sand	temporary	> 0,2
22	Small rivers in floodplains	10-100, 100-1.000	calcareous, siliceous	<200, 200-800	sand, silt, mud	permanent, backwater	<0,2
23	Backwater and brakish water influenced Black Sea tributaries	10-100, 100-1.000	calcareous, (siliceous)	<200	sand, pebbles	backwater	<0,2

To obtain the lake typology as described in system B, other optional factors can be used besides the obligatory factors (s. Table 2).

Table 2: Factors and class boundaries to obtain the lake typology as described in system WDF

Factors	Class boundaries
Obligatory factors	
Ecoregion	
Altitude	
Size	
Geology	
Optional factors	

A typification of lake waters in the Danube catchment area is not available.

In the Danube catchment area there are no coastal waters.

0.2.3 Reference conditions for surface water bodies

For the identified water body types of all categories of surface water bodies in Bulgaria, water body descriptions in the form of passports are created mainly on the basis of selected reference waters as well as the knowledge of experts. The monitoring data will also be used.

The description of water type specific reference conditions in Bulgaria is still worked on at present. It is intended to create these in the form of type-passports. Figure 5 shows an example of a passport of a German flowing water type. Passports include, besides descriptions and the data regarding obligatory and optional factors, more extensive information, as e.g. values regarding hydromorphological, physicochemical and biological quality elements. Those are e.g. information regarding the form and substrates of the river bed, sinuosity coefficient, valley shape and slope, information regarding the physicochemical guide values as well as a short characterization of the flow regime and the hydrology. The characterizations of biotic communities include a selection of type-specific species as well as descriptions of functional groups of the biological quality elements.

Type 9:	**Mid-sized fine to coarse substrate dominated siliceous highland rivers**
Distribution in river landscapes and regions according to Briem (2003):	Schist, gneiss, granite and similar rocks, Buntsandstein sandstone, volcanic regions, large floodplain over 300 m wide
Picture:	 *Orke (Hesse). Photograph: T. Ehlert*
Short description of morphology:	This stream type exhibits different morphological forms, depending on the width of the valley floor, the channel bedload and valley slope. In narrow valleys, the channel is straight or sinuous, with numerous side channels; in wide u-shaped valleys with limited slope, the single stream channel is sinuous to meandering. With increasing valley slope, the channel becomes slightly sinuous to meandering and forms anabranching sections and numerous side channels. In general, cobbles and rocks dominate the channel substrates. Gravel is less frequent and forms pronounced bars. Fine sediments like sand and loam are found in the calmer flow sections along shore and between large rocks. The channel profile is usually very shallow and wide. There is a typical alternation of riffle and pool sequences. Pronounced gravel and cobble bars with a distinct, well developed interstitial are typical for streams of this type.
Abiotic profile:	**Size class:** 100 - 1.000 km² catchment area **Slope of the valley floor:** 2 - 6 ‰ **Flow category:** predominantly fast to turbulent currents, with high current diversity. **Channel substrates:** cobbles and boulders dominate with high amounts of gravel mixed in; to a lesser degree sand and loam deposits in slowly flowing areas
Physico-chemical water conditions:	siliceous **Conductivity [µS/cm]:** 75 - 350 **pH-value:** 7,0 - 8,0 **Alkalinity [°dH]:** 1 - 6 **Total hardness [°dH]:** 6 - 10
Flow regime & hydrology:	Large fluctuations in discharge over the year, with pronounced individual events of extreme discharges.

T. Pottgiesser & M. Sommerhäuser 2004: Profiles of German Stream Types

Type 9:	**Mid-sized fine to coarse substrate dominated siliceous highland rivers**
Characterisation of the macroinvertebrate community:	**Functional groups:** As a result of high habitat diversity, the macroinvertebrate community is very diverse. On stable rocks and boulders of turbulent riffle sections, rheophile species with high oxygen demands dominate. The sandy and muddy deposits in calm sections between large rocks, in side channels or along shore are colonised by species preferring fine sediments. In this river type, species typical for smaller and cooler streams are frequently found. **Selection of type-specific species:** Characteristic species for the well-oxygenated, turbulent cobble bars are e.g. the mayflies *Baetis lutheri* and *Ecdyonurus insignis* or the caddis fly *Micrasema setiferum*. Numerous moss tufts on rocks are inhabited by the water beetle *Hydraena* spec. In the gravel and sand deposits large mussels like *Unio crassus* and *Margaritifera margaritifera* are found. Otherwise typical species include the mayfly *Ecdyonurus dispar*, stoneflies of the genus *Leuctra*, the true bug *Esolus parallelepipedus* and the caddis flies *Allogamus auricollis* and *Brachycentrus maculatus*.
Characterisation of macrophyte and pyhtobenthos communities:	Compared to other highland stream types, this stream type is relatively rich in macrophytes. Numerous water mosses (e.g. *Scapania undulata, Rhynchostegium riparioides, Fontinalis antipyretica, Fontinalis squamosa, Chiloscyphus polyanthos, Hygroamblystegium fluviatile, Jungermannia exsertifolia, Racomitrium aciculare, Schistidium rivulare, Marsupella emarginata*) and higher plants like *Ranunculus fluitans, R. peltatus, R. penicillatus, Callitriche platycarpa, C. stagnalis* and *Myriophyllum alterniflorum* occur.
Characterisation of the fish fauna:	Streams of this type generally support fish typical for the grayling region. Besides the character species of this region, brook trout are also found frequently. So are populations of the rheophile, gravel-spawning stream cyprinids like nase and dace. In the Danube region the huchen occurs. Side channels and backwaters also allow for indifferent species and even lenitic species to find suitable habitat. In some cases anadromous fish like salmon can occur.
Comments:	This stream type represents the „classic" highland river, dominated by coarse substrates, fast currents, with regularly alternating riffle and pool sequences. This dynamic stream type is characterised by expansive lateral channel movement and formation of numerous side channels. Because of their siliceous character „mid-sized fine substrate dominated highland rivers" are included in this stream type, although the higher amount of fine sediments, especially in Buntsandstein sandstone streams, results in biocoenotic differences. The somewhat species poorer fauna – analogous to stream type 5.1 – typically lacks interstitial species. That is also why the fish fauna does not include typical gravel-spawning species. On the other hand, brook lamprey are abundant.
Examples of typical streams	**Macroinvertebrates:** Eder, Orke (Hesse), Prüm (Rhineland-Palatinate), Wutach (Baden-Württemberg), Sieg (North Rhine-Westphalia) **Makrophyten- und Phytobenthos:** Fulda (Hesse), Zschopau (Saxony)
Comparative literature (selection):	LUA NRW (2001) „Schottergeprägter Fluss des Grundgebirges"

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Figure 5: Example of a passport of a German flowing water type as a contribution to the description of the reference conditions

0.2.4 Description of groundwater bodies

According to Article 2, Paragraph 12 of the WFD, a groundwater body is a „distinct volume of groundwater within an aquifer or aquifers". The Water Framework Directive is based on an integrative approach applied in relation to the River Basin Districts. The input situation was outlined by using an integrated, largely representative revision of groundwater.

Given the level like structure of aquifers in many regions, the boundaries of the groundwater bodies are placed in 4 layers. Without applying a strict stratigraphic sequence, the first layer contains mainly Quaternary aquifers, the second Neogene and Paleogene aquifers, the third mostly Karst aquifer massifs and basins and the fourth is the location of the most deeply located water bodies. The denomination of the bodies follows the largely used denomination of aquifers in the specialized literature. The numeration of the groundwater bodies (GWB) is uniform and uses the adopted country code – from BG001 to BG087. The arrangement was based on the hydrogeological zoning of the country as per H. Antonov and D. Danchev, 1980.

According to Article 2, Paragraph 12 of the WFD, the groundwater body is a „distinct volume of groundwater within an aquifer or aquifers". The Water Framework Directive is based on an integrative approach applied in relation to the River Basin Districts. The input situation was outlined by using an integrated, largely representative revision of groundwater.

The delimitation was conducted by the Executive Environmental Agency and was made available to the Danube River Basin Directorate in Pleven. Uncovered and covered parts of the GWB have been delimitated. The risk assessment took account of the recharge areas of each groundwater body. The precise recharge areas in Bulgaria have not been defined so far and therefore, a consideration is given to the outcropped surfaces. These recharge areas are essential as they are subject to all combinations of measures. When the GWB consists of two or more layers, a focus is given to the overlaying and/or the most productive one.

The basic materials used are a geological map (Geographic Information System (GIS) vector, scale 1:100 000), hydrological maps (GIS scalar, scale 1:200 000: for some water abundant areas in the country scaled M 1:25 000). The hydrological description of the surface is based on a GIS vector map prepared by the Environmental Executive Agency (EEA) with surface catchment areas of rivers up to the second degree – used in delimitation of the recharge areas and the connections with surface waters. All maps are available at the MoEW in Sofia.

0.2.5 Sub-Basins of the bulgarian part of the Danube River Basin

The bulgarian part of the Danube River Basin has 8 sub-basinds (see Figure 6). In Table 3 the key data of the catchment area are summerised. It covers an area of allover roughly 50.000 km², a llength of water bodies of 4.413 km and a popuöation of about 3,4 Mio. inhabitants.

The struchture of a River Basin Management Plan (RBMP) is exemplary developed and exemplified on the sub-basins Osam (see Figure 7) and Vit (see Figure 8).

Table 3: Key data of the bulgarian part of the Danube River Basin

Catchment area Водосборна област	Total area Обща площ km²	River length Дължина на реката km	Population Население No. / Бр.	People employed Заети лица No. / Бр.
Ogosta - Огоста	8 022	144	390 159	118 719
Iskar - Искър	8 647	368	1 533 669	664 123
Vit - Вит	3 220	189	227 421	82 995
Osam - Осъм	2 824	314	137 808	54 471
Yantra - Янтра	7 862	2 855	430 652	176 092
Russenski Lom - Русенски Лом	2 947	197	138 485	53 759
Dobrudja Rivers and Gullies Добруджански реки и дерета	6 862	346	247 983	108 090
Danube - Дунав	6 546	469	337 645	161 657
Total - Общо	**46 930**	**4 413***	**3 443 822**	**1 419 906**

* - Не е включена дължината на р. Дунав.

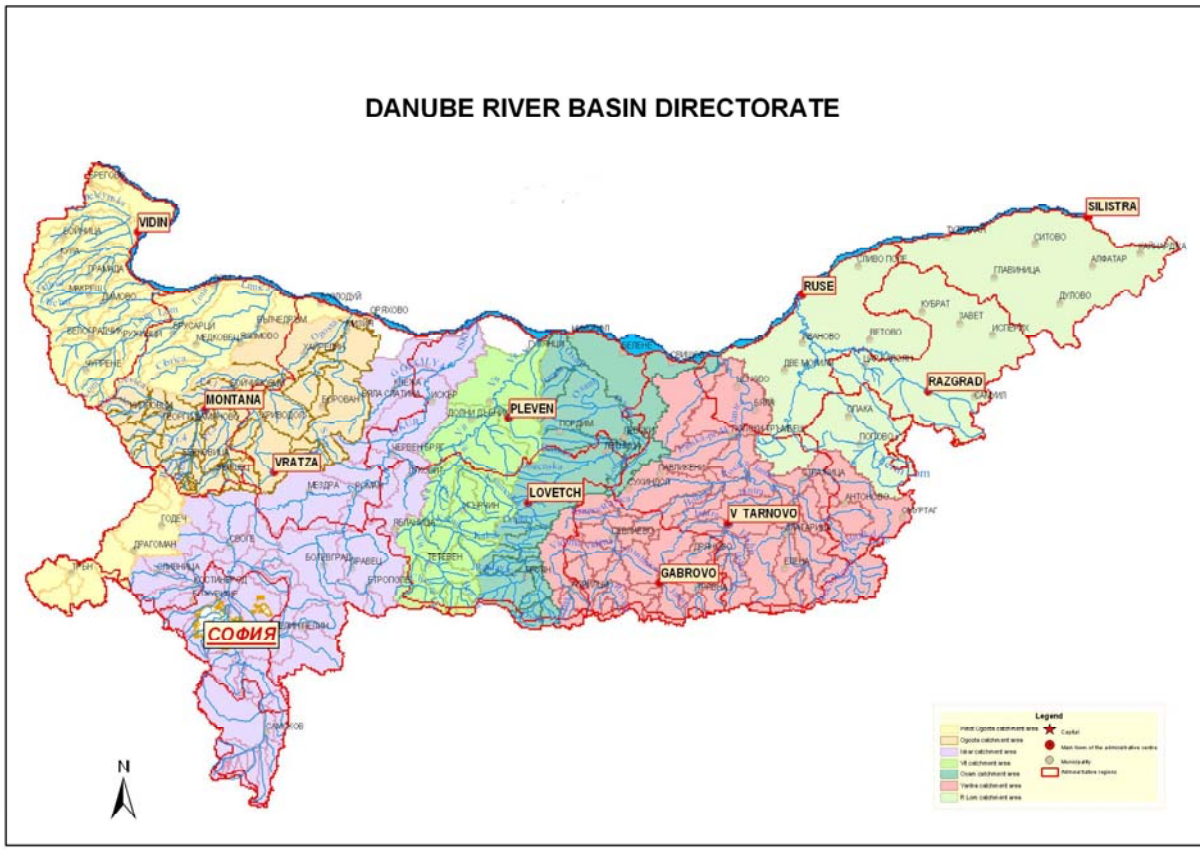


Figure 6: Sub-Basins of the bulgarian part of the Danube River Basin

Figure 7: Osam catchment area

Figure 8: Vit catchment area

1. General description of the characteristics of the river basin district

1.1 Characterisation of the Osam catchment area

1.1.1 Natural conditions

The Osam river basin includes parts of the Balkan mountains, the foothills and the Danubian Plain. The Troyan mountains comprise the northern slopes of a part of the middle Balkan mountains between the Kapudjika (1.521 m) and the Botev peak (2.376 m). The deeper and steeper valleys, which run from the ridge of the Balkan mountains in north-north eastern direction to the river Beli Osam, divide the northern slope in vertical and horizontal hills. This part of the Balkan mountains is generally characterised by steep southern slopes and not so steep northern ones. The northern slopes are cut through in some parts by rivers and divided into a multitude of hills in south-south eastern, north- north western and north west- south eastern direction. The more important mountain ridges and hills from East to West are: Grebana, Debeli djal, Dalgi djal, Jidov djal, Jalni djal, Osinaka, Prisoeto, Turlata, Rata, Schipkovski rat and others. In the North of Schipkovski rat to the valley of the river Kalnik, there are many peaks, ridges and hills, which are connected in different ways with the Vassiljovska mountains. The most important are Goljama Izhvarlenka and Malka Izhvarlenka, Ursel, Azmov kamak, Mominski kamak and others.

1.1.2 Land use

The Osam river basin covers very fertile, worked areas. In the mountain and foothill regions, the surface areas are layed out as small fields, many of which show a complicated relief and grey forest soils, alluvium and alluvial pasture soils. A considerable part of the worked surface area by the middle course have different relief forms and steepness. These are mainly carbonate containing, typical and leached out black earth and alluvium and alluvial pasture soils. The surface areas by the Osam river mouth are alluvial- and alluvial pasture soils and carbonate black earth. The lowlands of Beljane has weathered carbonate containing and typical black earth and alluvium and alluvial pasture soils.

In the river basin are cultivated mainly cereals (wheat and corn). The share of specialized crops, fodder crops, fruits, vegetables and permanent crops is smaller.

1.1.3 Surface water

1.1.4 Groundwater

For a initial characterization of the groundwater bodies on the level were described the petrography (lithography), the stratigraphy and other aspects – it exists a complete database with the parameters. For this was used a geological vector map on a scale of 1:100.000 and data from the hydrological maps, the land register, Geofond and EEA.

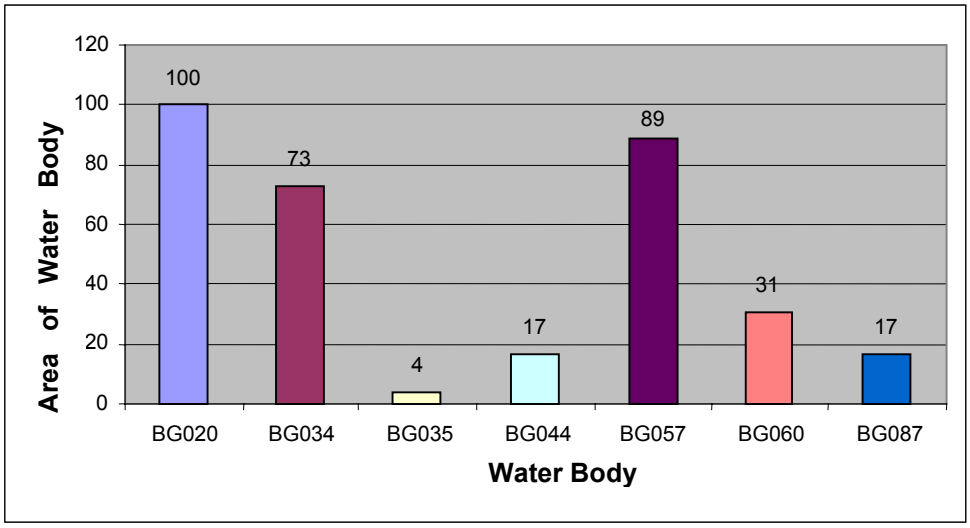
Data regarding hydraulic conductivity, porosity, groundwater level average, width etc. for each groundwater body will be captured in a database. These thematic layers will be unified in a map of hydrogeological units or in combined maps (e.g. rock type + permeability = type of aquifer).

In the Osam catchment area 7 groundwater bodies are designated. The characteristics are summarised in Table 4 und Figure 9.

Table 4: Groundwater Bodies in the Osam catchment area

GWB ID	GWB name	River name	Part of River Basin name	Area [km²]	Main Coolector Type	Area of catchment km²	Part of ground-water bodies %
BG020	Alluvial aquifer of Osam	Osam	Danube	371	Poreous	371	100
BG034	Pliopleystotzen aquifer between Vit and Osam	Osam	Danube	989	Poreous	723	73
BG035*	Upper Neogene complex in Vidin area of Lom depression	Osam	Danube	1705	Poreous	75	4
BG044*	Upper Cretaceous KB Pleven-Nikopol	Osam	Danube	2040	Fractured-karstific	339	17
BG057	Devetashka KW System	Osam	Danube	228	Fractured-karstific	204	89
BG060	Lovech-Tarnovo KW System	Osam	Danube	1159	Fractured-karstific	359	31
BG 087	Balkan karst massif	Osam	Danube	5074	Karstific	853	17

Figure 9: Share of area of groundwater bodies in the Osam catchment area (%)



Notice:

1. BG035* - a share of 80% of the groundwater bodies are located in the Jantra catchment area; therefore it will not be considered within the Osam catchmetn area.

2. BG044* - it will be considered in the Vit catchment area.

1.1.4.1 Protection Property of Layers

The assessment of the protection property of overlaying strata was based on the expert judgment of the characteristics of geological units located within the Osam River catchment area. Three classes have been identified – favourable, moderate and poor effect, presented on the geological map by three different colours (green, yellow and red, respectively). The map thus obtained is overlapped on the groundwater body (GWB) and each body was assessed (%) with view to the protection property of the overlaying strata. The expert judgement shows clearly, that the layer of BG020 in the Osam catchment area has only anj insufficient protection property.

Table 5: Protection property of the overlying strata – Osam catchment area

№	GWB	Favourable %	Moderate %	poor %
1	**BG020**	0	0	100
2	**BG034**	82	18	0
3	**BG057**	0	100	0
4	**BG060**	12	88	0
5	**BG087**	31	38	31

1.2 Characterisation of the Vit catchment area

1.2.1 Natural conditions

The spring of the river Vit is to be found in the main mountain chain of the Balkan mountains. The river comes from the northern slopes of the Zlatischko-Teteven Mountains, collects the waters of the foothill area and flows through the Danubian Plain. The foothills of the Balkan mountains consist of 4 – 6 mountain chains, following one after another from South to West. The structure determines the character of the relief. Typical for the relief of the foothill area is the strong influence of the structural elements on the appearance of the surface forms. The normal anticline forms were more or less changed by the Denudation and in some places converted into monocline mountain ridges. In the South the foothill area orographically borders on the longitudinal valleys and the steep slopes oft the main Balkan mountain chain. Tectonically this boundary runs along the strongly pressed anticline forms , which are surrounded by the mountain folds inclined to the North, the main mountain chain of the Balkan mountains in the South and the autochthonous mountain folds of the foothill area in the North. The northern boundary of this area is the southern boundary of the Danubian Plain. The boundary between these two morphological areas is partly tectonical and partly orographic. In the area of the examined river basins, it traverses the river Vit near the village Sadovez.

The Danube hill plain structurally consists of horizontally lying sediments. In the valley east of Vit the limestone layers from the Lower Cretaceous, which form the deeper and steeper part of the foothills, are revealed on the surface. The main part of the Danubian Plain, or rather of the examined area, consists of limestone layers, which are partly karstic. They are (except for the meanders) covered with a loess layer of 20-30 m.

Typical for the Danubian Plain are the flat hills between the valleys, which show a pronounced profile. The area which spreads from North to South is flat and plane. This flatness is determined by the loess cover. The eastern slopes are long and flat towards neighbour valleys. There are flowing the left, relatively long tributaries of the meander rivers. The western slopes, however, are short, steep and intersected by funnel-shaped valleys and rift valleys. From this side occurs the turn-over, erosion and landslide of the loess layer. This asymmetry between the valley hills developed without doubt before the formation of loess, as a result of the asymmetric development of the river valleys themselves. This event is typical for the river Iskar and the other rivers which take their course in its West, and can also be seen in the valleys of the rivers Vit and Osam. In the middle and upper course of these rivers this asymmetry is broken, especially near the river Vit. The right tributaries Katunetzka, Kamenka and Kalnik are much more developed than the left ones. It is very likely that the valley symmetry developed because of a relocation of the from North to South running rivers in eastern direction , which was a result of an east-north eastern incline of the Tertiary layers in the western part of the area and the total incline of the topographical surface of the Danubian Plain.

By the river mouth, the steep Danube river bank goes back between the rivers Iskar and Vit and between it and the Danube develops the Danube lowland Tscherno pole (Karaboaz), which originally was the old Danube river bed, but is now filled with alluvium material and loess.

1.2.2 Land use

Regarding the forests, the Vit river basin is one of the well afforested river basins in Bulgaria, 30 % of the area are wooded. The mountain areas of this river basin, the Teteven-Balkan mountains, are very well maintained and wooded. The forests are mainly beech forests. Up to the area Boaza, there are 600 km^2 of beech forests, which are 86 % of the total area. In the upper course of Ribaritza, there are also pine forests. After the beech forests, low-trunk forests spread in the lower parts of the Balkan mountains, grouped in areas of 20-40 km^2 up to the village Sadovez. The afforestation from the river sources to this village amounts 60% of the total surface area, which is more than a little. The area of the river basin from this village to the river mouth is almost completely deforested. Only along the river banks, there are still willows and bushes.

1.2.3 Surface water

1.2.4 Groundwater

For an initial characterization of the groundwater bodies on the level the petrography (lithography), the stratigraphy and other aspects were described – it exists a complete database with all relevant parameters. For this geological vector map on a scale of 1:100.000 and data from the hydrological maps, the land register, Geofond and EEA were used.

Data regarding hydraulic conductivity, porosity, groundwater level average, width etc. for each groundwater body will be captured in a database. These thematic layers will be unified in a map of hydrogeological units or in combined maps (e.g. rock type + permeability = type of aquifer).

1.2.4.1 Description of the Groundwater Bodies

Given the level like structure of aquifers in many regions, the boundaries of the groundwater bodies are placed in 4 layers. Without applying a strict stratigraphic sequence, the first layer contains mainly Quaternary aquifers, the second one - Neogene and Paleogene, the third one - mostly Karst aquifer massifs and basins and the fourth one - the location of the most deeply located water bodies. Denomination of the bodies follows the largely used denomination of aquifers in the specialized literature. The numeration of the groundwater bodies (GWB) is uniform and uses the adopted country code – from BG001 to BG087. The arrangement was based on the hydrogeological zoning of the country as per H. Antonov and D. Danchev, 1980.

According to Article 2, Paragraph 12 of the WFD, the groundwater body is a „distinct volume of groundwater within an aquifer or aquifers”. The Water Framework Directive is based on an integrative approach applied in relation to the River Basin Districts. The input situation was outlined by using an integrated, largely representative revision of groundwater.

The delimitation was conducted by the Executive Environmental Agency and was made available to the Danube River Basin Directorate in Pleven. Uncovered and covered parts of the GWB have been delimitated. The risk assessment took account of the recharge areas of each groundwater body. The precise recharge areas in Bulgaria have not been defined so far and therefore, a consideration is given to the outcropped surfaces. These recharge areas are essential for they are subject to all combinations of measures. When the GWB consists of two or more layers, a focus is given to the overlaying and/or the most productive one.

The basic materials used are geological map (Geographic Information System (GIS) vector, scale 1:100 000), hydrological maps (GIS scalar, scale 1:200 000. For some water abundant areas in the country scaled M 1:25 000. The hydrological description of the surface based on GIS vector map with surface catchment areas of rivers up to the second degree - used in delimitation of the recharge areas and the connections with surface waters – was prepared by the EEA (Environmental Executive Agency). All maps are available at the MoEW in Sofia.

Table 6: Groundwater Bodies in the Vit catchment area

Line no	GWB ID	GWB name	Area [km²]	Main collector Type	Outcropped area of the GWB [km²]	Outcropped area of the GWB %
1	**BG019**	Alluvial aquifer of Vit	184	Porous	184	100
2	**BG033**	Pliopleistocene aquifer between Iskar and Vit	765	Porous	425	55
3	**BG034**	Pliopleistocene aquifer between Vit and Osam	989	Porous	266	27
4	**BG039**	Furen and Dimovo Formation	4970	Fissure-karstific	4	0,1
5	**BG044**	Upper Cretaceous KB Pleven-Nikopol	2040	Fissure-karstific	876	43
6	**BG056**	Lukovit KW System	973	Fissure-karstific	398	41
7	**BG060**	Lovech-Tarnovo KW System	1140	Fissure-karstific	227	19
8	**BG087**	Balkan KW System	5074	Karstific	1024	20

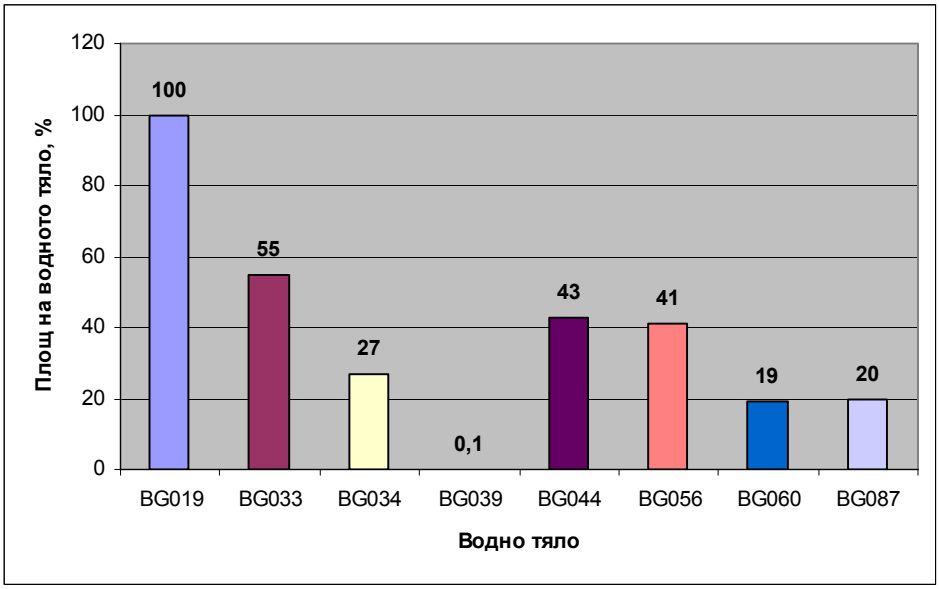


Table 7: Surface share of groundwater bodies in the Vit catchment area
(x – Groundwater Body; y- Outcropped area(%)

Note: 1. BG039* - the largest part of this groundwater body is located within the Ogosta River catchment area, so it will not be observed within the Vit River catchment area.

1.2.4.2 Location and Boundaries of the Groundwater Bodies

The territory of the observed catchment area has a complex geological structure. The following large structural units can be distinguished within the Vit River catchment area:

1. The Misia Platform;
2. The Fore-Balkan geosynclinal area;
3. The Balkan anticlynal area.

1.2.4.2.1 Fissure-Karstific waters in the Balkan region

Fissure-Karstific Waters in the Balkan are distributed in Carbonate-Triassic sediments (sandy, allevric limestone], dolomitized limestone and dolomites) aged ($l_s T_{1-3}$). Limestone is fissured and karstified. The established karst horizon is recharged by atmospheric rainfalls. The springs capacity varies within 5 to 80 dm^3/s.

1.2.4.2.2 Fissure waters in the Fore-Balkan region

The Fore-Balkan region is composed of:

Carboniferous-Permian and Permian systems - lythological sediments are the same as the ones described in the Balkan region. The springs capacity varies within 1 to 0, 5 dm^3/s.

Conglomerate formation aged Lower Triassic in terms of geology ($3T_1$=$1T_{1\ 1}$) represented by conglomerates, sandstones, allevrolite, and more rarely by breccia conglomerates and breccias.

- The depth varies within 15 - 30 m.
- The springs capacity varies within 1 to 0, 5 dm^3/s.

Lower Jurassic terrigenic continental sediments (IVJ1 h-s - Bachiishtenska (bcJ_1^h) and Kostinska (kJ_1^{h-s}) suits) - composed of conglomerates, sandstone, quartz allevrolite.

- The depth of deposits varies within 2, 0 m -120 m near the village of Lesidren.
- The springs capacity varies within 0, 5 to 1, 0 dm^3/s.

Central Fore-Balkan flisk group – represented by sandy marls to limy mudstone, limy sandstones and allevrolites, rhythmically changing with one another, combined in suite - XIJ_3^k - K_1^{bs} (Chernoosam - coJ_3^k - K_1^{bs} and Neshkovo- nJ_3^{kt} suits).

- The depth of this suit reaches 2000 - 2500 m.
- The springs capacity varies within 1 to 0, 5 dm^3/s.

Sandy and limestone type rocks aged Lower Cretaceous period (Kamchijska suite kmK_1^{v-b}) - marls, sandstones, few allevrolite and limestone), the so called sedimentation sub-zones of the typical flisk.

- The depth of deposits varies within 800 to 2000 m.
- The springs capacity varies within 0, 04 to 2 dm^3/s.

Roman suite (rmK_1^{b-ap}) - sandstones, limestone and argillites (marls).

- The depth of the Roman Suite reaches to 1000 - 1400 m.
- The springs capacity varies within 0, 4 to 4,0 dm^3/s.

1.2.4.2.3 Fissure-Porous waters in the Fore-Balkan region

Ugarchin suite ($ugPg_2^2$) - crumbly sandstone with sandy clay layer.

- The depth is more than 150 m.
- The springs do not have a that high capacity : <0,1 to 0,6 dm^3/s.

1.2.4.2.4 Fissure-Karstific waters in the Fore-Balkan region

Carbonate complex **(**bmT_3^n**)** - carbonate conglomerates with layers of sandstones, allevrolites, dolomites, limestone, mudstone).

- The deposits depth is 400 - 640 m.
- The springs capacity varies within 40 to 120 dm^3/s.

Dappled terrigenic-carbonate formation **(**$7T_3^h$**)** - represented by conglomerates, composed of limestone and sandy pieces with sandy and limestone fundamental aggregation.

- The depth is about 250 m.
- The springs capacity varies within 45 to160 dm^3/s.

Terrigenic and terrigenic-carbonate sediments (VJ_1^{h-t}) **–** sandy mudstones, quartz sandstones, sandy limestone, small piece conglomerates.

- The depth varies within 5 to 300 m.
- The springs capacity varies within 0,5 to 2 dm^3/s.

Carbonate rocks (XJ_2^c - K_1^{bs}**) -** limestone and marls.

- The depth thereof varies within 5 to 20 m.
- The springs capacity varies within 3 to 130 dm^3/s.

Kormianska sandy suite (κnK_1^b) - calcareous sandstones and allevrolites.

- The deposits depth is up to 20 m.
- The springs capacity varies within 0,7 to 2,5 dm^3/s.

1.2.4.2.5 Karstific waters in the Fore-Balkan region

- Middle Triassic aquifer - alverite, biodetrinite, pellite limestone and argillite-limestone sediments.

- The depth in the anticlinals is up to 180 m.
- The springs capacity varies within 3 to 2920 dm^3/s.

Upper Jurassic (Malm) aquifer ($J_2^c - J_3^t$) - composed of carbonate sediments (organogenic, micrograin limestone to marls) aged ($J_2^c - J_3^t$). The hydrometric measurement established that the Vit River losses 0,8 m^3/s of water between the village of Glojene and the Boaza locality.

Carbonate rocks (limestone and marls) aged Dogger-Malm **(**XJ_2^c - $K_1^{bs)}$ Yavoretzka (jJ_2^c - J_3^t), Ginska (gJ_3^{o-t}) and Glojenska (glJ_3^t - K_1^{bs}) suits.

- The depth thereof varies within 5 to 20 m.
- The springs capacity varies within 3 to 130 dm^3/s.

Limestones aged the Upper Maastricht level (κK_2^m*) - clay and marls and Eocene sandy deposits (*$lg\,Pg_2^{1-2}$*).*

- Springs capacity varies within 5-10 to 160 dm^3/s.

1.2.4.2.6 Fissure-Karstific Waters in Apt (Lovech Urgon group)

Marl and clay phase - small grainy sandstones and allevrolites.

- The depth varies within 100 to 500-600 m.
- It has low aquifer characteristics.

Carbonate-terrigenic phase (Belorechka suite - bK_1^{ap}) - marl allevrolites and sandstones of limestone type to limestone sandstones.

- The depth is 130 - 150 m.
- The springs capacity varies within 0,1 to 2 dm^3/s .

Fissure-Karstific waters in Apt (Svishtovska Suite - svK_1^{Qp}) - coarse grainy, well tossed, crumbly sandstone with limestone and sandy layers. At some places rocks transfer into sandy limestone.

- The depth of the suite is about 200 m.

Karstific waters in the Senone (Kampan-Maastricht) - Lomsko-Plevenska Depression (mzK_2^{Cp-m}) and Maastricht - Kailashka Suite – (kK_2^m).

- Depth: 20 – 70m.
- The springs capacity varies within 56 dm^3/s - 70 dm^3/s.

1.2.4.2.7 Porous waters in the Miocene (Sarmate)

The Sarmate sediments (Dimovska suite - dmN_1^s) are represented by sandy - clay and sandy phase.

- The depth is 10 - 80 m.
- The springs capacity varies within 3 to 10 dm^3/s.

1.2.4.2.8 Waters in Alluvial sediments of the Vit River

They are represented by marl sandstones, marl limestone, limestone, marls, sands, sandy clays and clays.

- The total alluvium depth is about 9 m in average.
- The lower alluvium layer, which is an aquifer, has a depth of 2m up to 10m.
- Water conductivity thereof is 60 to 1100 m^2/d.

1.2.4.3 Protection Property of Layers

The assessment of the protection property of overlaying strata was based on the expert judgment of the characteristics of geological units located within the Vit River catchment area. Three classes have been identified – favourable, moderate and poor effect, presented on the geological map by three different colours (green, yellow and red, respectively). The map thus obtained is overlapped on the GWB and each body was assessed (in %) with view to the protection property of the overlaying strata.

The expert judgment for the Vit River catchment area identifies that the overlaying strata of BG019 have predominantly a “poor” protection effect, the ones of BG034, BG044, BG056 and BG087 have a “moderate” protection effect, and those of BG033 and BG060 have a “favourable” protection effect.

Table 8: Protection property of the overlying strata – Vit catchment area

No	GWB	Favourable, %	Moderate, %	Poor, %
1	**BG019**	0	10	90
2	**BG033**	95	5	0
3	**BG034**	30	70	0
4	**BG044**	45	55	0
5	**BG056**	0	80	20
6	**BG060**	90	10	0
7	**BG087**	10	50	40

1.2.5 Groundwater Dependent Terrestrial Ecosystems

According to Annex II (Chapter 2.1) of the WFD under the initial characterization of groundwater bodies, an identification shall be made of the groundwater bodies for which there are directly dependent surface water ecosystems or terrestrial ecosystems. The apparent denomination of ecosystems is made in relation to the further characterization.

The NATURA 2000 areas (areas according to the Directive 92/43/EEC and birds reserves) and protected landscape areas and reserves containing groundwater dependent wetlands have been covered. The areas, which, being groundwater dependent, are subject to protection or contain groundwater dependent biotopes, have been selected from the data base.

Such areas have been overlapped in one and the same GIS with the potential areas of groundwater level lowering by the means of artificial water abstraction (wells, acting over large areas), where groundwater level from the surface is less than 5 m in undisturbed conditions. In relation to the potential areas of groundwater level lowering around the selected wells, a general active area has been defined by applying supportive methods, dependent on the hydrological characteristics of the concerned geological unit. Results from the experimental and filtration researches as well as exploitation water level measurement were applied. Terrestrial groundwater dependent ecosystems were identified and they are considered being potentially at risk.

The Vit River basin contains five ecosystems

2. Significant pressures and impact of human activity on the status of water

2.1 Osam

2.1.1 Surface Water

The different sources of pollution of the surface water bodies in the Osam catchment area are marked in Figure 10.

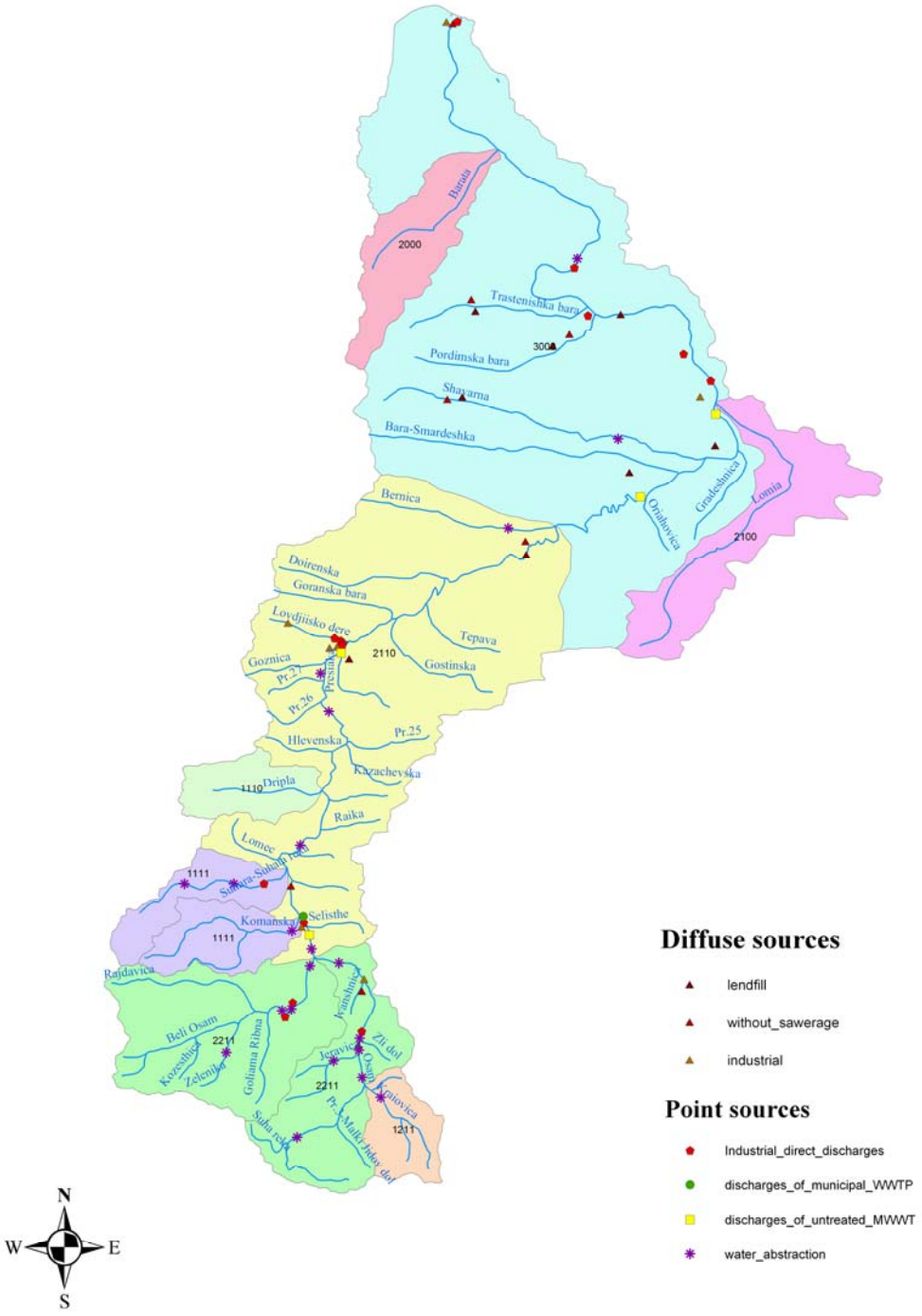


Figure 10: Sources of pollution of surface waters in the Osam river catchment area

2.1.2 Status of Surface Waters

2.1.2.1 Point Sources Pollution

2.1.2.1.1 Organic Pollution

The assessment criterion applied to identify the impact from organic pressure is the biotic index being a water status integrating parameter. The data received from the hydrobiological monitoring points of the National System of Environmental Monitoring were employed.

Table 9: Osam river; organic pollution

Line no.	Working aerea name	River name	Organic pollution Biotic Index
1	Cherni Osam - from spring to Troian town	Osam	+
2	Beli Osam - from spring to influent in river Osam	Osam	+
3	Osam - after Troian town to Aleksandrovo village	Osam	-
4	Osam - from Aleksandrovo village to Debovo village	Osam	+
5	Osam - from Debovo village to the mouth	Osam	-
6	Lomia - from spring to Butovo village	Osam	+
7	Lomia - from Butovo village to influent in river Osam	Osam	-

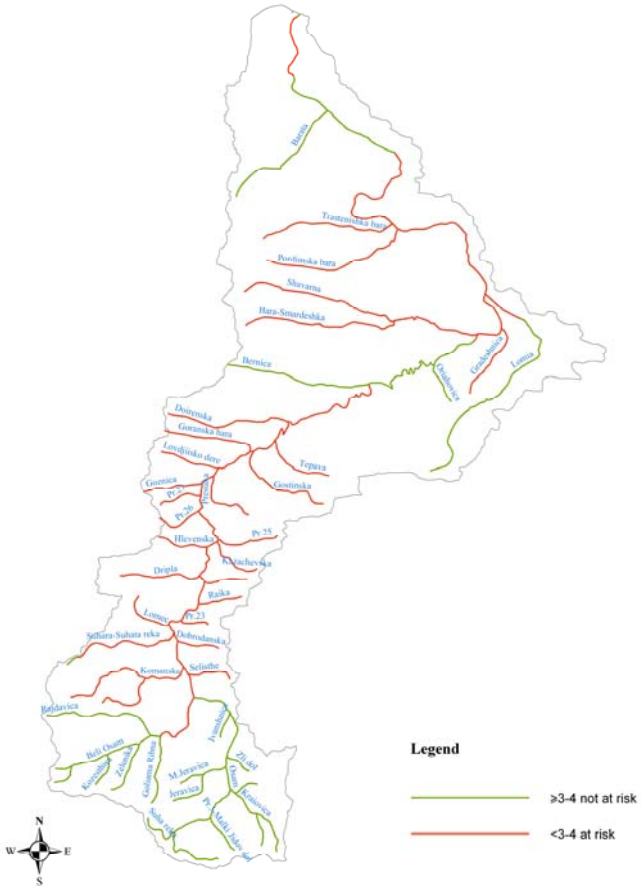


Figure 11: Osam river; organic pollution

2.1.2.1.2 Nutrients

The starting point in identifying the eutrofication potential of the nutrients is phosphates PO_4-P and nitrates NO_3-N related data (values). Data received from the monitoring points of the National System of Environmental Monitoring were used together with data from the points under Regulation No 12 which is related to the quality of surface waters used for drinking water supply.

Table 10: Osam river; pollution by nutrients

Line	Working aerea	River	Nutrients	
no.	name	name	ortho-PO4-P	NO3-N
1	Cherni Osam - from spring to influent in the river Osam	Osam	+	+
2	Beli Osam - from spring to influent in river Osam	Osam	+	+
3	Osam - after Troian town to the mouth	Osam	-	+
4	r.Dobrodanska to influent in the river Osam	Osam	+	+
5	r.Lomec to influent in the river Osam	Osam	+	+
6	Tributary 23 to influent in the river Osam	Osam	+	+
7	r.Raika to influent in the river Osam	Osam	+	+
8	r.Balgarensko dere to influent in the river Osam		+	+
9	r.Driplia to influent in the river Osam	Osam	+	+
10	r. Kazachevska to influent in the river Osam	Osam	+	+
11	r. Hlevenska to influent in the river Osam	Osam	+	+
12	Tributary 25 to influent in the river Osam	Osam	+	+
13	r.Bernica to influent in the river Osam	Osam	+	+
14	r.Oriahovica to influent in the river Osam	Osam	+	+
15	r.Gradeshnica to influent in the river Osam	Osam	+	+
16	r.Lomia to influent in the river Osam	Osam	+	+

Figure 12: Osam river; pollution by nutrients

2.1.2.1.3 Specific Chemical Substances

The assessment category „specific chemical substances“ covers the following groups of pollutants:

- Significant pollutants regarding the „ecological” assessment (as per Annex VIII of the WFD, other common physicochemicals (without N, P) and pollutants specific for the respective catchment area)
- Specific pollutants regarding the chemical status assessment (as per Annexes IX and X of the WFD / priority substances)
- Protection plant preparations.

The assessment of the specific chemical hazardous substances applies average values measured during the past 3 years – 2002, 2003 and 2004. The specific chemical hazardous substances were evaluated according to the applicable quality standards; since there are no such Bulgarian standards (no quality standards in force) the basis used are the existing assignments for the objectives; if those are not available - the expert judgment.

Data received from the monitoring points of the National System of Environmental Monitoring were used together with data from the points under Regulation No12 related to the quality of surface waters used for drinking water supply. They are classified into the “others” category substances available in the Osam River basin: cyanides, phenols and oil products.

Following substances are classified into the “others” category of substances available in the Osam River basin:

- cyanides, phenols and oil products.

No data were available on TOC (total organic hydrocarbons) and AOC (organic halogens), according to Regulation No12 related to the quality of surface waters used for drinking water supply. By 2007, methodologies related to the investigation of these substances shall be approved and adopted and will be included into the monitoring system.

Table 11: Osam river; pollution by specific chemical substances

Line	Working aerea	River	Specific chemical substances														
		name	Annex V					Annex VIII						Annex IX, X		
no.	name		Temperature	O_2	Cl	NH_4-N	pH	TOC	AOX	SO_4	Heavy matals	PSM Pesticides (agricultural)	Others	Heavy matals	Pesticides (agricultural)	Others
1	Cherni Osam - from spring to influent in the river Osam	Osam		+	+	+	+	n.a.	n.a.	+	+	+	+	+	+	+
2	Beli Osam - from spring to Beli Osam village	Osam		+	+	+	+	n.a.	n.a.	+	+	+	+	+	+	+
3	Beli Osam - from Beli Osam village to Troian town (before)	Osam		+	+	-	+	n.a.	n.a.	+	+	+	-	+	+	-
4	Osam - from Troian town (after) to Lovech town (before)	Osam		+	+	+	+	n.a.	n.a.	+	+	+	+	+	+	+
5	Osam - from Lovech town to Cherkvitza village (the mouth)	Osam		+	+	-	+	n.a.	n.a.	+	+	+	-	+	+	-
6	r.Doirenska to influent in the river Osam	Osam		+	+	+	+	n.a.	n.a.	+	+	+	+	+	+	+
7	r.Oriahovica to influent in the river Osam	Osam		+	+	+	+	n.a.	n.a.	+	+	+	+	+	+	+
8	r.Gradeshnica to influent in the river Osam	Osam		+	+	+	+	n.a.	n.a.	+	+	+	+	+	+	+
9	r.Lomia to influent in the river Osam	Osam		+	+	+	+	n.a.	n.a.	+	+	+	+	+	+	+
10	r.Barata to influent in the river Osam	Osam		+	+	+	+	n.a.	n.a.	+	+	+	+	+	+	+

Figure 13: Osam river; pollution by specific chemical substances

The point sources of pollution of surface water bodies were described and documented within the context of the twinning-project, using the Osam catchment area as an example. The following sources of pollution were dealt with only technically.

2.1.2.1.4 Diffuse Sources Pollution

Table 12: Osam river; diffuse sources pollution

DIFFUSE SOURCES			SUB BASIN
I.	**Urban areas without sewerage**	**PE > 2000**	
1.	Oreshak village	2 908	Cherni Osam River, Osam River catchment area
2.	Alexandrovo village	2 803	Osam River
3.	The town of Pordim	2 879	Shavarna river, Osam River catchment area
4.	The town of Slavianovo	5 836	Trastenishka Bara River, Osam River catchment area
6.	Obnova village	3 152	Pordimska Bara River, Osam River catchment area
II.	**Landfills**	**PE > 2000**	
1.	Slavianovo dump	5 836	Trastenishka Bara River, Osam River catchment area
2.	Letnitza dump	4 746	Osam River
3.	Levski dump	18 321	Osam River
4.	Lovech dump	85 667	Osam River
5.	Pordim dump	2 879	Shavarna River, Osam River catchment area
6.	Alexandrovo dump	2 803	Osam River
7.	Obnova dump	3 152	Pordimska Bara River, Osam River catchment area
III.	**Industry**	**Diffuse pollution**	
1.	MM Nikopol JSC, Nikopol – Cherkvitza village	Industrial waste deposit	Osam River
2.	Osam JSC, Lovech	Industrial waste deposit	Osam River
3.	Elma JSC, Troyan – Oreshak village	Hazardous waste deposit	Cherni Osam River
4.	Balkan JSC, Lovech	Hazardous waste deposit	Osam River
5.	Pig-breeding farm, Asparuhovo village	Lagoons	Osam River
6.	Pig-breeding farm of Troyamex Ltd, Kaleitza village	Lagoons	Osam River
7.	Pig-breeding farm of Troyamex Ltd, Bahovitza village	Lagoons	Lovdjijsko Dere River, Osam River catchment area

2.1.2.1.5 Hydromorphological Alterations and Flow Regulation

2.1.2.1.6 Abstraction from Surface Water Bodies

2.1.2.1.7 Flow Regulation

2.1.2.1.8 Morphological Alterations

2.1.2.1.9 Other Anthropogenic Impacts

2.1.2.1.10 Land Use Patterns

2.1.2.2 Summary

Within the Osam River basin, all water bodies falling into the Lake Category are identified as **"possibly at risk".** No data are available on these bodies and additional investigations are required.

Within the Osam River basin 6 water bodies falling into the River Category are identified as **"not at risk"**, and 8 water bodies in the River Category – as **"at risk"** (see Table 13 and Figure 14).

Table 13: Overall Risk Assessment of the Water Bodies in River Category in the Osam River catchment area

Line no.	Water Body no.	River name	Organic pollution	Nutrients	Specific chemical sunbstances	Overall Risk assessement
1	**WB 1**	Osam	- at risk	- at risk	possible at risk	- at risk
2	**WB 2**	Osam	+ not as risk	+ not as risk	+ not as risk	+ not as risk
3	**WB 4**	Osam	+ not as risk	+ not as risk	+ not as risk	+ not as risk
4	**WB 5**	Osam	+ not as risk	- at risk	- at risk	- at risk
5	**WB 7**	Osam	+ not as risk	- at risk	- at risk	- at risk
6	**WB 8**	Osam	+ not as risk	+ not as risk	+ not as risk	+ not as risk
7	**WB 9**	Osam	+ not as risk	+ not as risk	+ not as risk	+ not as risk
8	**WB 10**	Osam	+ not as risk	+ not as risk	+ not as risk	+ not as risk
9	**WB 11**	Osam	possible at risk	- at risk	- at risk	- at risk
10	**WB 12**	Osam	+ not as risk	- at risk	- at risk	- at risk
11	**WB 13**	Osam	+ not as risk	- at risk	- at risk	- at risk
12	**WB 14**	Osam	+ not as risk	- at risk	+ not as risk	- at risk
13	**WB 15**	Osam	+ not as risk	- at risk	- at risk	- at risk
14	**WB 16**	Osam	+ not as risk	+ not as risk	+ not as risk	+ not as risk

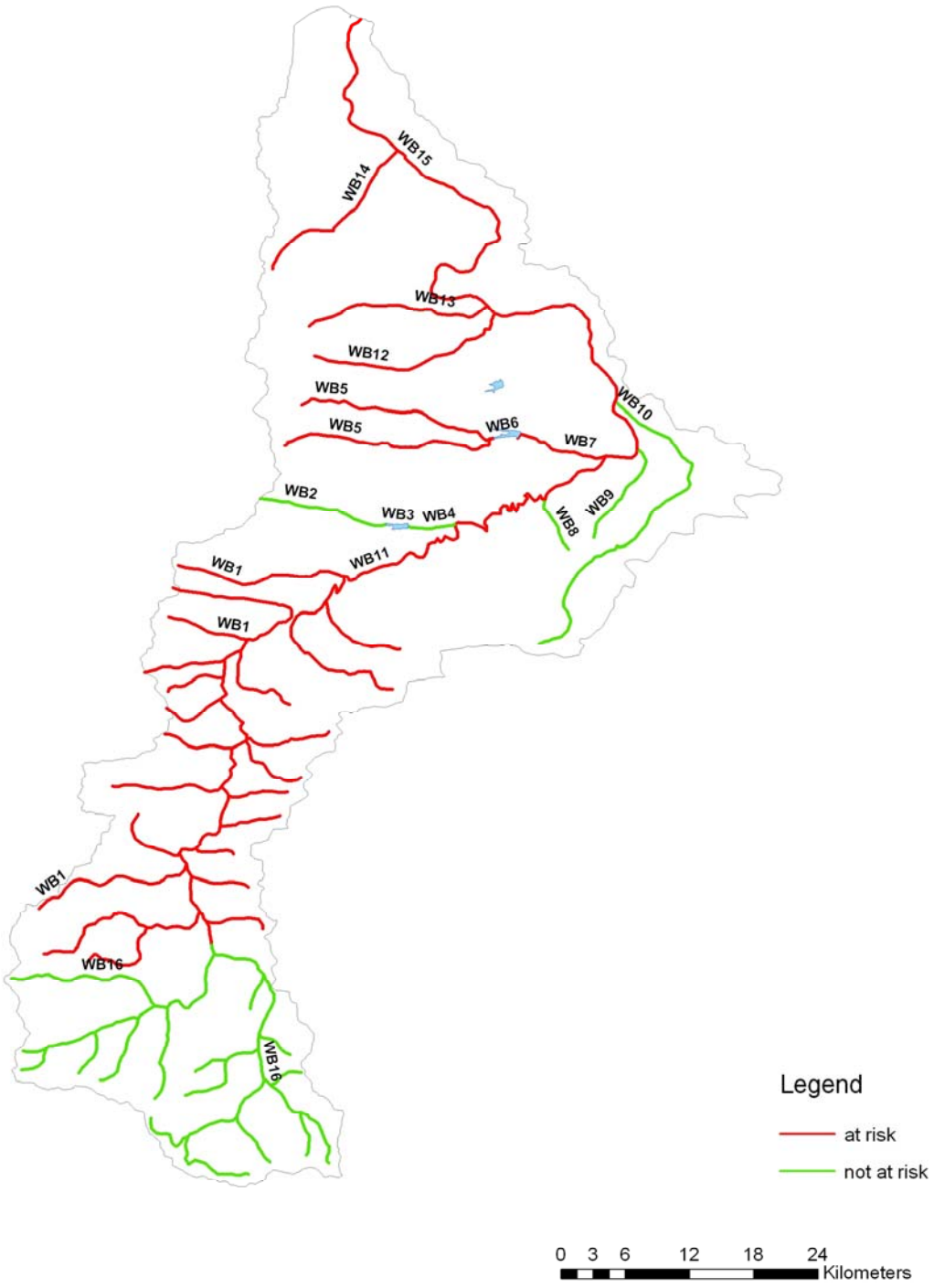


Figure 14: Overall Risk Assessment of the Water Bodies in River Category in the Osam River catchment area

2.1.3 Groundwater

2.1.3.1 Point Sources Pollution

According to the WFD, groundwater bodies, which are possibly endangered to the risk of point source infiltration of harmful substances, have to be identified within the initial characterization. First of all, this means predominantly potential point sources. The further characterization provides more precise characteristics and identifies those point sources, which are the reason for the characterization of the groundwater body as unlikely to achieve the objectives set in Article 4 of the WFD („at risk“). The further characterization reviews whether point sources really affect the good groundwater status.

In the database are registered potential point sources (old pesticide warehouses, big municipal landfills, small household waste deposits and recently constructed landfills, industrial sites of enterprises, industrial and hazardous waste landfills, locations of old pollutants and B-B cubes for collection, disposal, deactivation and safe storage of prohibited, unsold and unfit-for-use pesticides, still available in the country). Point sources, which have already been subject to or are currently undergoing rehabilitation, have not been considered. A potentially pressured surface of the groundwater body of about 1 km^2 (resulting from a 0,584 km impact radius) has been compared to each point source. In the Vit River catchment area there is one BB-cube site located in the region of the Kachitza mine – about 5 km north of the city of Pleven. It is assumed that the objective is unlikely to be achieved, if the sum of all active surfaces exceeds 33% of the surface of the respective groundwater body.

According to the expert judgment, an assumption is made that a GWB is “possibly at risk”, if between 20 and 33% of its area are endangered by point pressures. The further characterization investigates whether groundwater is really at risk, as a result of the harmful substances and hydrogeological conditions which exist at the point source location and which prevent the achievement of the objectives in the initial characterization. Therefore, a new assessment of the groundwater body compared to the outcropped surface will be carried out on the basis of the aforementioned scheme..

Table 14: Vit catchment area; Risk assessment point sources groundwater

Line	GWB	GWB	Area	Main Collector	Area - Vit		Point Sources	Area covered by Point Sources	0 = not at risk 1 = possibly at risk 2 = at risk
No 1	ID 2	name 3	[km²] 4	Type 5	[km²] 6	[%] 7	No 8	% 9	10
1	BG019	Alluvial aquifer of the Vit River	184	Porous	184	100	**23**	**25**	**1**
2	BG033	Pliopleistocene aquifer between Iskar and Vit Rivers	765	Porous	425	55	**14**	**7**	**0**
3	BG034	Pliopleistocene aquifer between Vit and Osam Rivers	989	Porous	266	27	**21**	**16**	**0**
4	BG044	Upper Cretaceous KB - Pleven-Nikopol	2040	Fissured-karstific	876	43	**28**	**6**	**0**
5	BG056	Lukovit KW System	973	Fissured-karstific	398	41	**9**	**5**	**0**
6	BG060	Lovech-Tarnovo KW System	1140	Karstific	227	19	**13**	**11**	**0**
7	BG087	Balkan KW System	5074	Porous	1024	20	**40**	**8**	**0**

The assessment of point source pressures on the groundwater bodies in the Vit River basin identifies that BG019 is the only groundwater body in the alluvium of the river that is „possibly at risk", while all the rest are "not at risk".

Annexes:

- map of point sources of pressures;
- map - assessment of point sources pressure

2.1.3.2 Diffuse Sources Pollution

According to the WFD, the groundwater bodies which might be at risk of diffuse sources infiltration of harmful substances have to be identified within the initial characterization.

Diffuse sources are:

1. Populated areas without a sewerage system, having more than 100 inhabitants.
2. CORINE LANDCOVER – LAND USE is to be used to differentiate types of land use as potential diffuse sources (arable land and perennial plants, urbanized areas).

Areas, which may contain potentially diffusive input substances (emission approach), havebeen registered, and the chemical composition of the groundwater has been reviewed in relation to the diffuse inputs from the surface (immission approach). For the emission approach have been used data regarding the land use on the outcropped surface. The assessment assumes that the emission source of settlements without sewerage should be their territory, enlarged with a 0,564 km wide strip (a radius of 1 km around the settlement). When the share of arable land and urbanized areas exceeds 75 % of the outcropped GWB surface, thebody is identified as being "at risk". The body is "possibly at risk" if the outcropped GWB surface is endangered by 50 - 75 %.

For the purpose of the immission approach, assessments were made of the chemical analysis of groundwater taken from sampling points and water abstraction facilities (with 1 km^2 impact zone) in relation to the groundwater body surface. Particular attention was paid to those substances, which might have been provoked by diffuse sources of pollution, as for example nitrates, plant protection preparations, chlorides, phosphates, ammonium, sulfates and pH. The assessment of the area is applicable only to outcrops of groundwater bodies on the surface. The nitrate content is a key parameter for diffuse inputs. The further characterization is carried out only for those groundwater bodies, for which the impact zone exceeds 33% of the outcrop surface and which are identified as being "at risk".According to the WFD, within the initial characterization they have to be identified the groundwater bodies which might be at risk of diffuse sources infiltration of harmful substances. Diffuse sources are:

1. Settlements without sewerage – more than 100 equivalent inhabitants.
2. Some land uses from CORINE LANDCOVER – LAND USE, as potential diffuse sources (arable land and perennial plants, urbanized areas).

Areas, which may contain potentially diffusively input substances (emission approach), have been registered, and the groundwater chemical composition in relation to the diffuse inputs from the surface (immission approach) has been reviewed. For the purposes of the emission approach data on the land use on the outcropped surface have been used. The assessment assumes that the emission source of settlements without sewerage shall be their territory, enlarged with a 0,564 km wide strip (a radius of 1 km around the settlement). When the share of arable land and urbanized areas exceeds 75 % of the outcropped GWB surface, the body is identified being "at risk". The body is "possibly at risk" if the outcropped GWB surface is 50 up to 75 % endangered.

For the purposes of the immission approach, assessments were made of the chemical analysis of groundwater taken from sampling points and water abstraction facilities (with 1 km^2 impact zone) in relation to the groundwater body surface. Particular attention is paid to those substances, which might have been provoked by diffuse sources of pollution, for example nitrates, plant protection preparations, chlorides, phosphates, ammonium, sulfates and pH. The assessment of the area is applicable only for outcrops of groundwater bodies on the surface. The nitrates content is a key parameter for diffuse inputs. The further characterization is carried out only for those groundwater bodies, for which the impact zone exceeds 33% of the outcrop surface and which are identified being "at risk".

Table 15: Vit catchment area; Risk assessment diffuse sources groundwater

Line	Ground-water body GWB	Out-cropped area	Crops, Arable land, Urban	Permanent Pasture, Grassland	Forest, Wood-land	Emission 0 = not at risk 1 = possibly at risk 2 = at risk	Measuring points with NO3 > 30 mg/l	Areas with NO_3 > 30 mg/l	Intrusion 0 = not at risk 1 = possibly at risk 2 = at risk
no	ID	[km²]	%	%	%		number (of total)	%	
1	**BG019**	184	75	9	26	**1**	8/36	4,37	**0**
2	**BG033**	765	87	6	7	**2**	0/12	0,00	**0**
3	**BG034**	989	81	4	5	**2**	1/1	0,10	**0**
4	**BG044**	2040	47	11	29	**0**	10/14	0,00	**0**
5	**BG056**	973	41	13	46	**0**	0/2	3,26	**0**
6	**BG060**	1140	45	10	45	**0**	0/3	0,00	**0**
7	**BG087**	5074	20	11	69	**0**	0/19	0,00	**0**

After land use areas were overlapped on the outcropped surface of the groundwater bodies and the percentage proportion of the arable land to the area of each body was identified, the conclusion was made that 2 bodies (BG033 and BG034) are "at risk" of land use pressure. The reason is the high share of arable land in these bodies – 83% and 81% respectively. 75% of the outcropped area of BG019 GWB is exposed to diffuse pressure and the expert judgment identifies this body as "possibly at risk".

Annexes:

- map of land uses;
- map of settlements without sewerage;
- map – assessment of the diffuse sources pressure.

2.1.3.3 Groundwater Hydrological Regime (Water Balance)

The water balance describes the pressure on the quantitative status in relation to the water abstraction and artificial recharge. According to Annex V, item 2.1.1 of the WFD good quantitative status is identified when the groundwater level in the groundwater body is such that the available groundwater resources are not exceeded by the long-term annual average rate of abstraction. The parameters of risk assessment of the quantitative status are either the groundwater level or the estimated water balance of the groundwater body.

During the examination of the anthropogenic impact on the quantitative status of the groundwater bodies according to the WFD, the quantitative status identified for the initial characterization is based on data related to water bodies which are used for water abstraction for human consumption, providing more than 10 m3 a day as an average or serving more that fifty

persons as well as water bodies intended for such future use and to places of direct water discharge, as well as artificial GWB recharge.

The parameters, registered during the quantitative status identification for the initial characterization, refer to the average annual rate of water abstraction (springs and wells), the flow direction and the kind of water exchange between the groundwater body and thereto- associated surface aquatic systems.

Data on the levels of well and spring capacities are taken from the central database of the National Institute of Meteorology and Hydrology (NIMH). Data related to the last 5 years are borrowed from the MoEW, BD and EEA. If the assessment of an individual groundwater body is not satisfactory, a balance shall be made between the abstraction from wells and springs and the groundwater recharge for each groundwater body. If the water abstraction exceeds 50 %, the groundwater body is estimated to be „at risk“

In order to identify the total groundwater flow of each water body, i.e. infiltration recharge = natural resource Q_{ecm}, in the Vit River catchment area, the water balance method is applied, based on the following equation:

$$Q_{ecm} = Q_{\rho} = 2.74\left(P_{an} - E_{an}\right)F - Q_s = 2.74W_{an}F \ ,$$

Whereas:

Q_{ρ} is the average annual rate of groundwater flow, m3/d.
P_{an} is the average annual rate of rainfall [mm]
E_{an} is the evapotranspiration [mm] calculated by Turc's formula

$$E_{an} = \frac{P_{an}}{\sqrt{0.9 + \frac{P_{an}^{\ 2}}{300 + 25t + 0.05t^2}}}$$, where t is a 365 days period

Q_s – average annual rate of the surface flow, m3/d.
F – Outcropped area of the water body, km^2
W_{an} – average annual rate of infiltration, mm

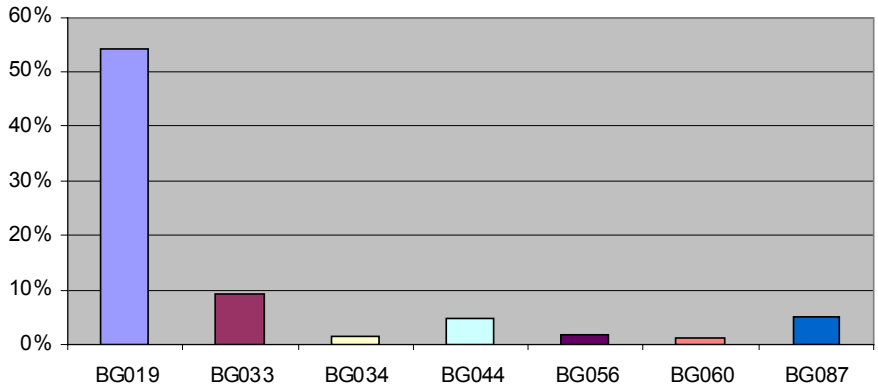
In order to identify the infiltration recharge of each water body, the data available from the

NIMH for the representative points were processed and the final averaged values are presented in table Table 16*.* The artificial recharge is included in the groundwater recharge.

Table 16: Groundwater Balance Vit river basin

Line	Groundwater body GWB		Outcropped Area	Permitted Water Use,	Average Annual Rate of Rainfall	Evaporation	Infiltration Recharge	Surface water flow,	Groundwater flow,	Recharge of GWB,	Recharge from Surface Waters,	Quantitative assessment, %	Risk assessment
no	ID	name	[km²]	[mln.m^3]	[mm/year]					[mln.m^3]	[mln.m^3]	[%]	0 = not at risk 1 =possibly at risk 2 = at risk
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	BG019	Alluvial aquifer	184	24, 99	578	442	136	82	54	10,05	35,05	54.4	2
	BG033	Pliopleistocene aquifer between Iskar and Vit Rivers	425	1,36	543	427	116	70	46	19,68	0,00	9,3	0
	BG034	Pliopleistocene aquifer between Vit and Osam Rivers	266	0,20	556	433	123	74	49	13,10	0,00	1,5	0
	BG044	Upper Cretaceous KB -Pleven-Nikopol	876		668	457	211	127	85	74,05	0,00	4,5	0
5	BG056	Lukovit KW System	398	0, 70	830	495	335	235	101	40,02	0,00	1,9	0
6	BG060	Lovech-Tarnovo KW System	227	0, 10	603	436	167	117	50	11,35	0,00	0.9	0
7	BG087	Balkan karst massif	5.024	27, 34	845	453	392	275	118	591,39	0,00	4,9	0

The assessment of pressure on the quantitative status in relation to the abstraction from groundwater bodies within the Vit River catchment area identifies the water body BG019 (Quaternary aquifer – alluvium of the Vit River) as “at risk” of water abstraction. The infiltration recharge in addition to the artificial ditch recharge (in the regions of Krushovitza pumping station, Plama pumping station, D. Mitropolia pumping station and Bivolare pumping station) of groundwater in the Vit River ledge is 36.276.143 m³ and is not able to provide sufficient water quantity to satisfy the demands. The rest of the water bodies are identified as „not at risk” of water abstraction.



(x – Groundwater body; y – Quantitative assessment (%))

Figure 15: Water Use Risk Assessment of the GWB in the Vit River Basin

Annex – map of drinking water supply sources

2.1.3.4 Other Anthropogenic Pressures

Apart from the impact of point and diffuse sources as well as the quantitative status, in compliance with the WDF there are to be assessed also other impacts of anthropogenic activities on large surfaces that may be related to groundwater quality, groundwater quantity and the groundwater flow regime. Such may be for instance the steps of cascades of rivers, dams, respectively, water retention basins in case of floods, waste water discharge in aquifers, (for instance discharge of water in connection with seeking, research and extraction of oil and natural gas), spoils, measures affecting large areas for drainage of marshlands, and in the mining, or large-scale projects in the field of high or underground construction that affect groundwater. Similar types of measures must be assessed in terms of their impact on the entire surface area of a particular groundwater body.

There are 234 dam-lakes along the Vit River Basin: 5 larger (Sopot, Telish, G.Dabnik, Krushovitza and Valchovetz) and 229 small bodies, which do not exert an anthropogenic pressure on the groundwater. The Hydro Power Plants located along the Vit River catchment area (Beli Vit, Cherni Vit, Lisetz and Rakita) do not impact the composition, quantities and regime of the groundwater.

Annex – *map of the dam-lakes*

2.1.3.5 Groundwater Status

The assessment of the groundwater body status in the Vit River catchment area was carried out. The results are presented in Figure 16*.* According to the quantitative status, one of the groundwater bodies (BG019) is “at risk” concerning the water abstraction, which means 12.5 % of the groundwater bodies. According to the chemical status, 25 % of the outcropped surface of the groundwater bodies is at risk of point and diffuse sources of pressures.

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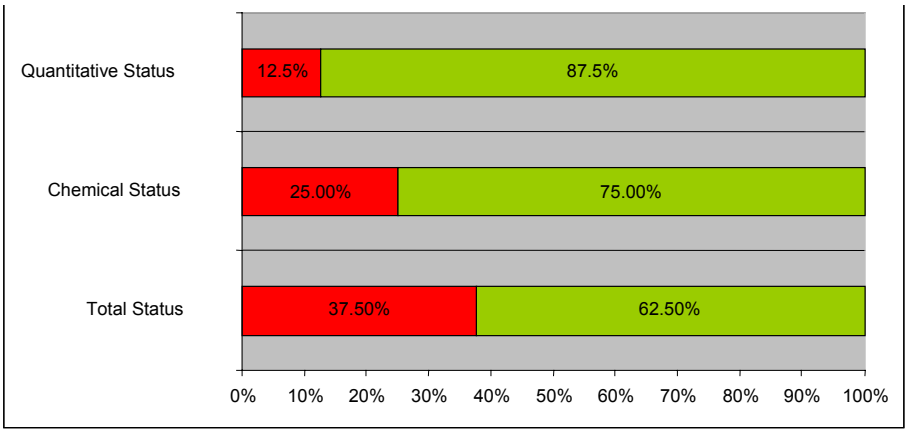

Figure 16: Overall Assessment of the GWB Status in the Vit River catchment area

In general terms, 37.5 % of the outcropped groundwater body surface in the Vit River basin, respectively 43 % of the groundwater bodies seem to be at risk of failing the objectives.

After the implementation of planned measures for the achievement of a good environmental status of the groundwater in the Vit River basin in relation to point and diffuse pressures and quantitative status, the objectives are likely to be achieved.

Annex – map of the overall groundwater status

2.1.3.6 Assessment of Groundwater Dependent Terrestrial Ecosystems

The results obtained from overlapping the impact zones around the water sources on the ecosystems are shown in Table 17.

Table 17: Assessment of groundwater dependent terrestrial Ecosystems

No	Catchment area	Ecosystem	Total area, km2	Areas of dependent parts, km2	Dependent areas compared to the total area, %
1	Vit	Vit River	109,10	9,29	8,52
2	Vit	Studenetz	234,24	6,42	2,74

In the ecosystems in the Vit River basin, there are few groundwater abstractions, operated by water abstraction facilities, which have a water level depth of not more than 5 m. The impact zone around the facilities impacts a part of the ecosystems (8,52% and 2,74%). Therefore, there are two potentially groundwater dependent terrestrial ecosystems within the Vit River basin, in the zones of which measures are to be undertaken to protect their state.

Hydrometrical measuring shows that the Vit River loses 0,8 m^3/s of its water between the village of Glojene, Teteven Municipality and the Boaza locality. This district of the Vit River catchment area does not contain any Natura 2000 designated ecosystems; therefore, the water losses do not have that drying impact.

Annex – map of dependent ecosystems

3. Protected Areas

3.1 Areas, designated for water abstraction and areas containing mineral springs

3.1.1 Sanitary-hygiene zones and medicinal springs

Article 7 (1) of the WFD requires that within each river basin district all water bodies shall be identified which are used for water abstraction for human consumption, providing more than 10 m3 a day as an average or serving more than fifty persons as well as water bodies intended for such future use.

Drinking water supply of the settlements in the Vit River catchment area is provided by surface waters and groundwater, but the groundwater predominates. The Water supply system management and maintenance along the catchment area is carried out by “Water Supply and Sewerage” Ltd – Pleven and “Water Supply and Sewerage” JSC – Lovech.

There are 256 water sources for drinking water supply from groundwater within the Vit River basin provided with a sanitary-hygiene belt I according to Regulation No2/1989. 115 of these are wells, the remaining part - springs and drainages. The new Regulation No3/16.10.2000 related to the conditions and procedure for exploration, design, approval and exploitation of sanitary-hygiene zones (SHZ) around water sources and facilities for drinking water supply and around water sources for mineral waters, used for medical, prophylactic, drinking and hygiene needs (SG 88/27.10.2000) states that sanitary-hygiene zones provided with belts I, II and III have to be established.

Belt I is the most inner belt securing a strict protection, located immediately around the water source and/or the facility of human activity, which can damage the used water.

The middle belt II is to protect the water source from pollution by chemical, biological, readily disintegrated, readily dissociable and strongly absorbing substances, resulting from operations liable to cause diminution of water resources and/or the projected capacity of the water abstraction facility as well as from other activities that may deteriorate the quality of abstracted water and/or the water source status.

The external belt III is meant to protect the water source from pollution with chemical, slowly disintegrated, non readily dissociable, bad absorbent and non absorbent substances, resulting from activities liable to cause diminution of water resources and/or the projected capacity of the water abstraction facility as well as from other activities that may deteriorate the quality of abstracted water and/or the water source status.

Depending on the kind of water source for drinking water supply (surface water body or groundwater body) Regulation No 3 provides lists of prohibitions and/or restrictions on certain activities in belts II and III of the SHZ.

All water sources in the Vit River basin are provided with belt I of the SHZ established under the Regulation No 2 / 1989. The boundaries of these zones are to be set in conformity with the requirements of Regulation No 3 / 16.10.2000. According to §4 (1) of the Transitional and Final Provisions of Regulation No 3 / 16.10.2000, the SHZ established under the Regulation No 2 of 1989 shall be set in conformity with the provisions of Regulation No 3 / 16.10.2000 regarding the boundaries and protection regimes applied in belts II and III (see Table 18).

Table 18: Register of Areas, designated for water abstraction for human consumption (Sanitary-Hygiene zones of water sources for drinking water supply)

No	Site – Sanitary-Hygiene Zone	Kind of water source	Water body, Catchment area, Tributary, Code	Location			Area of belt III da.	Establishment Ordinance
				Settlement	Municipality	Region		
1	2	3	4	5	6	7	21	23
1	Additional water supply of Shipkovo village (baths) – catchment from Stargonska river Konchetata locality	surface waters	Osam	Shipkovo village	Troyan	Lovech	1.259.973	SHZ-**03**/05.11.03
2	Water supply of Packing-house -Lovech"JSC from Abyssinian well -С1Б-ХГ	groundwater	Osam	Lovech	Lovech	Lovech	138.474	SHZ-**27**/22.10.04
3	Borehole P-2ХГ	groundwater	Osam	Totleben village	Pordim	Pleven	79.545	SHZ-**54**/04.04.05
4	Shaft well for drinking water supply of Vrabevo village	groundwater	Osam	Vrabevo village	Troyan	Lovech	64.040	SHZ-**57**/07.04.05
5	Shaft well 2, Shaft well 3, Shaft well 4 for drinking water supply of MELTA-90 JSC Lovech	groundwater	Osam	Lovech	Lovech	Lovech		SHZ-**75/**11.01.06

In relation to a groundwater source, only one SHZ has been established so far according to Regulation No 3/ 16.10.2000. Others are provided only with safeguard belt I (see Table 19).

Table 19: Register of Areas, designated for water abstraction for human consumption (Sanitary-Hygiene zones of water sources for drinking water supply)

No	Water User	Water Source	Ordinance for SHZ	Number of Belts	Legislation
1	"MISS PETRA" LTD	Catched spring	SHZ–91/ 29.05.2006	3	Regulation No 3/16.10.2000

Annexes:

- Map of drinking water supply sources provided with only belt I
- Map of drinking water supply sources provided with belts I, II and III of SHZ under Regulation No 3.

3.1.2 Areas, designated for protection of economically significant aquatic biological species

Until now, the MoEW has not set any criteria for the identification of economically significant species and for the identification of protected areas designated for protection of such species, respectively. The Bulgarian legislation contains no provisions on how to designate such types of protected areas.

3.1.3 Water basins designated as recreational and bathing waters

There are no water basins designated on the territory of the Danube River Basin Directorate as recreational and bathing waters.

3.1.4 Areas, designated for protection of habitats and biological species (FFH) and bird species

NATURA 2000 sites have been designated according to the EU Habitats and Birds Directives. These areas are referred to in the EU legislation as special protection areas, which include both protected areas (Under the Protected Areas Act) and areas, which are not pro-

tected but are related to such areas and form eco-passages for genetic exchange. The NATURA 2000 designation process is open to any suggestions by the Regional Environmental Inspectorates, municipalities, eco-organizations etc.

Table 20: Areas for protecting of FFH in the Osam River catchment area

PA category	Protected Area	water site, code (catchment area)	Location			Area ha	Designation objective - protected species
			Settlement	Municipality	Region		
Reserve							
R	Kozia Stena	Osam	Chiflik village	Lovech	Lovech	904,3	venerable beech forests, edelweiss habitat
Protected area							
PA	Eliata	Osam	Batzova mahala village	Nikopol	Pleven	0,3	Riparian venerable forest
Natural landmark							
NL	Brambar skok	Osam	Troyan	Troyan	Lovech	0,3	6 m waterfall on the Beli Osam River
NL	Banovski skok	Osam	Troyan	Troyan	Lovech	0,5	6 m waterfall on Bukovski dol River
NL	Lopushnitza	Osam	Kaleitza village	Troyan	Lovech	0,2	9 m waterfall on Lopushnitza River
NL	Koman	Osam	Terzijsko village	Troyan	Lovech	0,2	3 m waterfall on Komanska River
NL	Maarata	Osam	Krushuna village	Letnitza	Lovech	5,7	karst spring on Maarata River
NL	Devetashka cave	Osam	Devetaki village, Doirentzi village	Lovech	Lovech	14,6	archeological bodies, habitats of rare animal species (bats and invertebrates), drinking water catchment

Category PA – protected area, according to the Protected Areas Act
R – Reserve
PA – Protected Area
NL – Natural Landmark

Table 21: Data provided by the project for establishment of NATURA 2000 protected areas network in Bulgaria

No	Code	name	Area [ha]	Municipality	Region
1	BG0000405	Tzentralen Balkan	153.147.236	TROYAN TETEVEN UGARCHIN YABLANITZA TETEVEN	Lovech Lovech Lovech Lovech Lovech
2	BG0000234	Mikre	5.365.884	TROYAN LOVECH UGARCHIN	Lovech Lovech Lovech
3	BG0000215	Devetashko plato	6.803.453	LETNITZA LOVECH SEVLIEVO	Lovech Lovech Gabrovo
4	BG0000239	Obnova - Karaman dol	10.187.688	LEVSKI LETNITZA SVISHTOV PORDIM PLEVEN NIKOPOL	Pleven Lovech Veliko Pleven Pleven Pleven
5	BG0000247	Nikopolsko plato	18.260.334	NIKOPOL BELENE	Pleven Pleven
6	BG0000396	Persina	27.944.841	BELENE NIKOPOL SVISHTOV GULIANTZI	Pleven Pleven Veliko Pleven

4. Monitoring

4.1 Monitoring Network

4.1.1 Surface Waters

4.1.1.1 Surveillance monitoring - Osam River catchment area

Table 22: River Category

No 1	Point Type [1] 3	Point Name 4	Geographic Coordinates X N 5	Geographic Coordinates Y E 6	Code of the water body 7	Type of water body [2] 8	Quality Elements: Biological quality elements [3] Phytoplankton 9	Macrophytes 10	Phytobenthos 11	Benthic invertebrates 12	Fish fauna 13	Physico-chemical quality elements: Physico-chemical indicators 14	Priority Substances [5] 15	Specific pollutants [6] 16	Hydromorphological elements [7] 17
1.	P_{sdr}	Cherni Osam, catchment - Benta	24°46'41''	42°47'50''	WB 16		x	x	x	x	x	I,II	6, 20, 28	I -1, 2,13,14, 15, 16, 17;II-1,2,3,4,5,6; III-1,2	1 - 3
2.		Osam after Troyan	24°43'13''	42°54'16''	WB 1	10		x	x	x	x	I,II	6, 20, 23	I-1, 2 ; ,II-1, 3, 4; III -1,2	1 - 3
3.		Osam after Lovech	24°48'17''	43°11'42''	WB 1	10		x	x	x	x	I,II	6, 20, 23	I-1, 2 ; ,II-1, 3, 4; III -1,2	1 - 3
4.		Osam after Levski	25°09'17''	43°22'17''	WB 11	11		x	x	x	x	I,II	6, 20, 23, 24	I-1, 2 ; II-1, 3, 4; III -1,2	1 - 3
5.		Shavarna River before mouth into the Osam River	25°00'40''	43°21'01''	WB 5, 7, 12,13,14	7		x	x	x	x	I,II	6, 20, 23	I-1, 2 ; II-1, 3, 4; III -1,2	1 - 3
6.		Osam at Izgrev	25°03'54''	43°26'38''	WB 15	8		x	x	x	x	I,II	6, 20, 23, 24	I-1, 2 ; II-1, 3, 4; III -1,2	1 - 3
7.		Osam at Cherkvitza	24°51'00''	43°40'27''	WB 15	8		x	x	x	x	I,II	Jan 33	I-1-29; II-1-6; III-1-2	1 - 3

Table 23: Lake Category

No 1	Point Type [1] 3	Point Name 4	Geographic Coordinates N X 5	Geographic Coordinates E Y 6	Code of the water body 7	Type of the water body [2] 8	Quality Elements: Biological quality elements [3] Phytoplankton 9	Macrophytes 10	Phytobenthos 11	Benthic invertabrates 12	Fish fauna 13	physicochemical quality elements: Physicochemical indicators 14	Priority Substances [5] 15	Specific pollutants [6] 16	Hydromorphological elements [7] 17
		OSAM catchment area													
1	HMWB	***Alexandrovo dam-lake***	43°16'18,5"	24°54'56,3"	WB 3	TL 13									
1.1		On the dam					x			x		I, II- 6,7			
1.2		At the tail-end						x	x						
2	HMWB	***Kamenetz dam-lake***	43°21'10,3"	25°02'42,9"	WB 6	TL 6									
2.1		On the dam					x			x		I, II- 6,7			
2.2		At the tail-end						x	x						
3	AWB	***Lajenska Bara dam-lake***	43°23'39,2"	25°01'31,9"	WB 16	TL 1									
3.1		On the dam					x			x		I, II- 6,7			
3.2		At the tail-end						x	x						

4.1.1.2 Operational monitoring - Osam River catchment area

No 1	Point Name 4	Geographic Coordinates N X 5	Geographic Coordinates E Y 6	Water Body Code 7	Water body type [2] 8	Quality Elements: Biological quality elements[3] Phytoplankton 9	Macrophytes 10	Phytobentos 11	Benthic invertabrates 12	Fish fauna 13	Physico-chemical quality: Physico-chemical indicators 14	Hydromorphological elements[7] 17
1.	Osam River, after Troyan	24°43'13''	42°54'16''	WB 1	10		x	x	x	x	I – 9,10, 11,12,13,14	I-1,2; III-3
2.	Osam River, after Lovech	24°43'13''	42°54'16''	WB 1	10		x	x	x	x	I – 9,10, 11,12,13, 14	
3.	the Osam River after Levski	25°09'17''	43°22'17''	WB 11	11		x	x	x	x	I – 9,10, 11,12,13, 14	
4.	Shavarana River before mouth into the Osam River	25°00'40''	43°21'01''	WB 5, 7, 12,13,14	7		x	x	x	x	I – 9,10, 11,12,13, 14	
5.	Osam River at Izgrev	25°03'54''	43°26'38''	WB 15	8		x	x	x	x	I – 9,10, 11,12,13, 14	
6.	Osam River at Cherkvitza	24°51'00''	43°40'27''	WB 15	8		x	x	x	x	I – 9,10, 11,12,13, 14	

Legend:

[1] R – Referent point; $I_{h/g}$ – Intercalibration point (high/good) ; $I_{g/m}$ - (good/moderate)
F_s – Fluction point (infusion into the sea); F_{cb} – (before state border crossing)
P_{sdr} – Protected areas - surface water used for drinking water supply
P – Protected areas other than the above indicated

[2] Symbol 1, 2, 3 etc indicates the type of the water body, according to Annex 1, where a table will be given containing numeration of water body types for rivers, lakes, coastal waters (after being finally specified) 1 - type … ; 2 – type …. etc.

[3] Symbol X in the respective column is meant to indicate the respective biological quality element to be monitored according to Annex 2. Except if otherwise indicated, the monitoring frequency corresponds to Annex 2.

[4] Symbol I and II in the respective column is meant to indicate the groups of basin physico-chemical indicators to be monitored according to Annex 3. Except if otherwise indicated, the monitoring frequency corresponds to Annex 3.

[5] Numbers (1, 2, 3 …) in the respective column are meant to indicate priority substances to be monitored according to Annex 4. Except if otherwise indicated, the monitoring frequency corresponds to Annex 4.

[6] Numbers (1, 2, 3, …) in the respective column are meant to indicate specific pollutants to be monitored according to Annex 5. Except if otherwise indicated, the monitoring frequency corresponds to Annex 5.

[7] Numbers (1, 2, 3, …..) in the respective column are meant to indicate the respective hydromorphological elements to be monitored according to Annex 6. Except if otherwise indicated, the monitoring frequency corresponds to Annex 6.

Monitoring frequency: ^{m} - once per month; $^{3\,m}$ - one per three months etc..; ^{y} – once per annum ; ^{3y} - three times per annum etc.

Table 24: Annex 3: Basic physico-chemical indicators

No	Group I	No	Group II
1	pH	1	Nitrogen total
2	Temperature	2	Phosphorus total
3	Unsolved substances	3	Calcium
4	Transparency (Sekki disk)**	4	Magnesium
5	Chlorophyll A	5	Total solidity
6	Electric conductivity	6	Iron total
7	Dissolved O2 Nitrates	7	Manganese
8	O_2 Chloride Saturation	8	Calcium carbonate hardness ***
9	.Biological Oxygen Demand 5	9	Hydrogen sulfite***
10	Chemical Oxygen Demand		
11	Nitrogen-ammonium -N - NH4		
12	Nitrogen nitrate - N- NO3		
13	Nitrogen nitrite- N- NO2		
14	Orthophosphates - P- PO4		
15	Chlorides		
16	Sulfates		

* Monitoring frequency - quarterly
** For lakes and coastal sea waters and the Danube river
*** To be analyzed if necessary and upon the BD's discretion

Table 25: Annex 4: Priority substances in the field of water policy according to the Water Framework Directive 2000/60/EEC in Bulgaria

No	CAS number	EU number	Name of priority substance	Possibility to analyze	Remarks
1	15972-60-8	240-110-8	Alachlor	No	Method and internal standard
2	120-12-7	204-371-1	Anthracene	Yes, in future	
3	1912-24-9	217-617-8	Atrazine	Yes	
4	71-43-2	200-753-7	Benzene	Yes	
5	n.a.	n.a.	Brominated diphenylethers	No	Method and internal standard
6	7440-43-9	231-152-8	Cadmium and its compounds	Yes	
7	85535-84-8	287-476-5	C_{10-13} chloralkanes	No	Method and internal standard
8	470-90-6	207-432-0	Chlorfenvinphos	No	Method and internal standard
9	2921-88-2	220-864-4	Chlorpyrifos	No	Method and internal standard
10	107-06-2	203-458-1	1,2-Dichloroethane	Yes	
11	75-09-2	200-838-9	Dichloromethane		
12	117-81-7	204-211-0	Di(2-ethylhexyl) phthalate (DEHP)	No	
13	330-54-1	206-354-4	Diuron	Yes, in future	
14	115-29-7	204-079-4	Endosulfan	Yes	
	959-98-8	n.a.	alpha-endosulfan	Yes	
15	118-74-1	204-273-9	Hexachlorobenzene	Yes	
16	87-68-3	201-765-5	Hexachlorobutadiene	Yes, in future	
17	608-73-1	210-158-9	Hexachlorocyclohexane	Yes	
	58-89-9	200-401-2	(gamma-isomer,Lindane)	Yes	
18	34123-59-6	251-835-4	Isoproturon	No,	Method and internal standard
19	7439-92-1	231-100-4	Lead and its compounds	Yes	
20	7439-97-6	231-106-7	Mercury and its compounds	Yes	
21	91-20-3	202-049-5	Naphthalene	Yes, in future	
22	7440-02-0	231-111-4	Nickel and its compounds	Yes, in future	
23	25154-52-3	246-672-0	Nonylphenols	No	Method and internal standard
	104-40-5	203-199-4	(4-(para)-nonylphenol)	No	Method and internal standard
24	1806-26-4	217-302-5	Octylphenols	No	Method and internal standard
	140-66-9	n.a.	(para-tert-octylphenol)	No	Method and internal standard
25	608-93-5	210-172-5	Pentachlorobenzene	Yes, in future	
26	87-86-5	201-778-6	Pentachlorophenol	No	Method and internal standard
27	n.a.	n.a.	Polyaromatic hydrocarbons	Yes, in future	
	50-32-8	200-028-5	(Benzo(a)pyrene)	Yes, in future	
	205-99-2	205-911-9	(Benzo(b)fluoroanthene)	Yes, in future	
	191-24-2	205-883-8	(Benzo(g,h,i)perylene)	Yes, in future	
	207-08-9	205-916-6	(Benzo(k)fluoroanthene)	Yes, in future	
	206-44-0	205-912-4	(Fluoroanthene)	Yes, in future	
	193-39-5	205-893-2	(Indeno(1,2,3-cd)pyrene)	Yes, in future	
	122-34-9	204-535-2	Simazine	Yes	
28	688-73-3	211-704-4	Terbuthyltin compounds	No	Method and internal standard
	36643-28-4	n.a.	(Terbuthyltin-cation)	No	Method and internal standard
29	12002-48-1	234-413-4	Trichlorobenzenes	Yes, in future	
30	120-82-1	204-428-0	(1,2,4-Trichlorobenzene)	Yes, in future	
31	67-66-3	200-663-8	Trichloromethane (Chloroform)	Yes, in future	
32	1582-09-8	216-428-8	Trifluralin	No	Method and internal standard

Table 26: Annex 5: Specific pollutans

No	Organic substances I	No	Heavy metals and metalloids II	No	Others III
1	Phenols	1	Zink	1	SS anion active
2	Oil products	2	Copper	2	Cyanides
3	Aldrin	3	Chromium 6 valent		
4	Dieldrin	4	Chromium 3 valent		
5	Endrin	5	Arsenic		
6	Isodrin	6	Selenium		
7	Carbontetrachloride				
8	Tetrachloroethylene				
9	Trichloroethylene				
10	Polychlorinated biphenyiles(PCB)				
11	EOX (extractable)				
12	AOX (absorbable)				
13	o,p - DDE				
14	p,p- DDE				
15	o,p - DDD				
16	p,p - DDD + o,p DDT				
17	p,p - DDT				
18	Prometon				
19	Prometryn				
20	Propazine				
21	Ametrin				
22	Simetryn				
23	Terbutryn				
24	Dichlorodifluoromethane				
25	Chloromethane				
26	Bromomethane				
27	Bromodichloromethane				
28	1,4 - dichlorobenzene				
29	1,2 - dichlorobenzene				

Monitoring frequency: quarterly

The frequency of monitoring on the individual indicators may be changed depending on the obtained data about their values and dynamics in time.

4.1.2 Groundwater

When starting the implementation of the programmes of measures, provided for the River Basin Management Plans, Member States shall apply necessary measures to prevent or limit the input of pollutants in groundwater and to prevent deterioration in the status of all groundwater bodies, subject to the provisions of Paragraphs 6 and 7 without prejudice to the provisions of Paragraph 8 of Article 4 of the WFD, to which Article 11(3)(j) is applied. Member states shall protect, enhance and restore all groundwater bodies, with the aim of achieving a balance between the abstraction and recharge of groundwater at the latest 15 years after the date of entry into force of the WFD, in accordance with the provisions set in Annex V.

Groundwater monitoring is carried out through monitoring networks, which aim at monitoring the quantitative and qualitative status of the groundwater bodies. In relation to the new groundwater body classification, after groundwater bodies are designated, the groundwater body monitoring network shall be set in accordance with the requirements of Articles 7 and 8. The monitoring network is designed so as to guarantee a reliable quantitative status assessment of all groundwater bodies or groups of bodies, including the assessment of the available groundwater resources.

The quantitative status observation of the groundwater bodies is carried out by the NIMH (National Institute of Meteorology and Hydrology) within the BAS (Bulgarian Academy of Science), through the specially established network of wells and springs.

The groundwater quality status monitoring is carried out by the EEA (Executive Environmental Agency) within the MoEW.

The quantitative status network includes representative monitoring points for assessment of the level of the groundwater bodies. *S*uch points shall be more densely established when used for water bodies, identified as being at risk of failing the environmental objectives according to Article 4 of the WFD.

4.1.2.1 Surveillance Groundwater Monitoring

A list of groundwater monitoring points in the Vit River basin is presented in Table 27.

4.1.5.1.1. Monitoring of the Quantitative Status

The quantitative status of the groundwater bodies takes the form of a regime-based observation on groundwater level through the established monitoring network. In relation to the quantitative groundwater monitoring in the region of the Danube River Basin Directorate an assessment is made of the existing network of the National Institute of Meteorology and Hydrology.

Currently, the groundwater level in the Vit River basin is monitored by 3 points of the NIMH, 10 points, operated by the DRBD, and 6 points under the permission regime. The groundwater level monitoring points are selected so as to cover the area of water body from the south northwards to the Danube River.

Groundwater level measuring shall be carried out on a monthly basis. Monitoring data from the NIMH points shall be delivered to the DRBD quarterly. The data from the self-monitoring points under the issued water use permissions shall be delivered quarterly and the monitoring will be carried out monthly.

Table 27: Groundwater monitoring points in the Vit River Basin

No	Aquifer, ground water body, code	Monitoring Point					Aquifer	Measurements for the quantitative status no/Year	Samplings for qualitative analysis no/Year	
		Code	Location	Municipality	Type of Analysis	Operator			Group I	Group II
1	2	3	4	5	6	7	8	9	10	
1	BG019	214605	Pobeda	Dolna Mitropolija	quantitative	NIMH - Pleven	Alluvial aquifer of Vit River	4		
2	BG019	2221501	Dolna Mitropolija	Dolna Mitropolija	chemical	EEA			4	2
3	BG019		Pobeda	Dolna Mitropolija	quantitative	DRBD and EEA		4	4	2
4	BG019		Pobeda	Dolna Mitropolija	chemical	DRBD and EEA		4		
5	BG033		Gorna Mitropolia	Dolna Mitropolia	chemical	Self-monitoring	Plio-Pleistocene aquifer between Vit und Iskar		1	
6	BG033		Dolen Dabnik	Dolen Dabnik	quantitative	Self-monitoring		12	1	
7	BG034		Braschljanitza	Pleven	Quantity and quality	Self- monitoring	Plio-Pleistocene aquifer between Vit und Osam	12	1	
8	BG044	314301	Bejanovo	Lukovit	chemical	EEA	Upper Cretaceous KB – Pleven-Nikopol		1	
9	BG044		Pleven	Pleven	quantitative	DRBD and EEA		4	1	
10	BG044		Pleven	Pleven	quantitative	DRBD and EEA		4	1	
11	BG044		Pleven	Pleven	quantitative	DRBD and EEA		4	1	
12	BG044		Pleven	Pleven	quantitative	DRBD and EEA		4	1	
13	BG044		Pleven	Pleven	quantitative	DRBD and EEA		4	1	
14	BG044		Jasen	Pleven	quantitative	DRBD and EEA		4	1	
15	BG044		Dolni Dabnik	Dolni Dabnik	quantitative	DRBD and EEA		4	1	
16	BG044		Dolni Dabnik	Dolni Dabnik	quantitative	DRBD and EEA		4	1	
17	BG056	221462	Kruschuna	Letnitza	quantitative	NIMH - Pleven	Lukovit KW system	4		
18	BG056	211292	Dermantzi	Lukovit	quantitative	NMHI - Pleven	Lukovit KW system	4		
19	BG056	2068801	Dermantzi	Lukovit	chemical	EEA			1	
20	BG060		Raduvene	Lovech	Quantity and quality	Self- monitoring	Lovech – Tarnovo Karst basin	12	1	
21	BG087		Teteven	Teteven	Quantity and quality	Self- monitoring	Balkan Karst	12	1	
22	BG087		Cherni Vit	Teteven	Quantity and quality	Self- monitoring	Balkan Karst	12	1	

4.1.5.1.2. Qualitative Monitoring

The monitoring network for the quality status of the groundwater bodies is established in conformity with the requirements set in Articles 7 and 8 of the WFD/2000. It shall be designed so as to guarantee a consecutive and comprehensive review of the groundwater chemical status and to identify any long-term anthropogenically induced upward trends in pollutants.

The established groundwater quality monitoring network in the Vit River basin comprises 3 points from the national network (EEA), 10 points on wells, managed by the DRBD, but conducted by EEA and 6 self-monitoring points.

Subject of the groundwater monitoring of physico-chemical indicators, which are divided into two groups, are presented in Table 28. The quality analysis of the groundwater shall be made 4 times per year.

Table 28: Physico-chemical indicators of the groundwater monitoring

I GROUP		II GROUP	
1	Transparency /common dry residuum at 105°C	1	Lead (Pb 2+)
2	Water temperature	2	Cadmium (Cd 2+)
3	Active reaction (Ph)	3	Copper (Cu 2+)
4	Total mineralization	4	Zink (Zn 2+)
5	Permanganate oxydability	5	Nickel (Ni 2+)
6	Electric conductivity	6	Chromium (Cr^{3+})
7	Oxidation-restoration potential (Eh)	7	Chromium (Cr^{6+})
8	Calcium (Ca 2+)	8	Arsenic (As^{3+})
9	Magnesium (Mg 2+)	9	Mercury (Hg)
10	Chlorides (Cl -)	10	Trichloreethylene
11	Sulfates (SO4 2-)	11	Tetrachloreethylene
12	Hydrocarbonates (HCO_3^-)	12	Triasines
13	Carbonates (CO_3)	13	Pesticides
14	Ammonium ions (NH_4)		
15	Nitrites (NO_2)		
16	Nitrates (NO_3)		
17	Iron (Fe)		
18	Manganese (Mn 2+)		
19	Solved O_2		
20	Sodium (Na)		
21	Potassium (K)		

4.1.2.2 Operational Groundwater Monitoring

Operational monitoring is carried out to identify the status of groundwater bodies at risk of quantitative pressure (from water abstraction) as well as all anthropogenically induced upward trends in the quantitative pressure. The analysis made identifies BG 019 in the Vit River catchment area as being at risk of water abstraction. Therefore, an operational monitoring network has to be established.

Currently no data are available in the DRBD on established monitoring points in the Vit River ledge, which can be used to observe the water level. Therefore, will be considered the opportunity to use wells in private yards in settlements and if no such wells are found, new points are to be constructed.

4.1.2.2.1 Quantitative Monitoring

4.1.5.2.2. Qualitative Monitoring

Operational qualitative monitoring of groundwater bodies is carried out with view to identifying the chemical status of all groundwater bodies or groups of bodies, identified being at risk, and identifying of all anthropogenically induced upward trends in pollutants.

The operational monitoring will be carried out for all groundwater bodies, identified being “at risk” and “possibly at risk” for failing the objectives (BG019 for point sources and BG033 and BG034 for diffuse sources).

The operators shall prepare monitoring plans for all household waste landfills (dumps), which are closed down and/or exploited in accordance with the Waste Management Act and in connection with Regulation No 8/ 2004 for the conditions and requirements for construction and operation of deposits and other facilities and installations for use and disposal of waste. Monitoring boreholes are to be established in relation thereof. The same is applicable to the enterprises, which have been awarded a complex permission.

Table 29: Qualitativ monitoring - Vit catchment area

No	Acquifier, ground water body, code	Monitoring Point					Aquifer	Sampling for qualitative analysis /no/Year	
		Code	Location	Municipality	Type of Analysis	Operator		Group I	Group II
1	2	3	4	5	6	7	8	10	
1	BG019	2221501	Dolna Mitropolija	Dolna Mitropolija	Quality	EEA	Alluvial aquifer of Vit River	4	2
2	BG019		Pobeda	Dolna Mitropolija	Quality	DRBD and EEA		4	2
3	BG019		Pobeda	Dolna Mitropolija	Quality	DRBD and EEA		4	2
4	BG019		Krushovitza	Dolni Dabnik	Quality	Self- monitoring		1	
5	BG033		Gorna Mitropolia	Dolna Mitropolia	Quality	Self- monitoring	Plio-Pleistocene aquifer between Vit und Iskar Rivers	1	
6	BG033		Dolni Dabnik	Dolen Dabnik	Quality	Self- monitoring	Plio-Pleistocene aquifer between Vit und Iskar Rivers	1	
7	BG034		Braschljanitza	Pleven	Quality	Self- monitoring and EEA	Plio-Pleistocene aquifer between Vit und Osam Rivers	2	1
8	BG034		Obnova	Levski	Quality	Self- monitoring	Plio-Pleistocene aquifer between Vit und Osam Rivers	1	

4.2 Monitoring Results

4.2.1 Surface Water

4.2.2 Groundwater

After the final characterization of groundwater bodies, plans for operational monitoring are to be developed. Regarding the groundwater bodies „at risk “BG019 (from point sources), BG033 and BG034 (from diffuse sources) appropriate monitoring points have to be selected.

The analysis which was made indicates that a groundwater body at risk in the Vit River catchment area is BG019 – a Quaternary aquifer in the river alluvium. The further characterization of the quantitative pressure on this body shall use a number of existing wells, operated by various water users. Data thereof shall be delivered to the DRBD and after the analysis of presented reports, an assessment shall be made on the chemical pollution status, both regarding the identified body at risk and the rest of the water bodies along the Vit River catchment area.

No (operational) monitoring points have been established yet for the point sources.

4.2.3 Protected areas

The monitoring results of the the protected areas in the catchment areas of Osam and Vit will acc. to WFD be available in 2009.

5. Environmental Objectives for Surface Waters, Groundwater and Protected Areas

5.1 Political objectives set in the Urban Planning Act

5.2 Requirements to water resource according to environment and water uses

5.2.1 Environmental quality objectives for running waters

The National Classification System for Quality Assessment of Surface waters, used for the purpose of the analysis of pressure and impact (IMPRESS review) is given in the Table 30 below.

Table 30: Proposal for Bulgarian classification system for the purposes of the IMPRESS review

		determinants in water				
class limit values		**reference CLASS-high**	**TV-good**	**2 x TV**	**5 x TV**	**> 5 x TV**
	unit	**I**	**II**	**III**	**IV**	**V**
oxygen/nutrient regime						
temperature	C					
dissolved oxygen	mg/l	7	6	5	4	3
BOD5	mg/l	<2	< 5	<10	<25	>25
pH (acid.)	-		> 6.5	>6.0		
pH (alkal.)	-		<8,5	<9,0		
NH4 ammonium - N	mg/l	0,05	0,3	0,6	1,5	>1,5
NO2 nitrite - N	mg/l	0,01	0,06	0,12	0,3	>0,3
NO3 nitrate - N	mg/l	1	3	6	15	>15
PO4 ortho - P	mg/l	0,05	0,2	0,8	1	>1
total-P	mg/l	0,1	0,2	1	1,5	>1,5
chlorophyl -a	ug/l	25	50	100	250	>250
ions						
sulfate (SO4)	mg/l	80	150	250	300	> 300
chloride (Cl)	mg/l					
metals (dissolved)						
Zinc (Zn)	ug/l	bg	100	200	500	> 500
Copper (Cu)	ug/l	bg	20	40	100	> 100
Chromium (Cr-III+VI)	ug/l	bg	50	100	250	> 250
Lead (Pb)	ug/l	bg	5	10	25	> 25
Cadmium (Cd)	ug/l	bg	1	2	5	> 5
Mercury (Hg)	ug/l	bg	0,1	0,2	0,5	> 0,5
Nickel (Ni)	ug/l	bg	50	100	250	> 250
Arsenic (As)	ug/l	bg	5	10	25	> 25
Aluminium (Al)	ug/l	10	5	10	25	>25
biology						
biotic index		?4	>3	3	>2<3	<2

It has not been endorsed by an act of legislation. It was developed within the ICPDR – 5 classes' classification system for surface waters, in accordance with the regulatory definitions in Annex V, p.1.2 of the WFD and then adapted for the national conditions.

5.2.1.1 Biological Quality Elements.

See Table: Proposal for a Bulgarian classification system for the purpose of the IMPRESS review.

5.2.1.2 Physico-chemical Quality Elements

See Table: Proposal for a Bulgarian classification system for the purpose of the IMPRESS review.

5.2.1.3 Chemical Quality Elements

See Table: Proposal for a Bulgarian classification system for the purpose of the IMPRESS review.

5.2.2 Environmental Quality Objectives for Lakes and Dam-lakes

5.2.2.1 Biological Quality Elements

5.2.2.2 Physico-chemical Quality Elements

5.2.3 Environmental Quality Objectives for Artificial (AWB) and Heavily Modified Water Bodies (HMWB)

5.2.4 Environmental Quality Objectives for Groundwater

5.2.4.1 Environmental Objectives for the Quantitative Status

The data on the groundwater levels indicate that the water abstraction do not provoke an excess of natural resources. The groundwater levels are not subjected to anthropogenic alterations, which can provoke:

- Failure to achieve the environmental objectives specified under Art. 4 for associated surface waters;
- Any significant deterioration in the status of such waters;
- Any significant damage to the groundwater dependent terrestrial ecosystems;
- Temporary or continuous alterations to the flow in a spatially limited areas resulting from groundwater level changes.

5.2.4.2 Environmental Objectives for the Chemical Status

The environmental objectives for the chemical status of groundwater (see: Annex V 2.3.2 – Chemical Status) are:

- Prevention and limitation of harmful substance discharge into the groundwater;
- Reversing any apparent and continuous trends of a concentration increase of harmful substances in the groundwater;
- Complying with the standards and objectives of the EU legislation for the protected areas;
- Preventing performance deterioration;
- Taking account of the limit and threshold values.

Table 32 shows the environmental objectives for groundwater bodies “at-risk” for diffenrent kind of pollutions.

Table 31: Environmental Objectives for GWB „at risk“

GWB No	Type of pollution/ pressure	Type of pollutant/ load	Environmental objective
1	*2*	*3*	*4*
BG019	Point sources: - country dumps17 - municipal dumps 1 - pesticides warehouses 5	organic and nutrient wastes	Reducing the content of organic and nutrient substances in groundwater
	Diffuse sources: - land use	nitrogen	Reducing the content of nitrogen in groundwater
	Settlements without sewerage 17	phosphates	Reducing the content of phosphates in groundwater
	Industrial enterprises	organic and nutrient substances	Reducing the content of organic and nutrient substances in groundwater
	Water abstraction	over abstraction	Water resources protection
BG033	Diffuse sources: - land use	nitrogen	Reducing the content of nitrogen in groundwater
	Settlements without sewerage 9	phosphates	Reducing the content of phosphates in groundwater
BG034	Diffuse sources: - land use	nitrogen	Reducing the content of nitrogen in groundwater
	Settlements without sewerage system 9	phosphates	Reducing the content of phosphates in groundwater

5.3 Requirements to Water Resources Depending on Water Uses (Agriculture, Forestry, Urban and Economic Development, Regional Development)

5.4 Options and Scenarios for Water Resources Management

5.4.1 Options for Water Resources Management in the Catchment Areas

5.4.2 Comparative Analysis of Possible Activities in the Water Sector

6. Economic Analysis of Water Uses – Results from the Inventory of Activities

6.1 General Description

The Danube River Basin Directorate based in Pleven is an administrative basin management structure, so designated by the Water Act and the Organizational Regulations of the MoEW. The Basin Directorate has regional offices based in the cities of Vratza, Sofia, Veliko Tarnovo and Russe.

The Basin Directorate is assigned with various functions, which can be listed as follows:

1. *administrative-* through the river basin management plans
2. *regulatory* – issue of water and water site permissions
3. *control* – control on the compliance with the conditions set in the issued permissions
4. *Information* – public information and community involvement in the management and decision making processes.

The scope of activities of the Basin Directorate is regulated by the “Regulations for the Activity, Structure, Organization of Work and Staff of the Basin Directorates”. The Directorate is supported by a Basin Council, composed of 38 members with a 5-year mandate.

The Danube River Basin District (DRBD) encompasses about 45% of the territory of the country and the greatest part of North Bulgaria. Its catchment area is 46 930 km^2. This river basin covers the Bulgarian part of the Danube River and the catchment areas of rivers and gullies, flowing into the Danube River. The territory of the basin contains the catchment areas of the following rivers - Topolovetz, Voinishka, Archar, Skomlya, Lom, Tzibritza, Ogosta, Nishava, Erma, Iskar, Vit, Osam, Yantra, Rusenski Lom and the so called - Dobrudja rivers and gullies (see Figure 17).

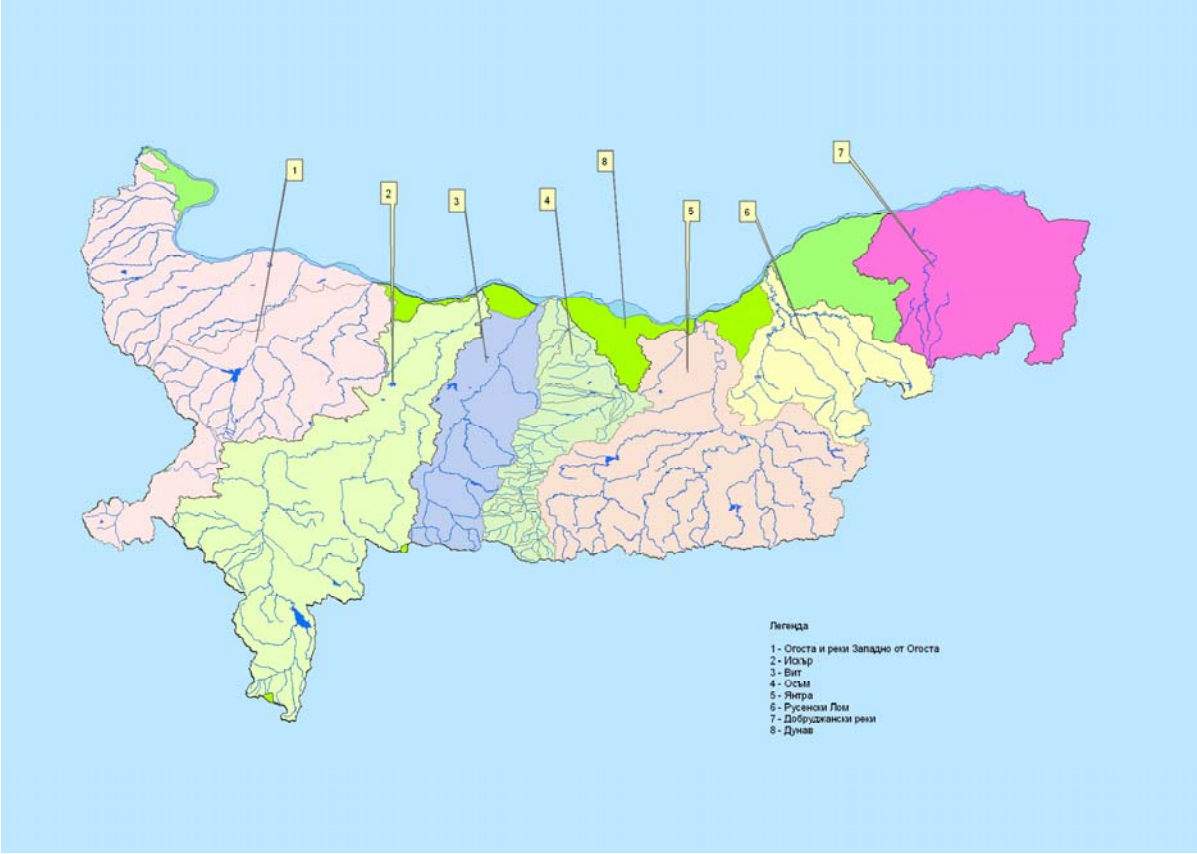

Figure 17: Danube River Basin District

The Danube River Basin District is composed of two basic morphological structural units: the Danube Plain, typical with its lowlands and hilly and plateau like relief, and the Northern slopes of the Balkan mountain chain, which is split into two parts: Fore-Balkan and Main Balkan Chain.

The Danube River Basin covers all tributaries, which are forming their streams in the territory of Bulgaria and are flowing into the Danube River on the Bulgarian territory. The Nishava river (with a catchment area of 331 km²) and its tributaries Erma, Gaberska and Visochitza, which rise in the territory of Bulgaria, cross the state border with Yugoslavia in the west and then get discharged into the Danube river (see Table 32).

The territory of the Danube River Basin District includes a large number of various protected areas, namely:

- 38 territories, designated for water abstraction intended for human consumption;
- 15 water bodies, designated for recreational and bathing waters;
- the whole Danube River Basin District contains nutrient-sensitive areas and vulnerable zones
- 55 territories designated for protection of habitats or wet biological species (2 national parks, 4 natural parks, 14 reserves, 3 maintained reserves, 18 protected areas and 14 natural landmarks).

The territory of the DRBD comprises 104 Bulgarian municipalities, with a total number of population amounting to 3,5 million inhabitants by 31.12.2003. The largest city in Bulgaria, the capital Sofia, is located in the DRBD.

Table 32: Characteristics of the Catchment Area of the Danube River Basin – 2002

Catchment Area	Total area km2	River length - km	Population number	Employed persons number
Ogosta	8 022	144	390 159	118 719
Iskar	8 647	368	1 533 669	664 123
Vit	3 220	189	227 421	82 995
Osam	2 824	314	137 808	54 471
Yantra	7 862	2 855	430 652	176 092
Rusenski Lom	2 947	197	138 485	53 759
Dobrudja rivers and gullies	6 862	346	247 983	108 090
Danube	6 546	469	337 645	161 657
Total:	**46 930**	**4 413***	**3 443 822**	**1 419 906**

* - The Danube River length is excluded

A pre-condition for the purpose of the economic analysis of water uses is a general assessment of the available water resources for the satisfaction of the annual water demands.

Water resources are the usable part of natural waters. They are formed mostly by rainfalls and are available in the form of surface waters and groundwater. In terms of quantity, surface water resources are getting balanced through the river flow. There are relatively few lakes and marshlands in the country so that the formation of the natural surface flow is not significantly influenced.

The mean annual rainfall in the Danube River catchment area varies within a large range — from 500 - 550 mm in the plain and up to more than 1.200 mm in the high mountain parts of the Central Balkan.

The annual natural flow rate in the Danube Basin is 5688 mio m3, registered on the basis of the mean value for the period 1930/31 - 2000/01. This rate in respect to the individual river catchment areas and territories is as follows: Ogosta, west rivers and Erma and Nishava 1402,73 mio m^3, Iskar 1632,76 mio m^3, Vit 493,10 mio m^3, Osam 490,44 mio m^3, Yantra 1400 mio m^3, Rusenski Lom 190,11 mio m^3, areas without river streams 50,50 mio m^3 and outer rivers 28,18 mio m^3.

In 2003, surface water resources, being in disturbed conditions in the Danube River District, were 4392,9 mio m^3. (National Strategy for Development and Management of the Water Sector by 2015). Generally, this flow is sufficient to guarantee the drinking water supply, but seasonal insufficiency occurs in the cases of water supply from running and spring waters.

The mean annual flow of the Danube River is estimated at about 180 km^3.

In the territory of the Danube River Basin, there are 797 dam-lakes, 16 of which are large complex and significant dam-lakes, 83 dam-lakes – state property and 698 dam-lakes – municipal property. Water delivered by four out of the sixteen complex and significant dam-lakes is used for drinking water supply – Iskar, Srechenska bara, Hristo Smirnenski and Yovkovtzi dam-lakes.

A great part of the used fresh water goes back to the river basin more or less polluted depending on the type of water use and the waste water treatment method. Although being of poorer quality, water in the down streams of the rivers is also used with or without treatment depending on the demands and nature of water uses. Constructed dam-lakes along the river catchment areas in most of the cases serve as seasonal and perennial equalizers and guarantee a more balanced water supply in the different seasons.

In addition to the researches on the river flow and rainfalls, an analysis is made on groundwater status and variations. For this purpose, a monitoring was carried out on springs and wells of the National Support Hydrogeological Network (MoEW, 2003).

The summary estimation of the potential exploitable groundwater resources in the Danube River Basin District amounts to totally 2.800 mio m3/annum, out of which (according to General Schemes of Water Uses in the River Basin Districts, 2000):

- 800 mio m^3/year are formed in the territory of the district;
- 2.000 mio m^3/year are waters potentially attractable from the Danube River.

The current groundwater exploitation in the district is difficult to be identified. It is assumed that 426 mio m^3/year of the groundwater are used; not used groundwater amounts to about 363 mio m^3.

Notwithstanding the above favourable facts, in the Danube River Basin District in the period 1999-2003 the number of settlements with a water restriction regime varied between 99 and 432 and the population subject to such a water restriction regime was 196.394 inhabitants (in a normally humid year) up to 668.842 inhabitants (in draughts), or 5.7% - 19.4% of the total population in the Danube River District (see Table 34).

Table 33: Settlements and Inhabitants Subject to a Water Restriction Regime in the Danube River Basin District

No	Year	1999	2000	2001	2002	2003
1.	Settlements with water restriction regime, number	99	428	432	196	187
2.	Inhabitants subject to water restriction regime, number	259325	668842	601117	315448	196394
3.	Settlements with seasonal water restriction regime, number	83	417	418	183	177
4.	Inhabitants subject to seasonal water restriction regime, number	144702	572158	518419	294049	185048
5.	Settlements with all year water restriction regime, number	16	11	14	13	11
6.	Inhabitants subject to all year water restriction regime, number	114622	96683	82698	21399	11346

The presented data by catchment areas for 2003 illustrate that the vast majority of the population which is subject to a water restriction regime is located in the catchment areas of the rivers Yantra, Ogosta, Iskar and Osam (see Table 34). At the same time, the first three catchment areas have large built-up volumes of the drinking water dam-lakes.

Table 34: Settlements and Inhabitants Subject to a Water Restriction Regime in the Catchment Areas of the Danube River Basin District in the period 1999-2003

No	Catchment area in the Danube River Basin District	Max. number of settlements with water restriction regime	Max. number of inhabitants subject to water restriction regime	Settlements with water restriction regime (2003)	Inhabitants subject to water restriction regime (2003)
1.	Ogosta	112 (2000)	237433 (2000)	38	21249
2.	Iskar	88 (2000)	105231 (2000)	24	17612
3.	Vit	26 (2000)	39417 (2000)	17	24275
4.	Osam	52 (2001)	107823 (2001)	14	50445
5.	Yantra	162 (2001)	161248 (2001)	83	74739
6.	Russenski Lom	5 (2001)	2077 (2001)	2	445
7.	Dobrudja rivers and gullies	7 (2001)	4341 (2001)	0	0

The number of drinking water treatment plants in the Danube River Basin District during the period 2001-2002 was 10, but the catchment areas of Vit, Osam, Rusenski Lom, Dobrudja rivers and gullies and the Danube do not have such drinking water treatment plants. Water in these catchment areas is chlorinated before use.

The total number of operational urban waste water treatment plants is 14, 7 of which are located along the Iskar catchment area, 2 along the Yantra catchment area, 2 in the Ogosta catchment area and one along the Vit, Osam and Rusenski Lom catchment areas.

6.2 Economic Significance of Water Uses

The economic analysis requires that the economic significance of water uses in the different sectors of economy, households (population), agriculture, industry and others (services occupy the largest share), which have a particular impact on the water status are identified and presented. The analysis is based on the assessment of water use indicators and socio-economic data (e.g. number of inhabitants, number of employed persons by economic sectors, gross added value by different economic sectors).

The Water Framework Directive 2000/60/EC requires that economic analyses are to be made at a river basin district level (or at a sub-basin level). By the time of the analyses, official statistics had not collected data at this level. Such data are available mostly at a municipal and regional level. Therefore, a methodology had to be developed so as to restructure the available data for the economic analysis purposes. All settlements have been preliminary classified by catchment areas and river basin districts. On this ground is made a percentage-based classification of the population within the respective municipalities and regions. Based on the identified shares of population in the specific municipality or region, living in a certain catchment area, all data used in the analysis were allocated – for example abstracted and used water, waste water treatment, incomes, gross domestic product, gross added value etc. For the purposes of classifying the population, data for 2003 were used, since the structure of the population has not considerably changed over the analyzed period. This is the last year for which concrete data are available (generally, the first year for which forecasts were made was 2004).

By using data delivered by the National Statistic Institute, in relation to the assessment of water availability, a balance was made between annually abstracted and used water (hydro power plants excluded), and a comparison between used surface water and the river flow in the catchment areas.

Table 35: Abstracted and Used Water in the Catchment Areas of the Danube River Basin District for the period 1999--2003

Year	1999	2000	2001	2002	2003
Danube River Basin, total					
Water abstracted [thousand m³]	**5054126**	**4139030**	**4173237**	**5002148**	**4311311**
- Surface waters	4933042	4026664	4070800	4901993	4206906
- Groundwater	121084	112366	102437	100155	104405
Water used [thousand m³]	**4674288**	**3645512**	**3761545**	**4594524**	**3905368**
- Household Sector:	189485	196035	181046	154083	165534
▪ households	137977	146715	135074	124323	136119
▪ others	51508	49320	45972	29760	29415
- Agriculture:	13477	31906	16508	11641	16343
▪ irrigation	4081	27441	11977	8544	12682
- Industry:	4471326	3417571	3563991	4428800	3723491
▪ cooling	4315448	3240221			3576605
Losses [%] (abstracted – used/abstracted)	**7.50%**	**11.90%**	**9.90%**	**8.10%**	**9.40%**

Table 36:´ Abstracted and Used Water in the Danube River Basin District in 2003

No	Abstracted/Used Water	Water Supply and Sewerage Companies	Irrigation Systems	Self water supply	Total
1.	Water abstracted [Thousand m^3]	**511810**	**113834**	**3685667**	**4311311**
1.1.	Surface waters	447075	113834	3645997	4206906
1.2.	Groundwater	64735	0	39670	104405
2.	Water used [Thousand m^3]	**195279**	**47921**	**3662168**	**3905368**
2.1.	Household Sector	161707	469	3358	165534
2.1.1.	households	136119			136119
2.1.2.	others	25588	469	3358	29415
2.2.	Agriculture	728	11725	3890	16343
2.2.1.	irrigation		11610	1072	12682
2.3.	Industry	32844	35727	3654920	3723491
2.3.1.	cooling		4650	3571955	3576605
3.	Losses, % (1-2/1)	**61,84%**	**57,90%**	**0,64%**	**9,40%**

The availability of a good water resource was one of the prerequisites for the fact that the mean twenty-four-hour water consumption per inhabitant in the Danube River Basin was 132 l/inhabit/day in 2003. In the household sector, which is one of the best indicators for all the basin directorates, it is 108 l/inhabit/day,. The lowest values of this indicator were registered in the catchment areas of Rusenski Lom and Dobrudja rivers and gullies.

The manner of water use in the households, agriculture and industry determines both its quality and quantity. The quantity of discharged waste water in the Danube River Basin in the period 1999 to 2003 was 333464 - 452379 thousand m^3 or 37.89% - 48.24% of the total discharged waste water in the country.

Table 37: Discharged waste water by different catchment areas for 2002

Catchment area	Discharged waste water, total in thousand m^3	Discharged waste water in thousand m^3	
		Untreated	Treated
Ogosta	25707	13104	12603
Iskar	216051	16127	199924
Vit	20050	4074	15976
Osam	9628	8533	1095
Yantra	26829	12568	14261
Rusenski Lom	16457	9619	6838
Dobrudja rivers	9502	6935	2567
Danube	42666	20236	22430
Danube River Basin	**366890**	**91196**	**275694**

Table 38 presents the summary data (data on water uses by different economic sectors and socio-economic data) for the economic significance of water uses in the Danube River Basin in 2002.

Table 38: Economic Significance of Water Uses for 2002

Catchment area	House-holds	Agriculture		Industry		Others	
	m^3/person	m^3/ employed person	m^3/ 1000 BGN GAV	m^3/ employed person	m^3/ 1000 BGN GAV	m^3/em-polyed person	m3/ 1000 BGN GAV
Ogosta	30,1	25,2	5,84	333	56,3	68	3,8
Iskar	42,6	14,8	3,42	579,8	27,7	27,1	2
Vit	33,9	72,4	15,35	221,3	27,6	106,2	10,2
Osam	33,7	55,6	12,02	470,1	62,5	77,1	7
Yantra	29	31,9	6,81	164,5	17,1	72,8	7,2
Rusenski Lom	25,7	86,8	18,24	507,2	66,6	29,7	3
Dobrudja rivers and gullies	26,2	18,6	3,88	424,3	65,8	37	3,8
Danube	36,5	31,6	6,84	15038,7	1158,6	28,7	3,9
Danube River Basin	**36,1**	**34,2**	**7,49**	**2882,7**	**202,6**	**38,4**	**3,1**

GAV – gross added value

6.3 Baseline Scenario 2015

The Baseline scenario includes a trend analysis related to water uses until 2015. For the elaboration of prognoses and scenarios for the costs in the Danube River Basin District are applied the following basic assumptions:

1. Related to the number of population.
4. Related to industrial development.
5. Related to agriculture development
6. Related to water quantities provided to satisfy the demands of water users.
7. Related to costs per water unit by group of water users.
8. Related to planned investments, in compliance with the country's obligations in the pre-accession process (in relation to the achievement of the objectives set in the WFD 2000/60/EC).

For each of the above assumptions were given absolute values or a coefficient reflecting the significance of the respective factor over the years.

In reference to the demographic prognoses three variants have been developed, provisionally named pessimistic, realistic and optimistic depending on the number of population. All three variants foresee a population decline in the country. The optimistic version presumes the lowest rate of decline, and the pessimistic one - the highest rate of decline, respectively. Within the territory of the Danube River Basin District lives the greatest number of population – about 45% of the country population. It is changing with a rate following the average trends for the country.

Table 39: Population projection for the Danube river district until 2015

Realistic variant	2003	2005	2010	2015
Ogosta	390.159	373.450	335.374	303.101
Iskar	1.533.669	1.535.900	1.552.459	1.570.605
Vit	227.421	222.494	210.660	200.115
Osam	137.808	133.124	122.003	112.104
Yantra	430.652	418.107	388.829	363.051
Russenski Lom	138.485	131.969	118.295	106.850
Dobrudja rivers	248.225	236.845	212.511	191.043
Danube	337.645	331.314	316.940	304.618
Danube District	**3.444.064**	**3.383.203**	**3.257.070**	**3.151.486**

In order to make prognoses on the economic development of the DRBD various econometric models have been applied based on the extrapolation of past and current trends. The analysis can be supplemented by the following conclusions related to each individual catchment area.

6.3.1 Ogosta

The Ogosta catchment area creates about 9-10% of the GVA in the DRBD. After 2000 the trends register a decline, although the decline is just 1% per annum. The reason is the sharp drop in the industrial production, as well as the shrinkage in the service sector.

In structural terms, agriculture registers the largest share generating about one-fifth of the GAV of the DRBD. The next is industry, with an 8% GAV in 2002, generated within the basin. The share of services is 6%, which keeps almost constant over the analyzed period.

Table 40: GAV shares by sectors and in total, generated in the Ogosta catchment area

		1999	2000	2001	2002
GAV share in agriculture of DRBD	%	18	19	20	19
GAV share in industry of DRBD	%	13	12	10	8
GAV share in services of DRBD	%	6	7	6	6
GAV share of DRBD	%	9	10	9	8

The profile of the Ogosta catchment area is shaped out by agriculture, while industry is subsidiary and the sector of services has a lower share in the basin economy. Compared to the other DRBD elements, the Ogosta catchment area is comparable as far as the GAV share is concerned, to the Danube River and the Yantra River catchment areas.

6.3.2 Iskar

The Iskar catchment area is dominant in the DRBD economy. It generates about 60% of the GAV in the basin. This share has been increasing over the past three years of the analyzed period. This is due to the growth of the services and industry sectors, which compensates the delay in agriculture.

Table 41: GAV shares by sectors and in total, generated in the Iskar catchment area

		1999	2000	2001	2002
GAV share in agriculture in DRBD	%	18	19	17	17
GAV share in industry of DRBD	%	46	51	58	61
GAV share in services in DRBD	%	68	65	68	68
GAV share in DRBD	%	58	57	60	61

Services and industry play a key role in the respective DRBD sectors, since they generate 68% and 61% of the GAV of the basin in the sector. Agriculture is the only sector, which does not have a leading role in the DRBD. It takes about 17-18 % in the GAV of the basin. Thanks to this, the allocation of agricultural production is much more even than the one of industry and services. The Iskar catchment area is of key importance for the DRBD economy. It concentrates the GAV generation in the sectors of services and industry.

6.3.3 Vit

The Vit catchment area has a modest contribution to the DRBD business. Its share in the GAV generation has been varying over the years around 4-5%. The face of economy in this catchment area is agriculture, with a 9% share in the basin GAV. Industry and services are evenly presented in the respective sectors of the basin economy – 4% each.

Table 42: GAV shares by sectors and in total, generated in the Vit catchment area

		1999	2000	2001	2002
GAV share in agriculture in DRBD	%	8	9	9	9
GAV share in industry of DRBD	%	5	4	4	4
GAV share in services in DRBD	%	4	4	4	4
GAV share in DRBD	%	4	5	5	4

This catchment area can be classified as underdeveloped. The reason is the low share in the GAV generated within the basin, as well as the higher share of the GAV in agriculture. The shares of the three sectors in the DRBD economy demonstrate an impressive stability. This

shows that the Vit catchment area follows the moderate development rates typical for the whole economy of the river basin district.

6.3.4 Osam

The Osam catchment area is typical for its very low share in the GAV generated in the basin – about 3%. Like in the Vit catchment area, agriculture is the most developed sector with about 6% GAV share in the agriculture within the basin. Industry has kept a constant 3% share throughout the analyzed period. Services are the least developed sector in the whole basin with a 2% share, thus being like the sector of services in the Rusenski Lom catchment area.

Table 43: GAV shares by sectors and in total, generated in the Osam catchment area

		1999	2000	2001	2002
GAV share in agriculture of DRBD	%	6	6	6	6
GAV share in industry of DRBD	%	3	3	3	3
GAV share in services of DRBD	%	2	3	2	2
GAV share of DRBD	%	3	3	3	3

The economy of the Osam catchment area is between the least developed in the DRBD. This catchment area follows the basin development trends, which help it to keep its share, but never to overcome the aggregated disadvantages.

6.3.5 Yantra

The business in the Yantra River creates 10% of the GAV in DRBD. The largest share in this catchment area has agriculture – 15% for 2002. Industry takes about 12% of the GAV of this basin sector. Services register the lowest relative share - 8% of the sector share in the DRBD.

Table 44: GAV shares by sectors and in total, generated in the Yantra catchment area

		1999	2000	2001	2002
GAV share in agriculture of DRBD	%	18	16	15	15
GAV share in industry of DRBD	%	14	12	11	12
GAV share in services of DRBD	%	7	8	8	8
GAV share of DRBD	%	10	10	9	10

This catchment area is considered being moderately developed. Another particularity of its economic development is that three key business sectors are relatively proportionately developed, which makes it the most harmonic catchment area in the whole DRBD..

6.3.6 Rusenski Lom

Definitely, the Rusenski Lom catchment area belongs to the outsider group in terms of economic development within the DRBD. It generates 2% of the basin GAV. The strongest sectors within the catchment area is agriculture, which definitely does not generate revenues good enough to enhance the development of the service sector. This sector, together with industry has a symbolic share of 2% in the basin GAV.

Table 45: GAV shares by sectors and in total, generated in the Rusenski Lom catchment area

		1999	2000	2001	2002
GAV share in agriculture of DRBD	%	8	8	8	8
GAV share in industry of DRBD	%	3	2	2	2
GAV share in services of DRBD	%	2	2	2	2
GAV share of DRBD	%	3	3	3	2

Unlike other underdeveloped catchment areas within the DRBD, the economy of this one registers a one-point drop over the analyzed year.

6.3.7 Dobrudja Rivers and Gullies

The catchment area formed around the Dobrudja Rivers and gullies, belongs to the group of more underdeveloped regions in terms of economy. This catchment area generates 5% of the basin GAV. A very extensively developed sector is agriculture, which adds up 19% to the basin GAV for the sector. Other sectors – industry and services - are far less developed with shares of 2% and 3%, respectively, in the sector GAV. The relative share of industry demonstrates a decline– from 4% in 1999 to 2% in 2002.

Table 46: GAV shares by sectors and in total, generated in the Dobrudja Rivers and gullies catchment area

		1999	2000	2001	2002
GAV share in agriculture in DRBD	%	18	18	19	19
GAV share in industry of DRBD	%	4	3	3	2
GAV share in services in DRBD	%	3	4	3	3
GAV share in DRBD	%	5	5	5	5

The Dobrudja Rivers and gullies catchment area follows the development trends typical for the whole basin, which do not change the relative economic significance it has for the DRBD. Agriculture is the key business sector within the basin, which is growing compared to industry, which registers lower growing rates than the average ones for this sector in the basin.

6.3.8 Danube

Business within the Danube catchment area is moderately represented in the DRBD economy with a varying share of 9-10% over the analyzed period. This share is formed mainly by industry, which, although declining, has a 15% share in the GAV, generated by this basin sector. Other two sectors have a relatively even share of about 6-7% in the GAV of the respective sectors in the basin. Unlike industry, this share has remained unchanged over the analyzed period.

Table 47: GAV shares by sectors and in total, generated in the Danube catchment area

		1999	2000	2001	2002
GAV share in agriculture of DRBD	%	6	6	6	6
GAV share in industry of DRBD	%	22	22	17	15
GAV share in services of DRBD	%	7	7	7	7
GAV share of DRBD	%	10	11	10	9

Industry is a key sector within the Danube catchment area. This sector is the one to determine variations in the share of the GAV generated within this river valley. Other sectors – agriculture and services - register equal development trends with the respective sectors, which helps them keeping their relative shares.

In conclusion, the Danube River Basin District economy is the largest compared to the other three basin economies in the country. The sector of services is the key economic sector of the DRBD with a 59% share in the gross added value of the basin and 56% in the gross added value of the country.

The analyzed river basin district generates about one-half of the industrial gross added value of the country and this relative share has tended to growing over the monitored period.

The Iskar catchment area is of key importance to the DRBD economy. It concentrates the GAV generation in services and industry sectors. The Ogosta, Danube and Yantra catchment areas are identified as being moderately developed; the catchment areas of Dobrudja Rivers and gullies and Vit have an insignificant economic development, and the catchment areas of Rusenski Lom and Osam – are poorly developed.

For each catchment area, a prognosis is elaborated for the development of the three sectors, taking account of the identified trends. Realistic, pessimistic and optimistic prognoses have been made for the three sectors for the GAV, as well as a general prognosis containing a summary prognoses value. The pessimistic and the optimistic prognoses follow the development trend of the realistic prognosis, but have different growing rates.

For the purposes of the analysis, four scenarios have been developed, which can be provisionally named as follows:

1. *Business as usual.* It presents the water use system development without any additional costs for the achievement of the objectives set in the Directive and in the National priorities in the field of water uses;
2. *A Pessimistic scenario*. It registers an unfavourable demographic and economic development of the country. This scenario includes indicators, related to water uses in unfavourable prognoses on the demographic development of the country and the Danube River Basin District respectively, as well as unfavourable prognoses on the development of industry and agriculture. This scenario involves the costs to be engaged so as to achieve the planned objective indicators.
3. *A Realistic scenario*. This scenario includes water use indicators taking into account prognoses identified as being realistic in terms of demographic, industrial and agricultural development. It involves the costs to be engaged so as to achieve the planned objective indicators.
4. *An Optimistic scenario*. This scenario includes prognoses identified as being optimistic in terms of demographic, industrial and agricultural development. It involves the costs to be engaged so as to achieve the planned objective indicators.

2004 is taken as the starting year for the different scenarios as the available statistical information, used in the analysis of current status, covers the period 1999 – 2003.

The results of the conducted scenarios in terms of value provide a quantitative picture for the future water use development in the DRBD.

The differences between the individual scenarios, containing the achievement of the set objectives (realistic, pessimistic and optimistic) are not that great, which means that they are feasible and realizable within the development prognoses.

Cost increase by water users – households, industry and other water users - is relatively smooth within the prognosis period, which indicates that the set objectives are consistent with the potential of providing the respective services by the respective companies and organizations. However, agriculture registers a considerable cost increase - about 8 times for the prognosis period. Such an abrupt cost increase results from the objective to restore the irrigated agriculture and to reconstruct the irrigation facilities.

The next table contains generalized information from the scenarios developed for the Danube River Basin District up to 2015.

Table 48: Prognostic Scenarios by 2015 for the Danube River Basin

Indicators	Measure Unit	Status 2003	Baseline Scenario 2015	Realistic Prognosis 2015	Pessimistic Prognosis 2015	Optimistic Prognosis 2015
Population	Number	3 443822	3 151486	3.151.486	3.066.558	3.198.889
Water quantity for the households	Thousand m3	136 119	125 265	138 035	134.315	140.111
Water supply costs	thousand BGN	92 309	135 240	149 027	145.011	151 269
Water quantity discharged	thousand m3	92 482	113 962	124 230	124.109	124 230
Costs for disposal and treatment of waste waters	thousand BGN	10 173	19 980	21 781	21.760	21 781
Industry						
GAV in industry	thousand BGN	4.344.088	5.945.762	5.945.762	5.626.685	6.266.943
Water quantity used in industry including cooling water	thousand m3	3.723.491	4.489.051	4.489.051	4.248.147	4.731.542
Industrial water supply costs	thousand BGN	268 412	510.358	510 358	482 970	537.927
Total quantity of discharged industrial waste water	thousand m3	23 078	44 296	44.296	44 296	44 296
Costs for disposal and treatment of industrial waste water	thousand BGN	42 465	61.726	71 774	71 774	71 774
Agriculture						
GAV in agriculture	thousand BGN	1.554.362	2.234.527	2.234.527	2.123.136	2.349.436
Total water quantity used in agriculture	thousand m3	16 343	15 695	15 695	15 421	15 964
Agricultural water supply costs	thousand BGN	1 842	3.778	3 778	3 712	3 843
Total waste water quantity from agriculture	thousand m3	46	63	63	62	64
Costs for disposal of agricultural waste water	thousand BGN	9	20	20	17	17
Others						
GAV	thousand BGN	9.474.485	12.527.199	12.527.199	11.826.605	13.216.094
Total water quantity used by services	thousand m3	29 415	33 500	33 500	32 804	34 159
Water supply costs	thousand BGN	21 559	44 694	44 694	43 767	45 574
Total quantity of discharged waste water	thousand m3	12 217	13 870	13 870	12 740	15 100
Costs for disposal and treatment of waste water	thousand BGN	3 665	4 840	4 840	4 740	4 935

6.4 Cost Recovery of Water Services

The financial and non-market costs of the companies providing water services in the Danube River Basin have been taken into account to determine the cost recovery level.

Financial costs are identified, including supply and administrative costs. They are::

- Costs of companies providing water services. These costs include the costs of Water Supply and Sewerage Companies operating in the territory of the Danube River Basin, Irrigation System costs and the costs of Dam-lakes and Cascades.

The Water Supply and Sewerage Companies operating within a part of the territory of the Danube District or within the Danube district and in other districts, whose costs are included in the calculation of water provider costs, are presented in table 49 below.

Table 49: Water Supply and Sewerage Companies

Bulstat	Ownership	Name	Settlement	District	Catchment areas			
104055066	public	Yovkovtzi Water Supply and Sewerage Ltd.	Veliko Tarnovo	DRBD	Osam	Yantra	Russenski Lom	Danube
815123415	public	Water Supply and Sewerage Ltd.	Vidin	DRBD	Ogosta	Danube		
816090199	public	Water Supply and Sewerage Ltd.	Vratza	DRBD	Ogosta	Iskar	Danube	
817040128	public	Water Supply and Sewerage Ltd.	Gabrovo	DRBD	Yantra			
820174646	public	Water Supply and Sewerage Ltd.	Lovech	DRBD	Iskar	Vit	Osam	Yantra
821152916	public	Water Supply and Sewerage Ltd.	Montana	DRBD	Ogosta	Danube		
824106518	public	Water Supply and Sewerage Ltd.	Pleven	DRBD	Iskar	Vit	Osam	Danube
827184123	public	Water Supply and Sewerage Ltd.	Russe	DRBD	Yantra	Rusenski Lom	Dobrudja rivers and gullies	Danube
828050351	public	Water Supply and Sewerage Ltd.	Silistra	DRBD	Dobrudja rivers and gullies			
130175000	concession	Sofijska Voda JSC	Sofia	DRBD	Iskar			
823073638	public	Water Supply and Sewerage Ltd.	Pernik	DRBD, WABD	Ogosta	Iskar	Struma	
832046330	public	Water Supply and Sewerage Ltd.	Sofia	DRBD, EABD	Ogosta	Iskar	Maritza	
829053806	public	Water Supply and Sewerage Ltd.	Sliven	DRBD, BSBD, EABD	Yantra	Kamchia	Maritza	Tundja
826043778	public	Danube Water Supply and Sewerage Ltd.	Razgrad	DRBD, BSBD	Rusenski Lom	Dobrudja rivers and gullies	Kamchia	
111037645	municipal	Water Supply and Sewerage Ltd.	Berkovitza	DRBD	Ogosta			
122052207	municipal	Bebresh Water Supply and Sewerage Ltd.	Botevgrad	DRBD	Iskar			
826043803	municipal	Water Supply and Sewerage Ltd.	Isperih	DRBD	Dobrudja rivers and gullies			
816088636	municipal	Asparuhov Val Ltd.	Kneja	DRBD	Iskar			
826043792	municipal	Meden Kladenetz Ltd.	Kubrat	DRBD	Dobrudja rivers and gullies			
120252	municipal	Water Supply and Sewerage JSC	Svishtov	DRBD	Osam	Yantra	Danube	
817022393	municipal	Biala Ltd.	Sevlievo	DRBD	Yantra			
820146942	municipal	Steneto Water Supply and Sewerage Ltd.	Troyan	DRBD	Vit	Osam	Yantra	
113026117	municipal	Water Supply Ltd	Breznik	DRBD, WABD	Ogosta	Struma		
835014989	public	Water Supply and Sewerage Ltd.	Targovishte	DRBD, BSBD	Yantra	Rusenski Lom	Kamchia	
837068284	public	Water Supply and Sewerage Ltd.	Shumen	DRBD, BSBD	Rusenski Lom	Dobrudja rivers and gullies	Kamchia	Provadijska

DRBD – Danube River Basin District
WABD – West Aegian Basin District
EABD – East Aegian Basin District
BSBD – Black Sea Basin District

The Irrigation System JSC - a joint stock company registered under the Commercial Act and 100% state owned by the Ministry of Agriculture and Forestry - has the following branches within the Danube River Basin District: Veliko Tarnovo, Vidin, Vratza, Montana, Pleven, Russe, Sofia, Targovishte and Shumen.

1. Costs of the water administration bodies: Information has been included on the budget of the Basin Directorate, on part of the costs from the MoEW budget which contains the costs for central bodies and on part of the costs of the Regional Environmental Inspectorates and the Executive Environmental Agency, including the costs for laboratories carrying out analysis for monitoring purposes
2. Costs of other central administration bodies – the Ministry of Regional Development and Public Works, the Ministry of Health and the Ministry of Agriculture and Forestry
3. Municipal water-related costs
4. State costs for the construction of infrastructure according to the annexes to the respective annual Acts on the State Budget of the Republic of Bulgaria
5. Costs of other financing institutions for water sector-related projects
6. Other payments of companies to water supply and sewerage providers, independent of the the costs mentioned above..

Wherever possible, costs are divided into operational and capital costs. Operational costs include all costs related to

- operation;
- maintenance of tangible assets;
- administration and monitoring.

Capital costs include costs incurred during each respective year by the construction of new water sector facilities. In order to evaluate the costs for prior investments, the costs for acquisition of fixed tangible assets for each respective year are supplemented with depreciation costs.

As far as administrative bodies are concerned (for which information was made available), operational (administrative) costs in the water sector were identified by experts using the MoEW programme budget.

As far as the companies are concerned, operational and investment costs for treatment facilities and the costs for water abstraction from sources owned were identified.

The definition of the financial costs was followed by the identification of those costs, which had been counted up twice in the total costs.

In order to eliminate the double counting of incurred costs and the deduction of costs related to the provision and administration of water services, which cannot be directly considered financial, athe specific costs were analysed by cost centers, identified at the previous stage. This analysis identified costs, counted up in two or more cost centers. For example, current municipal costs for water services contain water consumption costs, but at the same time Water Supply and Sewerage Companies also show water supply related costs, which include costs of water supplied to the respective municipalities.

The costs counted up by Water Supply and Sewerage Companies also included taxes and charges, for example profit tax, which have to be deduced from the total water use costs.

The results of the identification of financial costs by sources in the Danube River Basin District are presented in Table 50.

Table 50: Financial costs by sources for the period 1999-2003 [1.000 BGN]

	Financial costs by sources	1999	2000	2001	2002	2003
1.	**Costs of Operators**	**94.052**	**99.852**	**148.998**	**160.014**	**180.869**
	Operational costs	**85.167**	**89.664**	**128.787**	**135.539**	**152.192**
	Investment costs	**8.885**	**10.187**	**20.211**	**24.475**	**28.677**
1.1.	**Total costs of Water Supply and Sewerage Companies**	**85.656**	**90.932**	**135.652**	**145.662**	**164.638**
1.1.1.	incl. Operational costs	77.623	81.722	117.379	123.533	138.711
1.1.2.	incl. Investment costs	8.033	9.210	18.273	22.128	25.927
	incl. costs for economic acquisition and liquidation of fixed tangible assets	1.270	2.043	7.992	3.883	5.352
	incl. depreciation	827	7.167	10.281	18.245	29.111
1.1.3.	incl. Other costs	947	4.152	9.735	13.030	23.087
1.2.	**Costs of Irrigation Systems**	**5.198**	**5.506**	**8.131**	**8.685**	**9.799**
1.2.1.	incl. Operational costs	4.845	5.100	7.326	7.710	8.657
1.2.2.	incl. Investment costs	354	406	805	975	1.142
	incl. costs for economic acquisition and liquidation of fixed tangible assets	27	43	167	81	112
	incl. depreciation	40	351	504	894	1.426
1.2.3.	incl. Other costs	34	150	351	470	833
1.3.	**Costs for Dam-lakes and Cascades**	**3.197**	**3.413**	**5.215**	**5.668**	**6.431**
1.3.1.	incl. Operational costs	2.699	2.842	4.082	4.296	4.824
1.3.2.	incl. Investment costs	498	571	1.133	1.372	1.608
	incl. costs for economic acquisition and liquidation of fixed tangible assets	34	54	211	102	141
	incl. depreciation	58	499	715	1.270	2.026
1.3.3.	incl. Other costs	19	85	199	267	473
2.	**Costs of central administration**	**9.089**	**2.859**	**8.617**	**3.483**	**5.390**
	Operational costs	**1.682**	**1.437**	**1.777**	**1.186**	**1.422**
	Investment costs	**7.407**	**1.422**	**6.840**	**2.298**	**3.968**
2.1.	**Ministry of Environment and Water**	**9.089**	**2.859**	**8.617**	**3.483**	**5.390**
2.1.1.	(Enterprise for Management of the Environmental Protection Activities)	1.682	1.437	1.777	1.186	1.422
2.1.2.	Investment costs	7.407	1.422	6.840	2.298	3.968
3.	**Municipal costs**	**2.469**	**2.765**	**3.279**	**5.748**	**5.550**
3.1.	Operational costs	438	491	582	1.021	985
3.2.	Investment costs	2.030	2.274	2.697	4.728	4.565
4.	**State Budget Costs**	**4.875**	**5.660**	**3.760**	**4.510**	**6.837**
	Operational costs	**-**	**-**	**-**	**-**	**-**
	Investment costs	**4.875**	**5.660**	**3.760**	**4.510**	**6.837**
4.1.	Operational costs					
	Co financing by ISPA, PHARE etc					
4.2.	Investment costs	4.875	5.660	3.760	4.510	6.837
	Investment costs - direct	4.875	5.660	3.760	4.510	6.765
	Co financing by ISPA					72
5.	**Costs of other financing institutions**	**655**	**658**	**2.779**	**2.911**	**2.613**
	Operational costs	**355**	**438**	**2.779**	**2.848**	**2.396**
	Investment costs	**300**	**220**	**-**	**63**	**217**
5.1.	Operational costs	**355**	**438**	**2.779**	**2.848**	**2.396**
	EU PHARE Programme	-	151	2.270	2.498	1.956
	EU ISPA Programme					
	Other donors	-	288	509	351	440
5.2.	Investment costs	**300**	**220**	**-**	**63**	**217**
	EU ISPA Programme					217
	National Trust Eco-fund	*300*	*220*		*63*	
6.	**Costs of Companies**	**204.739**	**466.869**	**304.416**	**388.241**	**271.076**
6.1.	Operational costs - total	200.169	462.777	298.309	370.540	244.125
	Operational costs - self water supply	177.078	435.141	252.105	321.976	200.694
	Operational costs - circulating water supply	13.831	13.400	29.285	30.420	17.638
	Operational costs – WWTP maintenance	9.260	14.237	16.918	18.143	25.792
6.2.	Investment costs	4.571	4.092	6.107	17.701	26.952

Financial costs, based on real data provided by various sources (MoEW etc.), are presented in black colour. Part of the information required to determine the financial costs of water services is available for the whole analyzed period. However, data related to some costs is either available only for specific years within the period 1999-2003 or is not available at all. In the second case there is no reference point for data interpolation and/or extrapolation, therefore they are not taken into account when identifying the financial costs. A subsequent cost recovery analysis must obtain and analyze information related to water sector costs.

Where no data were available for several years within the analyzed period (mainly related to water operator costs), procedures have been applied to „recover" the information, i.e. inter-

polation and/or extrapolation of available values. In general, the applicable rate is the rate of change over those years for which data is available, or for which data relating to the water operator is available. Recovered data by these method are marked in blue colour.

These procedures were necessary as the financial costs are fundamental to the steps which are to follow, such as cost identification by main users, cost recovery analysis, scenario development etc.

After corrections were made, the third step was carried out, namely the identification of non-market costs. There are two types of costs which are to be analyzed under that heading:

1. Resource costs;
2. Environmental costs.

The identification of these costs is based on the assumption that during the investigated period society, more specifically the people and businesses within the Danube River Basin, had suffered damages and/or received benefits in relation to the water status of the river basin district. Valuation of these costs and benefits was based on the available information, including financial information, with primary emphasis on the level of satisfaction of the water demands during the analyzed period. The calculations are based on differences of the hydrological characteristics in the demand of each year – dry or humid years and the number of people subject to the water restriction regime.

The allocation of costs to the main types of water users is based on a percentage allocation of funds paid by the individual users to the respective water service provider companies. Wherever possible, these costs have been directly allocated to the respective water user.

This allocation makes a definition of the costs per water unit according to the kind of water user and the respective service possible. The final value is fundamental for drafting the prognosis scenarios for the period up to 2015.

The cost recovery analysis is based on the juxtaposition of the incurred annual costs of the providers during the assessment period (1999-2003) and the amounts paid by water users. The subject of the assessment was the difference between actual payments by households, industry, agriculture and others in comparison to the water supply costs. Data on payments are derived from the following statistical information:

- Payments by households
- Payments by industry
- Payments by agriculture
- Payments by other water users

VAT is excluded as it is being reimbursed to Water Supply and Sewerage Companies.

The initial attempt to assess financial cost recovery levels by sectors and services, with only revenues and costs as variables (i.e. subsidies are excluded) turned out to be more illustrative than informative as data for the precise allocation of revenues and costs of operators by kinds of services was not available. The identical source is used for the allocation of revenues and costs by kinds of services – the value in cash to the respective user of the water. Comprehensive information on the participation of individual water services by kinds of users (sectors) in the generation of revenues and costs of the operators would contribute to more precise calculations of the cost recovery level.

Table 51: Cost recovery assessment by sectors compared to the financial costs*

Water users	measure	1999	2000	2001	2002	2003
HOUSEHOLDS						
Drinking water supply revenues	thousands BGN	45.700	67.161	74.244	73.803	83.166
Drinking water supply costs	thousands BGN	47.049	65.084	78.595	78.835	91.948
Cost Recovery	**%**	**97**	**103**	**94**	**94**	**90**
Sewerage revenues	thousands BGN	5.657	6.987	7.815	7.973	9.165
Sewerage costs	thousands BGN	5.824	6.771	8.273	8.516	10.133
Cost Recovery	**%**	**97**	**103**	**94**	**94**	**90**
Waste water treatment revenues	thousands BGN	4.402	4.896	5.288	5.277	7.098
Waste water treatment costs	thousands BGN	4.532	4.745	5.598	5.637	7.848
Cost recovery	**%**	**97**	**103**	**94**	**94**	**90**
Total revenues	thousands BGN	**55.759**	**79.044**	**87.347**	**87.053**	**99.430**
Total costs	thousands BGN	**57.405**	**76.599**	**92.466**	**92.988**	**109.929**
Cost Recovery	**%**	**97**	**103**	**94**	**94**	**90**
INDUSTRY						
Water supply revenues	thousands BGN	208.635	465.930	298.578	371.761	238.621
Water supply costs	thousands BGN	214.795	451.517	316.078	397.108	263.818
Cost Recovery	**%**	**97**	**103**	**94**	**94**	**90**
Sewerage revenues	thousands BGN	2.275	2.315	2.375	3.489	3.509
Sewerage costs	thousands BGN	2.342	2.244	2.514	3.727	3.879
Cost Recovery	**%**	**97**	**103**	**94**	**94**	**90**
Waste water treatment revenues	thousands BGN	18.436	21.965	26.548	40.632	58.276
Waste water treatment costs	thousands BGN	18.981	21.286	28.104	43.402	64.430
Cost Recovery	**%**	**97**	**103**	**94**	**94**	**90**
Total revenues	thousands BGN	**229.347**	**490.211**	**327.502**	**415.882**	**300.405**
Total costs	thousands BGN	**236.117**	**475.047**	**346.696**	**444.237**	**332.127**
Cost Recovery	**%**	**97**	**103**	**94**	**94**	**90**
AGRICULTURE						
Water supply revenues	thousands BGN	1.260	2.414	2.061	1.650	1.659
Water supply costs	thousands BGN	1.297	2.340	2.182	1.762	1.834
Cost Recovery	**%**	**97**	**103**	**94**	**94**	**90**
Waste water disposal revenues	thousands BGN	6	6	15	8	6
Waste water disposal costs	thousands BGN	6	6	15	8	6
Cost Recovery	**%**	**97**	**103**	**94**	**94**	**90**
Waste water treatment revenues	thousands BGN	47	31	45	17	3
Waste water treatment costs	thousands BGN	48	30	47	18	3
Cost Recovery	**%**	**97**	**103**	**94**	**94**	**90**
Total revenues	thousands BGN	**1.312**	**2.451**	**2.120**	**1.674**	**1.668**
Total costs	thousands BGN	**1.351**	**2.376**	**2.245**	**1.788**	**1.844**
Cost Recovery	**%**	**97**	**103**	**94**	**94**	**90**
OTHER WATER USERS						
Water supply revenues	thousands BGN	14.379	18.899	20.771	17.787	19.424
Water supply costs	thousands BGN	14.803	18.314	21.989	18.999	21.475
Cost Recovery	**%**	**97**	**103**	**94**	**94**	**90**
Sewerage revenues	thousands BGN	2.250	2.490	2.991	2.205	2.104
Sewerage costs	thousands BGN	2.316	2.413	3.166	2.356	2.326
Cost Recovery	**%**	**97**	**103**	**94**	**94**	**90**
Waste water treatment revenues	thousands BGN	3.348	3.532	4.444	3.294	3.302
Waste water treatment costs	thousands BGN	3.447	3.423	4.704	3.518	3.651
Cost Recovery	**%**	**97**	**103**	**94**	**94**	**90**
Total revenues	thousands BGN	**19.977**	**24.921**	**28.206**	**23.286**	**24.829**
Total costs	thousands BGN	**20.567**	**24.150**	**29.859**	**24.873**	**27.451**
Cost Recovery	**%**	**97**	**103**	**94**	**94**	**90**

*The applied formula is “revenues/costs*100”

The currently available information allows an approximate general assessment of the cost recovery level (i.e. not by water users and water services) according to the requirements of the Guidance for the application of the Water Framework Directive. It takes into account the impact of subsidies in the water sector. There are different sources of subsidies in the water sector such as the state budget (direct subsidies and co-financing by EU programmes), the Enterprise for Management of the Environmental Protection Activities, EU Programmes etc.

Table 52: Cost Recovery Assessment for Operators According to the Guidance for Applying of the WFD*

		1999	2000	2001	2002	2003
Revenues	thousands BGN	306395	596627	445175	527894	426332
Subsidies	thousands BGN	9046	-18456	26091	35993	45019
Costs	thousands BGN	315441	578172	471266	563887	471351
Cost Recovery	%	**94,3**	**106,4**	**88,9**	**87,2**	**80,9**

*The applied formula is “revenues - subsidies/financial costs*100”

Output data does not allow a cost recovery assessment by kinds of water services and water users, i.e. availability or lack of cross-subsidizing. However, the results demonstrate that the cost recovery level in the water sector is incomplete and tended to decrease within the period 1999-2003.

The assessment of economic regulation is an essential to the analysis of the cost recovery level of water services. This assessment covers the analysis of the legislative frame and of the implementation of economic tools at national and at basin level in the country.

6.4.1 Fees for Uses of Water Resources

An essential element of the financial organization and the economic regulation of the water sector are fees paid by water users and users of water bodies to the state. Fees for the use of the natural resource “water” were introduced by the Water Act 1999, in force since 2000. This Act authorizes the Council of Ministers to set out in a Tariff the particular amount of fees for the different kinds of water uses. Fees have to be paid by water users and water body use permit holders.

In 2000 the Council of Ministers adopted a Tariff on Fees for Water Uses and/or Permitted Water Bodies Uses, which entered into force in 2001. This Tariff provided the method of the annual calculation of the fees due for specific water uses and water bodies uses.

Fees are payable annually and are uniform in the whole country. The annual amount of fees is determined on the basis of a formula which takes into account the annual volume of abstracted water, the purpose of water use and corrective coefficients. The amount of fees due for water uses (abstraction fees) is determined by

- the purpose of use of water resources abstracted from water sources,
- the abstracted water volume,
- the category of water used and
- the average Head of Water (Net Pressure) of Hydro Power Plant.

6.4.1.1 Purpose of use of water resources abstracted from water sources

Water uses from surface waters and groundwater may have the following purposes:

- Drinking water supply
- Electricity production
- Irrigation and stock-breeding
- Cooling
- Recreation and water sports
- Industrial water supply
- Other purposes

The Tariff provides a specific fee - expressed in BGN/m3 - for each purpose of surface waters and groundwater use. The fee also depends on the purpose of use where mineral waters are used. Fees are fixed for the following purposes:

- medication, rehabilitation, prophylactics, as well as for sport, recreational, household and hygiene needs of hospitals, social and educational institutions.
- drinking water supply to the population, if no other alternative is available
- sport, recreation, household and hygiene needs
- other purposes

6.4.1.2 Abstracted Water Volume

The water volume abstracted from water sources is measured by certified measuring equipment complying with the normative requirements. Before the installation of measurement equipment and in the case of a breakdown thereof, the due fee is calculated on the basis of the permitted annual water quantity.

In the case of electricity production the water volume can be defined on the basis of the produced electricity and the specific water consumption for the production of 1 kWh/m^3, if measurement equipment is not installed.

6.4.1.3 Category of Water Used

Surface waters are categorized according to Regulation No. 7 of 1986 related to the indicators and norms for the identification of the quality of running surface waters.

Groundwater including mineral water is categorized according to Regulation No. 1 of 2000 related to the exploration, use and protection of groundwater.

According to this categorization, surface waters and groundwater are classified as falling within the first, second and third category. The awarded category of water corresponds to a corrective coefficient, which is applied in the calculation of the amount of the due fee.

6.4.1.4 Average Head of Water (Net Pressure) of Hydro Power Plant

In case of electricity production the fee additionally takes into account the net pressure. It is divided by 450 in the formula for the calculation of the amount of the fee. A Water abstraction fee does not need to be paid in the following cases:

1. Individuals and legal entities abstract up to 10 m3/24h for their own needs
2. Anti-fire measures
3. Water abstraction for drainage.

Payments for special rights to water use include concession payments. The concession payment for a mineral waters concession is determined on the basis of the provided mineral water quantity. The amount of fees for permitted water body use is defined by:

1. Objective of the water body uses

- Recreation and water sports
- Abstraction of sand, rubble and other activities which disturb the water body regime
- Waste waters discharge into the water body, complying with the requirements for the water receiver
- Waste water discharge into coastal sea waters

A single amount of fee is fixed for each purpose of uses of the water body.

2. Area of the Water Body Used

The area covered by the water body use is essential, if the water body is used for recreation and water sports.

3. Abstracted Quantity of Inert Material

If the quantity of inert material abstracted is unknown, the fee is based on the quantity determined in the abstraction permission.

4. Category of Water of the used water body

After the categorization of the water in a used water body a corrective coefficient for the calculation of the fee is defined. In formulating discharge fees the following waters are to be categorized:

- Discharged waters into surface water body according to the indicators from the regulation on the admissible level of pollution of different categories of surface running waters: unsolved substances, Biological Oxygen Demand 5 and Chemical Oxygen Demand.
- Water receiver in which the waste waters will be discharged.

Fees for water uses and uses of water bodies are paid annually and shall be paid no later than the 31 January of the following year. The fee can be paid in advance by 31 January of the current year. Int eh case of advance payment the fee is reduced by 7%. The permit holder has to provide the authority issuing the permit with a copy of each payment document.

The amendments to Article 194 paragraph 1 item 1 of the Water Act 2006 regulate the payment of the following fees related to water use rights:

1. Water abstraction fee for:

- surface waters
- groundwater
- mineral waters

2. Fee for water body uses for:

- abstraction of alluvium/driftage sediments from surface water bodies
- aquacultures and related activities
- recreation and water sports

3. Pollution fees for:

- discharge of waste waters into surface waters
- disposal of pollutants into groundwater

4. Concession payment

The new Water Act 2006 provides a detailed regulation of fees for the resource water (water abstraction fee, fee for use of the water environment and water pollution fee). Principles for the definition of fees are set out and aim at enhancing the water resource protection and complex water uses. They are based on water use permits and a method of fee calculation for each individual case which is additionally laid down in a regulation of the Council of Ministers.

Accumulated funds are used to finance water infrastructure projects. The main part of these funds is invested in projects for urban treatment plants and urban water supply and sewer-

age networks, for monitoring and scientific researches. A part of the project financing comes from other financing sources such as co-financing by the Ministry of Regional Development and Public Works.

6.4.2 Administrative fees

Administrative fees are paid by customers (natural or legal persons) to the competent public authority for the preparation, issue, confirmation or approval of the respective permit or for the registration of certain events. Presently, the following administrative fees have been regulated:

1. Fees paid for permits and registrations from the Ministry of Environment and Water. These fees were pursuant to the Environment Protection Act of 1991, which is not effective at present. The new Environment Protection Act 2002 regulates the payment of fees due for the issue of permits and registrations from the Ministry of Environment and Water at rates laid down in the Tariff approved by the Council of Ministers. The rates are specified on the basis of the approximate average costs incurred by the administration in the issue of such permits. Pursuant to the Environment Protection Act, the Council of Ministers has accepted the Tariff of fees which are collected by the Ministry of Environment. The administrative fees determined in the last Tariff (2005) are:

- Fee for water use permit - 117 BGN
- Fee for the extension of the terms or the alteration/amendment of the permit – 50 BGN
- Registration fee for the grant of special water use rights – explicit state property with water bodies being public state property – 175 BGN

Fees are not differentiated by river basins and are uniform for the whole country. This fee is 100%-collectable as it is due before services are rendered. The application for a permit for water use will otherwise not be accepted.

Fees are used by the Enterprise for Management of the Environmental Protection Activities to finance the realization of water sector projects. Control of these revenues is not differentiated by types of services or by basin directorates since no sufficient information on such revenues was available in the past years. The expert evaluation based on the number of permits issued (4384) for the duration of the Water Act (2000 - 2004) shows that the revenues for the whole country are approximately 430 thousand BGN.

The new Water Act regulates similar rules concerning the payment of administrative fees for the issue of such permits.

2. The Act on the regulation of water supply and sewerage (WSS), in force since January 2005, also regulates the payment of administrative fees:

- Fees for WSS-regulation paid by WSS operators;
- Fees for the registration of experts – natural and legal persons which exercise control functions according to the WSS Act.

The purpose of the collection of these fees is to grant financial support to the State Commission for Energy and Water Regulation (WSS services). The amount of the fees is determined by the Council of Ministers from a proposal by the Commission.

6.4.3 Prices of the Water Services

Until1998 the prices of water services have been regulated pursuant to the Prices Act. After 1998, the prices of WSS services for state-owned or state-municipal-owned WSS companies were regulated pursuant to the internal rules of the Ministry of Regional Development and

Public Works. The prices of WSS services for the WSS companies with municipal ownership are subject to approval by the Municipal Councils upon a proposal by the WSS companies.

The Water Act from 2000 requires the prices of water supply, discharge and treatment services to cover the costs for the construction, operation, maintenance and reconstruction of the facilities and the systems required for their provision. Pursuant to the Act, the fees for water uses and use of water bodies are included in the price formation.

The prices of WSS services until 2005 were different, being mainly dependent on whether water was supplied naturally or by pumping. There were considerable differences (by more than five times) in the prices in the different settlements and regions.

According to the WSS prices are regulated by the State Commission for Energy and Water Regulation. The methods for price formation(e.g. They have to reflect the costs structure), their regulation, the order of submission of price proposals and their approval are determined by Regulation of the Council of Ministers.

The Commission regulations take into consideration the operators' business plan, economically justifiable costs, adequacy of the prices for different settlements and the actual costs, social affordability of the WSS services, avoidance of cross-subsidizing between the consumers, encouragement of reasonable and efficient planning of investments, elimination of water losses, environmental protection, prevention of abuse of the dominant economic situation, etc.

Until 2005 the legal basis for the application of social aid and protection systems to the WSS services provided to the population was missing. The WSS regulation fills this gap by specifying drinking water as a vital necessity according to the terms of the Social Aid Act.

According to the provisions of this Act, the water price in a region is socially affordable if the value of the minimum monthly needs of drinking water of 2.8 m3 per inhabitant does not exceed 4 per cent of the average monthly income per household in this region.

6.4.4 Concession Remunerations

The Water Act grants special rights of water use through concessions only for mineral waters which are state-owned, when the water is used for commercial purposes:

1. Bottling of natural mineral water and/or of aerated and other drinks containing mineral water;
9. Extraction of valuable substances;
10. P
roduction of hydro-geothermal energy.

The contracts for mineral water use concessions provide two ways of concession remunerations:

- Annual concession remunerations
- One-time concession remunerations

The annual concession remunerations represent payment for the use of mineral waters as a natural resource.

The annual concession remuneration is determined on the basis of the value of the mineral waters, their application and on the price proposed by the grantee and is fixed according to the methodology approved by the Minister of the environment and waters.

The revenues from concession remunerations for the period 1998–2003 were progressively increasing. In 2003 the revenues were greater by almost 40 times than those of the base year 1998. This was owed to the increasing number of the new contracts concluded during

these years, the end of contractual gratuitous periods and to the improved control exercised by the Ministry of Environment and Water.

The revenues from concession remunerations (in BGN) by years are presented below:

- 1998: 44 757
- 1999: 307 261
- 2000: 611 724
- 2001: 878 725
- 2002: 1 090 121
- 2003: 1 751 650

The size of the one-time concession remuneration is based on the costs as incurred by the state for the grant of the concession and varies from 1000 to 42 500 BGN.

15% of the concession revenues are directed to a special account of the Ministry of Finance, including the revenues from mineral waters. They financially support the administration in the realization of concession-related activities. Amounts of not less than 30% of the concession remunerations go into the budget of the Municipality, on whose territory the respective mineral waters deposits are located. The remaining receipts are directed to the National budget.

The Water Act envisages the grant of special rights of water use in one case only: on mineral water abstraction for bottling purposes. In contrast to the former legal regulation and practice, the Act regulates the acceptance of the Council of Ministers of the methodology for the determination of the concession remunerations for mineral water use as well as the principle for the determination of the amount of concession remunerations. These depend on the quantity of mineral water used and the amount per 1 m3 of water as determined on the basis of its value. Again, the Municipality on whose territory the mineral water deposits are located receives 30% of the revenues.

6.4.5 Subsidies

The Act for regulation of the WSS services determines them as activities of public interest according to the terms of the Act on Protection of Competition and the State Grants Act. The legislative envisages by the observation of the terms of this Act that state grants will provide a possible mechanism for investments in the realization of activities in this sector.

Until the actual start of the project within the EU pre-accession programs, the main investment source will be the National budget. Another considerable source for the financing of municipalities investment projects is the Enterprise for Management of the Environmental Protection Activities (successor to the National Fund for Environment Protection). Individual investment projects are supported under bilateral agreements with foreign Governments such as Switzerland and Denmark. The pre-accession programs ISPA, PHARE and SAPARD, as well as the financial instruments of the European Community after the accession of the country to the EU will provide the main resource for investments in the water sector together with the required national co-financing.

The Water Act envisages the grant of financial resources from the National Budget for the

- Activities of the state administration for the enforcement of the provisions of the Water Act,
- Investment in projects of protective measures against harmful impacts on water, the liquidation of eventual subsequences and the maintenance and recovery of forests within the sanitary-hygiene zones and
- Co-financing of projects funded by the EU.

7. Summary of the programmes of measures accepted according to Article 11 of the WFD

7.1 Summary of measures required for the enforcement of the EU-legislation in the water protection sector (see Annex VI Part A)

7.1.1 Basic measures

The basic measures already under way according to the actual legal regulations are presented in Table 53.

Table 53: Basic measures according to the actual legal regulations

EU-legislation applied in the water protection sector	Legislation of the Republic of Bulgaria applied in the water protection sector
The Bathing Water Directive (76/160/EEC)	Water Act (SG No. 67/ 1999, corrected SG No.65/ 2006 and amended SG No.66/ 2006)
	Regulation No. 11 on the Quality of Bathing Water (SG No. 25/ 2002)
The Birds Directive (79/409/EEC)	Law on the Biological Diversity (SG No. 77/ 2002)
	Protected Areas Act (SG No.133/ 1998r.)
The Drinking Water Directive (80/778/EEC) as amended by Directive 98/83/EC	Water Act
	Regulation No. 1 on the Exploration, Use and Protection of the Groundwater (SG No.57/ 2000, corrected by SG No.64/ 2000).
	Regulation No. 3 on the Terms and Procedures for the Exploration, Design, Approval and Operation of Sanitary Protected Areas Around Water Sources and Installations for Drinking and Domestic Water Supply and Around Water Sources of Mineral Waters Used for Therapeutic, Preventive, Drinking and Hygienic Purposes (SG No. 88/ 2000).
	Regulation No.9 on the Quality of Water Intended for Human Consumption (SG No.30/ 2001).
	Regulation No.12 on the Requirements to the Quality of Surface Waters Intended for Drinking-Water Supply (SG No.63/ 2002)
The Major Accidents (Seveso) Directive (96/82/EC)	Environmental Protection Act (SG No. 91/ 2002, corrected and amended by No. 77/ 2005)
	Ordinance on the Conditions and Procedure for Issuing of Permits for Construction and Operation of New Establishments or Installations and for Operation of Existing Establishments and Installations Implementing a System for the Prevention of Major Accidents Involving Hazardous Substances or the Limitation of Their Consequences(SG No.38/ 2003).
The Environmental Impact Assessment Directive (85/337/EEC)	Environmental Protection Act
	Regulation on the Conditions and the Order of the Impact Assessment upon the Environment (SG No.25/ 2003).
	Regulation on the Conditions and the Order and the Methods of Making an Ecological Assessment (SG No.57/ 2004).
The Sewage Sludge Directive (86/278/EEC)	Waste Management Act (SG No.86/ 2003, corrected and amended by No.77/ 2005)
	Ordinance on the Order and the Way of Recovery of Sludge from Waste Water Treatment through its use in the Agriculture (SG No.112/ 2004).
The Urban Waste Water Treatment Directive (91/271/EEC)	Regulation No.6 on the Limit Values for Admissible Contents of Hazardous and Harmful Substances in the Waste Water Discharged in the Water Bodies (SG No.97/ 2000, corrected and amended by SG No.24/ 2004)
	Regulation No.7 on the Terms and Procedure for Discharge of Industrial Waste Waters into Settlement Sewer Systems (SG No.98/ 2000)
	Regulation No.10 on Issuing Permits for Waste Water Discharge into Water Bodies and Setting Individual Emission Limit Values for Point Sources of Pollution (SG No.66/ 2001)
The Plant Protection Products Directive (91/414/EEC)	Law on Protection against Harmful Impact of Chemical Substances and Preparations (SG No. 10/ 2000, corrected and amended by SG No.114/ 2003)
The Nitrates Directive (91/676/EEC)	Regulation No.2 on the Protection of Waters against Pollution Caused by Nitrates from Agricultural Sources (SG No.57/ 2000)
The Habitats Directive (92/43/EEC)	Law on the Biological Diversity
	Regulation No.4 on the Quality of Waters Supporting Fish and Shellfish Organisms' life (SG No.88/ 2000)
The Integrated Pollution Prevention Control Directive (96/61/EC)	Environmental Protection Act
	Regulation on the Conditions and the Order of Issuing of Complex Permits for the Construction and Operation of New or Active Industrial Installations and Facilities (SG No. 26/ 2003, altered by SG No.29/ 2003)

7.2 Practical steps and measures in the application of the principle for cost recovery of water services

7.2.1 Comparative analysis of the production costs (Benchmarking)

7.2.2 Economic evaluation of measures and combinations of measures

7.2.3 Costs of measures and their funding

7.2.4 Determination, collection and utilization of environmental and resource costs

7.3 Measures for drinking water supply (Article 7)

7.3.1 Basic Measures

Basic measures already under way according to the actual legal regulations:

- Environmental Protection Act;
- Water Act;
- Waste Management Act;
- Application of Regulation No. 1 on the Exploration, Use and Protection of the Groundwater;
- Application of Regulation No. 2 on the Protection of Water against Pollution caused by Nitrates from Agricultural Sources;
- Application of Regulation No. 3 on the Sanitary Protected Areas around Water Sources for Drinking Water Supply;
- Application of Regulation No. 6 on the Limit Values for Admissible Contents of Hazardous and Harmful Substances in the Waste Water discharged in the Water Bodies;
- Application of Regulation No. 7 on the Terms and Procedure for Discharge of Industrial Waste Waters into Settlement Sewer Systems;
- Application of Regulation No. 10 on Issuing permits for Waste Water discharge into Water Bodies;
- Nitrates Directive

7.3.2 Measures for monitoring of the water bodies (Article 7 Para 1)

The measures consist in a central database of all relevant data regarding the groundwater bodies, as well as of the collection, recording and evaluation of the data from the installed monitoring network.

7.3.3 Measures to observe the limited values for drinking waters according to EU-Drinking Water Directive

The measures regard the reduction of pollution by point and diffuse sources (see 7.5.2).

7.3.4 Preventive measures for drinking water protection (determing the sanitary-prorected areas around the drinking water sources)

7.4 Summary of the control measures aplied in the water abstraction and water collection

7.4.1 Control measures applied in the water abstraction from surface water bodies

7.4.2 Control measures applied in the water abstraction from groundwater bodies

The water quantities permitted until now are determined on the basis of the rights granted for water abstraction purposes to WSS- companies – Pleven, Lovech and Troyan (as being big water users), but not as per the actual water use. In updating the rights granted to these

companies for water use, the requested water quantities shall be reviewed and they shall be grounded on the population water supply norms and on the water source exploitation resources. On the permitted quantity approval, the rights of groundwater use for industrial water supply and the reduction of the permitted water quantities shall be additionally agreed for the purposes of protection of the exploitation resources. The rights granted to some groundwater users may be possibly withdrawn, and rights of using surface waters may be granted to them instead.

7.4.2.1 Measures within the water supply management ("Supply-Side-Management")

- As to the water supply management – water use permissions shall be granted to all WSS- companies engaged in the drinking water supply to the households.
- Installing of measuring devices to monitor and control the water quantities being drawn by the WSS-companies from the water bodies.
- The annual water quantities permitted to be abstracted shall correspond to the water body natural resources, demographical status of the region and the water supply norms.
- In view of cost recovery for water use the respective control shall be exercised on the fees due for water use and on the charges for water supply to the households and to the industrial enterprises.
- The establishment of sanitary protection areas around water sources for drinking water supply with belts I, II and III and the accompanying prohibitions and restrictions on the land use and on the fertilizer use.

7.4.2.2 Measures within the water demand management („Demand-Side-Management")

- Water demand management – regulation of the use of clean drinking water and redirection of the water use to purposes different from drinking from surface water bodies.
- Installing of measuring devices for quantitative monitoring and control on the water quantities consumed by the households.

7.4.3 Measures for guaranteeing the water supply to industrial and craft enterprises

7.4.3.1 Measures within the water supply management ("Supply-Side-Management")

- Water supply for the needs of the industrial and craft enterprises of water not used for domestic-drinking purposes.
- Water shall be used only upon the obtainment of a water use permission as per the respective requirements and conditions.

7.4.3.2 Measures within the water demand management ("Demand-Side-Management")

- Water demand management through the introduction of closed cycles in the industrial water supply, in view of the reduction of the water quantities drawn for production needs.
- Installation of measuring devices for quantitative monitoring and control on the water quantities consumed by the respective enterprises.

7.4.4 Measures for guaranteeing the agricultural irrigation

- Conclusion of co-operation agreements between the water supply companies and agricultural producers.

7.4.5 Control measures in the impoundment of fresh surface waters

7.4.6 Exclusions made according to Article 11 (Para 3 "d")

7.5 Summary of the control measures on discharges and other activities which may have impact upon the state of the surface waters and groundwater according to Article 11 Para 3 ("g" and "i")

7.5.1 Control measures on discharges into surface water bodies

7.5.1.1 Basic measures

7.5.1.1.1 Waste waters discharge (centralized, decentralized)

- Construction of sewerage networks in settlements up to 10 000 equivalent inhabitants – up to 2010 and in settlements from 2000 up to 10 000 equivalent inhabitants – until the year 2014, according to Regulation No.6.

7.5.1.1.2 Waste water discharge from industrial and craft enterprise

- Construction of local treatment plants for the industrial waste waters from the companies before their discharge into the water receiver.

7.5.1.2 Preventive measures

- Monitoring of installations of industrial waste water disposal.

7.5.2 Control measures on the groundwater pollution from diffusive sources

7.5.2.1 Basic measures

- Rendering consulting services to agricultural producers with the aim of achieving a groundwater sparing crop rotation.
- Reducing the infiltration of substances from any agricultural activities.
- Reducing the use of N, P and plant protection preparations.
- Providing possibilities for manure storage and the use of the technology for its application.
- Determining the loads of N and P from groundwater to surface water.

7.5.2.2 Preventive measures

- Monitoring of the hazardous substances content in soils and groundwater.
- Prohibitions and restrictions in the application of manure in case of the reaching of the ecological threshold values for the groundwater pollution.

7.5.3 Reducing the pressure from point sources

7.5.3.1 Basic measures

- Progressive closure of the hazardous waste landfills until 31.12.2006.
- Progressive closure of the non-regulated dumps until 16.07.2009.
- Progressive construction and entering into operation of the regional domestic solid waste landfills.
- Construction of urban and industrial waste water treatment plants.
- Construction of rain-water sewerage systems on the company grounds and of local waste water treatment plants.
- For liquidation of pollution from non-regulated dumps, the respective measures for their progressive closure according to the approved Plans for setting the existing dumps in compliance with the normative requirements shall be undertaken. In the Vit catchment area the non-regulated dumps of 38 settlements have been closed by

the year 2006 and during the year 2006 the non-regulated dumps of another 15 areas are expected to be closed. By the year 2009 the non-regulated dumps in the remaining 30 settlements shall be closed. The total activity of the closure of the non-regulated dumps is related to the construction of respective regional domestic waste landfills and to the organization of the waste disposal from the settlements to regional landfills.

7.5.3.2 Preventive measures

- Construction of monitoring points for groundwater monitoring during and after closure of the dumps.

7.5.3.3 Selected additional measures for groundwater bodies „at risk“

The above mentioned basic measures for groundwater bodies “at risk” are not sufficient, there are some deficits and additional measures are recommended, depending on the reason for the assessment “at risk”. These measures have a priority according to their efficiency (measures 1, 2 and 3). In these cases, further special measures are defined for single local pressures, according to the type of pressure (see Table 54).

Table 54: Selected additional measures in the Vit catchment area

No.	GWB No.	Type of pollutant pressure	Level of risk	Mesures currently undertaken type	Current monitoring (yes/no)	Is the drinking water supply at risk (yes/no)	Assess-ment of the measures deficit (yes/no)	Mesure 1	Measure 2	Measure 3	Cost of the measure (high, medium or low)	Expected effect from the measures as undertaken
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
1	BG019	Point - dumps 17 rural and 1 municipal (organic and nutrients); stores for pesticides - 5	Medium	Waste Management Act, Regulation 7 and 8; closure of rural dumps	yes	no	yes	Closure of dumps	Dumps recultivation	Monitoring by/after closure of the dump	Medium	Reducing the content of organic and nutrient pollutants in the groundwater
		Diffuse – land use (nitrogen);	Medium	The Nitrates Directive	yes	no	yes	Reducing the fertilization with nitrogen fertilizers		Monitoring	Low	Reducing the nitrogen content in the ground water
		17 settlements without sewerage (phosphates)	High	According to Regulation № 6 over 10 000 Inh. by the year 2010 2000 -10 000 Inh. by the year 2014	yes	no	yes	WWTP construction	Settlement sewerage construction	Monitoring	High	Reducing the phosphates content in the groundwater
		Industrial enterprises	High	CPPC under Environmental Protection Act	yes	no	yes	Storm water within the enterprise site, Local WWTP	Monitoring of installation for industrial waste water disposal	Monitoring	High	Reducing the content of organic and nutrients pollutants in the groundwater
		Water abstraction	High	Water Act, Regulation 1	yes	no	yes	Water use updating	Monitoring	Termination of water abstractions	Medium	Water resources restoration
2	BG033	Point - dumps 9 rural and 1 municipal (organic and	Medium	Waste Management Act, Regulation 7 and 8; closure of rural	yes	no	yes	Closure of dumps	Dumps recultivation	Monitoring by/after closure of the dump	Medium	Reducing the content of organic and nutrient pollutants in the groundwater
		Diffuse – land use (nitrogen);	Medium	The Nitrates Directive	no	no	yes	Reducing the fertilization with nitrate fertilizers	Construction of monitoring points	Monitoring	Medium	Reducing the nitrogen content in the ground water
		9 settlements without sewerage (phosphates)	High	According to Regulation № 6 over 10 000 Inh.by the year 2010 2000 -10 000 Inh. by the year 2014	yes	no	yes	WWTP construction	Settlement sewerage construction	Monitoring	High	Reducing the phosphates content in the groundwater
		Water abstraction	Medium	Water Act, Regulation 1	yes	no	yes	Monitoring	Water use updating	Reducing the number of permissions issued for water use	Medium	Water resource preservation
3	BG034	Pont - dumps 15 rural and 1 municipal (organic and nutrients); stores	Medium	Waste Management Act, Regulation 7 and 8; closure of rural dumps	yes	no	yes	Closure of dumps	Dumps re-cultivation	Monitoring by/after closure of the dump	Medium	Reducing the content of organic and nitrogen pollutants in the groundwater
		Diffuse - land use (nitrogen);	High	The Nitrates Directive	yes	no	yes	Reducing the fertilization with nitrate fertilizers		Monitoring	Low	Reducing the nitrogen content in the groundwater
		2 settlements without sewerage (phosphates)	High	According to Regulation № 6 over 10 000 Inh. by the year 2010 2000 -10 000 Inh.by the year 2014	yes	no	yes	Construction of WWTP	Settlement sewerage construction	Monitoring	High	Reducing the phosphates content in the groundwater
		Water abstraction	Medium	Water Act, Regulation 1	yes	no	yes	Monitoring	Water use updating	Reducing the number of permissions issued for water use	Medium	Water resource preservation

7.5.4 Measures for hydromorphological quality restoration in combination with measures for flood protection

7.5.4.1 Measures for improvement of water passability

7.5.4.2 Measures for water bodies restoration to their natural status (returning to the original river bed)

7.5.4.3 Measures for improvement of the natural retention

7.5.4.4 Measures for river flow provision

7.5.4.5 Measures for flood protection

7.5.5 Other activities with impact upon the surface waters and groundwater status

7.6 Cases for which a permission is given for direct discharging into underground waters pursuant to the provisions of Article 11 (Para 3 “j”)

7.7 Measures taken in accordance with Article 16 on priority substances

7.8 Summary of measures for preventing or reducing the impact from accidental pollutions

7.9 Summary of measures taken under Article 11 (5) for water bodies which are unlikely to achieve the objectives set out under Article 4

7.9.1 Vit catchment area

BG019: Point sources – 11 village landfills and 1 landfill (organic, biogenic waste), 8 pesticide depots.

The achievement of the objectives by 2015 is not sure, because until now no monitoring was implemented and because neither the actual pressure, nor the necessary measures and their effects in time were assessed.

7.9.2 Osam catchment area

BG033 and BG034: diffusive sources, land use

The achievement of the objectives by 2015 is not possible, as the pollution migration in the non-saturated zone is so small that the success of the supplementary special measures 1-3 seems not to be likely.

7.9.2.1 Extension of the deadlines (according to Article 4, Para 4)

Ground water body BG019 is “at risk” from point sources – 17 rural dumps and 1 municipal dump (organic and nutrient wastes) and 5 stores for pesticides.

Probably the objectives will not be achieved until the year 2015 since until now no monitoring of the point pollutants is implemented. The actual loading and the need for measures undertaking as well as their successful realization in time are not assessed.

Groundwater bodies BG033 and BG034 are “at risk” from diffusive sources – land use and settlements without sewerage.

The objectives are not possible to be achieved until the year of 2015, since the pollution migration in the non-saturated zone is such small so the success of measures 1-3 is not likely.

7.9.2.2 Less stringent environmental objectives (according to Article 4, Para 5)

7.9.2.3 Temporary deterioration (according to Article 4, Para 6)

7.9.2.4 Impossibility for achievement of the environmental objectives (according to Article 4, Para 7)

7.10 Supplementary measures identified as necessary in order to meet the environmental objectives established

7.10.1 Development of legislative instruments

7.10.2 Development of administrative instruments

7.10.3 Development and application of economic and fiscal instruments

7.10.4 Creation of mechanisms for facilities construction and exploitation

7.10.5 Realization of educational projects

7.10.6 Realization of research, development and demonstration projects

The measure catalogues shall be applied and assessed for three pilot companies.

The pilot projects serve on the one hand to gain practical experience with the implementation of measures and on the other hand, the specific measures applied in the pilot companies can be transferred to the total catchment area. At that point, a close cooperation with the agriculture administration and with the agricultural producers themselves is already absolutely necessary.

Pilot companies will be selected, according to the conditions of the location (altitude, climate, soils, geology, etc.), as well as the typical land uses (farming, cattle farming, specialized crops, fruits). For the companies are to be collected the (if possible) complete data, regarding opertating method, size, nutrient budgets, etc. For the monitoring of the measures, suitable measuring points have to be installed.

The pilot companies are supposed to serve as demonstrative projects which act as a model (disseminator effect) in the 3 zones/altitudes

- Up to 200 m (Danubian lowlands),
- 200 m to 800 m,
- higher than 800 m

The following steps are planned for the elaboration of the programme of measures in the area of “Diffusive pressures in agriculture /nutrient pollution:

- Elaboration of objectives (e.g. concentration of nutrients acceptable for surface water bodies and groundwater bodies, see quality objectives for N and P), with these, determination of the actual conditions (inventory!) and further deficits. Examination if the elaborated objectives lead to a good ecological condition / potencial of surface waters. If necessary the objectives are to be adjusted.
- Objective: Reduction of nutrients, above all nitrate and also phosphate.

Elaboration of a catalogue of measures with all possible and practical measures for the reduction of N and P, in collaboration with the agricultural administration.

7.10.7 Measures towards more efficient water use

7.10.8 Measures towards water losses reduction

7.10.9 Measures for repairing, operation and maintainance of the water supply and waste water treatment facilities

7.10.10 Combination of measures in other political fields

8. Register of programmes and management plans for the river basin district dealing with particular sub-basins, sectors, issues or water types

9. Public information and consultation measures

9.1 Results from public information and consultation

9.2 Changes made in the management plan.

10. Competent authorities in accordance with Annex I

11. Contact points and procedures for obtaining the background documentation and information referred to Article 14 (1)

12. Annexes

12.1 References

12.2 Maps

12.3 Operational manual

12.4 Additional clarifications