



MANAGEMENT PLAN

of the River Basins
of Western Macedonia River Basin District

Summary

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**SPECIAL
SECRETARIAT
FOR WATER**

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**MINISTRY OF ENVIRONMENT, ENERGY AND CLIMATE CHANGE
SPECIAL SECRETARIAT FOR WATER**

PROJECT: DEVELOPMENT OF THE RIVER BASIN MANAGEMENT PLANS OF THE RIVER BASINS OF WEST MACEDONIA AND CENTRAL MACEDONIA RIVER BASIN DISTRICTS ACCORDING TO THE SPECIFICATIONS OF THE WFD 2000/60/EC, APPLYING THE GREEK LAW 3199/2003 AND THE GREEK PD 51/2007

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DEVELOPMENT OF THE RIVER BASIN MANAGEMENT PLAN OF THE RIVER BASINS OF WEST MACEDONIA RIVER BASIN DISTRICT (GR09)

SUMMARY

G.G. of Management Plan's Approval: G.G. B' 181/31.1.2014

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1. INTRODUCTION

The “Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy”(EU Water Framework Directive or WFD) sets a framework for comprehensive management of water resources in the European Community, within a common approach and with common objectives, principles and basic measures

The EU Water Framework Directive 2000/60/EC provides the major driver for achieving sustainable management of water throughout Europe, for many years to come.

The purpose of the EU Water Framework Directive is to establish a framework for the protection of inland surface waters (rivers and lakes), transitional waters (estuaries), coastal waters and groundwater. The fundamental objective of the Water Framework Directive is to prevent any deterioration in water quality and to achieve at least 'good status' for all waters by 2015.

The EU Water Framework Directive 2000/60/EC has been harmonized with the Greek legislation with Law 3199/2003 (Government Gazette A 280) and Presidential Decree 51/2007 (Government Gazette A '54). Under these provisions the basic concepts of the Water Framework Directive are incorporated to the National Legislation and at the same time a new administrative structure is formed and the responsibilities of the Management Bodies are defined nationally and regionally.

Priority and necessary step for the implementation of the Directive in the country is the preparation of the River Basin Management Plans of the 14 River Basins in the country, as established by the Decision of the National Water Commission of 16.07.2010¹. The River Basin Management Plans of the country are prepared under the auspices of the competent authorities for every River Basin. Based on the requests of the General Secretaries of the Regions of Western and Central Macedonia the Special Secretariat of Water of the Ministry of Environment, Energy and Climate Change undertook the preparation of the Water Management Plans of the River Basins of the River Basin Areas of West Macedonia (GR09) and Central Macedonia (GR10). In accordance to the law 4117/2013, which amended the law 3199/2003 and Presidential Decree 51/2007, it is foreseen that in this case the River Basin Management Plans is approved by the National Water Commission, upon recommendation of the Special Secretariat of Water of the Ministry of Environment, Energy and Climate Change

The Special Secretariat of Water of the Ministry of Environment, Energy and Climate Change launched a public international tender in June 2011 to contract the study «Development of the River Basin Management Plans of the River Basins of the River Basin Areas of Western

¹ www.ypeka.gr/LinkClick.aspx?fileticket=GdFmmT1BtE4%3d&tabid=247

Macedonia and Central Macedonia according to the Specifications of the WFD 2000/60/EC, applying the Greek Law 3199/2003 and the Greek PD 51/2007». Following the tender, the study was contracted on 27.04.2012, by the Special Secretariat of Water to the Consortium:

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2. RIVER BASIN MANAGEMENT PLAN OF THE RIVER BASIN DISTRICT

2.1 Contents of the Management Plan

The present document consists the summary of the River Basin Management Plan of Western Macedonia River Basin District (GR09) and the accompanying detailed documentation texts.

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

a/a	DOCUMENTATION TEXTS
1	RECORD OF THE COMPETENT AUTHORITIES AND DETERMINATION OF THEIR AREA OF RESPONSIBILITY
2	PROTECTED AREAS REGISTRY
3	ECONOMIC ANALYSIS OF THE WATER USES AND DETERMINATION OF THE CURRENT COST RECOVERY DEGREE FOR THE DIFFERENT WATER SERVICES
4	PRELIMINARY ASSESSMENT OF ALTERNATIVE PROPOSALS FOR FLEXIBLE WATER TARIFF POLICY AND COST RECOVERY MECHANISMS
5	IDENTIFICATION AND TYPOLOGY OF SURFACE WATER BODIES. INITIAL AND FURTHER CHARACTERISATION OF GROUNDWATER BODIES
6	TYPE-SPECIFIC REFERENCE CONDITIONS FOR THE TYPES OF SURFACE WATER BODIES
7	FINAL DESIGNATION OF HEAVILY MODIFIED AND ARTIFICIAL WATER BODIES
8	ANALYSIS OF THE ANTHROPOGENIC PRESSURES AND THEIR IMPACTS ON SURFACE AND GROUNDWATER BODIES
9	EVALUATION AND CLASSIFICATION OF THE QUALITATIVE STATUS (ECOLOGICAL AND CHEMICAL) OF SURFACE WATER BODIES
10	EVALUATION AND CLASSIFICATION OF THE QUALITATIVE AND QUANTITATIVE STATUS OF GROUNDWATER BODIES
11	DETERMINATION OF ENVIRONMENTAL OBJECTIVES INCLUDING "EXEMPTIONS" FROM OBJECTIVES ACHIEVEMENT
12	CATALOGUE OF SCHEDULED AND NEW PROJECTS/ ACTIVITIES/ ALTERNATIONS WITH THE SOCIO-ECONOMIC BENEFITS SERVED
13	PROGRAMME OF BASIC AND SUPPLEMENTARY MEASURES FOR THE PROTECTION AND RECOVERY OF WATER BODIES
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
15	UPDATED MONITORING PROGRAMMES OF THE QUALITATIVE AND QUANTITATIVE STATUS OF SURFACE AND GROUNDWATER BODIES
16	EVALUATION OF THE PROPOSED PROGRAMME OF MEASURES, INCLUDING COST EFFECTIVENESS ANALYSIS WITH RESPECT TO THEIR EFFICIENCY
17	SPECIAL MANAGEMENT PLAN FOR THE SUBBASIN OF PRESPIA IN THE RIVER BASIN OF PRESPIA (GR01) IN THE WATER DISTRICT OF WESTERN MACEDONIA (GR09)
18	DESIGN STUDY AND ORGANIZATION OF THE PUBLIC CONSULTATION PLAN AND RECORDING OF SOCIAL PARTNERS COMPOSED BY: <ul style="list-style-type: none"> • REPORT OF MEASURES • LIST OF MANAGEMENT BODIES ASSOCIATED WITH WATER • PUBLICATION AND INFORMATION CONTENT • QUESTIONNAIRES FOR SPECIFIC CONSULTATION ISSUES
19	REPORT WITH THE EVALUATION OF THE CONSULTATION RESULTS

2.2 Strategic Environmental Impact Assessment

In the context of the Strategic Environmental Assessment of the River Basin Management Plan of Western Macedonia River Basin District (GR09) a Strategic Environmental Impact Assessment

was prepared, in conformance with the Joint Ministerial Decision of the Special Environmental Agency of the Ministry of Environment, Energy and Climate Change under pr. No. 107017/28.8.2006 «environmental assessment of certain plans and programs, in compliance with the provisions of Directive 2001/42/EK» (Government Gazette B 1225/2006).

Taking into consideration the harmonization of the Management Plan with other National Plans and Programs and the conclusions of the Public Consultation Procedure, the Strategic Environmental Assessment Study of the River Basin Management Plan of Western Macedonia River Basin District (GR09) has been approved with the Ministerial Decision No. 172593/24.12.2013 under the conditions, restrictions and guidelines set out in this decision, which are to be observed at all stages of approval, specification and implementation of the Management Plan by the Planning Authority.

Evaluation and assessment of the impacts of the River Basin Management Plan on the examined environmental factors, concludes that no important negative impact is to be expected. On the contrary, in most cases, the recommended Program of Measures significantly improves -directly or indirectly and cooperatively- current state, due to the fact that its very aim is to achieve sustainability and to address any adverse conditions related to water resources management. Consequently, no alterations to the recommended Program are required towards environmental integration. Variations to specific points of the Preliminary Management Plan resulting during the process of Public Consultation are recorded in detail in the Joint Ministerial Decision of the Strategic Environmental Impact Assessment approval and have been taken into consideration in the final Management Plan.

2.3 Drought and Water scarcity Management Plan

Based on the principles of preventive planning, a Drought and Water Scarcity Management Plan (DWSMP) has been developed for the Western Macedonia River Basin Area (Water District GR09). This Plan evaluates the risks of water scarcity and droughts based on historic hydrological well as abstraction data and recommends early warning mechanisms along with adequate response measures to mitigate or eliminate the negative impacts of such phenomena.

The Drought and Water Scarcity Management Plan includes:

- Definitions and requirements set out in the WFD for water scarcity and drought the management.
- Recording of historical extreme drought events in Western Macedonia Water District (GR09).
- Determination of a water scarcity index based on the water balance variables.
- Evaluation of the risk of future water scarcity and drought events and possible impacts, based on vulnerability indicators, as a function of social, economic and environmental criteria.

- Evaluation of possible impacts of prolonged droughts on the achievement of the environmental objectives of Article 4 of the WFD.
- Determination of a drought index, as a criterion to identify the advent of scarcity and drought events as well as the gradation of this index's values to characterize these events.
- Determination of basic and supplementary measures essential for the prevention and response to the impacts from scarcity and drought.
- Identification and recommendation of alternative sources for various water uses and 'strategic water reserves', to be used in critical drought events.
- Recommendations on a flexible and effective early warning system for droughts, taking into account the drought index.

The implementation of the Plan is an additional safety measure in order to protect the Water Bodies and to cover vital needs in the event of drought.

3. CONSULTATION PROCESS

The public consultation processes have a key role during preparation, reading and revision of the river basin management plans.

The consultation period of the River Basin Management Plans, with a minimum required duration of 6 months, began on **June, 2012** and was completed in three phases:

Phase A', lasting until June 2013, addressing the following:

- Report on the consultation measures to be taken, including the Public Consultation Schedule
- Catalogue of stakeholders,

Phase B, from November 2012 until June 2013, addressing the following:

- Overview of the significant water management issues

Phase C' lasting from January 2013 to December 2013, with the following main objects:

- The Preliminary Management Plan for the River Basin of Western Macedonia
- The Strategic Environmental Impact Assessment

To enhance the participation of shareholders, Seminars / Thematic Meetings and Information Days were scheduled in central cities of the Water District.

On 13 December 2013, the Special Secretariat for Water announced the completion of the Public Consultation on the Preliminary Management Plan or the River Basins of Western Macedonia Water District.

4. WESTERN MACEDONIA RIVER BASIN DISTRICT

4.1 River Basins

The River Basin District of Western Macedonia according to Decision No. 706/16.7.2010 of the National Water Commission (Official Gazette B ' / 1383) includes two (2) River Basins:

- Prespes (GR01), with an area of 1.210 km²
- Aliakmonas (GR02), with an area of 12.410 km².

4.2 Administrative & natural characteristics

4.2.1 Administrative status

Water District GR09 is attached, for administrative purposes, to the Region of Western Macedonia of the Decentralized Authority\Water Directorate of Epirus - Western Macedonia (65,1%) and the Region of Central Macedonia of the Decentralized Authority\Water Directorate of Macedonia -Thrace (33,1%). Parts of the Water Basin District of low hydrological importance, belong to the Regional Units of Epirus (0,4%) and Thessalia (1,4%). The Water Basin District of Western Macedonia includes the Regional Unit of Florina, and almost the entire Regional Units of Kastoria, Grevena, Kozani and Pieria, as well as significant parts of Imathia and Pella.

The permanent population of the River Basin District of Western Macedonia (GR09), based on the 2001 census amounted to 589.525 inhabitants and reached 574.911 inhabitants, in accordance to the 2011 census, indicating a total decrease of 2.5%.

4.2.2 Land Uses

The largest part of the River Basin District of Western Macedonia is covered with forest (56,37%) while agricultural land covers a significant part of the River Basin (39,95%). Artificial land accounts for 2,17% which is distributed among urban areas (1,09%), Industrial and Trade Zones (0,21%), Transport Networks (0,12%) and Mining and Mineral Sites (0,76%). Wetlands cover 0.53% of the total area and water surfaces 1.98%

4.2.3 Major water uses

Water uses are distinguished in water supply, irrigation, livestock, industry as well as Energy Minerals extraction and thermoelectric power plant cooling in the Water Basin District.

The total annual demand for all uses is about 1.191 hm³.

The dominant water use in the River Basin District of Western Macedonia is irrigation with a consumption of 937 hm³ (79%), followed by water supply, with 141 hm³ (12%). Livestock contributes to the total demand with a consumption of 9,3 hm³ (1%) and industry 8,5 hm³ (1%).

Finally 19,6 hm³ (2%) are used for energy minerals extractions and 75 hm³ (6%) are used for the cooling of thermoelectric power plants.

Total annual abstraction from surface water bodies is estimated at about 574 hm³ (~ 48% of total annual demand), out of which 357 hm³ (~ 30% of total water abstraction) are used to cover the need for irrigation (293,2 hm³) and water supply (63,4 hm³) of the neighboring Water District of Central Macedonia.

Water needs of approximately 616 hm³/έτος (~ 52%) are covered with abstractions from ground water bodies in the Water Basin District of Western Macedonia.

5. COMPETENT AUTHORITIES

According to Law 3199/2003 (Government Gazette A 280), for the Protection and Management of the Water Bodies, as amended and in force, the following competent authorities for the protection and management at national level are specified:

The National Water Commission has been designated as the high-level inter-ministerial body and is responsible for the management and protection of water bodies at national level.

The National Water Council, issues opinions to the National Water Commission on national water resources protection and management programs.

The Special Secretariat for Water, of the Ministry of Environment, Energy and Climate Change, has the authority to prepare national programs for the protection and management of water resources and to coordinate state services and bodies on any matter related to the protection and management of water bodies.

The competent authority at regional level for the Western Macedonia River Basin District is presented in the following table.

Table 2: Competent Authorities and areas of responsibility

River Basin District Code	River Basin District Name	Percentage of area in every Region	Competent Decentralized Authority\Water Directorate ² (Government Gazette 1383 B\2-9-2010 ³)	National Competent Authority
GR01	Prespa	Western Macedonia (98,08%) Central Macedonia (1,92%)	1. Epirus -Western Macedonia/ Western Macedonia	Ministry of Environment Energy and Climate Change/ Special Secretariat for Water
GR02	Aliakmonas	Western Macedonia (61,77%) Central Macedonia (36,26%) Thessalia (1,51%) Epirus (0,46%)	2. Epirus -Western Macedonia/ Western Macedonia 3. Macedonia-Thrace/Central Macedonia	

² The Government Gazette refers to Regions, the competences of which are carried out, in accordance with Article 280 of law 3258/2010, by the Decentralized Administrations, with the exception of the cauthorities vested by Article 186 of the Law relevant to the Regions.

³ As amended by Government Gazette B 1572/28.09.10..

6. IDENTIFICATION OF WATER BODIES

6.1 Surface water bodies

Surface water according to the WFD fall within one of the following categories: rivers, lakes, transitional waters or coastal waters. In the River Basin District of Western Macedonia surface water bodies of all categories are identified.

6.1.1 Rivers

In the River Basin District of Western Macedonia, one hundred and fifty (150) rivers are identified, falling under ten different types (NmL0, NgL0, NgL1, NmH0, NmH1, NmL1, NsH0, NsH1, NsL0, NsL1).

6.1.2 Lakes

In the River Basin District of Western Macedonia, fourteen (14) lakes are identified in total, lakes Mikri Prespa and Kastoria as B type, lake Megali Prespa and Vegoritida as C type, lake Zazari, Chimaditida and Petron as F type and the reservoirs Papadia, Pramoritza, Ilarionas, Polifitos, Asomata, Sfikia and Ag.Varvara as L-MX type (artificial lakes).

6.1.3 Transitional waters

Two (2) transitional water bodies are identified in the River Basin District of Western Macedonia, including: one lagoon, Kitros, as TW-1 type and Axios' Estuarine system, as TW-2 type (estuary or delta).

6.1.4 Coastal waters

In the River Basin District of Western Macedonia two (2) coastal water bodies were identified, necessarily belong to the single national coastal water body type.

The statistical characteristics of surface water bodies of RBD of Western Macedonia (09), as these were identified per category, are presented in the table here below.

Table 3: Statistical characteristics of surface water bodies of RBD of Western Macedonia

Type of WB	Number	Characteristic size	Minimum	Mean	Maximum	Total
Rivers	150	Length (km)	1,0	10,3	127,0	1.539,4
Lakes	14	Surface (km ²)	0,3	21,2	74,7	296,7
Transitional waters	2	Surface (km ²)	4,5	19,7	34,9	39,4
Coastal waters	2	Surface (km ²)	112,9	563,6	1014,2	1.127,1

6.2 Groundwater bodies

Fifty-five (55) GWBs are designated at the RBD of Western Macedonia (09), for twelve (12) of which, “further characterization” was carried out.

The spatial characteristics of the groundwater bodies identified in the RBD of Western Macedonia (09), are presented in the table below.

Table 4: Spatial characteristics of groundwater bodies of RBD of Western Macedonia

Type of WB	Number	Minimum area (km ²)	Average area (km ²)	Maximum area (km ²)	Total area (km ²)
GWBs	55	1,3	238,1	2810,1	13587,9

6.3 Heavily modified water bodies (HMWB) and Artificial water bodies (AWB)

Surface water bodies have been physically altered by human activity, and identified as artificial or heavily modified, under specific circumstances, in order to meet a variety of human needs and activities for sustainable development, such as flood protection, water storage for irrigation and drinking-water supply, navigation etc.

Thirty (30) heavily modified (22 rivers, 8 lakes) and ten (10) artificial water bodies (10 rivers) are identified out of a total of one hundred and sixty eight (168) surface water bodies in RBD of Western Macedonia (09).

The ecological potential for Heavily modified water bodies (HMWB) and Artificial water bodies (AWB) is yet to be determined, therefore, under this management period the environmental objective for HMWB and AWB is to achieve the 'good ecological status' that corresponds to the type of natural water body to which it most closely resembles.

6.4 Protected Areas

The register of protected areas of the River Basin District of Western Macedonia, specified under Article 6 of the Water Framework Directive, includes the following types of protected areas.

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

Nowadays in the Water Basin District of Western Macedonia six (6) surface water bodies intended for human consumption are identified, while in the future two (2) more are going to be used, along with nine (9) groundwater bodies. As a result, the register of protected areas includes five (5) river water bodies (Drosopigi, Asprorema, Palio Rema, Enipeas, Aliakmonas (Nestorio)), three (3) lake water bodies (reservoirs Papadia, Pramoritza, Ag Varvara), three (3) kastic systems (NE of mount Vermio, Central-Eastern Vermio, SE Vermio), five (5) karstic subsystems (Prespes-

Florina, Triklario-Kastoria, Aposkepou-Kefalari, NW Vermio and Litochoro) and a fractured system (Pieria).

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

In the RBD of Western Macedonia the quality of bathing waters is being monitored at 14 points which are grouped into 10 bathing water profiles. In the RBD one (1) area with Recreational waters was identified with 2 monitoring points.

6.4.3 Nutrient-sensitive areas

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

One (1) area, the plains of Thessaloniki-Pella-Imathia, is officially designated as vulnerable to nitrates from agricultural sources (as per Joint Ministerial Decision 16175/824, Government Gazette B' 530/28-4-2006) in the river basin district of Western Macedonia, as well as the groundwater body of Ptolemaida, GR0900060. Finally small regions of the southern part of the River Basin District belongs to the vulnerable zone of Thessaliko Pedio.

Areas designated as sensitive under Directive 91/271/EEC

In the RBD of Western Macedonia twenty three (23) surface water bodies are recorded as sensitive concerning urban waste-water treatment, being listed in the Joint Ministerial Decision 19661/1982/1999, as updated and supplemented by the Joint Ministerial Decision 48392/939/2002. Out of the total 23 surface water bodies, eighteen (18) belong to the river Lugkos, one (1) to the river Greveniotiko, (3) three to the river Soulou and one (1) to the lake Petron.

6.4.4 Areas designated for the protection of habitats or species

In the RBD of Western Macedonia thirty three (33) areas are designated for the protection of habitats or species directly depending on water, including relevant NATURA 2000 sites. These include eighteen (18) Sites of Community Importance (SCI), eleven (11) Special Protection Areas (SPA) and four (4) areas protected as both SCI and SPA.

6.4.5 Areas designated for the protection of economically significant aquatic species

In the RBD of Western Macedonia the following areas designated for the protection of economically significant aquatic species are identified: the protected area for fish life at transitional waters (subregion estuary system of Loudias-Aliakmonas), the region for the development of Aquaculture of Pieria in the coastal water body of Eso Thermaikos Gulf - Aliakmonas and the regions for the protection of Aquaculture of inland waters which include the river water bodies of Aliakmonas, Edeseos and Arapitsa.

7. ANALYSIS OF PRESSURES IN WATER BODIES

The evaluation of anthropogenic pressures and their impacts on the surface and ground water bodies is based on the listing of the total pressures and impacts (as a result of point and diffuse pollution sources, water abstractions, water flow regulations, morphological alterations to water bodies, etc.), in order to fully understand the most crucial management issues and mechanisms by which they influence every Water Basin.

Every such pressure is characterized as important for a certain Water Body as long as it is likely to impede achievement of the environmental quality objectives set under Article 4 of the WFD for the particular Water Body.

Urban wastewater

In the RBD of Western Macedonia exist three Priority A Agglomerations (Florina, Ptolemaida, Grevena), seven (7) agglomerations of Priority B (Veroia, Edessa, Kastoria, Katerini, Kozani, Naousa, Litochoro) , entirely served by WWTP, Twenty four (24) Priority C agglomerations are in operation out of which six are served by WWTP and for the rest of them projects are already selected for funding to assure adequate coverage.

More specifically in the RBD of Western Macedonia 19 WWTP are in operation, the largest of which is the one in Katerini that can serve up to 130.000 of the equivalent population while the rest serve agglomerations from 2.000 to 70.000 residents. Notably the WWTP in Litochoro is positioned in the limits of WD09 and the WD08 where the wastewater go after their treatment.

Industry

The industrial activity in the River Basin District of Western Macedonia is significant in many positions and as a result it is taken into account when estimating pressures and their impacts on water bodies. In the RBD of Western Macedonia 205 industrial and artisanal units have been identified. The nationwide importance of energy production in the River Basin District should be emphasized as it constitutes an energy hub of the country. In the region, six (6) thermal power stations are in operation along with the Hydro Generation Complex of Aliakmonas which consists of four (4) large hydroelectric Power Plants (Polifitos, Sfikia, Asomata and Ag. Varvara), and one pending activation (Ilarionas). Additionally operate four (4) more hydroelectric stations of the Public Power Corporation (Makrichori, Vermio, Agra, Edeseos) and many small hydroelectric power stations.. It is noted that hydroelectric projects are not a source of pollution and consequently are not the subject of this paragraph.

The quantification of pollution deriving from industrial activity is based on the type of the activity (and the pollution to be expected), the separation between IPPC (Integrated Pollution Prevention Control) or NON IPPC, the connection with the treatment plant for wastewater or industrial waste, as well as produced waste data where available. To evaluate the industrial pollution load, 160 artisanal and industrial units that produce wastewater with a significant pollutant load (before treatment), judging from the branch they belong according to the national statistical service of Greece, were taken into consideration. The rest either don't produce wastewater or the produced wastewater has an insignificant pollution load so the potential pollution is low. Out of the total of industrial units thirteen (13) are categorized as IPPC. Seven (7) fall under SEVESO Directive six (6) of which are Steam Electric stations. From the total IPPC units twelve (12) are positioned in the river basin of Aliakmonas including the thermoelectric stations Aminteo, Liptol, Kardia, Ptolemaida and Ag. Dimitrios while one (1) IPPC unit of the river basin Prespes regards the thermoelectric station of Melitis.

Livestock

The pig farms (55 units) of the RBD of Western Macedonia, fall within the point pollution sources, as the wastewater are not suitable for fertilization, therefore, disposal and dispersion on the fields is not an option.

On the contrary, effluents from the numerous poultry units (76 farms) and cattle farm units (378 farms) as well as other units and free animal breeding -other than pig farms- end up in the fields for soil improvement or further treatment, disposal and eventual use for various purposes.

Significant livestock activity is present in the River Basin of Aliakmonas that contribute over 80% of the total livestock organic load (BOD, nitrogen and phosphorus) produced in the RBD.

Landfill Sites – Uncontrolled Waste Dumping Sites

In the River Basin District (RBD) of Western Macedonia 5 Landfills (Kozani, Almopia, Edesa, Katerini, Litochoro) are in operation.

According to the reported data of the Ministry of Environment, Energy and Climate Change (March 2012), in the RBD of Western Macedonia, Uncontrolled Waste Dumping Sites have been restored.

Mines – Quarry

An important number of mines and quarries are operating in the RBD of Western Macedonia which fall under the following categories: Thirty-seven (37) quarries (inert materials and marbles), eleven (11) red clay exploitation sites, nine (9) quartz exploitation sites, sixteen (16) mixed mineral exploitation sites (sulfur, feldspar, magnesite, manganese). However, these do not present a significant pressure on the RBD waters.

An important number of mines and quarries are operating in the RBD of Western Macedonia which fall under the following categories: Thirty-seven (37) quarries (inert materials and marbles), thirty-eight (38) quarries of marble and decorative plates, five (5) red clay exploitation to be used in ceramics industry, twenty-five (25) sites of extraction and industrial mining one (1) Community enterprise for mineral processing and one (1) exploitation point of indigenous gas. However the abovementioned plants are not considered as a significant pressure for the RBD.

Aquaculture

In the coastal water bodies of the RBD of Western Macedonia 79 aquaculture facilities operate. Of these, 63 facilities produce bivalve molluscs (shellfish aquacultures LONG LINE) and are located in depths of 10÷25 m within 0.25÷1.5 km from the coast within the coastal water bodies Esso Thermaikos-Aliakmonas.

The rest fourteen units (15) are of inland waters. They cultivate trout, carp and eel and are located mainly in the river water bodies of Aliakmonas, Arapitsa and Edeseos.

Agriculture

In the RBD of Western Macedonia the cultivated land sums up to 40% of the total area. Pollutants flowing into water bodies amount to 12,2 thousand tons of nitrogen per year, and to 361 tons of phosphorus per year. The loads leaching annually towards the groundwater bodies amount at approximately 2,1 thousand tons of nitrogen and 3,6 tons of phosphorus.

In order to co-evaluate the individual pollution sources and quantify the total impacts on surface waters, magnitude of significant pollution pressure criteria have been determined. Taking into account magnitude of total pressure in each surface water body sub-basin, the RBD water bodies have been classified according to the assessment of the likelihood to fail to meet the environmental quality objectives set for each particular body.

Pressures due to water abstractions, hydromorphological alterations and other pressures (sand extraction, forest fires, etc) were examined separately. Pressure of water abstractions was assessed based on a comparison against the available total surface hydrologic potential, while assessment of other pressures' effect was qualitative.

The main reason for not achieving the environmental objectives of the WFD seems to be, in most cases, intensive agriculture. Nutrient accumulation results in surface water eutrophication and deoxygenation phenomena. At the same time, intense industrial and artisanal activity that has been recorded in the RBD may result with pollution of the recipient water body with priority substances, which have a negative impact on the chemical status, and special pollutants, which affect the ecological status.

Pressures on groundwater bodies affect their natural function, which, according to the Directive 2000/60/EC can be described and determined through their quantitative and chemical status. In GWB of Western Macedonia where intense pressures due to agriculture occur, groundwater level lowering is a common phenomenon. However, human activity is concentrated mainly on granular aquifers that include impermeable horizons, which act as filters retaining pollutants and also as dry barriers preventing pollutants' transfer to deeper aquifers. Therefore a very small fraction of pollutants produced by human activities end up and affect the chemical status of the GWB of the RBD.

Pressures on groundwater bodies affect their natural function, which, according to the Directive 2000/60/EC can be described and determined through their quantitative and chemical status. In GWB of Western Macedonia where intense pressures due to agriculture occur along with lignit extraction, groundwater level lowering is a common phenomenon. However, the total pollution load that concentrates in groundwater bodies is limited as human activity is concentrated mainly on granular aquifers that include impermeable horizons, which act as filters retaining pollutants and also as dry barriers preventing pollutants' transfer to deeper aquifers.

8. STATUS OF WATER BODIES

8.1 Assessment and classification of status of surface water bodies

The quality of surface waters is defined by its ecological and 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

According to the WFD ecological status mainly concerns biological parameters, depending on the category of the water body, and secondly general physico-chemical conditions or other parameters (specific pollutants).

Out of a total of one hundred sixty eight (168) surface Water Bodies in the RBD of Western Macedonia sixty nine (69) are not achieving “good” status at the present. More specifically:

- The ecological status of forty nine (49) rivers, with total length 554.7 km, which corresponds to 37% of total length of all rivers of the RBD, is classified as “good ecological status”, while the ecological status of fifty nine (59) rivers, with a total length 614 km, which corresponds to 40% of the total length of all rivers is classified in classes lower than good. Due to lack of data, ecological status of forty two (42) rivers was not determined.
- The ecological status of seven (7) lakes, with a total surface 250 km², which corresponds to 84% of the total surface of all lakes of the RBD, is classified lower than “good”, while due to lack of data, ecological status of seven (7) lakes was not determined.
- The ecological status of two (2) transitional water body, with a total surface 39.4 km², which corresponds to 100% of the total surface of all transitional waters of the RBD, is classified under classes inferior to “good”.
- The ecological status of one (1) coastal water body, with a total surface of 1.014 km², corresponding to 90% of the total surface of coastal waters of the RBD is classified as “good”, while one (1) coastal water body, with a total surface of 113 km², corresponding to 10% of the total surface of the RBD coastal waters is classified as “bad”.

8.1.2 Surface water bodies chemical status

The criterion of classification of the chemical status of surface water bodies -in a two-class scale- is compliance with the limit values of quality objectives of certain hazardous substances in the aquatic environment. It is classified as:

- **“Good”**, when all parameters meet the Environmental Quality Standards set out in the 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 the Common Ministerial Decree 51354/2641/E103/2010, Annex 1, Part A.

The surface water bodies in the RBD of Western Macedonia with “good” chemical status are fifty (50) and the ones “failing to achieve good” chemical status twenty one (21), while ninety seven (97) are characterized as “unknown”, due to the lack of priority substances monitoring data. Specifically:

- The chemical status of fifty (50) rivers, with a total length 679.5 km, which corresponds to 44% of the total length of all rivers in the RBD, are classified at “good” chemical status. The chemical status of seventeen (17) rivers, with a total length 162.2 km, which corresponds to 11% of the total length of all rivers in the RBD, is classified as “failing to achieve good” chemical status. Due to lack of data, chemical status of eighty-three (83) rivers is not classified.
- The chemical status of four (4) lakes, with a total surface of 122.7 km², which corresponds to 41% of total surface of all lakes of the RBD, is classified as “failing to achieve good” chemical status, while due to the lack of data, chemical status of ten (10) lakes was not determined.
- Due to lack of data, the chemical status of transitional and coastal water bodies was not determined.

The classification of ecological, chemical and total status for each surface water body is presented in the table below.

Table 5: Classification of surface water bodies status of the RBD of Western Macedonia

WB category	WB code	WB name	Ecological Potential	Chemical Status	Total status
RW	Paliorema (Ag. Germanos)	GR0901R000001018N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Ag. Germanos	GR0901R000001019N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Kaloneri	GR0901R000001020N	UNKNOWN	GOOD	UNKNOWN
RW	Sirakio	GR0901R000002021N	UNKNOWN	GOOD	UNKNOWN
RW	Ligkos	GR0901R0F0201001N	POOR	UNKNOWN	POOR
RW	Kalinikiotiko	GR0901R0F0202002N	POOR	UNKNOWN	POOR
RW	Kalinikiotiko	GR0901R0F0202003N	POOR	UNKNOWN	POOR
RW	Kalinikiotiko	GR0901R0F0202004N	POOR	UNKNOWN	POOR
RW	Ligkos	GR0901R0F0203005N	POOR	UNKNOWN	POOR
RW	Paleo	GR0901R0F0204006N	POOR	FAILING TO ACHIEVE GOOD	POOR
RW	Paleo	GR0901R0F0204007N	POOR	UNKNOWN	POOR
RW	Ligkos	GR0901R0F0205008N	POOR	FAILING TO ACHIEVE GOOD	POOR

WB category	WB code	WB name	Ecological Potential	Chemical Status	Total status
RW	Florina	GR0901R0F0206011N	POOR	UNKNOWN	POOR
RW	Florina	GR0901R0F0206109N	POOR	UNKNOWN	POOR
RW	Florina	GR0901R0F0206110H	POOR	UNKNOWN	POOR
RW	Florina	GR0901R0F0206111N	POOR	UNKNOWN	POOR
RW	Tropeouxos	GR0901R0F0206012N	POOR	UNKNOWN	POOR
RW	Tropeouxos	GR0901R0F0206013N	POOR	UNKNOWN	POOR
RW	Melpe	GR0901R0F0207014N	POOR	UNKNOWN	POOR
RW	Melpe	GR0901R0F0207015N	POOR	UNKNOWN	POOR
RW	Asprorema	GR0901R0F0208016N	POOR	UNKNOWN	POOR
RW	Drosopigiotiko	GR0901R0F0209017N	HIGH	GOOD	HIGH
RW	Koilada (Soulou)	GR0902R0000010122N	POOR	FAILING TO ACHIEVE GOOD	POOR
RW	Soulou (Mines)	GR0902R0000010123H	POOR	FAILING TO ACHIEVE GOOD	POOR
RW	Soulou (Sari Gkioli)	GR0902R0000010124A	POOR	FAILING TO ACHIEVE GOOD	POOR
RW	Dioriga Vegoritida-Petron	GR0902R0000010125A	UNKNOWN	UNKNOWN	UNKNOWN
RW	Amintas	GR0902R0000010126N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Dioriga Chimaditida	GR0902R0000010127H	UNKNOWN	UNKNOWN	UNKNOWN
RW	Dioriga Zazari-Chimaditida	GR0902R0000010128A	UNKNOWN	UNKNOWN	UNKNOWN
RW	Sklithro	GR0902R0000010129H	UNKNOWN	UNKNOWN	UNKNOWN
RW	Rema Korinos (Morphologically altered)	GR0902R0001000114H	UNKNOWN	UNKNOWN	UNKNOWN
RW	Stream Katerini	GR0902R0001000115N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Aliakmonass (Krasopouli-Delta)	GR0902R0002010003H	POOR	FAILING TO ACHIEVE GOOD	POOR
RW	Krioneri (Morphologically altered)	GR0902R0002020001H	UNKNOWN	UNKNOWN	UNKNOWN
RW	Kerasies	GR0902R0002020002N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Aliakmonas (T66-Krasopouli)	GR0902R0002030007H	POOR	FAILING TO ACHIEVE GOOD	POOR
RW	Aliakmonas (T66-Krasopouli)	GR0902R0002030008H	POOR	FAILING TO ACHIEVE GOOD	POOR
RW	Krasopouli (Morphologically altered)	GR0902R0002040004H	UNKNOWN	UNKNOWN	UNKNOWN
RW	Krasopouli (Morphologically altered)	GR0902R0002040005H	UNKNOWN	UNKNOWN	UNKNOWN
RW	Krasopouli	GR0902R0002040006N	UNKNOWN	UNKNOWN	UNKNOWN

WB category	WB code	WB name	Ecological Potential	Chemical Status	Total status
RW	Aliakmonas (to T66)	GR0902R0002050009H	POOR	UNKNOWN	POOR
RW	Aliakmonas (to T66)	GR0902R0002050010H	POOR	UNKNOWN	POOR
RW	T66	GR0902R0002060079A	BAD	FAILING TO ACHIEVE GOOD	BAD
RW	T66	GR0902R0002060081A	BAD	FAILING TO ACHIEVE GOOD	BAD
RW	T66	GR0902R0002060083A	BAD	FAILING TO ACHIEVE GOOD	BAD
RW	T66	GR0902R0002060086A	POOR	FAILING TO ACHIEVE GOOD	POOR
RW	T66	GR0902R0002060088A	POOR	FAILING TO ACHIEVE GOOD	POOR
RW	T66	GR0902R0002060095A	POOR	FAILING TO ACHIEVE GOOD	POOR
RW	T66	GR0902R0002060100A	UNKNOWN	UNKNOWN	UNKNOWN
RW	Tripotamos	GR0902R0002061080N	MODERATE	UNKNOWN	MODERATE
RW	Konticha	GR0902R0002062082N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Arapitsa	GR0902R0002063084N	POOR	UNKNOWN	POOR
RW	Arapitsa	GR0902R0002063085N	GOOD	GOOD	GOOD
RW	Lianorema	GR0902R0002064087N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Edeseos (Skidras part)	GR0902R0002065089H	POOR	UNKNOWN	POOR
RW	Edeseos	GR0902R0002065090N	POOR	UNKNOWN	POOR
RW	Edeseos (hydroelectric station part)	GR0902R0002065091H	UNKNOWN	UNKNOWN	UNKNOWN
RW	Edeseos (groundwater diversion)	GR0902R0002065092H	UNKNOWN	UNKNOWN	UNKNOWN
RW	Edeseos (diversion towards hydroelectric station)	GR0902R0002065093H	UNKNOWN	UNKNOWN	UNKNOWN
RW	Edeseos (Agra part)	GR0902R0002065094H	UNKNOWN	UNKNOWN	UNKNOWN
RW	Mavropotamos	GR0902R0002066096N	POOR	UNKNOWN	POOR
RW	Mavropotamos	GR0902R0002066097N	POOR	UNKNOWN	POOR
RW	Μεγάλο -Καραβίδα	GR0902R0002066098N	POOR	GOOD	POOR
RW	Aspropotamos	GR0902R0002066099N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Aliakmonas (Polifitos-Sfikia)	GR0902R0002070011H	UNKNOWN	UNKNOWN	UNKNOWN
RW	Skoularitikos Lakos	GR0902R0002080012N	GOOD	GOOD	GOOD
RW	Skoularitikos Lakos	GR0902R0002080013N	GOOD	GOOD	GOOD
RW	Aliakmonas	GR0902R0002090024N	MODERATE	UNKNOWN	MODERATE
RW	Ftelias	GR0902R0002100014N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Ftelias	GR0902R0002100015N	GOOD	GOOD	GOOD
RW	Aliakmonas	GR0902R0002110036N	MODERATE	UNKNOWN	MODERATE
RW	Ag. Markos	GR0902R0002120016N	GOOD	GOOD	GOOD

WB category	WB code	WB name	Ecological Potential	Chemical Status	Total status
RW	Aikaterinis Lakos	GR0902R0002120017N	GOOD	GOOD	GOOD
RW	Aliakmonas	GR0902R0002130038N	MODERATE	UNKNOWN	MODERATE
RW	Aliakmonas	GR0902R0002150040N	MODERATE	UNKNOWN	MODERATE
RW	Smiksi	GR0902R0002160018N	GOOD	GOOD	GOOD
RW	Aliakmonas	GR0902R0002170044N	MODERATE	UNKNOWN	MODERATE
RW	Vintza	GR0902R0002180019N	GOOD	GOOD	GOOD
RW	Aliakmonas	GR0902R0002190047N	GOOD	UNKNOWN	UNKNOWN
RW	Aliakmonas	GR0902R0002190048N	GOOD	UNKNOWN	UNKNOWN
RW	Akoniou Lakos	GR0902R0002200020N	GOOD	GOOD	GOOD
RW	Aliakmonas	GR0902R0002210054N	MODERATE	UNKNOWN	MODERATE
RW	Karavida	GR0902R0002220021N	GOOD	GOOD	GOOD
RW	Aliakmonas	GR0902R0002230056N	MODERATE	UNKNOWN	MODERATE
RW	Aliakmonas	GR0902R0002230057N	MODERATE	UNKNOWN	MODERATE
RW	Potamia	GR0902R0002240022N	GOOD	GOOD	GOOD
RW	Sioutsa	GR0902R0002240023N	GOOD	GOOD	GOOD
RW	Aliakmonas	GR0902R0002250059N	MODERATE	UNKNOWN	MODERATE
RW	Aliakmonas	GR0902R0002270063N	MODERATE	UNKNOWN	MODERATE
RW	Venetikos	GR0902R0002280025N	MODERATE	UNKNOWN	MODERATE
RW	Venetikos	GR0902R0002280029N	GOOD	GOOD	GOOD
RW	Venetikos	GR0902R0002280034N	GOOD	GOOD	GOOD
RW	Venetikos	GR0902R0002280035N	GOOD	GOOD	GOOD
RW	Koutsafira	GR0902R0002281026N	GOOD	GOOD	GOOD
RW	Sravopotamos	GR0902R0002281027N	GOOD	GOOD	GOOD
RW	Koutsafira	GR0902R0002281028N	GOOD	GOOD	GOOD
RW	Venetikos	GR0902R0002282030N	GOOD	GOOD	GOOD
RW	Venetikos	GR0902R0002282031N	GOOD	GOOD	GOOD
RW	Venetikos	GR0902R0002282032N	GOOD	GOOD	GOOD
RW	Aspropotamos	GR0902R0002282033N	GOOD	GOOD	GOOD
RW	Aliakmonas	GR0902R0002290067N	MODERATE	UNKNOWN	MODERATE
RW	Potamia	GR0902R0002300037N	MODERATE	UNKNOWN	MODERATE
RW	Aliakmonas	GR0902R0002310070N	MODERATE	GOOD	MODERATE
RW	Greveniotikos	GR0902R0002320039N	BAD	FAILING TO ACHIEVE GOOD	BAD
RW	Aliakmonas	GR0902R0002330074N	MODERATE	GOOD	MODERATE
RW	Ntroumpeta	GR0902R0002340041N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Lisasmenis r.	GR0902R0002340042N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Potamia	GR0902R0002341043N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Aliakmonas	GR0902R0002350077N	HIGH	GOOD	HIGH
RW	Aliakmonas	GR0902R0002350078N	HIGH	GOOD	HIGH
RW	Milopotamos	GR0902R0002360045N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Milopotamos	GR0902R0002360046N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Pramoritsa	GR0902R0002380049N	MODERATE	UNKNOWN	MODERATE

WB category	WB code	WB name	Ecological Potential	Chemical Status	Total status
RW	Pramoritsa	GR0902R0002380050N	GOOD	GOOD	GOOD
RW	Koutsomilia	GR0902R0002380051N	GOOD	GOOD	GOOD
RW	Koutsomilia	GR0902R0002380052N	GOOD	GOOD	GOOD
RW	Paliochori	GR0902R0002381053N	GOOD	GOOD	GOOD
RW	Mirichos	GR0902R0002400055N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Poros	GR0902R0002420058N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Gkiole	GR0902R0002440060N	BAD	FAILING TO ACHIEVE GOOD	BAD
RW	Gkiole	GR0902R0002440061N	BAD	FAILING TO ACHIEVE GOOD	BAD
RW	Ksiropotamos	GR0902R0002440062N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Velas	GR0902R0002460064N	GOOD	GOOD	GOOD
RW	Velas	GR0902R0002460065N	GOOD	GOOD	GOOD
RW	Velas	GR0902R0002460066N	GOOD	GOOD	GOOD
RW	Sravopotamos	GR0902R0002480068N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Sravopotamos	GR0902R0002480069N	GOOD	GOOD	GOOD
RW	Aliakmonas	GR0902R0002500071N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Aliakmonas	GR0902R0002500072N	GOOD	GOOD	GOOD
RW	Aliakmonas	GR0902R0002500073N	GOOD	GOOD	GOOD
RW	Vrochopotamos	GR0902R0002520075N	GOOD	GOOD	GOOD
RW	Vrochopotamos	GR0902R0002520076N	GOOD	GOOD	GOOD
RW	Chelopotamos	GR0902R0003000116H	UNKNOWN	UNKNOWN	UNKNOWN
RW	Ksirolaki	GR0902R0003000117N	GOOD	GOOD	GOOD
RW	Mavroneri (morphologically altered)	GR0902R0004010102H	POOR	UNKNOWN	POOR
RW	Mavroneri	GR0902R0004010103N	POOR	UNKNOWN	POOR
RW	Pelekas	GR0902R0004020104N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Pelekas	GR0902R0004020105N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Patsiaris	GR0902R0004021106N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Mavroneri	GR0902R0004030107N	UNKNOWN	UNKNOWN	UNKNOWN
RW	Pisteries	GR0902R0004040108N	GOOD	GOOD	GOOD
RW	Pisteries	GR0902R0004040109N	GOOD	GOOD	GOOD
RW	Mavroneri	GR0902R0004050110N	GOOD	UNKNOWN	UNKNOWN
RW	Petriotiko	GR0902R0004060111N	GOOD	GOOD	GOOD
RW	Mavroneri	GR0902R0004070112N	GOOD	GOOD	GOOD
RW	Mavroneri	GR0902R0004070113N	GOOD	GOOD	GOOD
RW	Rema Mana (morphologically altered)	GR0902R0005000118H	UNKNOWN	UNKNOWN	UNKNOWN
RW	Mavrologos	GR0902R0005000119N	GOOD	UNKNOWN	UNKNOWN
RW	Mavrologos	GR0902R0005000120N	GOOD	GOOD	GOOD
RW	Mavrologos	GR0902R0005000121N	GOOD	GOOD	GOOD

WB category	WB code	WB name	Ecological Potential	Chemical Status	Total status
LW	Polifitos	GR0902L000000009H	MODERATE	UNKNOWN	MODERATE
LW	Kastoria	GR0902L000000012H	POOR	FAILING TO ACHIEVE GOOD	POOR
LW	Chimaditida	GR0902L000000003N	BAD	UNKNOWN	BAD
LW	Zazari	GR0902L000000002N	BAD	UNKNOWN	BAD
LW	Vegoritida	GR0902L000000005N	POOR	UNKNOWN	POOR
LW	Megali Prespa	GR0901LFA0000014N	MODERATE	FAILING TO ACHIEVE GOOD	MODERATE
LW	Mikri Prespa	GR0901L0A0000013N	POOR	FAILING TO ACHIEVE GOOD	POOR
LW	Petron	GR0902L000000004N	UNKNOWN	FAILING TO ACHIEVE GOOD	UNKNOWN
LW	Tecniti Limni Papadia	GR0901L000000001H	UNKNOWN	UNKNOWN	UNKNOWN
LW	Ilarionas	GR0902L000000010H	UNKNOWN	UNKNOWN	UNKNOWN
LW	Asomata	GR0902L000000007H	UNKNOWN	UNKNOWN	UNKNOWN
LW	Varvara	GR0902L000000006H	UNKNOWN	UNKNOWN	UNKNOWN
LW	Sfikia	GR0902L000000008H	UNKNOWN	UNKNOWN	UNKNOWN
LW	Pramoritsa	GR0902L000000011H	UNKNOWN	UNKNOWN	UNKNOWN
TW	Ekvoliko Sistima Loudias-Aliakmonas	GR0902T000000001N	POOR	UNKNOWN	POOR
TW	Limnothalassa Kitrous	GR0902T000000002N	MODERATE	UNKNOWN	MODERATE
CW	Ekso Thermaikos Kolpos-Paralia Katerinis	GR0902C0001N	GOOD	UNKNOWN	UNKNOWN
CW	Eso Thermaikos Kolpos-Aliakmonas	GR0902C0002N	MODERATE	UNKNOWN	MODERATE

8.2 Assessment and classification of groundwater bodies status

The overall groundwater status is determined by its quantitative and its chemical status. “Good groundwater status” means that both its quantitative status and its chemical status are at least “good”.

8.2.1 Groundwater bodies quantitative status

The quantitative status of a ground water body is characterized as poor when either of the following occurs:

- over 20%, of the monitoring positions have shown interannual water lowering level
- annual water abstractions from ground water bodies is larger than the annual recharge, resulting with a continuous increase of the pumping depth.

The quantitative status of forty three (43) GWBs is classified as “good”. These GWBs cover a surface of 10,367.7 km² apx., corresponding to 76.3% of the total surface of GWBs of the RBD. The quantitative status of twelve (12) GWBs, with a total surface of 3.220,1 km², is classified as

“bad”. This corresponds to 23.7% of the total surface of the GWBs of the RBD of Western Macedonia.

8.2.2 Groundwater bodies quality (chemical) status

The evaluation of the chemical status of a ground water body is based on the criterion of 20% and more specifically on the rule: « if the percentage of hydropoints that exceed the maximum acceptable values is $\geq 20\%$, for the entire groundwater body, then the groundwater body has a poor chemical status». The chemical status of fifty two (52) GWBs is classified as “good”. The surface of these GWBs covers 426.7 km², apx., corresponding to 3.1% of the total surface of GWBs of the RBD, while the chemical status of three (3) GWBs, with a total surface 427 km², which corresponds to 3.1% of the total surface of GWBs of the RBD of Western Macedonia is classified as “bad”.

Quantitative and chemical status classification results are presented in the table here below, per GWB.

Table 6: Quantitative – qualitative (chemical) status for each GWB in RBD of Western Macedonia

No	GWB Code	Name	Chemical status	Quantitative status
1	GR09AF010	GR09AF011: Sub. Triklario Kastoria	GOOD	GOOD
		GR09AF012: Prespes Florina		
		GR09AF013: Prespes		
		GR09AF014: Sub. Chalaras Mavrokampou		
		GR09AF015: Sub. Aposkepo Kefalari		
2	GR0900020	GR0900021: Sub. Kastoria	GOOD	GOOD
		GR0900022: Sub. Mesopotamia Chiliodendro		
3	GR0900030	GR0900031: Sub. Grevena	GOOD	GOOD
		GR0900032: Sub. Kaloneri Kozani		
		GR0900033: Sub. Pilori Kozani		
		GR0900034: Sub. Agiou Georgiou		
		GR0900035: Sub. Kitis Venetikos		
4	GR090F040	Florina	GOOD	GOOD
5	GR0900050	Amunteo Florina	GOOD	POOR
6	GR0900060	GR0900061: Sub. Ptolemaida	BAD	POOR
		GR0900062: Sub. Notio Pedio		
		GR0900063: Sub. Kariochori Kleitos-Tetralofos		
7	GR0900070	GR0900071: Sub. SW Vermio-Askio Oros	GOOD	GOOD
		GR0900072: Sub. Vatero		
		GR0900073: Sub. Ksirolimni		

No	GWB Code	Name	Chemical status	Quantitative status
		GR0900074: Sub. Krokos		
		GR0900075: Sub. Lefkopigi		
		GR0900076: Sub. Argilos Protochori		
		GR0900077: Sub. Polifitos		
8	GR0900080	GR0900081: Sub. NW Vermio (p. Edeseos)	GOOD	POOR
		GR0900082: Sub. Arnisa Pella		
9	GR090F090	NE Vermio	GOOD	GOOD
10	GR0900100	Centrak Eastern Vermio (Naousa)	GOOD	GOOD
11	GR0900110	SE Vermio (Veria)	GOOD	GOOD
12	GR0900120	Almopeos	GOOD	POOR
13	GR0900130	Kato rou Aliakmonas	GOOD	POOR
14	GR0900140	GR0900141: granular Sub. Litochoro	GOOD	POOR
		GR0900142: carstic Sub. Litochoro		GOOD
15	GR0900150	Katerini	GOOD	POOR
16	GR0900160	Kolindro	GOOD	POOR
17	GR0900170	Dasochori Grevena	GOOD	GOOD
18	GR0900180	Trikokia Grevena	GOOD	GOOD
19	GR0900190	Palioura Grevena	GOOD	GOOD
20	GR0900200	Kiti p. Sioutsa	GOOD	GOOD
21	GR0900210	Aetia Grevena	GOOD	GOOD
22	GR0900220	Korisou Kastoria	GOOD	GOOD
23	GR0900230	Galatia-Emporio Kozani	GOOD	GOOD
24	GR0900240	Pieria	GOOD	GOOD
25	GR0900250	Naousa	GOOD	GOOD
26	GR0900260	Almopia	GOOD	GOOD
27	GR090F270	Aridea	GOOD	GOOD
28	GR0900280	Vourinos	GOOD	GOOD
29	GR090F290	Vora	GOOD	GOOD
30	GR090F300	Varnounta	GOOD	GOOD
31	GR0900310	Voria Pindou	GOOD	GOOD
32	GR090F320	Vevi-Flampouro	GOOD	GOOD
33	GR0900330	Nimfeo- Vlastis	GOOD	GOOD
34	GR0900340	Perdika-Filota	GOOD	POOR
35	GR090A350	Mesoelliniki Avlaka	GOOD	GOOD
36	GR0900360	Elati-Livadero	GOOD	GOOD

8.3 Heavily modified and Artificial water bodies status

The results of classification for each heavily modified and artificial water body are presented in the table below:

Table 7: Classification AWB status of RBD of Western Macedonia

Κατ. ΥΣ	Όνομα ΥΣ	Κωδικός ΥΣ	Οικολογικό Δυναμικό	Χημική κατάσταση	Συνολική κατάσταση
RW	Soulou (Sari Gkioli)	GR0902R0000010124A	POOR	FAILING TO ACHIEVE GOOD	POOR
RW	Dioriga Petron Vegoritida	GR0902R0000010125A	UKNOWN	UKNOWN	UKNOWN
RW	Dioriga Zazari - Chimaditida	GR0902R0000010128A	UKNOWN	UKNOWN	UKNOWN
RW	T66	GR0902R0002060079A	BAD	FAILING TO ACHIEVE GOOD	BAD
RW	T66	GR0902R0002060081A	BAD	FAILING TO ACHIEVE GOOD	BAD
RW	T66	GR0902R0002060083A	BAD	FAILING TO ACHIEVE GOOD	BAD
RW	T66	GR0902R0002060086A	POOR	FAILING TO ACHIEVE GOOD	POOR
RW	T66	GR0902R0002060088A	POOR	FAILING TO ACHIEVE GOOD	POOR
RW	T66	GR0902R0002060095A	POOR	FAILING TO ACHIEVE GOOD	POOR
RW	T66	GR0902R0002060100A	UKNOWN	UKNOWN	UKNOWN
RW	Soulou (Orichia)	GR0902R0000010123H	POOR	FAILING TO ACHIEVE GOOD	POOR
RW	Kanali Chimaditida	GR0902R0000010127H	UKNOWN	UKNOWN	UKNOWN
RW	Sklithro	GR0902R0000010129H	UKNOWN	UKNOWN	UKNOWN
RW	Rema Korinou (morphologically altered)	GR0902R0001000114H	UKNOWN	UKNOWN	UKNOWN
RW	Aliakmonas (Krasopouli-Delta)	GR0902R0002010003H	POOR	FAILING TO ACHIEVE GOOD	POOR
RW	Krioneri (morphologically altered)	GR0902R0002020001H	UKNOWN	UKNOWN	UKNOWN
RW	Aliakmonas (T66-Krasopouli)	GR0902R0002030007H	POOR	FAILING TO ACHIEVE GOOD	POOR
RW	Aliakmonas (T66-Krasopouli)	GR0902R0002030008H	POOR	FAILING TO ACHIEVE GOOD	POOR
RW	Krasopouli (morphologically altered)	GR0902R0002040004H	UKNOWN	UKNOWN	UKNOWN
RW	Krasopouli (morphologically altered)	GR0902R0002040005H	UKNOWN	UKNOWN	UKNOWN
RW	Aliakmonas (os T66)	GR0902R0002050009H	POOR	UKNOWN	POOR
RW	Aliakmonas (os T66)	GR0902R0002050010H	POOR	UKNOWN	POOR
RW	Edeseos (part Skidras)	GR0902R0002065089H	POOR	UKNOWN	POOR
RW	Edeseos (groundwater body part)	GR0902R0002065091H	UKNOWN	UKNOWN	UKNOWN

Κατ. ΥΣ	Όνομα ΥΣ	Κωδικός ΥΣ	Οικολογικό Δυναμικό	Χημική κατάσταση	Συνολική κατάσταση
RW	Edeseos (groundwater diversion)	GR0902R0002065092H	UNKNOWN	UNKNOWN	UNKNOWN
RW	Edeseos (diversion towards groundwater body)	GR0902R0002065093H	UNKNOWN	UNKNOWN	UNKNOWN
RW	Edeseos (Agra part)	GR0902R0002065094H	UNKNOWN	UNKNOWN	UNKNOWN
RW	Aliakmonas (Polifitou-Sfikia)	GR0902R0002070011H	UNKNOWN	UNKNOWN	UNKNOWN
RW	Chelopotamos	GR0902R0003000116H	UNKNOWN	UNKNOWN	UNKNOWN
RW	Mavroneri (morphologically altered)	GR0902R0004010102H	POOR	UNKNOWN	POOR
RW	Florina	GR0901R0F0206110H	POOR	UNKNOWN	POOR
RW	Rema Mana (morphologically altered)	GR0902R0005000118H	UNKNOWN	UNKNOWN	UNKNOWN
LW	Polifitos	GR0902L000000009H	MODERATE	UNKNOWN	MODERATE
LW	Kastoria	GR0902L000000012H	POOR	FAILING TO ACHIEVE GOOD	POOR
LW	Tecniti Limni Papadia	GR0901L000000001H	UNKNOWN	UNKNOWN	UNKNOWN
LW	Ilariona	GR0902L000000010H	UNKNOWN	UNKNOWN	UNKNOWN
LW	Asomata	GR0902L000000007H	UNKNOWN	UNKNOWN	UNKNOWN
LW	Varvara	GR0902L000000006H	UNKNOWN	UNKNOWN	UNKNOWN
LW	Sfikia	GR0902L000000008H	UNKNOWN	UNKNOWN	UNKNOWN
LW	Pramoritsa	GR0902L000000011H	UNKNOWN	UNKNOWN	UNKNOWN

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

The number and statistics of the total status of WBs are presented in the table below for all WB categories (rivers, lakes, transitional waters, coastal water, groundwater).

Table 8: Statistical data of WB status at the RBD of Western 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
Rivers	47	58	45	31,33	38,67	30,00	35,55	39,50	24,95
Lakes	-	7	7	0,00	50,00	50,00	0,00	85,41	14,59
Coastal Waters	-	1	1	0,00	50,00	50,00	0,00	10,02	89,98
Transitional Waters	-	2	-	0,00	100,00	0,00	0,00	100,00	0,00
Groundwaters	43	12	-	78,2	21,8	-	76,3	23,7	-

[*] “Less than good” corresponds to surface WBs status that may be “moderate”, “poor”, or “bad”, while “Poor” corresponds to GWBs classified at “poor” status.

8.5 Monitoring Program

8.5.1 Monitoring of surface waters

Officially established monitoring program for surface waters

The monitoring programme provided for in the Joint Ministerial Decision 140384/2011 includes a total of forty-five (45) monitoring sites of the surface waters of the River Basin District of Western Macedonia; twenty two (22) for surveillance and twenty three (23) for operational monitoring.

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 River Basin Management Plan, i.e. new water bodies along with 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 optimised both in terms of the monitoring sites selected, as well as the type of monitoring, the parameters and frequency of monitoring.

The revised monitoring program of the River Basin District of Western Macedonia includes fifty one (51) monitoring sites in total; twenty-five (25) for surveillance and twenty six (26) for operational monitoring.

8.5.2 Monitoring of groundwaters

Officially established monitoring program for groundwaters

The monitoring programme of the Joint Ministerial Decision 140384/2011 includes eighty-eight (88) sites for the GWBs of the RBD of Western Macedonia; forty-four (44) for surveillance and forty-four (44) for operational monitoring, for groundwaters.

Revised Monitoring program for groundwaters

The design of the revised Monitoring programme for groundwaters is prepared on the basis of the officially established monitoring programme as well as additional 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.

The revised monitoring programme of the RBD of Western Macedonia includes one hundred and twenty-two (122) monitoring sites in total; one hundred and four (104) for surveillance and eighteen (18) for operational monitoring.

9. ECONOMIC ANALYSIS OF WATER USES

Article 9 §1 of the Directive 2000/60/EC states that Member states “shall take account of the principle of recovery of the costs of water services, including environmental and resource costs, having regard to the economic analysis [...]”. For the estimation of cost recovery ratio, water services, users and polluters of the water resources in the respective water basins of the Water District were primarily defined. Based on that, the total cost of water services as well as the cost recovery ratio was calculated.

Firstly, 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), was estimated. Apart from that, the environmental cost was also calculated and was defined as the valuation in monetary units of the environmental impacts for water resources and related ecosystems, caused by various socio-economic activities.

Finally, the resource cost was also taken into consideration. Resource cost refers to the foregone benefits that are due either to the inefficient allocation of water resources or the excessive use of water resources, i.e. water withdrawals greater than the renewable water reserves. Consequently, the resource cost equals to the foregone benefits of the service that is deprived of the use of the particular natural resource, while under conditions of effective allocation this would have not have happened.

The general formula for calculating the cost recovery rate for water services used was: $CRR = \frac{TR - Subsidy}{TC}$, 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 analyzed and then the overall cost-recovery was estimated that took into consideration environmental and resource cost. 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, This is why the cost recovery ratio for the water use in industry was based on simplified assumptions.

The cost recovery for public water supply for household – business and industry was calculated as follows:

Water supply- wastewater services: Cost categories	Water District 09
Financial Cost (million €)	54,2
Environmental Cost(million €)	13,7
Resource Cost (million €)	0,9
Total Cost (million €)	69,0
Cost Recovery Ratio	62%

The cost recovery for agriculture was calculated as follows:

Organized Farming: Cost categories	Water District 09
Financial Cost (million €)	9,4
Environmental Cost(million €)	0,5
Resource Cost (million €)	1,3
Total Cost (million €)	11,2
Cost Recovery Ratio	56%

Evaluating if the pricing policy is sufficient to recover the full cost and the rational utilization of water resources seems not to be satisfactory in certain occasions. More specifically, water pricing under the current circumstances should follow the following principles:

- Hierarchy concerning cost recovery
- Water pricing should be based on increasing block rates
- Prices should reflect external costs
- Seasonal differentiation
- Full recovery of financial 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: Deadline extension
- Article 4.5: Less strict environmental objective
- Article 4.6: Temporary deterioration in status
- Article 4.7: New Modifications – Sustainable human development activities

From the total WBs identified in the RBD of Western Macedonia the list of exemptions from the achievement of environmental objectives include:

- Twenty three (23) surface WBs and eight (8) GWBs, according to Article 4.4 (deadline extension)
- three (3) surface WBs, according to Article 4.7 (new modifications- activities)

Following and applying the methodology set out for the documentation on the exemptions, the type and the exemption justification for each WB exempted under Article 4.4., are presented in the table below, as well as the year of achieving the objectives and the measures that should be implemented.

Table 9: Exemptions from the environmental objectives in the RBD of Western Macedonia (Article 4.4)

a/a	WB Name	WB Code	WB Category	Ecological Status (SWB) / Quantitative Status (GWB)	Chemical Status	Exemption justification	Supplementary Measures
Article 4, paragraph 4.4 Surface water bodies							
1	MIKRI PRESPA	GR0901LOA0000013N	Lake WB	Poor	Failing to achieve good	Natural Conditions	SM17-010, SM08-010, SM17-060, SM17-070, SM16-040, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
2	MEGALI PRESPA	GR0901LFA0000014N	Lake WB	Moderate	Failing to achieve good	Natural Conditions	SM17-010, SM16-040, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
3	VEGORITIDA	GR0902L000000005N	Lake WB	Poor	Unknown	Technically unfeasible	SM08-060, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
4	PETRON	GR0902L000000004N	Lake WB	Unknown	Failing to achieve good	Natural Conditions	SM17-050, SM08-060, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
5	KASTORIA	GR0902L000000012H	Lake WB	Poor	Failing to achieve good	Natural Conditions	SM17-020, SM07-010, SM16-040, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
6	EKBOLIKO SISTIMA LOUDIAS - ALIAKMONAS	GR0902T000000001N	Transitional WB	Poor	Unknown	Technically unfeasible	SM04-030, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
7	LIGKOS P.	GR0901R0F0205008N	River WB	Poor	Failing to achieve good	Technically unfeasible	SM04-030, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
8	PALEO R.	GR0901R0F0204006N	River WB	Poor	Failing to achieve good	Technically unfeasible	SM02-020, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
9	EDESSEOS (VODAS) P.	GR0902R0002065090N	River WB	Poor	Unknown	Technically unfeasible	SM04-020, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
10	EDESSEOS (VODAS) P. (TMIMA SKIDRAS)	GR0902R0002065089H	River WB	Poor	Unknown	Technically unfeasible	SM04-020, SM02-020, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
11	PERIFERIAKI	GR0902R0002060079A	River WB	Bad	Failing to	Technically	SM11-030, SM06-010, SM15-030,

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a/a	WB Name	WB Code	WB Category	Ecological Status (SWB) / Quantitative Status (GWB)	Chemical Status	Exemption justification	Supplementary Measures
	TAFROS (T66)				achieve good	unfeasible	SM15-010, SM03-010, SM16-050, SM15-020
12	PERIFERIAKI TAFROS (T66)	GR0902R0002060081A	River WB	Bad	Failing to achieve good	Technically unfeasible	SM11-030, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
13	PERIFERIAKI TAFROS (T66)	GR0902R0002060083A	River WB	Bad	Failing to achieve good	Technically unfeasible	SM11-030, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
14	PERIFERIAKI TAFROS (T66)	GR0902R0002060086A	River WB	Poor	Failing to achieve good	Technically unfeasible	SM11-030, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
15	PERIFERIAKI TAFROS (T66)	GR0902R0002060088A	River WB	Poor	Failing to achieve good	Technically unfeasible	SM11-030, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
16	ALIAKMON P. (T66 TO KRASOPOULI)	GR0902R0002030008H	River WB	Poor	Failing to achieve good	Technically unfeasible	SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
17	ALIAKMON P. (T66 TO KRASOPOULI)	GR0902R0002030007H	River WB	Poor	Failing to achieve good	Technically unfeasible	SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
18	ALIAKMON P. (T66 TO KRASOPOULI)	GR0902R0002010003H	River WB	Poor	Failing to achieve good	Technically unfeasible	SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
19	GREBENIOTIKOS P.	GR0902R0002320039N	River WB	Bad	Failing to achieve good	Technically unfeasible	SM04-020, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
20	R. SOULOU (SARI GKIOL)	GR0902R0000010124A	River WB	Poor	Failing to achieve good	Technically unfeasible	SM08-060, SM08-090, SM08-100, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
21	R. SOULOU (ENTOS ORICHION)	GR0902R0000010123H	River WB	Poor	Failing to achieve good	Technically unfeasible	SM08-060, SM08-090, SM08-100, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
23	GKIOLE R.	GR0902R0002440061N	River WB	Bad	Failing to achieve good	Natural Conditions	SM04-020, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020

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Summary

a/a	WB Name	WB Code	WB Category	Ecological Status (SWB) / Quantitative Status (GWB)	Chemical Status	Exemption justification	Supplementary Measures
23	GKIOLE R.	GR0902R0002440060N	River WB	Bad	Failing to achieve good	Natural Conditions	SM04-020, SM06-010, SM15-030, SM15-010, SM03-010, SM16-050, SM15-020
Ground water bodies							
1	AMINTEO	GR0900050	Ground WB	Poor	Good	Technically unfeasible	SM04-030, SM05-020, SM05-050, SM08-060, SM08-090, SM08-100, SM16-010
2	PTOLEMAIDA	GR0900060	Ground WB	Poor	Bad	Technically unfeasible	SM04-030, SM05-020, SM08-060, SM08-090, SM08-100, SM16-010
3	NE VERMIUO	GR0900080	Ground WB	Poor	Good	Technically unfeasible	SM04-030, SM05-020, SM05-050, SM16-010
4	ALMOPEOU	GR0900120	Ground WB	Poor	Good	Technically unfeasible	SM04-030, SM05-050, SM16-010
5	KATO ROU ALIAKMONA	GR0900130	Ground WB	Poor	Good	Technically unfeasible	SM04-030, SM05-020, SM08-080, SM16-010
6	IPOSISTIMA LITOXOROU	GR0900141	Ground WB	Poor	Good	Technically unfeasible	SM04-010, SM08-070, SM08-080
7	KATERINIS	GR0900150	Ground WB	Poor	Good	Technically unfeasible	SM04-010, SM04-030, SM05-020, SM08-020, SM08-070, SM08-080, SM16-010
8	KOLINDROU	GR0900160	Ground WB	Poor	Good	Technically unfeasible	SM04-030, SM05-050, SM08-070, SM08-080, SM16-010
9	PERDIKKA – FILOTA	GR0900340	Ground WB	Poor	Good	Technically unfeasible	SM04-030, SM08-060, SM08-090, SM08-100

In the River Basin Management Plan of the RBD of Western Macedonia, future projects and activities have also been examined regarding their effect on the achievement of the environmental objectives of dependent WBs according to paragraph 7, article 4 of the WFD. These projects are presented in the Table below:

Table 10: New activities and related WBs, of which the achievement of the environmental objective remains unaffected

New activity	Short description	Related WB	Exemptions Article 4 Paragraph 7
Construction of Triantafilia dam in the Regional Unit of Florina	Triantafyllia dam is situated approximately 1.5 km southwest of the village Kato Ydrousa on the stream Asprorema. The dam is a rockfill with a central core, a height of 73m from (crest elevation +844 m), crest length of about 510m and 16m crest width. The lake shall cover an area of approximately 486 stremma ⁴ and will ensure a total water storage volume of about 10x10 ⁶ m ³ . The project also provides for reinforcement of the reservoir of Triantafilia with runoff from the neighboring basin of Drosopigi through a weir and a diversion canal.	River WB GR0901R0F0208016N (p.Asprorema) GR0901R0F0209017N (Drosopigiotiko r.)	YES
Parorio Reservoir in the Regional Unit of Florina	Impervious core rockfill dam, with a maximum height of 37m, crest elevation at +960m, crest length ~180m, and water storage volume of about 1.500.000 m ³ . A significant part of the dam has already been completed. Within 3,3 Km north of the dam on a branch of Krateros stream (Mala stream).A second dam of a smaller height is to be constructed (diversion project), of which water quantities will be transferred to the main dam through canal.	River WB GR0901R0F0201001N (Ligkos p.)	NO
Construction of Nestorio Dam	Earthen Dam - rockfill of a height 72m from foundation, of maximum water storage 19,42x10 ⁶ m ³ and water level approximately 2 km ² . The dam is multipurpose and provides for: (a) a power generation station of 7,031 MW, (b) irrigation needs of 70.860 stremma and (c) water supply needs of downstream agglomerations. The annual amount of water abstraction will not exceed 20,8x10 ⁶ m ³ .	River WB GR0902R0002500072N (Aliakmonas)	YES
Study of Almopeos-Kalis dam in the Municipality of Pella	Rockfill hard embankment dam, of a height 59-61m from foundation (crest elevation +105m), crest length approximately 210m, will ensure total water storage volume of 45x10 ⁶ m ³ apx.	River WB GR0902R0002066097N GR0902R0002066096N (p.Almopeos)	NO
Study of Asproklissia dam	Earthfill dam with central core of a height of 27,5 m from foundation, crest length 150 m, accompanied with a right side embankment with a length of 55 m, crest width 8 m. Total water storage volume of about 760.000 m ³ .	River WB GR0902R0002460064N (Velas p.)	NO
Construction of a reservoir in Anarachi, Municipality of Kozani	Includes the reservoir of Anarachi in the region Melios Anarachi, storage and diversion works(head works) in the central river bed of stream Emporio as well as the water transfer conduits from Emporio to Anarachi.	River WB GR0902R0000010122N (Soulou r.)	NO
Study of the irrigation dam and irrigation network of Dipotamia	Water storage volume of 882.000 m ³ and embankment volume of about 280.000 m ³ , in the river basin of streams Ksiropotamos and Chionato in the former community of Dipotamia, Prefecture	River WB GR0902R0002520076N (Vrochopotamos)	NO

⁴ 1 stremma is equal to 1.000m² or 0,1ha.

New activity	Short description	Related WB	Exemptions Article 4 Paragraph 7
	of Kastoria. The lake surface is 103 stremma. Maximum height (crest to river bed) of 30m, crest elevation +1.023m. Water storage 882.000 m ³ . Irrigation area 1.800 stremma. Irrigation water needs 490 m ³ /stremma/year.		
Study of Knidis-Poros dam Municipality of Grevena	Earthfill dam with central core, height 46,5 m, crest length 420 m, crest width 12 m and total water storage 9.740.000m ³ . Irrigation areas are placed higher than the reservoir elevation so the construction of a pumping station is necessary. The project includes the construction of auxiliary works (evacuator - abstraction tower, spillway, drainage tunnels) as well as the construction of ≈22 km of conduits.	River WB GR0902R0002300037N (Potamia.R)	NO
Construction of Mesovouno dam	50% of the project has been constructed. The installation of the connection pipe is still to be constructed to transport water from the reservoir to the plain. The Mesovouno dam was constructed in the position Piges of the stream Ag. Anargiri in the northwestern foothills of Mount Vermio within a distance of 5 Km from the agglomeration of Mesovouno in Kozani. It is a rockfill dam with inclined clay core, height 32 m from foundation, lake surface of approximately 2.03 Km ² and reservoir effective capacity 890.950 m ³ .	River WB GR0902R0000010122N (Kilada P.-Soulou R.)	NO
Construction of an expansion for the Thessaloniki Water Treatment Plant – Phase A2	Construction of the necessary facilities and installation of the necessary Electromechanical equipment for Phase A2 to increase the daily capacity of the plant from 150.000m ³ to 300.000m ³ .	Lake WB Ag.Varvara (GR0902L000000006H)	NO
Ptolemaida new thermoelectric station -Unit V	Unit V located in the depleted lignite area of the Komanos mine approximately 8 Km from Ptolemaida and 22 Km from Kozani. The power generation unit will be fueled by pulverized lignite. Joint power capacity 660MWe, to provide thermal power of 140MWth for district heating.	Lake WB Polifitos (GR0902L000000009H) GWB GR0900060 (granular system of Ptolemaida),	NO
Water Supply of thermoelectric stations in Aminteo and Ptolemaida from reservoirs in Drepano	a) Construction of conduits to connect reservoirs in Drepano with wells around lake Soulou from where the thermoelectric stations of Ptolemaida and Aminteo will be supplied. b) conduit to connect the reservoirs in Drepano with the new unit V of the Ptolemaida thermoelectric station which will replace the existing, in operation Units II, III and IV.	Lake WB Polifitos (GR0902L000000009H) River WB GR0902R0000010123H (Rema Soulou) GWB GR0900060 (granular system of Ptolemaida)	NO
Feli Small Hydroelectric power station on river Aliakmonas - 10,4 MW	Run-off-river concrete dam, height 23 m (foundation to crest), crest elevation +432 m, length 184,50 m and width 5 m, storage at Normal Operation level (+427 m) is 2,5 x 10 ⁶ m ³ , while inundated area is 0,42 km ² . The environmental impact assessment study, provides the construction of a pool weir fishpass.	River WB GR0902R0002130024N (part of river Aliakmonas)	NO
Taxiarchis Small Hydroelectric power station on river Aliakmonas - 9,525 MW	Run-off-river concrete dam, spillway crest elevation +502 m and dam crest elevation +507,5 m, crest width 5,0 m, maximum height 21 m from river bed. Upstream lake volume at Normal Operation level (+502 m) amounts up to 5,6 Mm ³ with a surface	River WB GR0902R0002190047N (part of river Aliakmonas)	NO

New activity	Short description	Related WB	Exemptions Article 4 Paragraph 7
	area of 0,97 km ² , extending over 8,5 km along the natural river bed upstream of the dam. The environmental impact assessment study, provides the construction of a pool weir fishpass.		
Mesolakos-Pistiko Small Hydroelectric power station in the Municipality of Grevena - 9,4 MW	Run-off-river concrete dam, height of 15m. Upstream river length of 4,5 km to be affected at Normal Operation level (+455), forming a lake volume of 3,5 x 10 ⁶ m ³ covering a total surface of 0,5 km ² . Installations also to include: a fish lane to preserve migration patterns, a sediment evacuator incorporated into the body of the dam on the right buttress. The power station will house two water turbines with a nominal discharge of 40m ³ /s each.	River WB GR0902R0002130038N (part of river Aliakmonas)	NO
Asprokampos Small Hydroelectric power station in the Municipality of Grevena - 9,4 MW	Run-off-river concrete dam, height of 19 m, at Maximum Operation Level (+485), crest length of 6,9 km, total water storage volume of 7,8 x 10 ⁶ m ³ and water surface area of 1,1 km ² . Auxiliary works include a fish lane to preserve migration patterns and a sediment evacuator. The power station will house two water turbines with a nominal discharge of 40m ³ /s each.	River WB GR0902R0002150040N (part of river Aliakmonas)	NO

Programmed or new projects that have not been examined in terms of their compatibility with the WFD and the RBMP or as exemptions according to Article 4.7, are to be examined under the procedure for Environmental Permitting.

In conclusion, for one hundred eighty-five (185) water bodies the environmental objective is to achieve good status in the year 2015, while thirty-five (35) systems are subject to exemptions.

Table 11: Number of WBs that will achieve the environmental objectives by 2015 or are included in the exemptions for each WB's category

WB category	Environmental objectives		
	Achievement by 2015	Exemption	
		Article 4 Paragraph 4	Article 4 Paragraph 7
rivers	130	17	3
lakes	9	5	0
coastal	2	0	0
transitional	1	1	0
groundwater	43	12	0

The number of WBs to achieve the environmental objectives by 2015, includes WBs of which the status is classified as unknown, due to lack of data. Results of the Monitoring Program for the time period 2012-2015 are expected to allow classification of their status.

In the following tables exemptions of WBs in the RBD of Western Macedonia and relevant justification per water body are presented.

Table 12: Rivers exemption

Type of Exemption	% percentage of WBs total length	Justification	% percentage of WBs of each justification	Comments
Article 4.4	10%	1) Technical infeasibility 2) disproportionate cost 3) natural conditions	1) 93%, 2) 0%, 3) 7%	
Article 4.5	0%	1) Technical infeasibility 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%	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) -	

Table 13: Lakes exemption

Type of Exemption	% percentage of WBs total surface that consists exemption	Justification	% percentage of WBs of each justification	Comments
Article 4.4	60%	1) Technical infeasibility 2) disproportionate cost 3) natural conditions	1) 13%, 2) 0%, 3) 87%	
Article 4.5	0%	1) Technical infeasibility 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 14: Transitional WBs exemption

Type of Exemption	% percentage of WBs total surface that consists exemption	Justification	% percentage of WBs of each justification	Comments
Article 4.4	89%	1) Technical infeasibility 2) disproportionate cost 3) natural conditions	1) 100%, 2) 0%, 3) 0%	
Article 4.5	0%	1) Technical infeasibility 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 15: Coastal WBs exemption

Type Exemption	% percentage of WBs total surface that consists exemption	Justification	% percentage of WBs of each justification	Comments
Article 4.4	0%	1) Technical infeasibility 2) disproportionate cost 3) natural conditions	1) -, 2) -, 3) -	
Article 4.5	0%	1) Technical infeasibility 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 16: GWBs exemptions

Type of Exemption	% percentage of WBs total surface that consists exemption	Justification	% percentage of WBs of each justification	Comments
Article 4.4	24%	1) Technical infeasibility 2) disproportionate cost 3) natural conditions	1)100%, 2) 0%, 3) 0%	
Article 4.5	0%	1) Technical infeasibility 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) 0% , , 2) 0%	

11. PROGRAM 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. 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 in specific Water Bodies which, even after the implementation of the basic measures, are likely to fail to achieve the environmental objectives.

In the RBD of Western Macedonia the Program of Measures consists of seventy-eight (78) measures, thirty-nine (39) basic and thirty-nine (3) supplementary.

The Basic Measures of the Program of Measures for the Western Macedonia RBD are presented in the table below:

Table 17: Basic measures of Western Macedonia RBD

Measure code	Measure Title	Description
MEASURES TO IMPLEMENT THE COST RECOVERY PRINCIPLE (ARTICLE 9)		
OM01-01	Customization of pricing policy in a flexible and efficient way in order to serve as primary target the environmental sustainability and avoid water wastage.	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.
MEASURES TO PROMOTE AN EFFICIENT AND SUSTAINABLE WATER USE (ARTICLE 4)		
OM02-01	Actions to enhance the operation of water supply networks of large agglomerations of the RBD. Leakage 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 5 % and 45%. 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 Municipalities of Ptolemaida are integrated in the OPESD 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

Measure code	Measure Title	Description
		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.
OM02-02	Introduction of institutional framework and program of measures for water saving in households.	<p>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 Institutional framework for Residential Water savings", funded by the OPESD.</p> <p>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 General Secretariat for Water, started at April of 2014 examining the development of an Institutional Framework and Program of Measures for residential water savings.</p> <p>The measures promoted are of institutional, regulatory, financial and 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.</p>
OM02-03	Projects for the rehabilitation / enhancement of existing water supply networks.	<p>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.</p> <p>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.</p>
OM02-04	Enhancing actions to contain leakages to the collective irrigation networks	<p>It is necessary to:</p> <p>(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.</p> <p>(2) The water transfer infrastructure should be maintained at a high standard, under the care of the Regional Authority</p>
OM02-05	Reorganization / rationalization of the institutional framework for the operation of management authorities of collective irrigation systems.	<p>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.</p> <p>The measure refers to the formulation of proposals and institutional changes associated with the upgrade of operation and the clarification of the institutional framework of the 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. In this framework, the creation of a special group with representatives of all involved authorities is deemed necessary in order to propose the required institutional and regulatory modifications for the modernization of LLRO /GLRO operation.</p>
OM02-06	Enhancing efficient methods of crops irrigation and increasing the crops that are receptive to these methods	<p>The measure aims to the expansion of efficient methods of irrigation, which reduce the volume of irrigation water required. Such method is the micro-irrigation, which applies in tree crops and other receptive crops.</p>

Measure code	Measure Title	Description
OM02-07	Compilation of technical specifications manual for the implementation of water 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.
OM02-08	Compilation of the water supply Masterplans from Municipal Water and Sewage Companies (DEYA).	Preparation of general water supply plans, which will identify water resources required to cover the medium and long term demand, will adopt the appropriate protection measures and will design the appropriate external aqueducts at a preliminary level. It is suggested that these Masterplans be developed by the Municipal Enterprises for Water Supply and Sewerage being the competent authorities. These plans should be in accordance with the provisions of the RBMPs as regards status of Water Bodies and programs of measures and should have the consent of the competent Directorate of Water.
MEASURES FOR DRINKING WATER (ARTICLE 7)		
OM03-01	Protection of abstraction projects for drinking water from surface water bodies.	Designation of a protection area around the surface water bodies that are being used for water supply, where no Water Safety Plan is being applied. These areas will be designated by the conduction of special studies. Until those studies are finished, in case of a permission request regarding either new projects and/or activities in the River Basin of the particular WB or the discharge of their wastewater in the RB, the Competent Authorities that are responsible for the environmental permitting should consider the impact of the abovementioned activities on the quality of the surface water, aiming at the preservation of the quality on the current levels. For the WBs that are designated for abstraction of drinking water, during the environmental permission of the projects regarding the utilization of the water resources, the developer of the project should deliver to the competent authorities the following: <ul style="list-style-type: none"> Detailed plan of the areas designated for the protection of water, Regulatory framework of the abovementioned designation and of the permitted activities
OM03-02	Designation of protection zones of works for the abstraction of drinking water.	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: <ul style="list-style-type: none"> ❖ <u>Zone of absolute protection I</u>: 10-20 m around the abstraction site. ❖ <u>Zone of controlled protection II</u>: defined depending on the type of aquifer as follows: <ul style="list-style-type: none"> Karstic systems: 1000 m upstream and both sides (recharge area) and 500m downstream of water abstraction site. Fractured systems: 500 m upstream and on both sides (recharge area) and 300m downstream of water abstraction site. Granular unconfined systems: perimeter with radius of 500m Granular confined or semi-confined aquifers: perimeter with radius of 500m For the karstic and fractured systems in case no data is

Measure code	Measure Title	Description
		<p>available regarding the piezometric level or the recharge area, a protection zone with radius equal to the abovementioned upstream distance is implemented.</p> <ul style="list-style-type: none"> ❖ <u>Zone of protection III</u>: It refers to the recharge basin of the abstraction site and can be determined only by the aforementioned hydrogeological study. <p>Activities in principle prohibited by zone:</p> <ul style="list-style-type: none"> ❖ <u>Protection zone I (absolute protection)</u>: 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. ❖ <u>Protection zone II (controlled)</u>: 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. ❖ <u>Protection zone III (supervised)</u>: 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. <p>The specifications for the aforementioned hydrogeological studies will be determined by the competent authorities, under the coordination of the General Secretariat for Water.</p>
OM03-03	Delineation of protection zones for groundwater abstraction (springs, boreholes) for drinking water abstractions > 1.000.000m ³ per year.	Detailed delineation of protection zones of groundwater abstraction points (springs, drillings) for drinking water abstractions > 1.000.000 m ³ per year. The elaboration of special hydrogeological studies, after the completion of which the detailed delineation will be feasible, is a prerequisite.
OM03-04	Protection of GWBs included in the register of protected areas as drinking water areas and issuing/amendment of the legal framework for their protection.	<p>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.</p> <p>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.</p> <p>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.</p>

Measure code	Measure Title	Description
OM03-05	Implementation of Water Safety Plans in Large Municipal Water and Sewage Companies (DEYA).	<p>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.</p> <p>It is proposed to implement the Water Safety Plans in big Municipal Enterprises for Water Supply and Sewerage, such as these of Thessaloniki, Kilkis, Thermis, Thermaikou and Pellas, 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.</p>
MEASURES TO CONTROL SURFACE AND GROUNDWATER ABSTRACTIONS		
OM04-01	Monitoring surface water bodies abstractions	<p>This measure refers to abstractions greater than 10 m³ 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 November of each year.</p>
OM04-02	Designation of Criteria for the determination of the total abstraction quantities per Water Body	<p>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.</p>
OM04-03	Update of the Decision F16/6631/1989 which specifies the minimum and maximum of quantities of irrigation water.	<p>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.</p>
OM04-04	Review of the legal framework for licensing water uses and execution of water resources exploitation projects.	<p>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</p>

Measure code	Measure Title	Description
OM04-05	Creation of a data base for all water abstractions through the process of licensing water uses.	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.
OM04-06	Installation of monitoring systems to record groundwater bodies abstractions.	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 10m ³ 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 November of each year.
OM04-07	Prohibition of projects for the exploitation of groundwater bodies (boreholes, wells, etc) for new water uses and the expansion of existing water use permits : <ul style="list-style-type: none"> • In areas with GWB in bad quantitative status • Within areas of collective irrigation systems • Within the protection zones (I and II) for the abstraction of drinking water. 	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.
OM04-08	Protection of the Surface Water Bodies from the direct and indirect abstractions via the correlated Ground Water Bodies	This measure refers to inland surface Water Bodies, rivers and lakes. <p>I. New direct extraction and utilization of surface water from lakes and rivers is allowed under the following precincts:</p> <p>i. For river water bodies the maintenance of the minimum required downstream flow for the protection of the environment and for the guarantee of the needs of the downstream water uses will be examined, during the authorization process.</p> <p>ii. Drafting an abstraction program for the average hydrological year and a program for reduced abstractions in case of a prolonged drought to meet a) the minimum water level for the lakes and b) the minimum flow for the rivers.</p> <p>iii. In case of abstraction for irrigation, this serves collective networks and / or groups of producers</p> <p>Lakes Volvi and Koronia are excluded because no new direct</p>

Measure code	Measure Title	Description
		<p>abstractions are allowed.</p> <p>II. For abstractions from GWBs:</p> <ul style="list-style-type: none"> • with association between the water level of the aquifer and the water level of SWBs and • where no other measures of the RBMP are applied, <p>the hydraulic relation and the maximum possible abstraction of groundwater should be established by a special study (hydraulic-hydrological and hydrogeological).</p> <p>The Directorate of Water defines the areas for which these studies will be elaborated in priority, taking into account the RBMPs, new data from the monitoring network, other relevant studies and research, as well as the number of petitions for new abstraction works permissions.</p> <p>Until the completion of the above mentioned studies:</p> <ul style="list-style-type: none"> - A special zone of 250 m from the shoreline is determined in which new boreholes are not permitted. - At the stage of the environmental licensing for new lake HMWBs /AWBs or for new abstractions from existing HMWBs /AWBs the above mentioned provisions should be met and especially in the case of par II here above the relevant special studies should be submitted by the concerned party. - for existing lake HMWBs /AWBs relevant provisions included in the approved environmental terms are maintained. <p>Where rules of protection areas (as per Law 3937/2011) apply, the stricter rules are imposed.</p> <p>For the purposes of this measure, in areas that the coastline has not been determined, the limit of the coastline will be defined by the competent Water Directorate based on the available data regarding maximum water level of the lake.</p> <p>This measure aims at protecting the SWBs from impairment of water resources through direct abstractions or through abstractions from a related GWB.</p>
MEASURES TO CONTROL THE ARTIFICIAL RECHARGE OF GROUNDWATER BODIES		
OM05-01	Investigation of conditions for implementing artificial recharge in groundwater bodies, as a mean of quantitative enhancement and qualitative protection of GWBs.	<p>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 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 GWB.</p> <p>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.</p> <p>Technical specifications for these Hydrogeological Studies of artificial recharge will be determined by the Special Secretariat for Water (SSW).</p>

Measure code	Measure Title	Description
OM05-02	Creation of a data base for wastewater application for irrigation purposes or for artificial recharge of groundwaters (FEK354/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 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.
MEASURES FOR POINT SOURCE POLLUTION		
OM06-01	Establishment of terms and conditions for the connection of industries to sewerage networks / reception of industrial waste 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.
OM06-02	Issuing/Amendment of the legal framework for licensing of transport sewage trucks.	There is a need to adopt an integrated legal framework that will govern the licensing of tanks 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 tanks 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 Instruction of a regulatory framework for the licensing of tanks transporting sewage that will define special measures for the positioning and control of the tanks. 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 municipalities, confirmation of the disposal of transported waste to a WWTP.
OM06-03	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.
OM06-04	Creation of a data base of pollution sources (emissions, discharges and leaks).	According to the first paragraph of Article 5 of «List of emissions, discharges and leaks» of the CMD 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, an List of emissions, discharges and leaks for all priority substances and pollutants

Measure code	Measure Title	Description
		<p>listed in Part A of Annex I of this Decision, including their concentrations in sediment and biota, as appropriate.»</p> <p>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:</p> <ul style="list-style-type: none"> 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. <p>The register will include the list of emissions, discharges and leaks for all priority substances and pollutants set out in Appendix I to CMD 51354/2641/E103/2010 in accordance with the provisions of Article 5 of the CMD. 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.</p>
OM06-05	Establishment of criteria for licensing new / expansion of existing aquaculture units.	<p>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.</p>
OM06-06	Specification of the process to control and designate zones for aquacultures in inland waters.	<p>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, infrastructure, waste), imposition of sanctions and fines in case of environmental conditions violations and / or illegal operation. 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.</p>
OM06-07	Amendment of national legislation on urban and industrial waste water management.	<p>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 brings forward poses ambiguity on an eventual legal loophole. After evaluation of the above mentioned requires the establishment of a modern legal framework for the management of urban and industrial waste water is proposed.</p>

Measure code	Measure Title	Description
OM06-08	Development of a legal framework / guidelines for monitoring water quality in aquaculture units.	<p>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.</p> <p>The competent authorities for issuing environmental terms and water use licenses usually apply the CMD 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.</p>
MEASURES FOR DIFFUSE SOURCE POLLUTION		
OM07-01	Gradual, selective conversion of conventional crops to organic	Encouragement and support (Technical & Scientific) of producers that implement conventional cultivation techniques towards conversion of crops to organic, primarily in vulnerable areas of the Directive 91/676/EEC.
OM07-02	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 CMD 80568/4225/91 and amended by the CMD 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 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 CMD 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.
OM07-03	Development of specialized tools for the sustainable use of fertilizers and water.	Development of 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 Central Macedonia to be applied to the nutrient- zones under Directive 91/676/EEC.
MEASURES TO DEAL WITH THE NEGATIVE IMPACT ON THE STATUS OF SURFACE WATER BODIES FROM HYDROMORPHOLOGICAL ALTERATIONS		
OM08-01	Determination of selected areas for taking materials for the needs of construction projects.	<p>The proposed measure aims to deal in a rational and environmentally friendly way with one of the main problems of arbitrary uses and interventions in streams across the country in order to deal with the hydro morphological pressures these undergo.</p> <p>Preparation of a specialized assessment study per river water basin is recommended, with main objects that include:</p> <p>A) Determination of sediment concentration areas along the broad riverbed of streams.</p> <p>B) Assessment of the available quantities per region</p>

Measure code	Measure Title	Description
		<p>C) Ecological assessment per region focusing on natural habitat types (structure, status of preservation) on the flora (herbaceous, shrubby and arborescent emphasizing on the arborescent in a good preservation status) and on habitats of fauna species.</p> <p>D) Classification of the areas according to the concentration of materials and potential for abstractions, taking into consideration all of the above mentioned. The assessment is to be carried out under the responsibility of the Water Division for each River Water Basin and it should be assessed whether it subjects to the need of a Strategic Environmental Impact Assessment</p> <p>The objective of the measure is to manage the sediment transport and regulate the extraction of materials from the riverbed in such a way as to preserve the sustainable management of this resource and to ensure maximum protection of ecosystems developed in the relevant water bodies as well as the protection of the coastline from erosion.</p>
OM08-02	Designation of the minimum water level for lakes	<p>Preparation of a study is proposed for all lakes (natural, heavily modified and artificial) included in the River Basin Management Plans as water bodies, in order to designate the minimum water level is recommended. For this assessment, the following should be taken into account :</p> <ul style="list-style-type: none"> • The need for periodic alterations of the drainage and flooding zone essential for the life of aquatic organisms, the riparian vegetation and dependent fauna. • Requirements for water storage, intended for human use (taking into account the possibility of safety reserves for use during drought) • Ensuring the desired uses in the riparian zone to the maximum possible extent. • Avoiding unhealthy and unaesthetic conditions due to the creation of water ponds at the zone between minimum and maximum lake water level where the development of septic conditions and insects is favored. <p>The following should also be addressed:</p> <ul style="list-style-type: none"> • the most complete and fast possible draining of the zone between minimum and maximum lake water level during the periodic water level variations • Avoiding drop of the water level below the minimum designated value. • The quickest possible lake recovery in case the water level falls below the minimum designated water level. <p>Specifications will be prepared by the Special Secretariat for Water by 2015.</p>
SPECIAL MEASURES FOR PRIORITY SUBSTANCES AND OTHER POLLUTANTS		
OM10-01	Designation of emissions levels for each river basin for priority substances and other pollutants included in JMD 51354/2641/E103/2010 as well as for physicochemist parameters in relation to the environmental requirements.	<p>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:</p> <ol style="list-style-type: none"> 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

Measure code	Measure Title	Description
		<p>companies.</p> <p>vi. The concentration of the basic parameters of the pollution load.</p> <p>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.</p> <p>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.</p>
MEASURES FOR THE PROTECTION FROM ACCIDENTS AND EXTREME NATURAL EVENTS		
OM11-01	Strengthening the synergy of the river basin management plans with the plans to cope with large scale technological accidents (SATAME) for facilities included in the IPPC and SEVESO Directives.	<p>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:</p> <ul style="list-style-type: none"> • 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 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.

The Supplementary Measures of the Program of Measures for the Western Macedonia RBD are presented in the table below:

Table 18: Supplementary measures of Western Macedonia RBD

Code	Measure name	Brief Description of the measure
Administrative Measures		
SM02-020	Provision to increase the frequency of reports on compliance monitoring with the environmental conditions upon renewal of environmental licensing for companies that operate in areas with severe pressures.	For companies that based on the environmental permits are required to submit annual environmental reports to the Ministry of Environment, Energy and Climate Change, it is suggested that in areas with severe pressures due to industrial activity and craft industries, increasing the frequency of the reports on one every semester to secure early recognition of possible pollution and the immediate determination of corrective measures only if proved necessary. The new reporting frequency to monitoring the compliance with the approved environmental conditions will be foreseen in the process of the next renewal of the environmental licensing of any business.
Financial or fiscal measures		
SM03-010	Reform accounting systems for water providers	Configuration and application of a uniform calculation method and recording the cost of water supply by water providers, to strengthen the credibility of its estimation. Based on the available data it is indicated that (a) The way of reporting and recording cost categories is highly nonuniform and (b) there is no systematic recording costs and revenue per service (water supply and sewage with / without WWTP). Finally, the environmental and resource costs should be aggregated, with suitable methodologies. Prerequisite for this is the computerization of water supply. The configuration and application of a uniform method of recording the cost of water concerns the providers of irrigation water, in the context of which the calculation of environmental costs and the costs of the resources with suitable methodologies is essential - even to the ones served by private pumping stations. Prerequisite for the application is the elementary computerization of the providers. An annual publication of the total cost of water supply and the degree of recovery to raise awareness of the public is recommended. The disclosure is to be made in a simplified manner and provide the opportunity to the users to compare the costs.
Environmental agreements after negotiations		
SM04-010	Promotion of agreements with owners of tourist accommodation establishments	Promotion of agreements with owners of tourist accommodation establishments for the adoption of practices and technologies aiming to water saving and reuse. The accommodation establishments that are going to be part of these agreements, is possible to be rewarded with special identification marks for their participation in the effort of the water resources preservation. Their participation will contribute to upgrade their recognition, raise awareness and educate the public.
SM04-020	Promotion of agreements with industries that consume large quantities of water or generate pollution in Water Bodies in order to adopt initiatives and codes of conduct.	Promotion of agreements with industries causing severe pressures in Water systems in order to achieve a long-term restoration of their ecological status. The companies will promote the creation of mechanisms responsible for the removal of the operative causes of charges and the elimination of the irreversible elements that cause environmental degradation.
SM04-030	Promotion of the inclusion of producers to Integrated Management Systems in the Agricultural Production	The measure concerns actions and activities of state environmental protection agencies for integration of producers or producer groups active in areas with highly contaminated water bodies in Integrated Management Systems of Agricultural Production. The implementation of such management systems ensures the proper irrigation water management, the precise implementation of fertilizer, the certified use, the quantity and quality of pesticides, the proper handling of the technical means for water resources exploitation with the main aim being a harmonious relationship between production of safe products and protection mainly of water resources, both surface and underground. The implementation process of these systems provides for the «internal inspection», i.e. the direct participation of the producer as controller for the implementation of the program requirements and ensures ecological agricultural techniques even beyond the requirements of the Code of Good Agricultural Practice and Cross Compliance. AGRO 2.1 & 2.2 is mentioned as an updated system covering the entire spectrum of the agricultural production and is expected to have a significant position in the arrangements of the new Common Agricultural Policy. The system is already part of the Code of Good Agricultural Practice with an effort from the Hellenic Ministry of Rural Development and Food to integrate with certain crops, such as sugar beet etc. and under subsidy.

Code	Measure name	Brief Description of the measure
Emission Limits Values		
SM05-020	Specialized hydrogeological - hydrochemical survey to identify Groundwater bodies or parts thereof, with high concentrations of chemical elements, due to natural background (indicatively Fe, As, B, U, Mg, etc.) in case those parts are connected to abstraction projects.	Delineation of areas with high concentrations of chemical elements, due to natural background. (As, Fe, Mn, Mg, Cl, B, As, U, etc.) and determination of new maximum acceptable price.
SM05-030	Construction of the 3rd Cell of Western Macedonia and other works	The measure consists of 4 projects: , 1. Construction of landfill cell., 2. Completion of infrastructure in the local waste management unit Eordaias 3. Completion of infrastructure in local waste management unit of Grevena
SM05-040	Constitution of rules for the protection of sinks	Establishment of protection of existing active or inactive sinks by prohibition of polluting activities and especially any activities that include direct disposal of liquid waste in sinks. , The sinks drain closed-drainage areas and measures must be taken to protect and improve the quality of that water, such as: setting incentives, tertiary treatment of wastewater, strict controls on the compliance of environmental conditions on existing units. etc.
SM05-050	Special protection measures in areas with groundwater bodies where geothermal and mineral waters exist.	The special protection measures for geothermal hot springs are adjusted and combined with the existing institutional framework for their protection. Firstly the prohibitions of zone II, for the protection of groundwater abstraction points for drinking water, are applied., The installation of new activities may be permitted in specific locations after submitting hydrogeological study or report depending on the size and type of activity and a favorable opinion of the competent Directorate of Water.
Codes of Conduct		
SM06-010	Monitoring Program for meteorological and water quality parameters	The purpose of the program is the rational use of irrigation water by farmers in the Regional Unit of Florina by irrigation advisory through On-line support of the rural population and the use of recording technology in real time. The existing network of meteorological and hydrological stations is being updated, calculating the water parameters of the crops and developing applications to inform the farmers.
Recreation and Restoration of wetlands areas		
SM07-010	Surveys on the protection and rehabilitation of Lake Kastoria	<p>1. Modernization of sluices in Gkirole stream. This project has as main objective the protection and conservation of soil functions, minimizing the loss of its territorial biodiversity as well as dealing with flooding phenomena in the immediate and the wider lakeside region, ensuring at the same time the required upper and lower lake level. The modernization will involve the replacement of existing sluices, with news of the same type and size and upgrade their mode of operation, placing mechanism for automation and remote control, while there will be no interference with other components of fixation.</p> <p>2. Study of forest technical projects concerning mountainous water supplies in parts of the river and streams Xeropotamos Crimson and Vissinia. The study is conducted in the northern part of the basin of Xeropotamos stream and to a part of the basin of Vissinia stream in order to deal with the phenomenon of fluvial outwash in lowlands and lake areas as well as the protection of the wetland ecosystem in lake Kastoria which is of high importance in the homonymous area.. The study is performed in the aforementioned streams, due to strong gradients presented in both the basin and the central bed, which in cooperation with the types of rocks in the areas, (crystalloid schist rocks. ophiolites and Quaternary sediments that is impermeable geological formations covering more than 60% of their basin) result in intense solids transport downstream.</p> <p>3. Preparation of a study for the routing of the stream Gkirole. The stream Gkirole is the only surface discharge outlet of the basin of Lake Kastoria and the connecting shaft between the basin and river Aliakmonas. The study is about the routing of a part of Gkirole stream approximately 1,300 meters carrying out the necessary anti-corrosion and anti-flood projects in order to protect and preserve the soil characteristics and minimize the loss of the land biodiversity. Today, the stream presents very gentle inclines which along with the the lush vegetation of the area</p>

Code	Measure name	Brief Description of the measure
		inhibit the discharge of water. The study will recommend the cutting of native vegetation on slopes and at the bottom of the channel, removal of the deposited sediment in the riverbed and stabilization - formulation and determination the cross section of streams.
Monitoring abstractions		
SM08-010	Study of the irrigation network in the area of Prespes	<p>Preparing a Study about the the conversion of the existing open irrigation network, covering approximately an area of 16,500 acres in a closed irrigation network, east of Little Lake Prespa. There is an ongoing competition for the study with a time schedule of 20 months.</p> <p>The surface irrigation network covers a total area less than the total cultivated area and has ordinary operating period of 100 days. Of these approximately 800 acres are irrigated with ditches or flooding from the stream St. Germanos and the rest from plants that draw water from the lake Small Prespa.</p> <p>The irrigation network operates with open canals and tanks The responsibility for the operation and maintenance of the network belongs to the Local Organization for land improvements of Prespes.</p> <p>The reasons for replacing and modernizing the infrastructures of the surface irrigation network with surface drip irrigation network due to environmental effects in the region of the Prespa are summarized as follows:</p> <ul style="list-style-type: none"> • lowering the water level of lake Small Prespa, • elevated levels of pollution from agricultural sources, • increased consumption of water resources, • increased soil erosion, • increased energy consumption and therefore economic burden on producers and designed to tackle problems in the best environmentally responsible way while providing support to producers, the promotion of environmental initiatives and actions and wiser management of water resources and crops.
SM08-020	Installation of a functional valve in artesian wells	Installation of a functional valve or a pipe to balance pressure or any other suitable way to control the outflow of artesian wells, during periods of time that they are not used, several times pressurized water field discharge throughout the year creating problems of quantitative sufficiency during the irrigation and drinking water abstraction period.
SM08-030	Electronic water abstraction for irrigation using a rechargeable card for saving irrigation water in the municipality of Velvendos	This measure involves the supply and installation of electronic water abstractions for irrigation using a rechargeable card in the positions provided for irrigation networks under pressure. The implementation of these interventions in irrigation networks is to achieve environmental protection through the rational use of water resources as well as the proper use of the network using a daily program with specific amounts of irrigation water in each network segment. With the Electronic water abstraction system an effort is made in order to prevent any possible improper use of the irrigation network, to facilitate the supervision of the network and to save precious water and energy as well as time and trouble for the farmers since their presence throughout the whole irrigation process is no longer needed.
SM08-040	Electronic Water Abstraction System for irrigation using a rechargeable card for saving irrigation water of the Local Organization for land improvements in the area Vrachou Municipality of Orestida	This measure involves the supply and installation of electronic water abstractions for irrigation using a rechargeable card in the positions provided for irrigation networks under pressure. The implementation of these interventions in irrigation networks is to achieve environmental protection through the rational use of water resources as well as the proper use of the network using a daily program with specific amounts of irrigation water in each network segment. With the Electronic water abstraction system an effort is made in order to prevent any possible improper use of the irrigation network, to facilitate the supervision of the network and to save precious water and energy as well as time and trouble for the farmers since their presence throughout the whole irrigation process is no longer needed. The electronic water abstractions will consist of a hydraulic valve, a controller display, a special battery box, card slot, card charger, computer software etc. As a total, 274 abstractions and 137 connecting pieces will be installed as foreseen by the study.
SM08-050	Electronic water abstraction for irrigation with the use of a card at the irrigation networks of Neapoli, Kaloneri and Eratyra	This measure involves the supply and installation of electronic water abstractions for irrigation using a rechargeable card in the positions provided for irrigation networks under pressure. The implementation of these interventions in irrigation networks is to achieve environmental protection through the rational use of water resources as well as the proper use of the network using a daily program with specific amounts of irrigation water in each network segment. With the Electronic water abstraction system an effort is made in order to prevent any possible improper use of the irrigation network, to facilitate the supervision of the network

Code	Measure name	Brief Description of the measure
		and to save precious water and energy as well as time and trouble for the farmers since their presence throughout the whole irrigation process is no longer needed.
SM08-060	Record of water uses and models update for water resources management in the Closed Basin of Ptolemaida.	In the Closed Basin of Ptolemaida there is a particularly complex water resources management as a result of multiple and intense activities that take place in the area along with the sensitive ecosystems of the lakes placed within protected areas. The quantitative and qualitative pressures brought on aquatic systems of Aliakmonas river basin and within and outside the closed basin of Ptolemaida, are mainly due to the activities of the Public Power Corporation and agriculture. The final recipient of the total pressure is Vegoritida lake, which is the barometer of the region. However, the lake level of Vegoritida benefits from no systematic measurement in the recent years by any government body. So regardless of a slight water level increase at the lake during 1996-2001, data from the Public Power Corporation for the years 2011-2012 present increase though without being safely comparable to earlier time series. In any case, there no clear tendency or increase rate or stabilization of the water level, levels are significantly lower compared with previous ones, while abnormalities are presented to its quality characteristics. Moreover the contribution to the increase or stabilization of the water level from the artificial lake of Polufutos where water pumping takes place needs investigation. So the registration of water uses becomes necessary for the rational water management and the confirmation of the effect of different water uses by updating and utilizing the existing computing and Hydrology - management-models of the Directorate of Water. The study should lead to a targeted program of measures in order to take it into account in the next management period. A prerequisite for the success of the measure is the active involvement of all relevant water users, through participatory processes and the consensus conclusions of the results of the study.
SM08-070	Definition and delimitation of areas of groundwater bodies that have poor quality due to seawater intrusion	In coastal groundwater systems that are in poor condition due to seawater intrusion or show signs of seawater intrusion specific hydrogeological studies should be prepared in order to determine precise definition of the limits for new water abstractions expansions of seawater intrusion, so to take measures for gradual restoration in this area not only through the prevention of new water abstractions but through reducing or even removing already existing water abstractions prioritizing alternative irrigation methods to cover their needs. The specifications for the above hydrogeological studies will be determined by the co-authorities under the coordination of the Special Secretariat of water.
SM08-080	Definition of principle restriction zones for drilling new wells for new water uses and extension of existing licenses in coastal groundwater bodies where phenomena of seawater intrusion are observed.	In coastal groundwater systems that are in poor condition due to seawater intrusion or show signs of seawater intrusion derived from human pressures (over-pumping) prohibitive and / or restrictive measures are taken for the construction of new water intake projects (boreholes, wells) of groundwater and the extension of permits for the existing uses. Until the precise delineation of restriction zones based on specific hydrogeological studies that should be prepared, the following restrictions are suggested for groundwater: – GR0900141, GR0900150, GR0900160: the drilling of new wells and the extension of existing licenses for any water use in an area 5.000 m width from the sea is forbidden – GR0900130: the drilling of new wells and the extension of existing licenses for any use concerning a quantitative expansion located less than 200 m from the sea is forbidden. These restrictions are intended to limit the expansion of seawater intrusion in coastal systems. The restriction zones can be further extended under the responsibility of Water Directorates. From all the above prohibitions special cases are excluded involving, with priority given, the implementation of projects for water supply using potable water and other special cases such as aquaculture drilling, wells for water abstractions for the desalination plants etc. In such cases authorization is upon substantiated hydrogeological studies which will be examined and approved by the competent Directorates of Water
SM08-090	Conditions for the construction of new abstraction projects from groundwater (boreholes, wells, etc.) and surface water bodies for new water uses and the	– In the water systems of river Soulou (GR0902R0000010123H, GR0902R0000010124A), GR0900060, GR0900061, GR0900062, GR0900063, GR0900050, GR0900340) the construction of new projects for water abstractions and the quantitative expansion of existing licenses are allowed with the following conditions: the abstraction refers to special cases prioritizing the use of potable water and projects that will lead to measurable reduction in of abstractions from surface and groundwater systems

Code	Measure name	Brief Description of the measure
	quantitative expansion of existing water use permits in Water bodies of the river Soulou (GR0902R0000010123H. GR0902R0000010124A) GR0900060 (GR0900061. GR0900062. GR0900063). GR0900050. GR0900340	a) Abstraction for industrial uses other than energy becomes after documentation of best practices as to energy saving and recycling of water in the production process (not resulting in excessive cost) by submitting a flowchart for water balance between water use- wastewater production and determine the final recipient. The abstraction for energy use and use for the relegation of the level for mining is implemented after submission to the Directorate of Water: a) the envisaged program of water abstractions and returns during the licensing period with an analytical description of the positions and quantities of water abstractions or returns from the management body inside the water basin of Aliakmonas per use per water system and in total. b) Monitoring program of the amount of water in the affected water systems ie level measurements in groundwater systems and the water supply of surface water. The locations and frequency of measurements will be determined by the competent authority – The abstractions inside the restriction zones of the collective irrigation networks from a new of new individual or group drilling is done only to enhance the needs of the collective irrigation network, greenhouses, crops with irrigation needs outside the period of the irrigation network and uses other than irrigation. – The drilling of new wells for agricultural use is regulated by the D / Water Directorate taking into account neighboring existing wells, other applications for licenses for drilling, the water supply options, as well as directions for rural policy for the region.
SM08-100	Special arrangements for electricity generation activities in the river basin of Aliakmonas, associated with surface water and groundwater systems	For all water systems, surface and groundwater, affected by all activities that are designed to produce energy shall, within two years, based on the energy planning of the country, prepare a special study, which will include at least the following : 1. As for the mining of energy minerals: o The program for the development of these activities based on the established energy design from energy minerals for the next six years, o Estimated quantities and locations of abstractions and water return per water system (underground and surface). 2. In thermal power plants: o the envisaged operating schedule of these (energy production) based on the established power planning for the next six years, 2. Estimated quantities and locations of abstractions and return water per unit per water systems (underground and surface). 3. The impact of such programs on abstractions and return concerning the state of groundwater and surface water systems in the region and the other uses in every water system. 4. Alternative scenarios of measures - actions to address those effects, taking into account technological developments in the respective field that includes an economic assessment of the measures examined by cost and efficiency analysis. 5. Balance of water abstraction, consumption and return of the total thermal power generation activity from water systems.
Construction projects		
SM11-010	Construction of Triantafyllia dam	The dam Triantafyllia is approximately 1.5 km southwest of the village on the Kato Ydrousa by the stream Asprorema. The dam is a rockfill central impervious core, will have a height of 73m from the foundation (crest elevation +844 m), crest length of about 510m and 16m crest width, whilst shall cover an area of approximately 486 acres and will ensure total water storage volume of about 10x10 ⁶ m ³ . It also includes the strengthening of the reservoir of the dam from the neighboring basin Drosopigi through clapper valve of Drosopigi (located approximately 0,8 km northeast of the village downstream of Drosopigi) and the diversion canal to the reservoir of Triantafyllia. The main economic benefits from the construction of the dam is expected to come primarily from the increase in irrigated land and secondarily by covering the water needs of Florina with 2.0 million m ³ /year. Similarly, the social benefit is in increasing irrigated land which will be an incentive for residents to remain in their region, while improving the water supply of the city of Florina will solve the water supply problems of the city. The environmental conditions of the dam have been approved by the Ministerial Decision 203732/26.09.2011 "Modifying and extending Common Ministerial Decision Approval of Environmental Terms of the project 106202/11.6.2001: Construction

Code	Measure name	Brief Description of the measure
		of dams in the plain of Florina which is valid until 30/06/2021. In January 2005 began the construction works of a planned duration of 55 months, which however stopped by canceling the contract with the company in February 2011. Today a new contract has been signed and the process proceeds to the completion of the project.
SM11-020	Determination of a Management Body for Perdikas Dam and of specifications for a techno-economic survey for the exploitation or removal of the Dam	Perdikas dam was completed in 1962, the dam is earthfill with a central core, height 22 m, volume of 530.000 m ³ and crest length 352 m. The developer of the project is the Ministry of Finance and there is no operator / maintenance / monitoring of it. The dam is located in the basin of the stream Soulou a short distance upstream Perdikas. During the first filling of the reservoir when the reservoir level had risen about two-thirds of the height of the dam severe leaks were observed leading to substantial discharge of the reservoir in a short time. The leak was performed by piping and washing-off of 'watertight' clayey-marly formation within the karst passages of the underlying limestone. Due to the inability of the reservoir to hold water, for the purpose of which the dam was built, this is considered as a failure. While because of that failure no human lives or properties were put at risk. A tecno-economic study is proposed to be prepared to evaluate the state of the dam and the possibility to use the project for the purpose it was built. The exploitation of the project may be a relief measure to the water balance of the stream Soulou. Depending on the study's conclusions as to any required rehabilitation projects and / or operating conditions of the project and its costs in relation to its benefits, the alternative waiver of hydromorphological alteration should also be considered (launching dam).
SM11-030	Study of Almopeos dam (Kali) in the Region of Pella	The dam Almopeos (Kalis) on the namesake river of regional unity of Pella, 5km north of the settlements in Prophet Ilias and Kali, extends along the course of the river Almopeos. It consists of a narrow valley, where the river Almopaios flows, supplied by runoffs upstream the water basin of lowland and upland Almopia, which delivers downstream in Thessaloniki plain. It is an important hydraulic infrastructure project which can regulate the disposal of 65.000.000 m ³ of water for multiple uses. The estimated irrigated area is approximately 150,000 acres and abstractions are estimated at 45 million m ³ / year. Human activities have changed the status of the water balance and environmental conditions both in plain Almopia and Thessaloniki plain resulting in the degradation and reduction of qualitative and quantitative characteristics of the available water resources, covering not only the needs of irrigation but also all kinds of needs (eg water a from the groundwater body. adequacy of ecological flow etc.). Building a reservoir in the river Almopaios to help meet these needs and to meet the required quantities of water in the downstream areas of the valley but also for the creation of acceptable environmental conditions eg diversion ditch in Thessaloniki and the underground aquifer. The operation of the reservoir will significantly reduce the abstractions of groundwater currently made for water supply and / or irrigation needs downstream in the wider area so that the project contributes to the achievement of good quantitative status.
SM11-040	Construction of Nestorio Dam and operation of the irrigation network	This measure relates to the completion of the construction of the dam Nestorio in the Regional Unit of Kastoria, with a foundation height 72m, with a crest length 270m, crest elevation +868 m and volume of the dam 2.060.000m ³ . The maximum operating level of the reservoir is +862 m, the minimum operating level is +833 m the surface at the maximum operating level is 823 acres, the total reservoir volume is 19.42 million m ³ , usable storage volume is 15.35 million m ³ and the average annual runoff is 144.4 millionm ³ . The use of water that will be stored to meet irrigation needs of downstream areas, will contribute positively to achieving the environmental objective for the downstream sedimentary aquifer (GR0900021), which is currently under strong pressure due to abstractions. It is important to move forward and complete the construction of the project to accelerate the launch its operation in order to reap the benefits for the environment and human activities that the project's operation would serve.
Educational Measures		
SM15-010	Consulting services for farmers to improve implementation of practices and supplies related to the protection of the environment.	This measure includes actions and activities designed to educate the rural community concerning the irrigation water management and the application of fertilizers and pesticides. The main objectives of the educational informative action are the conservation and improvement of the production in relation to the sustainable water use, fertilizers and pesticides aiming at the maximum protection of water systems especially those under protection. The recommended actions include designing ways of communication between the relevant management

Code	Measure name	Brief Description of the measure
		bodies, experts on irrigation methods, fertilization and plant protection, by organizing educational workshops and seminars with an emphasis on environmental protection and agricultural soil. The legislation texts and circulars are often difficult to comprehend because of their volume and special conditions listed, so there is no success in their implementation. The direct contact between specialist and producer specifies the achievement of the goal which is the harmonious correlation of water systems production and protection.
SM15-020	Enhancement of the Environmental Education Centre of the Regional Sections	The continuation of already existing educational programs, activities and networks for environmental education, and the organization and implementation of the new Environmental Education Centers Regional units is recommended. These educational programs contribute to Inform, educate and raise awareness among students of different levels of education in relation to water management and water systems, through activities and personal experiences.
SM15-030	Educational Measures to promote the rational management of water bodies.	<p>A constant public information campaign related to the sustainable water management and the protection of the water systems is recommended. Actions that indicatively can be implemented in some cases during this campaign are:</p> <ul style="list-style-type: none"> • implementation of Information Days and training Seminars for public awareness concerning the efficient water use, the prevention of pollution caused from various activities and to promote the use of recycled water. • Strengthening educational programs in primary, secondary and higher education to develop a way of thinking and participatory behaviors that will contribute to the protection of water resources, ecological balance and the quality of life and ensure sustainable development. • Creation of a website including interactive applications concerning the sustainable water supply use in order to inform and sensitize the general public. The online platform is user friendly and allows calculation of the water use in each residence based on consumer habits and household devices. • Promote research in the field of Environmental Education, Biodiversity Protection and Conservation of Water Quality as well as the connection with scientific institutions.
Research, development and demonstration Projects (best practices)		
SM16-010	Preparation of research studies for the artificial recharge of groundwater bodies with water originated from Wastewater Treatment Plants and Industrial Water Treatment Plants	Research surveys are recommended for the enrichment of groundwater systems with processed water mainly from the biggest Wastewater Treatment Plants and Cleansing Units of Industrial Waste in the Water District. In the context of the conducted surveys the effectiveness of various enrichment methods is to be studied, such as boreholes, basin infiltrations, grooves, ditches, and enrichment shafts, combinatorial methods based on geological and hydrogeological conditions of the regions, financial data and quality of treated water. Moreover the recovery capacity of water through boreholes to meet irrigation needs is to be explored.
SM16-020	Integrated Green Cities (INGREENCI)	The project aims to achieve integrated management of urban green areas through education, awareness and mobilization of manpower. For this purpose the creation of a model for the sustainable design and redesign of urban space focusing on the promotion of green areas is essential, along with an integrated model of irrigation water management with emphasizing on the use of rainwater.
SM16-030	Utilization Study of waste management for fertilization and irrigation of farms	<p>Purpose of the program is to investigate the amount of water that can be used to irrigate crops in the region. The possibility of mixing of treated wastewater from the wastewater treatment plants in Florina with clean water for the irrigation of crops based on the needs and characteristics of the broader area will be investigated. Also, a collective irrigation network will be designed with innovative optimization methods and the type of network will be investigated based on the particularities of the implementation area. All the above will have the ultimate goal of optimal cost - benefit correlation by using innovative methods for the utilization of the available quantities of water in the area.</p> <p>The project, as follows:</p> <p>Phase A</p> <ol style="list-style-type: none"> 1. Investigate the amount of water that can be used by mixing the treated wastewater of sewage treatment plants in Florina with clean water for the irrigation of crops based on the needs and characteristics of the broader area 2. Delineation of the area that is to be irrigated. 3. Inventory of land use and distribution of crops in the survey area. <p>Phase B</p> <ol style="list-style-type: none"> 4. Calculation of the specific flow for the irrigation needs of the crops. 5. designing a collective irrigation network with innovative optimization methods and the type of network will be investigated based on the particularities of the

Code	Measure name	Brief Description of the measure
		implementation area 6. Optimal cost - benefit correlation by using innovative methods for the utilization of the available quantities of water in the area.
SM16-040	SSM Nature: Innovative space satellite monitoring of the environmental natural resources of cross-border area Greece-Albania (Region of Western Macedonia)	The project aims to establish an innovative and cost-effective method of simultaneously monitoring the natural resources at the borders between Greece and Albania through the study of environmental change and the relationship between human activities -wildlife-nature. It includes satellite monitoring of water resources to identify pollution - but is not limited only to this action. The area that will be monitored includes lakes Prespa and Kastoria. One of the objectives of the project is to evaluate the current situation in relation to water pollution.
SM16-050	Soil Survey	Preparation of soil surveys for all the area under cultivation of the water basin along with those that were developed during the construction of land reclamation projects and the creation an easily accessible database of geotechnical personnel of public or private sector and any responsible government body that has the responsibility to provide data to third parties are the main objectives of the project. Benefits of implementation will be the rational use of fertilizers and irrigation water.
Other measures		
SM17-010	Further investigation regarding measurements and causes of exceedances in chemicals substances recorded in lakes Mikri and Megali Prespa	The measure refers to further investigation regarding measurements and causes of exceedances in chemicals substances (in particular phosphorus, molybdenum, selenium, copper, nickel, organophosphates and organochlorine insecticides and triazines) that are recorded in the water system to provide a clear link between state-pressure - measure. Indicatively the following are to be investigated : 1) Any physical production processes of each pollutant from geological formations of this region will be investigated with further measurements and also the preparation of special geochemical - hydrogeological study. 2) The contribution of pollutants in lake sediments with 3 rows of samples in a year, at of at least 3 positions and analysis for these pollutants.
SM17-020	Further investigation regarding measurements and causes of exceedances in chemicals substances that are recorded in lake Kastoria	The measure refers to further investigation regarding measurements and causes of exceedances in chemicals substances that are recorded in lake Kastoria in order to provide a clear link between the state-pressure - measure. The systematic recording and monitoring of point discharges along with systematic sampling and analysis of specimens from the bottom sediment in areas that were or are affected from anthropogenic activities like the operation of major industries or infrastructures such as wastewater treatment is essential. The frequency of sampling could be once every two years. The sediment sampling locations should be at least three. The substances which should be measured in the samples include: phosphorus, heavy metals, organophosphate and organochlorine pesticides and triazines.
SM17-050	Further investigation regarding measurements and causes of exceedances in chemicals substances that are recorded in lakes in the Prespa River Basin	The measure refers to further investigation regarding measurements and causes of exceedances in chemicals substances (especially for nickel) that are recorded in lakes in the Prespa basin in order to provide a clear link between the state-pressure - measure. Indicatively: 1) Any physical production processes of each pollutant from geological formations of this region will be investigated with further measurements and also the preparation of special geochemical - hydrogeological study. 2) There will be systematic recording and monitoring of point discharges and inflows into the lake.
SM17-060	Sounding of lake Mikri Prespa	The sounding of Lake Mikri Prespa is an additional management tool, which will facilitate decision making by the Wetland Management Committee of Prespes National Park Management Body. The Wetland Management Committee is an advisory committee of the Board of Prespes National Park Management Body and its purpose is counseling and providing scientific opinions on issues related to water management, wetland vegetation and birdlife and the implementation of conservation measures mentioned in the Guideline Document of the Restoration and Management of Wet Meadows in the Lake Mikri Prespa” (2007-2012) as incorporated to the Management Plan of the Prespa National Park (July 2011), promoting proposals for the protection of the environment, and issues related to cross-border cooperation the abovementioned fields. The sounding of Lake Mikri Prespa will become an indispensable tool initially for improving the calculation of the water balance of the lake and consequently contribute to better management of the water system. The sounding will also contribute to the better management of aquatic vegetation particularly reedbeds and wet meadows, that is the two extremely important habitats for nesting and feeding of endangered waterbirds eg Pelicans, pygmy cormorants, herons and endemic fish. Finally, the sounding of Mikri

Code	Measure name	Brief Description of the measure
		Prespa will take place additionally to the sounding of Megali Prespa which was carried out in the past years ((Institute of Geology and Mineral Exploration (International Atomic Energy Agency, 2000- 2002)).
SM17-070	Hydrogeological characteristics Study of Zone A1 of the Prespa National Park	The project refers to the preparation of a hydrogeological study for Zone A1 (Location a Complete Protection of Nature, Slatina Lemos – Opagias region) of the National Park of Prespes, which will contribute to the understanding of the natural flow of the water and to improve the management of Lake Mikri Prespa. The necessity of this project stems from the lack of integrated scientific knowledge on the hydrogeology of the area between the two lakes. According to the already existing study entitled "Study of hydrology, Study of modernization of the sluice Koula and Management Study for the Level of Lake Mikri Prespa, Phase A ". Karavokyris I. and Partners Consulting Engineers Jul. 2003, it is well known that apart from the overflow of Mikri Prespa to Megali, there are also underground leaks from the strip of land between the two lakes, because of the difference in altitude (and therefore hydro potential difference) while the soil consists of geological mounds. The proposed study is an additional management tool, for the Wetland Management Committee which has a consultative role for the Board of Prespes National Park Management Body on issues related to water management, wetland vegetation and birdlife according to the Guideline Document of the Restoration and Management of Wet Meadows in the Lake Mikri Prespa” (2007-2012). The understanding of interaction between groundwater and lakes will provide the data required for the calculation of the leakage losses and the minimum water level in order not to adversely affect the water level of Mikri Prespa, which is necessary in order to manage the level of the wetland area. It is carried out under the supervision of the Wetland Management of the Management Body through the sluice in Koula. To investigate the hydraulic conductivity of the soil between the two lakes research is required within the hydrogeological study that will focus on estimating the average annual balance, the seasonal variation of the water level and the level of interaction of the aquifer with the water level of Mikri and Megali Prespa. In this way the water balance of groundwater will be protected and the sustainable use in conjunction with the existing level management of Mikri Prespa which is applied since 2005 by the Prespes National Park Management Body will be ensured. The implementation of the study will be carried out on a program contract with the Region of Western Macedonia.
SM17-110	Evaluation of the Dual-Use of the united canal Aliakmonas - Axios concerning the construction of a separate pipeline for water supply in the regional area of Thessaloniki.	The measure aims to the improvement of Thessaloniki water supply transport infrastructures from the river Aliakmonas in order to reduce losses and thus reduce water abstraction (in accordance with Article 4 of the Directive), as well as the prevent deterioration of its quality, in order to reduce the treatment required for the production of drinking water (in accordance with Article 7 of the Directive). The united canal Aliakmonas - Axios transports water, throughout the entire the year (365 days), for the water supply of the broader agglomeration of Thessaloniki. Any disruption this operation will create insurmountable problems in the water supply of Thessaloniki, as the Aqueduct of Aliakmonas today supplies more than 50% of the total water supply for the city. In fact, with the implementation of the A2 stage of the refinery water aqueduct of Aliakmonas, which is in the process of auctioning, the water transferred for the water supply of the city is about to be doubled reaching approximately 3,5m3/sec. At the same time, during the irrigation season carries irrigation water (400-450 εκ. m3 per irrigation period) to supply the area of Thessaloniki. The channel presents growth sprouting phenomena in the bottom resulting in degradation of water quality. Moreover it presents slope fracture phenomena resulting in significant leakages estimated at 30%, which is actually a loss of a significant amount of water approximately 150.000m3/year. The above problems occur because of the technical impossibility of the general organization for land improvement of Thessaloniki to provide maintenance to the canal, also the continuous drainage of 2m3/sec cannot be interrupted for the water supply of Thessaloniki. As a result, since 2003, when it started serving the water supply of Thessaloniki, no large-scale maintenance or cleaning has taken place except for point intervention to restore local major fractures. At the same time, even under conditions of proper conservation and operation of the canal a slighter or greater degradation of the water quality is presented, taking into consideration the favorable growth conditions of algae (especially during the spring period, before the start of the irrigation season, when the sunshine and the air temperature are elevated and the amount of flowing water is still small), the exposure of the water in airborne pollutants derived from the strong rural and other activities on the plain of Thessaloniki and the lack of protection from accidental \ malicious actions, if

Code	Measure name	Brief Description of the measure
		transported through an open channel. In 2000 the relative preliminary study from the Ministry of Environment, Physical Planning and Public Works was completed titled "water supply in Thessaloniki by diversion dam from the river Aliakmonas to the river Axios with an independent channel", where after a techno-economic investigation an independent twin pipeline $\Phi 1.600\text{m}$ for the transfer of water intended for supply with a length of about 50km, parallel and adjacent to the united canal, was proposed. For the abovementioned reasons a cost benefit study is proposed, environmental impact assessment, final design and tender documents for updating the findings of the investigation of alternatives to improve infrastructure, which will address among other technical solutions for guaranteeing regular maintenance -cleaning interventions for the united canal and the construction of a closed pipeline for water supply, with single or partial implementation of this due to the large capital cost.

Additionally, in the Western Macedonia River Basin District Management Plan, **actions** related to the implementation of European Directives are also included. Moreover, **additional environmental activities** are mentioned, which will contribute to the achievement of the objectives of the Water Basin Management Plan without being a part of it.

The **implementation cost** of the proposed **basic measures** is estimated at **72 M€** and relates mainly to projects promoting the efficient and sustainable water use and especially restoration/ enhancement/ rehabilitation of existing water supply infrastructure, with a budget of 0.9 M€, already included in the NSRF 2007-2013. Additionally, the implementation cost of two (2) proposed basic measures is associated with private investments related to the measurement of water abstractions.

The **implementation cost** of the proposed **supplementary measures** is estimated at **67 M €**.

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

Based on the Directive, the CEA is used for assessing the cost-effectiveness of potential measures to be implemented in order to achieve the environmental objectives.

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, 8. Synergy with other measures, 9 Measure cost and 10 Contribution to the durability of the Program of Measures concerning water scarcity-drought.

Following calibration of these parameters the efficiency ratio of each measure is calculated and the measures are classified accordingly.

Moreover the Management Plan addressed two main issues (restrictions):

- the limited timeframe remaining until the year 2015,
- the limited financial capacity of the country at least until the year 2015.

Taking into account the above limitations, high efficiency was awarded to supplementary measures with low (or zero) cost and horizontal application.

For the current river basin management cycle (until 2015), it is estimated that 20 of 39 supplementary measures can be implemented, out of which eight (9) have zero implementation cost.

Regarding the remaining 19 supplementary measures, actions towards their implementation are expected to be initiated during the current management cycle but implementation is expected to be completed in the next river basin management cycle (2016-2021). These measures refer to projects that either require preparatory actions and/ or construction works and/ or measures of high cost, which exceed the management and financial capacity of the current river basin management cycle.

12. CROSS BORDER COOPERATION

12.1 The international river basin of Prespa Lakes

The international river basin of Prespa Lakes, with a total area of 2.500 km² approximately, is shared among three countries: Greece, Albania and FYROM. Only few areas in Europe have to show such wide range of biodiversity in such a limited space, as this small river basin, which, includes moreover, two of the most ancient Lakes of Europe, Micro Prespa and Macro Prespa, which are separated one from the other by a sandy isthmus. The Macro Prespa Lake and its watershed extend on three countries, the largest part laying within the FYROM (Lake surface distribution in neighbor countries: FYROM 69%, Albania 18% km², Greece , watershed distribution: FYROM 88% km², Albania 8% km², Greece ... km²)⁵. The Micro Prespa Lake and its watershed) extend mainly in Greece except for a small part which lays in Albania (8% of lake surface and 27% of the watershed).

The inadequately treated urban and industrial effluents, mainly in the part of the basin that belongs to FYROM, as well as the intensive agricultural activity are the most important human induced pressures on water resources in the international river basin of Prespa Lakes.

Several bilateral, trilateral and multilateral actions, programs and projects have been implemented by Greece, Albania and FYROM, related to water resources management, improvement of the ecological status of the Lakes, promotion and adoption of best management practices, efficient waste management, development of transboundary cooperation, raising awareness of the local people and technical infrastructure projects, in the international basin of Prespa Lakes.

The most recently planned infrastructure projects comprise six (6) Small Hydropower Plants (SHP) in three rivers (Golema Reka, Brajcinska Reka and Kranska Reka) in FYROM and the exploitation of abandoned fish-farming plants for the upgrading (nutrients removal) of the existing Waste Water Treatment Plant (WWTP) in Ezerani, in the framework of the program “Restoration of Prespa Lake Ecosystem” (2011-2018) (FYROM – UNDP).

12.2 Transboundary River Basin of Axios – Florina section

The Western Macedonia River Basin District also comprises an upstream part of the international River Basin of Axios. The river basin of Lygkos/Sakoulevas is one of the three sub-basins of River Axios in Greek but the only one located upstream in relation to FYROM.

⁵ <http://prespa.iwlearn.org/resources/brochures/brochure-on-water>

12.3 Cooperation in Transboundary River Basins

The major inhibiting factor for the development of a joint water management plan for Axios and Prespa Lakes river basins, during the present management period is the different status of the three states relative to EU and the deriving difference in the obligations of the WFD application among Greece, Albania and FYROM. Greece, being a member state, is bound to comply with the WFD and to prepare a River Basin Management Plan at least for the part of the international river basin within its territory, as well as to comply with all other relevant directives and regulations which promote the sustainable development and protection of the environment. On the other hand, FYROM as candidate country, and Albania, as a potential candidate country, have no obligation to comply with the WFD or, to that respect, to coordinate with the aim of producing a single international river basin management plan for Axios and Prespa Lakes river basin. FYROM, in the framework of the Program of UNDP, entitled “Integrated Ecosystem Management in the Prespa Basin in Albania, FYROM and Greece - GEF Project (2006-2011)” had already prepared the “Prespa River Basin Management Plan”(PLWMP-2012), for the part of the river basin within its territory. Albania on the other hand, has not carried out a similar study yet.

During the current, first river basin management cycle, two meetings with representatives of FYROM have taken place aiming to strengthen the cooperation between Greece and FYROM in environmental policy issues. These meetings, ended up in exchange of verbal notes. The first meeting, took place in Athens, in June 2012 (07/06/2012), where issues such as sectoral cooperation in environmental management were discussed between representatives of the Ministries of the two countries. Moreover, the Special Secretariat for Water of the Ministry of Environment, Energy and Climate Change of Greece composed a note addressed to FYROM towards coordination in specific issues (EU WFD and biodiversity protection). The Greek part placed an invitation for a Bilateral Experts meeting to be held in May 2013. The first Bilateral Expert Consultation on Environmental Affairs, with emphasis on management of transboundary waters, was held in Thessaloniki, on 13 May 2013. The meeting, which was conducted in a spirit of cooperation, allowed exchange of information on Axios river and Prespa Lakes, presentation of actions. The parties agreed to establish a regular cooperation and exchange of data on transboundary waters. Next meeting is expected to be hosted by FYROM.

Requests for data provision on Prespa Lakes river basin have also been addressed to the competent authorities of Albania, via the Ministry of foreign affairs.

Appendix – Maps



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