MANAGEMENT PLAN

of the River Basins of Eastern Macedonia River Basin District

SUMMARY

SEPTEMBER 2013

SPECIAL SECRETARIAT FOR WATER

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1. INTRODUCTION

The **2000/60/EC Directive** for the establishment of a framework for Community action in the field of water policy or Water Framework Directive, after a long period of discussion and negotiation between the Member States of the European Union came into force on **22 December 2000**.

It is a comprehensive and innovative effort to protect and manage water resources and is the basic institutional tool introduced in the water sector in the European Union, reflecting the trend towards integrated environmental planning and sustainable management for long-term protection of waters (surface and groundwater) and ecosystems.

To achieve this goal River Basin Management Plan (RBMP) has to be established, the content of which is described in Article 13 and Annex VII of 2000/60/EC Directive. Each River Basin Management Plan is a strategic document for the River Basin District to which it refers to and provides the necessary information and instructions for the integrated management of water and ecosystems.

The legislative and institutional framework of the country has been harmonized with 2000/60/EC Directive with various legislative provisions (Law 3199/9-12-2003 and its amendments, Presidential Decree 51/2007, Joint Ministerial Decision 39626/2208/E130, Decision 706/2010 of the National Water Committee, Ministerial Decision 51354/2641/E103/2010, Joint Ministerial Decision 140384/2011, Ministerial Decision 1811 of the Minister of Environment, Energy and Climate Change etc.).

With a Contract signed on **18/02/2011**, the Special Water Secretariat assigned the preparation of the River Basin Management Plans of Eastern Macedonia and Thrace River Basin Districts, to the Joint Venture consisting of the following companies and persons: Z&A – P. Antonaropoulos & Assoc. S.A. • GeoEnviro – X. Stavropoulos & Assoc. L.P. • Panagiota-Styliani Kaemaki • NERCO – N. Chlykas & Assoc. S.A. • Konstantinos Pagonis • Spyridon Kokkinos • Georgios Papageorgiou • Ioannis Sigalas • ORION – G. Tavlas & Assoc. L.P. • Georgios Mattheou • Aristos Loukaides.

According to Article 5 of Law 4117/5-2-2013, the completed River Basin Management Plan, was approved by the National Water Committee upon the recommendation of the Special Water Secretariat of the Ministry of Environment, Energy and Climate Change, and was published in the Government Gazette (FEK 2291/B/13-09-2013).

2. RIVER BASIN MANAGEMENT PLAN OF THE RIVER BASIN DISTRICT

2.1 Contents of the Management Plan

This document is a summary of the River Basin Management Plan of Eastern Macedonia River Basin District (GR11) and the following detailed documentation texts are attached:

Table 1: Documentation texts of Eastern Macedonia River Basin District Management Plan

DOCUMENTATION TEXTS	
TEXT 1:	RECORD OF THE COMPETENT AUTHORITIES AND DETERMINATION OF THEIR AREA OF RESPONSIBILITY
TEXT 2:	PROTECTED AREAS
TEXT 3:	ECONOMIC ANALYSIS OF THE WATER USES AND DETERMINATION OF THE CURRENT COST RECOVERY DEGREE FOR THE DIFFERENT WATER SERVICES
TEXT 4:	PRELIMINARY ASSESSMENT OF ALTERNATIVE PROPOSALS FOR FLEXIBLE WATER TARIFF POLICY AND COST RECOVERY MECHANISMS
TEXT 5:	IDENTIFICATION AND TYPOLOGY OF SURFACE WATER BODIES. INITIAL AND FURTHER CHARACTERISATION OF GROUNDWATER BODIES
TEXT 6:	TYPE-SPECIFIC REFERENCE CONDITIONS FOR THE TYPES OF SURFACE WATER BODIES
TEXT 7:	FINAL DESIGNATION OF HEAVILY MODIFIED AND ARTIFICIAL WATER BODIES
TEXT 8:	ANALYSIS OF THE ANTHROPOGENIG PRESSURES AND THEIR IMPACTS ON SURFACE AND GROUNDWATER BODIES
TEXT 9:	EVALUATION AND CLASSIFICATION OF THE QUALITATIVE STATUS (ECOLOGICAL AND CHEMICAL) OF SURFACE WATER BODIES
TEXT 10:	EVALUATION AND CLASSIFICATION OF THE QUALITATIVE AND QUANTITATIVE STATUS OF GROUNDWATER BODIES
TEXT 11:	DETERMINATION OF ENVIRONMENTAL OBJECTIVES INCLUDING “EXEMPTIONS” FROM OBJECTIVES ACHIEVEMENT
TEXT 12:	CATALOGUE OF SCHEDULED AND NEW PROJECTS/ ACTIVITIES/ ALTERNATIONS WITH THE SOCIO-ECONOMIC BENEFITS SERVED
TEXT 13:	DRAFT PROGRAMME OF MEASURES (BASIC AND SUPPLEMENTARY) FOR THE PROTECTION AND RECOVERY OF WATER BODIES
TEXT 14:	IMPLEMENTATION REPORT OF THE 2006/118/EC DIRECTIVE ‘‘ON THE PROTECTION OF GROUNDWATER AGAINST POLLUTION AND DETERIORATION’’ AND THE JMD 39626/2208/E130/2009

2.2 Strategic Environmental Assessment

The River Basin Management Plan was subject to a Strategic Environmental Assessment (SEA) according to the provisions of the 2001/42/EC Directive. The SEA procedure can be summarized as follows: An environmental report was prepared in which the likely significant effects on the environment and the reasonable alternatives of the proposed RBMP were identified. The public and the environmental authorities were informed and consulted on the draft RBMP and the environmental report. The environmental report and the results of the consultations were taken into account before adoption of the final RBMP.

The SEA results can be summarized as follows:

- The implementation of the RBMP as well as the suggested Program of Measures show optimum performance and promote the environmental objectives concerning water, while at the same time have strong relationship with the environmental objectives related to biodiversity, ground and public health.
- The suggested measures have positive effect in the water environment as well as in other environmental aspects such as ground and biodiversity. On the other hand the zero option will have a negative impact in the water environment.
- The expected negative effects derive from the construction of infrastructure and are considered to be reversible to a great extent, through the implementation of appropriate environmental restrictions (arise from specific Environmental Impact Assessments).
- The alternative additional measures don't seem to change the environmental performance of the Plan and therefore are not suggested to be adopted.

2.3 Drought and Water scarcity Management Plan

In the framework of the River Basin Management Plan of the River Basin District of Eastern Macedonia, a dedicated Drought and Water Scarcity Management Plan (DWSMP) has been developed, based on the principles of proactive management and planning. The main purpose of the DWSMP was to quantify the drought and water scarcity phenomena in the River Basin District, to assess possible methodologies for the prediction of future events, and to propose adequate response measures for the various risk levels. In more details, the following are included:

- The identification and analysis of historic drought and water scarcity events, and of their characteristics (duration, intensity, extent), for the time period 1980-2010. For this purpose, statistical methods, as well drought indicators (the Standard Precipitation Index – SPI-6, -9, -12 and -24) and water scarcity indicators (the Water Exploitation Index – WEI) have been used.
- The development of a methodology to accurately map drought and water scarcity in the RBD so that the stakeholders and end-users have in their hands a simple and understandable monitoring tool, at the adequate scale, useful for further defining the related risks in the next stages.
- The assessment of the impacts (environmental and socio-economic) of past drought events in the RBD, and the evaluation of their adverse effect in achieving the environmental targets of the Water Framework Directive (Article 4).
- The assessment of the related vulnerability and risk to water scarcity and drought, and the definition of relevant vulnerability zones (drought and water scarcity vulnerability mapping),

taking into consideration the prevailing physical (climate change, land use, etc.) and socio-economic conditions (water demand).

- The analysis of drought and water scarcity phenomena for the purpose of early warning. To this extent, a methodology for the early detection of potential upcoming drought events, with a horizon of 6-12 months, has been developed, based on the SPI, in order to support the operational planning of drought mitigation. Furthermore, suggestions have been made regarding the development of an early warning system, with the main system parameters being analyzed. Four alert levels have been proposed (ranging from “State of readiness”, to “Pre-alert conditions”, “Alert conditions” and “State of emergency”).
- The development of recommendation for the proper management of drought and water scarcity in the RBD based on operational planning, and the discussion of detailed measures to be taken for each alert level.

3. CONSULTATION PROCESS

The public consultation processes have a key role during preparation, reading and revision of the river basin management plans. In addition to 2000/60/EC Directive, there are requirements for public participation in other EU legislation, especially in the SEA Directive.

The consultation period of the River Basin Management Plans, with a minimum duration of 6 months, began on **November 18, 2011**, and was completed in two phases:

- **Phase A΄**

Until **May 7, 2012** the following were discussed:

1. Report on the consultation measures to be taken,
2. Catalogue of stakeholders,
3. Overview of the significant water management issues

- **Phase B΄**

On **May 7, 2012**, the documentation texts of Eastern Macedonia River Basin District Management Plan published on the consultation website of the Greek River Basin Managements Plans (http://wfd.opengov.gr).

During Phase B of the consultation the following were discussed:

1. River Basin Management Plan of Eastern Macedonia River Basin District,
2. Environmental Report of the Strategic Environmental Assessment (SEA)

On **21 November 2012**, Special Water Secretariat announced the completion of the public consultation of the Draft River Basin Management Plan of Eastern Macedonia River Basin District.

On **July 8**, **2013**, the consultation in the framework of SEA, was completed and the Environmental Report of the SEA was approved.

On **September 13, 2013** the RBMP for the Eastern Macedonia RBD was approved and published in the Government Gazette (FEK 2291/B/13-09-2013).

4. EASTERN MACEDONIA RIVER BASIN DISTRICT

4.1 River basins

The Eastern Macedonia River Basin District includes a single River Basin that of **Strymonas River (GR06)**.

Table 2: River Basin of the Eastern Macedonia River Basin District

RB Code	RB Name	Area (km²)	Elevation (m)		
			Minimum	Mean	Maximum
GR06	Strymonas	7.320	0	403	2.200

4.2 Administrative & natural characteristics

4.2.1 Administrative status

The Eastern Macedonia River Basin District includes the entire Prefecture of Serres, the larger part of the Prefecture of Drama and Kavala and small parts of the Prefectures of Kilkis and Thessaloniki.

Its de facto population according to the 2001 census was 414.679 individuals. Based on preliminary data from the 2011 census, the resident population of the River Basin District is estimated at 379.712 individuals.

4.2.2 Land Uses

According to Corine Land Cover 2000, in the Eastern Macedonia River Basin District forest and semi natural areas cover 52% of total RBD area, while important is the percentage of agricultural areas (42% of total RBD area). Artificial surfaces, wetlands and waters cover 6% of the total surface of the RBD. According to the 2007 census, cultivated areas and fallow land amounts to 2.354Km^2 (32% of total RBD area).

4.2.3 Major water uses

The main use of water in the RBD is irrigation, as happens in most areas of Greece. Secondary, in terms of quantities, are the demands created by drinking water supply and industry, while the participation of livestock and tourism in total demand is small. There is also a water demand for the preservation of the environment and ecosystems, especially at the mouth of Strymonas River and for maintaining the water level fluctuation in Kerkini Lake at desired levels for the ecosystems that supports.

The total average annual demand from anthropogenic uses is 886 x 10^6 m^3. The greatest demand for water in the RBD comes from irrigated agriculture, as mentioned above, which is 816.3 x 10^6 m^3 (92.4%). For other uses the demand stands at 47.0 x 10^6 m^3 for drinking water supply (5%), 0.7 x 10^6

m^3 for tourism (0.02%), 16.2 x 10^6 m^3 for industry (2%) and 5.8 x 10^6 m^3 for livestock (0.6%). The estimation for the required environmental flows at Strymonas delta is totaling to 818.6 x 10^6 m^3 and to 1,038.9 x 10^6 m^3 for the whole RBD. For Lake Kerkini, it is mentioned that the desired maximum water level fluctuation is approximately 3 m, which is not achieved in the current situation where occurring fluctuations are approximately 4.5 m.

Current demand in the RBD, is satisfied at an average annual basis to a large extent (97%) by the available quantities of water. Of course it should be noted that the water supply heavily depends on incoming amounts of water from Bulgaria through Strymonas River.

The RBD generally exhibits water surplus and the demand is covered from both surface and underground waters. Deficits occur only during periods of intense drought, such as the 1989-1993 drought event, but they do not exceed 10-20% of demand at the most.

5. COMPETENT AUTHORITIES

The competent authorities of Eastern Macedonia River Basin District are presented in the following table.

Table 3: Competent Authorities and areas of responsibility

Eastern Macedonia River Basin District (GR11)	River Basin	Percentage of area in every Region	Competent Decentralized Authority (FEK 1383B/2-9-2010 & FEK 1572B/28-9-2010)	National Competent Authority
	Strymonas (GR06)	Central Macedonia (59.9%), Eastern Macedonia and Thrace (40.1%)	Macedonia – Thrace (ADMT)	Special Water Secretariat/ YPEKA

Eastern Macedonia is an international River Basin District. The upstream part of the River Basin of Strymonas (GR06) is located within the Bulgarian RBD of “West Aegean”.

6. IDENTIFICATION OF WATER BODIES

6.1 Surface water bodies

The surface water bodies within a river basin district were identified as falling within either one of the following surface water categories: rivers, lakes, transitional waters or coastal waters. In the River Basin District of Eastern Macedonia all surface water body types are identified.

6.1.1 Rivers

In the River Basin District of Eastern Macedonia ninety one (91) River Water Bodies (RWBs) are identified, representing six (6) different types as following:

- NgL0: 2 RWBs
- NgL1: 4 RWBs
- NmL1: 7 RWBs
- NsH1: 8 RWBs
- NsL0: 3 RWBs
- NsL1: 67 RWBs

6.1.2 Lakes

In the River Basin District of Eastern Macedonia, two (2) LWBs, Kerkini Lake and Lefkogia Reservoir are identified as an H type and a L-M5/7W (reservoir) respectively.

6.1.3 Transitional waters

One (1) TWB (Strymonas Delta) is identified in the River Basin District of Eastern Macedonia and belongs to the TW2 type (river estuaries or Delta).

6.1.4 Coastal waters

All four (4) CWBs identified in the River Basin District of Eastern Macedonia belong to the IIIE type.

The statistical characteristics of surface water bodies of RBD of Eastern Macedonia (GR11), as these were identified per category, are presented in the table below.

Table 4: Spatial characteristics of surface water bodies of RBD of Eastern Macedonia

Type of WB	Number	Characteristic size	Minimum	Mean	Maximum	Total
Rivers	91	Length (km)	0,80	9,19	64,10	835,90
Lakes	2	Surface (km²)	1,09	23,59	46,09	47,18
Transitional	1	Surface (km²)	6,57	6,57	6,57	6,57
Coastal waters	4	Surface (km²)	11,43	182,50	479,74	730,00

6.2 Groundwater bodies

Initial characterization of groundwater bodies was performed in order to assess their uses and the degree to which they are at risk of failing to meet the objectives. For those groundwater bodies to which significant problems or trends for deterioration of their quantitative or qualitative status were identified or they are characterised by increased importance for local economy, or/and for the environment, further characterization was performed.

Fifteen (15) GWBs are designated at the RBD of Eastern Macedonia (GR11) and for four (4) of them, ‘‘further characterization’’ was carried out.

The statistical characteristics of the groundwater bodies identified in the RBD of Eastern Macedonia are presented in the table below.

Table 5: Spatial characteristics of groundwater bodies of RBD of Eastern Macedonia[K1]

Type of WB	Number	Minimum area (km^2)	Average area (km^2)	Maximum area (km^2)	Total area (km^2)
GWBs	15	18,83	455,60	2.245,5	6.834,03

6.3 Heavily modified water bodies and Artificial water bodies

Artificial and heavily modified water bodies resulted from human activities necessary in order to meet a variety of human needs and activities, such as flood protection, water storage for irrigation and drinking-water supply, navigation etc.

Twenty-nine (29) heavily modified (HM) and three (3) artificial (A) water bodies were finally identified from a total of ninety-eight (98) surface water bodies (rivers, lakes and coastal waters) in the RBD of Eastern Macedonia (GR11). The table below presents their distribution across the surface water categories.

Table 6: HMWBs and AWBs in the RBD of Eastern Macedonia

Surface WB Category	Number of WBs	HMWBs (no., %)	AWBs (no., %)
Rivers	91	27 (29.6%)	3 (3.3%)
Lakes	2	2 (100.0%)	- (0%)
Coastal	4	- (0%)	- (0%)
Transitional	1	- (0%)	- (0%)
Total	**98**	**29 (29.6%)**	**3 (3.1%)**

6.4 Protected Areas

The register of protected areas of the RBD of Eastern Macedonia, specified under Article 6 of the WFD, includes the following types of protected areas.

6.4.1 Areas designated for the abstraction of water intended for human consumption

All 15 GWBs of the RBD are included to this category of protected area as they are being used for the abstraction of water intended for human consumption of the population. No SWBs belong to this protected area category.

6.4.2 Bodies of water designated as recreational waters including areas designated as bathing waters under the Directive 2006/7/EC

In RBD of Eastern Macedonia (GR11) there are twenty three (23) bathing water areas that are located in the coastal water bodies of the RBD. Recreational waters were not identified in the RBD of Eastern Macedonia (GR11).

6.4.3 Nutrient- sensitive areas

Areas vulnerable to nitrates from agricultural sources under Directive 91/676/EEC

One (1) area is officially designated in the RBD of Eastern Macedonia as vulnerable to nitrates from agricultural sources, the RB of Strymonas River (in accordance to JMD 20419/2001). Based on newer data, the RBMP proposes to expand this zone so as to include the area of the Drama GWB (GR1100050).

6.4.4 Areas designated as sensitive under Directive 91/271/EEC

Three (3) areas have been identified as sensitive to eutrophication (Common Ministerial Decree 19661/1982/1999) in the RBD of Eastern Macedonia. These are the inland waters of Strymonas r., Aggitis r. and Chryssorois r. These areas are associated with fourteen (14) RWBs identified in this RBMP.

6.4.5 Areas designated for the protection of habitats or species

Twelve (12) areas of the NATURA 2000 Network are included in the register as for these areas the protection of water (surface and groundwater) is an important factor for the conservation of habitats and species. Six (6) of them are Special Areas of Conservation (SACs) and five (5) are Special Protection Areas (SPAs) and one (1) is both SAC and SPA.

6.4.6 Areas designated for the protection of economically significant aquatic species

Until the present day no protected areas of this type are officially designated in the RBD of Eastern Macedonia. This RBMP proposes the inclusion of four (4) CWBs for protection under the 2006/113/EC Directive and two (2) RWBs for protection under the 2006/44/EC Directive.

7. ANALYSIS OF PRESSURES IN WATER BODIES

Anthropogenic pressures on the bodies of water include all human activities that influence or may influence the water bodies of the area where they are developed. These pressures are characterized as significant as long as they form the cause for the WBs to be in danger of non-achieving their environmental objectives.

Urban Wastewater

In the RBD of Eastern Macedonia 8 Wastewater Treatment Plants (WWTPs) are in operation. In the region there are 2 Priority A agglomerations, Serres and Drama, which are served 100% by WWTP, 1 Priority B agglomeration (Kavala), which is served 84-98% by WWTP and also 30 Priority C agglomerations, which are served between 45% and 100% by WWTP. In addition, in the RBD, 5 WWTPs are inactive (Doxato, Kato Nevrokopi, Nea Zichni, Prosotsani and Nigrita) and 8 are under construction or development (Choristi, Nikisiani, Paralia Ofryniou, Stavros-Vrasna, Iraklias-Sidirokastrou, Chryso-Neo Souli-Neo Petritsi etc., Rodolivos, Alistrati), and are about to treat totally urban wastewater from 14 Priority C agglomerations. The agglomerations of Mitrousio and Skoutari (Priority C) are expected to connect to the Serres WWTP according to the official planning. Finally, 6 agglomerations in the RBD have combined flow collecting systems of urban wastewater and storm drainage without treatment facilities.

Industry

In the WD there are 2 Industrial areas and 2 Industrial parks. Industrial area of Drama is equipped with a central wastewater treatment plant. Industrial park of Serres is not operating. In Serres Industrial Area and Prosotsani industrial park each industrial unit installed is responsible for its wastewater treatment and disposal.

In the RBD of Eastern Macedonia, 8 units operate that fall under the provisions of the IPPC Directive:

- 1 Chemical installation for the production of phosphorous based fertilizers
- 1 Installation for the surface treatment of substances, objects or products using organic solvents (wood processing industry)
- 2 Installations for the production of lime.
- 1 installation for the treatment and processing intended for the production of food products from vegetable raw materials (sugar industry)
- 2 Landfills (Serres and Kavala)

- 1 Installation for the intensive rearing of pigs

Also, there are 3 units that fall under the provisions of the SEVESO Directive.

Livestock

According to the 2007 census in the RBD of Eastern Macedonia were bred:

- 569.503 sheep and goats, mainly free range
- 65.072 cattle
- 44.771 pigs
- 878.774 poultry, mainly in farms with a capacity of more than 1,000 animals.

Landfill Sites – Uncontrolled Waste Dumping Sites

In the River Basin District of Eastern Macedonia 2 Landfills are in operation (Serres, Kavala) and a third one is constructed but not yet operational (Paleokastro). According to the reported data of the Ministry of Environment, Energy and Climate Change (March 2012), there are 7 active Uncontrolled Waste Dumping Sites that are located in Serres Prefecture. There are also two (2) inactive such sites in the Prefecture of Drama and their rehabilitation is of top priority.

Mines – Quarry

Quarrying activity is very important in the RBD of Eastern Macedonia, especially in the mountain area of Paggeo. One hundred and forty-six (146) significant quarrying sites have been identified with the majority (~100) being marble quarries and the rest are quarries for stone, schist and some industrial minerals. There are also a number of sites where gravel is extracted from the riverbeds, especially along the Strymonas River and in a small number of other RWBs. There is no active mining activity in the RBD. Nine (9) Km north of Prosotsani there are manganese deposits, which were exploited in the past while an enrichment plant was operating in the area.

Aquacultures

In the RBD of Eastern Macedonia there are 15 aquaculture units. Ten (10) of these are located in the coastal waters and are primarily shellfish aquaculture units (9) while one (1) is a fish farm. The other five (5) units are located in freshwater bodies and are concerned with salmon trout production. The lagoon of the old riverbed of Strymonas is also under exploitation.

Agriculture

Agriculture uses 32% of the total area the RBD of Eastern Macedonia (more than 2,300 Km^2), from which 60% is irrigated. The vast majority of agricultural land relates to arable crops (91%). Tree

plantations amount to 7% of the agricultural land and vineyards to 2%. With regard to arable crops, the largest areas are related to grain, cotton and maize. The potato growing is highly developed in Nevrokopi. The most important horticultural crop is tomato. The most important tree crop is the olive groves.

Abstraction

The largest water abstractions from surface WBs in the Eastern Macedonia RBD are conducted for the supply of irrigation networks that have been developed in the lowlands of the RBD and particularly in the valley of Strymonas, Aggitis and Tenagi Fillipon (Fillipi marshlands). Abstractions from surface WBs for agricultural purposes are conducted, in their vast majority, by abstraction works of collective irrigation networks managed by Local Land Reclamation Organisations or General Land Reclamation Organisations of the region.

Table 7: Abstractions for irrigation purposes from Surface WBs in the RBD of Eastern Macedonia

SWB Name	SWB code	Volume (m^3/yr)
Kerkini Lake	GR1106L000002H	278.291.000
Strymonas river	GR1106R0002250070H, R1106R0002250071H, GR1106R0002000028H	139.844.000
Kefalari stream	GR1106R0002060218H, GR1106R0002060219N	84.850.000
Aggitis river	GR1106R0002060108N, GR1106R0002060112N, GR1106R0002060006H	31.822.000
Xiropotamos	GR1106R0002060421N	30.416.000
Mpelitsa Canal	GR1106R0002100238H	24.307.000
Leykogeia Reservoir	GR1106L000001H	14.762.000
Filippoi Canal	GR1106R0002060217A	10.734.000
Eptamyloi stream	GR1106R0002100135N	2.240.000
Total		**617.266.000**

Parts of GWBs exhibiting conditions of quantitative degradation due to overpumping is the southern part of the Serres GWB and the coastal parts of the Eleftheres – Nea Peramos and Ofrynio GWBs. In the rest of the GWB, level fluctuation of groundwater aquifers presents seasonal variations related to periods of high and low groundwater levels without showing any long-term downward trend.

The average annual inflow of the major fluvial and karst GWBs of the RBD of Eastern Macedonia amounts to 744 x 10^6 m^3 and annual abstractions to 310 x 10^6 m^3. **The water balance of the GWBs, except for the Eleftheres – Nea Peramos GWB, is positive and annual water abstraction is generally less than the annual replenishment of the underground aquifers.**

Water flow regulations and river management

The most importantly water flow regulation project in the entire RBD is Kerkini Lake. Through the lake, a volume of about 300 x 10^6 m^3 per year is regulated, which is used for irrigation, while the

evaporation and other losses amount to approximately 85 x 10^6 m^3. The overflow from the clapper, so that the maximum water level at the lake does not exceed 35.7 m, is approximately 70 x 10^6 m^3. Overall, a quantity of about 450 x 10^6 m^3 per year is handled via the lake, which represents about 20% of the total river flow of Strymonas upstream of the lake.

Much smaller quantities of water are handled by Leukogeia reservoir that supplies with irrigation water of about 14 x 10^6 m^3 per year the Nevrokopi basin.

Finally, there are flow regulation projects of smaller volume (weirs with or without gates) designed to ensure adequate water level upstream for the abstraction of irrigation water that have been constructed in several locations in Aggitis river and its tributaries. The most important of these works is the Symvoli dam in Aggitis. These projects do not constitute major hydromorphological pressures for the SWBs because they don't create significant storage while their flow control ability is limited. The abstractions for irrigation water supply that are carried out with their help constitute pressure which in some cases is significant.

Summary

Diffuse pollution from agriculture, livestock and settlements not serviced with sewerage and wastewater treatment facilities is the main source of pollution for SWBs and GWBs. There is a number of SWBs that is affected from transboundary pollution or their pollution source in not yet indentified. Water abstraction is significant in 10 SWBs and 1 GWB while hydromorphological pressures are significant in 6 SWBs.

8. STATUS OF WATER BODIES

8.1 Assessment and classification of status of surface water bodies

The assessment and classification of the status of SWBs have been made according to available monitoring data pursuant to 2000/60/EC and 2008/105/EC Directives as well as to Common Ministerial Decision 51354/2641/E103/2010 that has set Environmental Quality Standards for the classification of ecological and chemical status.

"Surface water status" is the general expression of the status of a body of surface water, determined by the poorer of its ecological status and its chemical status.

"Good surface water status" means the status achieved by a surface water body when both its ecological status and its chemical status are at least "good".

8.1.1 Surface water bodies ecological status

Ecological status mainly concerns biological parameters, depending on WB category, and secondly general physico-chemical conditions or other parameters (specific pollutants).

As mentioned in paragraph 6.1 in the Eastern Macedonia RBD there are sixty six (66) natural SWBs:

- Four (4) Coastal Water Bodies of a total area of 730,00 Km^2
- One (1) Transitional Water Body of a total area of 6,57 Km^2
- Sixty one (61) River Water Bodies of a total length of 565,20 Km

The natural SWBs in the Eastern Macedonia RBD that are not in "good" status are estimated in thirty four (34) from a total of sixty six (66). More specifically:

- The ecological status of eleven (11) rivers, with total length 141.90 km, which corresponds to 25.11% of the total length of the natural rivers of the RBD, is classified as "good", while the ecological status of thirty one (31) rivers, with total length 287.20 km, which corresponds to 50.81% of the total length of the natural rivers of the RBD is classified as less than good. Due to the lack of data, the ecological status of nineteen (19) rivers, with total length 136.10 km, which corresponds to 24.08% of the total length of the natural rivers of the RBD was not determined.
- The ecological status of the transitional WB of Strymonas Delta is classified as "moderate".
- The ecological status of two (2) coastal waters, with total surface of 536.03 km^2, which corresponds to 73.43% of the total surface of the natural coastal waters of the RBD, is classified as "good", while the ecological status of two (2) coastal waters, with total surface 193.97 km^2,

which corresponds to 26.57% of the surface of the natural coastal waters of the RBD is classified as “moderate”.

8.1.2 Surface water bodies chemical status

Chemical status is directly related to the presence of priority substances in surface waters and can be characterized as:

- **“Good”,** when all parameters meet the Environmental Quality Standards set out in Common Ministerial Decree 51354/2641/E103/2010, Annex 1, Part A.
- **"Failing to achieve good",** when even one of the parameters does not meet the Environmental Quality Standards set out in Common Ministerial Decree 51354/2641/E103/2010, Annex 1, Part A.

Due to the lack of data related to the monitoring of priority substances in the WBs of RBD of Eastern Macedonia, the chemical status of a significant number of WBs is not classified (“unknown”). More specifically:

- Eight (8) river water bodies, with total length of 93.7 km, which corresponds to 16.58% of the total length of the natural rivers of the RBD, are failing to achieve good chemical status. Seven (7) rivers, with total length 49.70 km, which corresponds to 8,79% of the total length of the natural rivers of the RBD, are in good chemical status. Due to the lack of data, the chemical status of forty six (46) rivers is not classified in any of the two classes (74.63% of the total length of the natural rivers of the RBD).
- The transitional WB of Strymonas Delta is classified is failing to achieve good chemical status.
- One (1) coastal water body is in good chemical status (65.72% of the surface of the natural coastal waters of the RBD) while the chemical status of three (3) coastal water bodies was not classified (34.28% of the surface of the natural coastal waters of the RBD).

The results of the classification of ecological, chemical and total status for each SWB are presented in the table below.

Table 8: Classification of the natural SWBs status of the RBD of Eastern Macedonia

WB category	WB Code	WB Name	Ecological status	Chemical Status	Status
CW	GR1106C0001N	Strymonikos Gulf	Good	Good	Good
CW	GR1106C0002N	Symbolo Coast	Good	Unknown	Unknown
CW	GR1106C0003N	Nea Peramos	Moderate	Unknown	Moderate
CW	GR1106C0004N	Western Gulf Of Kavala	Moderate	Unknown	Moderate
RW	GR1106R0001010001N	Anonymo R.	Unknown	Unknown	Unknown
RW	GR1106R0002000003N	Strymonas R.	Moderate	Failing to achieve good	Moderate
RW	GR1106R0002010002N	Strymonas R.	Moderate	Failing to achieve good	Moderate
RW	GR1106R0002020004N	Kastrolakkas R.	Unknown	Unknown	Unknown
RW	GR1106R0002040005N	Agia Paraskevi R.	Unknown	Unknown	Unknown
RW	GR1106R0002060007N	Aggiths R.	Moderate	Failing to achieve good	Moderate
RW	GR1106R0002060108N	Aggiths R.	Moderate	Failing to achieve good	Moderate
RW	GR1106R0002060109N	Lakkos R.	Moderate	Unknown	Moderate
RW	GR1106R0002060110N	Xeropotamos R.	Moderate	Unknown	Moderate
RW	GR1106R0002060112N	Archangelou R.	Moderate	Unknown	Moderate
RW	GR1106R0002060219N	Kefalari R.	Moderate	Unknown	Moderate
RW	GR1106R0002060326N	Doxatoy R.	Poor	Unknown	Poor
RW	GR1106R0002060414N	Pigon Mylopotamoy-Z.Pigis R.	Unknown	Unknown	Unknown
RW	GR1106R0002060416N	Pigon Ag. Varvaras R.	Poor	Unknown	Poor
RW	GR1106R0002060421N	Xeropotamos R.	Poor	Unknown	Poor
RW	GR1106R0002060423N	Xeropotamos R.	Moderate	Unknown	Moderate
RW	GR1106R0002080029N	Eziobhs R.	Moderate	Unknown	Moderate
RW	GR1106R0002080030N	Eziobhs R.	Good	Unknown	Unknown
RW	GR1106R0002100132N	Agioy Ioannoy R.	Moderate	Unknown	Moderate
RW	GR1106R0002100133N	Agioy Ioannoy R.	Moderate	Unknown	Moderate
RW	GR1106R0002100134N	Kokkinorema R.	Moderate	Failing to achieve good	Moderate
RW	GR1106R0002100135N	Eptamyloi R.	Moderate	Unknown	Moderate
RW	GR1106R0002100136N	Kokkinorema R.	Moderate	Failing to achieve good	Moderate
RW	GR1106R0002100137N	Kokkinorema R.	Moderate	Unknown	Moderate
RW	GR1106R0002100240N	Erythrorema R.	Moderate	Unknown	Moderate
RW	GR1106R0002100241N	Erythrorema R.	Moderate	Unknown	Moderate
RW	GR1106R0002100247N	Kroysobiths R.	Moderate	Good	Moderate
RW	GR1106R0002100248N	Kroysobiths P.	Good	Good	Good
RW	GR1106R0002100249N	Mavrorema R.	Good	Good	Good
RW	GR1106R0002100250N	Mavrorema R.	Good	Good	Good
RW	GR1106R0002100251N	Axladiths P.	Moderate	Good	Moderate

WB category	WB Code	WB Name	Ecological status	Chemical Status	Status
RW	GR1106R0002100252N	Axladiths R.	Moderate	Good	Moderate
RW	GR1106R0002100253N	Mavropoyli R.	Good	Good	Good
RW	GR1106R0002120157N	Xrysorohs R.	Moderate	Unknown	Moderate
RW	GR1106R0002120259N	Kleftolakkos R.	Moderate	Unknown	Moderate
RW	GR1106R0002120260N	Kleftolakkos R.	Good	Unknown	Unknown
RW	GR1106R0002140062N	Anonymo R.	Unknown	Unknown	Unknown
RW	GR1106R0002160064N	Flamoyri R.	Moderate	Unknown	Moderate
RW	GR1106R0002160065N	Flamoyri R.	Good	Unknown	Unknown
RW	GR1106R0002180066N	Anonymo R.	Unknown	Unknown	Unknown
RW	GR1106R0002180067N	Anonymo R.	Good	Unknown	Unknown
RW	GR1106R0002200068N	Anonymo R.	Moderate	Unknown	Moderate
RW	GR1106R0002200069N	Anonymo R.	Good	Unknown	Unknown
RW	GR1106R0002220074N	Kerkinitis R.	Unknown	Unknown	Unknown
RW	GR1106R0002220175N	Xeropotamos R.	Unknown	Unknown	Unknown
RW	GR1106R0003010086N	Phgadoyli R.	Unknown	Unknown	Unknown
RW	GR1106R0003010087N	Phgadoyli R.	Good	Unknown	Unknown
RW	GR1106R0003010088N	Platanorema R.	Unknown	Unknown	Unknown
RW	GR1106R0004000079N	Myloreyma R.	Unknown	Unknown	Unknown
RW	GR1106R0004010076N	Makropotamos R.	Unknown	Unknown	Unknown
RW	GR1106R0004010077N	Makropotamos R.	Unknown	Unknown	Unknown
RW	GR1106R0004020083N	Bathytopoy R.	Unknown	Unknown	Unknown
RW	GR1106R0004020085N	Bathyrema R.	Good	Unknown	Unknown
RW	GR1106R0004020127N	Pigon Akrinoy R.	Unknown	Unknown	Unknown
RW	GR1106R0004040081N	Myloreyma R.	Unknown	Unknown	Unknown
RW	GR1106R0004050024N	Karvounorema R.	Unknown	Unknown	Unknown
RW	GR1106R0005010089N	Marmara R.	Moderate	Unknown	Moderate
RW	GR1106R0007010091N	Brysh R.	Unknown	Unknown	Unknown
RW	GR1106R0009010092N	Kotsas R.	Unknown	Unknown	Unknown
RW	GR1106R0B02240094N	Aggistroy R.	Moderate	Failing to achieve good	Moderate
RW	GR1106R0B02250072N	Strymonas R.	Moderate	Failing to achieve good	Moderate
TW	GR1106T0001N	Strymonas R. Delta	Moderate	Failing to achieve good	Moderate

8.2 Assessment and classification of groundwater bodies status

“Groundwater status” is the general expression of the status of a body of groundwater, determined by the poorer of its quantitative status and its chemical status.

“Good groundwater status” means the status achieved by a groundwater body when both its quantitative status and its chemical status are at least ‘good’.

8.2.1 Groundwater bodies quantitative status

The quantitative status of the "Eleftheres - Nea Peramos" GWB is poor. The surface of this WB covers about 18.83 km², corresponding to 0,28% of the total groundwater surface of the RBD of Eastern Macedonia. The rest of the GWBs are in good quantitative status.

8.2.2 Groundwater bodies chemical status

The chemical status of the "Eleftheres - Nea Peramos" GWB is poor. The surface of this WB covers about 18.83 km², corresponding to 0,28% of the total groundwater surface of the RBD of Eastern Macedonia. The rest of the GWBs are in good chemical status.

The results of the classification of quantitative and chemical status for each GWB are presented in the table below.

Table 9: Quantitative – qualitative (chemical) status for each GWB in RBD of Eastern Macedonia

GWB Code	GWB Name	Quantitative status	Chemical status	Status
GR1100010	Serres	Good	Good	Good
GR1100040	Aggitis	Good	Good	Good
GR1100050	Drama	Good	Good	Good
GR1100060	Paggaio	Good	Good	Good
GR1100070	Marmaras	Good	Good	Good
GR1100090	Asprovalta	Good	Good	Good
GR1100100	Krousia - Kerdylia	Good	Good	Good
GR1100120	Neyrokopi	Good	Good	Good
GR1100130	Symvolo - Kavala	Good	Good	Good
GR1100140	Eleftheres - Nea Peramos	Poor	Poor	Poor
GR1100150	Ofrynio	Good	Good	Good
GR110B020	Agkistro	Good	Good	Good
GR110B030	Menoikio - Falakro	Good	Good	Good
GR110B110	Vrontou	Good	Good	Good
GR11FB080	Ano Poroia - Mpeles	Good	Good	Good

8.3 Heavily modified and Artificial water bodies potential

For HMWBs and AWBs the reference conditions on which status classification is based are called “Maximum Ecological Potential (MEP)”. The MEP represents the maximum ecological quality that could be achieved for a HMWB or AWB once all mitigation measures, that do not have significant adverse effects on its specified use or on the wider environment, have been applied. HMWBs and AWBs are required to achieve "good ecological potential" (GEP) and good surface water chemical status. GEP accommodates “slight” changes in the values of the relevant biological quality elements at MEP.

In the context of the current RBMP, for all cases where GEP for the Mediterranean ecoregion has not yet been defined in the Intercalibration Exercise (e.g. for heavily modified RWBs), the ecological potential and chemical status of the identified HMWBs and AWBs are considered as similar to the ecological and chemical status of natural surface water bodies that most closely resemble the HMWBs/AWBs.

The number of HMWBs and AWBs in the Eastern Macedonia RBD that are not in “good” potential is estimated at twenty four (24) from a total of thirty two (32). Moreover, twelve (12) of them are failing to achieve good chemical status. More specifically:

- The ecological potential of twenty two (22) RWBs, with a total length of 218.30 km, which corresponds to 80.64% of the total length of the HM and AW RWBs of the RBD is classified as less than good. Due to the lack of data, the ecological potential of eight (8) RWBs, with total length of 52.40 km, which corresponds to 19.36% of the total length, of the non-natural rivers of the RBD was not determined. Eleven (11) HM/AW RWBs are failing to achieve good chemical status with a total length of 156.70 km, which corresponds to 57.89% of the total length of the HM and AW RWBs of the RBD. One (1) HM RWB with a total length of 2.10 km is at good chemical status while the chemical status of eighteen (18) HM and A RWBs is not classified (41.34% of the total length of the HM and AW RWBs of the RBD).

- Lefkogia reservoir has a “moderate” potential and good chemical status (its area corresponds to 2.31% of the total area of the HM LWBs of the RBD). Kerkini Lake has a “poor” ecological potential and is failing to achieve good chemical status (its area corresponds to 97.69% of the total area of the HM LWBs of the RBD).

The results of the classification of the potential and chemical status for each heavily modified and artificial water body are presented in the table below.

Table 10: Classification of HMWBs and AWB potential of RBD of Eastern Macedonia

SWB category	SWB code	WB Name	Ecological potential	Chemical Status	Status
LW	GR1106L000001H	Lefkogion Reservoir	Moderate	Good	Moderate
LW	GR1106L000002H	Kerkini Lake	Poor	Failing to achieve good	Poor
RW	GR1106R0002000028H	Strymonas R.	Moderate	Failing to achieve good	Moderate
RW	GR1106R0002060006H	Aggiths R.	Moderate	Failing to achieve good	Moderate
RW	GR1106R0002060217A	Filippon Canal	Poor	Failing to achieve good	Poor
RW	GR1106R0002060218H	Kefalari R.	Poor	Unknown	Poor
RW	GR1106R0002060293A	Filippon Canal	Poor	Unknown	Poor
RW	GR1106R0002060325H	Doxatoy R.	Poor	Unknown	Poor
RW	GR1106R0002060420H	Doxatoy R.	Poor	Failing to achieve good	Poor
RW	GR1106R0002060422H	Xeropotamos R.	Moderate	Unknown	Moderate
RW	GR1106R0002100031H	Agioy Ioannoy R.	Moderate	Unknown	Moderate
RW	GR1106R0002100238H	Mpelitsas R.	Poor	Failing to achieve good	Poor
RW	GR1106R0002100239H	Erythrorema R.	Moderate	Unknown	Moderate
RW	GR1106R0002100242H	Mpelitsas R.	Poor	Failing to achieve good	Poor
RW	GR1106R0002100243H	Mpelitsas R.	Poor	Failing to achieve good	Poor
RW	GR1106R0002100244H	Mpelitsas R.	Poor	Failing to achieve good	Poor
RW	GR1106R0002100245H	Mpelitsas R.	Poor	Failing to achieve good	Poor
RW	GR1106R0002100246H	Kroysobiths R.	Poor	Good	Poor
RW	GR1106R0002120054H	Kleftolakkos R.	Moderate	Unknown	Moderate
RW	GR1106R0002120155H	Xrysorohs R.	Moderate	Unknown	Moderate
RW	GR1106R0002120156H	Xrysorohs R.	Moderate	Unknown	Moderate
RW	GR1106R0002120258H	Kleftolakkos R.	Moderate	Unknown	Moderate
RW	GR1106R0002140061H	Anonymo R.	Unknown	Unknown	Unknown
RW	GR1106R0002160063H	Flamoyri R.	Unknown	Unknown	Unknown
RW	GR1106R0002220073H	Kerkinitis R.	Unknown	Unknown	Unknown
RW	GR1106R0002250070H	Strymonas R.	Moderate	Failing to achieve good	Moderate
RW	GR1106R0002250071H	Strymonas R.	Moderate	Failing to achieve good	Moderate
RW	GR1106R0004020082A	Bathytopoy R.	Unknown	Unknown	Unknown
RW	GR1106R0004020084H	Bathytopoy R.	Unknown	Unknown	Unknown
RW	GR1106R0004030078H	Myloreyma R.	Unknown	Unknown	Unknown
RW	GR1106R0004040080H	Myloreyma R.	Unknown	Unknown	Unknown
RW	GR1106R0007010090H	Brysh R.	Unknown	Unknown	Unknown

8.4 Classification results of WBs status of the RBD of Eastern Macedonia

The number and the percentage of the WBs that will meet the environmental objectives of the WFD, as well as those that will fail to achieve a "good" status, as a result of any type of pressure (point and/or diffuse sources of pollution, abstraction, etc.) for all the WB categories (rivers, lakes, transitional, coastal, groundwater), are presented in the table below.

Table 11: Statistical data of WB status of the RBD of Eastern Macedonia

Type of WB	Status								
	Number of WBs			WB Percentage			Surface or length Percentage		
	High or Good	Less than good*	Unknown	High or Good	Less than good*	Unknown	High or Good	Less than good*	Unknown
Coastal	1	2	1	25,00%	50,00%	25,00%	65,72%	26,57%	7,71%
Lake	0	2	0	0,00%	100,00%	0,00%	0,00%	100,00%	0,00%
River	4	53	34	4,40%	58,24%	37,36%	2,34%	60,47%	37,18%
Transitional	0	1	0	0,00%	100,00%	0,00%	0,00%	100,00%	0,00%
Groundwater	14	1	0	93,33%	6,67%	0,00%	99,72%	0,28%	0,00%

*"Less than good" corresponds to status that may be "moderate", "poor" or "bad" for SWBs, or "poor" for GWBs.

8.5 Monitoring Program

8.5.1 Monitoring of surface waters

8.5.2 Officially established monitoring program for surface waters

The monitoring programme included in the Joint Ministerial Decision 140384/2011 provides in total forty (40) monitoring sites; twenty eight (28) for surveillance and twelve (12) for operational monitoring, for the surface waters of the RBD of Eastern Macedonia.

8.5.3 Revised Monitoring program for surface waters

The design of the Revised Monitoring Programme for surface waters was based on the new information obtained under the RBMP, i.e. new water bodies, the analysis of anthropogenic pressures and their impact, the determination of the ecological and chemical status of surface waters and the inventory of protected areas. This programme is optimized both in terms of the monitoring sites selected, as well as the type of the programme, the parameters monitored and their frequency of monitoring.

8.5.4 Monitoring of groundwater

8.5.5 Officially established monitoring program for groundwater

The monitoring programme included in the Joint Ministerial Decision 140384/2011 provides in total fifty one (51) monitoring sites, sixteen (16) for surveillance and thirty five (35) for operational monitoring, for the ground waters of the RBD of Eastern Macedonia.

8.5.6 Updated Monitoring program for groundwater

The design of the revised Monitoring programme for groundwater was based on the basis of the officially established monitoring programme as well as the data elaborated under the RBMP and specifically, the characterization of GWBs, the analysis of anthropogenic pressures and their impacts, the inventory of protected areas, and the status classification of GWBs.

9. ECONOMIC ANALYSIS OF WATER USES

The purpose of the economic analysis is to analyse the relationship of humans with water as an economic resource in the study area within the framework of the Directive 2000/60. Hence a description of the water uses and their economic importance was presented based on data and information from the water district. Trends were presented, too.

The principle of cost recovery for water services, including environmental cost and resource cost was taken into account in order to ensure that different water uses contribute to cost recovery (Article 9, Annex III).

Therefore, the financial cost, which includes expenditures on the procurement and management of water services (operating costs, maintenance costs, administrative expenses, depreciation, and other direct costs), the resource cost, which is based on estimates of water deficits and economic values of infrastructure or other measures for ensuring additional water resources and the non-priced environmental cost, using cost-based valuation methods, i.e. the cost of measures that should be taken to prevent environmental damage, are included in the analysis, in accordance with the objectives of the directive. Subsidies were taken into account, too.

The general formula for calculating the cost recovery rate for water services used was: $\mathrm{CRR} = \frac{\mathrm{TR-Subsidy}}{\mathrm{TC}} * 100\%$, where CRR is the Cost Recovery Rate, TR the total revenues (in €/year), Subsidy the total amount of subsidies paid to the water service, and TC the economic costs (in €/year) of the water service provided.

Initially the financial cost recovery was analysed and then the overall cost-recovery was estimated. The analyses were conducted for water uses and services, in order to facilitate the application of the "polluter-pays" principle. Due to the institutional and legislative structure and organization of the water service providers it was not possible to accurately reflect the revenue and expenditure (and hence cost recovery assessment) separately for water supply and sewerage services, as well as industry, household water supply and irrigation in some cases: water and sewerage services providers manage those services as one –determining their accounting systems as well as their pricing policies. Also they manage their viability consistently. So the cost recovery presentation is driven by the institutional form of the providers, although the economic analysis took a per use and service approach in more detail through assumptions.

The level of cost recovery is presented in following Tables (2010):

Table 12: Level of financial cost recovery of water uses

Water Use	Before Subsidies, Grants	After Subsidies, Grants
Drinking water supply (supply of Industrial areas not included)	108%	116%
Kavala, Drama and Serres Industrial Areas	17%	17%
Irrigation	72%	75%
Total	98%	105%

Table 13: Level of total cost recovery (financial and environmental) of water uses

Water Use	Before Subsidies, Grants	After Subsidies, Grants
Drinking water supply – Wastewater treatment, Municipal Enterprises for Water Supply and Sewerage	104%	112%
Drinking water supply – Wastewater treatment, Municipalities	104%	111%
Irrigation, Local Land Reclamation Organisations or General Land Reclamation Organisations	50%	52%
Irrigation, Municipalities	39%	40%
Total	80%	85%

It must be noted that in the above indicators of total cost recovery, the environmental cost is included but the resource cost is null for RBD GR11 since the district presents a surplus of water availability vs. total demand. The Industrial Areas while lagging considerably in the degree of recovery of the relevant gross financial cost, they account for a very small percentage (less than 2%) of total water consumption and the related financial inflows and outflows. The potentially significant environmental impact of the Phosphoric Fertilizers Industry is not also included, the quantitative assessment of the impact of which requires a special study.

Generally in the RBD the following are observed:

- The drinking water supply and drainage approximately recover all the gross total costs (financial and environmental).
- The irrigation shows significant cost recovery shortfall.
- Cost recovery is not recorded in livestock, since there are no charges to offset the environmental cost.

The economic analysis identified data collection issues and data gaps issues. The economic analysis conclusions produced specific measures.

10. ENVIRONMENTAL OBJECTIVES – EXEMPTIONS

In Article 4 paragraphs 4.4, 4.5, 4.6 and 4.7 of the WFD, a list of possible exemptions from the environmental objectives and a description of the terms and processes for their application is provided. The types of exemptions are:

- Article 4.4: Extension of the time limit
- Article 4.5: A less strict environmental objective
- Article 4.6: Temporary deterioration in status
- Article 4.7: New Modifications- Activities

Implementation of Article 4.4 (extended deadline) exemption is proposed for fifty two (52) SWBs and for one (1) GWBs from the total WBs of the RBD of Eastern Macedonia that are included in the list of "exemptions". The extended deadline for every water body that consists an "exemption" is based on a justification and it depends on the nature of the problem, and the measures needed for the achievement of "good status" by 2015.

In the River Basin Management Plan of Eastern Macedonia, there is one (1) project, that will have an impact on the achievement of environmental objectives of one (1) WB, and that is expected to be completed by 2015 (Article 4.7: New Modifications- Activities). The project concerns the construction of Marmaras Dam. The project will irrigate 1,300 ha of agricultural land that is currently irrigated by boreholes.

Other programmed or new projects that had not been examined for their compatibility with the WFD guidelines or as exemptions according to Article 4.7, they will be examined under the Environmental Permitting procedure.

The type and the exemption justification for each WB exempted, and the applied measures are presented in the tables below.

Table 14: Measures, status and type of exemption for each Surface water body exempted

No	SWB code	SWB Name	Current status			2015 status			Supplementary measures	Type of exemption
			Eco. Stat/Potential	Chem. Stat.	Total Status	Eco. Stat/Pot	Chem. Status	Total Status		
1	GR1106C0003N	Nea Peramos	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
2	GR1106C0004N	Western Gulf Of Kavala	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
3	GR1106L000001H	Lefkogion Reservoir	Moderate	Good	Moderate	Moderate	Good	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
4	GR1106L000002H	Kerkini Lake	Poor	Failing to achieve good	Poor	Poor	Failing to achieve good	Poor	RBD11_SM07_01, RBD11_SM07_02, RBD11_SM15_01, RBD11_SM16_02, RBD11_SM16_05, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
5	GR1106R0002000003N	Strymonas R.	Moderate	Failing to achieve good	Moderate	Moderate	Failing to achieve good	Moderate	RBD11_SM15_01, RBD11_SM16_05, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
6	GR1106R0002000028H	Strymonas R.	Moderate	Failing to achieve good	Moderate	Moderate	Failing to achieve good	Moderate	RBD11_SM15_01, RBD11_SM16_05, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
7	GR1106R0002010002N	Strymonas R.	Moderate	Failing to achieve good	Moderate	Moderate	Failing to achieve good	Moderate	RBD11_SM15_01, RBD11_SM16_01, RBD11_SM16_05, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
8	GR1106R0002060006H	Aggiths R.	Moderate	Failing to achieve good	Moderate	Moderate	Failing to achieve good	Moderate	RBD11_SM15_01, RBD11_SM16_05, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
9	GR1106R0002060007N	Aggiths R.	Moderate	Failing to achieve	Moderate	Moderate	Failing to achieve good	Moderate	RBD11_SM15_01, RBD11_SM16_05,	Article4(4) - Technical

No	SWB code	SWB Name	Current status			2015 status			Supplementary measures	Type of exemption
			Eco. Stat/Potential	Chem. Stat.	Total Status	Eco. Stat/Pot	Chem. Status	Total Status		
				good					RBD11_SM18_01, RBD11_SM18_02	feasibility
10	GR1106R0002060108N	Aggiths R.	Moderate	Failing to achieve good	Moderate	Moderate	Failing to achieve good	Moderate	RBD11_SM15_01, RBD11_SM16_05, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
11	GR1106R0002060109N	Lakkos R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
12	GR1106R0002060110N	Xeropotamos R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
13	GR1106R0002060112N	Archangelou R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
14	GR1106R0002060217A	Filippon Canal	Poor	Failing to achieve good	Poor	Poor	Failing to achieve good	Poor	RBD11_SM15_01, RBD11_SM16_05, RBD11_SM16_06, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
15	GR1106R0002060218H	Kefalari R.	Poor	Unknown	Poor	Poor	Unknown	Poor	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
16	GR1106R0002060219N	Kefalari R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
17	GR1106R0002060293A	Filippon Canal	Poor	Unknown	Poor	Poor	Unknown	Poor	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
18	GR1106R0002060325H	Doxatoy R.	Poor	Unknown	Poor	Poor	Unknown	Poor	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
19	GR1106R0002060326N	Doxatoy R.	Poor	Unknown	Poor	Poor	Unknown	Poor	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
20	GR1106R0002060416N	Pigon Ag.	Poor	Unknown	Poor	Poor	Unknown	Poor	RBD11_SM15_01,	Article4(4) -

No	SWB code	SWB Name	Current status			2015 status			Supplementary measures	Type of exemption
			Eco. Stat/Potential	Chem. Stat.	Total Status	Eco. Stat/Pot	Chem. Status	Total Status		
		Varvaras R.							RBD11_SM18_01, RBD11_SM18_02	Technical feasibility
21	GR1106R0002060420H	Doxatoy R.	Poor	Failing to achieve good	Poor	Poor	Failing to achieve good	Poor	RBD11_SM15_01, RBD11_SM16_05, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
22	GR1106R0002060421N	Xeropotamos R.	Poor	Unknown	Poor	Poor	Unknown	Poor	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
23	GR1106R0002060422H	Xeropotamos R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
24	GR1106R0002060423N	Xeropotamos R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
25	GR1106R0002080029N	Eziobhs R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM16_05, RBD11_SM18_01, RBD11_SM18_02, RBD11_SM18_03	Article4(4) - Technical feasibility
26	GR1106R0002100031H	Agioy Ioannoy R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
27	GR1106R0002100132N	Agioy Ioannoy R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
28	GR1106R0002100134N	Kokkinorema R.	Moderate	Failing to achieve good	Moderate	Moderate	Failing to achieve good	Moderate	RBD11_SM15_01, RBD11_SM16_05, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
29	GR1106R0002100135N	Eptamyloi R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
30	GR1106R0002100136N	Kokkinorema R.	Moderate	Failing to achieve good	Moderate	Moderate	Failing to achieve good	Moderate	RBD11_SM15_01, RBD11_SM16_05, RBD11_SM18_01,	Article4(4) - Technical feasibility

No	SWB code	SWB Name	Current status			2015 status			Supplementary measures	Type of exemption
			Eco. Stat/Potential	Chem. Stat.	Total Status	Eco. Stat/Pot	Chem. Status	Total Status		
									RBD11_SM18_02	
31	GR1106R0002100137N	Kokkinorema R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
32	GR1106R0002100238H	Mpelitsas R.	Poor	Failing to achieve good	Poor	Poor	Failing to achieve good	Poor	RBD11_SM15_01, RBD11_SM16_05, RBD11_SM16_06, RBD11_SM18_01, RBD11_SM18_02, RBD11_SM18_03	Article4(4) - Technical feasibility
33	GR1106R0002100239H	Erythrorema R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM05_04, RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
34	GR1106R0002100240N	Erythrorema R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM05_04, RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
35	GR1106R0002100242H	Mpelitsas R.	Poor	Failing to achieve good	Poor	Poor	Failing to achieve good	Poor	RBD11_SM15_01, RBD11_SM16_05, RRBD11_SM18_01, RBD11_SM18_02, RBD11_SM18_03	Article4(4) - Technical feasibility
36	GR1106R0002100243H	Mpelitsas R.	Poor	Failing to achieve good	Poor	Poor	Failing to achieve good	Poor	RBD11_SM15_01, RBD11_SM16_05, RRBD11_SM18_01, RBD11_SM18_02, RBD11_SM18_03	Article4(4) - Technical feasibility
37	GR1106R0002100244H	Mpelitsas R.	Poor	Failing to achieve good	Poor	Poor	Failing to achieve good	Poor	RBD11_SM15_01, RBD11_SM16_05, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
38	GR1106R0002100245H	Mpelitsas R.	Poor	Failing to achieve good	Poor	Poor	Failing to achieve good	Poor	RBD11_SM15_01, RBD11_SM16_05, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility

No	SWB code	SWB Name	Current status			2015 status			Supplementary measures	Type of exemption
			Eco. Stat/Potential	Chem. Stat.	Total Status	Eco. Stat/Pot	Chem. Status	Total Status		
39	GR1106R0002100246H	Kroysobiths R.	Poor	Good	Poor	Poor	Good	Poor	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
40	GR1106R0002120054H	Kleftolakkos R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM16_06, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
41	GR1106R0002120155H	Xrysorohs R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
42	GR1106R0002120156H	Xrysorohs R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
43	GR1106R0002120157N	Xrysorohs R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
44	GR1106R0002120258H	Kleftolakkos R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
45	GR1106R0002120259N	Kleftolakkos R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
46	GR1106R0002200068N	Anonymo R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
47	GR1106R0002250070H	Strymonas R.	Moderate	Failing to achieve good	Moderate	Moderate	Failing to achieve good	Moderate	RBD11_SM15_01, RBD11_SM16_05, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
48	GR1106R0002250071H	Strymonas R.	Moderate	Failing to achieve good	Moderate	Moderate	Failing to achieve good	Moderate	RBD11_SM15_01, RBD11_SM16_05, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
49	GR1106R0005010089N	Marmara R.	Moderate	Unknown	Moderate	Moderate	Unknown	Moderate	RBD11_SM15_01, RBD11_SM18_01, RBD11_SM18_02	Article4(7) - New modification

No	SWB code	SWB Name	Current status			2015 status			Supplementary measures	Type of exemption
			Eco. Stat/Potential	Chem. Stat.	Total Status	Eco. Stat/Pot	Chem. Status	Total Status		
50	GR1106R0B02240094N	Aggistroy R.	Moderate	Failing to achieve good	Moderate	Moderate	Failing to achieve good	Moderate	RBD11_SM15_01, RBD11_SM16_05, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
51	GR1106R0B02250072N	Strymonas R.	Moderate	Failing to achieve good	Moderate	Moderate	Failing to achieve good	Moderate	RBD11_SM15_01, RBD11_SM16_05, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility
52	GR1106T0001N	Strymonas R. Delta	Moderate	Failing to achieve good	Moderate	Moderate	Failing to achieve good	Moderate	RBD11_SM15_01, RBD11_SM16_05, RBD11_SM18_01, RBD11_SM18_02	Article4(4) - Technical feasibility

Table 15: Measures, status and type of exemption for each Ground water body exempted

GWB code	GWB name	Current Status			2015 Status			Supplementary measures	Type of exemption
		Quantitative status	Chemical status	Status	Quantitative status	Chemical status	Status		
GR1100140	Eleftheres - Nea Peramos	Poor	Poor	Poor	Poor	Poor	Poor	RBD11_SM04_01, RBD11_SM08_01, RBD11_SM08_02, RBD11_SM15_01, RBD11_SM16_04, RBD11_SM18_01, RBD11_SM18_02	Article4(4) -Technical feasibility

In conclusion, only six (6) RWBs will improve their ecological status until 2015.

The exemptions, per WB category in RBD of Eastern Macedonia, are presented below (2015).

Table 16: Rivers exemption

Type of Exemption	% percentage of WBs total length	Justification	% percentage of WBs of each justification	Comments
Article 4.4	50,20%	1) Technical feasibility 2) Disproportionate cost 3) Natural conditions	1) 100% 2) 0% 3) 0%	
Article 4.5	0%	1) Technical feasibility 2) Disproportionate cost	1) - 2) -	
Article 4.6	0%	1) Natural causes (floods, droughts) 2) Unforeseen circumstances 3) Accidents	1) - 2) – 3) -	
Article 4.7	3,49%	1) New modifications to the physical characteristics of a surface water body or alterations to the level of bodies of groundwater 2) New sustainable human development activities	1) 100% 2) 0%	

Table 17: Lakes exemption

Type of Exemption	% percentage of WBs total surface	Justification	% percentage of WBs of each justification	Comments
Article 4.4	100%	1) Technical feasibility 2) Disproportionate cost 3) Natural conditions	1) 100 2) - 3) -	
Article 4.5	0%	1) Technical feasibility 2) Disproportionate cost	1) - 2) -	
Article 4.6	0%	1) Natural causes (floods, droughts) 2) Unforeseen circumstances 3) Accidents	1) - 2) - 3) -	
Article 4.7	0%	1) New modifications to the physical characteristics of a surface water body or alterations to the level of bodies of groundwater 2) New sustainable human development activities	1) - 2) -	

Table 18: Coastal WBs exemption

Type of Exemption	% percentage of WBs total surface	Justification	% percentage of WBs of each justification	Comments
Article 4.4	26,57%	1) Technical feasibility 2) Disproportionate cost 3) Natural conditions	1) 100% 2) 0% 3) 0%	
Article 4.5	0%	1) Technical feasibility 2) Disproportionate cost	1) - 2) -	
Article 4.6	0%	1) Natural causes (floods, droughts) 2) Unforeseen circumstances 3) Accidents	1) - 2) - 3) -	
Article 4.7	0%	1) New modifications to the physical characteristics of a surface water body or alterations to the level of bodies of groundwater 2) New sustainable human development activities	1) - 2) -	

Table 19: Transitional WBs exemption

Type of Exemption	% percentage of WBs total surface	Justification	% percentage of WBs of each justification	Comments
Article 4.4	100%	1) Technical feasibility 2) Disproportionate cost 3) Natural conditions	1) 100% 2) 0% 3) 0%	
Article 4.5	0%	1) Technical feasibility 2) Disproportionate cost	1) - 2) -	
Article 4.6	0%	1) Natural causes (floods, droughts) 2) Unforeseen circumstances 3) Accidents	1) - 2) - 3) -	
Article 4.7	0%	1) New modifications to the physical characteristics of a surface water body or alterations to the level of bodies of groundwater 2) New sustainable human development activities	1) - 2) -	

Table 20: GWBs exemption

Type of Exemption	% percentage of WBs total surface	Justification	% percentage of WBs of each justification	Comments
Article 4.4	0,28%	1) Technical feasibility 2) Disproportionate cost 3) Natural conditions	1) 100% 2) 0% 3) 0%	
Article 4.5	0%	1) Technical feasibility 2) Disproportionate cost	1) - 2) -	
Article 4.6	0%	1) Natural causes (floods, droughts) 2) Unforeseen circumstances 3) Accidents	1) - 2) - 3) -	
Article 4.7	0%	1) New modifications to the physical characteristics of a surface water body or	1) -	

Type of Exemption	% percentage of WBs total surface	Justification	% percentage of WBs of each justification	Comments
		alterations to the level of bodies of groundwater 2) New sustainable human development activities	2) -	

11. PROGRAMME OF MEASURES

The program of measures is the key element of the River Basin Management Plan for the achievement of the 2000/60/EC Directive objectives. The measures are divided into basic and supplementary:

- **Basic measures** result from the implementation of national and European legislation on water protection, including 2000/60/EC Directive and the overall environmental policy.
- **Supplementary measures** include measures designed and implemented in addition to the basic measures.

The program of measures of the RBD of Eastern Macedonia, that is proposed to be implemented by 2027, includes Basic measures required to implement Community legislation for the protection of water, forty- (40) other Basic measures and twenty (20) supplementary measures for the protection of specific water bodies.

Basic measures required to implement Community legislation refer to the following Directives *(as they are amended and currently stand*):

(i) The Bathing Water Directive (76/160/EEC)
(ii) The Birds Directive (79/409/EEC)
(iii) The Drinking Water Directive (80/778/EEC) as amended by Directive (98/83/EC)
(iv) The Major Accidents (Seveso) Directive (96/82/EC)
(v) The Environmental Impact Assessment Directive (85/337/EEC)
(vi) The Sewage Sludge Directive (86/278/EEC)
(vii) The Urban Waste-water Treatment Directive (91/271/EEC)
(viii) The Plant Protection Products Directive (91/414/EEC)
(ix) The Nitrates Directive (91/676/EEC)
(x) The Habitats Directive (92/43/EEC) (5)
(xi) The Integrated Pollution Prevention Control Directive (96/61/EC)

Other Basic Measures included in the Programme of measures fall in the following categories:

OM04: Measures deemed appropriate for the purposes of the Cost Recovery of water services (Article 9)
OM05: Measures to promote an efficient and sustainable water use

OM06: Measures to meet the requirements of Article 7, including measures to safeguard water quality in order to reduce the level of purification treatment required for the production of drinking water

OM07: Controls over the abstraction of fresh surface water and groundwater, and impoundment of fresh surface water

OM08: Controls over artificial recharge or augmentation of groundwater bodies

OM09: Measures for point source discharges liable to cause pollution

OM10: Measures for diffuse sources liable to cause pollution

OM11: Measures to prevent significant adverse impacts on the status of water (in particular measures to protect hydromorphological conditions)

OM12: Measures prohibiting direct discharges of pollutants into groundwater

OM13: Measures to eliminate pollution from priority substances

OM14: Measures to prevent significant losses of pollutants from technical installations, and to prevent and/or to reduce the impact of accidental pollution incidents

The Supplementary measures included in the program of measures fall in the following categories:

SM04: Negotiated environmental agreements

SM05: Emission controls

SM07: Recreation and restoration of wetlands areas

SM08: Abstraction Controls

SM14: Artificial recharge of aquifers

SM15: Educational measures

SM16: Research, development and demonstration projects (best practices)

SM18: Other measures

The cost of these measures is estimated as follows:

- **129.35** mil. € for the measures taken in application of Community legislation for the protection of water
- **42.87** mil. € for the other Basic measures
- **3.99** mil. € for supplementary measures for the protection of specific water bodies
- Total cost of proposed measures: **176.21** mil. €

Proposed Other Basic Measures for Eastern Macedonia RBD are presented in the table below:

Table 21: Other Basic measures of Eastern Macedonia RBD

No	Measure Code	Measure Title/ Description	Category
1	RBD11_OM04_01	**Adaptation of pricing policies so as to avoid waste of water and serve in a flexible way the objective of environmental sustainability** Formulation of a common pricing policy for refined water for domestic use in order to curb wasting water and gradually recover the cost of water, taking into account social and environmental parameters.	OM04
2	RBD11_OM05_01	**Actions for the modernization of the water supply network operation for big urban agglomerations of the water district. Leakages control** The control of leakages in the water supply networks aims at detecting leaks and preventing great losses of water. It is supported by the OPESD, in the framework of the Priority Axis 2 "Water Resources Protection and Management", within the Invitation 2.6 "Leakages Minimization projects in problematic urban water supply networks", with a budget of 60 million Euros and a time horizon for project implementation until 2015. Leakages of any type due to defective connections or damages on pipelines, illegal connections, measurement errors, due to defective water meters or merely the absence of water meters, contribute to a non-pricing of water, which the Municipal Enterprises for Water Supply and Sewerage have estimated to be between 35 % and 70%. Methods for the detection of water losses in water distribution networks should be implemented under the responsibility of the Municipal Enterprises for Water Supply and Sewerage on an on-going basis. The detection should be followed by the repair and restore of the proper operation. The installation of water meters and/or replacement of the defective ones should be promoted. Projects involving such actions have already been integrated in the OPESD. However, such actions must be generalized as a priority in all Municipal Enterprises for Water Supply and Sewerage, where losses in the water distribution network of more than 50% occur. Indicatively, such projects for the Municipal Enterprises for Water Supply and Sewerage of Serres, Drama, Pageou and Nigrita are integrated in the OPESD (the city of Kavala has also submitted a relevant request) and should be promoted with responsibility of the competent authorities. In order to extend such actions to other Municipal Enterprises for Water Supply and Sewerage, initially the losses on networks should be recorded by the respective Municipal Enterprises under the supervision of the Direction of Water and the area priorities should be set, so that similar projects can be launched within the next programming period.	OM05
3	RBD11_OM05_02	**Projects for restoration / reinforcement of water supply network** The measure refers to the restoration of old damaged water pipes and to the reinforcement of external water supply reservoirs in order to cover increased water supply demand. Some projects concerning the improvement / expansion of the water supply network in new agglomerations or growing municipalities have already been integrated in the OPESD (more than 20 similar projects). These projects, aiming at the effective covering of the increasing water needs in agglomerations and municipalities, are priority projects for the implementation of the Directive. The competent authorities are held responsible for the promotion of them as well as of all similar projects.	OM05
4	RBD11_OM05_03	**Development of the legislative framework and of Program of Measures for residential water saving** The potential for water saving at residences has been investigated in the framework of the project "Technical Support to the General Secretariat for Water for the preparation of a Programme of Measures and of the	OM05

No	Measure Code	Measure Title/ Description	Category
		Institutional framework for Residential Water savings", funded by the OPESD. The implementation of residential water saving programs leads to the promotion of new technologies for water reuse and conservation. The relevant study, which has been completed, indicated that simple interventions in the household equipment can achieve important water savings (at least 30% in individual households and around 10% in total). The Ministry of Environment, Energy and Climate Change, through the Special Secretariat for Water, started at April of 2014 examining the development of an Institutional Framework and Program of Measures for residential water savings. The measures promoted are of institutional, regulatory, financial και demonstrating character. The New Building Code foresees already the installation of water saving equipment (which will be specified by decisions of the Minister of Environment, Energy and Climate Change) in new residences.	
5	**RBD11_OM05_04**	**Reorganization / Rationalization of the institutional framework for the operation of the collective irrigation networks management bodies** The framework for the operation of the Land Reclamation Organisations was enacted in 1958 and since then has been amended / supplemented by a series of acts. Nowadays, these organizations have, in their great majority, serious malfunctions due partly to the non-implementation of the legislative framework for the operation and partly to the outdated organisational structure. The measure refers to the formulation of proposals and institutional changes associated with the upgrade of operation and the update of the institutional framework of Local Land Reclamation Organisations / General Land Reclamation Organisations, so that they are adapted to the current administrative structure of the State and that the irrigation water management is substantially improved. Towards this direction, the Directorate for Utilization of Land Reclamation Projects and Equipment of the Ministry of Rural Development and Food has already elaborated a relevant legislative regulation, which has been sent to the Ministry of Interior for consultation with all competent Ministries.	**OM05**
6	**RBD11_OM05_05**	**Strengthening of the actions to reduce losses in collective irrigation networks** It is necessary to: (1) optimize the irrigation programme through the cooperation of the Local Land Reclamation Organization with the farmers, so that the irrigation during the hours of the day with a very high temperature is avoided. If it is necessary, it is also suggested to update the irrigation programmes after recommendation of the Regional Authority and in collaboration with the supervising department of the Local Land Reclamation Organization. It is noted that the Local Land Reclamation Organizations are already obliged by the existing legislative framework to develop timeschedules and irrigation programme. (2) The water transfer infrastructure should be maintained at a high standard, under the care of the Regional Authority and (3) The controls aiming at ensuring the proper implementation of the irrigation programmes should be intensified. It is proposed that the controls are conducted by the Body that supervises the Local Land Reclamation Organizations.	**OM05**

No	Measure Code	Measure Title/ Description	Category
7	RBD11_OM06_01	**Implementation of Water Safety Plans in big Municipal Enterprises for Water Supply and Sewerage** The Water Safety Plans are a holistic approach related to the qualitative management of water from the water source to the distribution, adopting the principle of multiple barriers and focusing on the need for implementation of control measures in all links of the water supply chain. The Specifications for the implementation of the Water Safety Plans were developed in the framework of the project "Technical Support to the General Secretariat for Water of the Ministry of Environment, Energy and Climate Change for the recording of the problems for the implementation of the Directive 98/83/EC on the quality of drinking water in Greece and investigation of possibilities for the adoption of Water Safety Plans", which was funded by the Operational Programme "Environment and Sustainable Development" (OPESD) and completed by 2011. It is proposed to implement the Water Safety Plans in big Municipal Enterprises for Water Supply and Sewerage, such as these of Serres, Kavala, Drama, Pageou and Nigrita aiming at safeguarding public health and adopting and implementing good practices in the drinking water supply network, through the minimization of pollutants in the drinking water and especially at its source, the right water treatment and distribution to water supply networks regardless the size of these networks.	OM06
8	RBD11_OM06_02	**Conduction / Update of the Water Supply Masterplan by the Municipal Enterprises for Water Supply and Sewerage** Conduction of the Masterplans regarding water supply, where the water resources are going to be determined. Those water resources are going to cover the water supply needs in a medium/long term basis. The appropriate protection measures are going to be implemented in time and the necessary external aqueducts are going to be designed in primary level. It is proposed that the Masterplans are going to be conducted by the Municipal Enterprises for Water and Sewerage, as the most pertinent body to this subject. The Masterplans must be conducted according to the RBMPs concerning the water bodies status and the rest program of measures. For this reason it must be assented by the competent Water Directorate.	OM06
9	RBD11_OM06_03	**Detailed delineation of protection zones of groundwater abstraction points (springs, boreholes) for drinking water abstractions> 1.000.000 m³ per year** Detailed delineation of protection zones of groundwater abstraction points (springs, drillings) for drinking water abstractions> 1.000.000 m³ per year (Municipalities of Kavala, Pageou, Drama, Prosotsani, Doxato, Serres, Sintiki, Visaltia, Emm. Pappas, Iraklia, Amphipolis and Nea Zichni). The elaboration of special hydrogeological studies, after the completion of which the detailed delineation will be feasible, is a prerequisite.	OM06
10	RBD11_OM06_04	**Delineation of protection zones for drinking water abstraction works** In the drinking water abstraction infrastructure (drillings, springs, wells), and until the completion of the specific hydrogeological studies, temporary protection zones of water abstraction points are defined as follows: • Zone of absolute protection I: 10-20 m around the abstraction site. • Zone of controlled protection II: defined depending on the type of aquifer as follows: ▪ Karstic systems: 600 m upstream and both sides (recharge	OM06

No	Measure Code	Measure Title/ Description	Category
		area) and 300m downstream of water abstraction site. ▪ Fractured systems: 400 m upstream and on both sides (recharge area) and 200m downstream of water abstraction site. ▪ Granular unconfined systems: perimeter with radius of 400m ▪ Granular confined or semi-confined aquifers: perimeter with radius of 300m For the karstic and fractured systems in case no data is available regarding the piezometric level or the recharge area, a protection zone with radius equal to the abovementioned upstream distance is implemented. • Zone of protection III: It refers to the recharge basin of the abstraction site and can be determined only by the aforementioned hydrogeological study. Activities in principle prohibited by zone: ▪ Protection zone I (absolute protection): The zone, which protects the immediate environment of the abstraction from pollution, is characterized as zone of full ban. Within this zone, all activities are prohibited, with the exception of the necessary works for the operation and maintenance of the water abstraction works. ▪ Protection zone II (controlled): This zone protects the drinking water mainly from the microbiological pollution (50-day zone) and from the pollution cause by human activities or works that are dangerous due to their proximity with the abstraction site. Within this zone, all activities with high polluting risk, such as (indicatively) intensive agricultural activities using pesticides – agrochemicals, livestock facilities, industrial – handicraft facilities, facilities for treatment or transfer of wastewater or solid waste, garages, quarrying and mining activities, cemeteries, and generally any relevant activity that can be a potential pollution source equal or greater than the aforementioned, are prohibited. ▪ Protection zone III (supervised): It surrounds the zones I and II and develops throughout the recharge basin that feeds the underground aquifer from which the abstraction is supplied. In Zone III the existing legislation on water protection applies. The specifications for the aforementioned hydrogeological studies will be determined by the competent authorities, under the coordination of the General Secretariat for Water.	
11	**RBD11_OM06_05**	**Protection of the groundwater systems included in the register of drinking water protected areas and definition of the protection legislative framework** First, for the installation of new activities the prohibitions of the protection zone II of groundwater abstraction points for drinking with the exception of cemeteries, garages and parkings, and quarrying activities, are implemented. The installation of new activities may be permitted in specific locations after the submission of the hydrogeological study or report, depending on the size and category of the activity and after the positive decision issued by the competent Water Direction. Determination of the legislative protection framework, where the measures for the protection of the groundwater systems included in the register of protected areas will be adopted in detail.	**OM06**

No	Measure Code	Measure Title/ Description	Category
12	RBD11_OM07_01	**Revaluation of the legislative framework for water use licensing and construction of water resources development works** The provisions of JMD 43504/2005 (Government Gazette No. 1784 B') and other relevant regulations should be revised in order to, among other things, (a) examine the compatibility of any water development project with the provisions of the River Basin Management Plan at an early stage for the timely information of stakeholders, and (b) to investigate the licensing procedure of water use for geothermal purposes.	OM07
13	RBD11_OM07_02	**Creation of a common registry of licensed water abstractions through the process of issuing water use licenses** This measure refers to the unification of the basic information collected by the Water Directorates when issuing water use licenses, mainly in relation to the location of the abstraction, the quantities abstracted and the water body affected, as well as information on the accountable person or persons, so that a rationalization of controls required for compliance with the terms and conditions of each license may be achieved. The information which should be included in the registry will be determined by SSW in cooperation with the Water Directorates. The registry will be available to the regional authorities so as to facilitate the necessary checks provided for such projects.	OM07
14	RBD11_OM07_03	**Monitoring of surface water abstractions for water supply, irrigation and other uses from large consumers** This measure refers to abstractions greater than 10 m^3 per day and includes the installation or modernization of existing recording equipment (water meters, water level loggers, etc.) at surface water abstraction projects. The associated necessary equipment will be determined upon issuing of a new water use license or renewal of an existing one and the relevant cost will be covered by the individual or entity that performs the abstraction of water; it is possible to provide suitable incentives for the implementation of this measure. The person or entity responsible shall be obliged to declare the start of operation of the metering equipment to the relevant Water Directorate. The measurements of the quantities of water abstracted annually will be communicated to the Water Directorate during the first ten days of October of each year.	OM07
15	RBD11_OM07_04	**Establishment of criteria to determine the limit of total abstractions per surface water body.** This measure is aimed at investigating the possibility of establishing a methodology and criteria for determining environmental flows downstream of major water projects based on the results of the National Monitoring Network on the status of surface water bodies in the country and having as goal the development of specific standards.	OM07
16	RBD11_OM07_05	**Implementation of total abstraction limits per groundwater body** The total annual abstraction per groundwater body are initially set as per the table of average annual abstractions for the GWBs included in the River Basin Management Plan. These limits can be differentiated by the Water Directorate based on the results of the National Monitoring Network of water status or following relevant targeted studies or investigations.	OM07
17	RBD11_OM07_06	**Prohibition of constructing new water abstraction works (boreholes, wells, etc.) for new water uses and for extending existing water use licenses within:** **• Groundwater bodies with quantitative status classified as "poor"**	OM07

No	Measure Code	Measure Title/ Description	Category
		• **Areas serviced by collective irrigation networks** • **Protection zones (zones I and II) of potable water abstraction works** In GWBs which have been determined to be in poor quantitative status, within areas serviced by collective irrigation networks and within the protection zones of drinking water abstraction points, new drilling should be forbidden in order to avoid further deterioration of their status and to protect these GWBs. This rule excludes special cases with priority to drinking water use projects and projects which can lead to a measurable decrease of abstraction from GWBs. Such projects will be reviewed and approved by the competent Water Directorate after submission of a documented hydrogeological desk study for abstractions less than 10 m^3/day or a full hydrogeological study for abstractions greater than 10 m^3/day. The technical specifications for the aforementioned hydrogeological studies will be determined by the competent authorities under the coordination of SSW. Within areas of collective irrigation networks, new borehole licenses may be granted to reinforce the collective irrigation network towards greenhouse water supply, protection against frost and other uses excluding irrigation.	
18	**RBD11_OM07_07**	**Installation of groundwater abstraction monitoring systems.** This measure requires the gradual installation of water meters in all forms of groundwater abstraction (boreholes, wells or spring water diversions) from which a volume of water equal to or greater than 10m3 per day is abstracted, for the monitoring and control of groundwater abstractions. This measure refers to all individuals and legal entities responsible for the operation of abstraction (e.g. Municipal Water and Sewerage Companies, Municipalities, Irrigation Boards, individuals). The cost of the necessary associated equipment will be covered by the abovementioned persons or entities, while it is possible to provide incentives for the implementation of the measure. The persons or entities responsible shall be obliged to declare the start of operation of the metering equipment to the relevant Water Directorate while large users (Municipal Water and Sewerage Companies, municipalities, industries, collective irrigation networks) are obliged to report to the Water Directorate the measurement data on the quantities annually abstracted within the first ten days of October of each year.	**OM07**
19	**RBD11_OM07_08**	**Update of the Ministerial Decision Φ16/6631/1989 on the lower and upper limits of necessary quantities of irrigation water** The Ministerial Decision Φ16/6631/1989 defined minimum and maximum necessary quantities for rational use of irrigation water, per category of crop and per River Basin District. These limits were calculated on a monthly basis for the period April - September and can also be applied cumulatively. The calculation of the necessary quantities was done by means of the Blaney – Griddle method. The update of the abovementioned Ministerial Decision is proposed, taking into account meteorological data from 1989 onwards, as well as the provisions of the River Basin Management Plans.	**OM07**
20	**RBD11_OM08_01**	**Investigation of the conditions for application of artificial recharge of groundwater bodies as a measure to enhance the quantitative status and protect the quality of GWBs** The artificial recharge of groundwater aquifers is an essential tool for addressing the quantitative reduction or qualitative degradation of GWBs which is caused by the various pressures on groundwater such as over-pumping, contamination, etc. This is an environmental action taking advantage of natural underground reservoirs, formed in the subsoil, for	**OM08**

No	Measure Code	Measure Title/ Description	Category
		storing good quality water during the winter period to be available for use during the summer period of increasing demands. The implementation of artificial recharge aims to enhance the quantitative and qualitative upgrading of GWBs. The measure is also important due to its contribution to the mitigation and gradual repelling of the seawater intrusion front in coastal aquifers. The effectiveness of artificial recharge is determined by several factors such as the determination of the storage capacity of aquifers, the water availability in sufficient quantity for the needs of the application and in the desired quality compatible or better than the quality of the recharged groundwater body. The artificial recharge procedures described are based on the exploitation of good quality surface water and are not related to artificial recharge foreseen by the JMD 145116/8.3.2011 (Government Gazette No. 354 B'). For the implementation of artificial recharge applications it will be necessary to conduct a specific hydrogeological study which will investigate the depth of the aquifer, the presence or absence of superimposed strata, the hydraulic conductivity and the depth of enrichment. This study will incorporate the detailed design of the recharge program, the appropriate method and the best implementation procedures. Technical specifications for these Hydrogeological Studies of artificial recharge will be determined by the Special Secretariat for Water (SSW).	
21	**RBD11_OM08_02**	**Drafting of a Technical Specifications Manual for the implementation of the reuse methods** Drafting of a Technical Specifications Manual for the implementation of the reuse methods foreseen in the Common Ministerial Decision 145116/2.3.2011 (OJ 354B) where the following will be indicatively determined: A) The description of the potential reuse methods, in which cases the implementation of each method is recommended, the minimum implementation requirements for each method, as well as the proper and effective Implementation practices. B) The reuse study and application procedures, i.e. the successive approach stages (expression of intent - preliminary study, Environmental Impact Assessment Study, Consultation of interested Parties, Technical implementation study, Licensing, Pilot implementation, implementation), as well as the specification of responsibilities of the stakeholders.	**OM08**
22	**RBD11_OM09_01**	**Modernization of national legislation on the management of urban and industrial waste waters** The Ministerial Decision E1b/221/1965 on the management of urban and industrial waste waters and its subsequent amendments was and still is even today, the basic institutional framework that governs the disposal of urban sewage and industrial and municipal waste waters. The Ministerial Decision E1b/221/1965 was characterized as an innovative institutional framework at its time, which, however, does not cover for the modern environmental policy. The relevant provisions of Articles 2, 7, 8, 12 and 14 of the Health Act No E1b/221/1965 (GG B'138) as amended, have already been repealed, while Article 59 of the Greek Law 4042/2012 describes its universal abolition, which however poses ambiguity on an eventual legal loophole. After co evaluating the above mentioned, the establishment of a modern legal framework for the management of urban and industrial waste water is proposed.	**OM09**

No	Measure Code	Measure Title/ Description	Category
23	RBD11_OM09_02	**Establishment/Designation of emissions limits at river basin level for priority substances and other pollutants included in JMD 51354/2641/E103/2010 as well as for physicochemical parameters in relation to the quality objectives set out in The River Basin Management Plans** The aim of this measure is the designation of emission limit values for the priority substances and the other pollutants that are established in the Joint Ministerial Decision 51354/2641/E103/2010 and affect the surface water bodies. During the designation of the emission limit values, attention should be paid to the following: i The Environmental Quality Standards that are designated in terms of Annual Average concentration by the Joint Ministerial Decision 51354/2641/E103/2010. ii. The Guidance 91/271/EEC. iii. The dilution during the summer period, when the river discharge is minimum and also the dilution when the wastewater discharge from the industries or from other activities is maximum. iv. The sensitivity of the area. v. The daily and annual estimated pollution load of the companies. vi. The concentration of the basic parameters of the pollution load. vii. The correlation with the protected areas for drinking water. The Emission Limit Values will be the maximum values and the wastewater of the industries or other activities developed in the RBD should conform to them in every case. Originally the Water Directorates should determine the rivers basins that are priority for their regions and then to price the activities that are essential in order to be implemented the appropriate researches and surveys in the next managing period.	**OM09**
24	RBD11_OM09_03	**Instruction of an institutional framework for the licensing of sewage tanks transport** There is a need to adopt an integrated legal framework that will govern the licensing of tanker trucks that transport sewage, as the existing legal framework, does not require licensing for the work of collection and transportation of urban waste. According to an earlier decision of the Ministry of Infrastructure, Transport and Networks, the licensing of tanker trucks that transport sewage only required the issuance of a vehicle registration document, which only determines traffic issues. Severe problems arise from unmonitored management and uncontrollable disposal of urban waste transferred by the tanks to protected areas, biotopes, water bodies, surface water drains or sewers, landfills, fields etc. due to lack of a control mechanism . The measure involves the creation of a regulatory framework for the licensing of tanker trucks transporting sewage that will define special measures for the positioning and control of the tanker trucks. Indicatively: electronic monitoring for each tank, a register of licensed tanks, provision for crosschecking with industries in the area, provision for the expansion of the inspectors' network (defining the competent monitoring services and imposing strict penalties for environmental violations, (e.g. immediate collectable fines and escalation of the above with license withdraw and vehicle seizure), involvement of the municipalities, confirmation of the disposal of transported waste to a WWTP.	**OM09**

No	Measure Code	Measure Title/ Description	Category
25	RBD11_OM09_04	**Defining terms and conditions for connection of industries to sewerage networks / acception of industrial wastes in WWTP** The management bodies of the sewerage networks and WWTP will have to issue sewerage networks operation rules or revise the existing ones in order to define the conditions for connection of industries to sewerage networks and/or terms for the reception of industrial wastes in WWTP. For the issuance of such regulations the opinion of the Water Directorate is required. The operating rules will be communicated to the Water Directorate, to the Special Secretariat for Water as well as to the competent for the relevant controls authorities of the Region.	OM09
26	RBD11_OM09_05	**Promoting the design of central treatment units for agricultural and animal waste** Originally the preparation of techno-economic studies and studies of scope per Regional Unit are recommended in order to investigate the sustainability for agricultural and animal waste as well as their preliminary location so as to allow launching of their construction.	OM09
27	RBD11_OM09_06	**Development of a regulatory framework / guidelines for monitoring water quality in aquaculture units** In the context of environmental licensing according to the Greek law 1650/86 as amended and in force with the Greek law .3010/2002 as well as protection and management of water bodies in accordance with the Greek law 3199/2003 and Presidential Decree 51/2007 the systematic monitoring of water quality in aquaculture units is provided for. The competent authorities for issuing environmental terms and water use licenses usually apply the JMD No. 46399/1352/27-6-1986 '' Quality required of surface water that are intended for : «drinking water», «bathing», «fish life in freshwater» and « shellfish waters », measuring methods, sampling frequency and analysis of surface water intended for drinking water, in compliance with the instructions of the Council of the European Communities 75/440/EEC, 76/160/EEC, 78/659/EEC, 79/923/EEC and 79/869/EEC'' even though it does not relate with the fish life in the sea. It has also been observed that the decisions issued do not include unified terms as to monitoring the parameters for all the units. In this context it is proposed to issue unified guidelines defining the parameters of water and sediment that should be monitored at regular time intervals in aquaculture units of coastal and inland waters in order to protect and maintain the status of the water bodies.	OM09
28	RBD11_OM09_07	**Specification of criteria for licensing new / expansion of existing aquaculture units** During the licensing process of new or the expansion of existing aquaculture units in water bodies whose status is characterized as bad, it must be demonstrated that in the immediate area of the units' installation, the status of the water bodies is good according to the Directive 2000/60/EC. The classification of the water bodies' status as bad is presumed by the Water Management Plans and the results of the National Monitoring Program of JMD 140384 (GG 2017/B/9.92011), which is in progress.	OM09
29	RBD11_OM09_08	**Specification of the process to control and designate zones for aquacultures in inland waters** This measure refers to establishing special specifications and issuing a regulatory act for the designation of zones for the development of inland waters aquaculture, implementation of operation checks (frequency, intensity, and infrastructure, waste), imposition of sanctions and fines in case of environmental conditions violations and / or illegal operation.	OM09

No	Measure Code	Measure Title/ Description	Category
		The co-operation of the Special Secretariat for Water with the competent authorities of the Ministry of Rural Development and Food is required as well as with the competent authorities for environmental licensing.	
30	RBD11_OM09_09	**Enhancement of the periodical audits of the coastal waters that are being pressured from stormwater outfalls and other pollution sources.** The monitoring program of the Directorate of Health and Social Care in every Regional Unit should be reviewed in order to expand the sampling period and therefore concentrate in coastal water bodies that are being pressured from stormwater outfalls and other pollution sources. The final aim is the adoption of a special program of periodical audits of the water that ends up to the sea. The sampling programming will be performed in collaboration with the Competent Division responsible for Waters and according to the provisions of the RBD Management Plans. The sampling results will be communicated to the abovementioned Division.	OM09
31	RBD11_OM09_10	**Establishment of a mandatory quality monitoring program of mine runoffs along the lines of landfills** The systematic quality monitoring of surface and groundwater affected by the operation of mines is proposed, including abandoned ones, based on the monitoring pattern followed for landfills.	OM09
32	RBD11_OM10_01	**Development of specialized tools for the rational use of fertilizers and water** Examination of the possibility to develop specialized tools for the determination of fertilizer treatment, in the pattern of the program «Recording of nutrients, heavy metals and Hydrodynamic Properties of Soils for the rational use of fertilizers and water and Production of Safe Products» of the Region of Eastern Macedonia and Thrace to be applied to the nutrient- zones under Directive 91/676/EEC. This tool has been developed for the regional units of Eastern Macedonia and Thrace The implementation of same is proposed for the regional unit of Serres of the Region of Central Macedonia.	OM10
33	RBD11_OM10_02	**Utilization of specialized tools for the rational use of fertilizers and water** Use of specialized tools for the determination of fertilizer treatment, from the program «Recording of nutrients, heavy metals and Hydrodynamic Properties of Soils for the rational use of fertilizers and water and Production of Safe Products» of the Region of Eastern Macedonia and Thrace, by the departments of Agricultural Development to determine fertilizer inputs, taking into account new areas proposed for inclusion to the nutrient-zones under Directive 91/676/EEC. This tool has been developed for the regional units of Eastern Macedonia and Thrace and can be readily applied to the regional units of Kavala and Drama.	OM10
34	RBD11_OM10_03	**Modernization of the institutional framework for sludge management from waste water treatment plants with emphasis on expanding the scope of its applications and review the quality characteristics of the applied sludge** The agricultural reuse of sludge is subject to the provisions of Directive 86/278/EK which has been incorporated to the National Law with the JMD 80568/4225/91 and amended by the JMD 114218/97 (GG-1016/B/17-11-97). The Public Consultation being completed in January 2012, the Draft Common Ministerial Decision entitled «Measures, conditions and procedures for the use of sludge which derives from	OM10

No	Measure Code	Measure Title/ Description	Category
		domestic and urban sewage treatment as well as some wastewater, in compliance with the provisions of Council Directive 86/278/EEC of the European Communities » has been drafted thereafter. This Draft modernizes and expands the scope of JMD 80568/4225/91 and aims to maximize utilization of sludge and specifically to increase the potential applications of sludge in the form of soil enhancer in agriculture, forestry, urban and suburban green sites and landscape planning. Adoption of a modern institutional framework that will promote viability in the management of sludge and reduce the amount disposed in landfills is recommended.	
35	**RBD11_OM11_01**	**Determination of selected areas suitable for material abstraction for technical project needs.** This measure deals with the problem of arbitrary interventions in streams across the whole country, in a rational and environmentally friendly way. The aim of the measure is to confront the hydromorphological pressures of the abovementioned WBs The conduction of a special study in every RB of the RBD is proposed, with the following main subjects: A) Determination of sediment concentration areas along the broad riverbed of the stream. B) Estimation of the available quantities in every region. C) Ecological evaluation per region with emphasis on the habitat types (structure, conservation status), on the flora species (herbaceous, shrubby and arboreal with emphasis on the arboreal in good conservation status) and on fauna habitats. D) Hierarchy of the concentration areas regarding the potential of material extraction taking into account the abovementioned. The study is proposed to be done with the responsibility on the competent Water Directorate of each RB. An assessment should be done regarding the need for Strategic Environmental Impact Assessment. The measure aims at the management of the sediment yield and at the regulation of the material extraction from stream bed, in a manner that both the sustainable exploitation of the resource and the maximum protection of the ecosystems developed on the WBs are ensured. It also aims at the protection of the coastline against erosion. • The implementation of this measure will be done as it is described below: **Phase I (short-term):** Modernization of the legislative framework for material abstraction for technical project needs of the bed of water bodies, torrents and streams. For more about determination of selected areas suitable for material abstraction you can see also 42279/24/24.11.1938 (ΦΕΚ Β΄ 267) **Phase II (short-term):** The Ministry of Environment, Energy and Climate Change will compose the specifications for a preliminary assessment per River Basin District, where the main criteria for distinguishing the three (3) zones of sediment deposition will be configured: Zone I: Zone of high capacity regarding sediment deposition, where sediment abstractions will be allowed. Zone II: Zone of medium capacity regarding sediment deposition, where sediment abstractions will be allowed under specific conditions. Zone III: Zone of low capacity regarding sediment deposition, where sediment abstraction will not be allowed. The criteria for distinguishing the abovementioned zones will mainly be hydromorphological, environmental and techno-economic as well as	**OM11**

No	Measure Code	Measure Title/ Description	Category
		criteria for the management of the flood risk. **Phase II (medium-term):** Conduction of a preliminary study per RB for the designation of the sediment deposition zones, according to the specifications that were defined in Phase I and to the conditions for the permitting for sediment extraction in zones I and II. The dynamics of the physical deposition process and the sediment transport should be co evaluated with the conditions required per zone. In protected areas the above study is properly adjusted in order to meet the requirements of the provisions according to which the institutionalization of the requirements was done, if such requirements exist. For the protection of the bed of the water bodies, until the aforementioned are implemented no more new aggregate abstractions are allowed in the following areas: • From the shore and the riparian zone of lakes, • From the areas where technical structures are located (e.g. bridges, dams, drainage or irrigation ditches) and in a distance of 500m upstream and 500m downstream of the structure, unless it is otherwise specified in the environmental permission of other projects or other existing provisions, or some other reasons regarding the protection or the maintenance of existing projects exists. Concerning the aggregate abstraction works, the position and the amount of abstracted material should be determined during the permitting procedure as well as the method and the timing of works.	
36	**RBD11_OM11_02**	**Set up of an institutional framework for the determination of the terms of protection of inland recreational waters according to Article 6 of the WFD – Temporary regulation for new projects in inland water bodies that are included in the list of protected areas as recreational waters.** The measure refers to the adoption of the necessary regulations that will contain the main criteria for the determination of the recreational waters according to Article 6 of the WFD in the inland waters and will determine the terms, the limitations and the conditions for the development of projects and activities on them. Until the enactment of the above institutional framework and the specification of the above terms, restrictions and conditions in inland water bodies included in the list of protected areas as recreational waters, the installation of small Hydroelectric projects and other projects of water intake is temporarily suspended. In special cases the Water Directorate may authorize the installation of water intake and small hydroelectric projects in those areas if it is proved that the water body status is not affected, in accordance with the provisions of Article 4 of the WFD and also if the project feasibility is co evaluated with the existing and / or planned recreational activities. In this case the opinion of the Water Council of the Decentralized Administration is required.	**OM11**
37	**RBD11_OM12_01**	**Creation of a single register of regions of wastewater disposal either through irrigation or through artificial recharge (Government Gazette 354/B/08.03.2011)** Under the current institutional framework for the reuse of treated wastewater either through irrigation or through artificial recharge, the Water Directorate of the Decentralized Administration decides after the submission of the design study. The measure regards the creation of a registry of disposal areas, that will include the details of the body responsible for the construction of the project, the basic technical specifications, the Water Body affected as well as any additional	**OM12**

No	Measure Code	Measure Title/ Description	Category
		monitoring measure and any data collected from monitoring that was possibly asked during the permitting procedure and was delivered to the Water Directorate. The determination of the information that should be included in the register will be determined from the Special Secretariat for Water in collaboration with the Water Directorates. The register will be available to the competent audit authorities of the Regional Unit in order to facilitate the programmed necessary audits of these projects.	
38	**RBD11_OM13_01**	**Register of pollution sources (emissions, discharges and leaks).** According to the first paragraph of Article 5 of «List of emissions, discharges and leaks» of the JMD 51354/2641/E103 (GG 1909B/8.12.2010)« The Water Divisions of the Regions, based on information collected in accordance with Articles 5 and 11 of PD 51/2007, Regulation (EC) No 166/2006 and other available data, compile for each Water District or part of that District within their administrative boundaries, a List of emissions, discharges and leaks for all priority substances and pollutants listed in Part A of Annex I of this Decision, including their concentrations in sediment and biota, as appropriate.» In particular, in the context of developing a list of emissions, discharges and leaks setting up a register of pollution sources is proposed. This will include: a) registration of installations, activities and uses constituting sources of release for priority substances and specific pollutants in order to set up the relevant register, b) the description of the waste that is discharged regularly from specific sources accompanied by the chemical analysis of that waste, c) issuing circulars and other information actions for the staff of the competent departments for licensing and control d) updating the relevant licenses to various facilities. The register will include the list of emissions, discharges and leaks for all priority substances and pollutants set out in Appendix I to JMD 51354/2641/E103/2010 in accordance with the provisions of Article 5 of the JMD. The register records the potential sources of pollution and forms the basis for an action plan to reduce the above mentioned substances if the increased concentrations of certain substances are due to anthropogenic causes or natural processes it should be investigated in the context of that measure. In addition, the register will assist the licensing authorities with locating all the bound plants and to proceed with the modification of the environmental licenses, where necessary and other relevant requirements deriving from the legislation.	**OM13**
39	**RBD11_OM14_01**	**Reinforcement of synergies between the River Basin Management Plans and the Major Technological Accident Prevention Policy Plans provided for in the IPPC and SEVESO Directives** Setting out of a major technological accident prevention policy plan, including ways to protect water bodies from major spills and accidents, especially WBs included in the register of protected areas as well as ways of dealing with such incidents in order to protect the ecosystem (e.g. NATURA 2000 areas), and human health (systems used for or intended for human consumption). Especially for high risk establishments, according to SEVESO, the internal emergency plans should include at least the following: • the WBs in the affected area, which should be visible as points of interest in defining protection areas (and in the relevant maps) • the specification of an early warning system (mobilization in the	**OM14**

No	Measure Code	Measure Title/ Description	Category
		event of a serious incident) for the responsible water authorities of the Decentralized Administrations and the Regions for the management and protection of the corresponding WBs. Similar changes may be required in the external emergency plans setting out the measures to be taken outside of the establishment in which dangerous substances are produced, used, handled or stored. The external emergency plans implementing the major technological accident prevention policy of the General Plan of Civil Protection Agency, are reviewed, tested, and where necessary updated every three years and in any case whenever there is a significant change in the operation of the establishment or as required by the instructions of the General Secretariat for Civil Protection. Responsible for the preparation of the external emergency plans are the Directorates of Civil Protection of the Decentralized Administration that produce a plan for each Decentralized Administration area which is subsequently elaborated on a regional level within the administrative boundaries of each regional unit. In this context the relevant Water Directorate should send the approved River Basin Management Plan to: (a) the competent authority for environmental licensing of SEVESO establishments in order to initiate the process for updating these licenses according to the existing legislative framework and (b) to the competent Directorates and Offices of Civil Protection of the Decentralized Administration to deal with any necessary amendments to the external emergency plans.	
40	**RBD11_OM14_02**	**Design and implementation of a central warning and management system against pollution from accidents / natural events** The measure includes strengthening of the activities of information, warning, control and rehabilitation, which will allow the correct procedures and actions to be taken in case of failure of projects such as urban wastewater treatment plants, industrial wastewater treatment plants, landfills, highways, etc. For better monitoring, control and management of water pollution incidents caused by accidents, it is proposed to establish a centralized control system at River Basin District level under the responsibility of the respective Water Directorate in collaboration with the regional unit of Civil Protection, where the operators of projects will refer to. Priority areas are zones of abstraction of drinking water, zones of economic interest (e.g. fish farms), bathing waters areas and protected areas.	**OM14**

Proposed Supplementary Measures for Eastern Macedonia RBD are presented in the table below:

Table 22: Supplementary measures of Eastern Macedonia RBD

No	Measure code	Measure Title/ Description	Category
1	**RBD11_SM04_01**	**Negotiated Environmental Agreements related to good water management between the public and private individuals who are large consumers of water** The objective of this measure is to contribute towards the rational and sustainable water management and to reduce the pressures on water bodies due to anthropogenic activities. The logic underlying the conclusion of negotiated agreements, is characterized mainly by the "option", i.e., agreements to be concluded within the scope of this measure will not be accompanied by legal obligations nor sanctions for non-implementation of these by the participants, since they are aiming at a successful 'voluntary' implementation of the objectives. Their conclusion will be an environmental policy tool that for	**SM04**

No	Measure code	Measure Title/ Description	Category
		its implementation will require continuous cooperation and participation by the parties. As large consumers in the first phase can be considered Municipal Enterprises for Water Supply and Sewerage and collective irrigation networks that consume quantities of groundwater> 300.000m^3 / year pumped out from GWBs who are in poor qualitative or quantitative status	
2	**RBD11_SM05_01**	**Preliminary designation of sinkhole protection zones** Designation of protection zones around existing active or inactive sinkholes where any polluting activity will be banned and especially any activity of direct disposal of liquid waste into the sinkholes. Sinkholes drain closed basins and measures must be taken to protect and improve the quality of the water they drain, such as: 1. Incentives to farmers make the transition from conventional to organic agriculture, 2. Incentives for tertiary treatment of wastewater 3. Strict inspections to existing facilities for compliance with their environmental permits. The measure concerns the GWB Menikio - Falakro (GR110V030) and GWB Nevrokopi (GR1100120).	**SM05**
3	**RBD11_SM05_02**	**Special Protection Measures in GWB areas with thermo-metallic and medicinal mineral waters** The special protection measures are combined and adapted to the existing statutory protection framework. At first the prohibitions of the protection controlled zone II of groundwater abstraction points are applied. The installation of new activities may be permitted in certain positions after submitting hydrogeological study or report depending on the size and category of activity and a favourable opinion of the competent Water Directorate. GWBs, where such waters are identified, are: Serres (GR1100010), Aggistro (GR110V020), Vrontou (GR110V110) and Symvola - Kavala (GR1100130)	**SM05**
4	**RBD11_SM05_03**	**Annual review of quality Status of licensed water abstraction works in GWBs with high natural background** The annual review of the quality status of GWBs exhibiting elevated concentrations of certain elements (e.g. chlorides, sulphates anions) which are attributable to natural background. The annual review of the quality status of groundwater is to check the possible extension of the zone characterized by poor quality due to natural background levels and the potential increase or decrease of the concentration of the element that causes it. The Water Directorate, through the evaluation of the data resulting from the annual quality reviews, will be able to take the necessary measures according to the possible deterioration or improvement of the situation. The GWB exhibiting elevated concentrations of these elements due to natural background is the GWB of Serres (GR1100010)	**SM05**
5	**RBD11_SM05_04**	**Investigative monitoring program of the quality of GWBs and surface WBs in the area of existing landfills** It is proposed to investigate the qualitative status of surface and groundwater in the perimeter of the area of the existing landfills. With this measure the Water Directorate will be able to complement the existing, under the law, monitoring network with additional monitoring points to avoid pollution. The measure concerns the GWB of Serres - GR1100010 (landfill of Serres) and the SWBs GR1106R0002100239H and GR1106R0002100240N.	**SM05**

No	Measure code	Measure Title/ Description	Category
6	RBD11_SM07_01	**Package of measures for protection of Lake Kerkini** It is suggested the adoption of a package of measures including the restoration of the riparian forest and reeds, management of the lake water level, elaboration of a study on diverting amounts of water to the old bed of the Strymonas in the north-eastern end of the lake, actions through transnational cooperation with Bulgaria for the construction of suitable sediment retention works to reverse the rate of sedimentation of the lake with debris, elaboration of a study for building islands in the lake in order to function as places of foraging and nesting birds and finally elaboration of a study for the construction of a small reservoir in the area of old Lake of Achinos, of a surface of 1.500 ha, to mitigate the impact of floods in the area of Lake Kerkini. Bathymetric surveying of the lake is also required.	SM07
7	RBD11_SM07_02	**Incentives for permanent fallow around the Kerkini Lake** Feasibility study on incentives for permanent fallow around the Kerkini Lake	SM07
8	RBD11_SM08_01	**Designation and delineation of areas of GWBs exhibiting local seawater intrusion or with poor qualitative status due to seawater intrusion** In coastal GWBs that are in poor qualitative status due to seawater intrusion or are exhibiting local seawater intrusion, specific hydrogeological studies should be compiled in order to delineate the precise boundaries of the salinity zones. In these areas, measures concerning banning of new groundwater abstractions and/or reducing the existing abstraction volumes should be taken gradually, with priority to find alternative water resources in order to satisfy actual irrigation needs. The specifications for the aforementioned hydrogeological studies will be determined by the competent authorities under the coordination of Special Secretariat for Water. Coastal GWBs exhibiting seawater intrusion are: Serres (GR1100140), Eleftheres - Nea Peramos (GR1100140) and Ofrynio (GR1100150).	SM08
9	RBD11_SM08_02	**Designation of preliminary restriction zones for the drilling of new boreholes for new water uses as well as the extension of permits for existing uses in coastal groundwater bodies with seawater intrusion.** In coastal GWBs that are in poor qualitative status due to sea water intrusion or are exhibiting local sea water intrusion, due to human pressures (over-pumping) restrictive measures are taken regarding the construction of new water abstraction works (boreholes, wells) and the extension of permits for existing uses. Until the exact delineation of the restriction zones, based on specific hydrogeological studies that should be drawn up, drilling of new wells for new water uses and extensions of existing use is prohibited in the following coastal zones: - For karst systems: 300m, - For granular free piezometric surface: 200m - For granular under pressure : 100m In special cases (e.g. drinking water supply, aquaculture and desalination etc) permission for drilling a new borehole may be given, after submitting hydrogeological study or report and a favourable opinion from the Water Directorate. This study will concern the whole groundwater system and not specifically the exact location of the new water resources development project. These restrictions intend to limit the expansion of seawater intrusion in coastal GWBs. In the cases of coastal karst GWBs with extensive natural salination, through regulatory decisions, the restriction zones may be extended further, under the responsibility of Water Directorates. The zones with	SM08

No	Measure code	Measure Title/ Description	Category
		restrictions or prohibitions of new water resources development projects, will be defined by a specific hydrogeological study. The ban excludes special circumstances relating to drinking water supply and other special occasions such as aquaculture drilling, wells for desalination plants etc. In such cases, authorization is upon substantiated hydrogeological study which will be examined and approved by the relevant Water Directorate. The specifications for the aforementioned hydrogeological studies will be determined by the responsible authorities under the coordination of Special Secretariat for Water. The GWBs exhibiting salination are the following: Serres (GR1100010), Eleftheres - Nea Peramos (GR1100140) and Ofrynio (GR1100150)	
10	**RBD11_SM14_01**	**Application of Artificial Recharge GWB Ofrynio - GR1100150** This measure includes the updating of an existing study and implementation of artificial recharge to the GWB of Ofrynio to limit the salination front of the coastal zone. The proposed method for the implementation of the artificial recharge is reactivating dormant beds and flooded basins with water that comes from Strymonas.	**SM14**
11	**RBD11_SM15_01**	**Implement of a training program of the rural population** This measure includes educational actions and activities of the rural population. The main objectives of these educational actions and activities concern the maintenance and improvement of production with the appropriate use of agrochemicals in order to maximize the protection of wetlands. The proposed actions include the identification of the interested groups and stakeholders, analysis of key features, as well as the planning of the appropriate communication strategy, media, key tools and messages. In the framework of this measure, an organization of educational workshops and seminars on the use of agrochemical products, on the modern cultivation techniques and on the environmental and agricultural soil protection issues, should be implemented	**SM15**
12	**RBD11_SM16_01**	**Investigation of appropriate measures to combat the salty wedge intrusion phenomenon at the estuaries of Strymonas** The measure refers to the elaboration of a study to determine the length of the river that is affected by the salt wedge. It involves the installation of local monitoring stations measuring physicochemical parameters for determining the physical border of the transitional water body and subsequently proposing measures to limit the intrusion of salty wedge upstream during the summer season	**SM16**
13	**RBD11_SM16_02**	**Study on sediment yield management of Strymonas** The aim of the study is both flood protection and prevention of the sedimentation of Lake Kerkini and of the reduction of its water storage capacity	**SM16**
14	**RBD11_SM16_03**	**Hydrogeological study for the regulation of karst springs around the plain of Drama and study for the construction of the Platanovrisi tunnel** Elaboration of hydrogeological feasibility study on the regulation of the diet of karst aquifers that are discharged to springs in the periphery of the lowland part of Drama (springs of Maara, Mylopotamos, Galazia Nera, Voirani and other smaller). The results of the study will be the basis for determining the necessary quantity of water that may be required to be transferred from the Platanovrisi reservoir to the Aggitis basin to irrigate the plain of Drama – Tenagi Philippi, through the Platanovrisi tunnel. The study of the tunnel will be updated based on the findings of this hydrogeological study	**SM16**

No	Measure code	Measure Title/ Description	Category
15	RBD11_SM16_04	**Hydrogeological study investigating alternative measures to tackle the quantitative degradation of the GWB of Nea Peramos (GR1100140).** This measure includes the elaboration of a hydrogeological study to investigate the possibility of the replacement of existing abstraction works (irrigation drillings) of the GWB of Nea Peramos (GR1100140) by other abstraction sources as an alternative measure of tackling its quantitative degradation.	SM16
16	RBD11_SM16_05	**Special study to investigate environmental quality standards exceedances of certain specific pollutants and priority substances** Investigation of environmental quality standards exceedances of certain specific pollutants and priority substances in the frameworks of a specific study, which will investigate the sources of the pollution and will correlate these substances with specific emission sources and activities.	SM16
17	RBD11_SM16_06	**Investigation of suitable sites for the construction of artificial wetlands** At the exit HMWBs and AWBs which operate as receivers of drainage networks (Mpelitsa trench and sections of watercourses of Flamouri, Kleftolakkos, Eziovis and Philippi trench) it is proposed to study the possibility for the construction of wetlands for the retention and physical removal of pollutant loads. This measure may, in the long term until 2027, allow the improvement of the ecological potential of these water bodies by improving the biological and physico-chemical quality of the aquatic environment.	SM16
18	RBD11_SM18_01	**Reforming of cost accounting systems of water services** Formulation and application of a uniform method of calculating and recording the cost of water supply from the water services, in order to enhance the reliability of its assessment. Based on the available data, it is concluded that (a) the way of reporting and recording of expenditure categories shows great heterogeneity and (b) there is no systematic registration of costs and revenues per water service (water supply and discharge with / without WWTP). Finally, the environmental costs and resource costs should be taken into account, using appropriate methodologies. A prerequisite for this is the computerization of water services. The formulation and application of a uniform method of recording concerns also the cost of water for irrigation whereas this assessment must also take into account, the environmental and resource costs using appropriate methodologies - even for those served by private pumping. A prerequisite for this is the computerization of water services	SM18
19	RBD11_SM18_02	**Annual disclosure of the total cost of water supply and the degree of cost recovery** Annual disclosure of the total cost of water supply and the degree of cost recovery, with the aim of raising public awareness. The disclosure shall be made in a non-technical text and it should be comparative	SM18
20	RBD11_SM18_03	**Rational management of waste water from agglomerations with a peak population <2000 p.e. serviced by sewerage** Implementation of guidelines of the Special Secretariat for Water on proper waste water management practices for agglomerations <2,000 p.e. Indicatively but not restrictively the following settlements are mentioned: Kala Thenthra, Kato Kamila and Provatas in the Municipality of Serres, Proti in the Municipality of Amphipolis, Mavrothalassa in the Municipality of Visaltia, Pentapolis in the municipality Em.Pappa. Furthermore, the drafting of a Guidance Document on good practices for small-scale wastewater treatment projects by Special Secretariat for Water and will be followed by the Municipalities, is proposed	SM18

For the **proposed supplementary measures** a **Cost Effectiveness Analysis (CEA)** was carried out.

The CEA is used for assessing the cost-effectiveness of potential measures for achieving the environmental objectives set out in the Directive, and in particular for making judgments about the most cost effective program of measures and assessing the cost-effectiveness of alternative measures.

The analysis included the following parameters: 1. degree of effect, 2. number of relevant Water Bodies, 3. period of implementation, 4. period of efficiency, 5. social impact, 6. economic impact, 7. environmental impact. For these parameters an appropriate rating is used and the rate of effectiveness was estimated. By taking into account the discounted cost of the measures, a **factor of economic efficiency** was calculated. In this way the group of the most effective measures was identified.

It is worth to mentioning that the RBMP plan has two key issues (restrictions) to address:

- the limited remaining time period until the year 2015 and
- the limited financial capacity of the country at least until the year 2015.

So there was an emphasis on selecting complementary measures with low cost (high coefficient of efficiency) and immediate implementation (by 2015).

For the current river basin management cycle (until 2015), it is estimated that 15 of 20 supplementary measures can be implemented, which have zero or low cost of implementation or have already been included in co-financed programmes.

The remaining 5 supplementary measures it is expected to be implemented in the coming river basin management cycles (2016-2021 and 2021-2027). These measures refer to projects that either require preparatory actions and/ or construction works and/ or measures of high cost, which exceed the financial capacity for the current river basin management cycle.

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